

BOOK NO. _____

CONTRACT NO. _____

CITY OF CUYAHOGA FALLS
2310 SECOND STREET
CUYAHOGA FALLS, OH 44221
Phone (330) 971-8000
Fax (330) 971-8168



TO BE COMPLETED BY THE CITY OF CUYAHOGA FALLS

DATE OF BIDDING _____, 2023 CONTRACT PRICE \$ _____

DATE AWARDED BOARD OF CONTROL _____, 2023 DATE EXECUTED _____, 2023

DEPARTMENT: Parks & Recreation

ORDINANCE To Award -2023

**Brookledge Clubhouse
Interior Renovation**

THE FOLLOWING INFORMATION MUST BE COMPLETED FOR BID CONSIDERATION

COMPANY NAME _____

CONTACT PERSON _____ PHONE NO. (____) _____ FAX: _____

Email Address: _____ Alternate Phone No. _____

ADDRESS _____
STREET CITY STATE ZIP

Attach Bid Bond Here

2023 BROOKLEDGE CLUBHOUSE INTERIOR RENOVATION

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* *These pages to be completely filled in, signed, notarized where required, and returned in the Proposal Book in its entirety at time of bid opening.*

τ *These pages to be inserted **after** bid awarded.*

INFORMATION AND INSTRUCTIONS

Section 1

**CITY OF
CUYAHOGA FALLS, OHIO**

**PRE-BID
CONSTRUCTION MEETING**

Brookledge Clubhouse Interior Renovation

A Pre-Bid Construction Meeting will be held to review bid documents and answer questions relative to the proposed project.

This meeting will be held **in person on Tuesday, December 5, 2023, at 2:00 p.m. at the Brookledge Golf Club Clubhouse located at 1621 Bailey Road, Cuyahoga Falls, Ohio 44221.**

Anyone interested in submitting a proposal for this project is strongly encouraged to attend.

Contact person for this project is:

Lori Visner, or Scott Nickol
Cuyahoga Falls Parks and
Recreation Office
330-971-8225
parks@cityofcf.com

SARA KLINE
SUPERINTENDENT

INFORMATION AND INSTRUCTIONS TO BIDDERS

1. In accordance with the advertised legal notice, sealed bids will be received by the City of Cuyahoga Falls, Ohio at the office of the Director of Public Service in the Municipal Building for certain material, equipment and/or labor services. The bids will be opened and read aloud at the time and place specified in the legal notice.
2. Bidders are advised to thoroughly examine the contract documents before submitting their bids. There may be changes in the specifications from those heretofore used. It is hereby understood that the bidder has read and fully understands each and every clause embodied therein.
3. All material, equipment and/or labor services proposed shall be in accordance with the attached specifications. Any exceptions are to be specifically noted herein.
4. Each proposal must contain the full name of the party or parties making the same and all persons interested therein.
5. All proposals or bids shall be signed and submitted on the printed blanks provided for that purpose and bound herewith. Except during the filling in of the proposal forms, no pages are to be removed from this binding. The complete set of contract documents must be submitted with the proposals. For clarity, uniformity and ease of tabulating bids all bidders are requested to TYPE their bids on the proposal forms.
6. The price bid for each unit of material equipment and/or service must be stated separately in figures in the proper column.
7. Each bidder shall submit on the proposal form the name of the manufacturer, type and catalog number of the equipment or material he proposed to furnish. He shall also submit all other data, statements and samples called for by the specifications and the data sheet forming a part of the proposal form.
8. Manufacturers or distributors failing to provide MSDS's will be considered as failing to meet contractual requirement. This statement shall appear on purchase orders or offers to bid.
9. Each bid shall be accompanied by a bond executed by the bidder and a surety company, per Ohio Revised Code, which the surety company shall be licensed to do business in the State of Ohio, in an amount not less than five (5) percent of the aggregate amount of the bid or proposal; or the bidder may submit with the bid, in lieu of such bond, a certified check on a solvent bank, payable to the order of the Director of Public Service, City of Cuyahoga Falls, Ohio, in an amount equal to the amount required in such bond. Said bond or certified check is required as a guarantee that should the said bid or proposal be accepted by the Director of Public Service, the bidder will, within ten (10) days from the time he shall have been notified of the acceptance of the same, enter into contract with the City of Cuyahoga Falls for the material, equipment and/or service bid upon.

10. Should any proposal be rejected, such check or bond will be returned to the bidder and should any proposal be accepted, such check or bond will be returned after proper execution of the contract documents. If the bidder, to whom the contract shall have been awarded shall refuse or neglect, within ten (10) days after due notice that the contract has been awarded to him, to execute the same, then the deposits shall be forfeited to the City as liquidate damages for such neglect or refusal.
11. Each proposal shall be accompanied by a non-conclusion affidavit executed on the form provided thereof.
12. When requested by the City of use in evaluation the bids submitted, the bidder must furnish satisfactory evidence of its ability, competency, facility and financial resource to furnish the material, equipment and/or labor services so bid. If the bidder represents a manufacturer, then he must submit similar data relating to the manufacturer.
13. Each bid on equipment, material and/or labor services shall contain a statement of the time, after the award of the contract, required by the bidder to deliver the equipment, material and/or labor services included in the bid.
14. Each bid shall be sealed and addressed to the Director of Public Service, City of Cuyahoga Falls, Ohio, and shall bear on its face, the name of the bidder, a statement that it is a sealed bid to be opened on the day and hour above mentioned, and statement of the item numbers on which the bid is made.
15. All bids shall be filed with the Director of Public Service, in that office in the Municipal Building, in the City of Cuyahoga Falls, Ohio, on or before the day and hour mentioned above and stated in the legal notice of advertisement. No proposal presented after that time will be accepted.
16. Permission will not be given for the modification of any proposal after the same has been filed. No bidder may withdraw his bid, for a period of thirty (30) days after the date of opening of same.
17. If any person contemplating submitting a bid for the proposed material, equipment and/or labor services is in doubt as to the true meaning of any part of the specifications or other proposed contract documents, he may submit to the Director of Public Service, a written request for an interpretation thereof. The person submitting the request will be responsible for its prompt delivery. Any interpretation of the proposed documents or changes therein will be made only by addendum duly issued and a copy of such addendum will be mailed or delivered to each person receiving a set of such documents. The Director of Public Service will not be responsible for any other explanation or interpretations of the proposed documents.
18. No bid will be accepted from, or contract awarded to, any person, firm or corporation that is in arrears to the City of Cuyahoga Falls, upon any debt or contract, or who has failed to execute, in whole or in part, in a satisfactory manner, any contract with the City; or who if a defaulter as to surety or otherwise upon any obligation to the City of Cuyahoga Falls.

19. Attention of the bidder is called to the statutory requirements of the State of Ohio relative to licensing of corporations organized under the laws of any other state.
20. Instructions must be adhered to; failure to strictly observe them shall constitute a sufficient cause of rejection of a bid.
21. the City shall not be liable for the payment of any material furnished under the contract except upon written order from the Director of Public Service supplementing this agreement, and no shipment of same shall be made under the contract except after receipt of such written order.
22. The Director of Public Service may consider bid specification items as distinct bids for each of the items such as material, equipment and/or labor services. However, all parts of any bid specification item must be bid to qualify that item for consideration.
23. After the public reading, all bids will be tabulated and upon completion of a report by the appropriate purchasing department on the bids received, the Director of Public Service will proceed, without unnecessary delay, to award contracts for the various times to the lowest and best bidders on materials, equipment and/or labor services, conforming to the specifications.
24. The Director of Public Service expressly reserves the right to reject any or all bids and to waive informalities and to judge the character and sufficiencies of equipment, apparatus, materials, and/or labor services bid upon. Bidders who are in sympathy with the purpose outlined above and prepared to act in accordance therewith, are invited to submit bids in accordance with these specifications.
25. A Performance Bond will be required (if indicated by the legal notice) of each successful bidder to assure the faithful completion of the contract that has been awarded.
26. The Performance Bond form and/or the Contract form are not to be executed by the bidder until a contract has been awarded.
27. The City expressly reserves the right to award more than one contract on any particular supply item to more than one bidder, if it is considered to be in the best interest of the City. Multiple contracts will not be considered on items obviously not suitable to such means of contracting.

End of Instructions

INSURANCE REQUIREMENTS - Amended 2/18/82

103.08 INSURANCE:

The Contractor shall not commence work under this contract until he has obtained all the insurance required under this paragraph and such insurance has been approved by the City nor shall the Contractor or any subcontractor to commence work on his subcontract until the insurance required of the subcontractor has been so obtained and approved.

1. COMPENSATION INSURANCE:

The Contractor shall procure, and shall maintain during the life of this contract, Workmen's Compensation Insurance as required by the State of Ohio for all of his employees to be engaged in work at the site of the project under this contract and, in case of any such work sublet, the Contractor shall require the subcontractor similarly to provide Workmen's Compensation Insurance for all of the latter's employees to be engaged in such work unless such employees are covered by the protection afforded by the Contractor's Workmen's Compensation Insurance. If any class of employees engaged in hazardous work on the project under this contract is not protected under the Workmen's Compensation Statute, the Contractor shall provide and shall cause each subcontractor to provide adequate employer's liability insurance for the protection of such of his employees as are not otherwise protected.

2. CONTRACTOR'S COMPREHENSIVE GENERAL LIABILITY INSURANCE AND AUTOMOBILE LIABILITY INSURANCE:

The Contractor shall procure and shall maintain, during the life of this contract, (1) Comprehensive General Liability Insurance including all Premises/Operations; Products/Completed Operations; and Broad Form Property Damage, and (2) Automobile Liability Insurance for all vehicles and equipment in the amount specified in subparagraph 2.

3. SUBCONTRACTOR'S COMPREHENSIVE GENERAL LIABILITY INSURANCE AND AUTOMOBILE LIABILITY INSURANCE:

The Contractor shall either (1) require of his subcontractors to procure and to maintain during the life OF HIS SUBCONTRACT, comprehensive, General Liability Insurance and Automobile Liability Insurance of the type and in the amount specified in Subparagraph 2 and 6 hereof or, (2) insure the activities of his policy, specified in Subparagraph 2 hereof.

4. SCOPE OF INSURANCE AND SPECIAL HAZARDS:

The insurance required under subparagraphs 2 and 3 hereof shall provide adequate protection for the Contractor and his Subcontractors, respectively, against claims which may arise from operations under this contract, whether such operations be by the insured or by anyone directly or indirectly employed by him and, also against any of the special hazards which may be encountered in the performance of this contract as enumerated in the SPECIAL PROVISIONS.

INCOME TAX REQUIREMENTS

Employers doing business within Cuyahoga Falls are required to deduct at the time of payment of salaries, wages, commissions or other compensation the tax of two (2) percent of the gross amount earned in Cuyahoga Falls.

Every employer who is required to deduct the tax at the source is liable directly to the City of Cuyahoga Falls for payment of such tax whether actually collected from their employees or not.

Also, the net profit from income earned within Cuyahoga Falls is subject to the tax. Both withholding and tax on profits are due quarterly.

CONTACT THE INCOME TAX DIVISION FOR THE NECESSARY FORMS AND ANY ADDITIONAL INFORMATION.

City of Cuyahoga Falls
Office of the Mayor

Mayor Don Walters
2310 Second Street
Cuyahoga Falls OH 44221



Phone: 330-971-8200
Fax: 330-971-5696
mayor@cityofcf.com

Dear Employer:

In today's society, we all seem to face the dangers and consequences of alcohol and drug abuse. Studies have found the workplace is not exempt from this scourge that is threatening our nation. It is found that two-thirds of those entering the workplace for the first time have used illegal drugs. Up to twenty-three percent of employees abuse alcohol/drugs on the job. The figures are staggering. Up to 100 billion dollars a year are lost in productivity.

The City of Cuyahoga Falls has passed Ordinance 12-1990, which requires employers who are awarded competitively-bid City contracts to maintain a drug-free workplace.

I have enclosed an outline of the requirements that need to be met. You will also find a sample policy statement, a certification to be completed and returned in your bid packet. It is our hope that through education and awareness, we can be an effective part of the solution.

Please know this office and I are available to assist in any way we can.

Sincerely,

A handwritten signature in black ink, appearing to read "D. Walters", written in a cursive style.

Don Walters
Mayor

Encl.

181.07 EMPLOYERS AWARDED CITY CONTRACTS TO MAINTAIN DRUG FREE WORKPLACE.

1. No contract awarded through the process of competitive bidding, other than contracts pursuant to Ohio R.C. 125.04, shall be awarded to any bidder who does not certify that the following requirements have been met:
 - a. A statement has been published and provided to employees notifying them that the manufacture, use, possession, or distribution of drugs in the work place is prohibited, as well as a specification of the disciplinary action that may be taken against employees who violate that prohibition.
 - b. Any employee convicted of violating a criminal drug statute occurring in the work place is required to notify the employer of said conviction within five days after such conviction.
 - c. Notice has been published specifying the sanctions for or requiring satisfactory participation in a drug abuse assistance or rehabilitation program by an employee convicted of violating a criminal drug statute occurring in the work place.
 - d. A program has been implemented for the distribution of information on drug abuse awareness and the availability of counseling and referral services.
2. The Board of Control may, for good cause shown, grant an extension of time for compliance of the above requirements.
3. The Drug control Coordinator be and hereby is directed to provide information and assistance necessary to facilitate compliance with the provisions of this section.

(Ord. 12-1990. Passed 1-22-90)

SEXUAL HARASSMENT POLICY

Employees of the City of Cuyahoga Falls have a right to work in an environment free of sexual harassment. The City will not tolerate any form of sexual harassment or any offensive conduct that has the effect of severely interfering with an employee's work performance or creating a pervasive intimidating, hostile, offensive work environment. Examples of sexual harassment include, but are not limited to, unwanted sexual advances; implicit or explicit demands for sexual favors in exchange for favorable treatment or continued employment; repeated sexual jokes, flirtations, advances or propositions; verbal abuse of a sexual nature; graphic, verbal commentary about an individual's body, sexual prowess or sexual deficiencies; leering; whistling; touching; pinching; assault; coerced sexual acts; suggestive insulting, obscene comments or gestures; and display in the work place of sexually suggestive objects or pictures.

It is the policy of the City of Cuyahoga Falls that any form of sexual harassment is unacceptable, either within the workplace or at City-sponsored events, whether on or off property owned by the City, and is subject to appropriate disciplinary action.

The City encourages individuals who believe they are being harassed to clearly and promptly notify the offender that his or her behavior is unwelcome. This procedure is not a required first step for reporting sexual harassment. If for any reason an individual does not wish to approach the offender directly or if such discussion does not successfully end the harassment, then the individual should notify their supervisor.

Additionally, any employee who observes harassment of any type is to report it to his or her supervisor.

All employees are expected to cooperate with an investigation of any type of harassment. Failure to do so may lead to discipline. False information provided in the course of any investigation may also lead to discipline.

The City will not retaliate against an individual who makes a report of sexual harassment, nor permit any employee to do so. Retaliation is a very serious violation of this policy and should be reported immediately. Any individual found to have retaliated against an individual for reporting sexual harassment, or against anyone participating in the investigation of a complaint, will be subject to appropriate disciplinary action.

FIREARMS POLICY

As a result of the General Assembly passing Am. Sub. House Bill 12 regarding “concealed carry” of firearms, the City of Cuyahoga Falls, Ohio, has adopted a policy. Each Bidder must review the policy and file the certification that is included in this bid packet. The policy can be accessed at the City’s website, www.cityofcf.com, or a copy can be obtained from the office of the Director of Public Service located on the 2nd floor of City Hall, 2310 Second Street, Cuyahoga Falls, Ohio. Upon request, the policy can be faxed or mailed.

A. PURPOSE

The purpose of this policy is to ensure a safe work environment, free of intimidation and threat of physical harm. This policy prohibits all employees, except law enforcement officers and security personnel, from carrying deadly weapons, including firearms, while acting in the course and scope of City employment.

No person shall knowingly possess, have under the person's control, convey or attempt to convey a deadly weapon onto City property except for those persons and circumstances specified in Section C., 2., below. This policy applies to employees, visitors, independent contractors, vendors and any other person on City property, including individuals with valid permits to carry deadly weapons and/or firearms.

B. DEFINITIONS

A "deadly weapon" is defined as any instrument, device or thing capable of inflicting death, and designed or specially adapted for use as a weapon. Examples of prohibited deadly weapons include, but are not limited to:

"Firearm" means any firearm capable of expelling or propelling one or more projectiles by the action of an explosive or combustible propellant. Firearm includes an unloaded firearm and a firearm that is inoperable but that can readily be rendered operable. Firearm includes, but is not limited to, handguns, pistols, rifles, shotguns, automatic and semi-automatic weapons and zip guns.

"Explosives" meaning any chemical compound, mixture, or device, the primary or common purpose of is to function by explosion. Explosive includes but is not limited to dynamite, black powder, pellet powders, blasting caps, fuse igniters and instantaneous fuses.

"Explosive devices" which are defined as any device designed or specially adapted to cause physical harm to persons or property by means of an explosion, and consisting of any explosive substance or agency and means to detonate it. Explosive devices include bombs, demolition devices, blasting caps or detonators containing an explosive charge and any pressurized vessel that has been knowingly tampered with or arranged so as to explode.

"Incendiary devices" which means any firebomb, and any device designed or specially adapted to cause physical harm to persons or property by means of fire and consisting of any incendiary substance or agency and means to ignite it.

Knives with a blade longer than 3.5".

"Ballistic knife" which means a knife with a detachable blade that is propelled by a spring-operated mechanism or other illegal knives.

“City property” means the vehicles, equipment, machinery, facilities and land owned, leased or under the primary control of the City of Cuyahoga Falls, including all Park and Recreation facilities and areas under construction.

“Visitor” means any person who is on City property, including independent contractors, vendors and visitors, and off-duty employees of the City of Cuyahoga Falls.

C. GENERAL PROVISIONS

No person is permitted to carry or possess a deadly weapon on City property except as provided in this policy.

1. Prohibition

Employees .Employees are prohibited from possessing or carrying a deadly weapon, including but not limited to a firearm, while acting in the course and scope of their employment, either on or off City property, regardless of whether the employee has a permit to carry a deadly weapon, except as otherwise provided in the policy.

Visitors .Visitors, vendors and independent contractors are prohibited from possessing or carrying a deadly weapon while on City property, or engaged in the course of City business or City activities, except as otherwise provided in this policy.

2. Exceptions

Law Enforcement .Law Enforcement officers, as defined in RC 2901 .01, acting within the scope of their duties, are exempt from this policy.

Security Officers .City of Cuyahoga Falls security officers and the head of security personnel, who are authorized to carry deadly weapons as a requirement of their duties, and who are acting within the scope of their duties at the time of that possession or control, are exempt from this policy.

Persons exempt pursuant to RC 2923.123

Parking Areas .This policy does not prohibit the lawful possession or carry of a concealed weapon in private vehicles in a City parking area or parking facility, provided the owner has obtained the appropriate permit(s) required under the law and stores the weapon in their own locked vehicle, either in a locked glove compartment (or other locked compartment), in the trunk, or locked inside a gun case.

Other Authorized Uses .Lawful possession or carry related to use at a City shooting range or other law-enforcement programs; Lawful discharge or possession of a deadly weapon for show or memorial purposes where no projectile is discharged; Lawful transport of an unloaded deadly weapon directly between a parking area or parking facility and the location authorized for its use, or transport of an unloaded deadly weapon directly between a parking area or parking facility and a storage facility provided by the City.

Other Authorized Persons . Individuals who have obtained written permission from the Mayor to carry or use deadly weapons or deadly weapons on City property to perform specific tasks for the City are exempt from this policy during the performance of those tasks.

D. DEADLY WEAPONS STORAGE

Deadly weapons are not permitted in any City vehicle. For purposes of this policy, City vehicles include any vehicle owned, leased or otherwise under the control of the City. City vehicles shall not be used to store or carry a deadly weapon, except as authorized for purposes under Section C. 2 above.

Nothing in this policy requires the City to provide storage facilities for employee's deadly weapon.

The City reserves the right to search all people and property in accordance with local, state and federal law.

E. VIOLATIONS BY EMPLOYEES

Violation of this policy by an employee while on duty or in the course of City business is grounds for immediate removal from City property and termination of employment. An employee who uses a deadly weapon while on duty or in the course of City business will not be defended or indemnified by the City of Cuyahoga Falls. Furthermore, the City may refer suspected violations to appropriate law enforcement authorities, as permitted by law.

Display of a deadly weapon while on or off duty on City property is considered a threat, and will subject the employee to disciplinary action up to and including termination of employment. An employee who displays an empty firearm holster while on duty, creates a physically intimidating and hostile work environment and will be subject to disciplinary action up to and including termination of employment.

F. REPORTING RESPONSIBILITY

If the employee believes that another person (visitor, independent contractor, vendor or another employee) is in possession of or carrying a deadly weapon in violation of this policy, the employee must report the suspected act immediately to the City Police Department and then his/her supervisor, unless reporting at that time would subject the employee or others to physical harm. The threat of physical harm may delay, but does not excuse this reporting requirement.

The City will not tolerate retaliation toward or harassment of any employee who, acting in good faith, reports violations of this policy.

Failure to Report . Failure to report knowledge the presence of any deadly weapon on City property in violation of this policy shall subject the employee to discipline up to and including termination of employment.

False Report .If an employee knowingly makes a false report of a suspected violation of this policy, the employee will be subject to disciplinary action, up to and including termination of employment.

G. SAFETY & ENFORCEMENT

Employees should be aware that the enforcement of this policy might deal with confronting individuals carrying potentially loaded deadly weapons. Under no circumstances should an employee take unnecessary risks or compromise his or her safety in order to enforce this policy. The Cuyahoga Falls Police Department should be contacted immediately if there is a possibility of imminent threat to the personal safety of an employee or others.

H. EMPLOYEE RESPONSIBILITY

Employees are responsible for making sure, in advance, that any potentially covered item in their possession is not prohibited by this policy. Questions regarding items covered in this policy should be directed to the City Police Department.

I. LIMITATIONS

In the event any other City policy or procedure is found to be in conflict with this policy, the terms of this policy shall govern. To the extent any federal, state or local law, rule or regulation limits or prohibits the application of any provision of this policy, then to the minimum extent necessary, this policy is deemed to be amended to be in compliance, pursuant to such law, rule or regulation.

CITY OF CUYAHOGA FALLS:

BIDS SUBJECT TO 60 DAY ACCEPTANCE

BECAUSE OF OUR DESIRE TO FAIRLY AND EQUABLY EVALUATE ALL COMPETITIVE BIDS, WE ARE SPECIFYING THAT ALL BIDS BE SUBJECT TO ACCEPTANCE BY THE CITY WITHIN 60 DAYS FROM THE DATE OF THE BID OPENING.

EXCEPTION BY THE BIDDER TO THIS REQUIREMENT MAY RESULT IN HAVING THE SUBJECT BID REJECTED BY THE CITY AS NOT HAVING MET THE CITY'S SPECIFICATIONS.

CONTRACTOR PERMIT/REGISTRATION REQUIREMENTS

The Contractor shall review and comply with the provisions of any and all permits issued for this work, including compliance with contractor registration, insurance and/or bonding provisions. Although City of Cuyahoga Falls permit fees for this work, if applicable, will be waived, costs for City of Cuyahoga Falls contractor registration, if applicable, will not.

INSURANCE

Section 2

CONTRACT FORMS

Section 3

(DIRECTOR OF PUBLIC SERVICE)

NOTE

The bidder hereby agrees that the Director of Public Service has the right to reject any or all bids and to waive informality in any bid and that the bidder shall not dispute the correctness of the quantities used in computing the lowest and best bid.

The bidder further agrees that the Director of Public Service may at his discretion award the contract on the basis of individual items taken separately in multiples or collectively for any or all items in this proposal and that he will not dispute the Director's judgment in his award upon this basis.

Signature of Officer, Partner or Owner

(Business address of bidder)

CERTIFIED CHECK OR BID BOND

Certified check or bid bond in the amount of:

_____ on
State Amount

Name of Bank or Bonding Company

_____ deposited herewith.

BIDDER

All bids not in conformity with these provisions will be rejected.

* *PLEASE PLACE BID BOND/CERTIFIED CHECK ON TOP OF THE BID PACKET WHEN SUBMITTING YOUR BID. ALSO, PLEASE HAVE NOTED THE ADDRESS OF WHERE THE BID BOND/CERTIFIED CHECK IS TO BE RETURNED. THANK YOU FOR YOUR COOPERATION.*

CERTIFICATION OF OSHA COMPLIANCE

I, _____, hereby certify that _____
Company Official) (Company)
will comply with all Federal, State and City of Cuyahoga Falls statutes, ordinances, rules and
regulations regarding job site safety, including but not limited to the Occupational Safety and
Health Act while engaged in this project. I understand that a failure of _____
(Company)
or its subcontractors to follow any safety regulation will result in the city, in its sole discretion
issuing a stop work order on the project until the violation is cured. Failure to stop work when
so ordered by the City may result in the immediate termination of the Agreement by the City.
The City may, in its sole discretion, notify OSHA of any violation of safety regulations by the
Company or its subcontractors. All fines and penalties that may result from any violation will be
borne by the Company or its subcontractor.

Signature

Title

State of Ohio)
)ss
County of _____)

Sworn to before me and subscribed in my presence this _____ of _____,
20_____.

Notary Public
My Commission Expires: _____

[seal]

CERTIFICATION

I, _____ certify that
(Company Official)

_____ has posted in the workplace and distributed
(Company)
to all employees our Drug-Free Workplace Policy Statement, a copy of which is attached hereto.

I further certify that _____ has made information on alcohol
(Employer)
and drug abuse awareness available to all employees and will provide information on the
availability of counseling and referral services to any employee requesting such information.

(Official Signature and Title)

State of Ohio)
County of Summit)ss
)

Sworn to before me and subscribed in my presence this ____ day of _____, 20____.

Notary Public

[Seal]

In accordance with City of Cuyahoga Falls Ordinance No. 12-1990, passed January 22, 1990:

DRUG FREE WORKPLACE POLICY STATEMENT

_____ hereby notifies all employees of our policy
(Employer)
regarding drugs in the workplace.

Without exception, the unlawful manufacture, distribution, dispensing, possession or use of a controlled substance while in the workplace is strictly prohibited.

_____ requires that as a condition of employment,
(Employer)
any employee convicted of a drug violation occurring in the workplace must notify his or her employer within five (5) days after conviction.

Any employee found in violation of this policy is subject to appropriate personnel action, up to and including termination of employment. Continued employment may be conditioned upon successful completion of an acceptable drug rehabilitation program.

Any employee seeking information on drug or alcohol abuse awareness and the availability of counseling and referral services should contact:

(Name)

(Phone)

CERTIFICATION

I, _____ hereby certify that
(Company Official)

_____ has received, reviewed, and distributed the
(Company)

City of Cuyahoga Falls' policy regarding Sexual Harassment to all employees who will be working or involved with this project. I further certify that _____
(Company)

will indemnify the City of Cuyahoga Falls in any action brought against it alleging that an employee of _____ engaged in any conduct prohibited by the
(Company)

City's Sexual Harassment Policy while working or otherwise involved with this particular Project.

Signature

Title

State of Ohio)
)ss
County of _____)

Sworn to before me and subscribed in my presence this _____ day of _____, 20__.

Notary Public

My Commission Expires: _____

[Seal}

EQUAL EMPLOYMENT OPPORTUNITY

During the performance of this contract, the CONTRACTOR agrees as follows:

- a. The CONTRACTOR will not discriminate against any employee or applicant for employment because of race, creed, color, sex, national origin or handicap status. The CONTRACTOR will take affirmative action to ensure that applicants are employed and that employees are treated during employment without regard to their race, creed, color, sex, national origin or handicap status. Such action shall include, but not be limited to the following: Employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship.

The CONTRACTOR agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provision of this nondiscrimination clause.

- b. The CONTRACTOR will, in all applications or advertisements for employees placed by or on behalf of the CONTRACTOR, state that all qualified applicants will receive consideration for employment without regard to race, creed, color, sex, national origin or handicap status.
- c. The CONTRACTOR will cause the foregoing provisions to be inserted in all subcontractors for any work covered by this Contract so that such provisions will be binding upon each subcontractor, provided that foregoing provisions shall not apply to contractors or subcontracts for standard commercial supplies or raw materials.

PREVAILING WAGE CONTRACTOR RESPONSIBILITIES

This is a summary of prevailing wage contractors' responsibilities. For more detailed information, please refer to Chapter 4115 of the Ohio Revised Code.

General Information

Ohio's prevailing wage laws apply to all public improvements financed in whole or in part by public funds when the total overall project cost is fairly estimated to be more than the following:

"New" construction threshold for Building Construction:	\$250,000
"Reconstruction, enlargement, alteration, repair, remodeling, renovation or painting" threshold for Building Construction:	\$75,000

OR

As of January 1, 2022:

"New" construction that involves roads, streets, alleys, sewers, ditches and other works connected to road or bridge construction threshold level has been adjusted to:	\$96,091
"Reconstruction, enlargement, alteration, repair, remodeling, renovation or painting" that involves roads, streets, alleys, sewers, ditches and other works connected to road or bridge construction threshold has been adjusted to:	\$28,789

- a. Thresholds are to be adjusted biennially by the administrator of Ohio Bureau of Employment Services.
- b. Biennial adjustments to threshold levels are made according to the Building Cost for Skilled Labor Index published by McGraw-Hill's Engineering News-Record, but may not increase or decrease more than 3% for any year.

Penalties for Violation

If an intentional violation is determined to have occurred, the Contractor is prohibited from contracting directly or indirectly with any public authority for the construction of a public improvement. Intentional violation means “a willful, knowing, or deliberate disregard for any provision” of the prevailing wage law and includes but is not limited to the following actions:

- a. Intentional failure to submit payroll reports as required, or knowingly submitting false or erroneous reports.
- b. Intentional misclassification of employees for the purpose of reducing wages.
- c. Intentional misclassification of employees as independent contractors or as apprentices.
- d. Intentional failure to pay the prevailing wage.
- e. Intentional failure to comply with the allowable ratio of apprentices to skilled workers as required by the regulations established by Ohio Bureau of Employment Services Wage and Hour Division.
- f. Intentionally employing an officer of a contractor or subcontractor that is known to be prohibited from contracting, directly or indirectly, with a public authority.

Responsibilities

A. Pay the prevailing rate of wages as shown in the wage rate schedules issued by the Ohio Bureau of Employment Services, Wage and Hour Division, for the classification of work being performed.

1. Wage rate schedules include all modifications, corrections, escalations, or reductions to wage rates issued for the project.
2. Overtime must be paid at time and one-half the employee’s base hourly rate. Fringe benefits are paid at straight time rate for all hours including overtime.
3. Prevailing wages must be paid in full without any deduction for food, lodging, transportation, use of tools, etc.; unless, the employee has voluntarily consented to these deductions in writing. The public authority and the Director of OBES Wage and Hour Division must approve these deductions as fair and reasonable. Consent and approval must be obtained before starting the project.

B. Use of Apprentices and helpers cannot exceed the rations permitted in the wage rate schedules.

1. Apprentices must be registered with the U.S. Department of Labor Bureau of Apprenticeship and Training.
2. Contractors must provide the Prevailing Wage coordinator a copy of the Apprenticeship Agreement for each apprentice on the project.

- C. Keep full and accurate payroll records available for inspection by any authorized representative of the Ohio Bureau of Employment Services or the contracting public authority, including the Prevailing Wage Coordinator. Records should include but are not limited to:
 - 1. Time cards, time sheets, daily work records, etc.
 - 2. Payroll ledger/journals and cancelled checks/check register.
 - 3. Fringe benefit records must include program name, address, account number, and cancelled checks.
 - 4. Records made in connection with the public improvement must not be removed from the State for one year following the completion of the project.
 - 5. Out-of-State Corporations must submit to the Ohio Secretary of State the full name and address of their Statutory Agent on Ohio.

- D. Prevailing Wage Rate Schedule must be posted on the job site where it is accessible to all employees.

- E. Prior to submitting the initial payroll report, supply the Prevailing Wage Coordinator with your project dates to schedule reporting of your payrolls.

- F. Supply the Prevailing Wage Coordinator a list of all subcontractors including the name, address, and telephone number for each.
 - 1. Contractors are responsible for their subcontractors' compliance with requirements of Chapter 4115 of the Ohio Revised Code.

- G. Before employees start work on the project, supply them with written notification of their job classification, prevailing wage rate, fringe benefit amounts, and the name of the Prevailing Wage Coordinator for the project. Copy of the completed signed notification should be submitted to Prevailing Wage Coordinator.

- H. Supply all subcontractors with the Prevailing Wage Rates and changes.

- I. Submit certified payrolls within two (2) weeks after the initial pay period. Payrolls must include the following information:
 - 1. Employee's names, addresses, and social security numbers.
 - a. Corporate officers/owners/partners and any salaried personnel who do physical work on the project are considered employees. All rate and reporting requirements are applicable to these individuals.
 - 2. Employee's work classification.
 - a. Be specific about he laborers and/or operators.
 - b. For all apprentices, show level/year and percent of journeyman's rate
 - 3. Hours worked on the project for each employee.
 - a. The number of hours worked in each day and the total number of hours worked each week.
 - 4. Hourly rate for each employee.
 - a. The minimum rate paid must be the wage rate for the appropriate classification. The Department's Wage Rate Schedule sets this rate.

- b. When the amount contributed to the fringe benefit is documented but not the total hours worked, the hourly amount is calculated by dividing the total yearly contribution by 2080.
 - 5. Where fringes are paid into a bona fide plan instead of cash, list each benefit and amount per hour paid to program for each employee.
 - a. When the amount contributed to the fringe benefit plan and the total number of hours worked by the employee on all projects for the year are documented, the hourly amount is calculated by dividing the total contribution of the employer by the total number of hours worked by the employee.
 - b. When the amount contributed to the fringe benefit is documented but not the total hours worked, the hourly amount is calculated by dividing the total yearly contribution by 2080.
 - 6. Gross amount earned on all projects during the pay period.
 - 7. Total deductions from employee's wages.
 - 8. Net amount paid.
- J. The reports shall be certified by the contractor, subcontractor, or duly appointed agent stating that the payroll is correct and complete: and that the wage rates shown are not less than those required by the O.R.C. 4115.
- K. Send a Final Affidavit to the Prevailing Wage Coordinator upon the completion of the project.

COMPLETION TIME CERTIFICATION

The Contractor shall state the number of calendar days necessary for completion of this Contract after the date of Award of Contract.

Number of calendar days for _____ : _____ days.
(Name of Contract)

Signature of Bidder

Witness: By: _____

Address: _____

LOCAL BID PREFERENCE

The City of Cuyahoga Falls shall apply a Local Bid Preference to this invitation as outlined in Section 181.08 of the Codified Ordinances, including:

- a) In determining the low bid for supplies, commodities, materials, equipment, furnishings or general services, the Board of Control shall exercise a preference for local bidders as provided herein. The local preference shall also apply to contracts for the building, repair or renovation of public buildings or improvements.
- b) Bidders having established their principal place of business, defined as a business with a significant economic and physical presence in Cuyahoga Falls for two (2) successive calendar years prior to the bid opening date, shall be preferred as lowest if their bid does not exceed by more than three percent (3%), with an upper limit of ten thousand dollars (\$10,000.00), the apparent lowest bid.
- c) To qualify for local preference, bidders shall state on the bid documents their principal place of business, the business address where work will be administered (post office boxes will not be accepted in lieu of a street address) and the date of establishment. Each bidder shall have only one principal place of business.
- d) Local preferences shall not be applied as provided; herein for any bids where prohibited by federal or state laws or regulations.
- e) Local preferences shall only be applied in considering the lowest bid and shall not waive or nullify evaluation of which bidders are responsive and responsible. In no event shall any preference granted herein exceed a maximum of three percent (3%) or ten thousand dollars (\$10,000.00), whichever is less.
- f) The City shall indicate in all its invitations to bid and specifications for all public contracts for supplies, equipment and materials, excluding construction contracts and contracts financed in whole or in part by contributions or loans from any agency of the State of Ohio or United States Government, that it shall apply a local bid preference as outlined in this section in the evaluation and award of bids received.

Principal Place of Business:

Street Address City State Zip

Address where work will be administered:

Street Address City State Zip

Date Business Established (MM/DD/YYYY):

Findings of Recovery by Auditor of the State

Ohio law (ORC section 9.24) prohibits any state agency or political subdivision from awarding a contract for goods, services, or construction to any person against whom a finding for recovery has been issued by the Auditor of State, if that finding is unresolved. While there are additional criteria, the statute limits this prohibition to contracts which are paid in whole or in part with state funds and which exceed \$25,000.

The Auditor of State has established a database pursuant to ORC 9.24 in order to list all persons who have unresolved findings for recovery, dating back to January 1, 2001. Before entering into a public contract described above, a state agency or political subdivision is required to verify that the person does not appear in this database.

Each bidder shall log on to <http://www.auditor.state.oh.us/> and **provide a copy of a certified search of unresolved findings with your bid.** This requirement shall apply to all contracts awarded by the City of Cuyahoga Falls.

CERTIFICATION

I, _____ hereby certify that
(Company Official)

_____ does not have an unresolved finding of
(Company Official)

recovery issued by the Auditor of the State of Ohio as required by Ohio law (ORC section 9.24).

I further certify that _____ has provided a certified search of
(Company Official)

unresolved findings with this bid showing no unresolved findings in his/her name.

Signature

Title

State of Ohio)
)ss
County of _____)

Sworn to before me and subscribed in my presence this ____ day of _____, 20__.

Notary Public

My Commission Expires: _____

[Seal]

CERTIFICATION OF COMPLIANCE WITH O.R.C. 3517.13

The following certificates are required pursuant to Ohio's Campaign Finance Reform law.

One of the following two certificates shall be completed by any individual, partnership, unincorporated business, association, professional association, estate, trust, corporation, or business trust that has been awarded a contract by the City of Cuyahoga Falls.

It shall be the Contractor's responsibility to determine which of the two certificates applies and if compliance with R.C. 3517.13 has been achieved.

SPECIFICATIONS AND PROPOSALS

Section 4

**SECTION 00 4113
BID FORM**

Project: Brookledge Golf Course Club House
1621 Bailey Road
Cuyahoga Falls, Ohio 44221

Date Submitted: _____

Having read and examined the Bidding Documents, including without limitation the Bidding and Contracting Requirements, Drawings, and Specifications, prepared by the Architect for the above-referenced Project, and the following Addenda:

Addendum No.	Date of Receipt
_____	_____
_____	_____

The undersigned Bidder proposes to execute the Contract, in accordance with the Bidding Documents, as follows:

**PART 1. BASE BID
GENERAL CONTRACTOR** - Labor and materials for the Sum of

_____ Dollars
(Sum in Words)

\$ _____
(Sum in Numerals)

PART 2 – ALTERNATES

ALTERNATE 1: Provide pricing for the installation of wood planks at new wall in Vestibule in lieu of paint.

_____ Dollars
(Sum in Words)

\$ _____
(Sum in Numerals)

ALTERNATE 2: Provide pricing for the installation of wood planks on the wall behind the food prep area in lieu of paint.

_____ Dollars
(Sum in Words)

\$ _____
(Sum in Numerals)

ALTERNATE 3: Provide pricing for the removal of / and installation of new single storefront door 100/1 at main entry. Similar hardware to be provided. Frame to remain.

_____ Dollars
(Sum in Words)

\$ _____
(Sum in Numerals)

ALTERNATE 4: Provide pricing for the removal of / and installation of new double storefront door 109/1 at Lounge area. Similar hardware to be provided. Frame to remain.

_____ Dollars
(Sum in Words)
\$ _____
(Sum in Numerals)

ALTERNATE 5: Provide pricing for the removal of / and installation of new single 114/1 at Storage. Similar hardware to be provided. Frame to remain.

_____ Dollars
(Sum in Words)
\$ _____
(Sum in Numerals)

PART 3 – ALLOWANCE

None at this time.

PART 4 – UNIT PRICES

None at this time.

PART 5 – BIDDER’S CERTIFICATION

The Bidder hereby acknowledges the following:

1. Bidder has read and understands the Bidding Documents and agrees to comply with the requirements of the Bidding Documents.
2. Bidder is familiar with local conditions and has correlated first-hand observations with the requirements of the Project. The Bidder has no outstanding questions regarding the interpretation or clarification of the Bidding Documents.
3. The Bidder and each person signing on behalf of the Bidder certifies, and in the case of a joint or combined bid, each party thereto certifies as to such party's organization, under penalty of perjury, that to the best of the undersigned's knowledge and belief: (a) the Bid has been arrived at independently without collusion, consultation, communication or agreement, for the purpose of restricting competition as to any matter relating to such Base Bid with any other Bidder; (b) unless otherwise required by law, the Base Bid and any Alternates have not been knowingly disclosed by the Bidder and will not knowingly be disclosed by the Bidder prior to the bid opening, directly or indirectly, to any other Bidder who would have any interest in the Bid; (c) no attempt has been made or will be made by the Bidder to induce any other individual, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition.
4. Bidder certifies that the upon the award of a Contract, the Contractor will make a good faith effort to ensure that all of the Contractor's employees, while working, will not purchase, transfer, use or possess illegal drugs or alcohol or abuse prescription drugs in any way.
5. Bidder agrees to furnish any information requested by the Owner to evaluate the responsibility of the Bidder.

_____ Initial

PART 6 – TIME OF ACCEPTANCE

The Undersigned agrees not to withdraw or modify this Bid for a period of (90) Ninety Days following the Bid Due Date and Time stated above.

_____ Initial

PART 7 – CONTRACT COMPLETION

The Bidder, if awarded a Contract, will complete the Work described in the Contract Documents within _____ calendar days following a written authorization to proceed.

_____ Initial

PART 8 – SIGNATURES

Bidder's Name:

Authorized Signature:

Print Name:

Title:

Company Name:

Mailing Address:

Telephone Number:

E-Mail Address:

Where Incorporated:

Federal Identification Number:

Contact person for Contract processing:

(please print)

END OF BID FORM

**SECTION 00 4323
ALTERNATES FORM**

PART 1 - GENERAL

1.1 BID INFORMATION

- A. Bidder: _____.
- B. Prime Contract: _____.
- C. Project Name: Brookledge Golf Course Club House.
- D. Project Location: 1621 Bailey Road, Cuyahoga Falls, Ohio 44221.
- E. Owner: City of Cuyahoga Falls.
- F. Architect: TC Architects, Inc.
- G. Architect Project Number: 58A23.

1.2 BID FORM SUPPLEMENT

- A. This form is required to be attached to the Bid Form.

1.3 DESCRIPTION

- A. The undersigned Bidder proposes the amount below be added to or deducted from the Base Bid if particular alternates are accepted by Owner. Amounts listed for each alternate include costs of related coordination, modification, or adjustment.
 - 1. Cost-Plus-Fee Contract: Alternate price given below includes adjustment to Contractor's Fee.
- B. If the alternate does not affect the Contract Sum, the Bidder shall indicate "NO CHANGE."
- C. If the alternate does not affect the Work of this Contract, the Bidder shall indicate "NOT APPLICABLE."
- D. The Bidder shall be responsible for determining from the Contract Documents the affects of each alternate on the Contract Time and the Contract Sum.
- E. Owner reserves the right to accept or reject any alternate, in any order, and to award or amend the Contract accordingly within **[60]** days of the Notice of Award unless otherwise indicated in the Contract Documents.
- F. Acceptance or non-acceptance of any alternates by the Owner shall have no affect on the Contract Time unless the "Schedule of Alternates" Article below provides a formatted space for the adjustment of the Contract Time.

1.4 SCHEDULE OF ALTERNATES

- A. **Alternate No. 1:** Installation of wood planks at new wall in Vestibule in lieu of paint.
 - 1. ADD___ DEDUCT___ NO CHANGE___ NOT APPLICABLE___.
 - 2. _____ Dollars
(\$_____).
 - 3. ADD___ DEDUCT___ calendar days to adjust the Contract Time for this alternate.
- B. **Alternate No. 2:** Installation of wood planks on the wall behind the food prep area in lieu of paint.
 - 1. ADD___ DEDUCT___ NO CHANGE___ NOT APPLICABLE___.
 - 2. _____ Dollars
(\$_____).
 - 3. ADD___ DEDUCT___ calendar days to adjust the Contract Time for this alternate.
- C. **Alternate No. 3:** Removal of / and installation of new single storefront door 100/1 at main entry. Similar hardware to be provided. Frame to remain.
 - 1. ADD___ DEDUCT___ NO CHANGE___ NOT APPLICABLE___.
 - 2. _____ Dollars
(\$_____).
 - 3. ADD___ DEDUCT___ calendar days to adjust the Contract Time for this alternate.

D. **Alternate No. 4:** Removal of / and installation of new double storefront door 109/1 at Lounge area. Similar hardware to be provided. Frame to remain.

1. ADD ___ DEDUCT ___ NO CHANGE ___ NOT APPLICABLE ___.

2. _____ Dollars
(\$_____).

3. ADD ___ DEDUCT ___ calendar days to adjust the Contract Time for this alternate.

E. **Alternate No. 5:** Removal of / and installation of new single 114/1 at Storage. Similar hardware to be provided. Frame to remain.

1. ADD ___ DEDUCT ___ NO CHANGE ___ NOT APPLICABLE ___.

2. _____ Dollars
(\$_____).

3. ADD ___ DEDUCT ___ calendar days to adjust the Contract Time for this alternate.

1.5 SUBMISSION OF BID SUPPLEMENT

A. Respectfully submitted this ___ day of _____, 2023.

B. Submitted By: _____ (Name of bidding firm or corporation).

C. Authorized Signature: _____ (Handwritten signature).

D. Signed By: _____ (Type or print name).

E. Title: _____ (Owner/Partner/President/Vice President).

END OF DOCUMENT 00 4323

RESOURCES AND EXPERIENCE OF BIDDER

THE BIDDER, in order to secure consideration of this proposal, shall complete the following:

A. State below work performed similar to that to be done under this proposed contract:

B. State below the larger items of owned equipment proposed for use under this proposed contract:

C. Submit evidence of financial ability to handle the work under this proposed contract. A statement such as "Adequate" will not be accepted by the Board of Control.

NOTE: NO PROPOSAL WILL BE CONSIDERED UNLESS THE ABOVE IS COMPLETED.

QUALIFICATION INFORMATION

The information contained herein is for the guidance of the Board of Control in awarding the Contract and will be regarded as confidential.

The undersigned bidder proposes to use the following entirely owned equipment on this project:

The undersigned bidder proposes to use the following rented equipment on this project:

The undersigned bidder agrees to maintain all owned or rented equipment used on this project in a workable and safe condition and further agrees that the director of public service (or a designee) shall have the right to inspect said equipment at any reasonable time.

THE UNDERSIGNED BIDDER HAS CONTRACTED WITH THE FOLLOWING GOVERNMENTAL AGENCIES FOR WORK OF A SIMILAR NATURE:

	LOCATION & TYPE	AGENCY	DATE (S)	\$ VALUE
1				
2				
3				
4				
5				

COMPANY

SIGNATURE

PRINT NAME AND TITLE

NOTICE OF SUBCONTRACTORS

Name of Bidder: _____

If you intend to have any portion of this contract performed by a subcontractor, list the subcontractor(s) below:

If you are the successful bidder, you will be fully responsible to the City of Cuyahoga Falls for the acts and omissions of all subcontractors, supplies and other persons performing or furnishing any portion of this contract. In addition, you must ensure that any warranties provided by or through any subcontractor, supplier, or other person are to the benefit of and enforceable by the City of Cuyahoga Falls, Ohio.

Acknowledged by:

Authorized Agent of Bidder

ATTENTION ALL BIDDERS

ATTENTION OF THE BIDDER is directed to general information relating to the PROPOSAL contained herein, all of which work shall be performed in accordance with the **Current Specifications for the City of Cuyahoga Falls** and any **Special Specifications** contained herein applicable to these improvements.

CURRENT CONSTRUCTION SPECIFICATIONS: (1976 Edition)

Bidders who do not have a copy of these specifications may obtain same from the office of the City Engineer at a cost of twenty dollars (\$20.00) per copy.

SPECIAL PROVISIONS:

This section of the Proposal contains any Addenda's, Supplemental Specifications and Special Specifications applicable to these improvement and should be carefully reviewed by the Bidder. (This section follows the Proposal of bid items).

QUALIFICATION INFORMATION:

This page follows the Proposal of Items of Work and shall be filled in by the bidder to be used by the Board of Control as a guide in awarding this contract. This information will NOT be read at the bid opening.

AWARD OF CONTRACT BY THE BOARD OF CONTROL:

The BOARD OF CONTROL proposes to award the contract for this Proposal based upon the summation of the individual total bid prices, however, the BOARD OF CONTROL reserves the right to REJECT ANY AND ALL BIDS.

LOCAL BID PREFERENCE

The City of Cuyahoga Falls shall apply a Local Bid Preference to this invitation as outlined in Section 181.08 of the Codified Ordinances.

LAWN RESTORATION

- 1) Perform lawn restoration and seeding work only after other work affecting ground surfaces have been completed. All existing lawn areas disturbed by the installation of this project shall be re-seeded to establish new lawn in these areas.
- 2) The Contractor shall be responsible for removal of all site debris, fine grading of the disturbed areas with four-inches (4") of new, clean, screened topsoil, and seeding new lawn areas with Fairlawn Brand Seed (Oliger) or equal at a rate of 5 lbs. per 1000 square feet.
- 3) To insure quick establishment of lawn areas the Contractor will apply Mil-Chem organic fertilizer (12-16-10) or approved equal at a rate of 40 lbs. per 5000 square feet and then install shredded wheat straw held in place with tackifier or green netting.
- 4) Seed shall be Fairlawn Brand as distributed by Oliger Seed or approved equal. Seed shall be clean and fresh, packed in sealed bags showing net weight, composition of mix, date of germination tests and supplier's name. Germination test shall be done within a nine (9) month period prior to sale of the seed.
- 5) Fertilizer shall be a granular, non-burning product composed of not less than 50% organic, slow acting, guaranteed analysis professional fertilizer. Included shall be starter fertilizer containing 13% nitrogen, 25% phosphoric acid and 12% potash by weight or approved similar composition.
- 6) Clean topsoil shall not contain glass, rocks, twigs, leaves or other unsuitable material. All topsoil shall be screened.

ATTENTION

GENERAL CONTRACTORS

PUBLIC IMPROVEMENT CONTRACTS ARE AWARDED BY THE BOARD OF CONTROL TO A GENERAL CONTRACTOR WHO IS ENTIRELY RESPONSIBLE TO THE CITY OF CUYAHOGA FALLS FOR THE WORK UNDER THE TERMS OF THE PROPOSAL CONTAINED HEREIN.

SUB-CONTRACTORS WORK DIRECTLY FOR THE GENERAL CONTRACTOR, WITH WHOM ALL PROBLEMS SHALL BE DISCUSSED, AND NO CONTACT SHALL BE MADE WITH THE DIVISION OF ENGINEERING EXCEPT THROUGH OR IN THE PRESENCE OF THE GENERAL CONTRACTOR.

PAYMENTS FOR THE WORK ARE MADE DIRECTLY TO THE GENERAL CONTRACTOR.

SPECIFICATION ADDENDUM

SECTIONS 109.08 & 109.09

109.08 Final Estimate

Before the final estimate is allowed, the Owner shall require the Contractor to submit an affidavit from each and every subcontractor showing that all claims and obligations arising in connection with the performance of his portion of the contract have been satisfactorily settled. The improvement shall be inspected by the Engineer, and if he finds the Work is completed according to the contract, shall, within 60 days after the completion of this contract, prepare a statement of the total cost of the Work done hereunder, and the Owner shall pay the entire sum so found to be due hereunder after deduction therefrom all previous payments under the provisions of this contract and ALSO DEDUCTING THE GUARANTEE AND RETAINAGE CHARGE AS SET FORTH IN SECTION 109.09 following.

109.09 Guarantee and Retainage

The Contractor shall guarantee all Materials and Equipment furnished and work performed for a period of one (1) year from the date of completion. The Contractor warrants and guarantees that the completed system is free from all defects due to faulty materials or workmanship and the Contractor shall promptly make such corrections as may be necessary by reason of such defects including the repairs of any damage to other parts of the system resulting from such defects. The Owner will give notice of observed defects with reasonable promptness. In event that the Contractor should fail to make such repairs, adjustments, or other work that may be made necessary by such defects, the Owner may do so and charge the Contractor the cost thereby incurred. The Performance Bond shall remain in full force and effect through the guarantee period.

Further the City will retain three percent (3%) of the entire cost of the work done by the Contractor for the above guarantee period of one year beginning on the date of the Engineer's final estimate payment sheet.

If the Contractor shall have complied with all the requirements of the contract in keeping said improvement in good and proper repair, at the end of his guarantee period upon order of the director the Contractor shall receive this retainer; but, if the Contractor shall fail to make all necessary repairs as indicated by said Engineer at any time during the above period, then the Engineer shall have power to expend all or such part of the amounts so retained as the said Engineer may see fit, and apply the same to making the necessary repairs.

Should the amount retained not be sufficient to make the required repairs, the contractor shall at once make good the deficiency. At the expiration of the guarantee period as above specified, whatever remains to the credit of the Contractor, provided all repairs shall have been made satisfactory to the said Engineer, shall be paid to the Contractor as full settlement of any balance due on said contract as herein provided whereupon and not until then, shall the Contractor be released from the obligation assumed in this contract and his bond discharged. The final acceptance of the work shall be the date when the guarantee is released.

SPECIFICATION ADDENDUM

SECTION 109.06

109.06 Partial Payments

(a) At least ten (10) days before each progress payment falls due (but not more often than once a month), the Contractor will submit to the Engineer a partial payment estimate filled out and signed by the Contractor covering the Work performed during the period covered by the partial payment estimate and supported by such data as the Engineer may reasonably require. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the site, the partial payment estimate shall also be accompanied by supporting data, as follows: 1) waiver of lien, 2) proper invoice for material, 3) assurance of City's title to material, 4) proof of payment to vendor for material, 5) proof of applicable insurance on material is in effect. Payment for material stored on site shall be limited to major items of construction with a value exceeding one percent (1%) of contract value. The Engineer will, within ten (10) days after receipt of each partial payment estimate, either indicate in writing his approval of payment and present the partial payment estimate to the Owner, or return the partial payment estimate to the Contractor indicated in writing his reasons for refusing to approve payment. In the latter case, the Contractor may make the necessary corrections and resubmit the partial payment estimate. The Owner will, within thirty (30) days of presentation to him of an approved partial payment estimate, pay the Contractor a progress payment on the basis of the approved partial payment estimate. The Contractor will be paid the bid and stipulated unit and lump sum prices as set forth in his Proposal, for the amount of work approved for payment by the Engineer. The sum total for these items shall constitute full payment for the job complete, tested, and ready for use.

(b) The Owner shall retain ten percent (10%) of the amount of each partial payment until the work is complete. With the final payment the Owner shall pay the Contractor seventy percent (70%) of the retainage held.

Ord. 56-1990
4/9/90

GENERAL CONTRACTORS

IMPROVEMENT CONTRACTS FOR CURBING, PAVING, RESURFACING

THE CONTRACTOR TO WHOM THIS CONTRACT HAS BEEN AWARDED SHALL COMPLY WITH THE REQUIREMENTS OUTLINED HEREIN:

1. PLANS AND STANDARD DRAWINGS:
Prints shall be on the job and available at all times.

2. CONCRETE WORK INVOLVING FORM WORK:
No concrete work shall be placed until form work has been approved and accepted by the City Project Inspector.

Concrete work constructed in violation of this directive shall be subject to removal and replacement at the expense of the Contractor.

3. UNDERGROUND ELECTRIC AND COMMUNICATION WIRES, CONDUIT AND APPURTENANCES:
The Contractor shall be responsible for any damages.

4. LOCATION OF DOWN SPOUT DRAINS:
The Contractor shall be responsible for the location of all down spout drains. If a drain is inadvertently overlooked and it is necessary to drill a hole in the curb after it has been placed, the drilling shall be performed by the City's contractor at the expense of the Contractor.

5. LOCATING OF WATER SERVICE BOXES, WATER SHUT-OFF VALVE BOXES, AND SANITARY AND STORM SEWER MANHOLES:
The initial locating of these boxes and manholes will be performed by the City Water Utilities Department forces upon a one (1) week notice.

It will then be the responsibility of the Contractor to preserve the location stakes or log the points by another method. If it is necessary for the City Water Utilities Department forces to relocate these items, costs will be billed at the prevailing hourly rate at which the work is performed.

6. ADJUSTING WATER SERVICE BOXES TO GRADE:
The top of these curb boxes shall be either flush with or a maximum of 1/4" below the surface of the berm, drive approach, or sidewalk. These boxes will be replaced prior to adjusting as determined by the City Engineer. The Contractor will ensure that each box is in good condition and that the stem is operational.

All damaged or buried service boxes must be corrected within two (2) weeks following written notification by the City. All costs incurred by the City to correct damaged or buried service boxes will be billed at the prevailing hourly rate at which the work is performed.

7. ADJUSTING WATER SHUT-OFF BOXES TO GRADE:

The top of these water boxes shall be either flush with or a maximum of 1/4" below the final surface of pavement, berm, drive approach, or sidewalk. Measurement in excess of these limits shall be grounds for non-acceptance of this item.

The boxes shall be adjusted prior to addition of the final asphalt surface course. Riser rings are acceptable for water boxes, provided the top section is in good condition. The boxes will be replaced prior to adjusting as determined by the City Engineer.

All boxes found damaged, covered, or buried must be corrected within two (2) weeks following written notification by the City. All costs incurred by the City to expose or correct damaged boxes will be billed at the prevailing hourly rate at which the work is performed, minus the bid amount for items not performed.

8. ADJUSTING SANITARY AND STORM SEWER FRAMES AND LIDS TO GRADE:

The top of the sanitary and storm sewer frames and lids shall be either flush with or a maximum of 1/4" below the final surface of pavement, berm, drive approach, or sidewalk. Measurement in excess of these limits shall be grounds for non-acceptance of these items.

The frames and lids shall be adjusted prior to addition of the final asphalt surface course. The frames shall be replaced prior to adjusting as determined by the City Engineer. Riser rings are not acceptable for adjusting sanitary and storm sewer lids to grade.

Care must be exercised to prevent debris from falling into the base of the manhole during removal, loosening installation or adjusting of these frames and lids. All debris must be removed immediately to prevent restriction of flow. All damage or work incurred by the City or residents due to a plugged sewer caused by debris from this work will be at the expense of the Contractor.

The Water Utilities Department will provide all frames and lids needed to replace defective items. NOTE: All two-inch (2") frames and lids are to be replaced with Cuyahoga Falls Standard one-inch (1") frames and lids. All frames and lids needed will be picked up by the Contractor following coordination with the Water Utilities Superintendent. All items replaced are the property of the City and will be picked up by City forces.

All manhole frames and lids found damaged or buried must be corrected within two (2) weeks following written notification by the City. All costs incurred by the City to expose or adjust manhole frames and lids will be billed at the prevailing hourly rate at which the work is performed, minus the bid amount for items not performed.

SPECIAL PROVISIONS

ADDENDAS AND SUPPLEMENTAL SPECIFICATIONS
TO THE CURRENT CONSTRUCTION SPECIFICATIONS FOR
THE CITY OF CUYAHOGA FALLS.

THIS SECTION ALSO INCLUDES ANY SPECIAL
SPECIFICATIONS AND STANDARD CONSTRUCTION
DRAWINGS APPLICABLE TO THIS PROPOSAL.

SECTION 5

NOTICE TO CONTRACTOR:

“DOMESTIC STEEL USE REQUIREMENTS AS SPECIFIED IN SECTION 153.011 OF THE REVISED CODE APPLY TO THIS PROJECT. COPIES OF SECTION 153.011 OF THE REVISED CODE CAN BE OBTAINED FROM ANY OF THE OFFICES OF THE DEPARTMENT OF ADMINISTRATIVE SERVICES.”

PROJECT MANUAL FOR



Brookledge Golf Course Club House

TC PROJECT NO: 58A23
DATE: November 22, 2023

00 0109-1

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**DOCUMENT 00 3143
PERMIT APPLICATION**

PART 1 - GENERAL

1.1 PERMIT APPLICATION INFORMATION

- A. This Document with its referenced attachments is part of the Procurement and Contracting Requirements for Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of the Bidders' own investigations. This Document and its attachments are not part of the Contract Documents.
- B. Building Permit Application: Complete building permit application and file with authorities having jurisdiction within five (5) days of the Notice of Award.
- C. Building Permit Application: The building permit for Project has been applied for by the Architect. A copy of the Permit Application will be provided to you at your request.

END OF DOCUMENT 00 3143

**SECTION 01 1000
SUMMARY OF WORK**

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, apply to this Specification.

1.2 SUMMARY

- A. The Project is a partial renovation of the existing Brookledge Golf Course Club House. The scope includes the renovation of the existing golf check in desk and food service area as well as replacement of the vanity and lavatories in the men's toilet room.
- B. The work included but is not limited to the following: new finishes, new fixtures (plumbing and electrical) millwork and countertops.
- C. Contracting Method: General Contractor is responsible for all aspects of the Work described in the Contract Documents.

1.3 SPECIAL PROJECT PROCEDURES

- A. Minimal occupancy During Construction: The building is typically closed until mid-April. Contractor shall schedule and coordinate all work with the Owner's representative to assure construction does not inhibit the Owner's operations.
- B. Safety and Security:
 - 1. Submittal: The Contractor shall submit to the Owner its program of job safety procedures and shall comply with the Owner's related construction policies.
 - 2. Site Access: The Contractor shall comply with the Owner's requirements for entering and leaving the building and the registration of construction personnel.
- C. Site Management
 - 1. The Contractor shall locate equipment, dumpsters, and materials only in areas acceptable to the Owner.
 - 2. The Contractor, subcontractors, and suppliers shall park vehicles only in areas allowed by the Owner.
 - 3. Smoking is not permitted on the property.
- D. Existing Facilities and Services: The Contractor and subcontractors may use existing building electrical power and water for construction provided use does not hinder the building's ongoing use of the same. The General Contractor shall supplement existing services when necessary to prevent disruptions to the facility's operations with generators, pumps, and other equipment.

PART 2 - PRODUCTS

2.1 PRODUCTS, GENERAL

- A. Refer to Section 01 6000 – Product Requirements.

PART 3 – EXECUTION

3.1 EXECUTION, GENERAL

- A. Refer to Section 01 7000 – Execution Requirements.

END OF SECTION 01 1000

**SECTION 01 2300
ALTERNATES**

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for alternates.

1.2 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
 2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.3 PROCEDURES

- A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated revisions to alternates.
- C. Execute accepted alternates under the same conditions as other work of the Contract.
- D. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES (Refer to the Drawings for complete descriptions).

Provide Alternate pricing for the following:

- A. **ALTERNATE 1:** Provide pricing for the installation of wood planks at new wall in Vestibule in lieu of paint.
- B. **ALTERNATE 2:** Provide pricing for the installation of wood planks on the wall behind the food prep area in lieu of paint.
- C. **ALTERNATE 3:** Provide pricing for the removal of / and installation of new single storefront door 100/1 at main entry. Similar hardware to be provided. Frame to remain.
- D. **ALTERNATE 4:** Provide pricing for the removal of / and installation of new double storefront door 109/1 at Lounge area. Similar hardware to be provided. Frame to remain.
- E. **ALTERNATE 5:** Provide pricing for the removal of / and installation of new single 114/1 at Storage. Similar hardware to be provided. Frame to remain.

END OF SECTION 01 2300

**SECTION 01 2500
SUBSTITUTION PROCEDURES**

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Requirements:
 - 1. Section 01 6000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.2 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
 - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
 - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.3 ACTION SUBMITTALS

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.
 - b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Certificates and qualification data, where applicable or requested.
 - g. List of similar installations for completed projects, with project names and addresses as well as names and addresses of architects and owners.
 - h. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.
 - i. Research reports evidencing compliance with building code in effect for Project, from applicable code organization.
 - j. Detailed comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - k. Cost information, including a proposal of change, if any, in the Contract Sum.

- l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.
 - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven (7) days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within ten (10) days of receipt of request, or seven (7) days of receipt of additional information or documentation, whichever is later.
- a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
 - b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.4 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.5 PROCEDURES

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

1.6 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than fifteen (15) days prior to time required for preparation and review of related submittals.
 - 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - b. Substitution request is fully documented and properly submitted.
 - c. Requested substitution will not adversely affect Contractor's construction schedule.
 - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - e. Requested substitution is compatible with other portions of the Work.
 - f. Requested substitution has been coordinated with other portions of the Work.
 - g. Requested substitution provides specified warranty.
 - h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- B. Substitutions for Convenience: Architect will consider requests for substitution if received within thirty (30) days after the Notice of Award. Requests received after that time may be considered or rejected at discretion of Architect.
 - 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.

- b. Requested substitution does not require extensive revisions to the Contract Documents.
- c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
- d. Substitution request is fully documented and properly submitted.
- e. Requested substitution will not adversely affect Contractor's construction schedule.
- f. Requested substitution has received necessary approvals of authorities having jurisdiction.
- g. Requested substitution is compatible with other portions of the Work.
- h. Requested substitution has been coordinated with other portions of the Work.
- i. Requested substitution provides specified warranty.
- j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 2500

**SECTION 01 2600
CONTRACT MODIFICATION PROCEDURES**

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling and processing contract modifications. Contract modification procedures include the following:
 - 1. Requests for Interpretation.
 - 2. Owner's supplemental instructions.
 - 3. Proposal requests.
 - 4. Contractor-initiated requests for changes in the Contract.
 - 5. Construction change directives.
 - 6. Change Orders.
- B. Related Sections:
 - 1. Section 01 3000 - "Administrative Requirements"
 - 3. Section 01 6000 - "Product Requirements."

1.2 REQUESTS FOR INTERPRETATION

- A. Submit requests for interpretation of Contract Documents on a form as acceptable to the Owner.
- B. Submission of Requests for Interpretation do not relieve the Contractor of responsibility for examining the Contract Documents and executing the Work under the terms of the Agreement.
- C. Requests for Interpretation shall not alter the contractual rights and responsibilities of the parties to the Contract.
- D. A Request for Interpretation submitted by the Contractor does not alter the Contract Sum or Contract Time.

1.3 SUPPLEMENTAL INSTRUCTIONS

- A. The Architect will issue written authorization to execute minor changes in the Work not requiring adjustment to the Contract Sum or Contract Time. Respond within ten days of receipt of supplemental instructions if supplemental instructions will result in changes in Contract Sum or Time.
 - 1. Form: *AIA G710 Architect's Supplemental Instructions.*

1.4 PROPOSAL REQUESTS

- A. Proposal Requests: The Architect will solicit proposals from the Contractor for changes in the Work that will require adjustment to the Contract Sum or Contract Time.
 - 1. Form: *AIA G709 Proposal Request.*
 - 2. Proposal requests are issued for information only. Do not stop work in progress or execute the proposed change without a fully executed Change Order.
 - 3. Within the number of days designated on the Proposal Request, submit a detailed estimate of cost necessary to execute the change for the Owner's review.
 - a. List quantities of products required and unit costs, with the total amount of purchases to be made.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. State how the proposed change in the Work will affect the Contract Time.
 - d. State how the proposed change may affect the work of other Contracts or future work.

1.5 CONTRACTOR-INITIATED REQUESTS FOR CHANGE IN THE CONTRACT

- A. When concealed unforeseeable conditions require modifications to the Contract, the Contractor shall submit a request for a change in the Contract. Requests shall include the following:
1. Justification for the proposed change, including description of Project conditions.
 2. Description of the proposed change.
 3. Proposed change in the Contract Sum, including detailed cost analysis.
 4. Proposed change in the Contract Time.
 5. Comply with requirements in Section 01 6000 "Product Requirements" if the proposed change requires substitution of a specified product or system.

1.6 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: A Construction Change Directive instructs the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
1. Form: AIA Form G714 Construction Change Directive.
- B. Documentation: Maintain detailed records of time and material expended for work required. After completion of the change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

1.7 CHANGE ORDERS

- A. Following approval of a proposal issued by the Contractor, the Architect will issue a Change Order for signatures of the Owner and the Contractor.
1. Form: AIA Form G701 Change Order.

1.8 SUBSTITUTION REQUEST PROCEDURES (SEE SUBSTITUTION REQUEST FORM)

- A. Format: Submit substitution proposals on the form provided following this Section. The form shall be signed and dated by the Contractor.
- B. Proposal Time Requirements: Submit substitution proposals to the Architect not less than ten (10) business days prior to the date and time bids are due.
- C. Supporting Information: Provide the following items with the Substitution Proposal Form to demonstrate that the proposed product is equal or greater in quality to the specified products:
1. Representative samples (as applicable to the product proposed).
 2. Product data.
 3. Test reports certifying the compliance of the product with the
 4. Independent research evaluations.
 5. Details of fabrication and installation.
 6. Maintenance instructions, availability of maintenance parts, and current bid list for those parts.
 7. Name, address, and telephone number of the manufacturer's local representative.
 8. Warranty information
 9. Additional information the Architect deems necessary for a complete evaluation.
- D. The Architect will review substitution proposals properly submitted and respond to the proposer. If the substitution is accepted, the Documents will be amended by Addendum. The Architect is under no obligation to accept proposed substitutions.
- E. The Architect may reject incomplete proposals or those not complying with the time requirements specified above.

SUBSTITUTION REQUEST FORM

We hereby submit for your consideration the following product instead of the specified item for the following project:

PROJECT: _____ PROJECT NO. _____

DRAWING NO. _____ DRAWING NAME _____

SPEC. SECT.	SPEC. NAME	PARAGRAPH	SPECIFIED ITEM

Proposed Substitution: _____

Attach complete information on changes to Drawings and/or Specifications which proposed substitution will require for its proper installation.

Submit, with request, all necessary samples, and substantiating data to prove equal quality and performance to that which is specified. Clearly mark manufacturer's literature to indicate equality in performance.

Substitutions of the materials and equipment described in the Contract Documents will be considered during the bidding period upon receipt of a written request to the Design Professional for approval prior to the date set for receipt of bids as described in Section 01 2500, Substitution Procedures.

CERTIFICATION OF EQUAL PERFORMANCE AND ASSUMPTION OF LIABILITY FOR EQUAL PERFORMANCE

The undersigned states that the function, appearance, and quality are equivalent or superior to the specified item.

Submitted by:

Signature Title

Firm

Address

Telephone FAX Number Date

Signature shall be by person having authority to legally bind his firm to the above terms. Failure to provide legally binding signature will result in retraction of approval.

Fill in Blanks Below:

A. Does the substitution affect dimensions shown on Drawings? Yes _____ No _____
If yes, clearly indicate changes:

B. Will the undersigned pay for changes to the building design, including engineering and detailing costs caused by the requested substitution? Yes _____ No _____
If no, fully explain: _____

C. What effect does substitution have on other Contracts or other trades?

D. What effect does substitution have on construction schedule?

E. Manufacturer's warranties of the proposed and specified items are: _____ Same _____ Different
(Explain)

F. Reason for Request:

G. Itemized comparison of specified item(s) with the proposed Substitution. List significant variations:

H. Accurate cost data comparing proposed substitution with product specified:

I. Designation of maintenance services and sources:

(ATTACH ADDITIONAL SHEETS IF REQUIRED)

For Use by Design Professional:

_____ Recommended _____ Recommended as Noted
_____ Not Recommended _____ Received Too Late

Signed By _____

Date _____

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 2600

**SECTION 01 2900
PAYMENT PROCEDURES**

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.2 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
 - 1. Coordinate line items in the schedule of values with items required to be indicated as separate activities in Contractor's construction schedule.
 - 2. Submit the schedule of values to Architect at earliest possible date, but no later than seven (7) days before the date scheduled for submittal of initial Applications for Payment.
- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
 - 1. Arrange schedule of values consistent with format of AIA Document G703.
 - 2. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide multiple line items for principal subcontract amounts in excess of five (5) percent of the Contract Sum.
 - 3. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site.
 - 4. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
 - 5. Overhead Costs: Include total cost and proportionate share of general overhead and profit for each line item.
 - 6. Overhead Costs: Show cost of temporary facilities and other major cost items that are not direct cost of actual work-in-place as separate line items.
 - 7. Closeout Costs. Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling five (5) percent of the Contract Sum and subcontract amount.
 - 8. Schedule of Values Revisions: Revise the schedule of values when Change Orders or Construction Change Directives result in a change in the Contract Sum. Include at least one separate line item for each Change Order and Construction Change Directive.

1.3 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
- C. Payment Application Times: Submit Application for Payment to Architect by the last Friday of the month. The period covered by each Application for Payment is one month, ending on the last day of the month.
 - 1. Submit draft copy of Application for Payment [seven] <Insert number> days prior to due date for review by Architect.
- D. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.

- E. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. **Architect** will return incomplete applications without action.
1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
 2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
 3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- F. Transmittal: Submit **three** signed and notarized original copies of each Application for Payment to **Architect** by a method ensuring receipt **within 24 hours**. One copy shall include waivers of lien and similar attachments if required.
1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment as well as subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.
1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 2. When an application shows completion of an item, submit conditional final or full waivers.
 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
 5. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.
- H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
 2. Schedule of values.
 3. Contractor's construction schedule (preliminary if not final).
 4. Products list (preliminary if not final).
 5. Sustainable design action plans, including preliminary project materials cost data.
 6. Schedule of unit prices.
 7. Submittal schedule (preliminary if not final).
 8. List of Contractor's staff assignments.
 9. List of Contractor's principal consultants.
 10. Copies of building permits.
 11. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 12. Initial progress report.
 13. Report of preconstruction conference.
 14. Certificates of insurance and insurance policies.
 15. Performance and payment bonds.
 16. Data needed to acquire Owner's insurance.
- I. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

- J. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 3. Updated final statement, accounting for final changes to the Contract Sum.
 4. AIA Document G706.
 5. AIA Document G706A.
 6. AIA Document G707.
 7. Evidence that claims have been settled.
 8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
 9. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 2900

**SECTION 01 3000
ADMINISTRATIVE REQUIREMENTS**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Electronic document submittal.
- B. Project meetings.
- C. Coordination drawings.
- D. Submittal procedures.

1.2 RELATED SECTIONS

- A. Section 01 3216 – Construction Progress Schedule.

1.3 PROJECT COORDINATION

- A. Project Coordinator: General Contractor.
- B. Coordinate use of mobilization areas of site; field offices, construction access, traffic, and parking.
- C. Implement procedures for communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
- D. Monitor use of Owner-provided power and water.
- E. Coordinate layout work.
- F. Make the following types of submittals to Architect:
 - 1. Requests for interpretation.
 - 2. Shop drawings, product data, and samples.
 - 3. Test and inspection reports.
 - 4. Design data.
 - 5. Manufacturer's instructions and field reports.
 - 6. Applications for payment and change order requests.
 - 7. Progress schedules.
 - 8. Coordination drawings.
 - 9. Closeout submittals.

PART 2 - PRODUCTS – NOT APPLICABLE

PART 3 - EXECUTION

3.1 ELECTRONIC DOCUMENT SUBMITTAL

- A. The Project will be managed and administered using Bluebeam. The General Contractor is required to host the project on the software and help the project team members become familiar with the program's features and procedures in order to execute the Work.
- B. All submittals, except for physical samples, shall be made in electronic (PDF) format.
 - 1. Besides submittals for review, information, and closeout, this procedure applies to requests for information (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, change proposals, change orders), applications for payment, field reports and meeting minutes, and any other document any participant wishes to make part of the project record.
 - 2. General Contractor to provide physical samples and manufactures color selection charts.

3.2 PRECONSTRUCTION MEETING

- A. Attendance Required:
 - 1. Owner Representative.
 - 2. Architect.
 - a. Architect's project manager
 - b. Applicable subconsultants.
 - 3. General Contractor.
 - a. General Contractor Superintendent.

- b. Subcontractors
- B. Agenda:
 1. Execution of Owner – General Contractor at Risk Agreement.
 2. Submission of executed bonds and insurance certificates.
 3. Distribution of Contract Documents.
 4. Submission of list of Subcontractors, list of Products, schedule of values, and progress schedule.
 5. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
 6. Scheduling.
- C. General Contractor shall record minutes and distribute copies within five days after meeting to participants and those affected by decisions made.

3.3 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the Work at maximum weekly intervals.
- B. General Contractor will make arrangements for meetings, prepare agenda, provide copies for participants, preside at meetings.
- C. Attendance Required: General Contractor Superintendent, major Subcontractors and suppliers, Owner Representative, Architect, as appropriate to agenda topics for each meeting.
- D. Agenda:
 1. Review minutes of previous meetings.
 2. Review of Work progress.
 3. Field observations, problems, and decisions.
 4. Identification of problems that impede, or will impede, planned progress.
 5. Review of submittals schedule and status of submittals.
 6. Review of off-site fabrication and delivery schedules.
 7. Maintenance of progress schedule.
 8. Corrective measures to regain projected schedules if required.
 9. Planned progress during succeeding work period.
 10. Maintenance of quality and work standards.
 11. Effect of proposed changes on progress schedule and coordination.
 12. Other business relating to Work.
- E. General Contractor shall record minutes and distribute copies within five days after meeting to participants and those affected by decisions made.

3.4 COORDINATION DRAWINGS – Not Required

3.5 SUBMITTAL PROCEDURES, GENERAL

- A. Transmit each submittal with approved form.
- B. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.
- C. Identify Project, General Contractor, Subcontractor, or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.
- D. Apply General Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.
- E. Deliver physical samples and / or manufactures color charts to the Architect's business address.
- F. Schedule submittals to expedite the Project, and coordinate submission of related items.
- G. For each submittal for review, allow seven (7) days excluding delivery time to and from the General Contractor.
- H. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.

- I. Provide space for General Contractor and Architect review stamps.
- J. When revised for resubmission, identify all changes made since previous submission.
- K. Distribute reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.
- L. Submittals not requested will not be recognized or processed.

3.6 SUBMITTALS FOR REVIEW

- A. When the following are specified in individual sections, submit them for review:
 - 1. Product data.
 - 2. Shop drawings.
 - 3. Samples for selection.
 - 4. Samples for verification.
- B. Submit to Architect via email or physical samples for review for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.
- C. Samples will be reviewed only for aesthetic, color, or finish selection.
- D. After review, provide copies and distribute in accordance with Submittal Procedures article below and for record documents purposes described in Section 01 7700 – Contract Closeout Requirements.

3.7 SUBMITTALS FOR INFORMATION

- A. When the following are specified in individual sections, submit them for information:
 - 1. Design data.
 - 2. Certificates.
 - 3. Test reports.
 - 4. Inspection reports.
 - 5. Manufacturer's instructions.
 - 6. Manufacturer's field reports.
 - 7. Other types indicated.
- B. Submit for Architect's information as Contract Administrator or for Owner.

3.8 SUBMITTALS FOR PROJECT CLOSEOUT

- A. When the following are specified in individual sections, submit them at project closeout:
 - 1. Project record documents.
 - 2. Operation and maintenance data.
 - 3. Warranties.
 - 4. Other types as indicated.

3.9 SUBMITTAL FORMAT

- A. Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.
- B. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
 - 1. Retained samples will not be returned to General Contractor unless specifically requested.

END OF SECTION 01 3000

**SECTION 01 3100
PROJECT MANAGEMENT AND COORDINATION**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. General coordination procedures.
 - 2. Coordination drawings.
 - 3. RFIs.
 - 4. Digital project management procedures.
 - 5. Project meetings.
- B. Related Requirements:
 - 1. Section 01 7300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.

1.3 INFORMATIONAL SUBMITTALS

- A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
 - 1. Name, address, telephone number, and email address of entity performing subcontract or supplying products.
 - 2. Number and title of related Specification Section(s) covered by subcontract.
 - 3. Drawing number and detail references, as appropriate, covered by subcontract.

1.4 GENERAL COORDINATION PROCEDURES

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 - 1. Preparation of Contractor's construction schedule.
 - 2. Preparation of the schedule of values.
 - 3. Installation and removal of temporary facilities and controls.
 - 4. Delivery and processing of submittals.
 - 5. Progress meetings.
 - 6. Preinstallation conferences.
 - 7. Project closeout activities.
 - 8. Startup and adjustment of systems.

1.5 REQUEST FOR INFORMATION (RFI)

- A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
1. Architect will return without response those RFIs submitted to Architect by other entities controlled by Contractor.
 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
1. Project name.
 2. Project number.
 3. Date.
 4. Name of Contractor.
 5. Name of Architect.
 6. RFI number, numbered sequentially.
 7. RFI subject.
 8. Specification Section number and title and related paragraphs, as appropriate.
 9. Drawing number and detail references, as appropriate.
 10. Field dimensions and conditions, as appropriate.
 11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 12. Contractor's signature.
 13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
- C. RFI Forms: AIA Document G716.
- D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow five (5) working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
1. The following Contractor-generated RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for approval of Contractor's means and methods.
 - d. Requests for coordination information already indicated in the Contract Documents.
 - e. Requests for adjustments in the Contract Time or the Contract Sum.
 - f. Requests for interpretation of Architect's actions on submittals.
 - g. Incomplete RFIs or inaccurately prepared RFIs.
 2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt by Architect of additional information.
 3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 01 2600 "Contract Modification Procedures."
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within three (3) days of receipt of the RFI response.
- E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly with not less than the following:
1. Project name.
 2. Name and address of Contractor.
 3. Name and address of Architect.
 4. RFI number including RFIs that were returned without action or withdrawn.
 5. RFI description.

6. Date the RFI was submitted.
 7. Date Architect's response was received.
- F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within three (3) days if Contractor disagrees with response.

1.6 DIGITAL PROJECT MANAGEMENT PROCEDURES

- A. Use of Architect's Digital Data Files: Digital data files of Architect's CAD drawings can be provided by Architect for Contractor's use during construction, providing the required release forms have been signed.
1. Digital data files may be used by Contractor in preparing coordination drawings, Shop Drawings, and Project record Drawings.
 2. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Contract Drawings.
 3. Digital Drawing Software Program: Contract Drawings are available in AutoCAD 2022.
 - a. Subcontractors, and other parties granted access by Contractor to Architect's digital data files must request specific drawings files and sign the required release forms.

1.7 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.
- B. Preconstruction Conference: Architect will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect.
1. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Responsibilities and personnel assignments.
 - b. Tentative construction schedule.
 - c. Phasing.
 - d. Critical work sequencing and long lead items.
 - e. Designation of key personnel and their duties.
 - f. Lines of communications.
 - g. Use of web-based Project software.
 - h. Procedures for processing field decisions and Change Orders.
 - i. Procedures for RFIs.
 - j. Procedures for testing and inspecting.
 - k. Procedures for processing Applications for Payment.
 - l. Distribution of the Contract Documents.
 - m. Submittal procedures.
 - n. Sustainable design requirements.
 - o. Preparation of Record Documents.
 - p. Use of the premises and existing building.
 - q. Work restrictions.
 - r. Working hours.
 - s. Owner's occupancy requirements.
 - t. Responsibility for temporary facilities and controls.
 - u. Procedures for moisture and mold control.
 - v. Procedures for disruptions and shutdowns.
 - w. Construction waste management and recycling.
 - x. Parking availability.
 - y. Office, work, and storage areas.
 - z. Equipment deliveries and priorities.

- aa. First aid.
 - bb. Security.
 - cc. Progress cleaning.
- 3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- C. Progress Meetings: **Conduct** progress meetings twice a month.
 - 1. Coordinate dates of meetings with preparation of payment requests.
 - 2. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 - 3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 1) Review schedule for next period.
 - b. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Resolution of BIM component conflicts.
 - 4) Status of submittals.
 - 5) Status of sustainable design documentation.
 - 6) Deliveries.
 - 7) Off-site fabrication.
 - 8) Access.
 - 9) Site use.
 - 10) Temporary facilities and controls.
 - 11) Progress cleaning.
 - 12) Quality and work standards.
 - 13) Status of correction of deficient items.
 - 14) Field observations.
 - 15) Status of RFIs.
 - 16) Status of Proposal Requests.
 - 17) Pending changes.
 - 18) Status of Change Orders.
 - 19) Pending claims and disputes.
 - 20) Documentation of information for payment requests.
 - 4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
 - a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 3100

**SECTION 01 3216
CONSTRUCTION PROGRESS SCHEDULE**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Construction progress schedule, bar chart type.

1.2 RELATED SECTIONS

- A. Section 01 3000 - Administrative Requirements

1.3 SUBMITTALS

- A. Within five (5) days after date of the Agreement, submit preliminary schedule defining planned operations and phasing for the first sixty (60) days of Work, with a general outline for remainder of Work.
- B. If preliminary schedule requires revision after review, submit revised schedule within five (5) days.
- C. Within five (5) days after review of preliminary schedule, submit draft of proposed complete schedule for review.
 - 1. Include written certification that major contractors have reviewed and accepted proposed schedule.
- D. Within five (5) days after joint review, submit complete schedule.
- E. Submit updated schedule with each Application for Payment or as requested by the Architect or Owner.

1.4 SCHEDULE FORMAT

- A. Listings: In chronological order according to the start date for each activity. Identify each activity with the applicable specification section number.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.1 CONTENT

- A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.
- B. Identify each item by specification section number.
- C. Identify work of separate stages and other logically grouped activities.
- D. Provide sub-schedules to define critical portions of the entire schedule.
- E. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.
- F. Provide legend for symbols and abbreviations used.

3.2 BAR CHARTS

- A. Include a separate bar for each major portion of Work or operation.
- B. Identify the first work day of each week.

3.3 REVIEW AND EVALUATION OF SCHEDULE

- A. Participate in joint review and evaluation of schedule with Architect at each submittal.
- B. Evaluate project status to determine work behind schedule and work ahead of schedule.
- C. After review, revise as necessary as result of review, and resubmit within three (3) days.

3.4 UPDATING SCHEDULE

- A. Maintain schedules to record actual start and finish dates of completed activities.
- B. Indicate progress of each activity to date of revision, with projected completion date of each activity.
- C. Annotate diagrams to graphically depict current status of Work.

- D. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.
- E. Indicate changes required to maintain Date of Substantial Completion.
- F. Submit reports required to support recommended changes.
- G. Provide narrative report to define problem areas, anticipated delays, and impact on the schedule. Report corrective action taken or proposed and its effect including the effects of changes on schedules of separate contractors.

3.5 DISTRIBUTION OF SCHEDULE

- A. Distribute copies of updated schedules to Architect, Owner, and other concerned parties.
- B. Instruct recipients to promptly report, in writing, problems anticipated by projections shown in schedules.

END OF SECTION 01 3216

**SECTION 01 3516
ALTERATION PROJECT PROCEDURES**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes special procedures for alteration work.

1.3 DEFINITIONS

- A. **Alteration Work:** This term includes remodeling, renovation, repair, and maintenance work performed within existing spaces or on existing surfaces as part of the Project.
- B. **Basis of Design:** The specific product that the drawings are based on. If a different product is submitted and approved, the contractor is responsible for all changes to the dimensions, size, weight and /or access locations that are required, if the basis of design product is NOT used.
- C. **Consolidate:** To strengthen loose or deteriorated materials in place.
- D. **Design Reference Sample:** A sample that represents the Architect's pre-bid selection of work to be matched; it may be existing work or work specially produced for the Project.
- E. **Dismantle:** To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.
- F. **Match:** To blend with adjacent construction and manifest no apparent difference in material type, species, cut, form, detail, color, grain, texture, or finish; as approved by Architect.
- G. **Refinish:** To remove existing finishes to base material and apply new finish to match original, or as otherwise indicated.
- H. **Repair:** To correct damage and defects, retaining existing materials, features, and finishes. This includes patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading materials.
- I. **Replace:** To remove, duplicate, and reinstall entire item with new material. The original item is the pattern for creating duplicates unless otherwise indicated.
- J. **Replicate:** To reproduce in exact detail, materials, and finish unless otherwise indicated.
- K. **Reproduce:** To fabricate a new item, accurate in detail to the original, and from either the same or a similar material as the original, unless otherwise indicated.
- L. **Retain:** To keep existing items that are not to be removed or dismantled.
- M. **Strip:** To remove existing finish down to base material unless otherwise indicated.

1.4 COORDINATION

- A. **Alteration Work Sub-schedule:** A construction schedule coordinating the sequencing and scheduling of alteration work for entire Project, including each activity to be performed, and based on General Contractor's Construction Schedule. Secure time commitments for performing critical construction activities from separate entities responsible for alteration work.
 - 1. Schedule construction operations in sequence required to obtain best Work results.
 - 2. Coordinate sequence of alteration work activities to accommodate the following:
 - a. Owner's continuing occupancy of portions of existing building.
 - b. Owner's partial occupancy of completed Work.
 - c. Other known work in progress.
 - d. Tests and inspections.
 - 3. Detail sequence of alteration work, with start and end dates.
 - 4. **Utility Services:** Indicate how long utility services will be interrupted. Coordinate shutoff, capping, and continuation of utility services.
 - 5. Use of elevator and stairs.
- B. **Pedestrian and Vehicular Circulation:** Coordinate alteration work with circulation patterns within Project building(s) and site. Circulation patterns cannot be closed off entirely and in places can

be only temporarily redirected around small areas of work. Plan and execute the Work accordingly.

1.5 PROJECT MEETINGS FOR ALTERATION WORK

- A. Preliminary Conference for Alteration Work: Before starting alteration work, Constructor conference at Project site.
1. Attendees: In addition to representatives of Owner, General Contractor, Architect, and Contractor testing service representative, and specialist's manufacturer(s) shall be represented at the meeting.
 2. Agenda: Discuss items of significance that could affect progress of alteration work, including review of the following:
 - a. Alteration Work Sub-schedule: Discuss and finalize; verify availability of materials, specialists' personnel, equipment, and facilities needed to make progress and avoid delays.
 - b. Fire-prevention plan.
 - c. Governing regulations.
 - d. Areas where existing construction is to remain and the required protection.
 - e. Hauling routes.
 - f. Sequence of alteration work operations.
 - g. Storage, protection, and accounting for salvaged and specially fabricated items.
 - h. Existing conditions, staging, and structural loading limitations of areas where materials are stored.
 - i. Qualifications of personnel assigned to alteration work and assigned duties.
 - j. Requirements for extent and quality of work, tolerances, and required clearances.
 - k. Embedded work such as flashings and lintels, special details, collection of waste, protection of occupants and the public, and condition of other construction that affects the Work or will affect the work.
 3. Reporting: Constructor will record conference results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from conference.
- B. Coordination Meetings: Conduct coordination meetings specifically for alteration work at weekly intervals. Coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings.
1. Attendees: In addition to representatives of Owner, Architect, and General Contractor, each specialist, supplier, installer, and other entity concerned with progress or involved in planning, coordination, or performance of alteration work activities shall be represented at these meetings. All participants at conference shall be familiar with Project and authorized to conclude matters relating to alteration work.
 2. Agenda: Review and correct or approve minutes of previous coordination meeting. Review other items of significance that could affect progress of alteration work. Include topics for discussion as appropriate to status of Project.
 - a. Alteration Work Sub-schedule: Review progress since last coordination meeting. Determine whether each schedule item is on time, ahead of schedule, or behind schedule. Determine how construction behind schedule will be expedited with retention of quality; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities are completed within the Contract Time.
 - b. Schedule Updating: Revise Contractor's Alteration Work Sub-schedule after each coordination meeting where revisions to schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
 - c. Review present and future needs of each entity present, including review items listed in the "Preliminary Conference for Alteration Work" Paragraph in this article and the following:
 - 1) Interface requirements of alteration work with other Project Work.
 - 2) Status of submittals for alteration work.
 - 3) Access to alteration work locations.

- 4) Effectiveness of fire-prevention plan.
 - 5) Quality and work standards of alteration work.
 - 6) Change Orders for alteration work.
3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

1.6 INFORMATIONAL SUBMITTALS

- A. Alteration Work Sub-schedule:
 1. Submit alteration work sub-schedule within five (5) days of date established for commencement of work.
- B. Preconstruction Documentation: Show preexisting conditions of adjoining construction and site improvements that are to remain, including finish surfaces, that might be misconstrued as damage caused by Contractor's alteration work operations.
- C. Fire-Prevention Plan: Submit three (3) days before work begins.

1.7 QUALITY ASSURANCE

- A. Specialist Qualifications: An experienced firm regularly engaged in specialty work similar in nature, materials, design, and extent to alteration work as specified in each Section and that has completed a minimum of five (5) recent projects with a record of successful in-service performance that demonstrates the firm's qualifications to perform this work.
 1. Field Supervisor Qualifications: Full-time supervisors experienced in specialty work similar in nature, material, design, and extent to that indicated for this Project. Supervisors shall be on-site when work begins and during its progress. Supervisors shall not be changed during Project except for causes beyond the control of the specialist firm.
- B. Alteration Work Program: Prepare a written plan for alteration work for whole Project, including each phase or process and protection of surrounding materials during operations. Show compliance with indicated methods and procedures specified in this and other Sections. Coordinate this whole-Project alteration work program with specific requirements of programs required in other alteration work Sections.
 1. Dust and Noise Control: Include locations of proposed temporary dust- and noise-control partitions and means of egress from occupied areas coordinated with continuing on-site operations and other known work in progress.
 2. Debris Hauling: Include plans clearly marked to show debris hauling routes, turning radii, and locations and details of temporary protective barriers.
- C. Fire-Prevention Plan: Prepare a written plan for preventing fires during the Work, including placement of fire extinguishers, fire blankets, rag buckets, and other fire-control devices during each phase or process. Coordinate plan with Owner's fire-protection equipment and requirements. Include fire-watch personnel's training, duties, and authority to enforce fire safety.
- D. Safety and Health Standard: Comply with ANSI/ASSE A10.6.

1.8 STORAGE AND HANDLING OF SALVAGED MATERIALS

- A. Salvaged Materials:
 1. Clean loose dirt and debris from salvaged items unless more extensive cleaning is indicated.
 2. Pack or crate items after cleaning; cushion against damage during handling. Label contents of containers.
 3. Store items in a secure area until delivery to Owner.
 4. Transport items to Owner's designated storage area.
 5. Protect items from damage during transport and storage.
- B. Salvaged Materials for Reinstallation:
 1. Repair and clean items for reuse as indicated.
 2. Pack or crate items after cleaning and repairing; cushion against damage during handling. Label contents of containers.
 3. Protect items from damage during transport and storage.

- C. Existing Materials to Remain: Protect construction indicated to remain against damage and soiling from construction work. Where permitted by Architect, items may be dismantled and taken to a suitable, protected storage location during construction work and reinstalled in their original locations after alteration and other construction work in the vicinity is complete.
- D. Storage: Catalog and store items within a weathertight enclosure where they are protected from moisture, weather, condensation, and temperatures.
 - 1. Identify each item for reinstallation with a nonpermanent mark to document its original location. Indicate original locations on plans, elevations, sections, or photographs by annotating the identifying marks.
 - 2. Secure stored materials to protect from theft.
 - 3. Control humidity so that it does not exceed 85 percent. Maintain temperatures 5 degrees F or more above the dew point and no higher than 85 degrees F.
- E. Storage Space:
 - 1. Arrange any off-site locations for storage and protection of salvaged material that cannot be stored and protected on-site.

1.9 FIELD CONDITIONS

- A. Discrepancies: Notify Architect of discrepancies between existing conditions and Drawings before proceeding with removal and dismantling work.
- B. Owner's Removals: Before beginning alteration work, verify in correspondence with Owner that the following items have been removed:
 - 1. Art work, Furniture, Equipment, IT Equipment, and 3rd party equipment.
- C. Size Limitations in Existing Spaces: Materials, products, and equipment used for performing the Work and for transporting debris, materials, and products shall be of sizes that clear surfaces within existing spaces, areas, rooms, and openings, including temporary protection, by 12 inches (or more).

PART 2 - PRODUCTS - (Not Used)

PART 3 - EXECUTION

3.1 PROTECTION

- A. Protect persons, motor vehicles, surrounding surfaces of building, building site, plants, and surrounding buildings from harm resulting from alteration work.
 - 1. Use only proven protection methods, appropriate to each area and surface being protected.
 - 2. Provide temporary barricades, barriers, and directional signage to exclude the public from areas where alteration work is being performed.
 - 3. Erect temporary barriers to form and maintain fire-egress routes.
 - 4. Contain dust and debris generated by alteration work, and prevent it from reaching the public or adjacent surfaces.
 - 5. Do not overload structural elements.
 - 6. Protect floors and other surfaces along hauling routes from damage, wear, and staining.
 - 7. Provide supplemental sound-control treatment to isolate demolition work from other areas of the building.
- B. Temporary Protection of Materials to Remain:
 - 1. Protect existing materials with temporary protections and construction. Do not remove existing materials unless otherwise indicated.
 - 2. Do not attach temporary protection to existing surfaces except as indicated as part of the alteration work program.
- C. Comply with each product manufacturer's written instructions for protections and precautions. Protect against adverse effects of products and procedures on people and adjacent materials, components, and vegetation.
- D. Utility and Communications Services:

1. Notify Owner, Architect, authorities having jurisdiction, and entities owning or controlling wires, conduits, pipes, and other services affected by alteration work before commencing operations.
 2. Disconnect and cap pipes and services as required by authorities having jurisdiction, as required for alteration work.
 3. Maintain existing services unless otherwise indicated; keep in service, and protect against damage during operations. Provide temporary services during interruptions to existing utilities.
- E. Existing Drains: Prior to the start of work in an area, test drainage system to ensure that it is functioning properly. Notify Architect immediately of inadequate drainage or blockage. Do not begin work in an area until the drainage system is functioning properly.
1. Prevent solids such as adhesive or mortar residue or other debris from entering the drainage system. Clean out drains and drain lines that become sluggish or blocked by materials resulting from alteration work.
 2. Protect drains from pollutants. Block drains or filter out sediments, allowing only clean water to pass.

3.2 PROTECTION FROM FIRE

- A. General: Follow fire-prevention plan and the following:
1. Comply with NFPA 241 requirements unless otherwise indicated.
 2. Remove and keep area free of combustibles, including rubbish, paper, waste, and chemicals, unless necessary for the immediate work.
 - a. If combustible material cannot be removed, provide fire blankets to cover such materials.
- B. Heat-Generating Equipment and Combustible Materials: Comply with the following procedures while performing work with heat-generating equipment or combustible materials, including welding, torch-cutting, soldering, brazing, removing paint with heat, or other operations where open flames or implements using high heat or combustible solvents and chemicals are anticipated:
1. Obtain Owner's approval for operations involving use of open-flame or other high-heat equipment. Use of open-flame equipment is not permitted. Notify Owner before each occurrence, indicating location of such work.
 2. As far as practicable, restrict heat-generating equipment to outside the building.
 3. Do not perform work with heat-generating equipment in or near rooms or in areas where flammable liquids or explosive vapors are present or thought to be present. Use a combustible gas indicator test to ensure that the area is safe.
 4. Use fireproof baffles to prevent flames, sparks, hot gases, or other high-temperature material from reaching surrounding combustible material.
 5. Prevent the spread of sparks and particles of hot metal through open windows, doors, holes, and cracks in floors, walls, ceilings, roofs, and other openings.
 6. Fire Watch: Before working with heat-generating equipment or combustible materials, station personnel to serve as a fire watch at each location where such work is performed. Fire-watch personnel shall have the authority to enforce fire safety. Station fire watch according to NFPA 51B, NFPA 241, and as follows:
 - a. Train each fire watch in the proper operation of fire-control equipment and alarms.
 - b. Prohibit fire-watch personnel from other work that would be a distraction from fire-watch duties.
 - c. Cease work with heat-generating equipment whenever fire-watch personnel are not present.
 7. Have fire-watch personnel perform final fire-safety inspection each day beginning no sooner than 30 minutes after conclusion of work to detect hidden or smoldering fires and to ensure that proper fire prevention is maintained.
- C. Fire-Control Devices: Provide and maintain fire extinguishers, fire blankets, and rag buckets for disposal of rags with combustible liquids. Maintain each as suitable for the type of fire risk in

each work area. Ensure that nearby personnel and the fire-watch personnel are trained in fire-extinguisher and blanket use.

- D. Sprinklers: Where sprinkler protection exists and is functional, maintain it without interruption while operations are being performed. If operations are performed close to sprinklers, shield them temporarily with guards.
 - 1. Remove temporary guards at the end of work shifts, whenever operations are paused, and when nearby work is complete.

3.3 GENERAL ALTERATION WORK

- A. Have specialty work performed only by qualified specialists.
- B. Ensure that General Contractor Superintendent is present when work begins and during its progress.
- C. Perform surveys of Project site as the Work progresses to detect hazards resulting from alterations.
- D. Notify Architect of visible changes in the integrity of material or components whether from environmental causes including biological attack, UV degradation, freezing, or thawing or from structural defects including cracks, movement, or distortion.
 - 1. Do not proceed with the work in question until directed by Architect.

END OF SECTION 01 3516

**SECTION 01 4000
QUALITY REQUIREMENTS**

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including Division 01 – Specification sections apply to work of this section.

1.2 SUMMARY

- A. Section includes quality assurance and quality control services to be provided by the General Contractor under the terms of the Contract. Refer to Definitions Article below for definitions of the terms used herein.
 - 1. Quality assurance services include but are not limited to the following:
 - a. Qualification of sources, manufacturers, fabricators, support service providers, testing and inspection agencies and installers.
 - b. Pre-construction testing procedures specified to be the General Contractor's responsibility.
 - c. Delegated design proposals.
 - d. Representative construction assemblies, activities, or processes.
 - e. Field measurements and surveys.
 - f. Evaluation of project conditions and corrective measures.
 - g. Manufacturer construction process monitoring.
 - h. Construction documentation.
 - 2. Quality control services include but are not limited to the following:
 - a. Post-installation quality control testing.
 - b. Inspection of installed work.
 - c. Scheduling required inspections.
 - d. Scheduling inspections for special project warranties.
 - e. Correction of deficient or defective work.
 - f. Re-testing following correction of deficient or defective work.

1.3 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and ensure that proposed construction complies with the Contract Documents.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to verify that completed construction complies with the Contract Documents. Services do not include contract administration activities performed by Architect or Contractor.
- C. Representative Construction:
 - 1. Mock-ups: Representative assemblies of dissimilar materials to verify understanding of the work of the Contract.
 - 2. Field Samples: Application of finish materials to verify the applicator's skill in performing the work.
 - 3. Field Demonstrations: Demonstration of a construction process or a portion thereof to verify understanding of the Work of the Contract.
- D. Qualified Testing Agency: An entity with the experience and capability to conduct the specified testing and inspecting procedures, as documented by ASTM E 548, and that specializes in types of tests and inspections to be performed.
- E. Qualified Factory-Authorized Service Representative: An authorized representative who is trained and approved by a specified manufacturer to inspect and service the manufacturer's installed products.
- G. Qualified Material Supplier: A firm with documented capability to produce specified materials of sufficient quality and quantity to service the Project in compliance with the Contract Documents and the Project Schedule.

- I. Qualified Manufacturer: A firm experienced in manufacturing the specified products or systems and with sufficient resources to produce specified products or systems in accordance with the Contract Documents and the Project Schedule.
- J. Qualified Product Distributor: A firm authorized by the specified product manufacturer to distribute the product in the Project vicinity and having sufficient product or material inventory access, service personnel, and distribution resources to adequately service the Project in accordance with the Contract Documents and the Project Schedule.
- K. Qualified Installer: A firm or individual experienced in installing, erecting, or assembling work for this Project in compliance with the Contract Documents and the Project Schedule.
- L. Qualified Specialists: A firm or individual with documented qualifications to perform certain critical construction activities in accordance with the Contract Documents and the Project Schedule. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
 - 1. Requirement for specialists shall not supersede building codes and similar regulations governing the Work, nor interfere with local trade-union jurisdictional settlements and similar conventions.

1.4 SUBMITTALS

- A. Design Data: Submit for Architect's knowledge as contract administrator for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents, or for Owner's information.
- B. Test Reports: After each test/inspection, promptly submit one electronic copy of report to Architect, applicable Engineer(s) and Owner.
 - 1. Include:
 - a. Date issued.
 - b. Project title and number.
 - c. Name of inspector.
 - d. Date and time of sampling or inspection.
 - e. Identification of product and specifications section.
 - f. Location in the Project.
 - g. Type of test/inspection.
 - h. Date of test/inspection.
 - i. Results of test/inspection.
 - j. Conformance with Contract Documents.
 - k. Interpretation of results.
 - 2. Test report submittals are for Architect's knowledge as contract administrator for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents, or for Owner's information.
- C. Certificates: When specified in individual specification sections, submit certification by the manufacturer and installation/application subcontractor to Architect, in quantities specified for Product Data.
 - 1. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
 - 2. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.
- D. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
- E. Manufacturer's Field Reports: Submit reports for Architect's benefit as contract administrator or for Owner.
 - 1. Submit report digitally within three (3) days of observation to Architect for information.
 - 2. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract document.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.1 CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply with manufacturers' instructions, including each step in the sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.
- D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Have Work performed by persons qualified to produce required and specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.2 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

3.3 MANUFACTURERS' FIELD SERVICES

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.
- B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.4 TESTING AND INSPECTION

- A. See individual specification sections for testing required.
- B. Testing Agency Duties:
 - 1. Provide qualified personnel at site. Cooperate with Architect and General Contractor in performance of services.
 - 2. Perform specified sampling and testing of products in accordance with specified standards.
 - 3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
 - 4. Promptly notify Architect and General Contractor of observed irregularities or non-conformance of Work or products.
 - 5. Perform additional tests and inspections required by Architect.
 - 6. Submit reports of all tests / inspections specified.

3.5 DEFECT ASSESSMENT

- A. Repair visual defects to the satisfaction of the Architect and Owner. If repairs cannot be made satisfactorily, replace items so designated.
- B. Replace Work or portions of the Work not conforming to specified requirements.
- C. If, in the opinion of Architect, it is not practical to remove and replace the Work, Architect will direct an appropriate remedy or adjust payment.

END OF SECTION 01 4000

**SECTION 01 4123
PERMIT REQUIREMENTS**

PART 1 – GENERAL

1.1 SUMMARY

- A. The Owner will be responsible for obtaining and paying for all permits, licenses, tap fees, and other local requirements for constructing the Project.

1.2 SUBMITTALS

- A. For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION 01 4123

**SECTION 01 4216
DEFINITIONS**

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative requirements for definitions. Refer to Divisions 02 through 28 for specific references.

1.2 DEFINITIONS

- A. General: Basic contract definitions are included in the Conditions of the Contract.
- B. **"Indicated"**: The term "indicated" refers to graphic representations, notes, or schedules on the Drawings; or to other paragraphs or schedules in the Specifications and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the user locate the reference. Location is not limited.
- C. **"Directed"**: Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by the Architect, requested by the Architect, and similar phrases.
- D. **"Approved"**: The term "approved," when used in conjunction with the Architect's action on the General Construction's submittals, applications, and requests, is limited to the Architect's duties and responsibilities as stated in the Conditions of the Contract. Refer to Section 00 2500 - "Submittal Procedures" for additional terms and phrases regarding review / approval / rejection as they relate to submittal procedures.
- E. **"Regulations"**: The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. **"Furnish"**: The term "furnish" means to supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. **"Install"**: The term "install" describes operations at the Project site including the actual unloading, temporary storage, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. **"Provide"**: The term "provide" means to furnish and install, complete and ready for the intended use.
- I. **"Installer"**: An installer is the Contractor or another entity engaged by the General Contractor, either as an employee, subcontractor, or contractor of lower tier, to perform a particular construction activity, including installation, erection, application, or similar operations. Installers are required to be experienced in the operations they are engaged to perform.
 - 1. The term "experienced," when used with the term "installer," means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with the special requirements indicated; and having complied with requirements of authorities having jurisdiction.
 - 2. Trades: Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.
 - 3. Assigning Specialists: Certain Sections of the Specifications require that specific construction activities shall be performed by specialists who are recognized experts in those operations. The specialists must be engaged for those activities, and their assignments are requirements over which the General Contractor has no option. However, the ultimate responsibility for fulfilling contract requirements remains with the General Contractor.
 - a. This requirement shall not be interpreted to conflict with enforcing building codes and similar regulations governing the Work. It is also not intended to interfere with local trade-union jurisdictional settlements and similar conventions.

- J. Product-Related Definitions:
1. **"Products"** are items purchased for incorporation in the Work, whether purchased for the Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 2. **"Materials"** are products substantially shaped, cut, worked, mixed, finished, refined, or otherwise fabricated, processed, or installed to form a part of the Work.
 3. **"Equipment"** is a product with operational parts, whether motorized or manually operated, that requires service connections, such as wiring or piping.
 4. **"Systems"** are sets of complementary materials or products arranged or combined by a manufacturing concern so as to form a unity or whole for fulfilling a specific building (or site) function.
 5. **"Damage"** shall mean a substandard or impaired condition of a product, including breakage, surface blemishes, abrasion, caused by weather exposure, accident, abuse, aging, mis-handling, storage, shipping, or other causes.
 6. A **"Substitution"** is a product not specified and which substantially deviates from the specified requirements.
- K. **"Project site"** is the space available to the General Contractor for performing construction activities, either exclusively or in conjunction with others performing other work as part of the Project. The extent of the Project site is shown on the Drawings and may or may not be identical with the description of the land on which the Project is to be built.
- L. **"Testing Agencies"**: A testing agency is an independent entity engaged to perform specific inspections or tests, either at the Project site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

1.3 SPECIFICATION FORMAT AND CONTENT EXPLANATION

- A. Specification Format: These Specifications are organized into Divisions and Sections based on the 50-division format and CSI/CSC's "MasterFormat" numbering system.
- B. Specification Content: These Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be interpolated as the sense requires. Singular words shall be interpreted as plural and plural words interpreted as singular where applicable as the context of the Contract Documents indicates.
 2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by the General Contractor. At certain locations in the Section Text, subjective language is used for clarity to describe responsibilities that must be fulfilled indirectly by the General Contractor or by others when so noted.
 - a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION 01 4216

**SECTION 01 4219
REFERENCE STANDARDS**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Special Conditions and Division 01 – Specification sections apply to work of this section.

1.2 SUMMARY

- A. Section includes administrative requirements for references.
- B. Specific references are in subsequent specification sections.

1.3 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of the date of the Contract Documents.
- C. Copies of Standards: Each entity engaged in construction on the Project must be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
- D. Where copies of standards are needed to perform a required construction activity, the Contractor shall obtain copies directly from the publication source and make them available on request.
- E. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where abbreviations and acronyms are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards-producing organization, authorities having jurisdiction, or other entity applicable to the context of the text provision. Refer to Gale Research's "Encyclopedia of Associations" or Columbia Books' "National Trade & Professional Associations of the U.S.," which are available in most libraries.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION 01 4219

**SECTION 01 6000
PRODUCT REQUIREMENTS**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including Division 01 – Specification sections apply to work of this section.

1.2 SUMMARY

- A. This Section contains product requirements that apply to all sections of the Specifications.

1.3 DEFINITIONS

- A. Definitions used in this Article are not intended to change the meaning of other terms used in the Contract Documents, such as "specialties," "systems," "structure," "finishes," "accessories," and similar terms. Such terms are self-explanatory and have well-recognized meanings in the construction industry.
1. **"Products"** are items purchased for incorporation in the Work, whether purchased for the Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 2. **"Materials"** are products substantially shaped, cut, worked, mixed, finished, refined, or otherwise fabricated, processed, or installed to form a part of the Work.
 3. **"Equipment"** is a product with operational parts, whether motorized or manually operated, that requires service connections, such as wiring or piping.
 4. **"Systems"** are sets of complementary materials or products arranged or combined by a manufacturing concern so as to form a unity or whole for fulfilling a specific building (or site) function.
 5. **"Damage"** shall mean a substandard or impaired condition of a product, including breakage, surface blemishes, abrasion, caused by weather exposure, accident, abuse, aging, mis-handling, storage, shipping, or other causes.
 6. A **"Substitution"** is a product not specified and which substantially deviates from the specified requirements.

1.4 SUBMITTALS

- A. Product Schedule: Prepare in tabular format a schedule of the specified products to be supplied for the Project (Do not propose substitutions in the Product Schedule). Organize the schedule according to the numbers and titles of each Section. Coordinate the Schedule of Products with the Submittal Schedule. Submit to the Architect not less than seven (7) days following the Notice to Proceed. Schedule content shall include, as a minimum, the following information:
1. Name of Manufacturer.
 2. Product designation, such as brand and model number.
 3. Applicable reference standards.
- B. Upon completion of the Project, submit a final Product Schedule for record. Include in the Operation and Maintenance manuals.

1.5 BASIC PRODUCT REQUIREMENTS

- A. Furnish all products new and unused, and in manufacturer's standard unit dimensions, unless specifically identified otherwise in the Contract Documents. Scraps, remnants, salvage, or otherwise objectionable materials will be rejected by the Architect.
- B. Ensure that each type of product is produced by a single manufacturer, the same production run and obtained through distribution sources authorized by the manufacturer of each product required, unless otherwise approved by the Architect.
- C. All products described in the Contract Documents shall be furnished complete, with all necessary fasteners, accessories, installation devices, and appurtenances required for a complete installation.

- D. All auxiliary components required for proper installation and performance of all products shall be produced and/or approved for the proposed application by the manufacturer of the primary product components.
- E. The General Contractor shall verify that products requiring electrical service are compatible with the electrical service available at the Project.

1.6 PRODUCT OPTIONS

- A. The General Contractor shall select products which comply with the Contract Documents and which are compatible with each other, with existing work, and with products provided by others.
- B. Manufacturer product references, model numbers, and other proprietary designations used in subsequent sections of the Specifications shall be regarded as minimum standards by which equivalent products by other listed manufacturers should be evaluated and selected.
 - 1. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.
 - 2. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.
 - 3. Products of other listed manufacturers shall meet or exceed the design requirements represented by specified proprietary designations.
- C. The General Contractor is to provide the products specifically listed in the construction documents. Only when multiple manufacturers are listed, the General Contractor may choose from among those products listed.
- D. Do not make unauthorized substitutions for products or manufacturers listed. Refer to General Conditions of the Contract for substitution procedures.

1.7 PRODUCT SUBSTITUTION PROCEDURES

- A. The following are administrative procedures for substitutions proposed following Award of Contract.
 - 1. Procedures for proposal of substitutions during the bidding period are specified in "Instructions to Bidders."
- B. Do not submit substitution proposals during the period between the Bid Due Date and Contract Award unless requested by the Architect.
- C. Substitutions following Award of Contract will not be considered except under the following circumstances:
 - 1. Through no fault of the General Contractor, the specified products become unavailable as a result of changes in manufacturing, product recalls, supply chain disruptions, changes in laws and regulations, or similar conditions.
 - 2. The Architect and Owner agree to consider Value Engineering proposals.
 - 3. A change of design requirements by the Architect.
- D. The General Contractor shall not make substitutions for specified products without submitting a formal request for substitution followed by written approval from the Architect. Unauthorized substitutions will be rejected by the Architect, and the General Contractor shall assume all costs for correction or replacement with specified products, whether or not the specifications state that substitutions will not be considered.
- E. Specification requirements indicating that a substitution will not be considered include:
 - 1. "Provide one of the following products:"
 - 2. "Provide Products produced by one of the manufacturers listed."
 - 3. "No Substitutions"
- F. The General Contractor shall not assume that the absence of one of the above phrases constitutes permission to make substitutions.
- G. In making requests for substitution, the General Contractor shall:
 - 1. Identify the specified product for which the substitution is being proposed.
 - 2. Identify the proposed substitution by manufacturer, model number, series, and other proprietary terms of identification.

3. Provide sufficient information for the Architect to evaluate the proposed substitution, including, as applicable:
 - a. product data
 - b. manufacturer's literature
 - c. test reports
 - d. independent research evaluations
 - e. details of fabrication and installation
 - f. maintenance instructions, availability of maintenance parts, and current price list for those parts.
 - g. Name, address, and telephone number of the manufacturer's local representative.
 - h. warranty information
 - i. list of prior installations in the vicinity of the project, including locations, dates of installations, and names of building owners.
 - j. Manufacturer's written endorsement of the installer of the proposed product.
4. Furnish a written statement of the net change in the Contract Sum if the substitution is accepted.
5. Furnish a written justification for the substitution in lieu of the specified product.
- H. Allow at least ten (10) business days for the Architect's review and response to substitution requests. The Architect will review substitution proposals and respond to the General Contractor writing. The Architect's decision regarding substitution proposals shall be considered final.
- I. The Architect may reject without consideration the following:
 1. Incomplete requests for substitution.
 2. Substitution requests made when a specification section indicates that no substitutions will be considered for a product.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Scheduling: Schedule deliveries to the Site (or other approved location) at times consistent with the progress of the Work to ensure that products do not undergo exposure to unsuitable conditions.
- B. Provide an appropriate level of labor forces and equipment at the site for the proper unloading and handling of products.
- C. Packaging and Identification: Deliver products in original packaging or bundles and labeled so as to be readily identifiable and so that assessment of their condition, quantity, and other qualitative characteristics can be readily performed. Obtain receipts for bulk product deliveries clearly stating the type, grade, quantity and other specified characteristics.
- D. Inventory and Inspection: Inventory products upon receipt to ensure that adequate quantities are delivered at proper intervals so as to maintain the progress of the work. Inspect products to evaluate and document their condition.
- E. Rejection and Re-ordering: Reject defective, broken, deteriorated or otherwise objectionable products and arrange for their immediate segregation and removal from the Project Site. Arrange for delivery of satisfactory products to replace those that have been rejected.
- F. Storage Conditions: Review manufacturer's literature and referenced standards to verify the optimum conditions required for proper and secure storage of each type of product to prevent deterioration, theft, or loss. Maintain such conditions and monitor them throughout the progress of the work. When existing conditions do not comply with referenced standards and manufacturer recommendations, provide and maintain all temporary protections, temporary utility services, and temporary support facilities required to maintain optimum conditions throughout the construction period.
 1. Do not store products in a manner that will impede the work of others or damage structures or excavations.
 2. If storage facilities are not available at the Site, provide bonded off-site storage facilities acceptable to the Owner.
- G. Handling: Handle products at all times during the progress of the work in accordance with the referenced standards and manufacturer's printed instructions.

1.9 EXTRA PRODUCTS

- A. Furnish extra products (a.k.a. attic stock or maintenance stock) in the quantities specified, or, when not specified, in the standard quantities customarily furnished by the manufacturer.
- B. Extra products shall be from the same runs as the products specified for the work described and shall be delivered to the site when the products to be incorporated into the work are delivered. Delivery, storage, and handling requirements specified herein apply to extra products.
- C. Furnish extra products in manufacturer's standard whole units, unless otherwise indicated. Scraps, remnants, salvage, or otherwise substandard items presented as extra products will be rejected by the Architect as non-complying.
- D. Furnish extra products in sealed containers or cartons, with manufacturer's name and product description clearly indicated on the packaging.
- E. General Contractor shall compensate the Owner for extra products used by the General Contractor for performing the work of the Contract or for performing corrective work during the specified correction period or warranty period.
- F. Retain signed receipts for each quantity of extra product delivered to the Owner's designated representative and submit them as a condition of Contract Closeout.

1.10 OWNER-FURNISHED PRODUCTS – Not Used

1.11 WARRANTIES

- A. The following requirements are applicable to warranties specified in individual Sections.
- B. Warranties shall not deprive the Owner of other rights provided by law or the Conditions of the Contract.
- C. Date of warranty period commencement shall be the Date of Owner occupancy, unless the Owner agrees to allow a different date of warranty commencement.
- D. Manufacturer Warranties: Unless more stringent warranty terms are specified within a Section, provide the manufacturer's standard product warranty for each product, running for the manufacturer's standard time period and according to the manufacturer's standard terms.
 - 1. Furnish executed copies of standard manufacturer warranties upon completion of the Project, whether or not the standard warranties are specified in the individual Sections.
- E. Special Project Warranties: When specified, provide special project warranties according to the terms and conditions specified in individual Sections. Submit notarized copies identifying the following:
 - F. Manufacturer's name, address, and telephone number.
 - G. Project title and address.
 - H. Owner's name and address.
 - I. Contractor's name and address.
 - 1. The specific terms and conditions of the warranty showing compliance with the terms specified in individual Sections.
 - 2. Date of Substantial Completion of the Project.
 - 3. Date of expiration of the warranty.
 - 4. Notarized signature of the manufacturer's authorized agent.
- J. The manufacturer shall notify the Owner and the General Contractor in writing not less than 365 days prior to the expiration date of the warranty.
- K. Warranty Requirements:
 - 1. Corrections made under the terms of warranties shall include repair or replacement (as adjudged by the Owner) of interfacing work affected by the product defect.
 - 2. Corrected work shall be fully warranted to the extent of the original work.
 - 3. Perform warranty work in accordance with the Contract Documents applicable to the Work.
 - 4. Warranties that fail to account for the provisions in the Contract Documents will be rejected and re-submittal will be required.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION 01 6000

**SECTION 01 7000
EXECUTION REQUIREMENTS**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract including Division 01 – Specification sections apply to work of this section.

1.2 SUMMARY

- A. Section includes execution requirements applicable to all sections of these Specifications.

1.3 EXAMINATION

- A. Prior to installation of products or systems, with Installer present, review the condition of the substrate or area of installation provided and verify that it is acceptable in accordance with the product manufacturer's instructions, referenced standards, and accepted trade practices.
 - 1. Report unfavorable conditions to the Architect.
 - 2. Verify that reinforcement, blocking, nailers, or other attachment provisions required for support of work are properly placed.
 - 3. Do not allow installation to proceed until all unsatisfactory conditions have been corrected.
- B. Commencing work in an area will be considered acceptance of the existing conditions by that Installer.

No allowance or change order will be made for conditions that, in the opinion of the Architect, were foreseeable during the bidding period or reasonably inferable from the Contract Documents.

1.4 PREPARATION

- A. Install representative construction, such field samples, as specified in subsequent sections. Do not proceed with work execution until representative construction has been reviewed and approved by the Architect and Owner.
- B. Prepare materials for installation in accordance with referenced industry standards, manufacturer's instructions, and accepted trade practices. In exposed or finish work, mix or arrange materials for uniform blending and optimum arrangement according to the Architect's instructions.
- C. Lay out work in advance to ensure accurate spacing of surface patterns with uniform joint thicknesses and for accurate location of openings, joints, returns, and offsets.
- D. Surface Preparation
 - 1. Furnish, install, maintain, and remove as required all necessary temporary protections to safeguard persons and property in the vicinity of the surface preparation area prior to commencement of surface preparation procedures, including but not limited to protection of MEP systems and existing adjacent construction.
 - 2. Prepare surfaces to receive work in accordance with manufacturer's instructions, referenced standards and accepted trade practices.

1.5 EXECUTION, GENERAL

- A. The work shall be performed by skilled and, where applicable, by licensed installers. Where indicated in the Contract Documents, installers shall be approved by the manufacturer for installing the materials in the manner indicated.
- B. Install work in accordance with recognized trade practices, unless more stringent installation requirements are described in the Contract Documents or in the approved manufacturer's published installation instructions. For materials or systems that are specified to receive warranties, Work shall also comply with the requirements of the manufacturer.
- C. Construct work to the full elevations, widths, and thicknesses shown.
- D. Leave openings for equipment to be installed before completing work. After installing equipment, complete work to match the construction immediately adjacent to the opening.
- E. As work progresses, build in items furnished under other sections.

1.6 FINISHING

- A. Except where specifically noted to remain unfinished, prepare, prime, and finish exposed elements of installed materials and products, whether or not indicated on the Finish Schedule, and in a manner acceptable to the Owner and Architect.
 - 1. Finish surfaces of installed work that are not pre-finished by the manufacturer or fabricator, including but not limited to metal, wood, cementitious elements, and paper-covered elements.
 - 2. Finishing includes but is not limited to, as applicable, insulating, filling, and sealing joints between frames and substrates, surface preparation, priming and painting or staining and sealing in accordance with the manufacturer's recommendations and the Owner's finish scheme.
 - 3. Final colors and sheen will be selected by the Architect.
 - 4. Do not conceal or paint over labels, warnings, tags, certificates, or other information required by authorities having jurisdiction.
 - 5. Refer to Division 09 Sections and the manufacturer's instructions for additional finishing requirements.
 - 6. Seal the backs and edges of wood, gypsum board, insulation, and other potentially absorptive materials that will be exposed to damp or humid conditions.
 - 7. Isolate dissimilar metals from each other to prohibit galvanic action with felts or other similar materials whether indicated or not.
 - 8. Isolate metals and other corrosion-sensitive materials from components containing deleterious or otherwise reactive chemicals, including but not limited to pressure-treated wood, solvents, and incompatible sealants.
 - 9. Fill and seal all voids around penetrations through the walls, floors and ceiling assembly.
 - 10. Assure that fasteners selected are of the correct type for the applications indicated, are corrosion-resistant, and will not react with the penetrated substrates when installed. Space fasteners appropriately. Provide pre-finished fasteners when required for aesthetic effect.
 - 11. Account for thermal movement of installed materials in executing the Work. Incorporate washers, gaskets, movement joints, and other appropriate means according to manufacturer instructions and referenced standards.
 - 12. Coat primed and unprimed ferrous metals with suitable finish systems approved by the Architect.
 - 13. Unless otherwise indicated, do not paint, stain, or otherwise coat stainless steel, chrome, bronze, brass, or other metals that have received a defined mechanical finish and are intended to remain exposed.
 - 14. Refer to subsequent Sections and the manufacturer's instructions for additional requirements.

1.7 INSPECTION

- A. When inspection and testing of installed work is required by authorities having jurisdiction over the Project, schedule and be present during such inspections and tests and promptly act upon recommendations.
- B. When review and inspection of work by a manufacturer representative is a condition of a special project warranty, schedule and oversee such reviews and inspections and promptly act upon recommendations.

1.8 CLEANING

- A. Progress Cleaning: As the Work progresses, the General Contractor shall ensure that installed products are cleaned in accordance with the recommendations of the product manufacturer and referenced standards.

1.9 OPERATION AND ADJUSTMENT

- A. Start, operate, and adjust products in accordance with the manufacturer's instructions and recommendations to ensure proper function. Make adjustments or other remedial procedures as required.

1.10 DEMONSTRATION AND TRAINING

- A. Schedule demonstration and training sessions with Owner's facilities manager to review preventive maintenance procedures for operational building components.
 - 1. Engage manufacturer's authorized field technician to oversee and conduct demonstration and training activities.
 - 2. Review preventive maintenance procedures, including, as applicable, but not limited to:
 - a. Recommended schedule of maintenance procedures.
 - b. Lubrication of moving parts.
 - c. Replacement of belts, lamps, filters, and other components.
 - d. Cleaning procedures.
 - e. Troubleshooting procedures.
 - f. Warranty notification protocol.
- B. Schedule demonstration and training sessions with Owner's facilities manager to review cleaning procedures of all exposed surfaces.
- C. Obtain Owner's written statement that demonstration and training activities have been completed.

1.11 PROTECTION

- A. Provide all necessary protections to ensure that installed products are without damage or due deterioration as of the Date of Substantial Completion. Upon final acceptance of the work, remove temporary protections from the Project Site.

PART 2 – PRODUCTS (Not applicable)

PART 3 – EXECUTION (Not applicable)

END OF SECTION 01 7000

**SECTION 01 7300
EXECUTION**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Construction layout.
 - 2. Field engineering and surveying.
 - 3. Installation of the Work.
 - 4. Cutting and patching.
 - 5. Coordination of Owner-installed products.
 - 6. Progress cleaning.
 - 7. Starting and adjusting.
 - 8. Protection of installed construction.
- B. Related Requirements:
 - 1. Section 01 1000 "Summary of Work" for limits on use of Project site.
 - 2. Section 01 3000 "Administrative Requirements".
 - 3. Section 01 7700 "Contract Closeout Requirements" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, replacing defective work, and final cleaning.
 - 4. Section 02 4000 "Selective Demolition" for demolition and removal of selected portions of the building.

1.3 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of subsequent work.
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of subsequent work.

1.4 INFORMATIONAL SUBMITTALS

- A. Cutting and Patching Plan: Submit plan describing procedures at least five (5) days prior to the time cutting and patching will be performed. Include the following information:
 - 1. Extent: Describe reason for and extent of each occurrence of cutting and patching.
 - 2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in appearance and other significant visual elements.
 - 3. Products: List products to be used for patching and firms or entities that will perform patching work.
 - 4. Dates: Indicate when cutting and patching will be performed.
 - 5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.
 - a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.
- B. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal, if any.

1.5 QUALITY ASSURANCE

- A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
 - 1. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that result in increased maintenance or decreased operational life or safety. Operational elements include the following:
 - a. Primary operational systems and equipment.
 - b. Fire separation assemblies.
 - c. Air or smoke barriers.
 - d. Fire-suppression systems.
 - e. Plumbing piping systems.
 - f. Mechanical systems piping and ducts.
 - g. Control systems.
 - h. Communication systems.
 - i. Fire-detection and alarm systems.
 - j. Electrical wiring systems.
 - k. Operating systems of special construction.
 - 2. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that result in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:
 - a. Water, moisture, or vapor barriers.
 - b. Membranes and flashings.
 - c. Insulation
 - d. Equipment supports.
 - e. Piping, ductwork, vessels, and equipment.
 - 3. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- B. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
 - 1. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with sustainable design requirements.
- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
 - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of utilities and construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of utilities, mechanical and electrical systems, and other construction affecting the Work.
- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where

indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 2. Examine walls, floors, and ceilings for suitable conditions where products and systems are to be removed.
 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect.
- B. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 1. Make vertical work plumb and make horizontal work level.
 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
- C. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- D. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- E. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- F. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- G. Tools and Equipment: Where possible, select tools or equipment that minimize production of excessive noise levels.
- H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- I. Repair or remove and replace damaged, defective, or nonconforming Work.
 1. Comply with Section 01 7700 "Contract Closeout Requirements" for repairing or removing and replacing defective Work.

3.3 CUTTING AND PATCHING

- A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
- C. Temporary Support: Provide temporary support of work to be cut.
- D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 01 1000 "Summary of Work."
- F. Existing Utility Services and Mechanical / Electrical Systems: Where existing services / systems are required to be removed, relocated, or abandoned, bypass such services / systems before

cutting to minimize interruption to occupied areas. Follow Cleveland Clinic's standard notification for utility interruption / shut down.

- G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 - 4. Proceed with patching after construction operations requiring cutting are complete.
- H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
 - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
 - 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
 - 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, prepare substrate, and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
 - 4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
- I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.4 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
 - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 - 2. Do not hold waste materials more than seven days during normal weather or three (3) days if the temperature is expected to rise above 80 deg F.
 - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
 - a. Use containers intended for holding waste materials of type to be stored.
 - 4. Coordinate progress cleaning for joint-use areas where multiple contractors are working concurrently.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 - 1. Remove liquid spills promptly.

2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 01 5000 "Temporary Facilities and Controls."
- H. Limiting Exposures: General Contractor is to supervise construction operations to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.
- C. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 01 7300

**SECTION 01 7423
PRE-OCCUPANCY CLEANING**

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes cleaning procedures to be performed following construction operations and prior to occupancy by the Owner. All cleaning procedures shall be carried out according to the Owner's standard operating procedures, guidelines, and recommendations.

1.2 SUBMITTALS

- A. Submit a list all cleaning products proposed for use for the Owner's review and approval prior to application.
- B. Cleaning Company's Qualification Data: Submit written qualification data for the Contractor's proposed cleaning service, containing the information specified in the Quality Assurance article below, for the Owner's review and approval.
- C. Do not begin pre-occupancy cleaning procedures until the Owner has approved use of Cleaning Company and all submittals.

1.3 QUALITY ASSURANCE

- A. Cleaning Company Qualifications: The Construction Manager shall provide documentation of the following qualifications according to the Submittals article above.
 - 1. Contract cleaner shall be a professional company specializing in post-construction and maintenance cleaning of commercial buildings with not less than five (5) years in the cleaning industry.
 - 2. Contract cleaner shall employ bondable personnel.
 - 3. Contract cleaner shall assign trained personnel knowledgeable in the procedures of pre-occupancy and maintenance cleaning to the project site.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Cleaning agents and disinfectants shall be labeled with MSDS information stored in in construction areas according to each manufacturer's instructions.
- B. Disinfectants should be dispensed into clean, dry, appropriately-sized dispensing bottles that are clearly labeled and dated.

PART 2 - PRODUCTS

2.1 CLEANING PRODUCTS

- A. All cleaning products used in the Project shall comply with the Owner's standards.

PART 3 - EXECUTION

3.1 PRE-OCCUPANCY CLEANING

- A. Perform the pre-occupancy cleaning following approval of personnel and products by the Owner's Representative.
- B. Sequence: Begin pre-occupancy cleaning operations at the top floor and proceed down to the lower floor. Complete the cleaning required on each floor before proceeding to the next floor.
- C. Perform the pre-occupancy cleaning according to the Owner's standard procedures, including but not limited to the following requirements.
 - 1. Floor Maintenance:
 - a. Do not splash, disfigure, or damage baseboards, walls, stair risers, furniture, or equipment during cleaning operations.
 - b. Take proper precautions to advise building occupants of wet and/or slippery floor conditions during the cleaning operations.
 - c. Sweeping and Mopping:

- 1) Thoroughly sweep the floors to remove visible dirt and debris. Remove all visible paint marks and similar substances from floor surfaces.
- 2) After sweeping and damp mopping operations, all floors shall be clean and free of dirt streaks; no dirt shall be left in corners, behind equipment, under furniture, behind doors, on stair landings or treads. Entrances and all similar areas shall be swept clean of all dirt and trash.
- d. Wet Mopping and Scrubbing: On completion of mopping, the floors shall be clean and free of dirt, water streaks, mop marks, string, etc., properly rinsed, and dry to present an overall appearance of cleanliness. All surfaces shall be dry and corners and cracks clean after the wet mopping or scrubbing.
- e. Machine scrub concrete floors and wash with a germicidal cleaner.
- f. Vacuum carpeting thoroughly using commercial grade vacuum equipment with filtering media acceptable to the Owner.
- g. Sweep and mop luxury vinyl planks (LVP) and rubber flooring per manufacturer standards.
2. Dusting: Remove dust directly from the areas in which it lies by the most effective means such as appropriately treated dusting cloths, vacuum tools, etc. When doing high cleaning, dust shall not be allowed to fall from high areas onto furniture and equipment below. The following conditions shall exist after the completion of each dusting task:
 - a. There shall be no dust streaks.
 - b. Corners, crevices, moldings, and ledges shall be free of all dust.
 - c. There shall be no oils, spots or smudges on dusted surfaces caused by dusting tools.
 - d. When inspected by a flashlight, there shall be few traces of dust on any surface.
3. Damp Wiping: Use a clean damp cloth or sponge to remove all dirt, spots, streaks and smudges from walls, doors (both wood and metal), glass, countertops and other surfaces. When dry, the surfaces shall have a polished appearance. The wetting solution shall contain an appropriate cleaning agent.
 - a. When damp wiping in toilet rooms, an approved multi-purpose disinfectant cleaner shall be used.
4. Spot Cleaning: Following this operation, smudges, marks, or spots shall be removed from the designated areas without causing unsightly discoloration.
5. Fixtures and Equipment:
 - a. Clean and disinfect all equipment and fixtures, including, but not limited to plumbing fixtures, mirrors, shelving, dispensers, receptors, drinking fountains, partitions, and dispensers.
 - b. Plumbing fixtures (drinking fountains, wash basins, urinals, toilets, etc.) shall be thoroughly washed, using a germicidal solution, and dried, leaving no dust, spots, streaks or stains, rust, mold, encrustation, or excess moisture. The walls and floor adjacent to fixtures shall be free of spots, drippings, and water marks.
 - c. Light fixtures, including lenses, cover panels, side panels, louvers, fixture frames and lamps, shall be vacuumed and cleaned with a damp cloth.
 - d. HVAC supply vents, exhaust grilles and room fan coil units shall be thoroughly vacuumed and cleaned with a damp cloth.
7. Walls:
 - a. Dust and spot clean painted walls. In areas where spot cleaning will produce color differences, the entire wall shall be washed, cleaned and wiped dry.

- b. Damp wipe tiles walls. The entire tiled wall area shall be washed, cleaned and wiped dry.
- 9. Doors and Frames:
 - a. Touch up stain all marks on doors to match adjacent surfaces.
 - b. Clean and polish all unpainted metal on doors, including, but not limited to, trim, hardware, kickplates, push / pull plates and door knobs / levers.
 - c. Doors and frames shall be thoroughly cleaned and wiped dry without damaging applied finishes.
- 10. Stairwells: Sweep all stairs clean if uses by construction personnel
- 11. Entrances: Thoroughly sweep, vacuum, and wash entrances if used by construction personnel with a germicidal cleaner.
- 12. Elevator: Thoroughly sweep, vacuum, and wash elevator frame, floor, walls, and ceiling of elevator cab without damaging finishes.
- 12. Other:
 - a. Overhead items, such as louvers, grilles, pipes, molding, etc., shall be dusted, vacuumed and wiped clean.
 - b. Metal surfaces such as hardware, frames, cover plates, stainless steel sinks, corner guards, etc., shall be cleaned with a damp cloth and polished where required.
 - c. Furniture and equipment shall be wiped clean using special care, be responsible for damage to this equipment. Where the workers see a piece of equipment too delicate or have doubt regarding how to proceed, they will request further instructions from the Owner's Representative.
- 13. Trash Removal:
 - a. Collect and remove all refuse, debris, rubbish, and trash throughout the entire area of work. Unless otherwise directed by the Owner's Representative all collected matter shall be deposited in dumpsters of sanitation trucks provided by the Construction Manager, and removed from the site.

END OF SECTION 01 7423

**SECTION 01 7700
CONTRACT CLOSEOUT REQUIREMENTS**

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, apply to this Specification.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for contract closeout.
- B. Related Section: Section 01 7423 Pre-Occupancy Cleaning.

1.3 EQUIPMENT AND SYSTEMS: START-UP, TESTING, DEMONSTRATION AND TRAINING PROCEDURES

- A. Operation and Maintenance Manuals:
 - 1. Prepare and submit operation and maintenance manuals for equipment and systems installed on the Project. Submit to the Architect for review and response.
 - 2. Operation and maintenance manuals shall contain the following information:
 - a. General operating instructions, including procedures for start-up, shut-down, and systems analysis, and trouble-shooting guidelines.
 - b. Inspection and maintenance procedures and schedules.
 - c. Emergency instructions.
 - d. Names, addresses, and telephone numbers of the following, as applicable:
 - 1) Equipment, System, or Product Manufacturer.
 - 2) Local company representative.
 - 3) Local authorized service representatives.
 - 4) Local authorized dealer of maintenance materials and spare parts.
 - e. Spare parts list.
 - f. Copies of warranties, guarantees, maintenance and service agreements.
 - g. Wiring diagrams.
 - h. Shop Drawings and Product Data.
- B. Demonstration and Training: The General Contractor shall schedule demonstration and training of equipment and systems for the benefit of the Owner's personnel. Coordinate sessions with the Owner.
- C. Start-up and testing and demonstration / training activities shall be performed by trained personnel approved by the original equipment manufacturers.
- D. The General Contractor shall collect and maintain copies of all testing reports and training certifications. These items shall be included in the Operation and Maintenance Manuals specified elsewhere in this Section.

1.4 INSPECTIONS BY AUTHORITIES HAVING JURISDICTION

- A. The General Contractor shall schedule and attend all required inspections required by Authorities Having Jurisdiction over the Project and perform and document all corrections so ordered.
- B. The General Contractor shall schedule and attend all re-inspections required by the Authorities Having Jurisdiction and pay all associated fees required to obtain the Certificate of Occupancy.
- C. The General Contractor shall submit the Certificate of Occupancy to the Owner as a condition of final acceptance of the Project.

1.5 NOTIFICATION AND ARCHITECT'S PUNCLIST INSPECTION

- A. The General Contractor shall notify the Architect when the Work is substantially complete according to the Contract Documents. Upon receipt of the notice, Architect will schedule and perform a Punch List inspection.
- B. If it is discovered that the Work is not sufficiently complete for the punch list inspection, the Architect will stop the punch list inspection until the General Contractor completes the Work and provides assurance that the punch list inspection can resume.
- C. The Architect will submit a Punch List to the General Contractor identifying deficient work items that will require correction. The Construction Manager shall complete the items and provide written certification before the Construction Manager's final payment application is certified.

1.6 INSURANCE CHANGEOVER

- A. The General Contractor shall submit written understanding between the Owner and the General Contractor of pending insurance change over requirements.

1.7 RECORD DOCUMENTS AND WARRANTIES

- A. General: Protect record documents from deterioration and loss in a secure location. Provide access to record documents for the Architect's reference during normal working hours.
- B. Upon completion of the Work, submit record documents to the Architect for the Owner's records.
- C. Record Documents:
 - 1. Record Drawings: Maintain a clean, undamaged set of blue or black line white-prints of Contract Drawings and Shop Drawings. Identify where the installation varies substantially from the Work as originally shown. Mark drawings to show conditions fully and accurately. Where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.
 - a. Mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the Work.
 - b. Mark new information that is important to the Owner but was not shown on Contract Drawings or Shop Drawings.
 - c. Note related change-order numbers where applicable.
 - d. Organize record drawing sheets into manageable sets. Bind sets with durable-paper cover sheets; print suitable titles, dates, and other identification on the cover of each set.
 - 2. Record Specifications: Maintain one complete copy of the Project Manual, including addenda. Include with the Project Manual one copy of other written construction documents, such as Change Orders and modifications issued in printed form during construction.
 - 3. Record Product Data: Maintain one copy of each Product Data submittal. Note related Change Orders and markup of record drawings and Specifications.
 - 4. Record Photographs: Maintain electronic copy of all construction photographs taken prior to and during construction and provide a copy to Owner's representative and periodically per Owner's request and / or at project completion.
- D. Warranties:
 - 1. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications, and similar documents.
 - 2. Warranties shall be original documents prepared specifically for the Project by an authorized agent of the Warrantor and signed by both the Warrantor and the Contractor.

1.8 EXTRA MATERIALS, SPARE PARTS, AND KEYS

- A. Deliver tools, spare parts, extra stock, and similar items to the Owner's authorized representative. Obtain signed receipts for each item.
- B. Arrange for keys to be delivered directly to the Owner's authorized representative. Obtain signed confirmation of delivery.

1.9 DE-MOBILIZATION AND CLEANING

- A. Re-furbish permanent construction used for construction purposes.
 - 1. Change filters, belts, and other consumable components of permanent equipment and systems used during construction.
 - 2. Re-lamp and clean light fixtures used during construction period.
- B. Discontinue and remove temporary facilities and protections from the site.
- C. Remove mock-ups, construction tools, equipment and similar elements.
- D. General: The General Conditions require general cleaning during construction. Regular site cleaning is included in Section 01 5000 Temporary Facilities and Controls.
- E. Cleaning: Perform Pre-Occupancy Cleaning according to Section 01 7423.
- C. Removal of Protection: Remove temporary protections and facilities installed for protection of the Work during construction.

1.10 FINAL PAYMENT PROCEDURES

- A. Complete the following prerequisites for final payment:
 - 1. Submit final Application for Payment with the following attachments executed:
 - a. General Contractor's Affidavit of Payment of Debts and Claims.
 - b. General Contractor's Affidavit of Release of Liens
 - c. Waivers of Lien from all Subcontractors, Suppliers, and Materialmen.
 - d. Consent of Surety Company to Final Payment (if performance and payment bond is required.)
 - e. Special Owner requirements related to payroll records, insurance, and other items.
 - 2. Submit an updated final statement, accounting for final adjustments to the Contract Sum.
 - 3. Submit certification that all items on the Architect's punch list have been completed in accordance with the Contract or otherwise resolved for acceptance.
 - 4. Submit a certificate of continuing insurance coverage complying with insurance requirements.

PART 2 - PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION 01 7700

**SECTION 02 4000
SELECTIVE DEMOLITION**

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Demolition and removal of selected portions of building.
 - 2. Salvage of existing items to be reused or recycled.
- B. Related Requirements:
 - 1. Section 01 1000 "Summary of Work" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.
 - 2. Section 01 7300 "Execution" for cutting and patching procedures.

1.3 DEFINITIONS

- A. **Remove:** Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.
- B. **Remove and Salvage:** Detach items from existing construction, in a manner to prevent damage, and turn over to Owner for reinstallation.
- C. **Remove and Reinstall:** Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.
- D. **Existing to Remain:** Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of General Contractor.

1.5 INFORMATIONAL SUBMITTALS

- A. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and for noise control. Indicate proposed locations and construction of barriers.
- B. Schedule of Selective Demolition Activities: Indicate the following:
 - 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's building manager's and other tenants' on-site operations are uninterrupted.
 - 2. Interruption of utility services. Indicate how long utility services will be interrupted.
 - 3. Coordination for shutoff, capping, and continuation of utility services.
 - 4. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
- C. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.

1.6 CLOSEOUT SUBMITTALS

- A. Inventory: Submit a list of items that have been removed and salvaged.

1.7 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
 - 1. Before selective demolition, Owner will remove the following items:
 - a. Artwork, Furniture, IT Equipment, and 3rd party equipment.

- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
 - 1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner's representative. Hazardous materials will be removed by Owner under a separate contract.
- E. Storage or sale of removed items or materials on-site is not permitted.
- F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 - 1. Maintain fire-protection facilities in service during selective demolition operations.

1.8 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties. Notify warrantor before proceeding. Existing warranties include the following:
 - 1. The Roof.
- B. Notify warrantor on completion of selective demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

1.9 COORDINATION

- A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
Review Project Record Documents of existing construction or other existing condition information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.

3.2 UTILITY SERVICES AND MECHANICAL / ELECTRICAL SYSTEMS

- A. Existing Services / Systems to Remain: Maintain services / systems indicated to remain and protect them against damage.
- B. Existing Services / Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
 - 1. Owner will arrange to shut off indicated services/systems when requested by General Contractor.
 - 2. If services / systems are required to be removed, relocated, or abandoned, provide temporary services / systems that bypass area of selective demolition and that maintain continuity of services / systems to other parts of building.
 - 3. Disconnect, demolish, and remove plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.
 - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.

- b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
- c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
- d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
- e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
- f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
- g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

3.3 PROTECTION

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent areas, buildings and facilities to remain.
 - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
 - 2. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 - 3. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 01 5000 "Temporary Facilities and Controls."
- B. Remove temporary barricades and protections where hazards no longer exist.

3.4 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
 - 2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - 3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
 - 4. Maintain fire watch during and after flame-cutting operations.
 - 5. Maintain adequate ventilation when using cutting torches.
 - 6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 - 7. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 - 8. Dispose of demolished items and materials promptly.
- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with parking lots, driveways, roads, streets, walks, walkways, and other adjacent occupied and used facilities.
- C. Removed and Salvaged Items:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers.
 - 3. Store items in a secure area until delivery to Owner.
 - 4. Transport items to Owner's designated storage area.
 - 5. Protect items from damage during transport and storage.
- D. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
 3. Protect items from damage during transport and storage.
 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings." Do not use methods requiring solvent-based adhesive strippers.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.
1. Do not allow demolished materials to accumulate on-site.
 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- B. Burning: Do not burn demolished materials.

3.7 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 02 4000

**SECTION 03 3000
CAST-IN-PLACE CONCRETE**

PART 1 - GENERAL

1.1 SUMMARY

- A. See this section and specifications on drawing S00 for Cast-In-Place Concrete, including formwork, reinforcing, mix design, placement procedures, and finishes, for the following:
 - 1. Concrete slabs.
 - 2. Miscellaneous concrete work required for signage posts, and other items indicated.
- B. Related Sections:
 - 1. Section 07 9200 – Joint Sealants.

1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM).
 - 1. ASTM A 82 Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
 - 2. ASTM A 185 Standard Specification for Welded Wire Fabric, Plain, for Concrete Reinforcement
 - 3. ASTM A 615 Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
 - 4. ASTM C 31 Standard Test Methods of Making and Curing Concrete Specimens in the Field
 - 5. ASTM C 33 Standard Specification for Concrete Aggregates
 - 6. ASTM C 39 Standard Test Methods for Compressive Strength of Cylindrical Concrete Specimens.
 - 7. ASTM C 94 Standard Specification for Ready-Mixed Concrete
 - 8. ASTM C 138 Standard Test Method for Unit Weight, Yield and Air Content (Gravimetric) of Concrete
 - 9. ASTM C 143 Standard Test Method for Slump of Hydraulic Cement Concrete
 - 10. ASTM C 150 Standard Specification for Portland Cement
 - 11. ASTM C 172 Standard Practice for Sampling Freshly Mixed Concrete
 - 12. ASTM C 173 Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
 - 13. ASTM C 231 Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
 - 14. ASTM C 260 Standard Specification for Air-Entraining Admixtures for Concrete
 - 15. ASTM C 309 Standard Specification for Liquid Membrane-Forming Curing Compounds for Curing Concrete
 - 16. ASTM C 330 Standard Specification for Lightweight Aggregates for Structural Concrete
 - 17. ASTM C 494 Standard Specification for Chemical Admixtures for Concrete
 - 18. ASTM C 779 Standard Test Method for Abrasion Resistance of Horizontal Concrete Surfaces.
 - 19. ASTM C 881 Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
 - 20. ASTM E 96 Standard Test Methods for Water Vapor Transmission of Materials.
 - 21. ASTM E 303 Standard Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester.
 - 22. ASTM E 1155 Standard Test Methods for Determining FF Floor Flatness and FL Floor Levelness Numbers

23. ASTM E 1745 Standard Specification for Water Vapor Retarders Used in Contact with Soil or Granulated Fill Under Concrete Slabs.
- B. American Concrete Institute (ACI).
1. ACI 301, "Specifications for Structural Concrete for Buildings."
 2. ACI 318, "Building Code Requirements for Reinforced Concrete."
 3. ACI 117 "Standard Specifications for Tolerances for Concrete Construction and Materials."
 4. ACI 302 "Guide for Concrete Floor and Slab Construction."
 5. ACI 304 "Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete."
 6. ACI 305 "Hot Weather Concreting."
 7. ACI 306 "Cold Weather Concreting."
 8. ACI 308 "Standard Practice for Concrete Curing."
 9. ACI 309 "Standard Practice for Consolidation of Concrete."
 10. ACI 311.4 "Guide for Concrete Inspection."
 11. ACI 318 "Building Code Requirements for Reinforced Concrete."
- C. Concrete Reinforcing Steel Institute (CRSI).
1. "Manual of Standard Practice."

1.3 SUBMITTALS

- A. Product data:
1. Form release agent.
 2. Admixtures.
 3. Curing compounds.
 4. Vapor barrier sheet.
 5. Concrete sealers and densifiers.
 6. Cementitious materials and aggregates.
 7. Steel reinforcement and reinforcement accessories.
 8. Bonding agents.
 9. Repair materials.
- B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
1. Indicate amounts of mixing water to be withheld for later addition at Project site.
- C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.
- D. Joint Plan: Provide detailed plan showing proposed locations of control joints in concrete slabs.

1.4 QUALITY ASSURANCE

- A. Field Quality Control Testing: Refer to the Conditions of the Contract.

1.5 COORDINATION

- A. Coordinate concrete work with installation of items furnished by other trades, including but not limited to trench drains.

PART 2 – PRODUCTS

2.1 FORM MATERIALS

- A. Forms: Plywood, lumber, metal, or another acceptable material.
- B. Form Release Agent: Commercial formulation, non-staining, V.O.C. content 340 grams per liter maximum.
- C. Form Ties: Factory-fabricated, adjustable-length, removable or snap-off metal form ties.

2.2 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.
- B. Steel Wire: ASTM A 82, plain, cold-drawn steel.
- E. Welded Wire Fabric: ASTM A 185, welded steel wire fabric, flat sheets only.
- D. Supports for Reinforcement: Bolsters, chairs, spacers, and other devices complying With CRSI specifications.

2.3 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type I.
- B. Aggregates:
 - 1. Normal-weight aggregates: ASTM C 33,
 - 2. Light-weight aggregates: ASTM C330
 - 3. Exterior surfaces coarse aggregate shall be crushed limestone.
- C. Water: Potable.

2.4 RELATED MATERIALS

- A. Vapor Barrier:
 - 1. Vapor transmission rate: Not exceeding 0.006 gr./ft²/hr. (ASTM E 96).
 - 2. Permeance rating: Not exceeding 0.01 gr./ft²/hr. (ASTM E 96).
 - 3. Puncture resistance: Minimum 1970 grams (ASTM E 1745, Class B).
 - 4. Tensile Strength: Minimum 45.0 lbf/in. (ASTM E 1745).
 - 5. Acceptable Products:
 - a. *Stego Wrap* (15 mil), Stego Industries LLC.
 - b. *Perminator* (15 mil), W.R. Meadows, Inc.
 - c. *Vaporguard*, Reef Industries.
 - d. Accessories: High-density polyethylene tape by vapor barrier manufacturer.
- B. Moisture-Retaining Cover for Curing: 10 oz. bulap laminated to 4 mils white polyethylene sheet.
- C. Liquid Membrane-Forming Curing Compound: ASTM C 309, Type I, Class A.
- D. Bonding Agent: Polyvinyl acetate or acrylic base.
- E. Epoxy Adhesive: ASTM C 881, two-component material suitable for use on dry or damp surfaces. Provide material type, grade, and class to suit Project requirements.
- F. Concrete Sealer: Duro-Nox manufactured by Nox-Crete Products Group (800) 669-2738, or equivalent product approved by the Owner's Representative.

2.5 PROPORTIONING AND DESIGNING MIXES

- A. Design mixes: Refer to Structural drawings for critical properties of concrete mixes.

2.6 ADMIXTURES

- A. General: Admixtures shall not contain more than 0.1 percent chloride ions.
- B. Concrete Admixtures:
 - 1. Air-Entraining Admixture: ASTM C 260.
 - 2. Water-Reducing Admixture: ASTM C 494, Type A.
 - 3. High-Range Water-Reducing Admixture, Super Plasticizer: ASTM C 494, Type F.
 - 4. Water-Reducing, Accelerating Admixture: ASTM C 494, Type E.
 - 5. Water-Reducing, Retarding Admixture: ASTM C 494, Type D.

2.7 PROPORTIONING AND DESIGNING MIXES

- A. Prepare design mixes for each type and strength of concrete as specified in ACI 301. For the trial batch method, use an independent testing agency acceptable to Owner's Representative for preparing and reporting proposed mix designs. Submit written reports to Owner's Representative of each proposed mix for each class of concrete at least 15

days prior to start of Work. Do not begin concrete production until proposed mix designs have been reviewed by Owner's Representative.

- B. Design mixes to provide normal weight concrete with the properties as indicated on drawings.
- C. Slump Limits: Refer to Structural Drawings and Structural Notes.
- D. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, as accepted by Owner.

2.8 ADMIXTURES

- A. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) in concrete, as required, for placement and workability.
- B. Use air-entraining admixture in exterior exposed concrete at manufacturer's prescribed rate to result in concrete at point of placement having total air content with a tolerance of plus or minus 1-1/2 percent within the following limits, in accordance with ASTM C 94, Table 3:

Exposure	3/8" aggregate	1/2" aggregate	3/4" aggregate	1" aggregate
Mild	4.5% air	4.0% air	3.5% air	3.0% air
Moderate	6.0% air	5.5% air	5.0% air	4.5% air
Severe	7.5% air	7.0% air	6.0% air	6% air

- C. Use admixtures for water reduction and retarding in strict compliance with manufacturer's directions.

2.9 CONCRETE MIXING

- A. Ready-Mixed Concrete: Comply with requirements of ASTM C 94, and as follows:
 - 1. When air temperature is between 85 deg F (30 deg C) and 90 deg F (32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

2.10 CONCRETE SEALER:

- A. One Application of Aquapel Plus, folowed by a topcaot of pertrotex manufactured by L & M Construction chemicals (421) 630-8277, or equivalent products manufactured by Dur-O-Nox.

PART 3 - EXECUTION

3.1 FORMS

- A. Formwork Tolerances: Comply with the following ACI 347 limits:
 - 1. Provide Class A tolerances for concrete surfaces exposed to view.
 - 2. Provide Class C tolerances for other concrete surfaces.
- B. General: Coat contact surfaces of forms with form-coating compound prior to placing reinforcement. Do not allow excess form-coating material to accumulate in forms or come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply according to manufacturer's instructions.

3.2 VAPOR BARRIER INSTALLATION

- A. General: Place sheeting in position with longest dimension parallel with direction of pour. Vapor barrier shall be placed in accordance with manufacturer's instructions.
- B. Lap joints and seal with manufacturer's recommended pressure-sensitive tape.

3.3 PLACING REINFORCEMENT

- A. General: Comply with CRSI's recommended practice for "Placing Reinforcing Bars," for details and methods of reinforcement placement and supports and as indicated on Structural Drawings and "General Notes."
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials that reduce or destroy bond with concrete. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as approved by Owner's Representative.
- C. Place reinforcement to maintain minimum coverages as indicated for concrete protection. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations.
- D. Install welded wire fabric in sheets only. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

3.4 INSTALLING EMBEDDED ITEMS

- A. General: Set and build into formwork anchorage devices and other embedded items required for other work that is attached to or supported by cast-in-place concrete. Use setting drawings, diagrams, instructions, and directions provided by suppliers of items to be attached.
- B. Forms for Slabs: Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and contours in finished surfaces. Provide and secure units to support screed strips using strike-off templates or compacting-type screeds.

3.5 CONCRETE PLACEMENT

- A. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast in. Notify other trades to permit installation of their work.
- B. General: Comply with ACI 304, "Guide for Measuring, Mixing, Transporting, and Placing Concrete," and as specified.
- C. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened sufficiently to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation at its final location.
- D. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers no deeper than 24 inches and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete complying with ACI 309.
- E. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until completing placement of a panel or section.
 - 1. Consolidate concrete during placement operations so that concrete is thoroughly worked around reinforcement, other embedded items and into corners.
 - 2. Bring slab surfaces to correct level with a straightedge and strike off. Use bull floats or darbies to smooth surface free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
 - 3. Maintain reinforcing in proper position on chairs during concrete placement.
- F. Cold-Weather Placement: Comply with provisions of ACI 306. When air temperature has fallen to or is expected to fall below 40 deg F (4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) at point of placement.
 - 1. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

2. Do not use calcium chloride, salt, or other materials containing antifreeze agents. Do not use chemical accelerators unless otherwise accepted in mix designs.
- G. Hot-Weather Placement: When hot weather conditions exist that would impair quality and strength of concrete, place concrete complying with ACI 305.

3.6 JOINTS

- A. Contraction (Control) Joints in Slabs: Saw cuts 1/8 inch wide by 1/4 of slab depth.

3.7 MONOLITHIC SLAB FINISHES

- A. Slope concrete surfaces evenly to drains. Slab finish designations specified comply with ASTM E 1155.
- B. Float Finish (Flt-Fn) - Not Critical Floor Tolerance:
 1. Specified Overall Value: FF 25/FL 20.
 2. Minimum Local Value: FF 20/FL 17.
 3. Apply float finish to monolithic slab surfaces that are to receive trowel finish and other thick finishes as hereinafter specified, and slab surfaces which are to be covered with waterproofing membrane.
- C. Trowel Finish 2 (Tr-Fn2):
 1. Specified Overall Value: FF 36/FL 25.
 2. Minimum Local Value: FF 30/FL 22.
 3. Apply trowel finish to monolithic slab surfaces that are to receive resilient flooring, carpet, or other thin finish system.
- D. Nonslip Broom Finish (NsBrm-Fn): Apply nonslip broom finish to exterior concrete platforms, steps and ramps.
 1. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber bristle broom, perpendicular to main traffic route.

CONCRETE SCHEDULE		
ITEM OR STRUCTURE	FINISH	COMPRESSIVE STRENGTH AND OTHER REQUIREMENTS
Interior concrete not otherwise indicated	RfFm-Fn SmFm-Fn, if exposed	4000 P.S.I. at 28 days <i>Max W/C Ratio = 0.44</i>
Interior formed concrete exposed to view	SmFm-Fn	4000 P.S.I. at 28 days <i>Max W/C Ratio = 0.50</i>
Exposed interior floor slabs and interior slabs scheduled to receive resilient flooring finishes	Tr-Fn1 Tr-Fn2 Tr-Fn3	3000 P.S.I. at 28 days <i>Max W/C Ratio = 0.55</i>
Exterior formed concrete exposed to view; exterior concrete not otherwise indicated	NsBrm-Fn Grt-Cl-Fn	4000 P.S.I. at 28 days 4% - 7% entrainment <i>Max W/C Ratio = 0.40</i>

3.8 CONCRETE CURING AND PROTECTION

- A. Wet curing method: polyethylene coated burlap cover.

3.9 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place, and cure concrete as specified to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete Work.

3.10 CONCRETE CURING AND PROTECTION

- A. General: Protect freshly placed concrete from premature drying, excessive cold or hot temperatures, and rapid moisture loss before and during finishing operations with an evaporation-control material. Apply according to manufacturer's instructions after screeding and bull floating, but before power floating and troweling.
- B. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.
- C. Do not use membrane-forming curing compounds for curing slabs to receive hardeners, sealers, or applied finishes. Perform wet curing with polyethylene coated burlap cover.
- D. Apply floor hardeners and sealers in accordance with the manufacturer's instructions.

3.11 REMOVING FORMS

- A. General: Formwork not supporting weight of concrete, such as sides of walls and similar parts of the work, may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form-removal operations, and provided curing and protection operations are maintained.
- B. Formwork supporting weight of concrete may not be removed in less than 14 days or until concrete has attained at least 75 percent of design minimum compressive strength at 28 days. Determine potential compressive strength of in-place concrete by testing field-cured specimens representative of concrete location or members.

3.12 REUSING FORMS

- A. Clean and repair surfaces of forms to be reused in the Work.

3.13 CONCRETE REPAIRS

- A. Remove and replace concrete with defective surfaces. Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

3.14 QUALITY CONTROL TESTING

Test	Requirements	Standards	Frequency of Testing
Slump	1. Refer to Structural Drawings.	ASTM C 143	One test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.
Air Content	1. Refer to Structural Drawings.	ASTM C 231 (pressure method) for normal weight concrete; ASTM C 173 (volumetric method) for lightweight concrete	One test for each day's pour of each type of air-entrained concrete.
Concrete Temperature	In-place temperature of concrete shall not exceed 80 deg F. In-place temperature of concrete shall not be less than 50 deg F.	ACI 304, 305, and 306.	Test hourly when air temperature is 40 deg F (4 deg C) and below, when 80 deg F (27 deg C) and above, and each time a set of compression test specimens is made.

Compressive Strength	1. Refer to Structural Drawings.	Comply with ASTM C 31; one set of 4 standard cylinders for each compressive strength test. Comply with ASTM C 39.	One set for each day's pour exceeding 5 cu. yds.; one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.
Unit Weight		ASTM C138	

Notes:

1. When frequency of testing will provide fewer than 5 strength tests for a given class of concrete, test from at least 5 randomly selected batches or from each batch if fewer than 5 are used.
2. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
3. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength, and no individual strength test result falls below specified compressive strength by more than 500 psi.
4. Testing service shall provide an on-site cure box for cylinder storage during inclement weather.
5. For each set of four cylinders, test two at 7 days and two at 28 days. Perform 28-day tests regardless of the results of the 7-day tests.

- A. Test results will be reported in writing to Owner's Representative, Structural Engineer, Ready-Mix Producer, and CMR within 24 hours after tests. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-day tests and 28-day tests

3.15 PROTECTION

- A. Protect concrete from damage from construction operations until final acceptance. Erect barricades, signs, and other means of protection as required.
- B. Do not permit pedestrian traffic on concrete surfaces until moisture curing is completed.
- C. Do not permit vehicular traffic on concrete surfaces for a period of 28 days following placement.

END OF SECTION 03 3000

**SECTION 06 0500
COMMON WORK RESULTS FOR WOOD, PLASTIC, AND COMPOSITES**

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract including Division 01 – Specification sections apply to work of this section.

1.2 SECTION INCLUDES

- A. General product and work results requirements for subsequent Division 06 Sections.

1.3 SUBMITTALS

- A. Manufacturer's color charts showing the full range of colors, textures, and patterns available for each type of material indicated.
- B. Shop Drawings: Show profiles, thicknesses, finishes, joints, ornamentation, installation tolerances, and anchorage details. Indicate attachment methods, embedded supports, reinforcement, fabrication methods, joint treatments, clearances, and supports.

1.4 QUALITY ASSURANCE

- A. Lumber Standards: Comply with DOC PS 20, "American Softwood Lumber Standard," and with applicable grading rules of inspection agencies certified by ALSC's Board of Review.
- B. Inspection Agencies: Inspection agencies, and the abbreviations used to reference them, include the following:
 - 1. Northeastern Lumber Manufacturers Association (NeLMA)
 - 2. National Lumber Grades Authority (NLGA)
 - 3. Southern Pine Inspection Bureau (SPIB)
- C. Grade Stamps: Provide lumber with each piece factory marked with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill.
- D. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
 - 1. Provide dressed lumber, S4S, unless otherwise indicated.
 - 2. Provide dry lumber with 19 percent maximum moisture content at time of dressing for 2-inch nominal thickness or less, unless otherwise indicated.
 - 3. Provide lumber with 15 percent maximum moisture content at time of dressing for 2-inch nominal thickness or less, unless otherwise indicated.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Environmental Requirements: Do not deliver materials or commence installation until the building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

1.6 PROJECT CONDITIONS

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural work can be supported and installed as indicated.

PART 2 – PRODUCTS

2.1 MATERIALS, GENERAL

- A. Refer to subsequent Division 06 Sections for specific material requirements.
- B. Do not use materials with defects that impair quality of rough carpentry or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

2.2 MISCELLANEOUS MATERIALS

- A. Fasteners and Anchors: Provide nails, screws, and other anchoring devices of the type, size, material, and finish required for application indicated to provide secure attachment, concealed where possible, and complying with applicable Federal Specifications. Provide in sufficient length to penetrate minimum of 1-1/2 inches into substrate, unless otherwise recommended by manufacturer.
 - 1. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections. Install fasteners without splitting wood.

2.3 FABRICATION

- A. Wood Moisture Content: Comply with requirements of specified inspection agencies and manufacturer's recommendations for moisture content of carpentry on relative humidity conditions existing during time of fabrication and in installation areas.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerance and other conditions affecting installation and performance of work. Do not proceed with installation until unsatisfactory conditions have been corrected.
- B. Do not install materials damaged by water or mold.

3.2 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.
- B. Condition wood to average prevailing humidity conditions in installation areas before installation, for a minimum of 48 hours unless longer conditioning is recommended by manufacturer.
- C. Ensure that all electrical or other services are in place.

3.3 INSTALLATION

- A. Discard units of material which are unsound, warped, bowed, twisted improperly treated, not adequately seasoned or too small to fabricate work with minimum of joints or optimum jointing arrangements. Do not use manufactured units with defective surfaces, sizes, or patterns.
- B. Install the work plumb, level, true, and straight with no distortions. Shim as required using concealed shims. Install to a tolerance of 1/8" in 10'-0" for plumb and level countertops; and with 1/16" maximum offset in flush adjoining 1/16" maximum offsets in revealed adjoining surfaces.
- C. Scribe and cut work to fit adjoining work, and refinish cut surface or repair damaged finish at cuts.
- D. Finish according to specified requirements.
- E. Anchor carpentry as indicated. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation. Except where prefinished matching fastener heads are required, use fine finishing nails for exposed nailings, countersunk and filled flush with finished surface, and matching final finish where transparent is indicated.

3.4 ADJUSTMENT, CLEANING, FINISHING, AND PROTECTION

- A. Repair damaged and defective carpentry work wherever possible to eliminate visual and functional defects. Replace woodwork that cannot be repaired to the Owner's satisfaction. Adjust joinery for uniform appearance.
- B. Clean work on exposed and semi-exposed surfaces.
- C. Refer to Division 09 Sections for final finishing requirements.

- D. Provide final protection and maintain conditions necessary to ensure that work will be without damage or deterioration at time of acceptance.

END OF SECTION 06 0500

**SECTION 06 1000
ROUGH CARPENTRY**

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract including Division 01 – Specification sections apply to work of this section.

1.2 SUMMARY

- A. Concealed wood blocking, nailers, supports and backer panels.

1.3 SUBMITTALS

- A. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.

PART 2 – PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
 - 1. Species: Spruce-Pine-Fir (South), unless otherwise indicated.
 - 2. Lumber of other species or grades is acceptable provided structural and appearance characteristics are equivalent to or better than products specified.

2.2 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

- A. Grading Agency: Southern Pine Inspection Bureau, Inc. (SPIB).
- B. Sizes: Nominal sizes as indicated on drawings, S4S.
- C. Moisture Content: S-dry or MC19.
- D. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
 - 1. Lumber: S4S, No. 2 or Standard Grade.
 - 2. Boards: Standard or No. 3.

2.3 CONSTRUCTION PANELS

- A. Communications, Fire, and Electrical Mounting Boards: PS 1 A-D plywood, or medium density fiberboard; 3/4 inch thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84

2.4 ACCESSORIES

- A. Fasteners and Anchors:
 - 1. Drywall Screws: Bugle head, hardened steel, power driven type, length three times thickness of sheathing.
 - 2. Anchors: Expansion shield and lag bolt type for anchorage to solid masonry or concrete.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerance and other conditions affecting installation and performance of finish carpentry. Do not proceed with installation until unsatisfactory conditions have been corrected.
- B. Do not install materials damaged by water or mold.

3.2 PREPARATION

- A. See Specification Section 06 0500 “Common Work Results for Wood, Plastic, and Composites”.

3.3 INSTALLATION

- A. See Specification Section 06 0500 "Common Work Results for Wood, Plastic, and Composites".

3.4 BLOCKING, NAILERS, AND SUPPORTS

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
- B. In metal stud walls, provide continuous blocking for millwork, securely attached to stud framing.
- C. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
- D. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.
- E. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. NES NER-272 for power-driven fasteners.
 - 2. Ohio Building Code, Table 2304.9.1, "Fastening Schedule."
- F. Items requiring non-structural framing and blocking include but are not limited to:
 - 1. Cabinets and shelf supports.
 - 2. Wall brackets for support of countertops.
 - 3. Toilet room grab bars.
 - 4. Wall-mounted door stops.

3.5 TOLERANCES

- A. Framing Members: 1/16 inch from true position, maximum.
- B. Variation from Plane: 1/16 inch in 10 feet maximum, and 1/8 inch in 30 feet maximum.

END OF SECTION 06 1000

**SECTION 06 2000
FINISH CARPENTRY**

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Finish carpentry items.
- B. Hardware and attachment accessories.
- C. Wood Paneling.

1.2 RELATED REQUIREMENTS

- A. Section 09 9000 - Painting: Painting and finishing of finish carpentry items.

1.3 REFERENCE STANDARDS

- A. AWI/AWMAC (QSI) - Architectural Woodwork Quality Standards Illustrated; Architectural Woodwork Institute and Architectural Woodwork Manufacturers Association of Canada; 2005, 8th Ed., Version 2.0.
- B. WI (MAN) - Manual of Millwork; Woodwork Institute; 2003.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the work with plumbing rough-in, electrical rough-in, and installation of associated and adjacent components.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data:
- C. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, accessories, to a minimum scale of 1-1/2 inch to 1 ft.
- D. Samples: Submit two (2) samples of wood trim 8inch long.

1.6 QUALITY ASSURANCE

- A. Plywood: Certified by the American Plywood Association.
 - 1. Hardwood Lumber: In accordance with NHLA Grading Rules; www.natlhardwood.org.
- B. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five (5) years of documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect work from moisture damage.

PART 2 – PRODUCTS

2.1 FINISH CARPENTRY ITEMS

- A. Quality Grade: Unless otherwise indicated provide products of quality specified by AWI//AWMAC/WI Architectural Woodwork Standards for Premium Grade.
- B. Unless otherwise indicated provide products of quality specified by AWI Architectural Woodwork Quality Standards Illustrated for Premium grade.
- C. Unless otherwise indicated provide products of quality specified by Woodwork Institute Manual of Millwork for Premium grade.

2.2 WOOD-BASED COMPONENTS

- A. Wood fabricated from old growth timber is not permitted.
- B. Provide wood harvested within a 500-mile radius of the project site.
- C. Wood fabricated from timber recovered from riverbeds or otherwise abandoned is permitted, unless otherwise noted, provided it is clean and free of contamination; identify source; provide lumber re-graded by an inspection service accredited by the American Lumber Standard Committee, Inc.

2.3 LUMBER MATERIALS

- A. Hardwood Lumber: Oak / Red Oak match existing wood species, quarter sawn, maximum moisture content of 6 percent; with vertical grain, of quality suitable for transparent finish.
- B. Prefinished Composite Wood Products: Products made of composite softwood and polymer products suitable for trim work. 4" high base and 2.5" would casing or trim, prefinished, architect to select from manufacturer's standard colors.

2.4 FASTENINGS

- A. Fasteners: Of size and type to suit application; flush finished finish in concealed locations and counter sunk and filled finish in exposed locations.

2.5 ACCESSORIES

- A. Primer: Alkyd primer sealer.
- B. Wood Filler: Solvent base, tinted to match surface finish color.

2.6 FABRICATION

- A. Shop assemble work for delivery to site, permitting passage through building openings.
- B. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

2.7 SHOP FINISHING

- A. Sand work smooth and set exposed nails and screws.
- B. Apply wood filler in exposed nail and screw indentations.
- C. On items to receive transparent finishes, use wood filler that matches surrounding surfaces and is of type recommended for the applicable finish.
- D. Back prime woodwork items to be field finished, prior to installation.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verify adequacy of backing and support framing.
- B. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.

3.2 INSTALLATION

- A. Install work in accordance with AWI/AWMAC/WI Architectural Woodwork Standards requirements for grade indicated.
- B. Set and secure materials and components in place, plumb and level.
- C. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.

3.3 PREPARATION FOR SITE FINISHING

- A. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth.
- B. Site Finishing: See Section 09 9000.
- C. Before installation, prime paint surfaces of items or assemblies to be in contact with cementitious materials.

3.4 TOLERANCES

- A. Maximum Variation from True Position: 1/16 inch.
- B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

3.5 SCHEDULE

- A. Interior:
 - 1. Door: White birch; prepare for Stain finish.
 - 2. Moldings, Casings, and Miscellaneous Trim: White birch; prepare for stain finish or composite wood lumber products may be used

END OF SECTION 06 2000

**SECTION 06 2023
INTERIOR FINISH CARPENTRY**

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Interior board paneling.
 - 2. Interior trim.

1.2 ACTION SUBMITTALS

- A. Samples: For each exposed product and for each color and texture specified.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with applicable rules of any rules-writing agency certified by the American Lumber Standard Committee's (ALSC) Board of Review. Grade lumber by an agency certified by the ALSC's Board of Review to inspect and grade lumber under the rules indicated.
 - 1. Factory mark each piece of lumber with grade stamp of grading agency.
 - 2. For exposed lumber, mark grade stamp on end or back of each piece.
- B. Softwood Plywood: DOC PS 1.
- C. Hardboard: ANSI A135.4.
- D. Melamine-Faced Particleboard: Particleboard complying with ANSI A208.1, Grade M-2, finished on both faces with thermally fused, melamine-impregnated decorative paper and complying with NEMA LD 3, Grade VGL, for Test Methods 3.3, 3.4, 3.6, 3.8, and 3.10.
 - 1. Color: As selected by Architect from manufacturer's full range

2.2 INTERIOR TRIM

- A. Softwood Lumber Trim for Transparent Finish (Stain or Clear Finish):
 - 1. Species and Grade: See Drawings.
 - 2. Maximum Moisture Content: 15 percent with at least 85 percent of shipment at 12 percent or less.
 - 3. Finger Jointing: Not allowed.
 - 4. Face Surface: Surfaced (smooth).
- B. Hardwood Lumber Trim for Transparent Finish (Stain or Clear Finish):
 - 1. Species and Grade: See Drawings.
 - 2. Maximum Moisture Content: 13 percent.
 - 3. Finger Jointing: Not allowed.
 - 4. Gluing for Width: Not allowed.
 - 5. Veneered Material: Not allowed.
 - 6. Face Surface: Surfaced (smooth).
 - 7. Matching: Selected for compatible grain and color.
- C. Softwood Moldings for Transparent Finish (Stain or Clear Finish): MMPA WM 4, N-grade wood moldings. Made to patterns included in MMPA's "WM/Series Softwood Molding Patterns."
 - 1. Species: See drawings.
 - 2. Maximum Moisture Content: 15 percent with at least 85 percent of shipment at 12 percent or less.
 - 3. Finger Jointing: Not allowed.
 - 4. Matching: Selected for compatible grain and color.
 - 5. Base Pattern: See drawings,
- D. Hardwood Moldings for Transparent Finish (Stain or Clear Finish): MMPA WM 4, N-grade wood moldings made to patterns included in MMPA's "HWM/Series Hardwood Molding Patterns."
 - 1. Species: See Drawings.
 - 2. Maximum Moisture Content: 9 percent.
 - 3. Finger Jointing: Not allowed.

4. Matching: Selected for compatible grain and color.
5. Optional Material: Kiln-dried softwood or MDF, with exposed surfaces veneered with species indicated, may be used in lieu of solid wood.
6. Base Pattern: See Drawings.

2.3 Wood Plank PANELING

- A. Board Paneling:
1. Species and Grade: Eastern white pine; NeLMA or NLGA C Select.
 2. Species and Grade: Owner Furnished Contractor installed.
 3. Maximum Moisture Content: 15 percent with at least 85 percent of shipment at 12 percent or less.
 4. Pattern: TBD.
 5. Net Coverage Width: Sa shown on drawings.

2.4 MISCELLANEOUS MATERIALS

- A. Fasteners for Interior Finish Carpentry: Nails, screws, and other anchoring devices of type, size, material, and finish required for application indicated to provide secure attachment, concealed where possible.
- B. Low-Emitting Materials: Adhesives shall comply with testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.
- B. Before installing interior finish carpentry, condition materials to average prevailing humidity in installation areas for a minimum of 24 hours, unless longer conditioning is recommended by manufacturer.

3.2 INSTALLATION, GENERAL

- A. Install interior finish carpentry level, plumb, true, and aligned with adjacent materials.
1. Use concealed shims where necessary for alignment.
 2. Scribe and cut interior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.
 3. Where face fastening is unavoidable, countersink fasteners, fill surface flush, and sand unless otherwise indicated.
 4. Install to tolerance of 1/8 inch in 96 inches for level and plumb. Install adjoining interior finish carpentry with 1/32-inch maximum offset for flush installation and 1/16-inch maximum offset for reveal installation.
 5. Coordinate interior finish carpentry with materials and systems in or adjacent to it. Provide cutouts for mechanical and electrical items that penetrate interior finish carpentry.

3.3 STANDING AND RUNNING TRIM INSTALLATION

- A. Install trim with minimum number of joints as is practical, using full-length pieces from maximum lengths of lumber available.
1. Do not use pieces less than 24 inches long.
 2. Stagger joints in adjacent and related standing and running trim.
 3. Match existing corners at returns, miter at outside corners, and cope at inside corners to produce tight-fitting joints with full-surface contact throughout length of joint.
 4. Use scarf joints for end-to-end joints.
 5. Plane backs of casings to provide uniform thickness across joints where necessary for alignment.
 6. Match color and grain pattern of trim for transparent finish (stain or clear finish) across joints.

7. Install trim after gypsum-board joint finishing operations are completed.
8. Install without splitting; drill pilot holes before fastening where necessary to prevent splitting.
9. Fasten to prevent movement or warping.
10. Countersink fastener heads on exposed carpentry work and fill holes.

3.4 PANELING INSTALLATION

A. Hardboard Paneling:

1. Arrange in pattern shown on drawings, with boards / planks of uniform width.
2. Install in full lengths without end joints when possible.
3. Stagger end joints in random pattern to uniformly distribute joints on each wall.
4. Install with uniform end joints. Locate end joints only over furring or blocking.
5. Select and arrange boards on each wall to minimize noticeable variations in grain character and color between adjacent boards.
6. Install with uniform tight joints between boards.
7. Fasten boards by face nailing, setting nails, and filling over nail heads.

END OF SECTION 06 2023

SECTION 06 4023
INTERIOR ARCHITECTURAL WOODWORK

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Interior standing and running trim.
 - 2. Wood Beams.
 - 3. Wood furring, blocking, shims, and hanging strips for installing interior architectural woodwork items that are not concealed within other construction.
 - 4. Shop priming of interior architectural woodwork.
 - 5. Shop finishing of interior architectural woodwork.
- B. Related Requirements:
 - 1. Section 06 1000 "Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing interior architectural woodwork that are concealed within other construction before interior architectural woodwork installation.
 - 2. Section 06 2023 "Interior Finish Carpentry" for interior carpentry exposed to view that is not specified in this Section.

1.3 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections, to ensure that interior architectural woodwork can be supported and installed as indicated.

1.4 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Anchors.
 - 2. Adhesives.
 - 3. Shop finishing materials.
 - 4. Wood-Preservative Treatment:
 - a. Include data and warranty information from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.
 - b. Indicate type of preservative used and net amount of preservative retained.
 - c. Include chemical-treatment manufacturer's written instructions for finishing treated material and manufacturer's written warranty.
 - 5. Waterborne Treatments: For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
- B. Shop Drawings:
 - 1. Include the following:
 - a. Dimensioned plans, elevations, and sections.
 - b. Attachment details.
 - 2. Show large-scale details.
 - 3. Show locations and sizes of furring, blocking, and hanging strips, including blocking and reinforcement concealed by construction and specified in other Sections.
 - 4. Apply AWI Quality Certification Program label to Shop Drawings.
- C. Samples: For each exposed product and for each shop-applied color and finish specified.
 - 1. Size:
 - a. Panel Products: 12 inches by 12 inches.
 - b. Lumber Products: Not less than 5 inches wide by 12 inches long, for each species and cut, finished on one side and one edge.

- D. Samples for Initial Selection: For each type of shop-applied exposed finish.
 - 1. Size:
 - a. Panel Products: 12 inches by 12 inches.
 - b. Lumber Products: Not less than 5 inches wide by 12 inches long, for each species and cut, finished on one side and one edge.
- E. Samples for Verification: For the following:
 - 1. Lumber for Transparent Finish: Not less than 5 inches wide by 12 inches, for each species and cut, finished on one side and one edge.
 - 2. Veneer Leaves: Representative of and selected from flitches to be used for transparent-finished interior architectural woodwork.
 - 3. Lumber and Panel Products with Shop-Applied Opaque Finish: 5 inches wide by 12, for panels, for each finish system and color.
 - a. Finish **entire** exposed surface.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For architectural woodwork manufacturer and Installer.
- B. Product Certificates: For the following:
 - 1. Composite wood and agrifiber products.
 - 2. Adhesives.
- C. Evaluation Reports: For preservative-treated and fire-retardant-treated wood materials, from ICC-ES.
- D. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

- A. Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

1.7 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
 - 1. Manufacturer's Certification: Licensed participant in AWI's Quality Certification Program.
 - 2. Installer Qualifications: Manufacturer of products and Licensed participant in AWI's Quality Certification Program.
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - 1. Build mockups of typical interior architectural woodwork as shown on Drawings.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Owner specifically approves such deviations by Change Order.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Comply with the Architectural Woodwork Standards, Section 2.
- B. Do not deliver interior architectural woodwork until painting and similar finish operations that might damage woodwork have been completed in installation areas.
- C. Store woodwork in installation areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.
 - 1. Handle and store fire-retardant-treated wood to comply with chemical treatment manufacturer's written instructions.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install interior architectural woodwork until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature

and relative humidity at levels designed for building occupants for the remainder of the construction period.

- B. Environmental Limitations: Do not deliver or install interior architectural woodwork until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 degrees F and relative humidity between 25 and 55 percent during the remainder of the construction period.
- C. Field Measurements: Where interior architectural woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings.
 - 1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being concealed by construction, and indicate measurements on Shop Drawings.
- D. Established Dimensions: Where interior architectural woodwork is indicated to fit to other construction, establish dimensions for areas where woodwork is to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.10 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that architectural woodwork can be supported and installed as indicated.

PART 2 - PRODUCTS

2.1 ARCHITECTURAL WOODWORK, GENERAL

- A. Quality Standard: Unless otherwise indicated, comply with the Architectural Woodwork Standards for grades of interior architectural woodwork indicated for construction, finishes, installation, and other requirements.
 - 1. Provide labels from AWI certification program indicating that woodwork [and installation] complies with requirements of grades specified.
 - 2. The Contract Documents contain requirements that are more stringent than the Architectural Woodwork Standards. Comply with Contract Documents and Architectural Woodwork Standards.

2.2 INTERIOR STANDING AND RUNNING TRIM FOR STAINED FINISH

- A. Architectural Woodwork Standards Grade: Custom.
 - 1. Wood Species: As indicated on Drawings and / or Finish Schedule.
 - 2. Wood Moisture Content: 5 to 10 percent.

2.3 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Nailers: Softwood or hardwood lumber kiln-dried to less than 13 percent moisture content.
 - 1. Fire-Retardant Treatment: Complying with requirements; provide where indicated.
- B. Provide self-drilling screws for metal-framing supports, as recommended by metal-framing manufacturer.
- C. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage.
 - 1. Provide metal expansion sleeves or expansion bolts for post-installed anchors.
 - 2. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.
- D. Installation Adhesive: Product recommended by fabricator for each substrate for secure anchorage.

2.4 FABRICATION

- A. Sand fire-retardant-treated wood lightly to remove raised grain on exposed surfaces before fabrication.

- B. Fabricate interior architectural woodwork to dimensions, profiles, and details indicated.
 - 1. Ease edges to radius indicated for the following:
 - a. Edges of Solid-Wood (Lumber) Members: 1/16 inch unless otherwise indicated.
 - b. Edges of Rails and Similar Members More Than 3/4 Inch thick: 1/8 inch.
- C. Complete fabrication, including assembly, to maximum extent possible before shipment to Project site.
 - 1. Disassemble components only as necessary for shipment and installation.
 - 2. Where necessary for fitting at site, provide allowance for scribing, trimming, and fitting.
 - 3. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled.
 - a. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting.
 - b. Verify that parts fit as intended, and check measurements of assemblies against field measurements indicated on approved Shop Drawings before disassembling for shipment.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before installation, condition interior architectural woodwork to humidity conditions in installation areas for not less than 72 hours prior to beginning of installation.
- B. Before installing interior architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming of concealed surfaces.

3.2 INSTALLATION

- A. Grade: Install interior architectural woodwork to comply with same grade as item to be installed.
- B. Assemble interior architectural woodwork and complete fabrication at Project site to the extent that it was not completed during shop fabrication.
- C. Install interior architectural woodwork level, plumb, true in line, and without distortion.
 - 1. Shim as required with concealed shims.
 - 2. Install level and plumb to a tolerance of 1/16 inch in 96 inches.
- D. Scribe and cut interior architectural woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- E. Preservative-Treated Wood: Where cut or drilled in field, treat cut ends and drilled holes according to AWPA M4.
- F. Fire-Retardant-Treated Wood: Install fire-retardant-treated wood to comply with chemical treatment manufacturer's written instructions, including those for adhesives used to install woodwork.
- G. Anchor interior architectural woodwork to anchors or blocking built in or directly attached to substrates.
 - 1. Secure with countersunk, concealed fasteners and blind nailing.
 - 2. Use fine finishing nails for exposed fastening, countersunk and filled flush with interior architectural woodwork.
 - 3. For shop-finished items, use filler matching finish of items being installed.
- H. Standing and Running Trim:
 - 1. Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to greatest extent possible.
 - 2. Do not use pieces less than 36 inches long, except where shorter single-length pieces are necessary.
 - 3. Scarf running joints and stagger in adjacent and related members or as indicated on drawings.
 - 4. Fill gaps, if any, between top of base and wall with wood filler; sand smooth; and finish same as wood base if finished.
 - 5. Install standing and running trim with no more variation from a straight line than 1/16 inch in 96 inches.

3.3 FIELD QUALITY CONTROL

- A. Inspections: Provide inspection of installed Work through AWI's Quality Certification Program certifying that woodwork, including installation, complies with requirements of the Architectural Woodwork Standards for the specified grade. Inspection entity shall prepare and submit report of inspection.

3.4 REPAIR

- A. Repair damaged and defective interior architectural woodwork, where possible, to eliminate functional and visual defects.
- B. Where not possible to repair, replace defective woodwork.
- C. Field Finish: See Section 09 9000 "Painting" and Section 09 9300 "Staining and Transparent Finishing" for final finishing of installed interior architectural woodwork not indicated to be shop finished.

3.5 CLEANING

- A. Clean interior architectural woodwork on exposed and semi exposed surfaces.

END OF SECTION 06 4023

**SECTION 06 4100
ARCHITECTURAL WOODWORK**

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Custom fabricated cabinet units.
- B. Cabinet hardware.
- C. Shelving and shelving hardware.

1.2 RELATED REQUIREMENTS

- A. Section 06 1000 – Rough Carpentry: Support framing, grounds, and concealed blocking.
- B. Section 12 3600 – Countertops.
- C. Section 12 3610 – Solid Surface Fabrication.

1.3 REFERENCE STANDARDS

- A. ANSI A135.4 - American National Standard for Basic Hardboard.
- B. ANSI A208.1 - American National Standard for Particleboard.
- C. ANSI A208.2 - American National Standard for Medium Density Fiberboard for Interior Use.
- D. AWI - Architectural Woodwork Standards.
- E. NEMA LD 3 - High-Pressure Decorative Laminates; National Electrical Manufacturers Association.

1.4 SUBMITTALS

- A. Product Data: For each type of product, including but not limited to panel products, high-pressure decorative laminate, adhesive for bonding plastic laminate, fire-retardant-treated materials and cabinet hardware and accessories.
 - 1. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.
- B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
 - 1. Show details full size.
 - 2. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
 - 3. Show locations and sizes of cutouts and holes for electrical switches and outlets and other features installed in architectural plastic-laminate cabinets.
- C. Product Data: Provide data for hardware accessories.
- D. Samples: Submit actual samples of architectural cabinet construction, minimum 12 inches square, illustrating cabinet, countertop, and shelf unit substrate and finish as specified in the Finish Legend.
- E. Samples: Submit actual sample items of specified pulls, hinges, shelf standards, and locksets, demonstrating hardware design, quality, and finish.

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum seven (7) years of documented experience.
- B. Quality Certification: Provide AWI Quality Certification Program inspection report and quality certification of completed work.
- C. Perform work in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, Custom quality, unless other quality is indicated for specific items.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver cabinets until painting and similar operations that could damage woodwork have been completed in installation areas. If cabinets must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

- B. Protect units from moisture damage.

1.7 FIELD CONDITIONS

- A. A. Environmental Limitations: Do not deliver or install cabinets until wet work is complete, and HVAC system is operating and maintaining temperature between 60 and 80 degrees F and relative humidity between 25 and 55 percent during the remainder of the construction period.
- B. Field Measurements: Where cabinets are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 1. Locate concealed framing, blocking, and reinforcements that support cabinets by field measurements before being enclosed, and indicate measurements on Shop Drawings.
- C. Established Dimensions: Where cabinets are indicated to fit to other construction, establish dimensions for areas where cabinets are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.8 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that cabinets can be supported and installed as indicated.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Single Source Responsibility: Provide and install this work from single fabricator.

2.2 CABINETS

- A. A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of architectural plastic-laminate cabinets indicated for construction, finishes, installation, and other requirements.
 - 1. The Contract Documents contain selections chosen from options in the quality standard and additional requirements beyond those of the quality standard. Comply with those selections and requirements in addition to the quality standard.
- B. Grade: Custom.
- C. Type of Construction: Face frame.
- D. Cabinet, Door, and Drawer Front Interface Style: Flush overlay.
- E. High-Pressure Decorative Laminate Cladding for Exposed Surfaces:
 - 1. Horizontal Surfaces: Grade HGS.
 - 2. Postformed Surfaces: Grade HGP.
 - 3. Vertical Surfaces: Grade VGS.
 - 4. Edges: PVC Edge banding. Coordinate with 06 4100.
 - 5. Pattern Direction: Vertically for doors and fixed panels, horizontally for drawer fronts.
- F. Materials for Semi Exposed Surfaces:
 - 1. Surfaces Other Than Drawer Bodies: Thermoset decorative panels.
 - a. Edges of Plastic-Laminate Shelves: Laminate edge banding, matching laminate in color, pattern, and finish.
 - b. For semi exposed backs of panels with exposed plastic-laminate surfaces, provide surface of high-pressure decorative laminate, NEMA LD 3, Grade CLS.
 - 2. Drawer Sides and Backs: Thermoset decorative panels.
 - 3. Drawer Bottoms: Thermoset decorative panels.
 - 4. Color: Refer to Drawings.
- G. Cabinets:
 - 1. Exposed Exterior Surfaces: Decorative laminate.
 - 2. Exposed Interior Surfaces: Decorative laminate.
 - 3. Concealed Surfaces: Thermoset decorative overlay.
 - 4. Door and Drawer Front Edge Profiles: Square edge with thin applied band.

5. Door and Drawer Front Retention Profiles: Fixed panel.
 6. Casework Construction Type: Type A - Frameless.
 7. Adjustable Shelf Loading: 50 lbs. per sq. ft.
 8. Cabinet Style: Flush overlay.
 9. Cabinet Doors and Drawer Fronts: Flush style.
 10. Drawer Side Construction: Multiple-dovetailed.
 11. Drawer Construction Technique: Dovetail joints.
- H. Dust Panels: 1/4-inch tempered hardboard above compartments and drawers unless located directly under tops.
- I. Concealed Backs of Panels with Exposed Plastic-Laminate Surfaces: High-pressure decorative laminate, NEMA LD 3, Grade BKL.
- J. Drawer Construction: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.
1. Join subfronts, backs, and sides with glued rabbeted joints supplemented by mechanical fasteners.
- K. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
1. As indicated by laminate manufacturer's designations, and as scheduled on drawings.

2.3 SHELVING

- A. Shelving shall be plastic-laminate-faced high-density fiberboard, 3/4" thick, shelf-edged.

2.4 LAMINATE MATERIALS

- A. Manufacturers: Manufacturers and colors for plastic laminate are listed on the Finish Legend on the Drawings. No substitutions will be considered.
- B. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for specific applications.
- C. Provide specific types as scheduled. Grade: GP-50 (0.050-inch nominal thickness)

2.5 COUNTERTOPS

- A. Refer to Section 12 3600 & 12 3610.

2.6 ACCESSORIES

- A. Adhesive: Type recommended by fabricator to suit application.

2.7 HARDWARE

- A. Hardware: BHMA A156.9, types as indicated for quality grade specified.
- B. Adjustable Shelf Supports: Standard side-mounted system using recessed metal shelf standards or multiple holes for 5 mm pin-supported spoon-type self-rests, polished chrome finish, finish color selected by the Architect, for nominal 1-inch spacing adjustments.
1. Manufacturers:
 - a. Knape & Vogt KV #238 steel pilasters with #338 support clips
 - b. EPCO
 - c. Woodworker's Supply
- C. Wall-Mounted Shelving Supports: System rated up to 1000 lbs. capacity.
1. Wall-mounted standards: Fabricated from 12-gauge steel, 7/8" wide x 11/16" deep, adjustable in 2" increments.
 2. Brackets: 3-lug blade type fabricated from 12-gauge steel.
 3. Manufacturers:
 - a. Knape & Vogt (87 Series Standards, 186/187 Series Brackets)
 - b. C.R. Laurence
- D. Drawer and Door Pulls: Hafele: Handel, Zink Showcase Collection: 155.00.601Handel Showcase ZN M4 CTC 160 MM.
- E. Cabinet Locks: Keyed cylinder, two keys per lock, master keyed, steel with satin finish.

1. Provide cam locks with removable lock plug system and solid brass keys equivalent to CompX Timberline series manufactured by CompX Security Products or equivalent approved by the Architect.
 - a. Lock Plug Finish: Selected by the Architect from CompX standard finishes or equivalent by another approved manufacturer.
- F. Drawer Slides: Ball-bearing, side-mounted, full extension, self-closing, hold-in drawer feature, BHMA certified, and as follows:
 1. Static Load Capacity: Commercial grade, 100 lb. capacity or greater. (Box Drawer Slides)
 2. Static Load Capacity: Commercial grade, 200 lb. capacity or greater. (File Drawer Slides)
 3. Static Load Capacity: Commercial grade, 45 lb. capacity or greater. (Pencil Drawer Slides)
 4. Static Load Capacity: Commercial grade, 75 lb. capacity or greater. (Keyboard Slide)
 5. Manufacturers:
 - a. Basis of Design: Accuride
 - b. A manufacturer of products complying with these requirements and approved by the Architect.
- G. Hinges: Concealed (fully mortised) self-closing type, ANSI/BHMA No. A56.1, zinc, nickel plated steel with satin finish.
 1. Manufacturers:
 - a. Blum
 - b. Grass America Inc; Product #3803 (120 deg swing) or #3903 (165 deg swing): www.grassusa.com.
 - c. Stanley Hardware
- H. Wall Bumpers (for door pulls): 1-inch base diameter, surface-mounted. Locations to be coordinated with installation of door pulls.
 1. Manufacturers:
 - a. Ives
 - b. Bommer
 - c. Hager
- I. Countertop Support Brackets: Provide reversible steel support brackets equivalent to A&M Hardware, Inc., Work Station Brackets or equivalent by another approved manufacturer, and as follows:
 1. Load capacity: Not less than 1000 lbs. per bracket.
 2. Factory-Applied Primer: Brackets shall be factory-primed and field-painted to match the wall to which it is attached. Refer to the Finish Legend on the Drawings for pre-selected paint colors.
- J. Coat Rods and Flanges:
 1. Rods: 1-5/16" diameter steel tubing, 0.075" wall thickness, double-plated finish
 2. Flanges: Screw-mounted wall flanges compatible with specified tubing.
 3. Manufacturers:
 - a. Knappe & Vogt
 - b. Lido Designs
 - c. Stanley Hardware

2.8 SHOP TREATMENT OF WOOD MATERIALS

- A. Provide UL approved identification on fire retardant treated material.

2.9 FABRICATION

- A. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.
- B. Fitting: When necessary to cut and fit on site, provide materials with ample allowance for cutting.
- C. Provide matching trim for scribing and site cutting.
- D. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet from sink cut-outs.

1. Cap exposed plastic laminate finish edges with material of same finish and pattern.
- E. Provide cutouts for plumbing fixtures, inserts, appliances, and fixtures and fittings. Verify locations of cutouts from on-site dimensions. Seal cut edges.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verify location and sizes of utility rough-in associated with work of this section.

3.2 INSTALLATION

- A. Use fixture attachments in concealed locations for wall mounted components.
- B. Use concealed joint fasteners to align and secure adjoining cabinet units.
- C. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.
- D. Secure cabinets to floor using appropriate angles and anchorages.
- E. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.

3.3 ADJUSTING

- A. Adjust installed work.
- B. Adjust moving or operating parts to function smoothly and correctly.

3.4 CLEANING

- A. Clean casework surfaces according to AWI recommendations.

END OF SECTION 06 4100

**SECTION 07 9200
JOINT SEALANTS**

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Joint backing and sealants.

1.2 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

1.3 CLOSEOUT SUBMITTALS

- A. Warranties: Special warranties specified in this Section.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized Installer who is approved or licensed for installation of elastomeric sealants required for this Project.
- B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.

1.5 WARRANTY

- A. Manufacturer's written agreement to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: five (5) years from Project Completion Date.

PART 2 - PRODUCTS

2.1 PRODUCTS AND MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide one (1) of the products indicated for each type in the Schedule at the end of Part 3.

2.2 PERFORMANCE REQUIREMENTS

- A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.

2.3 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.
- B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.4 ELASTOMERIC JOINT SEALANTS

- A. Elastomeric Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including classifications for type, grade, class, and uses related to exposure and joint substrates.
- B. Stain-Test-Response Characteristics: Sealants shall be tested according to ASTM C 1248.
- C. Suitability for Immersion in Liquids. Comply with ASTM C 1247 and qualify for the length of exposure indicated by reference to ASTM C 920 for Class 1 or 2. Liquid used for testing sealants is deionized water, unless otherwise indicated.

2.5 JOINT-SEALANT BACKING

- A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

- B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer. Provide self-adhesive tape where applicable.

2.6 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent surfaces.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 PROJECT CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
 1. When joint substrates are wet.
 2. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 3. Contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 2. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
 - a. Concrete.
 - b. Unglazed surfaces of ceramic tile.
 3. Remove laitance and form-release agents from concrete.
 4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
 - a. Metal.
 - b. Glass.
- B. Joint Priming: Prime joint substrates, where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Acoustical Sealant Application Standard: Comply with recommendations in ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.
- D. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of sealant backings.
 - 2. Do not stretch, twist, puncture, or tear sealant backings.
 - 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- E. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- F. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- G. Tooling of Nonsag Sealants: Tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 - 1. Remove excess sealant from surfaces adjacent to joints.
 - 2. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.

3.4 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants.

3.5 PROTECTION

- A. Protect joint sealants during and after curing period so sealants are without deterioration or damage at time of Substantial Completion.
- B. Cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.6 JOINT-SEALANT SCHEDULE

- A. Type 1 - General Purpose Exterior Sealant: Polyurethane; ASTM C 920, Grade NS, Class 25, Uses M, O, and A; multi- component.
 - 1. Manufacturers/Product:
 - a. Tremco Dymeric 240/240FC
 - b. Mameco Vulkem 227
 - c. BondaFlex Bondaflex PUR 2 NS
 - d. Percora Dynatrol II
 - 2. Applications: Use for:
 - a. Joints between metal frames and other materials.
 - b. Joints between different materials listed above.
 - c. Perimeter joints between materials listed above and frames of doors, windows, storefronts, louvers, and similar openings.
- B. Type 2 - General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C 834, Type OP, Grade NF single component, paintable.

1. Manufacturers/Product:
 - a. Tremco Tremflex 834
 - b. Sonneborn Building Products Sonolac
 - c. Pecora Corporation AC-20 + Silicone
 - d. BondaFlex Sil 150
 2. Applications
 - a. Non-traffic interior locations.
 - b. Interior perimeter of window and door frames and elevator entrances.
 - c. Control and construction joints.
 - d. Miscellaneous openings and penetrations.
 - e. Joints between dissimilar materials.
 - f. Interior wall and ceiling control joints.
 - g. Interior joints between door and window frames and wall surfaces.
 - h. Perimeter joints between interior wall surfaces and frames of interior doors, windows, storefronts, and similar openings.
 - i. Other interior joints for which no other type of sealant is indicated.
 - j. Other joints as indicated.
 3. Comply with ASTM C 834, Type P, Grade NF.
- C. Type 3 (Multi-Component Nonsag Urethane Sealant)
1. Manufacturer/Product:
 - a. Mameco Vulekem 227
 - b. Pecora Corporation Dynaflex
 - c. Sonneborn NP2
 - d. BondaFlex Bondaflex PUR 2 NS
 - e. Sika Corporation, Inc. Sika-Flex-2cNS TG
 2. Applications:
 - a. Interior and exterior applications subject to traffic.
 - b. Control, expansion, and isolation joints in cast-in-place concrete.
 - c. Joints between architectural precast concrete paving units.
 - d. Tile control and expansion joints.
 - e. Joints between different materials listed above.
 - f. Other interior and exterior traffic bearing joints in horizontal and sloped traffic surfaces.
- D. Type 4 (Single-Component Mildew-Resistant Acid Curing Silicon Sealant)
1. Manufacturer/Product:
 - a. Dow Corning 786 Mildew Resistant
 - b. GE Silicones Sanitary SCS 1700
 - c. Pecora Corporation 898 Silicone Sanitary Sealant
 - d. Tremco Tremsil 200 [white][clear]
 - e. Bondaflex Technologies Sil 100 GP
 2. Applications:
 - a. Perimeter of all plumbing fixtures and adjoining walls, floors, and counters.
 - b. All countertop backsplashes / all interfaces where a sink is located in the countertop.
 - c. Piping which penetrates wall and is exposed to view.
- E. Type 5 (Acoustical Joint Sealant): Manufacturer's standard nonsag, paintable, non-staining latex sealant complying with ASTM C 834 and the following requirements:
1. Product is effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
 - a. Products:
 - 1) ChemRex, Inc.; Contech Brands; PL Acoustical Sealant.
 - 2) Pecora Corporation; AC-20 FTR Acoustical and Insulation Sealant.
 - 3) USG Corporation; SHEETROCK Acoustical Sealant.

END OF SECTION 07 9200

**SECTION 08 0500
BASIC MATERIALS AND METHODS: OPENINGS**

PART 1 – GENERAL

1.1 SUMMARY

- A. This Section includes common requirements for openings, including doors, frames, hardware, and glazing specified in subsequent Division 08 Sections.
- B. Related Sections:
 - 1. Section 08 4313 - Aluminum-Framed Entrances and Storefronts
 - 2. Section 08 8000 - Glazing

1.2 SUBMITTALS:

- A. General: Section 01 3000 – Administrative Requirements: For Submittal Procedures and subsequent Division 08 Sections.

1.3 QUALITY ASSURANCE

- A. General: Section 01 4000 – Quality Requirements and subsequent Division 08 Sections.
- B. Installer Qualifications: Engage only qualified installers to perform work.
- C. Regulatory Requirements: Comply with requirements of authorities having jurisdiction related to the following:
 - 1. Fire resistance of assemblies.
 - 2. Accessibility requirements.
- A. Source Limitation: Obtain each type of specified product from a single qualified manufacturer and distribution source.

1.4 COORDINATION

- A. General: Section 01 3000 – Administrative Requirements, 01 4000 – Quality Requirements, and subsequent Division 08 Sections.
- B. Perform field measuring to determine dimensions for rough openings and existing openings to receive new doors and windows. Record field measurements on shop drawings and retain for record.
- C. Furnish templates, setting diagrams, and other information necessary for shop fabrication and assembly of specified products, in sufficient time to maintain the Project Schedule.
- D. Furnish installation information to other trades to ensure preparation of openings by other trades is performed in accordance with the Contract Documents, approved Shop Drawings, and the manufacturer's recommendations.
- E. Prepare doors and frames to receive scheduled hardware using templates provided by the approved hardware manufacturers.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with manufacturer's delivery, storage, and handling information.
- B. Establish proper storage conditions at shops, the site, and other points of delivery to prevent loss, deterioration, damage, and theft.
 - 1. Provide temporary heat and humidity control if required to achieve the conditions required by referenced standards and manufacturer's instructions.
 - 2. Provide secure lock-up for hardware products.
 - 3. Store doors and frames in accordance with referenced standards to prevent warping, condensation, and incidental damage at the site.
- A. Inspect and inventory products upon delivery. Reject defective or damaged products and promptly remove them from the Site.

PART 2 PRODUCTS – NOT USED

PART 3 – EXECUTION

3.1 INSPECTION

- A. Verify acceptability of rough opening conditions in accordance with referenced standards and manufacturer's instructions. Correct non-complying conditions, including removal of interfering elements, restoration of substrates, and installation of supplementary framing, blocking, and supports to stabilize and square the openings. Do not proceed with installation until objectionable conditions are corrected.

3.2 PREPARATION

- A. Isolate framing components to prevent contact with incompatible substrates, including dissimilar metals to prevent galvanic reaction.
- B. Correct unacceptable conditions in existing substrates and existing frames and openings to ensure that finished work complies with regulatory requirements and operates properly.

3.3 INSTALLATION

- A. Install products in accordance with the drawings, manufacturer's recommendations, and approved shop drawings.
- B. Arrange for connection of electrified components to building power supply by qualified personnel.

3.4 OPERATION AND ADJUSTMENT

- A. Test installed products to ensure proper operation.

END OF SECTION 08 0500

**SECTION 08 4313
ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS**

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Aluminum doors with Vision glass.

1.2 RELATED REQUIREMENTS

- A. Section 08 8000 - Glazing.

1.3 REFERENCE STANDARDS

- A. American Architectural Manufacturers Association (AAMA)
 - 1. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site.
 - 2. AAMA 501.2 - Field Check of Metal Storefronts, Curtain Walls, and Sloped Glazing Systems for Water Leakage.
 - 3. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections.
 - 4. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
- B. American Society of Civil Engineers ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
- C. ASTM International (ASTM):
 - 1. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 - 2. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 - 3. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
 - 4. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
 - 5. ASTM E547 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Static Air Pressure Differential.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with installation of other components that comprise the exterior enclosure.
- B. Preinstallation Meeting: Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

1.5 SUBMITTALS

- A. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, door hardware, internal drainage details.
- B. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work, expansion and contraction joint location and details, and field welding required.
- C. Design Data: Provide framing member structural and physical characteristics, engineering calculations, dimensional limitations.
- D. Hardware Schedule: Complete itemization of each item of hardware to be provided for each door, cross-referenced to door identification numbers in Contract Documents.
- E. Samples: Submit two samples 24x24 inches in size illustrating finished aluminum surface, glass, infill panels, glazing materials.
- F. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.
- G. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.6 QUALITY ASSURANCE

- A. Designer Qualifications: Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed at the State in which the Project is located.
- B. Manufacturer and Installer Qualifications: Company specializing in manufacturing aluminum glazing systems with minimum three years of documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Handle products of this section in accordance with AAMA CW-10.
- B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.8 FIELD CONDITIONS

- A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

1.9 WARRANTY

- A. Provide manufacturer's written agreements for the following:
 - 1. Against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.
 - 2. Against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.
- B. Warranty Duration: Five (5) years from the date of Substantial Completion of the Project.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: Products manufactured by Kawneer.

2.2 STOREFRONT

- A. Aluminum-Framed Storefront: Existing to remain.

2.3 COMPONENTS

- A. Exterior Aluminum Framing Members: Existing to remain
- B. Doors: 350 Medium Stile Entrance.
 - 1. Thickness: 1-3/4 inches.
 - 2. Top Rail: 3-1/2 inches wide.
 - 3. Vertical Stiles: 3 1/2 inches wide.
 - 4. Bottom Rail: Per ADA requirements.
 - 5. Glazing Stops: Beveled.
 - 6. Finish: Same as storefront.

2.5 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M).
- B. Sheet Aluminum: ASTM B209 (ASTM B209M).
- C. Fasteners: Stainless steel.
- D. Concealed Flashings: 0.018 inch thick galvanized steel.
- E. Perimeter Sealant: Type as specified in Section 07 9200.
- F. Glass: As specified in Section 08 8000.
- G. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.
- H. Glazing Accessories: As specified in Section 08 8000.
- I. Shop and Touch-Up Primer for Steel Components: SSPC-Paint 25, zinc oxide, alkyd, linseed oil primer.
- J. Touch-Up Primer for Galvanized Steel Surfaces: SSPC-Paint 20, zinc rich.

2.6 HARDWARE

- A. Door Hardware: As specified in Section 08 7100.
- B. Weatherstripping: Wool pile, continuous and replaceable; provide on all doors.
- C. Sill Sweep Strips: Resilient seal type, retracting, of neoprene; provide on all doors.
- D. Threshold: Extruded aluminum, one piece per door opening, ribbed surface; provide on all exterior doors.

2.7 FABRICATION

- A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
- B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- C. Prepare components to receive anchor devices. Fabricate anchors.
- D. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.
- E. Arrange fasteners and attachments to conceal from view.
- F. Reinforce components internally for door hardware.
- G. Reinforce framing members for imposed loads.
- H. Finishing: Apply factory finish to all surfaces that will be exposed in completed assemblies.
 - 1. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify dimensions, tolerances, and method of attachment with other work.

3.2 INSTALLATION

- A. Install door in accordance with manufacturer's instructions.
- B. Provide alignment attachments and shims to permanently fasten system to building structure.
- C. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- D. Set thresholds in bed of mastic and secure.
- F. Install glass in accordance with Section 08 8000, using glazing method required to achieve performance criteria.
- G. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.3 TOLERANCES

- A. Maximum Variation from Plumb: 0.06 inches every 3 ft non-cumulative or 1/16 inches per 10 ft, whichever is less.

3.4 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for independent testing and inspection requirements. Inspection will monitor quality of installation and glazing.

3.5 ADJUSTING

- A. Adjust operating hardware and sash for smooth operation.

3.6 CLEANING

- A. Remove protective material from pre-finished aluminum surfaces.
- B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
- C. Remove excess sealant by method acceptable to sealant manufacturer.

3.7 PROTECTION

- A. Protect installed products from damage during subsequent construction.

END OF SECTION 08 4313

**SECTION 08 8000
GLAZING**

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Glass.
- B. Glazing compounds and accessories.

1.2 RELATED REQUIREMENTS

- A. Section 07 9200- Joint Sealants.

1.3 REFERENCE STANDARDS

- A. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers.
- B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
- C. ASTM C1036 - Standard Specification for Flat Glass.
- D. ASTM C1048 - Standard Specification for Heat-Treated Flat Glass--Kind HS, Kind FT Coated and Uncoated Glass.
- E. ASTM C1193 - Standard Guide for Use of Joint Sealants.
- F. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings.
- G. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation.
- H. GANA (SM) - GANA Sealant Manual; Glass Association of North America.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Pre-installation Meeting: Convene a pre-installation meeting one week before starting work of this section; require attendance by all affected installers.

1.5 SUBMITTALS

- A. Product Data on Glass Types: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.
- B. Product Data on Glazing Compounds: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors.
- C. Samples: Submit two samples 12 x 12 inch in size of glass units.
- D. Manufacturer's Certificate: Certify that all glass meets or exceeds specified requirements.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with GANA Glazing Manual and FGMA Sealant Manual for glazing installation methods.
- B. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.

1.7 FIELD CONDITIONS

- A. Do not install glazing when ambient temperature is less than 50 degrees F.
- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.8 WARRANTY

- A. Sealed Insulating Glass Units: Provide a ten (10) year warranty to include coverage for seal failure, interpane dusting or misting, including replacement of failed units.
- B. Coated Glass Products: Provide a ten (10) year warranty to include coverage for deterioration, including replacement of failed units.

PART 2 - PRODUCTS

2.1 GLAZING TYPES

- A. Sealed Insulating Glass Units: 1" Vision glazing, low-E - Argon Filled.

1. Application(s): All exterior glazing unless otherwise indicated.
2. Substitutions: Refer to Section 01 6000 - Product Requirements.
3. Between-lite space filled with argon.
4. Thermal Resistance (U-Value): 0.24, winter 0.21, summer, nominal.
5. Total Solar Heat Gain Coefficient: 0.29, maximum.
6. Total Visible Light Transmittance: 58 percent, nominal.
7. Outboard Lite: Annealed float glass, 1/4 inch thick, minimum.
 - a. Tint and Coating: Match existing storefront glazing.
8. Inboard Lite: Annealed float glass, 1/4 inch thick.
 - a. Tint: Match existing storefront glazing.
9. Total Thickness: 1 inch.

2.2 EXTERIOR GLAZING ASSEMBLIES

- A. Structural Design Criteria: Select type and thickness to withstand dead loads and wind loads acting normal to plane of glass at design pressures calculated in accordance with ASCE 7.
 1. Use the procedure specified in ASTM E1300 to determine glass type and thickness.
 2. Limit glass deflection to 1/200 or flexure limit of glass, whichever is less, with full recovery of glazing materials.
 3. Thicknesses listed are minimum.
- B. Air and Vapor Seals: Provide completed assemblies that maintain continuity of building enclosure vapor retarder and air barrier:
 1. In conjunction with vapor retarder and joint sealer materials described in other sections.
 2. To maintain a continuous air barrier and vapor retarder throughout the glazed assembly from glass pane to heel bead of glazing sealant.

2.3 GLASS MATERIALS

- A. Float Glass: All glazing is to be float glass unless otherwise indicated.
 1. Annealed Type: ASTM C1036, Type I, transparent flat, Class 1 clear, Quality Q3 (glazing select).
 2. Heat-Strengthened and Fully Tempered Types: ASTM C1048.
 3. Tinted Types: Color and performance characteristics as indicated. (tinted)
 4. Thicknesses: As indicated; for exterior glazing comply with specified requirements for wind load design regardless of specified thickness.

2.4 SEALED INSULATING GLASS UNITS

- A. Sealed Insulating Glass Units: Types as indicated.
 1. Locations: Exterior, except as otherwise indicated.
 2. Durability: Certified by an independent testing agency to comply with ASTM E2190.
 3. Edge Spacers: Aluminum, bent and soldered corners.
 4. Edge Seal: Glass to elastomer with supplementary silicone sealant.
 5. Purge interpane space with dry hermetic air.

2.5 GLAZING COMPOUNDS

- A. Glazing Putty: Polymer modified latex recommended by manufacturer for outdoor use, knife grade consistency; grey color.
- B. Polyurethane Sealant: Single component, chemical curing, non-staining, non-bleeding; ASTM C 920, Type S, Grade NS, Class 25, Uses M, A, and G; Shore A Hardness Range 20 to 35; color as selected.

2.6 GLAZING ACCESSORIES

- A. Setting Blocks: Neoprene, 80 to 90 Shore A durometer hardness, ASTM C 864 Option I. Length of 0.1-inch for each square foot of glazing or minimum 4-inch x width of glazing rabbet space minus 1/16-inch x height to suit glazing method and pane weight and area.

- B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness, ASTM C 864 Option I. Minimum 3-inch long x one half the height of the glazing stop x thickness to suit application, self-adhesive on one face.
- C. Glazing Tape: Preformed butyl compound with integral resilient tube spacing device; 10 to 15 Shore A durometer hardness; coil on release paper; black color.
- D. Glazing Gaskets: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C 864 Option I; Black color.
- E. Glazing Clips: Manufacturer's standard type.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that openings for glazing are correctly sized and within tolerance.
- B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing.

3.2 PREPARATION

- A. Clean contact surfaces with solvent and wipe dry.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant.
- D. Install sealants in accordance with ASTM C1193 and GANA Sealant Manual.
- E. Install sealant in accordance with manufacturer's instructions.

3.3 INSTALLATION - EXTERIOR/INTERIOR DRY METHOD (GASKET GLAZING)

- A. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.
- B. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.
- C. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

3.4 MANUFACTURER'S FIELD SERVICES

- A. Glass and Glazing product manufacturers to provide field surveillance of the installation of their products.
- B. Monitor and report installation procedures and unacceptable conditions.

3.5 CLEANING

- A. Remove glazing materials from finish surfaces.
- B. Remove labels after Work is complete.
- C. Clean glass and adjacent surfaces.

3.6 PROTECTION

- A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.

END OF SECTION 08 8000

**SECTION 09 0500
BASIC MATERIALS AND METHODS: FINISHES**

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes general requirements for performance of finishes work in accordance with the Contract Documents.

1.2 REFERENCES

- A. General: Section 01 4219 – “Reference Standards.”
- B. Comply with applicable provisions of standards referenced, edition in effect as of date of Contract, unless more stringent requirements are required by governing codes, laws, and ordinances, or other Specification Sections.

1.3 SUBMITTALS

- A. General: Refer to Section 01 3000 – “Administrative Requirements”: For Submittal requirements.
- B. Samples: Submit samples in accordance with requirements of each Section. Submit in sufficient size and quantity to demonstrate normal variations in color and texture, and as follows:
 - 1. Samples for Selection Purposes.
 - 2. Samples for Verification Purposes.
 - 3. Samples to demonstrate proper matching characteristics.
- C. Maintenance Instructions for installed products: Submit at Contract closeout.

1.4 QUALITY REQUIREMENTS

- A. Source Limitations: Ensure that each type of product is produced by a single manufacturer and obtained through distribution sources authorized by the manufacturer of each product required, unless otherwise approved by the Architect.
- B. Representative Construction: Construct mock-ups and field samples in accordance with the requirements of applicable Sections.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION

3.1 EXECUTION, GENERAL

- A. Refer to Section 01 7000 – Execution Requirements.

3.2 EXAMINATION

- A. Review the condition of the area of installation and verify that it is acceptable in accordance with the product manufacturer’s instructions, referenced standards, and accepted trade practices. Report unfavorable conditions in writing to the Architect. Do not allow installation to proceed until all unsatisfactory conditions have been corrected. Commencing work in an area will be considered acceptance of the existing conditions by that Installer and the Contractor shall assume all responsibility therefore.
- B. Test substrates in accordance with specified testing procedures specified in subsequent Sections and as recommended by manufacturers.

3.3 PREPARATION

- A. Prepare materials for installation in accordance with referenced industry standards, manufacturer’s instructions, and accepted trade practices. In exposed or finish work, mix or arrange materials for uniform blending and optimum arrangement according to the Architect’s instructions.
- B. Lay out work in advance to ensure accurate spacing of surface patterns with uniform joint thicknesses and for accurate location of openings, joints, returns, and offsets.

- C. Furnish items to be installed or built into work performed by other trades according to the project schedule so as not to cause delays.
- D. Surface Preparation for New Construction:
 - 1. Furnish, install, maintain, and remove as required all necessary temporary protections to safeguard persons and property in the vicinity of the surface preparation area prior to commencement of surface preparation procedures, including but not limited to protection of HVAC system and existing adjacent construction.
 - 2. Prepare surfaces to receive work in accordance with manufacturer's instructions, referenced standards and accepted trade practices.
 - 3. Test substrates according to standard industry practices approved by the manufacturer of the components to be installed. Perform additional testing as recommended by the manufacturer.

3.4 EXECUTION, GENERAL

- A. All work identified in the Contract Documents shall be performed by skilled and, where applicable, by licensed installers. Where indicated in the Contract Documents, installers shall be approved by the manufacturer for installing the materials in the manner indicated.
- B. The Work shall be installed, applied, or erected in accordance with recognized trade practices, unless more stringent installation requirements are described in the Contract Documents or in the approved manufacturer's published installation instructions. For materials or systems that are specified to receive warranties, work shall comply with the requirements of the manufacturer.
- C. Perform all cutting and patching required for full execution of the work. Patching of finished materials shall be performed by skilled installers in a manner that fully restores the finished work to a condition acceptable to the Architect.
- D. Construct work to the full elevations, widths, and thicknesses shown.

3.5 INSPECTION

- A. When required by authorities having jurisdiction over the Project, the Contractor shall schedule and oversee inspections and testing of the installed work and respond to all recommendations that arise therefrom.
- B. When review and inspection of work by a manufacturer representative is a condition of a special project warranty, the Contractor shall schedule and oversee such reviews and inspections and respond to all recommendations that arise therefrom.

3.6 CLEANING

- A. Progress Cleaning: As the Work progresses, the Contractor shall ensure that installed products are cleaned in accordance with the recommendations of the product manufacturer, referenced standards, and accepted trade practices.

3.7 PROTECTION

- A. Provide necessary protections to ensure that installed products are without damage or undue deterioration as of the Project Completion Date. Upon final acceptance of the work, the Contractor shall remove temporary protections from the Project Site.

END OF SECTION 09 0500

**SECTION 09 0561
FLOORING PREPARATION**

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. This section applies to all floors identified in the Contract Documents to receive floor coverings.
- B. Remediation of concrete floor slabs due to unsatisfactory moisture or pH conditions.
 - 1. Perform all specified remediation of concrete floor slabs. If such remediation is indicated by testing agency's report and is due to a condition not under Contractor's control or could not have been predicted by examination prior to entering into the contract, a contract modification will be issued.

1.2 REFERENCES

- A. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; current edition.
- B. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; current edition.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate scheduling of cleaning and testing, so that preliminary cleaning has been completed for at least 24 hours prior to testing.

1.4 SUBMITTALS

- A. Floor Covering and Adhesive Manufacturers' Product Literature: For each specific combination of substrate, floor covering, and adhesive to be used; showing:
 - 1. Moisture and pH limits and test methods.
 - 2. Manufacturer's required bond / compatibility test procedure.
- B. Test Reports: Include:
 - 1. Description of areas tested; include photographs.
 - 2. Summary of conditions encountered.
 - 3. Moisture and pH test reports.
 - 4. Copies of specified test methods.
 - 5. Recommendations for remediation of unsatisfactory surfaces.
 - 6. Submit report not more than two business days after conclusion of testing.
- C. Adhesive Bond and Compatibility Test Report.

1.5 QUALITY ASSURANCE

- A. Contractor may perform moisture, adhesive and bond tests with his own personnel or hire a testing agency.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Patching Compound: Floor covering manufacturer's recommended product, suitable for conditions, and compatible with adhesive and floor covering. In the absence of any recommendation from flooring manufacturer, provide a product with the following characteristics:
 - 1. Cementitious moisture-, mildew-, and alkali-resistant compound, compatible with floor, floor covering, and floor covering adhesive, and capable of being feathered to nothing at edges.
 - 2. Latex or polyvinyl acetate additions are permitted; gypsum content is prohibited.
 - 3. Compressive Strength: 3000 psi, minimum, after 28 days, when tested in accordance with ASTM C109/C109M or ASTM C472, whichever is appropriate.
- B. Alternate Flooring Adhesive: Floor covering manufacturer's recommended product, suitable for the moisture and pH conditions present; low-VOC. In the absence of any recommendation from

flooring manufacturer, provide a product recommended by adhesive manufacturer as suitable for substrate and floor covering and for conditions present.

- C. Remedial Floor Coating: Single- or multi-layer coating or coating/overlay combination designed to resist water vapor transmission to degree sufficient to meet flooring manufacturer's emission limits, resistant to the level of pH found, and suitable for adhesion of flooring without further treatment.
 - 1. Thickness: 1/8-inch, maximum per coat.

PART 3 - EXECUTION

3.1 CONCRETE SLAB PREPARATION

- A. Perform following operations in the order indicated:
 - 1. Preliminary cleaning.
 - 2. Moisture vapor emission tests; at least one (1) test in each set (men's and women's) toilet room and coffee station, unless otherwise indicated or required by flooring manufacturer.
 - 3. Internal relative humidity tests; in same locations as moisture vapor emission tests, unless otherwise indicated.
 - 4. pH tests; in same locations as moisture vapor emission tests, unless otherwise indicated.
 - 5. Specified remediation, if required.
 - 6. Patching, smoothing, and leveling, as required.
 - 7. Other preparation specified.
 - 8. Adhesive bond and compatibility test.
 - 9. Protection.
- B. Remediations:
 - 1. Excessive Moisture Emission or Relative Humidity: If an adhesive that is resistant to the level of moisture present is available and acceptable to flooring manufacturer, use that adhesive for installation of the flooring; if not, apply remedial floor coating over entire suspect floor area.
 - 2. Excessive pH: If remedial floor coating is necessary to address excessive moisture, no additional remediation is required; if not, if an adhesive that is resistant to the level present is available and acceptable to the flooring manufacturer, use that adhesive for installation of the flooring; otherwise, apply a skim coat of specified patching compound over entire suspect floor area.

3.2 PRELIMINARY CLEANING

- A. Remove dust, solvents, paint, wax, oil, grease, asphalt, residual adhesive, adhesive removers, film-forming curing compounds, sealing compounds, alkaline salts, excessive laitance, mold, mildew, and other materials that might prevent adhesive bond.
- B. Do not use solvents or other chemicals for cleaning.

3.3 MOISTURE VAPOR EMISSION TESTING

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. Test in accordance with ASTM F1869 and as follows.
 - 1. Plastic sheet test and mat bond test may not be substituted for the specified ASTM test method, as those methods do not quantify the moisture content sufficiently.
- C. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if test values exceed 3 pounds per 1000 square feet per 24 hours.
- D. Report: Report the information required by the test method.

3.4 PH TESTING

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. Note: This procedure is the equivalent of that described in ASTM F710, repeated here for the Contractor's convenience.

- C. Use a wide range pH paper, its associated chart, and distilled or deionized water.
- D. Place several drops of water on a clean surface of concrete, forming a puddle approximately 1-inch in diameter. Allow the puddle to set for approximately 60 seconds, then dip the pH paper into the water, remove it, and compare immediately to chart to determine pH reading.

3.5 PREPARATION

- A. See individual floor covering section(s) for additional requirements.
- B. Comply with requirements and recommendations of floor covering manufacturer.
- C. Fill and smooth surface cracks, grooves, depressions, control joints and other non-moving joints, and other irregularities with patching compound.
- D. Do not fill expansion joints, isolation joints, or other moving joints.
- E. See drawings for built up area of floor at dissimilar products.

3.6 ADHESIVE BOND AND COMPATIBILITY TESTING

- A. Comply with requirements and recommendations of floor covering manufacturer.

3.7 APPLICATION OF REMEDIAL FLOOR COATING

- A. Comply with requirements and recommendations of coating manufacturer.

3.8 PROTECTION

- A. Cover prepared floors with building paper or other durable covering.

END OF SECTION 09 0561

**SECTION 09 2116
GYPSUM BOARD ASSEMBLIES**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Special Conditions and Division 1 – Specification sections apply to work of this section.

1.2 SECTION INCLUDES

- A. Non-structural metal stud wall framing and furring components.
- B. Gypsum wallboard.
- C. Joint treatment and accessories.

1.3 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry
- C. Section 07 9200 - Joint Sealants

1.4 REFERENCE STANDARDS

- A. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2002 (Reapproved 2007).
- B. ASTM C514 - Standard Specification for Nails for the Application of Gypsum Board.
- C. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members.
- D. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
- E. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board.
- F. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.
- G. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
- H. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.
- I. ASTM C1278/C1278M - Standard Specification for Fiber-Reinforced Gypsum Panel.
- J. ASTM C1396/C1396M - Standard Specification for Gypsum Board.
- K. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
- L. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
- M. GA-216 - Application and Finishing of Gypsum Board; Gypsum Association.

1.5 SUBMITTALS

- A. Product Data: Provide data on gypsum board, accessories, and joint finishing system.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing gypsum board application and finishing, with minimum 3 years of experience.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Gypsum Board Materials:
 - 1. Store gypsum board panels inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.
 - 2. Protect pre-mixed taping and topping compounds from freezing. Do not deliver to the site until adequate protection can be provided.

- B. Non-Structural Metal Framing Materials:
 - 1. Deliver non-structural metal framing materials marked and identified according to the American Iron and Steel Institute (AISI) S220 *North American Standard for Cold-Formed Steel Framing – Nonstructural Members*, Section A6.5 Product Identification.
 - 2. Store according to the manufacturer's recommendations to prevent damage from weather exposure and construction operations.

PART 2 – PRODUCTS

2.1 GYPSUM BOARD ASSEMBLIES

- A. Provide completed assemblies complying with ASTM C840 and GA-216.
 - 1. See PART 3 for finishing requirements.
- B. Interior Partitions: Provide completed assemblies with the following characteristics:
 - 1. Acoustic Attenuation: STC of 55-59 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.
- C. Fire Rated Assemblies: Provide completed assemblies as indicated on drawings

2.2 METAL FRAMING MATERIALS - Maybe used in Lieu of Wood Studs

- A. Manufacturers - Metal Framing, Connectors, and Accessories:
 - 1. Clarkwestern Dietrich Building Systems LLC: www.clarkdietrich.com.
 - 2. Dietrich Metal Framing: www.dietrichindustries.com.
 - 3. Marino: www.marinoware.com.
 - 4. Phillips Manufacturing Company: www.phillipsmfg.com.
 - 5. Substitutions: Not permitted.
- B. Non-Loadbearing Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/240 at 5 psf.
 - 1. Studs: "C" shaped with flat or formed webs with knurled faces.
 - 2. Runners: U shaped, sized to match studs.
 - 3. Furring: Hat-shaped sections, minimum depth of 7/8 inch.

2.3 BOARD MATERIALS

- A. Manufacturers - Gypsum-Based Board:
 - 1. American Gypsum: www.americangypsum.com.
 - 2. CertainTeed Corporation: www.certainteed.com.
 - 3. Georgia-Pacific Gypsum: www.gpgypsum.com.
 - 4. Lafarge North America Inc: www.lafargenorthamerica.com.
 - 5. National Gypsum Company: www.nationalgypsum.com.
 - 6. USG Corporation: www.usg.com.
 - 7. Substitutions: Not permitted.
- B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
 - 1. Application: Use for painted vertical surfaces, unless otherwise indicated.
 - 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 - a. Mold-resistant board is required in all potential wet locations.
 - 3. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
 - 4. Thickness: As shown on drawings.

2.4 ACCESSORIES

- A. Finishing Accessories: ASTM C1047, paper-faced galvanized steel sheet accessories as follows:
 - 1. Cornerbead.
 - 2. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - 3. L-Bead: L-shaped; exposed long flange receives joint compound.

4. U-Bead: J-shaped; exposed short flange does not receive joint compound.
5. Expansion (control) joint.
- E. Joint Materials: ASTM C475 and as recommended by gypsum board manufacturer for project conditions.
 1. Tape: 2 inch wide, creased paper tape for joints and corners, except as otherwise indicated.
 2. Chemical hardening type compound.
- F. Screws for Attachment to Steel Members Less Than 0.03 inch In Thickness, to Wood Members, and to Gypsum Board: ASTM C1002; self-piercing tapping type; cadmium-plated for exterior locations.
- G. Screws for Attachment to Steel Members From 0.033 to 0.112 inch in Thickness: ASTM C954; steel drill screws for application of gypsum board to loadbearing steel studs.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verify that project conditions are appropriate for work of this section to commence.

3.2 FRAMING INSTALLATION

- A. Studs: Space studs at 16 inches on center.
 1. Extend partition framing to structure where indicated and to above ceiling in other locations as indicated on drawings.
- B. Blocking: Install wood blocking for support of:
 1. Framed openings.
 2. Wall mounted cabinets.
 3. Plumbing fixtures.
 4. Wall mounted door hardware.
- D. Install Gypsum board at masonry walls scheduled to receive gypsum board, laminate directly to CMU.
 1. Orientation: Horizontal.

3.3 BOARD INSTALLATION

- A. Comply with ASTM C 840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
- B. Single-Layer Non-Rated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
 1. Exception: Tapered edges to receive joint treatment at right angles to framing.
- C. Double-Layer Non-Rated: Use gypsum board for first layer, placed parallel to framing or furring members, with ends and edges occurring over firm bearing. Use glass mat faced gypsum board at exterior walls and at other locations as indicated. Place second layer perpendicular to framing or furring members. Offset joints of second layer from joints of first layer.
- D. Fire-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.
- E. Installation on Metal Framing: Use screws for attachment of all gypsum board except face layer of non-rated double-layer assemblies, which may be installed by means of adhesive lamination.
- F. Moisture Protection: Treat cut edges and holes in moisture resistant gypsum board with sealant.

3.5 INSTALLATION OF TRIM AND ACCESSORIES

- A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.
 1. Not more than 30 feet apart on walls and ceilings over 50 feet long.
- B. Corner Beads: Install at external corners, using longest practical lengths.
- C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.
- D. Pre-manufactured wall reveal joints: Install at locations as indicated on drawings.

3.6 JOINT TREATMENT

- A. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
 - 1. Level 4: Walls to receive paint finish or wall coverings, unless otherwise indicated.
 - 2. Level 5: Walls to receive semi-gloss or gloss paint finish and other areas specifically indicated.
 - 3. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.
- B. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
 - 1. Feather coats of joint compound so that camber is maximum 1/32 inch.
 - 2. Taping, filling, and sanding is not required at surfaces behind adhesive applied ceramic tile and fixed cabinetry.
 - 3. Taping, filling and sanding is not required at base layer of double layer applications.
- C. Fill and finish joints and corners of cementitious backing board as recommended by manufacturer.

3.7 TOLERANCES

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 15 feet in any direction.

END OF SECTION 09 2116

**SECTION 09 6500
RESILIENT FLOORING**

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Luxury vinyl plank flooring.
- B. Resilient base.
- C. Installation accessories.

1.2 RELATED REQUIREMENTS

- A. Section 09 0561 - Flooring Preparation: Independent agency testing of concrete slabs, removal of existing floor coverings, cleaning, and preparation.

1.3 REFERENCE STANDARDS

- A. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
- B. ASTM F1066 - Standard Specification for Vinyl Composition Floor Tile.
- C. ASTM F1344 - Standard Specification for Rubber Floor Tile.
- D. ASTM F1861 - Standard Specification for Resilient Wall Base.
- E. FS RR-T-650 - Treads, Metallic and Nonmetallic, Skid Resistant; Federal Specifications and Standards.
- F. RFCI - Recommended Work Practices for Removal of Resilient Floor Coverings; Resilient Floor Covering Institute.

1.4 SUBMITTALS

- A. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
- B. Verification Samples: Submit two samples, 12 x 24 inch in size illustrating color and pattern for each resilient flooring product specified.
- C. Concrete Testing Standard: Submit a copy of ASTM F710.
- D. Certification: Prior to installation of flooring, submit written certification by flooring manufacturer and adhesive manufacturer that condition of sub-floor is acceptable.
- E. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.
- F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Extra Flooring Material: 150 square feet of each type and color.
 - 3. Extra Wall Base: 50 linear feet of each type and color.

1.5 QUALITY REQUIREMENTS

- A. Fire Performance Characteristics for resilient flooring and accessories: Critical Radiant Flux (CRF):
 - 1. Critical Radiant Flux: Minimum 0.45 watt per square centimeter when tested according to ASTM E 648 or NFPA 253.
- B. Coefficient of Friction for Flooring Surfaces: 0.6 or greater for level surfaces, 0.8 or greater for ramps or other inclined surfaces according to ADA.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect roll materials from damage by storing according to the manufacturer's recommendations.

1.7 FIELD CONDITIONS

- A. Maintain temperature in storage area between 55 degrees F and 80 degrees F.
- B. Store materials for not less than 48 hours prior to installation in area of installation at a

temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 60 degrees F.

- C. Do not install tiles over concrete slabs until slabs have pH range recommended by flooring manufacturer. No condensation on underside of 4-foot by 4-foot polyethylene sheet within 48 hours, fully taped at perimeters. PH and moisture rates:
 - 1. PH range of 5 to 9.
 - 2. Moisture emission rate of 3 lb./1000 sq.ft. per 24 hours or less.
- D. Where slab moisture conditions do not meet the manufacturer's requirements and the conditions in 1.7 of this section take corrective measures; refer to section 2.

PART 2 - PRODUCTS

2.1 PRODUCTS, GENERAL

- A. Refer to the Finish Legend on the Drawings for selected flooring products, sizes, colors, and patterns required under this Section. No substitutions will be considered.

2.2 TILE FLOORING

- 1. Luxury vinyl plank: Minimum Requirements: Comply with ASTM F1066, of Class corresponding to type specified. See Finish Legend.

2.3 RESILIENT BASE

- A. Resilient Base: ASTM F1861, Type TR rubber, roll; Cove, refer to the Finish Legend on the Drawings for selected base products, size, and colors required under this Section.
 - 1. Height: Refer to the Drawings.
 - 2. Thickness: 0.125 inch thick.
 - 3. Finish: Matte.
 - 4. Length: Rolls. 4' sections not permitted.
 - 5. Accessories: Factory pre-molded external corners and end stops.

2.4 ACCESSORIES

- A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.
- B. Primers, Adhesives, and Seaming Materials: Waterproof; types recommended by flooring manufacturer.
- C. Moldings, Transition and Edge Strips: Refer to the Finish Legend on the Drawings for pre-approved flooring products, sizes, colors, and patterns required under this Section.

2.5 MOISTURE REDUCING AGENT – If required

- A. Above slab Vapor Barrier: (to be used if the slab does not comply with the moisture requirements)
- B. Emission Testing: Perform prior to treatment in accordance with ASTM F 1869 (Anhydrous Calcium Chloride Test). Perform one test per 1000 square feet.
- C. Acceptable Manufacturers:
 - 1. Dependable Floor Products; Vaporseal - DB.
 - 2. Koester America Corp; VAP I 2000. www.koester.com <<http://www.koester.com>>.
 - 3. Aquafin; SG-2.
- D. Physical Characteristics
 - 1. Color: Clear.
 - 2. Volume Solids: 100%.
 - 3. Density: 9.0 lbs./gal.
 - 4. VOC Content: Zero.
 - 5. Compressive Strength: 11,000 psi (80MPa).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of

cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.

- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive base.
- C. Cementitious Sub-floor Surfaces: Verify that substrates are dry and ready for resilient flooring installation by testing for moisture and ph.
 - 1. Test in accordance with Section 09 0561.
 - 2. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.

3.2 PREPARATION

- A. Remove existing resilient flooring and flooring adhesives; follow the recommendations of RFCI Recommended Work Practices for Removal of Resilient Floor Coverings.
- B. Prepare floor substrates for installation of flooring in accordance with Section 09 0561.
- C. Remove sub-floor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.
- D. Clean substrate.

3.3 INSTALLATION

- A. Starting installation constitutes acceptance of sub-floor conditions.
- B. Install in accordance with manufacturer's instructions.
- C. Spread only enough adhesive to permit installation of materials before initial set.
- D. Fit joints tightly.
- E. Set flooring in place, press with heavy roller to attain full adhesion.
- F. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring at transition strip under centerline of door.
- G. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
 - 1. Metal Strips: Attach to substrate before installation of flooring using manufactures recompensated method.
 - 2. Resilient Strips: Attach to substrate using adhesive.
- H. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

3.4 LVP FLOORING

- A. Mix tile from container to ensure shade variations are consistent when tile is placed, unless manufacturer's instructions say otherwise.
- B. Lay flooring with joints and seams parallel to building lines to produce tile patterns indicated on drawings.

3.5 RESILIENT BASE

- A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.
- B. Install base on solid backing. Bond tightly to wall and floor surfaces.
- C. Scribe and fit to door frames and other interruptions.

3.6 CLEANING

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean in accordance with manufacturer's instructions.
- C. Finishing in accordance with manufacturer's instructions.

3.7 PROTECTION: Prohibit traffic on flooring for 48 hours after installation.

END OF SECTION 09 6500

**SECTION 09 9000
PAINTING**

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of paints, stains, varnishes, and other coatings.
- C. Materials for back-priming woodwork.
- D. Scope: Finish all interior and exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
 - 1. All sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
 - 2. Mechanical and Electrical:
 - a. In all areas, paint all insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
 - b. In all areas, paint shop-primed items.
 - c. Paint interior surfaces of air ducts and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
 - d. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.
- E. Do Not Paint or Finish the Following Items:
 - 1. Items fully factory-finished unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.
 - 2. Items indicated to receive other finishes.
 - 3. Items indicated to remain unfinished.
 - 4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
 - 5. Stainless steel and anodized aluminum.
 - 6. Porcelain and other tiles.
 - 7. Acoustical materials, unless specifically so indicated.
 - 8. Concealed pipes, ducts, and conduits.

1.2 DEFINITIONS: Conform to ASTM D16 for interpretation of terms used in this section.

1.3 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.
- B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2012.
- C. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials; 2007.

1.4 SUBMITTALS

- A. Product Data: Provide complete list of all products to be used, with the following information for each:
 - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
 - 2. MPI product number (e.g. MPI #47).
 - 3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
 - 4. Manufacturer's installation instructions.
 - 5. If proposal of substitutions is allowed under submittal procedures, explanation of all substitutions proposed.

- B. Samples: Submit three paper "drop" samples, 8-1/2 by 11 inches in size, illustrating range of colors available for each finishing product specified.
 - 1. Where sheen is specified, submit samples in only that sheen.
 - 2. Where sheen is not specified, discuss sheen options with Architect before preparing samples, to eliminate sheens definitely not required.
 - 3. Allow 30 days for approval process, after receipt of complete samples by Architect.
 - 4. Paint color submittals will not be considered until color submittals for major materials not to be painted, such as masonry, have been approved.
- C. Samples: Submit two paper chip samples, 3 x 3 inch in size illustrating range of colors and textures available for each surface finishing product scheduled.
- D. Certification: By manufacturer that all paints and coatings comply with VOC limits specified.
- E. Manufacturer's Instructions: Indicate special surface preparation procedures.
- F. Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Extra Paint and Coatings: 1 gallon of each color; store where directed.
 - 3. Label each container with color in addition to the manufacturer's label.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three (3) years' experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.7 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.
- D. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.
- E. Minimum Application Temperature for Varnish Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.
- F. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

1.8 EXTRA MATERIALS

- A. Supply a minimum of 1 gallon of each color; store where directed.
- B. Label each container with color in addition to the manufacturer's label.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Provide all paint and coating products used in any individual system from the same manufacturer; no exceptions.
- B. Provide all paint and coating products from the same manufacturer to the greatest extent possible.

1. In the event that a single manufacturer cannot provide all specified products, minor exceptions will be permitted provided approval by Architect is obtained using the specified procedures for substitutions.
- C. Acceptable manufacturers:
1. Sherwin Williams
 2. PPG
 3. Benjamin Moore

2.2 PAINTS AND COATINGS - GENERAL

- A. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating.
1. Provide paints and coatings of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
 2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
 3. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
 4. Supply each coating material in quantity required to complete entire project's work from a single production run.
 5. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.
- B. Primers: Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.
- C. Volatile Organic Compound (VOC) Content:
1. Provide coatings that comply with the most stringent requirements specified in the following:
 - a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
 - b. Ozone Transport Commission (OTC) Model Rule, Architectural, Industrial, and Maintenance Coatings; www.otcair.org; specifically:
 - 1) Opaque, Flat: 50 g/L, maximum.
 - 2) Opaque, Nonflat: 150 g/L, maximum.
 - 3) Opaque, High Gloss: 250 g/L, maximum.
 - 4) Varnishes: 350 g/L, maximum.
 2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.
- D. Colors: As indicated on drawings and within finish schedules
1. Selection to be made by Architect after award of contract.
 2. Extend colors to surface edges; colors may change at any edge as directed by Architect.
 3. In all areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling they are mounted on/under.
 4. In utility areas, finish equipment, piping, conduit, and exposed duct work in colors according to the color-coding scheme indicated.

2.3 PAINT SYSTEMS - INTERIOR

- A. Epoxy Coating Systems: Provide approved manufacturer's recommended epoxy coating systems for surfaces in the following locations:
1. Janitor Closets.
 2. Toilet rooms.
 3. Showers.
 4. Pool areas, Spa, and Pool Equipment Room, Pool Storage.
 5. Elevator pit walls up to 8 feet above finished First Floor, including the concrete floor. This system shall be bright white color.

- B. Paint I-OP - All Interior Surfaces Indicated to be Painted, Unless Otherwise Indicated: Including gypsum board, concrete, concrete masonry, brick, wood, plaster, uncoated steel, shop primed steel, galvanized steel, and aluminum.
 - 1. Two top coats and one coat primer.
 - 2. Top Coat(s): MPI Interior Latex; MPI #43, 44, 52, 53, 54, 114.
 - a. Provide epoxy intermediate and topcoats where indicated in 2.04 A above.
 - 3. Flat: MPI gloss level 1; use this sheen for ceilings and soffits, unless otherwise indicated.
 - 4. Eggshell: MPI gloss level 3; use this sheen for walls unless otherwise indicated.
 - 5. Satin: MPI gloss level 4; use this sheen for items subject to frequent touching by occupants, including door frames and railings.
 - 6. Semi-Gloss: MPI gloss level 5; use this sheen for epoxy systems.
 - 7. Top Coat Product(s):
 - a. Sherwin-Williams Pre-Catalyzed Waterbased Epoxy where indicated.
 - b. Sherwin-Williams Harmony Low Odor Interior Latex unless otherwise indicated.
 - 8. Primer(s): As follows unless other primer is required or recommended by manufacturer of top coats:
 - a. Gypsum Board: MPI #50, Interior Latex Primer Sealer.
 - b. Steel, Uncoated: MPI #79, Anti-Corrosive Alkyd Primer for Metal.
 - c. Steel -- Shop Primer: MPI #76, Quick Dry Alkyd Primer for Metal.
 - d. Galvanized Steel: MPI #134, Water Based Galvanized Primer.
 - e. Aluminum: MPI #95, Quick Dry Primer for Aluminum.
 - f. Epoxy primers: Provide epoxy primers appropriate for substrates indicated in areas specified in 2.04 A above.
- C. Paint I-OP-HD - Heavy Duty Vertical and Overhead: Including gypsum board, uncoated steel, shop primed steel, galvanized steel, and aluminum.
 - 1. Two top coats and one coat primer; primer may be omitted if top coat manufacturer approves.
 - 2. Primer(s): As recommended by manufacturer of top coats.
- D. Paint WI-TR-VS - Wood, Transparent, Varnish, Stain:
 - 1. One coat of stain.
 - 2. One coat of sealer.
 - 3. Satin: One coat of varnish.
- E. Paint MI-OP-3L - Ferrous Metals, Unprimed, Latex, 3 Coat:
 - 1. One coat of latex primer.
 - 2. Semi-gloss: Two coats of latex enamel; Color as selected by Architect.
- F. Paint MI-OP-2L - Ferrous Metals, Primed, Latex, 2 Coat:
 - 1. Touch-up with latex primer.
- G. Paint GI-OP-3A - Gypsum Board/Plaster, Alkyd, 3 Coat:
 - 1. One coat of alkyd primer sealer.
 - 2. Eggshell: Two coats of alkyd enamel. Color as selected by Architect
- H. Paint GI-OP-3L - Gypsum Board/Plaster, Latex, 3 Coat:
 - 1. One coat of alkyd primer sealer.
 - 2. Eggshell: Two coats of latex enamel; Color as selected by Architect.

2.4 ACCESSORY MATERIALS

- A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required to achieve the finishes specified whether specifically indicated or not; commercial quality.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

- B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- C. Test shop-applied primer for compatibility with subsequent cover materials.
- D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 - 1. Gypsum Wallboard: 12 percent.

3.2 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to coating application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or repair existing coatings that exhibit surface defects.
- D. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- E. Seal surfaces that might cause bleed through or staining of topcoat.
- F. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- G. Gypsum Board Surfaces to be Painted: Fill minor defects with filler compound. Spot prime defects after repair.
- H. Shop-Primed Steel Surfaces to be Finish Painted: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces.
- I. Interior Wood Surfaces to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats. Prime concealed surfaces with gloss varnish reduced 25 percent with thinner.
- J. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.3 APPLICATION

- A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- B. Apply products in accordance with manufacturer's instructions.
- C. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.
- D. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- E. Apply each coat to uniform appearance.
- F. Sand wood and metal surfaces lightly between coats to achieve required finish.
- G. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- H. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.
- I. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.4 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection.

3.5 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.6 PROTECTION

- A. Protect finished coatings until completion of project.

B. Touch-up damaged coatings after Substantial Completion.

END OF SECTION 09 9000

Interior Paint Schedule

Item	Requirement		Mils per coat (Wet/Dry)				Manufacturers				Finish		Notes			
	Substrate	Location	Primer	Finish		ICI	Pittsburg		Sherwin Williams		Benjamin Moore			Pratt & Lambert	Luster	Final Coats
				D	W		Primer or Stain	2 Finish	Primer or Stain	2 Finish	Primer or Stain	2 Finish				
Factory Primed Steel	Doors and Frames, Exposed Piping		-	3	3.25	Devflex High Performance 4216	90-709 Pitt-Tech Primer/Finish DTM	DTM Acrylic Semi-Gloss #866-200	DTM Acrylic Semi-Gloss Primer/Finish	M29 DTM	M29 DTM	Enducryl DTM Z6600 Series	Enducryl DTM Z6600 Series	Semi gloss	Acrylic Enamel	
Ferrous Metals	Stacks, Pipes, Beams, Misc Metals		6	3	5	ICI - Devflex - 4216	ICI - Devflex - 4020	KemKromik Metal Primer B50Z	M06 Alkyd Metal Primer	M06 Alkyd Metal Primer	M06 Alkyd Metal Primer	S4501 Rust Inhibitive Metal Primer	S4501 Rust Inhibitive Metal Primer	Semi gloss	Acrylic Enamel	
Ferrous Metals	Exposed Structure, Steel, Deck, Joist		2	-	4	Spraymaster Pro Uni-Grip-WB 1486	Per the Manf.	Water Based Dryfall M535 Semi-Gloss Dryfall Water Base	Water Based Dryfall M535 Semi-Gloss Dryfall Water Base	Water Based Dryfall M535 Semi-Gloss Dryfall Water Base	Water Based Dryfall M535 Semi-Gloss Dryfall Water Base	S4501 Rust Inhibitive Metal Primer	S4501 Rust Inhibitive Metal Primer	Semi gloss	Latex	Test patch for adhesion to be approved by Architect before installation
Ferrous Metals	Galvanized Steel		2	-	4	Spraymaster Pro Uni-Grip-WB 1486	Per the Manf.	Water Based Dryfall M535 Semi-Gloss Dryfall Water Base	Water Based Dryfall M535 Semi-Gloss Dryfall Water Base	Water Based Dryfall M535 Semi-Gloss Dryfall Water Base	Water Based Dryfall M535 Semi-Gloss Dryfall Water Base	S4501 Rust Inhibitive Metal Primer	S4501 Rust Inhibitive Metal Primer	Semi gloss	Latex	Test patch for adhesion to be approved by Architect before installation
Wood Stained	Wood	Clearcoat Only	-	-	4	1.8	Woodpride 1908 Interior Gloss Polyurethane Varnish	Wood Classics Polyurethane Varnish A67 Series	Wood Classics Polyurethane Varnish A67 Series	Wood Classics Polyurethane Varnish A67 Series	Wood Classics Polyurethane Varnish A67 Series	Varmor R10 Series Varnish	Varmor R10 Series Varnish	Satin	Poly-Urethane	
Wood Stained	Wood	Stain and Varnished	-	-	4	1.8	Woodpride 1700	Premium Custom Stain applied on Polyurethane Varnish	Premium Custom Stain applied on Polyurethane Varnish	Premium Custom Stain applied on Polyurethane Varnish	Premium Custom Stain applied on Polyurethane Varnish	Premium Custom Stain applied on Polyurethane Varnish	Premium Custom Stain applied on Polyurethane Varnish	Satin	Poly-Urethane	Match Architect's sample or coordinate color with architect
Painted interior trim	Wood or Primed Composite Trim	Painted	4	1.4	4	1.6	Dulux Gripper 3210	S-W PrepRite Pro Block Latex B51 Series	200 Latex Egg-Shel, B20W2200 Series	200 Latex Egg-Shel, B20W2200 Series	200 Latex Egg-Shel, B20W2200 Series	-	-	Satin	Latex	
Concrete Block - Epoxy Coated	Plain Block	Exposed Block	16	8	4	2	Prep & Prime 3010 Water-based Block Filler	PrepRite Block Filler B25W25	PrepRite Block Filler B25W25	PrepRite Block Filler B25W25	PrepRite Block Filler B25W25	Pro-Hide Silver Block Filler Z8485	Pro-Hide Silver Block Filler Z8485	Egg-shel	Latex	
Concrete Block - Epoxy Coated	Plain Block	Exposed Block	16	8	4	2	Tru-Glaze-WB 4408	Tru-Glaze-WB 4408	coat Kem Coat High Solids B42W400	coat Kem Coat High Solids B42W400	coat Kem Coat High Solids B42W400	Techgard Epoxy Block Filler S4250, S4251 (activator)	Techgard Epoxy Block Filler S4250, S4251 (activator)	Gloss	Epoxy	Epoxy Based Paint for Showers, High Humidity Areas and Kitchens
Concrete Block - Semi Gloss	Plain Block	Exposed Block	16	8	4	2	Prep & Prime 3010 Water-based Block Filler	PrepRite Block Filler B25W25	PrepRite Block Filler B25W25	PrepRite Block Filler B25W25	PrepRite Block Filler B25W25	Pro-Hide Silver Block Filler Z8485	Pro-Hide Silver Block Filler Z8485	Semi - Gloss	Latex	Higher Abuse Walls, Corridor Walls, Lobbies and Teaching walls
Concrete Block - Epoxy Coated - Semi	Plain Block	Exposed Block	16	8	6	3.5	Boxfil 4000 Heavy Duty Acrylic Block Filler	PrepRite Block Filler B25W25	PrepRite Block Filler B25W25	PrepRite Block Filler B25W25	M42 Waterborne Epoxy	Z8485 Enducryl HP Block Filler	Z8485 Enducryl HP Block Filler	Semi-Gloss	Epoxy	Water Based Epoxy for Girls and Boys Wet Walls Only

Gypsum Board - Standard Wall Application	Gypsum Board	General Areas	4	1.25	4	1.5	Dulux Gripper 3210	Dulux Pro Premium 1402 Acrylic Latex Eggshell	6-2 SpeedHide Interior Quick-Drying Latex Sealer	6-411 Series SpeedHide Eggshell/Acrylic Latex Enamel	PrepRite 200 Latex Primer B28W200 Series	ProMar 200 Latex Egg-shell B20 Series	253 Superspec Primer	274 Superspec Eggshell	Z8160 Pro-Hide Gold Latex Primer	Pro-Hide Gold Series Latex Eggshell	Egg-shell	Latex	
Gypsum Board - Soffits	Gypsum Board	Soffits and Ceilings	4	1.25	4	1.5	Dulux Gripper 3210	Dulux 1210	6-2 SpeedHide Interior Quick-Drying Latex Sealer	6-70 Line SpeedHide Interior Wall Flat Latex Paint	PrepRite 200 Latex Primer B28W200 Series	ProMar 200 Flat Latex B30-200 Series	253 Superspec Primer	275 Superspec Flat	Z8160 Pro-Hide Gold Latex Primer	Z8100 Series Pro-Hide Gold Flat Latex	Flat	Latex	
Gypsum Board - Subbubble	Gypsum Board	Walls	4	1.25	4	1.5	Prep & Prime Gripper 3210 Primer Sealer	Tri-Glaze-WB 4406 Waterborne Epoxy Semi-Gloss Coating	6-2 SpeedHide Interior Quick-Drying Latex Sealer	16-551 Pitt-Glaze WB Acrylic Epoxy Semi-Gloss	PrepRite 200 Latex Primer B28W200 Series	Water Based Catalyzed Epoxy Semi-Gloss B70 Series	023 Fresh Start Primer	M43/M44 Acrylic Epoxy Semi-Gloss	Z8160 Pro-Hide Gold Latex Primer	Enducryl Water Based Catalyzed Epoxy Series (Z7025 Semi-Gloss Activator)	Semi-Gloss	Epoxy	Scrubable and wet Applications
Gypsum Board - Subbubble	Gypsum Board	Kitchens and Baths	4	1.25	4	1.5	Prep & Prime Gripper 3210 Primer Sealer	Zinsser Bathroom and Kitchen paint	-	-	-	-	-	-	-	-	Gloss	Latex	Scrubable and wet Applications
VCT Flooring	VCT	Gym Floors	-	5	-	6	Devfloor 506 Water-Based Epoxy Primer and Devfloor 525 100% Solids Epoxy Surfacer	Devfloor 568 High Solids Urethane	PPG MegaSeal 99-6639 High Solids Primer Clear and 1 coat MegaSeal WB Primer Gray	PPG Megaseal HPU 99-6730 High Performance Urethane	CP #5531 primer at 500 to 1,000 sf per gallon and 1 coat GP #3504 High Solids Epoxy Primer	GP #4638 General Polymer	M36/M39 High Build Epoxy at 500 to 1,000 sf per gallon	coats of M36/M37 Epoxy Clear	S6700 Series HS Floor Epoxy and Activator	S6500 Series HS Polyurethane	Satin	Poly-Urethane	Stripping on VCT Floors

**SECTION 09 9300
STAINING AND TRANSPARENT FINISHING**

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and application of wood stains and transparent finishes on the following substrates:
 - 1. Interior Substrates:
 - a. Exposed framing.
 - b. Dressed lumber (finish carpentry or woodwork).

1.2 DEFINITIONS

- A. MPI Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
- B. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
- C. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
- D. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
- E. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
 - 1. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
- B. Samples: For each type of finish system and in each color and gloss of finish required.

1.4 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each finish system indicated and each color selected to verify preliminary selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - 1. Architect will select one surface to represent surfaces and conditions for application of each type of finish system and substrate.
 - a. Vertical and Horizontal Surfaces: Provide samples of at least 20 sq. ft.
 - b. Other Items: Architect will designate items or areas required.
 - 2. Final approval of stain color selections will be based on mockups.
 - a. If preliminary stain color selections are not approved, apply additional mockups of additional stain colors selected by Architect at no added cost to Owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide products indicated in wood finish systems schedules or comparable products by one of the following:
 - 1. Furnished by Owner.
- B. Products: Subject to compliance with requirements, listed in wood finish systems schedules for the product category indicated.

2.2 MATERIALS, GENERAL

- A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products List."
- B. Material Compatibility:
 - 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

2. For each coat in a paint system, products shall be recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- C. Stain Colors: As selected by Architect from manufacturer's full range of manufactures products.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Interior Wood Substrates: **13** percent, when measured with an electronic moisture meter.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Proceed with finish application only after unsatisfactory conditions have been corrected.
 1. Beginning finish application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and finishing.
 1. After completing finishing operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean and prepare surfaces to be finished according to manufacturer's written instructions for each substrate condition and as specified.
 1. Remove dust, dirt, oil, and grease by washing with a detergent solution; rinse thoroughly with clean water and allow to dry. Remove grade stamps and pencil marks by sanding lightly. Remove loose wood fibers by brushing.
 2. Remove mildew by scrubbing with a commercial wash formulated for mildew removal and as recommended by stain manufacturer.

3.3 APPLICATION

- A. Apply finishes according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."
- B. Apply finishes to produce surface films without cloudiness, holidays, lap marks, brush marks, runs, ropiness, or other surface imperfections.

3.4 CLEANING AND PROTECTION

- A. Protect work of other trades against damage from finish application. Correct damage by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- B. At completion of construction activities of other trades, touch up and restore damaged or defaced finished wood surfaces.

3.5 INTERIOR WOOD - FINISH-SYSTEM SCHEDULE

- A. Wood Substrates: Exposed framing.
 1. Water-Based Varnish over Stain System MPI INT 6.2M:
 - a. Stain Coat: Stain, semitransparent, for interior wood, MPI #90.
 - 1) Basis of Design: Sherwin Williams.
 - b. First Intermediate Coat: Water-based varnish matching topcoat.
 - c. Second Intermediate Coat: Water-based varnish matching topcoat.
 - d. Topcoat: Varnish, water based, clear, satin MPI Gloss Level 5, MPI #129.
 - 1) Basis of Design: Sherwin Williams.
- B. Wood Substrates: Wood trim, architectural woodwork, and wood board paneling.

1. Semitransparent Stain System MPI INT 6.3C:
 - a. Prime Coat: Stain, exterior, solvent based, semitransparent, matching topcoat.
 - b. Topcoat: Stain, exterior, solvent based, semitransparent, MPI #13.
 - 1) Basis of Design: Sherwin Williams.
- C. Wood Substrates: Wood paneling and casework.
 1. Water-Based Varnish over Stain System MPI INT 6.4U:
 - a. Stain Coat: Stain, semitransparent, for interior wood, MPI #90.
 - 1) Basis of Design: Sherwin Williams.
 - b. First Intermediate Coat: Water-based varnish matching topcoat.
 - c. Second Intermediate Coat: Water-based varnish matching topcoat.
 - d. Topcoat: Varnish, water based, clear, satin MPI Gloss Level 4, MPI #128.
 - 1) Basis of Design: Sherwin Williams.
 - e. Topcoat: Varnish, water based, clear, semi-gloss MPI Gloss Level 5, MPI #129.
 - 1) Basis of Design: Sherwin Williams.
 - f. Topcoat: Varnish, water based, clear, gloss MPI Gloss Level 6, MPI #130.
 - 1) Basis of Design: Sherwin Williams.

END OF SECTION 09 9300

**SECTION 10 5113
METAL LOCKERS**

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Ventilated lockers.

SCOPE: Furnish and install steel lockers, accessories and finish metal trim as shown on drawings.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For metal lockers.
 - 1. Include plans, elevations, sections, and attachment details.
 - 2. Include locker identification system and numbering sequence.
- C. Samples: Color Charts showing manufactures available colors.

1.3 INFORMATIONAL SUBMITTALS

- A. Sample warranty.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.5 QUALITY ASSURANCE:

- A. UNIFORMITY: Provide each type of metal locker as produced by a single manufacturer, including necessary accessories, fittings, and fasteners.
- B. UNIFORMITY: Provide each type of metal locker as produced by a single manufacturer, including necessary accessories, fittings, and fasteners.

1.6 JOB CONDITIONS: Do not deliver metal lockers until building is enclosed and ready for locker installation. Protect from damage during delivery, handling, storage, and installation.

1.7 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of metal lockers that fail in materials or workmanship, excluding finish, within specified warranty period.
 - 1. Warranty Period for Knocked-Down Metal Lockers: Two (2) years from date of Substantial Completion.
 - 2. Warranty Period for Welded Metal Lockers: Ten (10) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 BASIS ODF DESIGN: Republic Storage Products, LLC www.republicstorage.com Single Point II Half Height Vented Locker

- A. MATERIAL: All major steel parts shall be made of mild cold rolled steel, free from imperfections and capable of taking a high-grade enamel or powder coat finish.
- B. FINISH: Surfaces of the steel shall be thoroughly cleaned, phosphatized and prepared for baked enamel or powder coat finish in accordance with paint manufacturer's instructions.
- C. CONSTRUCTION: Lockers shall be built on the unit principle each locker shall have an individual door and frame, an individual top, bottom, back and shelves with common intermediate uprights separating units. Assembly of all locker components shall be by riveting with a backup washer to provide a shake-proof permanent fastening system while still permitting fastener removal by drilling to allow future rearrangement of lockers or replacement of damaged parts. OPTION: Keps nuts and bolts may be used for assembly.

- D. **DOOR FRAMES:** Door frames shall be 16 gauge formed into 1" wide face channel shapes with a continuous vertical door strike integral with the frame on both sides of the door opening. Cross frame members of 16-gauge channel shapes, including intermediate cross frame on double, triple and four tier lockers shall be securely welded to vertical framing members to ensure a square and rigid assembly. Intermediate cross frame members not required on box lockers.
DOORS: Construction shall be a single piece 14-gauge outer door with double return flanges on both vertical edges and a single return flange on the top and bottom edges. Doors on tiered lockers shall be reinforced with a full height 16-gauge channel reinforcement.
 Ventilation consists of full perimeter opening plus, Verti-vent slots in the top and bottom of doors.
 Doors for tiered lockers shall have diamond shaped perforations 3/4" wide by 1 1/2" high to provide free air flow while leaving sufficient metal for rigidity and strength. Doors for box lockers 4, 5 and 6 openings high are perforated for free airflow using small diamond perforations 7/16" wide by 15/16" high.
 Doors shall be punched for the number plate mounting on the top face of the door.
- E. **LATCHING:** Latching shall be achieved by securing an 11-gauge frame hook to the locker side frame located midway up on the door. This frame hook shall have a padlock hasp protruding through the stainless steel recessed pocket and also will have punching to accept Master Lock 1690 or 1790.
- F. **HANDLES:** A one piece, deep drawn stainless steel cup shall be securely riveted to the door to form a receptacle for the padlock or built-in lock. The pocket shall also have a formation across the top that provides a door pull. This stainless steel pocket shall contain a recessed area for the various lock types.
- G. **HINGES:** Hinges shall be 2" high, 5-knuckle, full loop, tight pin style, securely welded to frame and double riveted to the inside of the door flange. Locker doors 42" high and less shall have two hinges. Doors over 42" shall have three hinges.
- H. **BODY:** Locker body components shall be made of cold rolled steel specially formed for added strength and rigidity and ensure tight joints at fastening points. 16-gauge side uprights are perforated with diamond-shaped openings 3/4" wide by 1-1/2" high for maximum ventilation. Locker backs shall be 18-gauge steel with right angle flanges on each vertical side for stiffness, ease of assembly, and to provide corner rigidity. Tops, bottoms, shelves and compartment dividers shall be 16-gauge steel, fully flanged on all sides for added stiffness. Shelves shall have an additional return flange on the front edge creating a channel shape to rigidize the impact surface. All body parts are finished in the same color selected for doors and frames
- I. **INTERIOR EQUIPMENT:** Single tier lockers over 42" high shall have one hat/book shelf. Other tiered lockers do not require shelves. All single, double, and triple tier lockers shall have one double prong rear hook and two single prong side hooks in each compartment. All hooks shall be made of steel, formed with ball p
- J. **NUMBER PLATES:** Each locker shall have a polished aluminum number plate with black numerals not less than 1/2" high. Plates shall be attached with rivets to the top face of the locker door for high visibility
- K. **COLOR:** Doors and exposed body parts shall be finished in colors selected from Republic's full collection of enamel colors.
- L. **ASSEMBLY:** Assembly of all locker components shall be accomplished by the use of zinc plated, low round head, slotless, fin neck machine screws with Keps nut, producing a strong mechanical connection.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Lockers must be installed in accordance with manufacturer's approved drawings and installation instructions. Installation shall be level and plumb with flush surfaces and rigid attachment to anchoring surfaces. Space fasteners at 36" O.C. or less as recommended by manufacturer. Use fasteners appropriate to load and anchoring substratum. Use reinforcing plates wherever fasteners could distort metal. Various trim accessories where shown such as sloping tops,

fillers, bases, recess trim, etc., shall be installed using concealed fasteners. Flush, hairline joints are provided at all abutting trim parts and at adjoining surfaces.

- B. Install lockers level, plumb, and true; shim as required, using concealed shims.
 - 1. Anchor locker runs at ends and at intervals recommended by manufacturer, but not more than 36 inches o.c. Using concealed fasteners, install anchors through backup reinforcing plates, channels, or blocking as required to prevent metal distortion.
 - 2. Anchor single rows of metal lockers to walls near top and bottom of lockers.
 - 3. Anchor back-to-back metal lockers to floor.
- C. Knocked-Down Lockers: Assemble with manufacturer's standard fasteners, with no exposed fasteners on door faces or face frames.
- D. Trim: Fit exposed connections of trim, fillers, and closures accurately together to form tight, hairline joints, with concealed fasteners and splice plates.
 - 1. Attach recess trim to recessed metal lockers with concealed clips.
 - 2. Attach filler panels with concealed fasteners.
 - 3. Attach sloping-top units to metal lockers, with closures at exposed ends.
 - 4. Attach boxed end panels using concealed fasteners to conceal exposed ends of non-recessed metal lockers.
 - 5. Attach finished end panels using fasteners only at perimeter to conceal exposed ends of non-recessed metal lockers.

END OF SECTION 10 5113

**SECTION 12 3600
COUNTERTOPS**

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Countertops for casework.
- B. Wall-hung counters and vanity tops.
- C. Sinks molded into countertops.

1.2 RELATED REQUIREMENTS

- A. Section 06 2000 - Finish Carpentry.
- B. Section 07 9200 - Joint Sealers: For sealing of joints with adjacent materials.

1.3 REFERENCE STANDARDS

- A. ANSI A208.1 - American National Standard for Particleboard; 2009.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2010b.
- C. AWI/AWMAC (QSI) - Quality Standard Illustrated; Architectural Woodwork Institute and Architectural Woodwork Manufacturers Association of Canada; 2005, 8th Ed., Version 2.0.
- D. ISSFA-2 - Classification and Standards for Solid Surfacing Material; International Solid Surface Fabricators Association; 2001 (2007).
- E. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Specimen warranty.
- C. Shop Drawings: Complete details of materials and installation; combine with shop drawings of cabinets and casework specified in other sections.
- D. Selection Samples: For each finish product specified, color chips representing manufacturer's full range of available colors and patterns.
- E. Verification Samples: For each finish product specified, minimum size 6 inches square, representing actual product, color, and patterns.
- F. Test Reports: Chemical resistance testing, showing compliance with specified requirements.
- G. Installation Instructions: Manufacturer's installation instructions and recommendations.
- H. Maintenance Data: Manufacturer's instructions and recommendations for maintenance and repair of countertop surfaces.

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Same fabricator as for cabinets on which tops are to be installed.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.7 FIELD CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 – PRODUCTS

2.1 COUNTERTOP ASSEMBLIES

- A. Thin Solid Surfacing Countertops: Solid surfacing sheet or plastic resin casting over continuous substrate.
 - 1. Flat Sheet Thickness: 1/2 inch, minimum.
 - 2. Solid Surfacing Sheet and Plastic Resin Castings: Complying with ISSFA-2 and NEMA LD 3; acrylic or polyester resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard woodworking tools; no surface coating; color and pattern consistent throughout thickness.
 - a. Finish on Exposed Surfaces: Matte, gloss rating of 5 to 20.
 - b. Color and Pattern: As selected by Architect from manufacturer's full line.
 - c. Manufacturers:
 - 1) Basis of Design: Thinscape Performance Tops, Wilsonart International, Inc: www.wilsonart.com.
 - 3. Other Components Thickness: 1/2 inch, minimum.
 - 4. Exposed Edge Treatment: Built up to minimum 1 inch thick; bullnosed edge; use marine edge at sinks at men's toilet room will be undermounted.
 - 5. Back Splashes: Same sheet material, square top; minimum 4 inches high.

2.2 ACCESSORY MATERIALS

- A. Particleboard for Supporting Substrate: ANSI A208.1 Grade 2-M-2, 45 pcf minimum density; minimum 3/4 inch thick; join lengths using metal splines.
- B. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.
- C. Joint Sealant: Mildew-resistant silicone sealant, clear.

2.3 FABRICATION

- A. Fabricate tops and splashes in the largest sections practicable, with top surface of joints flush.
 - 1. Join lengths of tops using best method recommended by manufacturer.
 - 2. Fabricate to overhang fronts and ends of cabinets 1 inch except where top butts against cabinet or wall.
 - 3. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.
- B. Provide back/end splash wherever counter edge abuts vertical surface unless otherwise indicated.
 - 1. Secure to countertop with concealed fasteners and with contact surfaces set in waterproof glue.
 - 2. Height: 4 inches, unless otherwise indicated.
- C. Solid Surfacing: Fabricate tops up to 144 inches long in one piece; join pieces with adhesive sealant in accordance with manufacturer's recommendations and instructions.
- D. Wall-Mounted Counters: Provide skirts, aprons, brackets, and braces as indicated on drawings, finished to match.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Verify that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Securely attach countertops to cabinets using concealed fasteners. Make flat surfaces level; shim where required.
- B. Attach plastic laminate countertops using screws with minimum penetration into substrate board of 5/8 inch.
- C. Seal joint between back/end splashes and vertical surfaces.

3.4 TOLERANCES

- A. Variation From Horizontal: 1/8 inch in 10 feet, maximum.
- B. Offset From Wall, Countertops: 1/8 inch maximum; 1/16 inch minimum.
- C. Field Joints: 1/8 inch wide, maximum.

3.5 CLEANING

- A. Clean countertops surfaces thoroughly.

3.06 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 12 3600

**SECTION 12 3610
SOLID SURFACE FABRICATIONS**

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Solid surface countertops.

1.2 RELATED REQUIREMENTS

- A. Section 07 9200 - Joint Sealants: For sealing of joints with adjacent materials.
- D. Division 22 - Plumbing Fixtures: Sinks.

1.3 REFERENCE STANDARDS

- A. ANSI A208.1 - American National Standard for Particleboard; 2009.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- C. AWI - Quality Standard Illustrated.
- D. ISSFA-2 - Classification and Standards for Solid Surfacing Material.

1.4 SUBMITTALS

- A. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Specimen warranty.
- B. Shop Drawings: Complete details of materials and installation; combine with shop drawings of related work specified in other sections.
 - 1. Show proposed locations of all seams for the Architect's approval prior to fabrication.
- C. Verification Samples: For each finish product specified, minimum size 6 inches square, representing actual product, color, and patterns.
- D. Test Reports: Chemical resistance testing, showing compliance with specified requirements.
- E. Maintenance Data: Manufacturer's instructions and recommendations for maintenance and repair of countertop surfaces.

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Same fabricator as for cabinets on which tops are to be installed.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.7 FIELD CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 - PRODUCTS

2.1 SOLID SURFACE ASSEMBLIES

- A. Solid Surfacing Sheet and Plastic Resin Castings: Complying with ISSFA-2 and NEMA LD 3; acrylic or polyester resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard woodworking tools; no surface coating; color and pattern consistent throughout thickness.
 - 1. Finish on Exposed Surfaces: Matte, gloss rating of 5 to 20.
 - 2. Flat Sheet Thickness: Refer to Drawings.
 - 3. Exposed Edge Treatment: Built up to minimum 1 inch thick; bullnosed edge; use marine edge at sinks.
 - 4. Back and End Splashes: Same sheet material, square top; minimum 4 inches high.

5. Provide manufacturer's selection of colors.

2.2 HARDWARE

- A. Work Surface Support Brackets: Provide reversible steel support brackets equivalent to A&M Hardware, Inc., Work Station Brackets or equivalent by another approved manufacturer, and as follows:
 1. Load capacity: Not less than 1000 lbs. per bracket.
 2. Factory-Applied Primer: Brackets shall be factory-primed and field-painted to match the wall to which it is attached. Refer to the Finish Legend on the Drawings for pre-selected paint colors.
- B. Shower Wall Brackets: Continuous type, polished stainless steel.
- C. Attachments, Screws, and Bolts: Stainless steel, tamper proof type.
 1. For attaching panels and pilasters to brackets: Through-bolts and nuts; tamper proof.

2.3 ACCESSORY MATERIALS

- A. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.
- B. Joint Sealant: Mildew-resistant silicone sealant, clear.

2.4 FABRICATION

- A. Fabricate items in the largest sections practicable, with top surface of joints flush.
 1. Join lengths of tops using best method recommended by manufacturer.
 2. Fabricate to overhang fronts and ends of cabinets 1 inch except where top butts against cabinet or wall.
 3. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.
- B. Provide back/end splash wherever counter edge abuts vertical surface unless otherwise indicated.
 1. Secure to countertop with concealed fasteners and with contact surfaces set in waterproof glue.
 2. Height: 4 inches, unless otherwise indicated.
- C. Solid Surfacing: Fabricate items up to 144 inches long in one piece; join pieces with adhesive sealant in accordance with manufacturer's recommendations and instructions.
- D. Wall-Mounted Counters: Provide skirts, aprons, brackets, and braces as indicated on drawings, finished to match.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Verify that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Securely attach items to substrates using concealed fasteners. Make flat surfaces level; shim where required.
- B. Seal joints.

3.4 TOLERANCES

- A. Variation From Horizontal: 1/8 inch in 10 feet, maximum.
- B. Offset From Wall, Countertops: 1/8 inch maximum; 1/16 inch minimum.
- C. Field Joints: 1/8 inch wide, maximum.

3.5 CLEANING

- A. Clean installed surfaces thoroughly.

3.6 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 12 3610

**SECTION 22 05 00
COMMON WORK RESULTS FOR PLUMBING**

PART 1 - GENERAL

1.1 GENERAL REFERENCE

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification sections, apply to work of this section.
- B. Refer to Division 01 section "Alternates" for possible alternates affecting the extent of this Section of work.
- C. This Contractor is also referred to the Mechanical, Architectural, Structural, Electrical and all other drawings and specifications pertinent to this project. All of the above mentioned drawings and specifications are considered a part of the Contract Documents.
- D. This section specifies the basic requirements for Plumbing installations and includes requirements common to more than one section of Division 22. It expands and supplements the requirements specified in sections of Division 01.

1.2 DEFINITIONS

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in chases.
- E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.
- F. The following are industry abbreviations for plastic materials:
 - 1. ABS: Acrylonitrile-butadiene-styrene plastic.
 - 2. CPVC: Chlorinated polyvinyl chloride plastic.
 - 3. PE: Polyethylene plastic.
 - 4. PVC: Polyvinyl chloride plastic.
- G. The following are industry abbreviations for rubber materials:
 - 1. EPDM: Ethylene-propylene-diene terpolymer rubber.
 - 2. NBR: Acrylonitrile-butadiene rubber.
- H. The term "Contractor" as applied to work specified, shown or reasonably implied in the contract documents for Division 22 shall be defined as the subcontractor who is responsible for the work specified or indicated. All subcontracted work must be incorporated by and coordinated by the prime contractor.
- I. Throughout this specification section the term "Design Professional" is referenced. The specification calls for certain actions to be undertaken or referred to the Design Professional. Accordingly, the term "Design Professional" shall be defined as the firm with which the "Owner" has contracted to produce the contract drawings and specifications. It shall be understood that the Design Professional for this project is the Architect whose name is shown on the drawing title block.

1.3 QUALITY ASSURANCE

- A. Electrical Characteristics for Plumbing Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified at

the expense of the Plumbing contractor. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

1.4 PLUMBING COORDINATION

- A. This Contractor shall familiarize himself with the work to be done under other Divisions of this specification and their related drawings and shall so coordinate and schedule his work as not to cause delays or interference with the work of others. Such coordination and scheduling shall accomplish the installation of equipment and piping with a minimum of cutting through masonry and other adjustments.
- B. Ceiling grid systems shall not be supported from plumbing lines or any other utility lines, and vice versa. Each utility and the ceiling grid system shall be a separate installation and each shall be independently supported from the building structure-concrete, steel or masonry. Where interferences occur, in order to support piping, ceiling grid systems, etc., trapeze type hangers or supports shall be employed which shall be located so as not to interfere with access to such plumbing equipment as valves, regulators, etc.
- C. This Contractor shall be responsible for proper size and location of pipe spaces, anchors, chases, recesses, slots and openings, etc., required for the proper installation of his work during progress of construction to allow for plumbing installations. Verify all dimensions by field measurements. Coordinate the installation of required supporting devices and sleeves in structural components as they are constructed. Sequence, coordinate, and integrate installations of plumbing materials and equipment for efficient flow of the work.
- D. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.
- E. Install equipment and materials to provide required access for servicing and maintenance. Coordinate the final location of concealed equipment and devices requiring access with final location of required access panels and doors.
- F. Coordinate requirements for access panels and doors for plumbing items requiring access that are concealed behind finished surfaces. Access panels and doors are specified in Division 08 Section "Access Doors and Frames."
- G. Allow ample space for removal of all parts that require replacement or servicing. Extend all grease fittings to an accessible location. Install equipment to facilitate maintenance and repair or replacement of equipment components. Connect equipment for ease of disconnecting, with a minimum of interference with other installations. Sequence, coordinate, and integrate installations of plumbing materials and equipment for efficient flow of the work.
- H. All plumbing equipment, especially piping, shall be at least three feet away horizontally from any electrical switchgear or transformers. No hydronic lines shall pass through telephone, transformer, switchgear rooms or elevator equipment rooms.
- I. Verify final locations for rough-ins with field measurements and with the requirements of the actual equipment to be connected.
- A. Specific divisions of responsibility when coordinating with trades other than plumbing shall be as indicated on drawings, in Division 01, as follows. The Contractors under this Division shall:
 - 1. Run the indicated utilities outside the building to points as noted on the drawings. He shall be responsible for the actual tie-in to street utility services where routing to site utility services on drawings pertaining to this Division are indicated.
 - 2. Provide and place all sleeves in floors, walls, etc., and coordinate such location.
 - 3. Be responsible for flashing at roof vent terminals.
 - 4. Rough-in and connect all equipment furnished by other trades or Owner where shown on the drawings.
 - 5. Provide motors, special controls, transformers and relays as required for the proper operation of all equipment furnished by him under this Division.
 - 6. Coordinate the location of floor drains and cleanouts with architectural and structural elements or work of other trades affecting the location of floor drains and cleanouts. Where floor drains are installed to serve specific pieces of equipment, coordinate the location of

floor drains with the contractor who is providing the equipment, using manufacturer's shop drawings for the equipment served or written instructions from the equipment manufacturer.

1.5 EXAMINATION OF SITE

- A. Before submitting a bid, the Contractor is requested to visit the job site to familiarize himself with construction conditions. No consideration or remuneration will be given for his failure to do so.

1.6 DIVISION 22 DESIGN DOCUMENTS

- A. Should it appear that there is a discrepancy between or within the drawings and/or specifications concerning the nature, quality or extent of materials or work to be furnished and/or installed, and such discrepancy is not clarified by Addendum during the bidding period, this Contractor shall base his bid on performing the work in the manner having the higher cost. The Design Professional shall have the option of selecting either of the manners shown and/or specified. In the event the lower cost manner is selected, a credit shall be due the Owner in the amount of the difference between the lower cost and higher cost manner. Any discrepancies shall be called to the attention of the Design Professional before proceeding with work affected thereby.
- B. Where a discrepancy exists within the specifications, among the drawings, or between the specifications and the drawings, refer to project supplementary conditions.
- C. Should it appear that there is a duplication on the drawings or in the specifications, wherein the same work or items are shown or specified as being provided under separate subcontracts or supply orders, and such duplication is not clarified by addendum during the bidding period, it shall be assumed that the responsible prime contractor will select and coordinate which subcontract will supply the item and the item will be supplied as indicated. Occasionally, certain references may be indicated on the Drawings to items which are suggested to be furnished and/or installed by various subcontractors. This is done to assist the applicable Prime Contractor in organizing his subcontractor's bids. However, no attempt has been made, nor is it implied, that this specification or plans are attempting to specifically divide all responsibilities for subcontractors. It is the Prime Contractor's responsibility that all items covered on Plumbing plans and Division 22 specifications are included in his bid and are coordinated with his subcontractors. No consideration will be given for Prime Contractor's failure to include all applicable plumbing work in his bid.
- D. The design drawings, as submitted, are diagrammatic and are not intended to show exact location of equipment and piping unless dimensions are given. Drawings are not to be scaled.
 - 1. Equipment shall be installed along the general arrangement indicated on the drawings, and in accordance with the manufacturer's instructions.
 - a. Provide at least the minimum manufacturer's recommended and code required clearance around the equipment for normal maintenance.
 - b. Locate and arrange equipment in relationship to other system components to assure that the equipment will be operating under the best possible conditions to meet the scheduled performance requirements.
 - 2. Piping is to be installed along the general plans shown on the drawings keeping in mind the constraints of the available space and the need to coordinate with the work of other trades. Additional offset and fittings shall be provided as necessary to meet space constraints and to facilitate the work of other trades.
 - a. Recognizing the potential need for additional offsets and fittings in piping, the Engineer has included a safety factor in all friction calculations. The Contractor is advised to plan and coordinate his work carefully to minimize the need for additional offsets and fittings. The Contractor shall be responsible to notify the Engineer of any and all modifications to systems which may affect the ability of equipment to serve its intended use prior to the purchase and installation of such equipment.
- E. All equipment, piping and material specified hereinafter as shown on the drawings shall be furnished and installed by this Contractor, unless specifically indicated to the contrary.

- F. If this Contractor proposes to install equipment requiring space conditions other than those as specified and/or shown on the design drawings, or to rearrange the equipment, he shall assume full responsibility for the rearrangement of the space and shall obtain the full approval of the Design Professional before proceeding with the work.

1.7 RECORD DOCUMENTS

- A. Prepare record documents in accordance with the requirements of this division, and in Division 01.
- B. This Contractor shall record all changes from original design drawings which were made during the installation of the work. These changes shall be recorded in red ink on a designated set of prints. Changes shall be accurately dimensioned and/or drawn to scale.
- C. This Contractor shall keep an updated set of specifications and prints, including changes on the job site, at all times and shall submit one (1) set of updated and legible prints to the Design Professional when the work is complete.

1.8 COORDINATION DRAWINGS

- A. Before construction work commences, Contractors for all trades under this Division shall submit coordination drawings in AutoCAD, drawn to scale (1/4"=1'-0" or larger) for review. Refer to project schedule for required submission dates. Such drawings will be required throughout all areas for all trades. The requirements for Coordination Drawings are specified in Division 23 and are reprinted below:
 1. The HVAC Contractor shall prepare the base plan coordination drawings showing all ductwork, all pertinent heating piping and equipment. The drawings shall be coordinated with lighting fixtures, sprinklers, air diffusers, other ceiling mounted items, ceiling heights, structural work, maintenance clearances, electric code clearances, reflected ceiling plans, and other contract requirements. Reposition proposed locations of work after coordination drawing review by the Architect and Engineer. Provide adjustments to exact size, location and offsets of ducts, pipes, conduit, etc., to achieve reasonable appearance objectives. Provide these adjustments as part of contract. Minor revisions need not be redrawn.
 2. HVAC Contractor shall provide the base plan in AutoCad and submit the base plan to all major trades' Contractors. All ductwork and piping shall be on separate layers.
 3. The Fire Protection Contractor shall draft location of piping, sprinkler heads and equipment on the base plan using a separate layer, indicating areas of conflict and suggested resolutions.
 4. The Plumbing Contractor shall draft location of all piping and equipment on the base plan using a separate layer.
 5. The Electrical Contractor shall draft location of lighting fixtures, cable trays, and feeders over 2 in. on the base plan using a separate layer, indicating areas of conflict and suggested resolution.
 6. The HVAC Contractor shall then combine all layers on a composite AutoCad drawing indicating all areas of conflict.
 7. The General Trades Contractor shall indicate areas of architectural/structural conflicts or obstacles and coordinate to suit the overall construction schedule.
 8. The Construction Manager shall expedite all drawing work and coordinate to suit the overall construction schedule. He shall then review these drawings and compare them with the architectural, structural, equipment and other drawings and determine that all of the work can be installed without interference. In the case of unresolved interferences, he shall notify the Architect. The Architect will then direct the various Contractors as to how to revise their drawings as required to eliminate installation interferences.
 9. If a given trade proceeds prior to resolving conflicts, then, if necessary, that trade shall change its work at no extra cost in order to permit others to proceed with a coordinated installation. Coordination approval will be given for individual areas after special site meetings involving all Trades.

10. Coordination drawings are intended for the respective Contractor's use during construction and shall not replace any Shop Drawings, or record drawings required elsewhere in these contract documents.
11. After resolution of all conflicts, all trades shall sign and date a hard copy of the composite coordination drawing.

1.9 SHOP DRAWINGS

- A. Refer to the conditions of the Contract (General and Supplementary) and Division 01 Section: Shop drawings, product data, and samples for submittal definitions, requirements, and procedures. Refer to project schedule for required submission dates.
- B. Submit electronic copy of shop drawings to the Design Professional.
- C. This Contractor shall review, stamp and sign with his approval and submit, with reasonable promptness and in orderly sequence so as to cause no delay in the work or in the work of any other Contractor, all submittal information required by the contract documents. Shop drawings not stamped with Contractor approval will be returned for reprocessing.
 1. Shop drawings shall only cover equipment or components that are being provided. Failure to edit shop drawings and options will be reason for rejection.
 2. In approving the submittals, the Contractor guarantees that the submittals accurately and completely represent the equipment and materials to be installed.
 3. Shop drawings shall be submitted for ALL material items as outlined in these specifications. Any deviations from contract requirements must be clearly indicated on shop drawings, and justification for their consideration must be included.
 4. Acceptance of submittal items will not preclude rejection of those items upon later discovery that their suitability for the application or ability to meet the requirements of these specifications was misrepresented in the submittals.
 5. Equipment shop drawings shall include nameplate data, model number and efficiency rating along with full load amps for all electrical motors.
 6. Submittals for equipment shall include detailed dimensional drawings which completely and accurately represent the specific piece of equipment to be supplied. When more than one piece of similar equipment is to be supplied, provide accurate dimensional drawings for each unique size and/or configuration of the equipment.
- D. In checking shop drawings, the Design Professional will make every effort to detect and correct errors, omissions and inaccuracies in such drawings, but his failure to detect errors, omissions and inaccuracies shall not relieve the Contractor of responsibility for the proper and complete installation in accordance with the intent of the Contract Documents.

1.10 EQUIPMENT

- A. Before entering into a contract, the successful bidder may be required to submit satisfactory evidence to show that the manufacturer of all parts of the equipment offered have been regularly engaged in the manufacture of such equipment for three (3) years and have not less than three (3) installations of a similar type which have been in successful operation under conditions similar to those specified for not less than two (2) years.
- B. When two or more items of same equipment are required (plumbing fixtures, pumps, valves, etc.) they shall be of the same manufacturer.
- C. In placing his bid, the Contractors under this Division shall take note that manufacturer's products change frequently, and only the scheduled products have been checked by the Engineer for compliance with the Contract Documents and physical characteristics. Other manufacturers are listed because they are believed to be capable of complying, and in order to achieve fair and competitive bidding. However, it is the responsibility of the manufacturer in his relationship with the Contractor to bid to the Contractor only products complying with the Contract Documents, and the responsibility of the Contractor to base his bid only on manufacturers which do comply. No consideration will be given to the Contractor for his failure to do this. Should Contractors during the bidding process discover that listed manufacturers cannot comply with the Documents, they are encouraged to contact the Engineer as soon as

practical, and provided sufficient time in the bidding process exists, and the Engineer agrees with the request, the Engineer will attempt to adjust the documents in the addendum process. If no addendum is issued adjusting the requirements so that all listed manufacturers can bid, the Contractor will be required to supply one of the listed manufacturers which comply with the Contract Document requirements.

1.11 SUBSTITUTIONS

- A. Refer to the Instructions to Bidders and the related Division 01 sections for requirements in selecting products and requesting substitutions.

1.12 CODES AND PERMITS

- A. All equipment, materials, and installation shall comply with the National Fire Protection Association's "National Fire Codes" and "National Electrical Code". Equipment shall bear the "UL" label as required by these codes.
- B. Install work in full accordance with rules and regulations of State, County and City authorities having jurisdiction over premises. This shall include safety requirements of Ohio State Department of Industrial Relations. Do not construe this as relieving Contractor from compliance with any requirements of specifications which are in excess of Code requirements and not in conflict therewith. Sanitary and waste piping indicated may, in some cases, exceed code requirements. If drawings indicate individual wastes for each fixture, the drawings shall hold precedent over the Code as long as the pipe sizing equals or exceeds prescribed waste and vent Code minimums.
- C. To comply with "Reduction of Lead in Drinking Water Act" all pipe, fixtures, and fitting used to convey water for potable use shall contain less than 0.25% of lead by weight.
- D. Unless otherwise indicated, secure and pay for all permits and certificates of inspection incidental to this work required by foregoing authorities. Be responsible for payments to all public utilities for work performed by them in connection with provision of service connections required under this DIVISION of specifications. Deliver all certificates to Design Professional in duplicate.
- E. The contractor shall be required to comply with OSHA requirement for physical hazards, safety equipment, fire fighting equipment and protective equipment.
- F. Belt guards, coupling guards, rails, roof fall protection, etc. shall be provided to meet OSHA requirements. Vent shafts and vertical openings shall be enclosed and comply with all OSHA requirements.

1.13 INTERFERENCES

- A. Before installing any work, this Contractor shall see that it does not interfere with clearance required for finish on beams, columns, pilasters, walls or other structural or architectural members, as shown on Architectural Drawings. If any work is so installed and it later develops that Architectural design cannot be followed, Contractor shall, at his own expense, make such changes in his work as the Design Professional may direct to permit completion of Architectural work in accordance with plans and specifications.
- B. Install additional offsets on piping where required to obtain maximum headroom or to avoid conflict with other work without additional cost to the Owner. Where mounting heights are not detailed or dimensioned, install plumbing services and overhead equipment to provide the maximum headroom possible.
- C. Report any interferences between work under this division and that of any other Contractors to the Design Professional as soon as they are discovered. The Design Professional will determine which equipment shall be relocated, regardless of which was first installed, and his decision shall be final.

1.14 SHOP AREAS AND MATERIAL STORAGE

- A. No plumbing related trade is permitted to use as shop working area, any concrete slab that is to receive metallic waterproofing, asphalt tile, plastic tile, etc., except by express permission of the Design Professional.
- B. The Contractor shall make provisions for the delivery and safe storage of his materials and equipment in coordination with the work of others. Materials and equipment shall be delivered at such stages of the work as will expedite the work as a whole and shall be marked and stored in such a way as to be easily checked and inspected. The arrival and placing of large equipment items shall be scheduled early enough to permit entry and setting when there is no restriction or problem due to size and weight. Stored piping and equipment to be covered and sealed at all open ends.

1.15 CLEAN-UP

- A. Refer to the Division 01 for general requirements for project cleaning. Contractor is responsible for cleaning each day.
- B. Insofar as the Plumbing work is concerned, at all times keep premises and building in neat and orderly condition, follow explicitly any instructions of Design Professional in regard to storing of materials, protective measures, cleaning-up of debris, etc.
- C. Upon completion of work, this Contractor shall thoroughly clean all apparatus furnished by him, pack all valves and thoroughly clean piping, fixtures and equipment removing all dirt, grease and oil.
- D. All equipment to be thoroughly cleaned prior to startup.

1.16 OPERATING AND MAINTENANCE

- A. This Contractor shall furnish competent personal instruction to the Owner's operating personnel for a period of hours as indicated in individual Division 22 specification sections in the proper operation of the plumbing equipment. He shall also supply the Owner with three (1) hardbound copies of an operation manual bound in a transparent vinyl sleeve on the front of the binder and binder edge to protect labeling and (1) electronic copy in "PDF" format on disk. The manual shall be labeled on the front as well as the binder with the project name, project number, and the trade covered (i.e. "Plumbing"). The operating and maintenance manual shall include the following:
 - 1. Cover sheet with project name, number, and contractor.
 - 2. Contractor and sub-contractor contact and phone list.
 - 3. Contractor warranty, indicating date of final acceptance and expiration.
 - 4. Equipment and material warranties and guarantees.
 - 5. Contact names and phone numbers for each product.
 - 6. Table of contents.
 - 7. Tabbed sections for each topic included in the manual.
 - 8. Complete equipment list with model and serial number.
 - 9. Manuals shall indicate all local suppliers of equipment.
 - 10. Step-by-step procedures for start-up and shutdown for each system and piece of equipment.
 - 11. Performance data, curves, ratings.
 - 12. Wiring diagrams.
 - 13. Manufacturer's descriptive literature.
 - 14. Automatic controls with diagrams and written sequence of operation.
 - 15. Manufacturer's maintenance and service manuals.
 - 16. Spare parts and replacement parts list for each piece of equipment.
 - 17. Name of service agency and installer complete with an emergency service phone number for nights, weekends and holidays.
 - 18. Final approved shop drawings indicating actual device/equipment provided, not generic product data.
 - 19. Final approved balance reports.

20. Final Operating parameters (Pressures, GPM etc.) Parameters must match TAB and Commissioning reports.

1.17 WARRANTIES

- A. Refer to the Division 01 Section: Specific Warranties for procedures and submittal requirements for warranties. Refer to individual equipment specifications for additional warranty requirements.
- B. Furnish to owner two (2) hard copies and (1) electronic in "PDF" format along with contact names, phone numbers, and email address for each product.
- C. This Contractor shall warranty all materials, workmanship and the successful operation of all equipment and apparatus installed by him for a period of one year from the date of the final acceptance of the entire work and shall guarantee to repair or replace at his own expense any part of the apparatus which may show defect during that time provided such defect is, in the opinion of the Design Professional, due to imperfect material or workmanship and not to carelessness or improper use. Compile and assemble the warranties specified in Division 22 into a separated set of vinyl covered three-ring binders, tabulated and indexed for easy reference.

1.18 TEMPORARY SERVICES

- A. The Contractor under this division shall provide temporary services, i.e.: water, fuel, sanitary, or storm as specified herein or in Division 01 "General Conditions" and "Special Conditions" portions of this specification.
- B. Permanent equipment may be used for temporary (construction period) services only as directed by the Design Professional. Any permanent equipment used, shall be maintained by this Contractor. Owner's warranty period shall not begin until final acceptance of the completed system.

1.19 PROTECTION OF WORK AND PROPERTY

- A. The Contractor shall be responsible for safeguarding work, property and facilities against damage, both his own as well as others, with which he may come into contact in the performance of his work.
- B. Stored materials shall be protected against damage from weather. Pipe openings shall be closed with caps or plugs during installation. All fixtures and equipment shall be covered and protected against injury. Any materials or equipment damaged at any stage in the construction shall be replaced or repaired, and at the final completion of all work shall be in a clean, unblemished condition.

1.20 CUTTING AND PATCHING

- A. Refer to the Division 01 Section: CUTTING AND PATCHING for general requirements for cutting and patching.
- B. Do not endanger or damage installed Work through procedures and processes of cutting and patching. Arrange for repairs required to restore other work, because of damage caused as a result of plumbing installations. No additional compensation will be authorized for cutting and patching Work that is necessitated by ill-timed, defective, or non-conforming installations.
- C. The contractor under this division shall perform cutting, fitting, and patching of building components and plumbing equipment and materials required to:
 - 1. Uncover Work to provide for installation of ill-timed Work;
 - 2. Remove and replace defective Work;
 - 3. Remove and replace Work not conforming to requirements of the Contract Documents;
 - 4. Remove samples of installed Work as specified for testing;
 - 5. Install equipment and materials in existing structures;
 - 6. Install all new work.
 - 7. Upon written instructions from the Design Professional, uncover and restore Work to provide for Design Professional observation of concealed Work.

- D. Pipe holes in floors and walls shall be core drilled if not sleeved during construction.

PART 2 - PRODUCTS (Not Applicable to this Section)

PART 3 - EXECUTION

3.1 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. Install piping according to the following requirements and Division 22 Sections specifying piping systems.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- F. Install piping to permit valve servicing.
- G. Install piping at indicated slopes.
- H. Install piping free of sags and bends.
- I. Install fittings for changes in direction and branch connections.
- J. Install piping to allow application of insulation.
- K. Select system components with pressure rating equal to or greater than system operating pressure.

3.2 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.
- B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- C. Install equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.
- D. Install equipment to allow right of way for piping installed at required slope.

3.3 TESTS AND ADJUSTMENTS

- A. Upon completion of the erection of all equipment and all work specified herein and/or shown on approved drawings, or at such times as directed by the Design Professional, this Contractor shall start all apparatus, make necessary tests as directed and as specified herein and make complete adjustments of all items of equipment before acceptance by the Design Professional to whose representative this Contractor shall demonstrate (by performance) all of the various apparatus and equipment.
- B. When the Contractor is ready to run capacity tests, he shall notify the Design Professional. When this notice is given, the Design Professional will assume that the Contractor has made preliminary tests and is satisfied that the plant will develop specified and guaranteed capacities. It will be the Contractor's responsibility to furnish any and all instruments required to obtain test data which shall include thermometers, electric meters, pressure gages, etc.
- C. Work under this division of the specifications shall not be considered complete until the Contractor has obtained required inspection, performance tests, made necessary adjustments and has submitted satisfactory evidence of compliance. The Design Professional or his representative will make spot checks to determine the accuracy and completeness of final adjustments. Should spot checks indicate more than a reasonable deviation from design

requirements, the Contractor shall repeat tests and adjustments to the satisfaction of the Design Professional.

3.4 PUNCHLISTS

- A. From time to time throughout the course of the work, or upon completion of the work the Design Professional may perform site observations resulting in written documentation of deviations in the work from the Contract Documents. In such cases the Contractor shall respond in writing to each and every item on this written documentation stating the specific action taken to remedy the deviation. A response shall be provided by the Contractor for each separate observation. This work shall not be considered complete until such satisfactory written response is received by the Design Professional.

END OF SECTION 22 0500

**SECTION 22 0501
BASIC MECHANICAL MATERIALS AND METHODS FOR PLUMBING**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.
- B. Requirements specified in Division 22 Section "Common Work Results for Plumbing" apply to this section.

1.2 DESCRIPTION OF WORK

- A. Extent of plumbing related work required by this section is indicated on drawings and/or specified in other Division 22 sections.
- B. Except as noted in this specification, this Contractor shall do all excavating and backfilling necessary to the work of this Division.
- C. This Contractor is to coordinate all excavating and backfilling required under this Division with General Trades as specified under Division 03.
- D. See specification Division 09 for painting requirements. Coordinate all plumbing painting work required. Coordinate protection requirements for plumbing equipment which could be damaged by paint.
- E. Furnish and install all miscellaneous steel required for supports, hangers, anchors, guides, etc., required for installation of equipment and materials furnished and installed under this Division. Steel used in a moist environment shall be hot dipped galvanized unless otherwise noted.
- F. This Contractor shall provide to the General Trades Contractor dimensions and special requirements for the concrete foundations or bases under all equipment that rests on floors in Mechanical Equipment Rooms. Follow drawings and/or manufacturer's literature with regard to design and construction of same.

1.3 QUALITY ASSURANCE

- A. Codes and Standards: Perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.
- B. Concrete Work Codes and Standards: Comply with governing regulations and, where not otherwise indicated, comply with industry standard, in its application to work in each instance.
- C. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's technical product data, including the recommended installation method, all in accordance with Division 01 and Section 220500 requirements.

PART 2 - PRODUCTS – Not Applicable

PART 3 - EXECUTION

3.1 SURFACE PREPARATION FOR PAINTING:

- A. General: Clean surfaces before applying paint products. Remove oil and grease prior to mechanical cleaning. Comply with paint products manufacturer's instructions for surface cleaning and preparation. Remove surface-applied accessories which are not to be painted, and reinstall after completion of painting. Protect non-removable items not to be painted, by covering with paper or plastic film.
- B. Ferrous Metal Surfaces: Clean and remove mill scale and loose rust on surfaces which are not zinc-coated or shop/factory prime coated.
- C. Zinc-Coated Surfaces: Clean with non-petroleum based solvent. Wash with copper sulfate solution and flush with water, unless surface has been pretreated, or unless treatment is not recommended by manufacturer of prime coat.

3.2 ERECTION OF METAL SUPPORTS AND ANCHORAGES

- A. Refer to Division 05 Section "Metal Fabrications" for structural steel.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor plumbing materials and equipment.
- C. Field Welding: Comply with AWS D1.1.

END OF SECTION 22 0501

**SECTION 22 0518
ESCUTCHEONS FOR PLUMBING PIPING**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Escutcheons.

1.3 DEFINITIONS

- A. Existing Piping to Remain: Existing piping that is not to be removed and that is not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 ESCUTCHEONS

- A. One-Piece, Steel Type: With polished, chrome-plated finish and setscrew fastener.
- B. One-Piece, Cast-Brass Type: With polished, chrome-plated finish and setscrew fastener.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install escutcheons for piping penetrations of walls, ceilings, and finished floors.
- B. Install escutcheons with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.
 - 1. Escutcheons for New Piping:
 - a. Piping with Fitting or Sleeve Protruding from Wall:
 - 1) One-piece, deep pattern with spring-clip fasteners.
 - b. Insulated Piping:
 - 1) One-piece steel or cast brass.
 - c. Bare Piping at Wall and Floor Penetrations in Finished Spaces:
 - 1) One-piece steel or cast brass.
 - d. Bare Piping at Ceiling Penetrations in Finished Spaces:
 - 1) One-piece steel or cast brass.
 - e. Bare Piping in Unfinished Service Spaces:
 - 1) One-piece steel or cast brass.
 - f. Bare Piping in Equipment Rooms:
 - 1) One-piece steel or cast brass.
 - 2. Escutcheon Finishes:
 - a. Furnish pipe escutcheons with chrome finish for occupied areas, prime paint finish for unoccupied areas.
 - 3. New Piping: Split floor plate.

3.2 FIELD QUALITY CONTROL

- A. Using new materials, replace broken and damaged escutcheons and floor plates.

PART 4 - SUPPLEMENTAL REQUIREMENTS

4.1 SUPPLEMENTAL REQUIREMENTS

- A. General: Provide pipe escutcheons on all pipes passing through floors and all pipes passing through walls or ceilings in exposed areas with inside diameter closely fitting pipe outside diameter, or outside of pipe insulation where pipe is insulated. Select outside diameter of escutcheon to completely cover pipe penetration hole in floors, walls, or ceilings; and pipe sleeve extension, if any. Furnish pipe escutcheons with chrome finish for occupied areas, prime paint finish for unoccupied areas.
- B. Pipe Escutcheons for Moist Areas including Equipment Rooms: For waterproof floors, and areas where water and condensation can be expected to accumulate, provide cast brass or sheet brass escutcheons, solid or split hinged.
- C. Pipe Escutcheons for Dry Areas: Provide chrome plated sheet steel escutcheons, solid or split hinged.
- D. Secure escutcheon to pipe or insulation so escutcheon covers penetration hole and is flush with adjoining surface.

END OF SECTION 22 0518

**SECTION 22 0523
GENERAL DUTY VALVES AND STRAINERS**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Division 22 Section "Identification for Plumbing Piping and Equipment" for valve tags and schedules.

1.2 DESCRIPTION OF WORK

- A. Extent of valves required by this section are indicated on drawings and/or specified in other Division 22 sections.
- B. Valves furnished as part of factory fabricated equipment, are specified as part of equipment assembly in other Division 22 sections.

1.3 QUALITY ASSURANCE

- A. Valve Types: Provide valves of same type by same manufacturer.
- B. Valve Identification: Provide valves with manufacturer's name (or trademark) and pressure rating clearly marked on valve body.
- C. Codes and Standards:
 - 1. MSS Compliance: Mark valves in accordance with MSS 25 "Standard Marking System for Valves, Fittings, Flanges and Unions".
 - 2. ANSI Compliance: For face to face and end to end dimensions of flanged or welded end valve bodies, comply with ANSI B16.10 "Face to Face and End to End Dimensions of Ferrous Valves".
 - 3. FCI Compliance: Test and rate "Y" type strainers in accordance with FCI 73 1 "Pressure Rating Standard for "Y" Type Strainers". Test and rate other type strainers in accordance with FCI 78 1 "Pressure Rating Standard for Pipeline Strainers Other than "Y" Type".
 - 4. ASME Compliance:
 - a. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
 - b. ASME B31.1 for power piping valves.
 - c. ASME B31.9 for building services piping valves.
 - 5. NSF Compliance: NSF 61 for valve materials for potable-water service.

1.4 SUMMARY

- A. Section Includes:
 - 1. Ball Valves

1.5 DEFINITIONS

- A. CWP: Cold working pressure.
- B. EPDM: Ethylene propylene copolymer rubber.
- C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.
- D. NRS: Nonrising stem.
- E. OS&Y: Outside screw and yoke.
- F. RS: Rising stem.
- G. SWP: Steam working pressure.

1.6 ACTION SUBMITTALS

- A. Product Data: For each type of valve. Include pressure drop curve or chart for each type and size of valve and strainer. Submit schedule showing manufacturer's figure number, size, location and features for each required valve and strainer. Indicate sizes being supplied.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Prepare valves for shipping as follows:
 - 1. Protect internal parts against rust and corrosion.
 - 2. Protect threads, flange faces, grooves, and weld ends.
 - 3. Set ball and plug valves open to minimize exposure of functional surfaces
- B. Use the following precautions during storage:
 - 1. Maintain valve end protection.
 - 2. Store valves indoors and maintain at higher-than-ambient-dew-point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.
- C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR VALVES

- A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.
- B. ASME Compliance:
 - 1. ASME B16.1 for flanges on iron valves.
 - 2. ASME B16.5 for pipe flanges and flanged fittings, NPS 1/2 through NPS 24.
 - 3. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
 - 4. ASME B31.1 for power piping valves.
 - 5. ASME B31.9 for building services piping valves.
- C. AWWA Compliance: Comply with AWWA C606 for grooved-end connections.
- D. Valve Pressure-Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- E. Valve Sizes: Same as upstream piping unless otherwise indicated.
- F. Valves in Insulated Piping: With 2-inch stem extensions with extended necks.

2.2 BALL VALVES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Ball Valves 1" and smaller:
 - a. Conbraco (Apollo).
 - b. Crane.
 - c. Grinnell.
 - d. Jenkins.
 - e. Stockham.
 - f. Watts.
 - g. Milwaukee.
 - h. Milwaukee Butterball.
 - i. Hammond.
 - 2. Ball Valves – 1-1/4" and larger
 - a. Conbraco (Apollo).
 - b. Grinnell.
 - c. Nibco.
 - d. Stockham.
 - e. Watts.
 - f. Milwaukee.
 - g. Milwaukee Butterball.
- B. Brass Ball Valves, Two-Piece with Full Port and Brass Trim (2-1/2" and Smaller):
 - 1. Description:

- a. UL classified in accordance with ANSI/NSF-61 for potable water service, and shall be certified to the low lead requirements of NSF-372.
- b. Standard: MSS SP-110.
- c. Body Design: Two piece.
- d. Body Material: Forged brass or bronze.
- e. Seats: PTFE or RPTFE.
- f. Stem: Brass or bronze, blowout proof pressure retaining.
- g. Ball: Chrome-plated brass.
- h. Port: Full.
- i. Ends: Threaded or Soldered.
- j. Ends: Press with Buna-N or EPDM O-Ring Seal.
- k. Maximum Rating:
 - 1) CWP: 600 psig.
 - 2) Similar to Nibco T/S-585-66-LF.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
- B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
- C. Examine mating flange faces for damage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.
- D. Do not attempt to repair defective valves; replace with new valves.

3.2 VALVE INSTALLATION

- A. Valves shall be provided in suitable locations at each item of equipment, branch circuit, riser, or section of piping as indicated or required for proper and safe operation of the system and to facilitate maintenance and/or removal of all equipment and apparatus. On horizontal pipe runs, install all valve stems vertically up where possible and in no case shall the stems be turned more than 90 degrees from the vertically up position.
- B. Install valves in compliance with manufacturer's installation instructions.
- C. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- D. Install valves in position to allow full stem movement.
- E. Potable water systems (2" and smaller) shall utilize valves as indicated with soldered connections where used for zone isolation, or threaded connections when used in conjunction with a union for equipment isolation
- F. Potable water systems (2 1/2" and larger) shall utilize valves with flanged connections.
- G. Install valve tags. Comply with requirements in Section 220553 "Identification for Plumbing Piping and Equipment" for valve tags and schedules.

3.3 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

- A. Install valves in compliance with manufacturer's installation instructions.
- B. If valves with specified SWP classes or CWP ratings are unavailable, the same types of valves with higher SWP classes or CWP ratings may be substituted.
- C. Select valves, except wafer types, with the following end connections:
 - 1. For Copper Tubing, NPS 2 and Smaller: Threaded ends except where solder-joint valve-end or press style options are indicated in valve schedules.
 - 2. For Copper Tubing, NPS 2-1/2 to NPS 4: Flanged ends.

3.4 VALVE SCHEDULE (SYSTEMS LESS THAN 150 PSIG)

A. Ball Valves

1. Pipe NPS 2-1/2 and Smaller: Brass or bronze ball valves, two piece, with brass or bronze trim, full port.
 - a. Valves may be provided with solder-joint ends or press style instead of threaded ends.

END OF SECTION 22 0523

SECTION 22 0553
IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Equipment labels.
 - 2. Pipe labels.
 - 3. Valve tags.
 - 4. Warning tags.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For color, letter style, and graphic representation required for each identification material and device.
- C. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.
- D. Valve numbering scheme.
- E. Valve Schedules: For each piping system to include in maintenance manuals.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

- A. Plastic Labels for Equipment:
 - 1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
 - 2. Letter Color: White.
 - 3. Background Color: Black.
 - 4. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
 - 5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
 - 6. Text of Signs: In addition to name of identified unit, provide lettering to distinguish between multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations.
 - 7. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-quarters the size of principal lettering.
 - 8. Fasteners: Stainless-steel rivets or self-tapping screws.
 - 9. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- B. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch bond paper. Tabulate equipment identification number, and identify Drawing numbers where equipment is indicated (plans, details, and schedules) and the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

2.2 PIPE LABELS

- A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction according to ASME A13.1.
- B. Pretensioned Pipe Labels: Pre-coiled, semirigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.
- C. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.

- D. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings; also include pipe size and an arrow indicating flow direction.
 - 1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions or as separate unit on each pipe label to indicate flow direction.
 - 2. Lettering Size: Size letters according to ASME A13.1 for piping. Abbreviate only as necessary for each application length.

2.3 VALVE TAGS

- A. Description: 1-1/2" diameter stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers. Numbers to be sequenced. The tag engraving shall be filled with black enamel.
 - 1. Tag Material: Brass, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
 - 2. Tag Material: Plastic, 3/32-inch minimum thickness engraved plastic laminate valve tags and having predrilled or stamped holes for attachment hardware.
 - 3. Fasteners: Brass wire-link chain, brass or stainless steel beaded chain, or S-hook.
- B. Valve Schedules: For each piping system, on 8-1/2-by-11-inch bond paper. Tabulate valve number, piping system service, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), equipment or area isolated, and variations for identification. Mark valves for emergency shutoff and similar special uses.
 - 1. Valve-tag schedule shall be included in operation and maintenance data.
 - 2. For each page of valve schedule, provide glazed display frame, with screws for removable mounting on masonry walls. Provide frames of finished hardwood or extruded aluminum, with plastic (plexiglass) panel. Submit valve schedule for Engineer's review prior to mounting.

2.4 WARNING TAGS

- A. Description: Preprinted or partially preprinted accident-prevention tags of plasticized card stock with matte finish suitable for writing.
 - 1. Size: Approximately 4 by 7 inches.
 - 2. Fasteners: Brass grommet and wire.
 - 3. Nomenclature:
 - a. Large-size primary caption such as "DANGER," "CAUTION," or "DO NOT OPERATE".
 - b. For confined space identification: "Danger" with the words "Permit-Required Confined Space. Do Not Enter".
 - 4. Furnish a quantity of 24 lockout tags, professionally pre-printed with the word "Danger" in white lettering on red background with the words "Do Not Start. Equipment Locked Out" following.
 - 5. Color: Safety-yellow background with black lettering.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 GENERAL INSTALLATION REQUIREMENTS

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with locations of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.

3.3 EQUIPMENT LABEL INSTALLATION

- A. Install or permanently fasten labels on each major item of mechanical equipment.
- B. Equipment labels shall be located where accessible and easily seen from the front of the equipment. When the equipment itself is not able to accept the label (i.e. pressure sensitive tape does not stick to the surface) the tag shall be mounted in an appropriate location on the wall. Equipment tags shall include such information as make, model, capacity, voltage, static pressure ratings, CFM, GPM, TDH, HP, Building Automation System (BAS) tag number and pressure settings based on actual system setup at time of commissioning.
- C. At Installer's option, where equipment to be identified is concealed above acoustical ceiling or similar concealment, plasticized tags may be installed within concealed space to reduce amount of text in exposed sign (outside concealment).
- D. Operational valves and similar minor equipment items located in non-occupied spaces (including machine rooms) may, at Installer's option, be identified by installation of plasticized tags in lieu of engraved plastic signs.
- E. Provide labels for the following general categories of equipment and operational devices:
 - 1. Main control and operating valves, including safety devices and hazardous units such as gas outlets.
 - 2. Meters, gages, thermometers and similar units.
 - 3. Fuel-burning units including boilers, furnaces, heaters, stills and absorption units.
 - 4. Pumps, compressors, chillers, condensers and similar motor-driven units.
 - 5. Heat exchangers, coils, evaporators, cooling towers, heat recovery units and similar equipment.
 - 6. Tanks and pressure vessels.
 - 7. Strainers, filters, humidifiers, water treatment systems and similar equipment.
- F. All expansion tanks, relief valves and pressure reducing valves shall have system set pressure attached to device once final set point is complete.
- G. Equipment located concealed above ceilings or access doors shall be labeled utilizing an engraved tag or printed label, black 18-point size letters, on white background, mounted on the ceiling grid or on the access door.

3.4 CONFINED SPACE IDENTIFICATION:

- A. Furnish and install confined space identification signs in a conspicuous location where approved by Owner's authorized representative for each permit required confined space. A permit required confined space is defined as a confined space in which an employee's whole body can enter, has an entrance into or exit from the space which is restricted in any way, and is not designed for continuous employee occupancy. In addition, a permit required confined space must have the potential to contain a hazardous atmosphere, contain a material such as fluid or particles that could trap or asphyxiate an entrant, or contain any other serious safety or health hazard, such as an electrical or mechanical hazard. Examples of permit required confined spaces requiring signs are air handling units, boilers, cooling tower sumps, underground tanks, vaults or manholes, etc.

3.5 LABEL INSTALLATION

- A. Pipe labels to be taped around pipe at both ends of label. Do not use plastic bands to hold on pipe markers.
- B. Pipe Label Locations: Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:
 - 1. Near each valve and control device.
 - 2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
 - 3. Near penetrations and on both sides of through walls, floors, ceilings, and inaccessible enclosures.
 - 4. At access doors, manholes, and similar access points that permit view of concealed piping.

5. Near major equipment items and other points of origination and termination.
 6. Locate labels near points where pipes enter into and exit from concealed spaces (fixed ceiling, shaft, underground, or similar concealment) and at maximum intervals of 50 feet in each space where pipes are exposed or concealed by removable ceiling system. Reduce intervals to 25 feet in areas of congested piping and equipment. Label piping at both sides of wall or floor penetrations.
 7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.
 8. Main isolation valves located concealed above ceilings or access doors shall be labeled utilizing an engraved tag or printed label, black 18-point size letters, on white background, mounted on the ceiling grid or on the access door.
- C. Directional Flow Arrows: Arrows shall be used to indicate direction of flow in pipes, including pipes where flow is allowed in both directions.
- D. Pipe Label Color Schedule:
1. Plumbing Vent: White letters on a safety-green background.
 2. Sanitary Drain or Sewer Piping: White letters on a safety-green background.
 3. Storm Drain or Sewer Piping: White letters on a safety-green background.
 4. Domestic Cold Water: White letters on a safety-green background.
 5. Domestic Hot Water: Black letters on a safety-yellow background.

3.6 VALVE-TAG INSTALLATION

- A. Install tags on valves and control devices in piping systems, except check valves, valves within factory-fabricated equipment units, shutoff valves, faucets, convenience and lawn-watering hose connections, and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.
- B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following subparagraphs:
1. Valve-Tag Colors:
 - a. Toxic and Corrosive Fluids: Black letters on a safety-orange background.
 - b. Flammable Fluids: Black letters on a safety-yellow background.
 - c. Combustible Fluids: White letters on a safety-brown background.
 - d. Potable and Other Water: White letters on a safety-green background.
 - e. Compressed Air: White letters on a safety-blue background.

3.7 WARNING-TAG INSTALLATION

- A. Write required message on, and attach warning tags to, equipment and other items where required.

END OF SECTION 22 0553

**SECTION 22 0719
PLUMBING PIPING INSULATION**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes insulating the following plumbing piping services:
 - 1. Domestic cold-water piping.
 - 2. Domestic hot-water piping.
- B. Related Sections:
 - 1. Section 220501 "Basic Mechanical Materials and Methods for Plumbing" for firestopping materials and requirements for penetrations through fire and smoke barriers.
 - 2. Section 220500 "Basic Mechanical Materials and Methods for Plumbing" for sound stopping materials and requirements.
 - 3. Section 220716 "Plumbing Equipment Insulation."

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include thermal conductivity, thickness, water-vapor permeance thickness, and jackets (both factory- and field-applied, if any).

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Firm with at least 3 years successful installation experience on projects with mechanical insulations similar to that required for this project. Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.
- B. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E84 by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.
 - 1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
 - 2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.
- C. Comply with the following applicable standards and other requirements specified for miscellaneous components:
 - 1. Supply and Drain Protective Shielding Guards: ICC A117.1.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.
- B. Protect insulation against dirt, water, chemical and mechanical damage. Do not install damaged or wet insulation; remove from project site. Insulation made wet or damaged even after installation shall be removed and replaced.

1.6 COORDINATION

- A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."
- B. Coordinate clearance requirements with piping Installer for piping insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.
- C. Coordinate installation and testing of heat tracing.

1.7 SCHEDULING

- A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.
- B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

- A. Comply with requirements in "Piping Insulation Schedule, General," "Indoor Piping Insulation Schedule," "Outdoor, Aboveground Piping Insulation Schedule," and "Outdoor, Underground Piping Insulation Schedule" articles for where insulating materials shall be applied.
- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C871.
- D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C795.
- E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.
- F. Flexible Elastomeric Insulation: Closed-cell, sponge- or expanded-rubber materials. Maximum thermal conductivity (k-value) $k=0.28$ at 75 F mean, up to 200 F. Comply with ASTM C534, Type I for tubular materials.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Aeroflex USA, Inc.
 - b. Armacell LLC.
 - c. K-Flex USA.
- G. Mineral-Fiber, Preformed Pipe Insulation:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Johns Manville; a Berkshire Hathaway company.
 - b. Knauf Insulation.
 - c. Manson Insulation Inc.
 - d. Owens Corning.
 - 2. Type I, 850 deg F Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C547, Type I, Grade A, with factory-applied ASJ or ASJ-SSL. Maximum thermal conductivity $k=0.25$ at 100 F mean. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
- H. Mineral-Fiber, Pipe and Tank Insulation: Mineral or glass fibers bonded with a thermosetting resin. Semirigid board material with factory-applied ASJ complying with ASTM C1393, Type II or Type IIIA Category 2, or with properties similar to ASTM C612, Type IB. Nominal density is 2.5 lb/cu. ft. or more. Thermal conductivity (k-value) at 100 deg F is 0.29 Btu x in./h x sq. ft. x deg F or less. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. CertainTeed Corporation.
 - b. GLT Products.
 - c. Johns Manville; a Berkshire Hathaway company.
 - d. Knauf Insulation.
 - e. Manson Insulation Inc.
 - f. Owens Corning.

2.2 INSULATING CEMENTS

- A. Mineral-Fiber Insulating Cement: Comply with ASTM C195.
- B. Mineral-Fiber, Hydraulic-Setting Insulating and Finishing Cement: Comply with ASTM C449.

2.3 ADHESIVES

- A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.
- B. Flexible Elastomeric and Polyolefin Adhesive: Comply with MIL-A-24179A, Type II, Class I.
- C. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
- D. ASJ Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.
- E. PVC Jacket Adhesive: Compatible with PVC jacket.

2.4 MASTICS AND COATINGS

- A. Materials shall be compatible with insulation materials, jackets, and substrates.
- B. Vapor-Retarder Mastic: Water based; suitable for indoor use on below-ambient services.
 - 1. Water-Vapor Permeance: Comply with ASTM C755, Section 7.2.2, Table 2, for insulation type and service conditions.
 - 2. Service Temperature Range: Minus 20 to plus 180 deg F.
 - 3. Comply with MIL-PRF-19565C, Type II, for permeance requirements.
 - 4. Color: White.
- C. Breather Mastic: Water based; suitable for indoor and outdoor use on above-ambient services.
 - 1. Water-Vapor Permeance: ASTM E96, greater than 1.0 perm at manufacturer's recommended dry film thickness.
 - 2. Service Temperature Range: Minus 20 to plus 180 deg F.
 - 3. Color: White.

2.5 LAGGING ADHESIVES

- A. Description: Comply with MIL-A-3316C, Class I, Grade A, and shall be compatible with insulation materials, jackets, and substrates.
 - 1. For indoor applications, use lagging adhesives that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 2. Fire-resistant, water-based lagging adhesive and coating for use indoors to adhere fire-resistant lagging cloths over pipe insulation.
 - 3. Service Temperature Range: 0 to plus 180 deg F.
 - 4. Color: White.

2.6 SEALANTS

- A. ASJ Flashing Sealants, and Vinyl, and PVC Jacket Flashing Sealants:
 - 1. Materials shall be compatible with insulation materials, jackets, and substrates.
 - 2. Fire- and water-resistant, flexible, elastomeric sealant.
 - 3. Service Temperature Range: Minus 40 to plus 250 deg F.
 - 4. Color: White.

2.7 FACTORY-APPLIED JACKETS

- A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:
 - 1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C1136, Type I.
 - 2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C1136, Type I.

2.8 TAPES

- A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C1136.
 - 1. Width: 3 inches.
 - 2. Thickness: 11.5 mils.
 - 3. Adhesion: 90 ounces force/inch in width.
 - 4. Elongation: 2 percent.

5. Tensile Strength: 40 lbf/inch in width.
6. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.

2.9 SECUREMENTS

- A. Bands:
 1. Stainless Steel: ASTM A167 or ASTM A240/A240M, Type 304; 0.015 inch thick, 3/4 inch wide with wing seal.
 2. Aluminum: ASTM B209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 3/4 inch wide with wing seal.
- B. Staples: Outward-clinching insulation staples, nominal 3/4-inch-wide, stainless steel or Monel.
- C. Wire: 0.080-inch nickel-copper alloy 0.062-inch soft-annealed, stainless steel or 0.062-inch soft-annealed, galvanized steel.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.
 1. Verify that systems to be insulated have been tested and are free of defects.
 2. Verify that surfaces to be insulated are clean and dry.
 3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.
- B. Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that apply to insulation.
- C. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

3.3 GENERAL INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping including fittings, valves, and specialties.
- B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of pipe system as specified in insulation system schedules. Unless otherwise indicated, furnish and install insulations of the same type for the same service throughout this work.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs. Do not staple longitudinal laps on insulation having a vapor retarder. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- G. Keep insulation materials dry during application and finishing.
- H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- I. Install insulation with least number of joints practical.
- J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
 1. Install insulation continuously through hangers and around anchor attachments.
 2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.

3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
 4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.
- K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- L. Install insulation with factory-applied integral jackets as follows:
1. Draw jacket tight and smooth.
 2. Cover circumferential joints with 3-inch-wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
 3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 4 inches o.c.
 - a. For below-ambient services, do not apply staples. Secure tabs with additional adhesive as recommended by the insulation material manufacturer and seal with vapor-retarder mastic.
 4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
 5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges, unions, valves, and fittings.
- M. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
- N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.
- P. For above-ambient services, do not install insulation to the following:
1. Vibration-control devices.
 2. Testing agency labels and stamps.
 3. Nameplates and data plates.
 4. Cleanouts.

3.4 PENETRATIONS

- A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.
1. Seal penetrations with flashing sealant.
 2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
 3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
 4. Seal jacket to roof flashing with flashing sealant.
- B. Insulation Installation at Underground Exterior Wall Penetrations: Terminate insulation flush with sleeve seal. Seal terminations with flashing sealant.
- C. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.
1. Seal penetrations with flashing sealant.
 2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.

3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
4. Seal jacket to wall flashing with flashing sealant.
- D. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.
- E. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions.
 1. Comply with requirements in Section 078413 "Penetration Firestopping" and Section 220501 "Basic Mechanical Materials and Methods for Plumbing" for firestopping and fire-resistive joint sealers.
- F. Insulation Installation at Floor Penetrations:
 1. Pipe: Install insulation continuously through floor penetrations.
 2. Seal penetrations through fire-rated assemblies. Comply with requirements in Section 078413 "Penetration Firestopping" and Section 220501 "Basic Mechanical Materials and Methods for Plumbing".

3.5 GENERAL PIPE INSULATION INSTALLATION

- A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.
- B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:
 1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.
 2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
 3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
 4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
 5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below-ambient services, provide a design that maintains vapor barrier.
 6. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.
 7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below-ambient services and a breather mastic for above-ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
 8. For services not specified to receive a field-applied jacket except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and

unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.

9. Stencil or label the outside insulation jacket of each union with the word "union." Match size and color of pipe labels.
- C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.
- D. Install removable insulation covers at locations indicated. Installation shall conform to the following:
 1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as adjoining pipe insulation.
 2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union long at least two times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless-steel or aluminum bands. Select band material compatible with insulation and jacket.
 3. Construct removable valve insulation covers in same manner as for flanges, except divide the two-part section on the vertical center line of valve body.
 4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless-steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.
 5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

3.6 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION

- A. Follow manufacturer's written instructions for applying insulation.
- B. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- C. Insulation Installation on Pipe Flanges:
 1. Install pipe insulation to outer diameter of pipe flange.
 2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
 3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as pipe insulation.
 4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- D. Insulation Installation on Pipe Fittings and Elbows:
 1. Install mitered sections of pipe insulation.
 2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- E. Insulation Installation on Valves and Pipe Specialties:
 1. Install preformed valve covers manufactured of same material as pipe insulation when available according to the manufacturer's written instructions.
 2. When preformed valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
 3. Install insulation to flanges as specified for flange insulation application.
 4. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

- F. Coat exposed outdoor flexible elastomeric insulation after adhesive has fully cured with two coats of manufacturer's recommended protective white coating.

3.7 INSTALLATION OF MINERAL-FIBER INSULATION

- A. Insulation Installation on Straight Pipes and Tubes:
 - 1. Secure each layer of preformed pipe insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
 - 2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
 - 3. For insulation with factory-applied jackets on above-ambient surfaces, secure laps with outward clinched staples at 6 inches o.c.
 - 4. For insulation with factory-applied jackets on below-ambient surfaces, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.
 - 5. Apply vapor retarder to ends of insulation at intervals of 15 to 20 feet (4.5 to 6 m) to form a vapor retarder between pipe insulation segments.
- B. Insulation Installation on Pipe Flanges:
 - 1. Install preformed pipe insulation to outer diameter of pipe flange.
 - 2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
 - 3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
 - 4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.
 - 5. See flexible elastomeric insulation application for additional valve and specialty information.
- C. Insulation Installation on Pipe Fittings and Elbows:
 - 1. Install preformed sections of same material as straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.
 - 2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.
 - 3. Cover fittings with standard PVC fitting covers. Secure fitting covers with manufacturer's attachments and accessories. Seal seams with tape and vapor-retardant mastic.
- D. Insulation Installation on Valves and Pipe Specialties:
 - 1. Install preformed sections of same material as straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.
 - 2. When preformed sections are not available, install mitered sections of pipe insulation to valve body.
 - 3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
 - 4. Install insulation to flanges as specified for flange insulation application.
 - 5. Use preformed standard PVC fitting covers for valve sizes where available. Secure fitting covers with manufacturer's attachments and accessories. Seal seams with tape and vapor-retarder mastic.
 - 6. For larger sizes where PVC fitting covers are not available, seal insulation with canvas jacket and sealing compound recommended by the insulation material manufacturer.
 - 7. See flexible elastomeric insulation application for additional valve and specialty information.

3.8 FIELD-APPLIED JACKET INSTALLATION

- A. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints. Seal with manufacturer's recommended adhesive for a completely sealed waterproof installation. Completely sealed system shall comply with requirements of USDA and FDA.

1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.
- B. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches o.c. and at end joints.

3.9 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

3.10 PIPING INSULATION SCHEDULE, GENERAL

- A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.
- B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:
 1. Drainage piping located in crawl spaces, unless otherwise indicated.
 2. Underground piping.
 3. Flexible connectors on other than cold piping systems.
 4. Chrome-plated pipes and fittings unless there is a potential for personnel injury.
- C. Plumbing Insulation Omitted: Unless otherwise indicated, omit insulation on chrome-plated exposed piping, shock absorbers, unions, strainers, check valves, flow regulators, drain lines from water coolers, drainage piping located in crawl spaces or tunnels, and pre-insulated equipment. See plumbing specifications for possible additional insulation requirements. Trap primer insulation may be omitted on trap primer piping in walls or underground.

3.11 INDOOR PIPING INSULATION SCHEDULE

- A. Refer to insulation application schedules for required insulation materials, vapor retarders, and field-applied jackets.
- B. Application schedules identify piping system and indicate pipe size ranges and material, thickness, and jacket requirements. Where more than one material is indicated for a particular service, choice of listed material is installer's option, unless otherwise specifically indicated.
- C. Domestic Cold Water:
 1. NPS 1 and Smaller: Insulation shall be the following:
 - a. Mineral-Fiber, Preformed Pipe Insulation, Type I, with vapor retarder and all-service jacket: 1/2 inch thick.
 2. NPS 1-1/4 and Larger: Insulation shall be the following:
 - a. Mineral-Fiber, Preformed Pipe Insulation, Type I, with vapor retarder and all-service jacket: 1 inch thick.
- D. Domestic Hot Water:
 1. NPS 1 and Smaller: Insulation shall be the following:
 - a. Mineral-Fiber, Preformed Pipe Insulation, Type I, with all-service jacket: 1 inch thick.
 2. NPS 1-1/2 to NPS 2: Insulation shall be the following:
 - a. Mineral-Fiber, Preformed Pipe Insulation, Type I, with all-service jacket: 1-1/2 inch thick.
 3. NPS 2-1/2 and Larger: Insulation shall be the following:
 - a. Mineral-Fiber, Preformed Pipe Insulation, Type I, with all-service jacket: 1-1/2 inch thick.

END OF SECTION 22 0719

**SECTION 22 1116
DOMESTIC WATER PIPING**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Copper tube and fittings.
 - 2. Piping joining materials.
 - 3. Transition fittings.
 - 4. Dielectric fittings.
- B. Related Requirements:
 - 1. Section 221113 "Facility Water Distribution Piping" for water-service piping and water meters outside the building from source to the point where water-service piping enters the building.

1.3 QUALITY ASSURANCE

- A. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
- B. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.
- C. To comply with "Reduction of Lead in Drinking Water Act" all pipe, fixtures, and fitting used to convey water for potable use shall contain less than 0.25% of lead by weight.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.
- B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.5 ACTION SUBMITTALS

- A. Product Data: For transition fittings and dielectric fittings.

1.6 REGULATORY REQUIREMENTS

- A. ASME B 31.9 "Building Services Piping" for materials, products and installation. Safety valves and pressure vessels shall bear the appropriate ASME label.
- B. ASME "Boiler and Pressure Vessel Code" Section IX, "Welding and Brazing Qualification" for Qualifications for Welding Processes and Operators.
- C. IPC International Plumbing Code.

1.7 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

1.8 FIELD CONDITIONS

- A. Interruption of Existing Water Service: Do not interrupt water service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water service according to requirements indicated:
 - 1. Notify Owner no fewer than seven days in advance of proposed interruption of water service.
 - 2. Do not interrupt water service without Owner's written permission.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.
- B. Potable-water piping and components shall comply with NSF 14, NSF 61, and NSF 372.

2.2 COPPER TUBE AND FITTINGS

- A. Hard Copper Tube: ASTM B 88, Type L water tube, drawn temper.
- B. Soft Copper Tube: ASTM B 88, Type K water tube, annealed temper.
- C. Cast-Copper, Solder-Joint Fittings: ASME B16.18, pressure fittings.
- D. Wrought-Copper, Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.
- E. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends.
- F. Copper Unions:
 - 1. MSS SP-123.
 - 2. Cast-copper-alloy, hexagonal-stock body.
 - 3. Ball-and-socket, metal-to-metal seating surfaces.
 - 4. Solder-joint or threaded ends.
- G. Copper, Brass, or Bronze Pressure-Seal-Joint Fittings:
 - 1. Fittings: Cast-brass, cast-bronze or wrought-copper with EPDM O-ring seal in each end. Sizes NPS 2-1/2 and larger with stainless steel grip ring and EPDM O-ring seal.
 - 2. Minimum 200-psig working-pressure rating at 250 deg F.
- H. Appurtenances for Grooved-End Copper Tubing:
 - 1. Bronze Fittings for Grooved-End, Copper Tubing: ASTM B 75/B 75M copper tube or ASTM B 584 bronze castings.
 - 2. Mechanical Couplings for Grooved-End Copper Tubing:
 - a. Copper-tube dimensions and design similar to AWWA C606.
 - b. Ferrous housing sections.
 - c. EPDM-rubber gaskets suitable for hot and cold water.
 - d. Bolts and nuts.
 - e. Minimum Pressure Rating: 300 psig.

2.3 PIPING JOINING MATERIALS

- A. Pipe-Flange Gasket Materials:
 - 1. AWWA C110/A21.10, rubber, flat face, 1/8 inch thick or ASME B16.21, nonmetallic and asbestos free unless otherwise indicated.
 - 2. Full-face or ring type unless otherwise indicated.
- B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.
- C. Solder Filler Metals: ASTM B 32, lead-free alloys.
- D. Flux: ASTM B 813, water flushable.
- E. Brazing Filler Metals: AWS A5.8M/A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.

2.4 ENCASEMENT FOR PIPING

- A. Standard: ASTM A 674 or AWWA C105/A21.5.

2.5 TRANSITION FITTINGS

- A. General Requirements:
 - 1. Same size as pipes to be joined.
 - 2. Pressure rating at least equal to pipes to be joined.
 - 3. End connections compatible with pipes to be joined.
- B. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.

2.6 DIELECTRIC FITTINGS

- A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.

- B. Insulating Material: Suitable for system fluid, pressure, and temperature.
- C. Dielectric Unions:
 - 1. Standard: ASSE 1079.
 - 2. Pressure Rating: 125 or 250 psig (minimum working pressure as required to suit system pressures) at 180 deg F.
 - 3. End Connections: Solder-joint copper alloy and threaded ferrous.
- D. Dielectric Flanges:
 - 1. Standard: ASSE 1079.
 - 2. Factory-fabricated, bolted, companion-flange assembly.
 - 3. Pressure Rating: 125 or 250 psig (minimum working pressure as required to suit system pressures) at 180 deg F.
 - 4. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.
- E. Dielectric-Flange Insulating Kits:
 - 1. Nonconducting materials for field assembly of companion flanges.
 - 2. Pressure Rating: 150 or 300 psig (minimum working pressure as required to suit system pressures).
 - 3. Gasket: Neoprene or phenolic.
 - 4. Bolt Sleeves: Phenolic or polyethylene.
 - 5. Washers: Phenolic with steel backing washers.
- F. Dielectric Nipples:
 - 1. Standard: IAPMO PS 66.
 - 2. Electroplated steel nipple complying with ASTM F 1545.
 - 3. Pressure Rating and Temperature: 300 psig at 225 deg F.
 - 4. End Connections: Male threaded or grooved.
 - 5. Lining: Inert and noncorrosive, propylene.
- G. Dielectric Couplings: Galvanized-steel coupling with inert and noncorrosive, thermoplastic lining; threaded ends; and 300-psig minimum working pressure at 225 deg F.
- H. Dielectric Waterways: Copper silicon casting conforming to UNS C87850 with grooved and/or threaded ends. Shall meet low-lead requirement of NSF-372.

PART 3 - EXECUTION

3.1 EARTHWORK

- A. Comply with requirements in Section 312000 "Earth Moving" for excavating, trenching, and backfilling.

3.2 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.
- B. Install copper tubing under building slab according to CDA's "Copper Tube Handbook."
- C. Install ductile-iron piping under building slab with restrained joints according to AWWA C600 and AWWA M41.
- D. Install underground copper tube and ductile-iron pipe in PE encasement according to ASTM A 674 or AWWA C105/A21.5.
- E. Install shutoff valve, hose-end drain valve, strainer, pressure gage, and test tee with valve inside the building at each domestic water-service entrance. Comply with requirements for pressure gages in Section 220519 "Meters and Gages for Plumbing Piping" and with requirements for drain valves and strainers in Section 221119 "Domestic Water Piping Specialties."
- F. Install shutoff valve immediately upstream of each dielectric fitting.
- G. Rough-in domestic water piping for water-meter installation according to utility company's requirements.

- H. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.
 - I. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
 - J. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.
 - K. Install piping to permit valve servicing.
 - L. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than the system pressure rating used in applications below unless otherwise indicated.
 - M. Install piping free of sags and bends.
 - N. Install fittings for changes in direction and branch connections.
 - O. Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty.
 - P. Install pressure gages on suction and discharge piping for each plumbing pump and packaged booster pump. Comply with requirements for pressure gages in Section 220519 "Meters and Gages for Plumbing Piping."
 - Q. Install thermostats in hot-water circulation piping. Comply with requirements for thermostats in Section 221123 "Domestic Water Pumps."
 - R. Install thermometers on inlet and outlet piping from each water heater. Comply with requirements for thermometers in Section 220519 "Meters and Gages for Plumbing Piping."
 - S. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."
 - T. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."
 - U. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 220518 "Escutcheons for Plumbing Piping."
 - V. Install check valves on hot and cold water supplies to mop basins and mixing valves.
- 3.3 JOINT CONSTRUCTION**
- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
 - B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
 - C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 1. Apply appropriate tape or thread compound to external pipe threads.
 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.
 - D. Brazed Joints for Copper Tubing: Comply with CDA's "Copper Tube Handbook," "Brazed Joints" chapter.
 - E. Soldered Joints for Copper Tubing: Apply ASTM B 813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B 828 or CDA's "Copper Tube Handbook."
 - F. Pressure-Sealed Joints for Copper Tubing: Join copper tube and pressure-seal fittings with tools and procedure recommended by pressure-seal-fitting manufacturer. Leave insertion marks on pipe after assembly.
 - G. Joint Construction for Grooved-End Copper Tubing: Make joints according to AWWA C606. Roll groove ends of tubes. Lubricate and install gasket over ends of tubes or tube and fitting. Install coupling housing sections over gasket with keys seated in tubing grooves. Install and tighten housing bolts.
 - H. Joints for Dissimilar-Material Piping: Make joints using adapters compatible with materials of both piping systems.
- 3.4 TRANSITION FITTING INSTALLATION**
- A. Install transition couplings at joints of dissimilar piping.
 - B. Transition Fittings in Underground Domestic Water Piping:

1. Fittings for NPS 1-1/2 and Smaller: Fitting-type coupling.
 2. Fittings for NPS 2 and Larger: Sleeve-type coupling.
- C. Transition Fittings in Aboveground Domestic Water Piping NPS 2 and Smaller: Plastic-to-metal transition fittings or unions.

3.5 DIELECTRIC FITTING INSTALLATION

- A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
- B. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.
- C. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.
- D. Dielectric Fittings for NPS 2 and Smaller: Use dielectric couplings or nipples.
- E. Dielectric Fittings for NPS 2-1/2 to NPS 4: Use dielectric flange kits.
- F. Dielectric Fittings for NPS 5 and Larger: Use dielectric flange kits.

3.6 HANGER AND SUPPORT INSTALLATION

- A. Comply with requirements for pipe hanger, support products, and installation in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."
- B. Support vertical piping and tubing at base and at each floor.
- C. Rod diameter may be reduced one size for double-rod hangers, to a minimum of 3/8 inch.
- D. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:
 1. NPS 3/4 and Smaller: 60 inches with 3/8-inch rod.
 2. NPS 1 and NPS 1-1/4: 72 inches with 3/8-inch rod.
 3. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.
 4. NPS 2-1/2: 108 inches with 1/2-inch rod.
 5. NPS 3 to NPS 5: 10 feet with 1/2-inch rod.
- E. Install supports for vertical copper tubing every 10.
- F. Install hangers for steel piping with the following maximum horizontal spacing and minimum rod diameters:
 1. NPS 1-1/4 and Smaller: 84 inches with 3/8-inch rod.
 2. NPS 1-1/2: 108 inches with 3/8-inch rod.
 3. NPS 2: 10 feet with 3/8-inch rod.
 4. NPS 2-1/2: 11 feet with 1/2-inch rod.
 5. NPS 3 and NPS 3-1/2: 12 feet with 1/2-inch rod.
 6. NPS 4 and NPS 5: 12 feet with 5/8-inch rod.
- G. Install supports for vertical steel piping every 15 feet.
- H. Support piping and tubing not listed in this article according to MSS SP-58 and manufacturer's written instructions.

3.7 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. When installing piping adjacent to equipment and machines, allow space for service and maintenance.
- C. Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials.
- D. Connect domestic water piping to water-service piping with shutoff valve; extend and connect to the following:
 1. Domestic Water Booster Pumps: Cold-water suction and discharge piping.
 2. Water Heaters: Cold-water inlet and hot-water outlet piping in sizes indicated, but not smaller than sizes of water heater connections.
 3. Plumbing Fixtures: Cold- and hot-water-supply piping in sizes indicated, but not smaller than that required by plumbing code.

4. Equipment: Cold- and hot-water-supply piping as indicated, but not smaller than equipment connections. Provide shutoff valve and union for each connection. Use flanges instead of unions for NPS 2-1/2 and larger.

3.8 IDENTIFICATION

- A. Identify system components. Comply with requirements for identification materials and installation in Section 220553 "Identification for Plumbing Piping and Equipment."
- B. Label pressure piping with system operating pressure.

3.9 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 1. Piping Inspections:
 - a. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
 - b. During installation, notify authorities having jurisdiction at least three days before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:
 - 1) Roughing-in Inspection: Arrange for inspection of piping before concealing or closing in after roughing in and before setting fixtures.
 - 2) Final Inspection: Arrange for authorities having jurisdiction to observe tests specified in "Piping Tests" Subparagraph below and to ensure compliance with requirements.
 - c. Reinspection: If authorities having jurisdiction find that piping will not pass tests or inspections, make required corrections and arrange for reinspection.
 - d. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
 2. Piping Tests:
 - a. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
 - b. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.
 - c. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
 - d. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow it to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
 - e. Repair leaks and defects with new materials, and retest piping or portion thereof until satisfactory results are obtained.
 - f. Prepare reports for tests and for corrective action required.
- B. Domestic water piping will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

3.10 ADJUSTING

- A. Perform the following adjustments before operation:
 1. Close drain valves, hydrants, and hose bibbs.
 2. Open shutoff valves to fully open position.
 3. Open throttling valves to proper setting.
 4. Adjust balancing valves in hot-water-circulation return piping to provide adequate flow.
 - a. Manually adjust ball-type balancing valves in hot-water-circulation return piping to provide hot-water flow in each branch.
 - b. Adjust calibrated balancing valves to flows indicated.

5. Remove plugs used during testing of piping and for temporary sealing of piping during installation.
6. Remove and clean strainer screens. Close drain valves and replace drain plugs.
7. Remove filter cartridges from housings and verify that cartridges are as specified for application where used and are clean and ready for use.
8. Check plumbing specialties and verify proper settings, adjustments, and operation.

3.11 CLEANING

- A. Clean and disinfect potable domestic water piping as follows:
 1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
 2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:
 - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
 - b. Fill and isolate system according to either of the following:
 - 1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.
 - 2) Fill system or part thereof with water/chlorine solution with at least 200 ppm of chlorine. Isolate and allow to stand for three hours.
 - c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
 - d. Repeat procedures if biological examination shows contamination.
 - e. Submit water samples in sterile bottles to authorities having jurisdiction.
- B. Clean non-potable domestic water piping as follows:
 1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
 2. Use purging procedures prescribed by authorities having jurisdiction or; if methods are not prescribed, follow procedures described below:
 - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
 - b. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedures if biological examination shows contamination.
- C. Prepare and submit reports of purging and disinfecting activities. Include copies of water-sample approvals from authorities having jurisdiction.
- D. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

3.12 PIPING SCHEDULE

- A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.
- B. Flanges and unions may be used for aboveground piping joints unless otherwise indicated.
- C. Fitting Option: Extruded-tee connections and brazed joints may be used on aboveground copper tubing.
- D. Under-building-slab, domestic water, building-service piping, NPS 3 and smaller, shall be one of the following:
 1. Soft copper tube, ASTM B 88, Type K; copper pressure-seal fittings; and pressure-sealed joints.
- E. Under-building-slab, domestic water piping, NPS 2 and smaller, shall be one of the following:
 1. Soft copper tube, ASTM B 88, Type L; copper pressure-seal-joint fittings; and pressure-sealed joints.
- F. Aboveground domestic water piping, NPS 2 and smaller, shall be one of the following:
 1. Hard copper tube, ASTM B 88, Type L; cast- or wrought-copper, solder-joint fittings; and soldered joints.

2. Hard copper tube, ASTM B 88, Type L; copper pressure-seal-joint fittings; and pressure-sealed joints.
 3. Hard copper tube, ASTM B 88, Type L; copper push-on-joint fittings; and push-on joints.
- G. Aboveground domestic water piping, NPS 2-1/2 to NPS 4, shall be one of the following:
1. Hard copper tube, ASTM B 88, Type L; cast- or wrought-copper, solder-joint fittings; and soldered joints.
 2. Hard copper tube, ASTM B 88, Type L; copper pressure-seal-joint fittings; and pressure-sealed joints.
 3. Hard copper tube, ASTM B 88, Type L; grooved-joint, copper-tube appurtenances; and grooved joints.

3.13 VALVE SCHEDULE

- A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
1. Shutoff Duty: Use ball or gate valves for piping NPS 2 and smaller. Use butterfly, ball, or gate valves with flanged ends for piping NPS 2-1/2 and larger.
 2. Throttling Duty: Use ball or globe valves for piping NPS 2 and smaller. Use butterfly or ball valves with flanged ends for piping NPS 2-1/2 and larger.
 3. Hot-Water Circulation Piping, Balancing Duty: Memory-stop balancing valves.
 4. Drain Duty: Hose-end drain valves.
- B. Use check valves to maintain correct direction of domestic water flow to and from equipment.
- C. Iron grooved-end valves may be used with grooved-end piping.

END OF SECTION 22 1116

**SECTION 22 1119
DOMESTIC WATER PIPING SPECIALTIES**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Temperature-actuated, water mixing valves.
 - 2. Water-hammer arresters.
 - 3. Trap-seal primer valves.
 - 4. Trap-seal primer systems.
- B. Related Requirements:
 - 1. Section 220519 "Meters and Gauges for Plumbing Piping" for thermometers, pressure gages, and flow meters in domestic water piping.
 - 2. Section 221116 "Domestic Water Piping" for water meters.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For domestic water piping specialties.
 - 1. Include diagrams for power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For domestic water piping specialties to include in emergency, operation, and maintenance manuals.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR PIPING SPECIALTIES

- A. Potable-water piping and components shall comply with NSF 61 and NSF 14.
- B. Comply with NSF 372 for low lead.

2.2 PERFORMANCE REQUIREMENTS

- A. Minimum Working Pressure for Domestic Water Piping Specialties: 125 psig unless otherwise indicated.

2.3 TEMPERATURE-ACTUATED, WATER MIXING VALVES

- A. Individual-Fixture, Water Tempering Valves:
 - 1. Standard: ASSE 1016, thermostatically controlled, water tempering valve.
 - 2. Pressure Rating: 125 psig minimum unless otherwise indicated.
 - 3. Body: Bronze body with corrosion-resistant interior components.
 - 4. Temperature Control: Adjustable.
 - 5. Inlets and Outlet: Threaded.
 - 6. Finish: Rough or chrome-plated bronze.

2.4 WATER-HAMMER ARRESTERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. PPP, Inc. or approved equal.
- B. Water-Hammer Arresters:

1. Standard: ASSE 1010 or PDI-WH 201.
2. Type: Metal bellows.
3. Size: ASSE 1010, Sizes AA and A through F, or PDI-WH 201, Sizes A through F.

2.5 TRAP-SEAL PRIMER DEVICE

- A. Supply-Type, Trap-Seal Primer Device:
 1. Standard: ASSE 1018.
 2. Pressure Rating: 125 psig minimum.
 3. Body: Bronze.
 4. Inlet and Outlet Connections: NPS 1/2 threaded, union, or solder joint.
 5. Gravity Drain Outlet Connection: NPS 1/2 threaded or solder joint.
 6. Finish: Chrome plated, or rough bronze for units used with pipe or tube that is not chrome finished.
- B. Drainage-Type, Trap-Seal Primer Device:
 1. Standard: ASSE 1044, lavatory P-trap with NPS 3/8 minimum, trap makeup connection.
 2. Size: NPS 1-1/4 minimum.
 3. Material: Chrome-plated, cast brass.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Temperature-Actuated, Water Mixing Valves: Install with check stops or shutoff valves on inlets and with shutoff valve on outlet.
 1. Install cabinet-type units recessed in or surface mounted on wall as specified.
- B. Water-Hammer Arresters: Install in water piping according to PDI-WH 201.
- C. Supply-Type, Trap-Seal Primer Device: Install with outlet piping pitched down toward drain trap a minimum of 1 percent, and connect to floor-drain body, trap, or inlet fitting. Adjust valve for proper flow.
- D. Drainage-Type, Trap-Seal Primer Device: Install as lavatory trap with outlet piping pitched down toward drain trap a minimum of 1 percent, and connect to floor-drain body, trap, or inlet fitting.

3.2 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. When installing piping specialties adjacent to equipment and machines, allow space for service and maintenance.
- C. Comply with requirements for grounding equipment in Section 260526 "Grounding and Bonding for Electrical Systems."

3.3 IDENTIFICATION

- A. Plastic Labels for Equipment: Install engraved plastic-laminate equipment nameplate or sign on or near each of the following:
 1. Supply-type, trap-seal primer valves.
 2. Trap-seal primer systems.
- B. Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit. Nameplates and signs are specified in Section 220553 "Identification for Plumbing Piping and Equipment."

3.4 FIELD QUALITY CONTROL

- A. Domestic water piping specialties will be considered defective if they do not pass tests and inspections.
- B. Prepare test and inspection reports.

3.5 ADJUSTING

- A. Set field-adjustable pressure set points of water pressure-reducing valves.
- B. Set field-adjustable flow set points of balancing valves.

- C. Set field-adjustable temperature set points of temperature-actuated, water mixing valves.

END OF SECTION 22 1119

**SECTION 22 1316
SANITARY WASTE AND VENT PIPING**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Hub-and-spigot, cast-iron soil pipe and fittings.
 - 2. Hubless, cast-iron soil pipe and fittings.
 - 3. Ductile-iron pipe and fittings.
 - 4. Copper tube and fittings.
 - 5. PVC pipe and fittings.
 - 6. Specialty pipe fittings.
- B. Related Requirements:
 - 1. Section 221313 "Facility Sanitary Sewers" for sanitary sewerage piping and structures outside the building.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.
- B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For hub-less, single-stack drainage system. Include plans, elevations, sections, and details.

1.5 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

1.6 FIELD CONDITIONS

- A. Interruption of Existing Sanitary Waste Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:
 - 1. Notify Owner no fewer than two days in advance of proposed interruption of sanitary waste service.
 - 2. Do not proceed with interruption of sanitary waste service without Owner's written permission.

1.7 WARRANTY

- A. Listed manufacturers to provide labelling and warranty of their respective products.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Components and installation shall be capable of withstanding the following minimum working pressure unless otherwise indicated:
 - 1. Soil, Waste, and Vent Piping: 10-foot head of water.

2.2 PIPING MATERIALS

- A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

- B. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

2.3 HUB-AND-SPIGOT, CAST-IRON SOIL PIPE AND FITTINGS

- A. Pipe and Fittings: ASTM A74, Service class.
- B. Gaskets: ASTM C564, rubber.
- C. Caulking Materials: ASTM B29, pure lead and oakum or hemp fiber.

2.4 HUBLESS, CAST-IRON SOIL PIPE AND FITTINGS

- A. Pipe and Fittings: ASTM A888 or CISPI 301.
- B. Single-Stack Aerator Fittings: ASME B16.45, hub-less, cast-iron aerator and deaerator drainage fittings.
- C. CISPI, Hubless-Piping Couplings:
 - 1. Standards: ASTM C1277 and CISPI 310.
 - 2. Description: Stainless-steel corrugated shield with stainless-steel bands and tightening devices; and ASTM C564, rubber sleeve with integral, center pipe stop.

2.5 DUCTILE-IRON PIPE AND FITTINGS

- A. Ductile-Iron, Mechanical-Joint Piping:
 - 1. Ductile-Iron Pipe: AWWA C151/A21.51, with mechanical-joint bell and plain spigot ends unless grooved or flanged ends are indicated.
 - 2. Ductile-Iron Fittings: AWWA C110/A21.10, mechanical-joint, ductile- or gray-iron standard pattern or AWWA C153/A21.53, ductile-iron compact pattern.
 - 3. Glands, Gaskets, and Bolts: AWWA C111/A21.11, ductile- or gray-iron glands, rubber gaskets, and steel bolts.
- B. Ductile-Iron, Push-on-Joint Piping:
 - 1. Ductile-Iron Pipe: AWWA C151/A21.51, with push-on-joint bell and plain spigot ends unless grooved or flanged ends are indicated.
 - 2. Ductile-Iron Fittings: AWWA C110/A21.10, push-on-joint, ductile- or gray-iron standard pattern or AWWA C153/A21.53, ductile-iron compact pattern.
 - 3. Gaskets: AWWA C111/A21.11, rubber.
- C. Ductile-Iron, Grooved-Joint Piping: AWWA C151/A21.51, with round-cut-grooved ends according to AWWA C606.
- D. Ductile-Iron, Grooved-End Pipe Appurtenances:
 - 1. Grooved-End, Ductile-Iron Fittings: ASTM A536 ductile-iron castings, with dimensions matching AWWA C110/A 21.10 ductile-iron pipe or AWWA C153/A 21.53 ductile-iron fittings, and complying with AWWA C606 for grooved ends.
 - 2. Grooved Mechanical Couplings for Ductile-Iron Pipe: ASTM F1476, Type I. Include ferrous housing sections with continuous curved keys; EPDM-rubber center-leg gasket suitable for hot and cold water; and bolts and nuts.

2.6 PVC PIPE AND FITTINGS

- A. Comply with NSF 14, "Plastics Piping Systems Components and Related Materials," for plastic piping components. Include marking with "NSF-DWV" for plastic drain, waste, and vent piping and "NSF-sewer" for plastic sewer piping.
- B. Solid-Wall PVC Pipe: ASTM D2665, drain, waste, and vent.
- C. PVC Socket Fittings: ASTM D2665, made to ASTM D3311, drain, waste, and vent patterns and to fit Schedule 40 pipe.
- D. Adhesive Primer: ASTM F656.
- E. Solvent Cement: ASTM D2564.

2.7 SPECIALTY PIPE FITTINGS

- A. Transition Couplings:
 - 1. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.

2. Unshielded, Nonpressure Transition Couplings:
 - a. Standard: ASTM C1173.
 - b. Description: Elastomeric, sleeve-type, reducing or transition pattern. Include shear ring and corrosion-resistant-metal tension band and tightening mechanism on each end.
 - c. End Connections: Same size as and compatible with pipes to be joined.
 - d. Sleeve Materials:
 - 1) For Cast-Iron Soil Pipes: ASTM C564, rubber.
 - 2) For Plastic Pipes: ASTM F477, elastomeric seal or ASTM D5926, PVC.
 - 3) For Dissimilar Pipes: ASTM D5926, PVC or other material compatible with pipe materials being joined.
 3. Shielded, Nonpressure Transition Couplings:
 - a. Standard: ASTM C1460.
 - b. Description: Elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.
 - c. End Connections: Same size as and compatible with pipes to be joined.
 4. Pressure Transition Couplings:
 - a. Standard: AWWA C219.
 - b. Description: Metal, sleeve-type same size as, with pressure rating at least equal to, and ends compatible with, pipes to be joined.
 - c. Center-Sleeve Material: Manufacturer's standard.
 - d. Gasket Material: Natural or synthetic rubber.
 - e. Metal Component Finish: Corrosion-resistant coating or material.
- B. Dielectric Fittings:
1. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.
 2. Insulating Material: Suitable for system fluid, pressure, and temperature.
 3. Dielectric Unions:
 - a. Description:
 - 1) Standard: ASSE 1079.
 - 2) Pressure Rating: 125 psig minimum at 180 deg F.
 - 3) End Connections: Solder-joint copper alloy and threaded ferrous.
 4. Dielectric Flanges:
 - a. Description:
 - 1) Standard: ASSE 1079.
 - 2) Factory-fabricated, bolted, companion-flange assembly.
 - 3) Pressure Rating: 125 psig minimum at 180 deg F.
 - 4) End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.
 5. Dielectric-Flange Insulating Kits:
 - a. Description:
 - 1) Nonconducting materials for field assembly of companion flanges.
 - 2) Pressure Rating: 150 psig.
 - 3) Gasket: Neoprene or phenolic.
 - 4) Bolt Sleeves: Phenolic or polyethylene.
 - 5) Washers: Phenolic with steel backing washers.
 6. Dielectric Nipples:
 - a. Description:
 - 1) Standard: IAPMO PS 66.
 - 2) Electroplated steel nipple.
 - 3) Pressure Rating: 300 psig at 225 deg F.
 - 4) End Connections: Male threaded or grooved.
 - 5) Lining: Inert and noncorrosive, propylene.

7. Dielectric Couplings: Galvanized-steel coupling with inert and noncorrosive, thermoplastic lining; threaded ends; and 300-psig minimum working pressure at 225 deg F.
8. Dielectric Waterways: Copper silicon casting conforming to UNS C87850 with grooved and/or threaded ends. Shall meet low-lead requirement of NSF-372.

PART 3 - EXECUTION

3.1 EARTH MOVING

- A. Comply with requirements for excavating, trenching, and backfilling specified in Section 312000 "Earth Moving."

3.2 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems.
 1. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations.
 2. Install piping as indicated unless deviations to layout are approved on coordination drawings.
- B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- E. Install piping to permit valve servicing.
- F. Install piping at indicated slopes.
- G. Install piping free of sags and bends.
- H. Install fittings for changes in direction and branch connections.
- I. Install piping to allow application of insulation.
- J. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends.
 1. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical.
 2. Use long-turn, double Y-branch and 1/8-bend fittings if two fixtures are installed back to back or side by side with common drain pipe.
 - a. Straight tees, elbows, and crosses may be used on vent lines.
 3. Do not change direction of flow more than 90 degrees.
 4. Use proper size of standard increasers and reducers if pipes of different sizes are connected.
 - a. Reducing size of waste piping in direction of flow is prohibited.
- K. Lay buried building waste piping beginning at low point of each system.
 1. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream.
 2. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.
 3. Maintain swab in piping and pull past each joint as completed.
- L. Install soil and waste and vent piping at the following minimum slopes unless otherwise indicated:
 1. Building Sanitary Waste: 2 percent downward in direction of flow for piping NPS 3 and smaller; 1 percent downward in direction of flow for piping NPS 4 and larger.
 2. Horizontal Sanitary Waste Piping: 2 percent downward in direction of flow.
 3. Vent Piping: 1 percent down toward vertical fixture vent or toward vent stack.
- M. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."

1. Install encasement on underground piping according to ASTM A674 or AWWA C105/A 21.5.
- N. Install underground PVC piping according to ASTM D2321.
- O. Install engineered soil and waste and vent piping systems as follows:
 1. Combination Waste and Vent: Comply with standards of authorities having jurisdiction.
 2. Hubless, Single-Stack Drainage System: Comply with ASME B16.45 and hubless, single-stack aerator fitting manufacturer's written installation instructions.
 3. Reduced-Size Venting: Comply with standards of authorities having jurisdiction.
- P. Plumbing Specialties:
 1. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers in sanitary waste gravity-flow piping.
 - a. Install cleanout fitting with closure plug inside the building in sanitary drainage force-main piping.
 - b. Comply with requirements for cleanouts specified in Section 221319 "Sanitary Waste Piping Specialties."
 2. Install drains in sanitary waste gravity-flow piping.
 - a. Comply with requirements for drains specified in Section 221319 "Sanitary Waste Piping Specialties."
- Q. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.
- R. Install sleeves for piping penetrations of walls, ceilings, and floors.
 1. Comply with requirements for sleeves specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."
- S. Install sleeve seals for piping penetrations of concrete walls and slabs.
 1. Comply with requirements for sleeve seals specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."
- T. Install escutcheons for piping penetrations of walls, ceilings, and floors.
 1. Comply with requirements for escutcheons specified in Section 220518 "Escutcheons for Plumbing Piping."

3.3 JOINT CONSTRUCTION

- A. Join hub-and-spigot, cast-iron soil piping with gasket joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.
- B. Join hub-and-spigot, cast-iron soil piping with calked joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for lead-and-oakum calked joints.
- C. Join hubless, cast-iron soil piping according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-piping coupling joints.
- D. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1.
 1. Cut threads full and clean using sharp dies.
 2. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - a. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
 - b. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.
 - c. Do not use pipe sections that have cracked or open welds.
- E. Grooved Joints: Cut groove ends of pipe according to AWWA C606. Lubricate and install gasket over ends of pipes or pipe and fitting. Install coupling housing sections, over gasket, with keys seated in piping grooves. Install and tighten housing bolts.
- F. Flanged Joints: Align bolt holes. Select appropriate gasket material, size, type, and thickness. Install gasket concentrically positioned. Use suitable lubricants on bolt threads. Torque bolts in cross pattern.
- G. Plastic, Nonpressure-Piping, Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:

1. Comply with ASTM F402 for safe-handling practice of cleaners, primers, and solvent cements.
2. PVC Piping: Join according to ASTM D2855 and ASTM D2665 appendixes.

3.4 SPECIALTY PIPE FITTING INSTALLATION

- A. Transition Couplings:
 1. Install transition couplings at joints of piping with small differences in ODs.
 2. In Waste Drainage Piping: Unshielded, nonpressure transition couplings.
 3. In Aboveground Force Main Piping: Fitting-type transition couplings.
 4. In Underground Force Main Piping:
 - a. NPS 1-1/2 and Smaller: Fitting-type transition couplings.
 - b. NPS 2 and Larger: Pressure transition couplings.
- B. Dielectric Fittings:
 1. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
 2. Dielectric Fittings for NPS 2 and Smaller: Use dielectric unions.
 3. Dielectric Fittings for NPS 2-1/2 to NPS 4: Use dielectric flanges.
 4. Dielectric Fittings for NPS 5 and Larger: Use dielectric flange kits.

3.5 VALVE INSTALLATION

- A. Shutoff Valves:
 1. Install shutoff valve on each sewage pump discharge.
 2. Install gate or full-port ball valve for piping NPS 2-1/2 and smaller.
 3. Install gate valve for piping NPS 3 and larger.
- B. Check Valves: Install swing check valve, between pump and shutoff valve, on each sewage pump discharge.

3.6 HANGER AND SUPPORT INSTALLATION

- A. Comply with requirements for seismic-restraint devices specified in Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment."
- B. Comply with requirements for pipe hanger and support devices and installation specified in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."
 1. Install carbon-steel pipe hangers for horizontal piping in noncorrosive environments.
 2. Install carbon-steel pipe support clamps for vertical piping in noncorrosive environments.
 3. Vertical Piping: MSS Type 8 or Type 42, clamps.
 4. Install individual, straight, horizontal piping runs:
 - a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
 - b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
 - c. Longer Than 100 Feet if Indicated: MSS Type 49, spring cushion rolls.
 5. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
 6. Base of Vertical Piping: MSS Type 52, spring hangers.
- C. Support horizontal piping and tubing within 12 inches of each fitting, valve, and coupling.
- D. Support vertical piping and tubing at base and at each floor.
- E. Rod diameter may be reduced one size for double-rod hangers, with 3/8-inch minimum rods.
- F. Install hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters:
 1. NPS 1-1/2 and NPS 2: 60 inches with 3/8-inch rod.
 2. NPS 3: 60 inches with 1/2-inch rod.
 3. NPS 4 and NPS 5: 60 inches with 5/8-inch rod.
 4. NPS 6 and NPS 8: 60 inches with 3/4-inch rod.
 5. NPS 10 and NPS 12: 60 inches with 7/8-inch rod.
 6. Spacing for 10-foot lengths may be increased to 10 feet. Spacing for fittings is limited to 60 inches.
- G. Install supports for vertical cast-iron soil piping every 15 feet.

- H. Support piping and tubing not listed above according to MSS SP-58 and manufacturer's written instructions.

3.7 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.
- C. Connect waste and vent piping to the following:
 - 1. Plumbing Fixtures: Connect waste piping in sizes indicated, but not smaller than required by plumbing code.
 - 2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.
 - 3. Plumbing Specialties: Connect waste and vent piping in sizes indicated, but not smaller than required by plumbing code.
 - 4. Install test tees (wall cleanouts) in conductors near floor and floor cleanouts with cover flush with floor.
 - 5. Comply with requirements for cleanouts specified in Section 221319 "Sanitary Waste Piping Specialties."
 - 6. Equipment: Connect waste piping as indicated.
 - a. Provide shutoff valve if indicated and union for each connection.
 - b. Use flanges instead of unions for connections NPS 2-1/2 and larger.
- D. Where installing piping adjacent to equipment, allow space for service and maintenance of equipment.
- E. Make connections according to the following unless otherwise indicated:
 - 1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
 - 2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.

3.8 IDENTIFICATION

- A. Identify exposed sanitary waste and vent piping.
- B. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment."

3.9 FIELD QUALITY CONTROL

- A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.
 - 1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
 - 2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
- B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.
- C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
- D. Test sanitary waste and vent piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:
 - 1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired.
 - a. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
 - 2. Leave uncovered and unconcealed new, altered, extended, or replaced waste and vent piping until it has been tested and approved.
 - a. Expose work that was covered or concealed before it was tested.
 - 3. Roughing-in Plumbing Test Procedure: Test waste and vent piping except outside leaders on completion of roughing-in.

- a. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water.
- b. From 15 minutes before inspection starts to completion of inspection, water level must not drop.
- c. Inspect joints for leaks.
- 4. Finished Plumbing Test Procedure: After plumbing fixtures have been set and traps filled with water, test connections and prove they are gastight and watertight.
 - a. Plug vent-stack openings on roof and building drains where they leave building. Introduce air into piping system equal to pressure of 1-inch wg.
 - b. Use U-tube or manometer inserted in trap of water closet to measure this pressure.
 - c. Air pressure must remain constant without introducing additional air throughout period of inspection.
 - d. Inspect plumbing fixture connections for gas and water leaks.
- 5. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
- 6. Prepare reports for tests and required corrective action.

3.10 CLEANING AND PROTECTION

- A. Clean interior of piping. Remove dirt and debris as work progresses.
- B. Protect sanitary waste and vent piping during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
- C. Place plugs in ends of uncompleted piping at end of day and when work stops.
- D. Exposed PVC Piping: Protect plumbing vents exposed to sunlight with two coats of water-based latex paint.
- E. Repair damage to adjacent materials caused by waste and vent piping installation.

3.11 PIPING SCHEDULE

- A. Flanges and unions may be used on aboveground pressure piping unless otherwise indicated.
- B. Aboveground, soil and waste piping NPS 4 and smaller shall be any of the following:
 - 1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
 - 2. Hubless, cast-iron soil pipe and fittings; CISPI hub-less-piping couplings; and coupled joints.
 - 3. Dissimilar Pipe-Material Couplings: Unshielded, nonpressure transition couplings.
- C. Aboveground, soil and waste piping NPS 5 and larger shall be any of the following:
 - 1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
 - 2. Hubless, cast-iron soil pipe and fittings; CISPI hubless-piping couplings; and coupled joints.
 - 3. Dissimilar Pipe-Material Couplings: Unshielded, nonpressure transition couplings.
- D. Aboveground, vent piping NPS 4 and smaller shall be any of the following:
 - 1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
 - 2. Hubless, cast-iron soil pipe and fittings; CISPI hubless-piping couplings; and coupled joints.
 - 3. Dissimilar Pipe-Material Couplings: Unshielded, nonpressure transition couplings.
- E. Aboveground, vent piping NPS 5 and larger shall be any of the following:
 - 1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
 - 2. Hubless, cast-iron soil pipe and fittings; CISPI hubless-piping couplings; and coupled joints.
 - 3. Dissimilar Pipe-Material Couplings: Unshielded, nonpressure transition couplings.
- F. Underground, soil, waste, and vent piping NPS 4 and smaller shall be any of the following:
 - 1. Service class, cast-iron soil piping; gaskets; and gasketed joints.
 - 2. Hubless, cast-iron soil pipe and fittings; CISPI cast-iron hub-less-piping couplings; and coupled joints.
 - 3. Solid wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
 - 4. Dissimilar Pipe-Material Couplings: Unshielded, nonpressure transition couplings.

- G. Underground, soil and waste piping NPS 5 and larger shall be any of the following:
1. Service class, cast-iron soil piping; gaskets; and gasketed joints.
 2. Hubless, cast-iron soil pipe and fittings; CISPI cast-iron hubless-piping couplings; coupled joints.
 3. Solid-wall PVC pipe; PVC socket fittings; and solvent-cemented joints.
 4. Dissimilar Pipe-Material Couplings: Unshielded, nonpressure transition couplings.

END OF SECTION 22 1316

**SECTION 26 0500
COMMON WORK RESULTS FOR ELECTRICAL**

PART 1 - GENERAL REFERENCE AND GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Division 26 Common Work Results for Electrical and Common Electrical Materials and Methods section apply to work specified in this is section.
- C. Refer to Division 01 section "Alternates" for possible alternates affecting the extent of this section of work.
- D. This Contractor is also referred to the Architectural, Structural, Mechanical and all other drawings and specification pertinent to this project. All of the above-mentioned drawings and specifications are considered a part of the Contract Documents.
- E. This section specifies the basic requirements for electrical installations and includes requirements common to more than one section of Division 26. It expands and supplements the requirements specified in sections of Division 01.

1.2 SUMMARY

- A. This Section includes general administrative and procedural requirements for electrical installations. The following administrative and procedural requirements are included in this Section to expand the requirements specified in Division 01:
 - 1. Shop Drawings
 - 2. Definitions
 - 3. Discrepancies
 - 4. Record drawings
 - 5. Equipment
 - 6. Substitutions
 - 7. Codes and permits
 - 8. Coordination
 - 9. Interferences
 - 10. Delivery, storage and handling
 - 11. Punchlists
 - 12. Operating and maintenance
 - 13. Warranties
- B. Related Sections: The following sections contain requirements that relate to this Sections:
 - 1. Division 23 Section "ELECTRICAL REQUIREMENTS FOR MECHANICAL EQUIPMENT", for factory-installed motors, controllers, accessories, and connections.
 - 2. Division 26 Section "COMMON ELECTRICAL MATERIALS AND METHODS", for materials and methods common to the remainder of Division 26.

1.3 SHOP DRAWINGS

- A. Product Data: Submit manufacturer's technical product data, including the recommended installation method, all in accordance with Division 01 and Section 26 requirements.

1.4 DEFINITIONS

- A. To achieve brevity in Specification and on Drawings, certain words and phrases not contributing to clarity have been omitted. Unless mentioned specifically as work to be done by Other Trades, all requirements contained in the Specifications and shown on the Drawings shall be performed by the Principal Contractor for this Division of the Contract. The following definitions shall apply:
 - 1. Where the work "provide" is used in connection with a system, equipment, or time, it shall be construed to mean the furnishing and installing of the system, equipment or item.
 - 2. Where the phrases "as directed" is used it shall be construed to mean as directed by the Architect or their authorized representative.

- B. The term "Contractor" as applied to work specified, shown or reasonably implied in the contract documents for Division 26 shall be defined as the subcontractor who is responsible for the work specified or indicated. All subcontracted work must be incorporated by and coordinated by the Prime Contractor.
- C. The term "Contractor" as applied to work specified, shown or reasonable implied in the contract documents for Division 26 shall be defined as the prime contractor who is responsible for the work specified, or indicated. All work subcontracted to each prime contractor must be incorporated by the coordinated by each prime contractor.

1.5 DISCREPANCIES

- A. Should it appear that there is a discrepancy between or within the drawings and/or specifications concerning the nature, quality or extent of materials or work to be furnished and/or installed, and such discrepancy is not clarified by Addendum during the bidding period, this Contractor shall base his bid on performing the work in the manner having the higher cost. The Architect shall have the option of selecting either of the manners shown and/or specified. In the event the lower cost manner is selected, a credit shall be due the Owner in the amount of the difference between the lower cost and higher cost manner. All discrepancies shall be called to the attention of the Architect before proceeding with work affected thereby.
- B. Should it appear that there is a duplication on the Drawings or in the Specifications, wherein the same work or items are shown or specified as being provided under different contracts, subcontracts or supply orders, and such duplication is not clarified by Addendum during the bidding period, it shall be assumed that the prime contractors have included duplicate quotations in their proposal to the Owner. The Architect shall have the option of selecting the contract, subcontract or supply order under which the work or items are to be provided and a credit shall be due the Owner for the duplicate work or items.
- C. The design drawings, as submitted, are diagrammatic and are not intended to show exact location of equipment, electrical devices, etc. unless dimensions are given. Drawings are not to be scaled.
 - 1. Equipment shall be installed along the general arrangement indicated on the drawings, and in accordance with the manufacturer's instructions.
 - a. Provide at least the minimum manufacturer's recommended and code required clearance around the equipment for normal maintenance.
 - b. Locate and arrange equipment in relationship to other system components to assure that the equipment will be operating under the best possible conditions to meet the scheduled performance requirements.
 - 2. Raceways are to be installed along the general plans shown on the drawings keeping in mind the constraints of the available space and the need to coordinate with the work of other trades. Additional bends, pull and splice boxes shall be provided as necessary to meet space constraints and to facilitate the work of other trades.
- D. Electrical equipment, specified hereinafter or as shown on the drawings shall be furnished and installed by this Contractor, unless specifically indicated to the contrary.
- E. Occasionally, certain references may be indicated on the drawings to items which are suggested to be furnished and/or installed by various subcontractors. This is done to assist the applicable Prime Contractor in organizing his subcontractor's bids. However, no attempt has been made, nor is it implied, that this specification or plans are attempting to specifically divide all responsibilities for subcontractors. It is the Prime Contractor's responsibility that all items covered on electrical plans and Division 26 specifications are included in his bid and are coordinated with his subcontractors. No consideration will be given for Prime Contractor's failure to include all applicable electrical work in his bid.
- F. Where more than one manufacturer is named for major items of equipment, the manufacturer noted on the Drawings has been used as a basis for design. If another manufacturer is used, other than the one named on the Drawings, it shall be the responsibility of this contractor to ensure that the equipment will fit the space with all legal clearances, or bear the expense to change the space and structure to accommodate equipment used.

1.6 RECORD DRAWINGS

- A. Prepare record documents in accordance with the requirements of this division, and in Division 01.

1.7 EQUIPMENT

- A. Before entering into a contract, the successful bidder may be required to submit satisfactory evidence to show that an equipment manufacturer has been regularly engaged in the manufacturing of such equipment for three (3) years and have not less than three (3) installations of a similar type which have been in successful operation under conditions similar to those specified for not less than two (2) years.
- B. When two or more items of same equipment are required (panelboards, switchboards, etc.) they shall be of the same manufacturer.

1.8 SUBSTITUTIONS

- A. Refer to the Instructions to Bidders and the related Division 01 sections for requirements in selecting products and requesting substitutions.

1.9 CODE AND PERMITS

- A. All equipment, materials and installation shall comply with the National Fire Protection Association's "National Fire Codes" and "National Electrical Code". Equipment shall bear the "UL" label as required by these codes.
- B. Install work in full accordance with rules and regulations of State, County and City authorities having jurisdiction over premises. This shall include safety requirements of Ohio State Department of Industrial Relations. Do not construe this as relieving Contractor from compliance with any requirements of specification which are in excess of Code requirements and not in conflict therewith.
- C. Unless otherwise indicated, secure and pay for all permits and certificates of inspection incidental to this work required by foregoing authorities. Be responsible for payments to all public utilities for temporary service work performed by them in connection with provision of temporary service required under this Division of specifications. Deliver all certificated to Architect in duplicate.

1.10 COORDINATION

- A. Coordinate arrangement, mounting, and support of electrical equipment:
 - 1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
 - 2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
 - 3. To allow right of way for piping and conduit installed at required slope.
 - 4. So connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.
- B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.
- C. Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed. Access doors and panels are specified in Division 08 Section "Access Doors and Frames."
- D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."
- E. Unless otherwise additionally required in "Project Coordination" sections, prepare and submit for approval coordination drawings drawn to readable scale of all areas where equipment or materials are being used which are not basis of specification and result in a change in the accessibility, performance, or serviceability of such equipment, or a conflict with other trades. Such equipment or materials shall not be installed until it receives approval form the Engineer.

1.11 INTERFERENCES

- A. Before installing any work, this Contractor shall see that it does not interfere with clearance required for finish on beams, columns, pilasters, walls or other structural or architectural members, as shown on Architectural Drawings. If any work is so installed and it later develops that Architectural design cannot be followed, Contractor shall, at his own expense, make such changes in his work as the Architect may direct to permit completion of Architectural work in accordance with plans and specifications.
- B. Install additional conduit, pullboxes, spliceboxes, etc. where required to obtain maximum headroom or to avoid conflict with other work without additional cost to the Owner. Where mounting heights are not detailed or dimensioned, install electrical conduit and overhead equipment to provide the maximum headroom possible.
- C. Report any interferences between work under this division and that of any other Contractors to the Architect as soon as they are discovered. The Architect will determine which equipment shall be relocated, regardless of which was first installed, and his decision shall be final.

1.12 DELIVERY, STORAGE, AND HANDLING

- A. The Contractor shall make provisions for the delivery and safe storage of his materials and equipment in coordination with the work of others. Materials and equipment shall be delivered at such stages of the work as will expedite the work as a whole and shall be marked and stored in such a way as to be easily checked and inspected. The arrival and placing of large equipment items shall be scheduled early enough to permit entry and setting when there is no restriction or problem due to size and weight.

1.13 PUNCHLISTS

- A. From time to time throughout the course of the work, or upon completion of the work the Engineer may perform site observations resulting in written documentation of deviations in the work from the Contract Documents. In such cases the Contractor shall respond in writing to each and every item on this written documentation stating the specific action taken to remedy the deviation. A response shall be provided by the Contractor for each separate observation. This work shall not be considered complete until such satisfactory written response is received by the Engineer. Contractor shall submit the responses to these items as part of the closeout documentation.

1.14 OPERATING AND MAINTENANCE

- A. This Contractor shall furnish competent personal instruction to the Owner's operating personnel for a period of hours as indicated in individual Division 26 specification sections in the proper operation of the electrical equipment. He shall also supply the Owner with one (1) hardbound copy and (1) electronic copy of an operation manual containing the following:
 - 1. Step-by-step procedures for start-up and operation for each system and piece of equipment.
 - 2. Performance data, curves, ratings.
 - 3. Wiring diagrams.
 - 4. Manufacturer's descriptive literature.
 - 5. Manufacturer's maintenance and service manuals.
 - 6. Spare parts and replacement parts list for each piece of equipment.
 - 7. Name of service agency and installer complete with an emergency service phone number for nights, weekends and holidays.
 - 8. Final approved shop drawings.

1.15 WARRANTIES

- A. Refer to Division 01 Section: Specific Warranties for procedures and submittal requirements for warranties. Refer to individual equipment specifications for additional warranty requirements.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION 26 0500

**SECTION 26 0501
COMMON ELECTRICAL MATERIALS AND METHODS**

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Division 26 Common Work Results for Electrical and Common Electrical Materials and Methods section apply to work specified in this is section.

1.2 DESCRIPTION OF WORK

- A. Extent of electrical related work required by this section is indicated on drawings and/or specified in other Division 26 sections.
- B. Except as noted in this specification, this Contractor shall be responsible for all excavating and backfilling necessary to the work of this Division.
- C. This Contractor is to coordinate all excavating and backfilling required under this Division with work specified under Division 02.
- D. See specification Division 09 for painting requirements. Coordinate all electrical painting work required. Coordinate protection requirements for electrical equipment which could be damaged by painting.
- E. Furnish and install all miscellaneous steel required for supports, hangers, anchors, etc., required for installation of equipment and materials furnished and installed under this Division. Steel used in a damp or wet environment shall be hot dipped galvanized unless otherwise noted.
- F. Furnish and install all miscellaneous lumber required for support of electrical equipment, telephone backboards, etc.
- G. This Contractor shall furnish and install concrete foundations or bases under all electrical equipment that rests on floors, concrete encased ductbanks and exterior lighting fixture pole bases. The Contractor shall follow drawings and/or manufacturer's literature with regard to design and construction of same.
- H. This Contractor shall provide to the General Contractor, dimensions and special requirements for the concrete foundations or bases under all electrical equipment that rests on floors, concrete encased ductbanks. The Contractor shall follow drawings and/or manufacturer's literature with regard to design and construction of same.
- I. Furnish and install fire stopping for sealing around electrical penetrations through fire or smoke barriers, and floors.
- J. This Contractor shall perform all Division 26 related and indicated demolition including: Nondestructive removal of materials and equipment for re-use or salvage as indicated. All equipment removed shall be offered to the Owner for his retention. If the Owner elects to retain equipment, it shall be turned over to the Owner at the site. If not, the equipment shall be removed from the premises by this Contractor. Refer to Division 02 Section "Selective Demolition" for additional requirements.

1.3 SUMMARY

- A. This section includes a limited scope of general construction materials and methods pertaining to Division 26 applications of the following items:

Excavation and backfilling

Miscellaneous Metal
Concrete work
Rough-ins
Miscellaneous Lumber
Electrical installations
Cutting and patching
Fire stopping
Selective demolition and alterations

1.4 PROJECT CONDITIONS

- A. Conditions Affecting Demolition: The following project conditions apply:
1. Protect adjacent materials to remain. Install and maintain dust and noise barriers to keep dirt, dust, and noise from being transmitted to adjacent areas. Remove protection and barriers after demolition operations are complete.
 2. Locate, identify, and protect electrical services passing through demolition area and serving other areas outside the demolition limits. Maintain services to areas outside demolition limits. When services must be interrupted, install temporary services for affected areas.
- B. Conditions Affecting Excavations: The following project conditions apply:
1. Maintain and protect existing building services which transit the area affected by excavation.
 2. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by excavation operations.
 3. Existing Utilities: Locate existing underground utilities in excavation areas. If utilities are indicated to remain, support and protect services during excavation operations.
- C. Notify proper authorities prior to commencing excavation. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for directions. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.
- D. Do not interrupt existing utilities serving facilities occupied and used by Owner or others, during occupied hours, except when permitted in writing by Architect and then only after acceptable temporary utility services have been provided.
- E. Provide minimum of 14 working day notice to Architect, and receive written notice to proceed before interrupting any utility.
- F. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shut-off of services if lines are active.
- G. Protection of Persons and Property: Barricade open excavations occurring as part of this work and post with warning lights. Where trenches cross roads, walks, or public thoroughfares, provide suitable barricades and bridges adequately protected by signs or red flags during day and lights at night.
- H. Operate warning lights as recommended by authorities having jurisdiction.
- I. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.

1.5 SUBMITTALS

- A. Product Data: Submit manufacturer's technical product data, including the recommended installation method, all in accordance with Division 01 and Section 260500 requirements.
- B. Electrical Penetration Seals: Submit the following:
1. Shop drawings showing each condition requiring penetration seals. Indicate proposed UL systems materials, anchorage, methods of installation, and actual adjacent construction.
 2. A copy of UL illustration of each proposed system indicating manufacturer approved modifications.
 3. Manufacturer's specifications, recommendations, installation instructions and maintenance instructions.

1.6 SEQUENCE AND SCHEDULING

- A. Coordinate the shut-off and disconnection of electrical service and/or power with the Owner. All associated work to be done at Owner's convenience.
- B. Notify the Architect at least 5 working days prior to commencing demolition operations.
- C. Perform demolition in phases as required by Architect.

PART 2 PRODUCTS

2.1 EXCAVATING FOR ELECTRICAL WORK:

- A. Backfill Materials:
 - 1. All backfilling within the building shall consist of a 6" layer of sand under the conduit and a 12" layer of sand over the conduit. The remainder of the backfill shall be coarse interlocking aggregate.
 - 2. All backfilling outside the building shall be selected dirt, free of large stones.

2.2 MISCELLANEOUS METALS

- A. Fasteners: Zinc-coated, type, grade, and class as required.
- B. Metal Framing: As manufactured by Unistrut or Kindorf unless noted otherwise. Provide framing of sizes required by specific application.

2.3 MISCELLANEOUS LUMBER

- A. Electrical backboards to be 5/8" thick ACX-EXT, Non-Com plywood. Paint both sides and all edges with grey fire-retardant paint.

2.4 MATERIALS OF CONCRETE WORK

- A. Reinforcing Materials:
 - 1. Reinforcing Bars: Except as otherwise indicated, provide ASTM A 615, deformed, Grade 40 for size numbers 3 through 18; ASTM A 675, plain, Grade 60, for size number 2; sizes as indicated or required.
- B. Reinforcement Supports: Provide supports for reinforcement including bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing bars and welded wire fabric in place. Provide wire bar type supports complying with CRSI recommendations, unless otherwise indicated.
- C. Concrete Materials:
 - 1. Portland Cement: ASTM C 150, Type I, except as otherwise indicated.
 - 2. Aggregates: ASTM C 33, except as otherwise indicated.
 - a. Local aggregates not complying with ASTM C 33 but which have shown by special test or actual service to produce concrete of adequate strength and durability may be used.
 - b. For rough grouting, provide aggregate which is well graded and 100 percent passing through 3/8" sieve.
 - 3. Water: Clean and free of substances harmful to concrete.

2.5 DESIGN AND PROPORTIONING OF CONCRETE MIXES

- A. General: Design electrical work concrete as follows, for each 28-day compressive strength class:
 - 1. 3000 psi Class: 500 lbs of cement per cu. yd. (5.25 sacks), and 0.46 water/cement ratio.
 - 2. 2500 psi Class: 450 lbs. of cement per cu. yd. (4.75 sacks), and 0.54 water/cement ratio.
 - 3. Rough Grouting Class: 565 lbs. of cement per cu. yd. (6.0 sacks), and 0.60 water/cement ratio.
- B. Mix for Patching: Where electrical work requires patching of exposed concrete work which has been cut to accommodate electrical work, provide concrete patching mix which is identical with mix of work being patched (same cement, aggregates, ad-mixtures and proportioning).

2.6 FIRE STOPPING MATERIALS

- A. Fire stopping materials shall be intumescent safety barriers designed to block the spread of fire and smoke through penetrations created by electrical installations in fire rated walls and floors. Materials

shall be flame, toxic fume and water resistant and shall have a minimum 3-hour fire rating. Fire rating shall be defined by tests conducted by ASTM, UL or other testing and inspection agencies acceptable to authorities having jurisdiction.

1. Acceptable Manufacturers:
 - Specified Technologies, Inc. (STI) Somerville, NJ
 - Tremco, Inc. Beachwood, OH
 - 3M Inc., Minneapolis, MN
2. Materials:
 - a. Firestop Mortar:
 - STI SpecSeal Mortar
 - Tremco TREMstop-M
 - 3M Fire Barrier Mortar
 - b. Intumescent Firestop Sealants and Caulks
 - SpecSeal SSP Putty
 - Tremco TREMstop-WBM
 - 3M Fire Barrier CP-25 WB
 - c. Silicone Firestop Sealants Caulks
 - STI SpecSeal Pensil 100 & 300
 - Tremco Fyre Sil Sealant
 - 3M Fire Barrier 2000 & 2003
 - d. Firestop Putty:
 - STI SpecSeal Firestop Putty Bars & Pads
 - Tremco TREMstop FP Flowable Putty
 - 3M Fire Barrier Firestop Putty
 - e. Firestop Collars:
 - STI SpecSeal Firestop Collars
 - Tremco TREMstop D Combustible Pipe Device
 - 3M Fire Barrier Pipe Device
 - f. Wrap Strip:
 - STI Spec Seal Wrap Strip
 - Tremco TREMstop-WS
 - 3M Fire Barrier WS-195 Wrap Strip

- B. Sleeves shall be Schedule 40, galvanized steel with plain end. Sleeves shall be no more than two sizes larger than single penetrating conduit. For multiple cable or conduit penetrations, make sleeve as small as possible to allow for penetrating items and firestopping material.

2.7 GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

PART 3 EXECUTION

3.1 EXAMINATION AND PROJECT CONDITIONS

- A. Examine area and conditions under which basic electric materials are to be installed or methods are to be performed and notify Engineer in writing of conditions detrimental to proper completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to Engineer.

3.2 EXCAVATION AND BACKFILLING

- A. Slope sides of excavations to comply with local codes and ordinances. Shore and brace as required for stability of excavation.

- B. Shoring and Bracing: Establish requirements for trench shoring and bracing to comply with local codes and authorities. Maintain shoring and bracing in excavations regardless of time period excavations will be open.
 - 1. Remove shoring and bracing when no longer required. Where sheeting is allowed to remain, cut top of sheeting at an elevation of 30 inches below finished grade elevation.
- C. Install sediment and erosion control measures in accordance with local codes and ordinances.
- D. Dewatering: Prevent surface water and subsurface or ground water from flowing into excavations and from flooding project site and surrounding area.
 - 1. Do not allow water to accumulate in excavations. Remove water to prevent softening of bearing materials. Provide and maintain dewatering system components necessary to convey water away from excavations.
 - 2. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey surface water to collecting or run-off areas. Do not use trench excavations as temporary drainage ditches.
- E. Material Storage: Stockpile satisfactory excavated materials where directed, until required for backfill or fill. Place, grade, and shape stockpiles for proper drainage.
 - 1. Locate and retain soil materials away from edge of excavations. Do not store within drip-line of trees indicated to remain.
 - 2. Remove and legally dispose of excess excavated materials and materials not acceptable for use as backfill or fill.
- F. Excavation for Underground Vaults and Electrical Structures: Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10 foot; plus a sufficient distance to permit placing and removal of concrete formwork, installation of services, other construction, and for inspection.
 - 1. Excavate, by hand, areas within dip-line of large trees. Protect the root system from damage and dry-out. Maintain moist conditions for root system and cover exposed roots with burlap. Paint root cuts of 1 inch in diameter and larger with emulsified asphalt tree paint.
 - 2. Take care not to disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is place.
- G. Trenching: Excavate trenches for electrical installations as follows:
 - 1. Excavate trenches to the uniform width, sufficiently wide to provide ample working room and a minimum of 6 to 9 inches clearance on both sides of raceways and equipment.
 - 2. Excavate trenches to depth as required.
 - 3. Limit the length of open trench to that in which installations can be made and the trench backfilled within the same day.
 - 4. Where rock is encountered, carry excavation below required elevation and backfill with a layer of crushed stone or gravel to 6" below conduit.
- H. Cold Weather Protection: Protect excavation bottoms against freezing when atmospheric temperature is less than 35 deg F (1 deg C).
- I. Backfilling and Filling: Place soil materials in layers to required subgrade elevations for each area classification listed below, using materials specified in Part 2 of this Section.
 - 1. Under walks and pavements, use a course interlocking aggregate ODOT #6, 67, 68, 7, 78 or 8 equivalent.
 - 2. Under building slabs, use a course interlocking aggregate ODOT #6, 67, 68, 7, 78 or 8 or equivalent.
 - 3. Under conduit and equipment, use subbase materials where required over rock bearing surface and for correction of unauthorized excavation.
 - 4. For raceways less than 30 inches below surface of roadways, provide 4-inch thick concrete base slab support. After installation of raceways, provide a 4-inch thick concrete encasement (side and top) prior to backfilling and placement of roadway subbase.
 - 5. Other areas, use excavated or borrowed materials, free of large stones.
- J. Backfill excavations as promptly as work permits, but not until completion of the following:
 - 1. Inspection, testing, approval, and locations of underground utilities have been recorded.
 - 2. Removal of concrete formwork.
 - 3. Removal of shoring and bracing, and backfilling of voids.

4. Removal of trash and debris.
- K. Placement and Compaction: Place backfill and fill materials in layers of not more than 8 inches in loose depth for material compacted by heavy equipment, and not more than 4 inches of loose depth for material compacted by hand operated tampers.
- L. Before compaction, moisten or aerate each layer as necessary to provide optimum moisture content. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification specified below. Do not place backfill or fill material on surfaces that are muddy, frozen or contain frost or ice.
- M. Place backfill and fill materials evenly adjacent to structures, conduit and equipment to required elevations. Prevent displacement of raceways and equipment by carrying material uniformly around them to approximately same elevation in each lift.
- N. Compaction: Control soil compaction during construction, providing minimum percentage of density specified for each area classification indicated below.
 1. Percentage of Maximum Density Requirements: Compact soil to not less than the following percentages of maximum density for soils which exhibit a well-defined moisture-density relationship (cohesive soils), determined in accordance with ASTM D 1557 and not less than the following percentages of relative density, determined in accordance with ASTM D 2049, for soils which will not exhibit a well-defined moisture-density relationship (cohesionless soils).
 - a. Areas Other Than Under Building or Pavement: Compact top 6 inches of subgrade and each layer of backfill or fill material to 85 percent maximum density for cohesive soils, and 90 percent relative density for cohesionless soils.
 2. Moisture Control: Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water. Apply water in minimum quantity necessary to achieve required moisture content and to prevent water appearing on surface during, or subsequent to, compaction operations.
- O. Subsidence: Where subsidence occurs at electrical installation excavations during the period 12 months after Substantial Completion, remove surface treatment (i.e., pavement, lawn, or other finish), add backfill material, compact to specified conditions, and replace surface treatment. Restore appearance, quality and condition of surface or finish to match adjacent areas.

3.3 DISPOSAL OF EXCESS AND WASTE EXCAVATION MATERIALS

- A. Removal from Owner's Property: Remove excess excavated material, trash, debris and waste materials and dispose of it off Owner's property.

3.4 ERECTION OF METAL SUPPORTS AND ANCHORAGE

- A. Cut, fit, and place miscellaneous metal fabrications accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- B. Field Welding: Comply with AWS "Structural Welding Code."

3.5 INSTALLATION OF CONCRETE WORK

- A. Formwork:
 1. General: Design, construct and maintain formwork to support vertical and lateral loads including pressure of cast-in-place concrete. Construct formwork so that formed concrete will be of required size and shape and in required location. Construct with joints which will not leak cement paste. Form sides and bottoms of concrete work, except where clearly indicated to be cast directly in excavation or against other construction, or on grade or prepared subgrade. Design and construct forms for easy removal without damage to concrete and other work.
 - a. Install chamfer strips at external corners of exposed concrete work.
 - b. Construct forms to retain equipment anchor bolts in accurate locations during placement of reinforcing steel and concrete. Use templates furnished by equipment manufacturers to locate anchor bolts or, where not furnished, locate by accurate measure from certified setting diagrams.
- B. Placing Reinforcement:

1. General: Comply with requirements and recommendations of specified standards, including "Placing Reinforcing Bars" by CRSI. Place bars where indicated and support to prevent displacement during concrete placement, using appropriate reinforcement supports, properly spaced and wire tied to reinforcing bars.
 - a. Place reinforcement to obtain at least minimum recommended coverages for concrete protection. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.
 2. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials which would reduce bond with concrete.
- C. Placing Concrete:
1. Wet wooden forms which have been coated with compound, immediately before concrete, and remove excess water from forms.
 2. Strength-Class Application: Comply with the following general application requirements.
 - a. Plain Concrete Encased Ductbanks: Provide 2500 PSI class.
 - b. Reinforced Concrete Encased Ductbanks: Provide 3000 PSI class.
 - c. Underground Structural Concrete: Provide 3000 PSI class.
 - d. Miscellaneous Supported Work: Provide 3000 PSI class for electrical equipment pads and similar supported work.
 - e. Concrete Fill: Provide 2500 PSI class for filling structural steel foundation frames and for filling similar large-volume units.
 - f. Concrete Grout: Provide rough grouting class for filling voids to be grouted which are too small to be filled effectively with 2500 PSI class concrete.
 - g. Patching General Concrete Work: Match concrete being patched.
 3. Deposit concrete continuously or in layers of thickness which will result in no concrete being placed on concrete which has hardened sufficiently to cause formation of seams or planes of weakness within section. If section cannot be placed continuously, provide construction joints. Deposit concrete as nearly as practicable in its final location, so as to avoid segregation due to rehandling or flowing.
 4. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding or tamping. Use equipment and procedures complying with recommended practices of ACI 309; eliminate voids in work.
 5. Bring horizontal surfaces to correct level with straightedge and strike off. Use bull floats or darbies to smooth surface, free of humps and hollows.
 6. Cold Weather Placement: Comply with ACI 306. Do not use frozen materials or materials containing ice and snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials. When air temperature has fallen or is expected to fall below 40 deg F (4.4 deg C), heat water and aggregates uniformly before mixing, as required to obtain concrete mixture temperature of not less than 50 deg F (10 deg C), and not more than 80 deg F (26.7 deg C), at time of placement. Protect concrete work from physical damage and reduced strength resulting from frost, freezing actions, or low temperatures.
 7. Finishing Horizontal Surfaces: Float and trowel horizontal (top) surfaces to level, smooth, uniform textured, dense finish, where surface is to remain exposed or receive coating, membrane or other thin-set finish. Otherwise, leave struck-off surface undisturbed; except scratch surfaces which are to receive concrete or mortar topping.
 8. Surface Repairs:
 - a. Unexposed Surfaces: Repair significantly damaged and honeycombed areas, and remove major projections and fins where forms have been removed.
 - b. Exposed Surfaces: On formed surfaces which are to be exposed, including those to be coated or covered with membrane or other thin-set applied finish, repair and patch form-tie holes and damaged and honeycombed areas, filling voids with grout and completely removing fins and other projections.

3.6 CONCRETE CURING AND PROTECTION

- A. General: Protect freshly placed concrete from drying and excessively cold and hot temperatures, and maintain in moist condition at relatively constant temperature for period of time necessary for hydration of cement, proper hardening, and achievement of strength requirements as specified.

3.7 MISCELLANEOUS CONCRETE WORK

- A. Concrete Grouting: Space approximately 1" thick between bottom of equipment and top of concrete foundation or base which remains after shimming, shall be filled completely with grouting. Grout shall be made up with sand and cement designed for the purpose which does not shrink on setting up. Exposed surface of grouting shall be finished to make a neat appearance. Grout openings and recesses as indicated, in and around mechanical work and other work which penetrates or adjoins mechanical concrete work, using rough grouting class of concrete mix. Provide formwork where required, and tamp, screed and trowel surfaces. Cure grout as specified for concrete work.
- B. Concrete Bases: In the absence of more specific information, either on drawings, or manufacturer's literature, the bases shall be level, shall have a minimum height above finished floor of 4" and extend 3" beyond the base dimensions of the item of equipment.
- C. Concrete pads placed in existing structures shall be mounted securely to the original substrate with anchor bolts.

3.8 MISCELLANEOUS LUMBER

- A. Cut, fit and place miscellaneous lumber fabrications accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- B. Both sides and all edges of all lumber fabrications shall be painted with two (2) coats of grey fire-retardant paint unless noted otherwise.

3.9 ROUGH-IN

- A. Verify with Architect prior to rough-in, exact location of items such as switches, receptacles, clocks, speakers, fire alarm devices, floor boxes, surface-mounted raceways, etc., in finished areas.
- B. Verify with respective equipment supplier prior to rough-in, exact location and method of connection to respective equipment for such items as mechanical equipment, etc.

3.10 ELECTRICAL INSTALLATIONS

- A. General: Sequence, coordinate, and integrate the various elements of electrical systems, materials, and equipment. Comply with the following requirements:
 1. Coordinate electrical systems, equipment, and materials installation with other building components.
 2. Verify all dimensions by field measurements.
 3. Arrange for chases, slots, and openings in other building components during progress of construction, to allow for electrical installations.
 4. Coordinate the installation of required supporting devices and sleeves to be set in poured-in-place concrete and other structural components, as they are constructed.
 5. Sequence, coordinate, and integrate installations of electrical materials and equipment for efficient flow of the Work. Give particular attention to large equipment requiring positioning prior to closing in the building.
 6. Where mounting heights are not detailed or dimensioned, install systems, materials, and equipment to provide the maximum headroom possible.
 7. Coordinate connection of electrical systems with exterior underground and/or overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Provide required connection for each service.
 8. Install systems, materials, and equipment to conform with approved submittal data to greatest extent possible. Conform to arrangements indicated by the Contract Documents, recognizing that portions of the work are shown only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer conflict to the Engineer.
 9. Install systems, materials, and equipment level and plumb, parallel, and perpendicular to other building systems and components.

10. Equipment shall be installed along the general arrangement indicated on the drawings, and in accordance with the manufacturer's instruction.
 - a. Provide at least the minimum manufacturer's recommended and code required clearance around the equipment for normal maintenance.
 - b. Locate and arrange equipment in relationship to other system components to assure that the equipment will be operating under the best possible conditions to meet the scheduled performance requirements.
11. Install electrical equipment to facilitate servicing, maintenance, and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations.
12. Provide access panel or doors where units are concealed behind finished surfaces such as drywall and/or plaster construction, etc. Coordinate the access panel type with the Architect.
13. Install systems, materials, and equipment giving right-of-way priority to systems required to be installed at a specified slope (such as for underground services, etc.).
14. All wiring other than within an item of equipment, to be in raceways unless shown otherwise on Drawings or covered otherwise in these Specifications.
15. Raceways are to be installed along the general plans shown on the drawings keeping in mind the constraints of the available space and the need to coordinate with the work of other trades. Additional bends, pull and splice boxes shall be provided as necessary to meet space constraints and to facilitate the work of other trades.
16. Raceways, boxes, cables, conductors, etc., installed in plenum spaces and similar areas shall be supported from the building structure and shall be installed symmetrical with the axis of the space (do not cross room at an angle). Support wires for lay-in type grid ceilings shall not be used to support electrical equipment, raceways, cables, etc.
17. Wiring of Motors and/or Equipment:
 - a. Provide necessary power wiring to motors and/or equipment where shown on Drawings.
 - 1.) Make final "line" connections to respective items of equipment as shown on Drawings.
 - 2.) Provide "Control" wiring, regardless of voltage, only when shown on Electrical Drawings.
 - 3.) In general, all 120, 208, 240, 277, or 480 volt wiring to be construed as power wiring; however, line voltage control wiring shall not be construed as power wiring unless shown on Electrical Drawings.
18. Wiring of Heating, Ventilating, and Air Conditioning Equipment:
 - a. Provide power wiring as shown on Electrical Drawings. In general, this shall consist of power conductors and raceway up to and including connections to line terminals of respective items of equipment.
 - 1.) Where this Contractor furnishes motor starter and/or disconnect switch, this also shall include the power wiring between the load side of starter and/or disconnect switch and line terminals of respective item of equipment.
 - 2.) Where other Divisions furnish motor starter and/or disconnect switch (other than factory-mounted, prewired items), this Contractor shall provide power wiring as described in previous paragraph and shall mount respective starter and/or disconnect switch.
 - 3.) Where electric heating equipment is involved, wiring responsibilities to be as shown on Electrical Drawings.
 - 4.) Control wiring, regardless of voltage characteristics, is not to be construed as power wiring and is not the responsibility of this Contractor unless indicated as such on Electrical Drawings.

In certain cases, such as between a thermostat and a cabinet heater or a unit heater, or between a switch and a

small exhaust fan, wiring may be required by this Contractor only if shown on Electrical Drawings.

- 5.) It shall be the responsibility of this Contractor, prior to rough-in of conduits serving mechanical equipment, to verify with respective equipment supplier the required ampacity and quantity of conductors serving the equipment. In the event changes are required from those shown on the Drawings, this information shall be brought to the attention of the Engineer and authorization obtained from the Engineer in writing prior to proceeding with the necessary changes. Changes required shall be performed at the expense of the mechanical (HVAC or plumbing) contractor.
19. Wiring of Plumbing Equipment:
 - a. Provide necessary power wiring to plumbing equipment requiring same, where shown on Electrical Drawings.
 - b. Control equipment such as thermostats, pressure switches, etc., to be furnished, set in place, and wired by other Divisions, unless shown otherwise on Electrical Drawings.
 - c. Provide necessary disconnect switches, starters, or contactors where shown on Electrical Drawings. See "MOTOR CONTROL" section of these Specifications.
 20. Temperature Control Wiring:
 - a. Temperature control wiring, regardless of voltage characteristics, is not the responsibility of this Contractor unless indicated as such on Electrical Drawings or herein described.
 - 1.) In general, the furnishing and installing of all temperature control devices and respective wiring shall be the responsibility of other Divisions.

3.11 CUTTING AND PATCHING

A. General: Perform cutting and patching in accordance with Division 01 Section "CUTTING AND PATCHING". In addition to the requirements specified in Division 01, the following requirements apply:

1. Perform cutting, fitting, and patching of electrical equipment and materials required to:
 - a. Demolition of electrical items required to be removed from structure to remain.
 - b. Uncover work to provide for installation of ill-timed work.
 - c. Remove and replace defective work.
 - d. Remove and replace work not conforming to requirements of the Contract Documents.
 - e. Install equipment and materials in existing structures.
 - f. Upon written instructions from the Engineer, uncover and restore work to provide for Engineer observation of concealed work.
2. Cut, remove, and legally dispose of electrical equipment, components, and materials, including but not limited to electrical items to be removed and items made obsolete by the new work.
3. Protect the structure, furnishings, finishes, and adjacent materials not to be removed.
4. Provide and maintain temporary partitions or dust barriers adequate to prevent the spread of dust and dirt to adjacent areas.
5. Protection of Installed Work: During cutting and patching operations, protect adjacent installations.
6. Patch new and/or existing finished surfaces and building components using new materials matching existing materials and using workmen skilled in respective trade.
7. Where existing construction such as floors, walls, ceilings, etc., must be cut to relocate, remove or add raceways and/or equipment, such construction to be restored to original condition to satisfaction of Architect by this Contractor using workmen skilled in respective trade.
8. General penetrations through walls, floors, slab, etc. will be patched with materials to match the surrounding surface (i.e. vinyl concrete patch for concrete surfaces, joint and patching

compound for dry wall surfaces, etc.). If the penetrated surface is a fire or smoke barrier, refer to "Installation of Fire Stopping Materials" in this section.

3.12 INSTALLATION OF FIRE-STOPPING MATERIAL

- A. General:
1. All fire and smoke rated walls and floors penetrated by electrical raceways, exposed conductors, etc. shall be properly sleeved and fire sealed. See Division 7 "Firestopping". All firestop system types shall be by same manufacturer to fullest extent possible.
 2. All fire stopping will be installed in accordance to the U.L. rated system designed for the application.
 3. Insulation types specified in other sections shall not be installed in lieu of firestopping material specified herein.
 4. Grout, Mortar, or Gypsum products shall not be installed in lieu of firestopping material specified here.
- B. Sleeves:
1. Wall and floor opening shall be made as small as possible. Install sleeves during the erection of concrete or masonry walls. Sleeve shall be grouted in using material to match surrounding surface. Install electrical raceway, exposed conductors, etc. through sleeve and install fire stopping, intumescent material.
- C. Penetrations - Provide Firestopping:
1. Where penetrations including conduit, cable, wire, or other elements which pass through one or both outer surfaces of a fire rated floor or wall.
 2. Except for floor on grade, where a penetration occurs through a structural floor or roof and a space would otherwise remain open between the surfaces of the penetration and the edge of the adjoining structural floor or roof.
 3. Where a penetration occurs through fire-rated walls, or partitions of hollow-type construction, provide fire stopping to completely fill spaces around the penetration, on each side of the wall or partition.
 4. These requirements for penetrations shall apply whether or not sleeves have been provided, and whether or not penetrations are to be equipped with escutcheons or other trim. If penetrations are sleeved, fire stop annular space, if any, between sleeve and wall opening.
- D. Provide fire stopping to fill miscellaneous voids and blank openings in fire-rated construction where conduit, cable, wire or equipment has been removed.

3.13 SELECTIVE DEMOLITION AND ALTERATION OF EXISTING ELECTRICAL SYSTEMS

- A. Demolition Definitions:
1. Under demolition notes, several words and phrases are used. These shall be interpreted to mean as follows:
 - a. Abandon: Disconnect designated equipment and remove respective conductors back to source, such as a panelboard, distribution panel, switchboard, switchgear, etc. Alter respective legend accordingly.
 - b. Disconnect: Disconnect designated equipment and remove respective branch circuit wiring and affected exposed electrical equipment, such as boxes, raceways, control, etc.
 - 1.) Remove conductors back to source such as panelboard, etc. Alter respective legend accordingly.
 - 2.) Remove exposed raceway. When in unfinished areas such as mechanical equipment rooms, remove back to source. When in finished spaces, remove only that raceway which is exposed.
 - 3.) Where raceway is above an existing suspended, accessible ceiling and that ceiling grid is being reused or replaced, remove the exposed raceway in the affected area. Concealed homeruns are to remain and may be reused at Contractor's option.

- c. Disconnect and Reconnect: Disconnect designated items, remove and store same where necessary, and then reinstall item and reconnect to existing branch circuit and control.
 - d. Remove Branch Circuit and/or Feeder: Remove conductor and respective raceway, fittings, boxes, etc.
- B. Where existing building construction is to be altered to accommodate the planned renovations and/or an addition(s), alter existing electrical service and distribution system, communications systems, fire alarm system, etc., as shown on the drawings and as required for proper operation of the altered system.
- C. Where existing accessible ceiling grid panels and grid support members are removed to permit the installation of new conduit, boxes, etc., it shall be the responsibility of this Contractor to reinstall the panels and grid support system to the satisfaction of the Architect. Damaged items shall be replaced at no cost to the Owner.
- D. Remove all existing affected electrical equipment, devices, fixtures, boxes, etc. which are not incorporated into or are not necessary for the operation of new and/or existing electrical systems, making sure that no remaining fixtures, devices, or appliances are left without service.
- E. Make sure that no remaining fixtures, devices, etc. within the renovated area or adjacent areas are left without service.
 - 1. Services and/or power outages and cutovers to be coordinated Engineer and Owner and done at Owner's convenience.
 - 2. Modify existing "systems" as required to accommodate added equipment.
 - 3. Remove abandoned accessible surface-mounted boxes and raceway. Abandoned accessible surface raceway shall be removed complete back to source.
 - 4. Where an abandoned raceway penetrates floor, slab, wall, etc. raceway shall be cut below the surface. Seal the opening and restore respective surface to match surrounding surface as directed.
 - 5. Where an abandoned raceway is not accessible, the raceway shall remain. Any accessible portions penetrating out of wall, floor, slab, etc. shall be cut off below the surface. Seal the opening and restore the respective surface to match the surrounding surface as directed.
 - a. Perform cutting and patching required for demolition in accordance with Division 01 and Division 02 section "Cutting and Patching".
 - 6. Flush mounted outlet boxes which are abandoned or used for junction boxes and are not concealed by new construction shall have openings covered by a blank, stainless steel plate.
 - 7. Where an existing distribution center is altered, provide a new, accurate, typed legend.
 - 8. Where work cannot be executed during normal working hours, this Contractor shall include in the Base Bid all necessary overtime pay to execute this contractors contract.
- F. All electrical equipment removed and not scheduled for reuse shall be turned over to the Owner at the construction site for salvage. All items deemed not salvageable by the Owner shall become the property of this Contractor and shall be removed from the site within 72 hours.

END OF SECTION 26 0501

SECTION 26 0519
LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Division 26 Common Work Results for Electrical and Common Electrical Materials and Methods section apply to work specified in this is section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Copper building wire rated 600 V or less.
 - 2. Metal-clad cable, Type MC, rated 600 V or less.
 - 3. Connectors, splices, and terminations rated 600 V and less.

1.3 DEFINITIONS

- A. RoHS: Restriction of Hazardous Substances.
- B. VFC: Variable-frequency controller.

1.4 SUBMITTALS

- A. Product Data: For each type of product.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Member company of NETA.
 - 1. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.

PART 2 - PRODUCTS

2.1 COPPER BUILDING WIRE

- A. Description: Flexible, insulated and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Alpha Wire Company.
 - 2. American Bare Conductor.
 - 3. Belden Inc.
 - 4. Cerro Wire LLC.
 - 5. Encore Wire Corporation.
 - 6. General Cable Technologies Corporation.
 - 7. Okonite Company (The).
 - 8. Service Wire Co.
 - 9. Southwire Company.
 - 10. WESCO.
 - 11. West Penn.
- C. Standards:
 - 1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
 - 2. RoHS compliant.
 - 3. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."
- D. Conductors: Copper, complying with ASTM B 3 for bare annealed copper and with ASTM B 8 for stranded conductors.
- E. Conductor Insulation:
 - 1. Type THHN and Type THWN-2: Comply with UL 83.

2.2 METAL-CLAD CABLE, TYPE MC

- A. Description: A factory assembly of one or more current-carrying insulated conductors in an overall metallic sheath in 6' length or less from J-box to lighting fixture or as approved by the Project Manager.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. AFC Cable Systems; a part of Atkore International.
 - 2. Alpha Wire Company.
 - 3. American Bare Conductor.
 - 4. Belden Inc.
 - 5. Encore Wire Corporation.
 - 6. General Cable Technologies Corporation.
 - 7. Okonite Company (The).
 - 8. Service Wire Co.
 - 9. Southwire Company.
 - 10. WESCO.
- C. Standards:
 - 1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
 - 2. Comply with UL 1569.
 - 3. RoHS compliant.
 - 4. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."
- D. Circuits:
 - 1. Single circuit and multicircuit with color-coded conductors.
- E. Conductors: Copper, complying with ASTM B 3 for bare annealed copper and with ASTM B 8 for stranded conductors.
- F. Ground Conductor: Insulated.
- G. Conductor Insulation:
 - 1. Type THHN/THWN-2: Comply with UL 83.
- H. Armor: Steel, interlocked.
- I. Jacket: PVC applied over armor.

2.3 CONNECTORS AND SPLICES

- A. Description: Factory-fabricated connectors, splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
- B. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1. 3M Electrical Products.
 - 2. AFC Cable Systems; a part of Atkore International.
 - 3. Gardner Bender.
 - 4. Hubbell Power Systems, Inc.
 - 5. Ideal Industries, Inc.
 - 6. ILSCO.
 - 7. NSi Industries LLC.
 - 8. O-Z/Gedney; a brand of Emerson Industrial Automation.
 - 9. Service Wire Co.
 - 10. TE Connectivity Ltd.
 - 11. Thomas & Betts Corporation; A Member of the ABB Group.
- C. Jacketed Cable Connectors: For steel and aluminum jacketed cables, zinc die-cast with set screws, designed to connect conductors specified in this Section.
- D. Lugs: One piece, seamless, designed to terminate conductors specified in this Section.
 - 1. Material: Copper.
 - 2. Type: One hole with standard barrels.

3. Termination: Crimp.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders and Branch Circuits: Copper; solid for No. 14 AWG and smaller; stranded for No. 12 AWG and larger.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. All Wiring: Type THHN/THWN-2, single conductors in raceway.
- B. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.
- B. Complete raceway installation between conductor and cable termination points according to Section 260533 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.
- C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- F. Support cables according to Section 260529 "Hangers and Supports for Electrical Systems."

3.4 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
- B. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
 1. Use oxide inhibitor in each splice, termination, and tap for aluminum conductors.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 12 inches of slack.

3.5 IDENTIFICATION

- A. Identify and color-code conductors and cables according to Section 260553 "Identification for Electrical Systems."
- B. Identify each spare conductor at each end with identity number and location of other end of conductor, and identify as spare conductor.

3.6 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.7 FIRESTOPPING

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Section 078413 "Penetration Firestopping."

3.8 FIELD QUALITY CONTROL

- A. Perform tests and inspections.

1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors for compliance with requirements.
 2. Perform each of the following tests:
 - a. Inspect exposed sections of conductor and cable for physical damage and correct connection according to the single-line diagram.
 - b. Inspect compression-applied connectors for correct cable match and indentation.
 - c. Inspect for correct identification.
 - d. Inspect cable jacket and condition.
- B. Cables will be considered defective if they do not pass tests and inspections.

END OF SECTION 26 0519

SECTION 26 0526
GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Division 26 Common Work Results for Electrical and Common Electrical Materials and Methods section apply to work specified in this is section.

1.2 SUMMARY

- A. Section includes grounding and bonding systems and equipment.

1.3 SUBMITTALS

- A. Coordination Drawings: Plans showing dimensioned locations of grounding features specified in "Field Quality Control" Article, including the following:
 - 1. Ground rods.
 - 2. Ground rings.
- B. Qualification Data: For testing agency and testing agency's field supervisor.
- C. Field quality-control reports.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For grounding to include in emergency, operation, and maintenance manuals.
 - 1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
 - a. Plans showing as-built, dimensioned locations of grounding features specified in "Field Quality Control" Article, including the following:
 - 1) Ground rods.
 - 2) Ground rings.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Certified by NETA.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with UL 467 for grounding and bonding materials and equipment.

2.2 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Advanced Lightning Technology, Ltd.
 - 2. Burndy; Part of Hubbell Electrical Systems.
 - 3. Dossert; AFL Telecommunications LLC.
 - 4. ERICO; a brand of nVent.
 - 5. Fushi Copperweld Inc.
 - 6. Galvan Industries, Inc.; Electrical Products Division, LLC.
 - 7. Harger Lightning & Grounding.
 - 8. ILSCO.
 - 9. O-Z/Gedney; a brand of Emerson Industrial Automation.
 - 10. Robbins Lightning, Inc.
 - 11. Siemens Industry, Inc., Energy Management Division.
 - 12. Thomas & Betts Corporation; A Member of the ABB Group.

2.3 CONDUCTORS

- A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
 - 1. Solid Conductors: ASTM B 3.
 - 2. Stranded Conductors: ASTM B 8.
 - 3. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch in diameter.
 - 4. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
 - 5. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
 - 6. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
- C. Grounding Bus: Predrilled rectangular bars of annealed copper, 1/4 by 4 inches in cross section, with 9/32-inch holes spaced 1-1/8 inches apart. Stand-off insulators for mounting shall comply with UL 891 for use in switchboards, 600 V and shall be Lexan or PVC, impulse tested at 5000 V.

2.4 CONNECTORS

- A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.
- B. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.
- C. Bus-Bar Connectors: Mechanical type, cast silicon bronze, solderless exothermic-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.
- D. Beam Clamps: Mechanical type, terminal, ground wire access from four directions, with dual, tin-plated or silicon bronze bolts.
- E. Cable-to-Cable Connectors: Compression type, copper or copper alloy.
- F. Conduit Hubs: Mechanical type, terminal with threaded hub.
- G. Ground Rod Clamps: Mechanical type, copper or copper alloy, terminal with hex head bolt.
- H. Lay-in Lug Connector: Mechanical type, copper rated for direct burial terminal with set screw.
- I. Straps: Solid copper, copper lugs. Rated for 600 A.
- J. U-Bolt Clamps: Mechanical type, copper or copper alloy, terminal listed for direct burial.
- K. Water Pipe Clamps:
 - 1. Mechanical type, two pieces with zinc-plated bolts.
 - a. Material: Tin-plated aluminum.
 - b. Listed for direct burial.
 - 2. U-bolt type with malleable-iron clamp and copper ground connector.

2.5 GROUNDING ELECTRODES

- A. Ground Rods: Copper-clad steel; 3/4 inch by 10 feet.

PART 3 - EXECUTION

3.1 APPLICATIONS

- A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.
- B. Underground Grounding Conductors: Install barecopper conductor, No. 2/0 AWG minimum.
 - 1. Bury at least 24 inches below grade.
 - 2. Duct-Bank Grounding Conductor: Bury 12 inches above duct bank when indicated as part of duct-bank installation.
- C. Grounding Bus: Install in electrical equipment rooms, in rooms housing service equipment, and elsewhere as indicated.
 - 1. Install bus horizontally, on insulated spacers.
- D. Conductor Terminations and Connections:
 - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.

2. Underground Connections: Exothermic welded connectors as indicated.
3. Connections to Structural Steel: Exothermic welded connectors.

3.2 GROUNDING AT THE SERVICE

- A. Equipment grounding conductors and grounding electrode conductors shall be connected to the ground bus. Install a main bonding jumper between the neutral and ground buses.

3.3 GROUNDING UNDERGROUND DISTRIBUTION SYSTEM COMPONENTS

- A. Comply with IEEE C2 grounding requirements.
- B. Grounding Manholes: Install a driven ground rod through manhole floor, close to wall, and set rod depth so 4 inches will extend above finished floor. If necessary, install ground rod before manhole is placed and provide No. 1/0 AWG bare, tinned-copper conductor from ground rod into manhole through a waterproof sleeve in manhole wall. Protect ground rods passing through concrete floor with a double wrapping of pressure-sensitive insulating tape or heat-shrunk insulating sleeve from 2 inches above to 6 inches below concrete. Seal floor opening with waterproof, nonshrink grout.
- C. Grounding Connections to Manhole Components: Bond exposed-metal parts such as inserts, cable racks, pulling irons, ladders, and cable shields within each manhole or handhole, to ground rod or grounding conductor. Make connections with No. 4 AWG minimum, stranded, hard-drawn copper bonding conductor. Train conductors level or plumb around corners and fasten to manhole walls. Connect to cable armor and cable shields according to written instructions by manufacturer of splicing and termination kits.

3.4 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with all feeders and branch circuits.
- B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:
 1. Feeders and branch circuits.
 2. Lighting circuits.
 3. Receptacle circuits.
 4. Single-phase motor and appliance branch circuits.
 5. Three-phase motor and appliance branch circuits.
 6. Flexible raceway runs.
 7. Armored and metal-clad cable runs.
 8. Busway Supply Circuits: Install insulated equipment grounding conductor from grounding bus in the switchgear, switchboard, or distribution panel to equipment grounding bar terminal on busway.

3.5 FENCE GROUNDING

- A. Fence Grounding: Install at maximum intervals of 1500 feet except as follows:
 1. Fences within 100 Feet of Buildings, Structures, Walkways, and Roadways: Ground at maximum intervals of 750 feet.
 - a. Gates and Other Fence Openings: Ground fence on each side of opening.
 - 1) Bond metal gates to gate posts.
 - 2) Bond across openings, with and without gates, except at openings indicated as intentional fence discontinuities. Use No. 2 AWG wire and bury it at least 18 inches below finished grade.
- B. Fences Enclosing Electrical Power Distribution Equipment: Ground as required by IEEE C2 unless otherwise indicated.
- C. Grounding Method: At each grounding location, drive a grounding rod vertically until the top is 6 inches below finished grade. Connect rod to fence with No. 6 AWG conductor. Connect conductor to each fence component at grounding location.
- D. Bonding Method for Gates: Connect bonding jumper between gate post and gate frame.

- E. Bonding to Lightning-Protection System: If fence terminates at lightning-protected building or structure, ground the fence and bond the fence grounding conductor to lightning-protection down conductor or lightning-protection grounding conductor, complying with NFPA 780.

3.6 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- B. Ground Rods: Drive rods until tops are 2 inches below finished floor or final grade unless otherwise indicated.
 - 1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.
 - 2. Use exothermic welds for all below-grade connections.
 - 3. For grounding electrode system, install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes, and connect to the service grounding electrode conductor.
- C. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.
 - 1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
 - 2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
 - 3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.
- D. Grounding and Bonding for Piping:
 - 1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes; use a bolted clamp connector or bolt a lug-type connector to a pipe flange by using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
 - 2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
 - 3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.
- E. Ground Ring: Install a grounding conductor, electrically connected to each building structure ground rod and to each steel column or indicated item, extending around the perimeter of building.
 - 1. Install tinned-copper conductor not less than No. 2/0 AWG for ground ring and for taps to building steel unless otherwise noted on drawings.
 - 2. Bury ground ring not less than 24 inches from building's foundation.
- F. Connections: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact are galvanically compatible.
 - 1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer in order of galvanic series.
 - 2. Make connections with clean, bare metal at points of contact.
 - 3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
 - 4. Make aluminum-to-galvanized-steel connections with tin-plated copper jumpers and mechanical clamps.
 - 5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

3.7 FIELD QUALITY CONTROL

- A. Testing Agency: Contractor to engage a qualified third party testing agency to perform tests and inspections.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- C. Tests and Inspections:
 - 1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
 - 2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
 - 3. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, at ground test wells. Make tests at ground rods before any conductors are connected.
 - a. Measure ground resistance no fewer than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
 - b. Perform tests by fall-of-potential method according to IEEE 81.
 - 4. Prepare dimensioned Drawings locating each ground rod and ground-rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location, and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.
- D. Grounding system will be considered defective if it does not pass tests and inspections.
- E. Prepare test and inspection reports.
- F. Report measured ground resistances that exceed the following values:
 - 1. Power and Lighting Equipment or System with Capacity of 500 kVA and Less: 10 ohms.
 - 2. Power and Lighting Equipment or System with Capacity of 500 to 1000 kVA: 5 ohms.
 - 3. Power and Lighting Equipment or System with Capacity More Than 1000 kVA: 3 ohms.
 - 4. Power Distribution Units or Panelboards Serving Electronic Equipment: 1 ohm(s).
 - 5. Substations and Pad-Mounted Equipment: 5 ohms.
 - 6. Manhole Grounds: 10 ohms.
- G. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

END OF SECTION 26 0526

**SECTION 26 0529
HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Division 26 Common Work Results for Electrical and Common Electrical Materials and Methods section apply to work specified in this is section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Steel slotted support systems.
 - 2. Conduit and cable support devices.
 - 3. Support for conductors in vertical conduit.
 - 4. Structural steel for fabricated supports and restraints.
 - 5. Mounting, anchoring, and attachment components, including powder-actuated fasteners, mechanical expansion anchors, concrete inserts, clamps, through bolts, toggle bolts, and hanger rods.
 - 6. Fabricated metal equipment support assemblies.
- B. Related Requirements:
 - 1. Conduit supports on roof non-penetration product specifically designed for conduit support.
 - 2. Product shall be approved by roofing manufacturer to retain roofing warranty.

1.3 SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:
 - a. Slotted support systems, hardware, and accessories.
 - b. Clamps.
 - c. Hangers.
 - d. Sockets.
 - e. Eye nuts.
 - f. Fasteners.
 - g. Anchors.
 - h. Saddles.
 - i. Brackets.
 - 2. Include rated capacities and furnished specialties and accessories.
- B. Shop Drawings: Signed and sealed by a qualified professional engineer. For fabrication and installation details for electrical hangers and support systems.
 - 1. Hangers. Include product data for components.
 - 2. Slotted support systems.
 - 3. Equipment supports.
- C. Welding certificates.

1.4 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design hanger and support system.
- B. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame Rating: Class 1.
2. Self-extinguishing according to ASTM D 635.

2.2 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Preformed steel channels and angles with minimum 13/32-inch-diameter holes at a maximum of 8 inches o.c. in at least one surface.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Allied Tube & Conduit; a part of Atkore International.
 - b. B-line, an Eaton business.
 - c. CADDY; a brand of nVent.
 - d. Flex-Strut Inc.
 - e. Gripple Inc.
 - f. GS Metals Corp.
 - g. G-Strut.
 - h. Haydon Corporation.
 - i. Metal Ties Innovation.
 - j. MIRO Industries.
 - k. Thomas & Betts Corporation; A Member of the ABB Group.
 - l. Unistrut; Part of Atkore International.
 - m. Wesanco, Inc.
 2. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.
 3. Material for Channel, Fittings, and Accessories: Galvanized steel.
 4. Channel Width: 1-1/4 inches.
 5. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
 6. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
 7. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
 8. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- C. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for nonarmored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be made of malleable iron.
- D. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M steel plates, shapes, and bars; black and galvanized.
- E. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Hilti, Inc.
 - 2) ITW Ramset/Red Head; Illinois Tool Works, Inc.
 - 3) MKT Fastening, LLC.
 - 4) Simpson Strong-Tie Co., Inc.
 2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.

- a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) B-line, an Eaton business.
 - 2) Empire Tool and Manufacturing Co., Inc.
 - 3) Hilti, Inc.
 - 4) ITW Ramset/Red Head; Illinois Tool Works, Inc.
 - 5) MKT Fastening, LLC.
- 3. Concrete Inserts: Steel or malleable-iron, slotted support system units are similar to MSS Type 18 units and comply with MFMA-4 or MSS SP-58.
- 4. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units are suitable for attached structural element.
- 5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
- 6. Toggle Bolts: All Stainless-steel springhead type.
- 7. Hanger Rods: Threaded steel.

2.3 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

- A. Description: Welded or bolted structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.
- B. Materials: Comply with requirements in Section 055000 "Metal Fabrications" for steel shapes and plates.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Comply with the following standards for application and installation requirements of hangers and supports, except where requirements on Drawings or in this Section are stricter:
 - 1. NECA 1.
 - 2. NECA 101
 - 3. NECA 102.
 - 4. NECA 105.
 - 5. NECA 111.
- B. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation for penetrations through fire-rated walls, ceilings, and assemblies.
- C. Comply with requirements for raceways and boxes specified in Section 260533 "Raceways and Boxes for Electrical Systems."
- D. Maximum Support Spacing and Minimum Hanger Rod Size for Raceways: Space supports for EMT, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch in diameter.
- E. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted or other support system, sized so capacity can be increased by at least 50 percent in future without exceeding specified design load limits.
 - 1. Secure raceways and cables to these supports with two-bolt conduit clamps.

3.2 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this article.
- B. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.
- C. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
 - 1. To Wood: Fasten with lag screws or through bolts.
 - 2. To New Concrete: Bolt to concrete inserts.
 - 3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.

4. To Existing Concrete: Expansion anchor fasteners.
 5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
 6. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts.
 7. To Light Steel: Sheet metal screws.
 8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that comply with seismic-restraint strength and anchorage requirements.
- D. Drill holes for expansion anchors in concrete at locations and to depths that avoid the need for reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Comply with installation requirements in Section 055000 "Metal Fabrications" for site-fabricated metal supports.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- C. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 CONCRETE BASES

- A. Construct concrete bases of dimensions indicated, but not less than 4 inches larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.
- B. Use 3000-psi, 28-day compressive-strength concrete. Concrete materials, reinforcement, and placement requirements are specified in Section 033000 "Cast-in-Place Concrete." And/or Section 033053 "Miscellaneous Cast-in-Place Concrete."
- C. Anchor equipment to concrete base as follows:
 1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 2. Install anchor bolts to elevations required for proper attachment to supported equipment.
 3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

3.5 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.
- B. Touchup: Comply with requirements in Section 099113 "Exterior Painting" Section 099123 "Interior Painting" and Section 099600 "High-Performance Coatings" for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 26 0529

**SECTION 26 0533
RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Division 26 Common Work Results for Electrical and Common Electrical Materials and Methods section apply to work specified in this is section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Metal conduits and fittings.
 - 2. Nonmetallic conduits and fittings.
 - 3. Metal wireways and auxiliary gutters.
 - 4. Surface raceways.
 - 5. Boxes, enclosures, and cabinets.
- B. Related Requirements:
 - 1. Section 078413 "Penetration Firestopping" for firestopping at conduit and box entrances.
 - 2. Section 260543 "Underground Ducts and Raceways for Electrical Systems" for exterior ductbanks, manholes, and underground utility construction.

1.3 DEFINITIONS

- A. GRC: Galvanized rigid steel conduit.

1.4 SUBMITTALS

- A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
- B. Shop Drawings: For custom enclosures and cabinets. Include plans, elevations, sections, and attachment details.

PART 2 - PRODUCTS

2.1 METAL CONDUITS AND FITTINGS

- A. Metal Conduit:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Adalet, Inc.
 - b. AFC Cable Systems; a part of Atkore International.
 - c. Allied Tube & Conduit; a part of Atkore International.
 - d. Amp.
 - e. Anamet Electrical, Inc.
 - f. Appleton Electric Co.
 - g. Arlington Industries Inc.
 - h. Calconduit.
 - i. Electri-Flex Company.
 - j. FSR Inc.
 - k. Hubbell, Inc.
 - l. Korkap.
 - m. NEC, Inc.
 - n. Opti-Com Manufacturing Network, Inc (OMNI).
 - o. O-Z/Gedney; a brand of Emerson Industrial Automation.
 - p. Republic Conduit.
 - q. Southwire Company.
 - r. Thomas & Betts Corporation; A Member of the ABB Group.
 - s. Western Tube and Conduit Corporation.

- t. Wheatland Tube Company.
 - 2. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 - 3. GRC: Comply with ANSI C80.1 and UL 6.
 - 4. EMT: Comply with ANSI C80.3 and UL 797.
 - 5. FMC: Comply with UL 1; zinc-coated steel.
 - 6. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.
- B. Metal Fittings:
- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. AFC Cable Systems; a part of Atkore International.
 - b. Allied Tube & Conduit; a part of Atkore International.
 - c. Anamet Electrical, Inc.
 - d. Electri-Flex Company.
 - e. FSR Inc.
 - f. Korkap.
 - g. NEC, Inc.
 - h. NewBasis.
 - i. Opti-Com Manufacturing Network, Inc (OMNI).
 - j. O-Z/Gedney; a brand of Emerson Industrial Automation.
 - k. Perma-Cote.
 - l. Republic Conduit.
 - m. Southwire Company.
 - n. Thomas & Betts Corporation; A Member of the ABB Group.
 - o. Western Tube and Conduit Corporation.
 - p. Wheatland Tube Company.
 - 2. Comply with NEMA FB 1 and UL 514B.
 - 3. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 - 4. Fittings, General: Listed and labeled for type of conduit, location, and use.
 - 5. Fittings for EMT:
 - a. Material: Steel.
 - b. Type: Setscrew.
 - 6. Expansion Fittings: steel to match conduit type, complying with UL 651, rated for environmental conditions where installed, and including flexible external bonding jumper.
- C. Joint Compound for GRC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.2 NONMETALLIC CONDUITS AND FITTINGS

- A. Nonmetallic Conduit:
- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. AFC Cable Systems; a part of Atkore International.
 - b. Anamet Electrical, Inc.
 - c. Arnco Corporation.
 - d. CANTEX INC.
 - e. CertainTeed Corporation.
 - f. Condux International, Inc.
 - g. Electri-Flex Company.
 - h. FRE Composites.
 - i. Lamson & Sessions.
 - j. Niedax Inc.
 - k. RACO; Hubbell.
 - l. Thomas & Betts Corporation; A Member of the ABB Group.

- m. Topaz Electric; a division of Topaz Lighting Corp.
 - 2. Listing and Labeling: Nonmetallic conduit shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 - 3. ENT: Comply with NEMA TC 13 and UL 1653.
 - 4. RNC: Type EPC-40-PVC, complying with NEMA TC 2 and UL 651 unless otherwise indicated.
 - 5. LFNC: Comply with UL 1660.
 - 6. Rigid HDPE: Comply with UL 651A.
 - 7. Continuous HDPE: Comply with UL 651A.
 - 8. RTRC: Comply with UL 2515A and NEMA TC 14.
- B. Nonmetallic Fittings:
- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. AFC Cable Systems; a part of Atkore International.
 - b. Anamet Electrical, Inc.
 - c. Arco Corporation.
 - d. CANTEX INC.
 - e. CertainTeed Corporation.
 - f. Condux International, Inc.
 - g. Electri-Flex Company.
 - h. FRE Composites.
 - i. Kraloy.
 - j. Lamson & Sessions.
 - k. Niedax Inc.
 - l. RACO; Hubbell.
 - m. Thomas & Betts Corporation; A Member of the ABB Group.
 - n. Topaz Electric; a division of Topaz Lighting Corp.
 - 2. Fittings, General: Listed and labeled for type of conduit, location, and use.
 - 3. Fittings for ENT and RNC: Comply with NEMA TC 3; match to conduit or tubing type and material.
 - a. Fittings for LFNC: Comply with UL 514B.
 - 4. Solvents and Adhesives: As recommended by conduit manufacturer.

2.3 METAL WIREWAYS AND AUXILIARY GUTTERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. B-line, an Eaton business.
 - 2. Hoffman; a brand of nVent.
 - 3. MonoSystems, Inc.
 - 4. Square D.
- B. Description: Sheet metal, complying with UL 870 and NEMA 250, Type 1 and/or Type 3R unless otherwise indicated, and sized according to NFPA 70.
 - 1. Metal wireways installed outdoors shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- D. Wireway Covers: Hinged for type 3R, screw-cover for type 1 unless otherwise indicated.
- E. Finish: Manufacturer's standard enamel finish.

2.4 SURFACE RACEWAYS

- A. Listing and Labeling: Surface raceways and tele-power poles shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

- B. Surface Metal Raceways: Galvanized steel with snap-on covers complying with UL 5. Manufacturer's standard enamel finish in color selected by Architect.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Hubbell Incorporated; Wiring Device-Kellems.
 - b. Panduit Corp.
 - c. Wiremold / Legrand.
- C. Surface Nonmetallic Raceways: Two- or three-piece construction, complying with UL 5A, and manufactured of rigid PVC with texture and color selected by Architect from manufacturer's standard colors. Product shall comply with UL 94 V-0 requirements for self-extinguishing characteristics.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Hubbell Incorporated.
 - b. Panduit Corp.
 - c. Wiremold / Legrand.

2.5 BOXES, ENCLOSURES, AND CABINETS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Adalet.
 - 2. Crouse-Hinds, an Eaton business.
 - 3. EGS/Appleton Electric.
 - 4. Erickson Electrical Equipment Company.
 - 5. FSR Inc.
 - 6. Hoffman; a brand of nVent.
 - 7. Hubbell Incorporated.
 - 8. Hubbell Incorporated; Wiring Device-Kellems.
 - 9. Kraloy.
 - 10. Milbank Manufacturing Co.
 - 11. MonoSystems, Inc.
 - 12. Oldcastle Enclosure Solutions.
 - 13. O-Z/Gedney; a brand of Emerson Industrial Automation.
 - 14. Plasti-Bond.
 - 15. RACO; Hubbell.
 - 16. Spring City Electrical Manufacturing Company.
 - 17. Stahlin Non-Metallic Enclosures.
 - 18. Thomas & Betts Corporation; A Member of the ABB Group.
 - 19. Topaz Electric; a division of Topaz Lighting Corp.
 - 20. Wiremold / Legrand.
- B. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.
- C. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.
- D. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.
- E. Luminaire Outlet Boxes: Nonadjustable, designed for attachment of luminaire weighing 50 lb. Outlet boxes designed for attachment of luminaires weighing more than 50 lb shall be listed and marked for the maximum allowable weight.
- F. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- G. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, galvanized, cast iron with gasketed cover.
- H. Box extensions used to accommodate new building finishes shall be of same material as recessed box.
- I. Device Box Dimensions: 4 inches square by 2-1/8 inches deep for power 5 inches square x 2-1/8 inches deep for telecom.

- J. Gangable boxes are allowed.
- K. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 1 and/or Type 3R with continuous-hinge cover with flush latch unless otherwise indicated.
 - 1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
 - 2. Nonmetallic Enclosures: Plastic.
 - 3. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.
- L. Cabinets:
 - 1. NEMA 250, Type 1 and/or Type 3R galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
 - 2. Hinged door in front cover with flush latch and concealed hinge.
 - 3. Key latch to match panelboards.
 - 4. Metal barriers to separate wiring of different systems and voltage.
 - 5. Accessory feet where required for freestanding equipment.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

- A. Outdoors: Apply raceway products as specified below unless otherwise indicated:
 - 1. Exposed Conduit: GRC.
 - 2. Concealed Conduit, Aboveground: GRC.
 - 3. Underground Conduit: RNC, Type EPC-40-PVC or Type EPC-80-PVC,.
 - 4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
 - 5. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.
- B. Indoors: Apply raceway products as specified below unless otherwise indicated:
 - 1. Exposed, Not Subject to Physical Damage: EMT.
 - 2. Exposed, Not Subject to Severe Physical Damage: EMT.
 - 3. Exposed and Subject to Severe Physical Damage: GRC. Raceway locations include the following:
 - a. Loading dock.
 - b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
 - c. Mechanical rooms.
 - d. Gymnasiums.
 - e. Garages
 - 4. Concealed in Ceilings and Interior Walls and Partitions: EMT.
 - 5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
 - 6. Damp or Wet Locations: GRC.
 - 7. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4 stainless steel in institutional and commercial kitchens and damp or wet locations.
- C. Minimum Raceway Size: 3/4-inch trade size.
- D. Raceway Fittings: Compatible with raceways and suitable for use and location.
 - 1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
 - 2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with this type of conduit. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.
 - 3. EMT: Use setscrew, steel fittings. Comply with NEMA FB 2.10.
 - 4. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.
- E. Install surface raceways only where indicated on Drawings.

3.2 INSTALLATION

- A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.
- B. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
- C. Do not install raceways or electrical items on any "explosion-relief" walls or rotating equipment.
- D. Do not fasten conduits onto the bottom side of a metal deck roof.
- E. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- F. Complete raceway installation before starting conductor installation.
- G. Arrange stub-ups so curved portions of bends are not visible above finished slab.
- H. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches of changes in direction. Pull point shall be no more than 200 linear feet.
- I. Make bends in raceway using large-radius preformed ells. Field bending shall be according to NFPA 70 minimum radii requirements. Use only equipment specifically designed for material and size involved.
- J. Conceal conduit within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
- K. Support conduit within 12 inches of enclosures to which attached.
- L. Stub-Ups to Above Recessed Ceilings:
 - 1. Use EMT or GRC for raceways.
 - 2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.
- M. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- N. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.
- O. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch trade size and insulated throat metal bushings on 1-1/2-inch trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.
- P. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.
- Q. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.
- R. Cut conduit perpendicular to the length and deburr. For conduits 2-inch trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.
- S. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.
- T. Surface Raceways:
 - 1. Install surface raceway with a minimum 2-inch radius control at bend points.
 - 2. Secure surface raceway with screws or other anchor-type devices at intervals not exceeding 48 inches and with no less than two supports per straight raceway section. Support surface raceway according to manufacturer's written instructions. Tape and glue are not acceptable support methods.
- U. Install raceway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings according to NFPA 70.

- V. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:
 - 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 - 2. Where an underground service raceway enters a building or structure.
 - 3. Conduit extending from interior to exterior of building.
 - 4. Conduit extending into pressurized duct and equipment.
 - 5. Conduit extending into pressurized zones that are automatically controlled to maintain different pressure set points.
 - 6. Where otherwise required by NFPA 70.
- W. Comply with manufacturer's written instructions for solvent welding RNC and fittings.
- X. Expansion-Joint Fittings:
 - 1. Install in each run of aboveground RNC that is located where environmental temperature change may exceed 30 deg F and that has straight-run length that exceeds 25 feet. Install in each run of aboveground RMC and EMT conduit that is located where environmental temperature change may exceed 100 deg F and that has straight-run length that exceeds 100 feet.
 - 2. Install type and quantity of fittings that accommodate temperature change listed for each of the following locations:
 - a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F temperature change.
 - b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F temperature change.
 - c. Indoor Spaces Connected with Outdoors without Physical Separation: 125 deg F temperature change.
 - d. Attics: 135 deg F temperature change.
 - 3. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F of temperature change for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.000078 inch per foot of length of straight run per deg F of temperature change for metal conduits.
 - 4. Install expansion fittings at all locations where conduits cross building or structure expansion joints.
 - 5. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.
- Y. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 36 inches/72 inches of flexible conduit for recessed and semirecessed luminaires, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
 - 1. Use LFMC in damp or wet locations subject to severe physical damage.
 - 2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.
- Z. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.
- AA. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall. Prepare block surfaces to provide a flat surface for a raintight connection between box and cover plate or supported equipment and box.
- BB. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.
- CC. Locate boxes so that cover or plate will not span different building finishes.
- DD. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.
- EE. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.

3.3 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.4 FIRESTOPPING

- A. Install firestopping at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

3.5 PROTECTION

- A. Protect coatings, finishes, and cabinets from damage and deterioration.
 - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 - 2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 26 0533

SECTION 26 0544
SLEEVES AND SLEEVE SEALS FOR ELECTRICAL RACEWAYS AND CABLING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Division 26 Common Work Results for Electrical and Common Electrical Materials and Methods section apply to work specified in this is section.
- C.

1.2 SUMMARY

- A. Section Includes:
 - 1. Sleeves for raceway and cable penetration of non-fire-rated construction walls and floors.
 - 2. Sleeve-seal systems.
 - 3. Sleeve-seal fittings.
 - 4. Grout.
 - 5. Silicone sealants.
- B. Related Requirements:
 - 1. Section 078413 "Penetration Firestopping" for penetration firestopping installed in fire-resistance-rated walls, horizontal assemblies, and smoke barriers, with and without penetrating items.

1.3 SUBMITTALS

- A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 SLEEVES

- A. Wall Sleeves:
 - 1. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, plain ends.
- B. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies: Galvanized-steel sheet; 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint, with tabs for screw-fastening the sleeve to the board.
- C. Sleeves for Rectangular Openings:
 - 1. Material: Galvanized sheet steel.
 - 2. Minimum Metal Thickness:
 - a. For sleeve cross-section rectangle perimeter less than 50 inches and with no side larger than 16 inches, thickness shall be 0.052 inch.
 - b. For sleeve cross-section rectangle perimeter 50 inches or more and one or more sides larger than 16 inches, thickness shall be 0.138 inch.

2.2 SLEEVE-SEAL SYSTEMS

- A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Advance Products & Systems, Inc.
 - b. CALPICO, Inc.
 - c. Metraflex Company (The).
 - d. Pipeline Seal and Insulator, Inc.
 - e. Proco Products, Inc.
 - f. GPT, Link-Seal
 - 2. Sealing Elements: EPDM rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
 - 3. Pressure Plates: Carbon steel.

4. Connecting Bolts and Nuts: Carbon steel, with corrosion-resistant coating, of length required to secure pressure plates to sealing elements.

2.3 GROUT

- A. Description: Nonshrink; recommended for interior and exterior sealing openings in non-fire-rated walls or floors.
- B. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
- C. Design Mix: 5000-psi, 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 SLEEVE INSTALLATION FOR NON-FIRE-RATED ELECTRICAL PENETRATIONS

- A. Comply with NECA 1.
- B. Comply with NEMA VE 2 for cable tray and cable penetrations.
- C. Sleeves for Conduits Penetrating Above-Grade Non-Fire-Rated Concrete and Masonry-Unit Floors and Walls:
 1. Interior Penetrations of Non-Fire-Rated Walls and Floors:
 - a. Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Section 079200 "Joint Sealants."
 - b. Seal space outside of sleeves with mortar or grout. Pack sealing material solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect material while curing.
 2. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
 3. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway or cable unless sleeve seal is to be installed.
 4. Install sleeves for wall penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of walls. Cut sleeves to length for mounting flush with both surfaces of walls. Deburr after cutting.
 5. Install sleeves for floor penetrations. Extend sleeves installed in floors 2 inches above finished floor level. Install sleeves during erection of floors.
- D. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies:
 1. Use circular metal sleeves unless penetration arrangement requires rectangular sleeved opening.
 2. Seal space outside of sleeves with approved joint compound for gypsum board assemblies.
- E. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.
- F. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- G. Underground, Exterior-Wall and Floor Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch annular clear space between raceway or cable and sleeve for installing sleeve-seal system.

3.2 SLEEVE-SEAL-SYSTEM INSTALLATION

- A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at raceway entries into building.
- B. Install type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

END OF SECTION 26 0544

**SECTION 26 0553
IDENTIFICATION FOR ELECTRICAL SYSTEMS**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Division 26 Common Work Results for Electrical and Common Electrical Materials and Methods section apply to work specified in this is section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Color and legend requirements for raceways, conductors, and warning labels and signs.
 - 2. Labels.
 - 3. Bands and tubes.
 - 4. Tapes and stencils.
 - 5. Tags.
 - 6. Signs.
 - 7. Cable ties.
 - 8. Paint for identification.
 - 9. Fasteners for labels and signs.

1.3 SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for electrical identification products.
- B. Identification Schedule: For each piece of electrical equipment and electrical system components to be an index of nomenclature for electrical equipment and system components used in identification signs and labels. Use same designations indicated on Drawings.
- C. Dedicated-Design Submittal: For arc-flash hazard study.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Comply with ASME A13.1 and IEEE C2.
- B. Comply with NFPA 70.
- C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.
- D. Comply with ANSI Z535.4 for safety signs and labels.
- E. Comply with NFPA 70E and Section 260573.19 "Arc-Flash Hazard Analysis" requirements for arc-flash warning labels.
- F. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.
- G. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
 - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 COLOR AND LEGEND REQUIREMENTS

- A. Raceways and Cables Carrying Circuits at 600 V or Less:
 - 1. Black letters on white field.
 - 2. Legend: Indicate voltage and system or service type.
- B. Color-Coding for Phase- and Voltage-Level Identification, 600 V or Less: Use colors listed below for ungrounded service feeder and branch-circuit conductors.
 - 1. Color shall be factory applied.
 - 2. Colors for 208/120-V Circuits:
 - a. Phase A: Black.
 - b. Phase B: Red.

- c. Phase C: Blue.
 - d. Neutral: White.
 - 3. Colors for 240-V Circuits:
 - a. Phase A: Black.
 - b. Phase B: Red.
 - c. Phase C: Blue
 - d. Neutral: White.
 - 4. Color for Equipment Grounds: Green.
- C. Warning Label Colors:
 - 1. Identify system voltage with black letters on an orange background.
- D. Warning labels and signs shall include, but are not limited to, the following legends:
 - 1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
 - 2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES."
- E. Equipment Identification Labels:
 - 1. Black letters on a white field.

2.3 LABELS

- A. Vinyl Wraparound Labels: Preprinted, flexible labels laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing label ends.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Brady Corporation.
 - b. Champion America.
 - c. emedco.
 - d. Grafoplast Wire Markers.
 - e. HellermannTyton.
 - f. LEM Products Inc.
 - g. Marking Services, Inc.
 - h. Panduit Corp.
 - i. Seton Identification Products.
- B. Self-Adhesive Wraparound Labels: Preprinted, 3-mil-thick, vinyl flexible label with acrylic pressure-sensitive adhesive.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. A'n D Cable Products.
 - b. Brady Corporation.
 - c. Brother International Corporation.
 - d. emedco.
 - e. Grafoplast Wire Markers.
 - f. Ideal Industries, Inc.
 - g. LEM Products Inc.
 - h. Marking Services, Inc.
 - i. Panduit Corp.
 - j. Seton Identification Products.
 - 2. Self-Lamination: Clear; UV-, weather- and chemical-resistant; self-laminating, protective shield over the legend. Labels sized such that the clear shield overlaps the entire printed legend.
 - 3. Marker for Labels: Machine-printed, permanent, waterproof, black ink recommended by printer manufacturer.
- C. Self-Adhesive Labels: Vinyl, thermal, transfer-printed, 3-mil-thick, multicolor, weather- and UV-resistant, pressure-sensitive adhesive labels, configured for intended use and location.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. A'n D Cable Products.
 - b. Brady Corporation.
 - c. Brother International Corporation.
 - d. emedco.
 - e. Grafoplast Wire Markers.
 - f. HellermannTyton.
 - g. Ideal Industries, Inc.
 - h. LEM Products Inc.
 - i. Marking Services, Inc.
 - j. Panduit Corp.
 - k. Seton Identification Products.
2. Minimum Nominal Size:
 - a. 1-1/2 by 6 inches for raceway and conductors.
 - b. 3-1/2 by 5 inches for equipment.
 - c. As required by authorities having jurisdiction.

2.4 TAPES AND STENCILS

- A. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Carlton Industries, LP.
 - b. Champion America.
 - c. HellermannTyton.
 - d. Ideal Industries, Inc.
 - e. Marking Services, Inc.
 - f. Panduit Corp.
- B. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; not less than 3 mils thick by 1 to 2 inches wide; compounded for outdoor use.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Brady Corporation.
 - b. Carlton Industries, LP.
 - c. emedco.
 - d. Marking Services, Inc.
- C. Tape and Stencil: 4-inch-wide black stripes on 10-inch centers placed diagonally over orange background and are 12 inches wide. Stop stripes at legends.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. HellermannTyton.
 - b. LEM Products Inc.
 - c. Marking Services, Inc.
 - d. Seton Identification Products.
- D. Underground-Line Warning Tape:
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Brady Corporation.
 - b. Ideal Industries, Inc.
 - c. LEM Products Inc.
 - d. Marking Services, Inc.
 - e. Reef Industries, Inc.
 - f. Seton Identification Products.
 2. Tape:

- a. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical and communications utility lines.
 - b. Printing on tape shall be permanent and shall not be damaged by burial operations.
 - c. Tape material and ink shall be chemically inert and not subject to degradation when exposed to acids, alkalis, and other destructive substances commonly found in soils.
3. Color and Printing:
- a. Comply with ANSI Z535.1, ANSI Z535.2, ANSI Z535.3, ANSI Z535.4, and ANSI Z535.5.
 - b. Inscriptions for Red-Colored Tapes: "ELECTRIC LINE, HIGH VOLTAGE".
 - c. Inscriptions for Orange-Colored Tapes: "TELEPHONE CABLE, CATV CABLE, COMMUNICATIONS CABLE, OPTICAL FIBER CABLE" .
4. Tag: All maker tape shall be:
- a. Reinforced, detectable three-layer laminate, consisting of a printed pigmented woven scrim, a solid aluminum-foil core, and a clear protective film that allows inspection of the continuity of the conductive core; bright-colored, continuous-printed on one side with the inscription of the utility, compounded for direct-burial service.
 - b. Width: 3 inches.
 - c. Overall Thickness: 8 mils.
 - d. Foil Core Thickness: 0.35 mil.
 - e. Weight: 34 lb/1000 sq. ft..
 - f. Tensile according to ASTM D 882: 300 lbf and 12,500 psi.
- E. Stenciled Legend: In nonfading, waterproof, black ink or paint. Minimum letter height shall be 1 inch.

2.5 TAGS

- A. Nonmetallic Preprinted Tags: Polyethylene tags, 0.015 inch thick, color-coded for phase and voltage level, with factory printed permanent designations; punched for use with self-locking cable tie fastener.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- a. Brady Corporation.
 - b. Carlton Industries, LP.
 - c. emedco.
 - d. Grafoplast Wire Markers.
 - e. LEM Products Inc.
 - f. Marking Services, Inc.
 - g. Panduit Corp.
 - h. Seton Identification Products.

2.6 SIGNS

- A. Baked-Enamel Signs:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- a. Carlton Industries, LP.
 - b. Champion America.
 - c. emedco.
 - d. Marking Services, Inc.
2. Preprinted aluminum signs, high-intensity reflective, punched or drilled for fasteners, with colors, legend, and size required for application.
3. 1/4-inch grommets in corners for mounting.
4. Nominal Size: 7 by 10 inches.
- B. Laminated Acrylic or Melamine Plastic Signs:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Brady Corporation.
 - b. Carlton Industries, LP.
 - c. Emedco.
 - d. Marking Services, Inc.
- C. Engraved legends:
 1. Engraved legend with black letters on white face:
 - a. Punched or drilled for mechanical fasteners with 1/4-inch grommets in corners for mounting.
 - b. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.
 2. Thickness:
 - a. For signs up to 20 sq. in., minimum 1/16 inch thick.
 - b. For signs larger than 20 sq. in., 1/8 inch thick.

2.7 CABLE TIES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. HellermannTyton.
 2. Ideal Industries, Inc.
 3. Marking Services, Inc.
 4. Panduit Corp.
- B. Plenum-Rated Cable Ties: Self-extinguishing, UV stabilized, one piece, and self-locking.
 1. Minimum Width: 3/16 inch.
 2. Tensile Strength at 73 Deg F according to ASTM D 638: 7000 psi.
 3. UL 94 Flame Rating: 94V-0.
 4. Temperature Range: Minus 50 to plus 284 deg F.
 5. Color: Black.

2.8 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Retain paint system applicable for surface material and location (exterior or interior).
- B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Self-Adhesive Identification Products: Before applying electrical identification products, clean substrates of substances that could impair bond, using materials and methods recommended by manufacturer of identification product.

3.2 INSTALLATION

- A. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and operation and maintenance manual. Use consistent designations throughout Project.
- B. Install identifying devices before installing acoustical ceilings and similar concealment.
- C. Verify identity of each item before installing identification products.
- D. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and operation and maintenance manual.
- E. Apply identification devices to surfaces that require finish after completing finish work.
- F. Install signs with approved legend to facilitate proper identification, operation, and maintenance of electrical systems and connected items.

- G. System Identification for Raceways and Cables under 600 V: Identification shall completely encircle cable or conduit. Place identification of two-color markings in contact, side by side.
 - 1. Secure tight to surface of conductor, cable, or raceway.
- H. System Identification for Raceways and Cables over 600 V: Identification shall completely encircle cable or conduit. Place adjacent identification of two-color markings in contact, side by side.
 - 1. Secure tight to surface of conductor, cable, or raceway.
- I. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
- J. Emergency Operating Instruction Signs: Install instruction signs with white legend on a red background with minimum 3/8-inch-high letters for emergency instructions at equipment used for power transfer, load shedding, etc.
- K. Elevated Components: Increase sizes of labels, signs, and letters to those appropriate for viewing from the floor.
- L. Vinyl Wraparound Labels:
 - 1. Secure tight to surface of raceway or cable at a location with high visibility and accessibility.
 - 2. Attach labels that are not self-adhesive type with clear vinyl tape, with adhesive appropriate to the location and substrate.
- M. Self-Adhesive Wraparound Labels: Secure tight to surface at a location with high visibility and accessibility.
- N. Self-Adhesive Labels:
 - 1. On each item, install unique designation label that is consistent with wiring diagrams, schedules, and operation and maintenance manual.
 - 2. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on 1-1/2-inch-high label; where two lines of text are required, use labels 2 inches high.
- O. Heat-Shrink, Preprinted Tubes: Secure tight to surface at a location with high visibility and accessibility.
- P. Marker Tapes: Secure tight to surface at a location with high visibility and accessibility.
- Q. Self-Adhesive Vinyl Tape: Secure tight to surface at a location with high visibility and accessibility.
 - 1. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding.
- R. Tape and Stencil: Comply with requirements in painting Sections for surface preparation and paint application.
- S. Floor Marking Tape: Apply stripes to finished surfaces following manufacturer's written instructions.
- T. Underground Line Warning Tape:
 - 1. During backfilling of trenches, install continuous underground-line warning tape directly above cable or raceway at 6 to 8 inches below finished grade. Use multiple tapes where width of multiple lines installed in a common trench or concrete envelope exceeds 16 inches overall.
 - 2. Limit use of underground-line warning tape to direct-buried cables.
 - 3. Install underground-line warning tape for direct-buried cables and cables in raceways.
- U. Metal Tags:
 - 1. Secure using plenum-rated cable ties.
- V. Nonmetallic Preprinted Tags:
 - 1. Secure using plenum-rated cable ties.
- W. Write-on Tags:
 - 1. Place in a location with high visibility and accessibility.
 - 2. Secure using general-purpose cable ties.
- X. Baked-Enamel Signs:
 - 1. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.

2. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on minimum 1-1/2-inch-high sign; where two lines of text are required, use signs minimum 2 inches high.
- Y. Laminated Acrylic or Melamine Plastic Signs:
1. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
 2. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on 1-1/2-inch-high sign; where two lines of text are required, use labels 2 inches high.
- 3.3 IDENTIFICATION SCHEDULE
- A. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment. Install access doors or panels to provide view of identifying devices.
 - B. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, pull points, and locations of high visibility. Identify by system and circuit designation.
 - C. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use vinyl wraparound labels to identify the phase.
 1. Locate identification at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
 - D. Power-Circuit Conductor Identification, More Than 600 V: For conductors in vaults, pull and junction boxes, manholes, and handholes, use nonmetallic preprinted tags colored and marked to indicate phase, and a separate tag with the circuit designation.
 - E. Control-Circuit Conductor Identification: For conductors and cables in pull and junction boxes, manholes, and handholes, use self-adhesive labels with the conductor or cable designation, origin, and destination.
 - F. Control-Circuit Conductor Termination Identification: For identification at terminations, provide self-adhesive labels with the conductor designation.
 - G. Conductors to Be Extended in the Future: Attach marker tape to conductors and list source.
 - H. Locations of Underground Lines: Underground-line warning tape for power, lighting, communication, and control wiring and optical-fiber cable.
 - I. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Self-adhesive labels.
 1. Apply to exterior of door, cover, or other access.
 2. For equipment with multiple power or control sources, apply to door or cover of equipment, including, but not limited to, the following:
 - a. Power-transfer switches.
 - b. Controls with external control power connections.
 - J. Arc Flash Warning Labeling: Self-adhesive labels. Secure on all:
 - a. Panelboards
 - b. Switchboards
 - c. Motor-control centers
 - K. Operating Instruction Signs: Self-adhesive labels.
 - L. Emergency Operating Instruction Signs: Self-adhesive labels with white legend on a red background with minimum 3/8-inch-high letters for emergency instructions at equipment used for power transfer.
 - M. Equipment Identification Labels:
 1. Indoor Equipment: Laminated acrylic or melamine plastic sign.
 2. Outdoor Equipment: Laminated acrylic or melamine sign.
 3. Equipment to Be Labeled:
 - a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be in the form of a self-adhesive, engraved, laminated acrylic or melamine label.
 - b. Enclosures and electrical cabinets.
 - c. Access doors and panels for concealed electrical items.
 - d. Switchboards.
 - e. Motor-control centers.

- f. Enclosed switches.
- g. Enclosed controllers.
- h.

END OF SECTION 26 0553

**SECTION 26 0923
LIGHTING CONTROL DEVICES**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Division 26 Common Work Results for Electrical and Common Electrical Materials and Methods section apply to work specified in this is section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Indoor occupancy and vacancy sensors.
- B. Related Requirements:
 - 1. Section 262726 "Wiring Devices" for wall-box dimmers, non-networkable wall-switch occupancy sensors, and manual light switches.

1.3 SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings:
 - 1. Show installation details for the following:
 - a. Occupancy sensors.
 - b. Vacancy sensors.
 - 2. Interconnection diagrams showing field-installed wiring.
 - 3. Include diagrams for power, signal, and control wiring.

1.4 CLOSEOUT DOCUMENTS

- A. Operation and Maintenance Data: For each type of lighting control device to include in operation and maintenance manuals.

1.5 WARRANTY

- A. Manufacturer's Warranty: Manufacturer and Installer agree to repair or replace lighting control devices that fail(s) in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Faulty operation of lighting control software.
 - b. Faulty operation of lighting control devices.
 - 2. Warranty Period: Two year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 INDOOR OCCUPANCY AND VACANCY SENSORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Cooper Industries, Inc.
 - 2. Leviton Manufacturing Co., Inc.
 - 3. Lithonia Lighting; Acuity Brands Lighting, Inc.
 - 4. Lutron Electronics Co., Inc.
 - 5. Sensor Switch, Inc.
 - 6. WattStopper; a Legrand® Group brand.
- B. General Requirements for Sensors:
 - 1. Wall or Ceiling-mounted, solid-state indoor occupancy and vacancy sensors.
 - 2. Dual technology.
 - 3. Separate power pack.
 - 4. Hardwired and Wireless connection to switchpower pack.
 - 5. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

6. Operation:
 - a. Occupancy Sensor: Unless otherwise indicated, turn lights on when coverage area is occupied, and turn them off when unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
 - b. Vacancy Sensor: Unless otherwise indicated, lights are manually turned on and sensor turns lights off when the room is unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
 - c. Combination Sensor: Unless otherwise indicated, sensor shall be programmed to turn lights on when coverage area is occupied and turn them off when unoccupied, or to turn off lights that have been manually turned on; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
7. Sensor Output: Contacts rated to operate the connected relay, complying with UL 773A.
8. Power Pack: Dry contacts rated for 20-A LEDload at 120- and 277-V ac, for 13-A tungsten at 120-V ac, and for 1 hp at 120-V ac. Sensor has 24-V dc, 150-mA, Class 2 power source, as defined by NFPA 70.
9. Mounting:
 - a. Sensor: Suitable for mounting in any position on a standard outlet box.
 - b. Relay: Externally mounted through a 1/2-inch knockout in a standard electrical enclosure.
 - c. Time-Delay and Sensitivity Adjustments: Recessed and concealed behind hinged door.
10. Indicator: Digital display, to show when motion is detected during testing and normal operation of sensor.
11. Bypass Switch: Override the "on" function in case of sensor failure.
- C. Dual-Technology Type: Wall or Ceiling mounted; detect occupants in coverage area using PIR and ultrasonic detection methods. The particular technology or combination of technologies that control on-off functions is selectable in the field by operating controls on unit.
 1. Sensitivity Adjustment: Separate for each sensing technology.
 2. Detector Sensitivity: Detect occurrences of 6-inch-minimum movement of any portion of a human body that presents a target of not less than 36 sq. in., and detect a person of average size and weight moving not less than 12 inches in either a horizontal or a vertical manner at an approximate speed of 12 inches/s.
 3. Detection Coverage (Standard Room): Detect occupancy anywhere within a circular area of 1000 sq. ft. when mounted on a 96-inch-high ceiling.
 4. Detection Coverage (Room, Wall Mounted): Detect occupancy anywhere within a 180-degree pattern centered on the sensor over an area of 2000 square feet 3000 square feet when mounted 48 inches above finished floor.

2.2 CONDUCTORS AND CABLES

- A. Power Wiring to Supply Side of Remote-Control Power Sources: Not smaller than No. 12 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- B. Classes 2 and 3 Control Cable: Multiconductor cable with copper conductors not smaller than No. 18 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine lighting control devices before installation. Reject lighting control devices that are wet, moisture damaged, or mold damaged.
- B. Examine walls and ceilings for suitable conditions where lighting control devices will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SENSOR INSTALLATION

- A. Comply with NECA 1.
- B. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, smoke detectors, fire-suppression systems, and partition assemblies.
- C. Install and aim sensors in locations to achieve not less than 90-percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's written instructions.

3.3 CONTACTOR INSTALLATION

- A. Comply with NECA 1.
- B. Mount electrically held lighting contactors with elastomeric isolator pads to eliminate structure-borne vibration unless contactors are installed in an enclosure with factory-installed vibration isolators.

3.4 WIRING INSTALLATION

- A. Comply with NECA 1.
- B. Wiring Method: Comply with Section 260519 "Low-Voltage Electrical Power Conductors and Cables." Minimum conduit size is 1/2 inch.
- C. Wiring within Enclosures: Comply with NECA 1. Separate power-limited and nonpower-limited conductors according to conductor manufacturer's written instructions.
- D. Size conductors according to lighting control device manufacturer's written instructions unless otherwise indicated.
- E. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

3.5 IDENTIFICATION

- A. Identify components and power and control wiring according to Section 260553 "Identification for Electrical Systems."
 - 1. Identify controlled circuits in lighting contactors.
 - 2. Identify circuits or luminaires controlled by photoelectric and occupancy sensors at each sensor.
- B. Label time switches and contactors with a unique designation.

3.6 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- B. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
 - 1. Operational Test: After installing time switches and sensors, and after electrical circuitry has been energized, start units to confirm proper unit operation.
 - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- C. Lighting control devices will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

3.7 ADJUSTING

- A. Occupancy Adjustments: When requested within **12 months** from date of Substantial Completion, provide on-site assistance in adjusting lighting control devices to suit actual occupied conditions. Provide up to **four (4) visits** to Project during 12 month period immediate following substantial completion.
 - 1. For occupancy and motion sensors, verify operation at outer limits of detector range. Set time delay to suit Owner's operations.
 - 2. For daylighting controls, adjust set points and deadband controls to suit Owner's operations.
 - 3. Align high-bay occupancy sensors using manufacturer's laser aiming tool.

3.8 DEMONSTRATION

- A. Engage a factory-authorized service representative to train] Owner's maintenance personnel to adjust, operate, and maintain lighting control devices.

END OF SECTION 26 0923

**SECTION 26 2726
WIRING DEVICES**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Division 26 Common Work Results for Electrical and Common Electrical Materials and Methods section apply to work specified in this is section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Standard-grade receptacles, 125 V, 20 A.
 - 2. GFCI receptacles, 125 V, 20 A.
 - 3. Toggle switches, 120/277 V, 20 A.
 - 4. Occupancy sensors.
 - 5. Wall-box dimmers.
 - 6. Wall plates.

1.3 DEFINITIONS

- A. AFCI: Arc-fault circuit interrupter.
- B. BAS: Building automation system.
- C. EMI: Electromagnetic interference.
- D. GFCI: Ground-fault circuit interrupter.
- E. Pigtail: Short lead used to connect a device to a branch-circuit conductor.
- F. RFI: Radio-frequency interference.

1.4 SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.
- C. Samples: One for each type of device and wall plate specified, in each color specified.

1.5 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing-label warnings and instruction manuals that include labeling conditions.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Floor Service-Outlet Assemblies: Provide one cover for every 10, but no fewer than one. Provide a minimum of one entire assembly.

PART 2 - PRODUCTS

2.1 GENERAL WIRING-DEVICE REQUIREMENTS

- A. Wiring Devices, Components, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
- B. Comply with NFPA 70.
- C. RoHS compliant.
- D. Comply with NEMA WD 1.
- E. Devices that are manufactured for use with modular plug-in connectors may be substituted under the following conditions:

1. Connectors shall comply with UL 2459 and shall be made with stranding building wire.
 2. Devices shall comply with requirements in this Section.
- F. Devices for Owner-Furnished Equipment:
1. Receptacles: Match plug configurations.
 2. Cord and Plug Sets: Match equipment requirements.
- G. Device Color:
1. Wiring Devices Connected to Normal Power System: As selected by Architect unless otherwise indicated or required by NFPA 70 or device listing.
 2. Wiring Devices Connected to Essential Electrical System: Red.
- H. Wall Plate Color: For plastic covers, match device color.
- I. Source Limitations: Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

2.2 STANDARD-GRADE RECEPTACLES, 125 V, 20 A

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Eaton (Arrow Hart).
 2. Hubbell Incorporated; Wiring Device-Kellems.
 3. Leviton Manufacturing Co., Inc.
 4. Pass & Seymour/Legrand (Pass & Seymour).
- B. Duplex Receptacles, 125 V, 20 A:
1. Description: Two pole, three wire, and self-grounding.
 2. Configuration: NEMA WD 6, Configuration 5-20R.
 3. Standards: Comply with UL 498 and FS W-C-596.
- C. Tamper-Resistant Duplex Receptacles, 125 V, 20 A:
1. Description: Two pole, three wire, and self-grounding. Integral shutters that operate only when a plug is inserted in the receptacle.
 2. Configuration: NEMA WD 6, Configuration 5-20R.
 3. Standards: Comply with UL 498 and FS W-C-596.
 4. Marking: Listed and labeled as complying with NFPA 70, "Tamper-Resistant Receptacles" Article.
- D. Weather-Resistant Duplex Receptacle, 125 V, 20 A:
1. Description: Two pole, three wire, and self-grounding. Integral shutters that operate only when a plug is inserted in the receptacle. Square face.
 2. Configuration: NEMA WD 6, Configuration 5-20R.
 3. Standards: Comply with UL 498.
 4. Marking: Listed and labeled as complying with NFPA 70, "Receptacles in Damp or Wet Locations" Article.
- E. Tamper- and Weather-Resistant Duplex Receptacles, 125 V, 20 A:
1. Description: Two pole, three wire, and self-grounding. Integral shutters that operate only when a plug is inserted in the receptacle. Square face.
 2. Configuration: NEMA WD 6, Configuration 5-20R.
 3. Standards: Comply with UL 498.
 4. Marking: Listed and labeled as complying with NFPA 70, "Tamper-Resistant Receptacles" and "Receptacles in Damp or Wet Locations" articles.

2.3 GFCI RECEPTACLES, 125 V, 20 A

- A. Duplex GFCI Receptacles, 125 V, 20 A:
1. Description: Integral GFCI with "Test" and "Reset" buttons and LED indicator light. Two pole, three wire, and self-grounding.
 2. Configuration: NEMA WD 6, Configuration 5-20R.
 3. Type: Feed through.
 4. Standards: Comply with UL 498, UL 943 Class A, and FS W-C-596.
- B. Tamper-Resistant Duplex GFCI Receptacles, 125 V, 20 A:

1. Description: Integral GFCI with "Test" and "Reset" buttons and LED indicator light. Two pole, three wire, and self-grounding. Integral shutters that operate only when a plug is inserted in the receptacle.
 2. Configuration: NEMA WD 6, Configuration 5-20R.
 3. Type: Feed through.
 4. Standards: Comply with UL 498, UL 943 Class A, and FS W-C-596.
 5. Marking: Listed and labeled as complying with NFPA 70, "Tamper-Resistant Receptacles" Article.
- C. Tamper- and Weather-Resistant, GFCI Duplex Receptacles, 125 V, 20 A:
1. Description: Integral GFCI with "Test" and "Reset" buttons and LED indicator light. Two pole, three wire, and self-grounding. Integral shutters that operate only when a plug is inserted in the receptacle. Square face.
 2. Configuration: NEMA WD 6, Configuration 5-15R.
 3. Type: Feed through.
 4. Standards: Comply with UL 498 and UL 943 Class A.
 5. Marking: Listed and labeled as complying with NFPA 70, "Tamper-Resistant Receptacles" and "Receptacles in Damp or Wet Locations" articles.

2.4 TOGGLE SWITCHES, 120/277 V, 20 A

- A. Single-Pole Switches, 120/277 V, 20 A:
1. Standards: Comply with UL 20 and FS W-S-896.
- B. Two-Pole Switches, 120/277 V, 20 A:
1. Comply with UL 20 and FS W-S-896.
- C. Three-Way Switches, 120/277 V, 20 A:
1. Comply with UL 20 and FS W-S-896.
- D. Four-Way Switches, 120/277 V, 20 A:
1. Standards: Comply with UL 20 and FS W-S-896.

2.5 OCCUPANCY SENSORS

- A. Wall Switch Sensor Light Switch, Dual Technology:
1. Description: Switchbox-mounted, combination lighting-control sensor and conventional switch lighting-control unit using dual (ultrasonic and passive infrared) technology.
 2. Standards: Comply with UL 20.
 3. Rated 960 W at 120 V ac for tungsten lighting, 10 A at 120 V ac or 10 A at 277 V ac for fluorescent or LED lighting, and 1/4 hp at 120 V ac.
 4. Adjustable time delay of 20 minutes.
 5. Able to be locked to Automatic or Manual-On mode.
 6. Automatic Light-Level Sensor: Adjustable from 2 to 200 fc.
 7. Connections: Provisions for connection to BAS.
 8. Connections: RJ-45 communications outlet.
 9. Connections: Integral wireless networking.

2.6 DIMMERS

- A. Wall-Box Dimmers:
1. Description: Modular, full-wave, solid-state dimmer switch with integral, quiet on-off switches, with audible frequency and EMI/RFI suppression filters.
 2. Control: Continuously adjustable slider; with single-pole or three-way switching.
 3. Standards: Comply with UL 1472.
 4. LED Lamp Dimmer Switches: Modular; compatible with LED lamps; trim potentiometer to adjust low-end dimming; capable of consistent dimming with low end not greater than 20 percent of full brightness. 0-10V control without the use of an additional supply.

2.7 WALL PLATES

- A. Single Source: Obtain wall plates from same manufacturer of wiring devices.
- B. Single and combination types shall match corresponding wiring devices.

1. Plate-Securing Screws: Metal with head color to match plate finish.
 2. Material for Finished Spaces: Smooth, high-impact thermoplastic.
 3. Material for Unfinished Spaces: Galvanized steel.
 4. Material for Damp Locations: Cast aluminum with spring-loaded lift cover, and listed and labeled for use in wet and damp locations.
- C. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with Type 3R, weather-resistant, die-cast aluminum with lockable cover.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with NECA 1, including mounting heights listed in that standard, unless otherwise indicated.
- B. Coordination with Other Trades:
1. Protect installed devices and their boxes. Do not place wall finish materials over device boxes, and do not cut holes for boxes with routers that are guided by riding against outside of boxes.
 2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
 3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
 4. Install wiring devices after all wall preparation, including painting, is complete.
- C. Conductors:
1. Do not strip insulation from conductors until right before they are spliced or terminated on devices.
 2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
 3. The length of free conductors at outlets for devices shall comply with NFPA 70, Article 300, without pigtails.
 4. Existing Conductors:
 - a. Cut back and pigtail, or replace all damaged conductors.
 - b. Straighten conductors that remain and remove corrosion and foreign matter.
 - c. Pigtailing existing conductors is permitted, provided the outlet box is large enough.
- D. Device Installation:
1. Replace devices that have been in temporary use during construction and that were installed before building finishing operations were complete.
 2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
 3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
 4. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.
 5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, two-thirds to three-fourths of the way around terminal screw.
 6. Use a torque screwdriver when a torque is recommended or required by manufacturer.
 7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
 8. Tighten unused terminal screws on the device.
 9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.
- E. Receptacle Orientation:
1. Install ground pin of vertically mounted receptacles up, and on horizontally mounted receptacles to the right.
- F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.
- G. Dimmers:

1. Install dimmers within terms of their listing.
 2. Verify that dimmers used for fan-speed control are listed for that application.
 3. Install unshared neutral conductors on line and load side of dimmers according to manufacturers' device, listing conditions in the written instructions.
- H. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.
- I. Adjust locations of floor service outlets and service poles to suit arrangement of partitions and furnishings.

3.2 GFCI RECEPTACLES

- A. Install non-feed-through GFCI receptacles.

3.3 IDENTIFICATION

- A. Comply with Section 260553 "Identification for Electrical Systems."
- B. Identify each receptacle with panelboard identification and circuit number. Use preprinted tape label (PTouch) machine printing with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.
- C. Essential Electrical System: Mark receptacles supplied from the essential electrical system to allow easy identification using a self-adhesive label.

3.4 FIELD QUALITY CONTROL

- A. Test Instruments: Use instruments that comply with UL 1436.
- B. Test Instrument for Receptacles: Digital wiring analyzer with digital readout or illuminated digital-display indicators of measurement.
- C. Perform the following tests and inspections:
1. Test Instruments: Use instruments that comply with UL 1436.
 2. Test Instrument for Receptacles: Digital wiring analyzer with digital readout or illuminated digital-display indicators of measurement.
- D. Tests for Receptacles:
1. Line Voltage: Acceptable range is 105 to 132 V.
 2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is unacceptable.
 3. Ground Impedance: Values of up to 2 ohms are acceptable.
 4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
 5. Using the test plug, verify that the device and its outlet box are securely mounted.
 6. Tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault-current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.
- E. Wiring device will be considered defective if it does not pass tests and inspections.
- F. Prepare test and inspection reports.

END OF SECTION 26 2726

**SECTION 26 2813
FUSES**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Division 26 Common Work Results for Electrical and Common Electrical Materials and Methods section apply to work specified in this is section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Cartridge fuses rated 600 V ac and less for use in the following:
 - a. Control circuits.
 - b. Switchboards.
 - c. Enclosed controllers.
 - d. Enclosed switches.
 - 2. Spare-fuse cabinets.

1.3 SUBMITTALS

- A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for spare-fuse cabinets. Include the following for each fuse type indicated:
 - 1. Ambient Temperature Adjustment Information: If ratings of fuses have been adjusted to accommodate ambient temperatures, provide list of fuses with adjusted ratings.
 - a. For each fuse having adjusted ratings, include location of fuse, original fuse rating, local ambient temperature, and adjusted fuse rating.
 - b. Provide manufacturer's technical data on which ambient temperature adjustment calculations are based.
 - 2. Dimensions and manufacturer's technical data on features, performance, electrical characteristics, and ratings.
 - 3. Current-limitation curves for fuses with current-limiting characteristics.
 - 4. Time-current coordination curves (average melt) and current-limitation curves (instantaneous peak let-through current) for each type and rating of fuse. Submit in PDF format.
 - 5. Coordination charts and tables and related data.
 - 6. Fuse sizes for elevator feeders and elevator disconnect switches.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For fuses to include in emergency, operation, and maintenance manuals. In addition to items specified in Section 017700 "Closeout Procedures," include the following:
 - 1. Ambient temperature adjustment information.
 - 2. Current-limitation curves for fuses with current-limiting characteristics.
 - 3. Time-current coordination curves (average melt) and current-limitation curves (instantaneous peak let-through current) for each type and rating of fuse used on the Project. Submit in PDF format.
 - 4. Coordination charts and tables and related data.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Fuses: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.

1.6 FIELD CONDITIONS

- A. Where ambient temperature to which fuses are directly exposed is less than 40 deg F or more than 100 deg F, apply manufacturer's ambient temperature adjustment factors to fuse ratings.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Bussmann, an Eaton business.
 - 2. Edison; a brand of Bussmann by Eaton.
 - 3. Littelfuse, Inc.
 - 4. Mersen USA.
- B. Source Limitations: Obtain fuses, for use within a specific product or circuit, from single source from single manufacturer.

2.2 CARTRIDGE FUSES

- A. Characteristics: NEMA FU 1, current-limiting, nonrenewable cartridge fuses with voltage ratings consistent with circuit voltages.
 - 1. Type RK-1: 250 or 600-V, zero- to 600-A rating, 200 kAIC, time delay.
 - 2. Type RK-5: 250 or 600-V, zero- to 600-A rating, 200 kAIC, time delay.
 - 3. Type CC: 600-V, zero- to 30-A rating, 200 kAIC, time delay.
 - 4. Type CD: 600-V, 31- to 60-A rating, 200 kAIC, time delay.
 - 5. Type J: 600-V, zero- to 600-A rating, 200 kAIC, time delay.
 - 6. Type T: 250-V, zero- to 1200-A or 600-V, zero- to 800-A rating, 200 kAIC, time delay.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Comply with NEMA FU 1 for cartridge fuses.
- D. Comply with NFPA 70.
- E. Coordinate fuse ratings with utilization equipment nameplate limitations of maximum fuse size and with system short-circuit current levels.

2.3 SPARE-FUSE CABINET

- A. Characteristics: Wall-mounted steel unit with full-length, recessed piano-hinged door and key-coded cam lock and pull.
 - 1. Size: Adequate for storage of spare fuses specified with 10 percent spare capacity minimum.
 - 2. Finish: Gray, baked enamel.
 - 3. Identification: "SPARE FUSES" in 1-1/2-inch- (38-mm-) high letters on exterior of door.
 - 4. Fuse Pullers: For each size of fuse, where applicable and available, from fuse manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine fuses before installation. Reject fuses that are moisture damaged or physically damaged.
- B. Examine holders to receive fuses for compliance with installation tolerances and other conditions affecting performance, such as rejection features.
- C. Examine utilization equipment nameplates and installation instructions. Install fuses of sizes and with characteristics appropriate for each piece of equipment.
- D. Evaluate ambient temperatures to determine if fuse rating adjustment factors must be applied to fuse ratings.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 FUSE APPLICATIONS

- A. Cartridge Fuses:

1. Service Entrance: Class L, time delay.
2. Feeders: Class RK1.
3. Motor Branch Circuits: Class RK5, time delay.

3.3 INSTALLATION

- A. Install fuses in fusible devices. Arrange fuses so rating information is readable without removing fuse.
- B. Install spare-fuse cabinet(s) in location shown on the Drawings or as indicated in the field by Project Manager.

3.4 IDENTIFICATION

- A. Install labels complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems" and indicating fuse replacement information inside of door of each fused switch and adjacent to each fuse block, socket, and holder.

END OF SECTION 26 2813

**SECTION 26 2816
ENCLOSED SWITCHES AND CIRCUIT BREAKERS**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- B. Division 26 Common Work Results for Electrical and Common Electrical Materials and Methods section apply to work specified in this is section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Fusible switches.
 - 2. Nonfusible switches.
 - 3. Enclosures.

1.3 DEFINITIONS

- A. NC: Normally closed.
- B. NO: Normally open.
- C. SPDT: Single pole, double throw.

1.4 SUBMITTALS

- A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include nameplate ratings, dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.
 - 1. Enclosure types and details for types other than NEMA 250, Type 1.
 - 2. Current and voltage ratings.
 - 3. Short-circuit current ratings (interrupting and withstand, as appropriate).
 - 4. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices, accessories, and auxiliary components.
 - 5. Include time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device. Provide in PDF electronic format.
- B. Shop Drawings: For enclosed switches and circuit breakers.
 - 1. Include plans, elevations, sections, details, and attachments to other work.
 - 2. Include wiring diagrams for power, signal, and control wiring.

1.5 CLOSEOUT DOCUMENTS

- A. Operation and Maintenance Data: For enclosed switches and circuit breakers to include in emergency, operation, and maintenance manuals.
 - 1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
 - a. Manufacturer's written instructions for testing and adjusting enclosed switches and circuit breakers.
 - b. Time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device. Provide in PDF electronic format.

1.6 MAINTENANCE MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Fuses: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.
 - 2. Fuse Pullers: Two for each size and type.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:
 - 1. Ambient Temperature: Not less than minus 22 deg F and not exceeding 104 deg F.
 - 2. Altitude: Not exceeding 6600 feet.

1.8 WARRANTY

- A. Manufacturer's Warranty: Manufacturer and Installer agree to repair or replace components that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: One year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single manufacturer.
- B. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
- D. Comply with NFPA 70.

2.2 FUSIBLE SWITCHES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. ABB Inc.
 - 2. Eaton.
 - 3. General Electric Company.
 - 4. Siemens Industry, Inc., Energy Management Division.
 - 5. Square D; by Schneider Electric.
- B. Type HD, Heavy Duty:
 - 1. Single throw.
 - 2. Three pole.
 - 3. 240 or 600-V ac.
 - 4. 1200 A and smaller.
 - 5. UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate indicated fuses.
 - 6. Lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- C. Accessories:
 - 1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
 - 2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
 - 3. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.
 - 4. Lugs: Mechanical type, suitable for number, size, and conductor material.
 - 5. Service-Rated Switches: Labeled for use as service equipment. Provide as indicated on drawings.

2.3 NONFUSIBLE SWITCHES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton.
 2. General Electric Company.
 3. Siemens Industry, Inc., Energy Management Division.
 4. Square D; by Schneider Electric.
- B. Type HD, Heavy Duty, Three Pole, Single Throw, 240 or 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- C. Accessories:
1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
 2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors..
 3. Lugs: Mechanical type, suitable for number, size, and conductor material.
 4. Service-Rated Switches: Labeled for use as service equipment. Provide as indicated on drawings.

2.4 ENCLOSURES

- A. Enclosed Switches and Circuit Breakers: UL 489, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.
- B. Enclosure Finish: The enclosure shall be gray baked enamel paint, electrodeposited on cleaned, phosphatized galvanized steel.
- C. Conduit Entry: Knock-outs for Type 1 and threaded hubs for Type 3R and Stainless Steel Type 4X.
- D. Operating Mechanism: The circuit-breaker operating handle shall be directly operable through the dead front trim of the enclosure. The cover interlock mechanism shall have an externally operated override. The override shall not permanently disable the interlock mechanism, which shall return to the locked position once the override is released. The tool used to override the cover interlock mechanism shall not be required to enter the enclosure in order to override the interlock.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
 1. Commencement of work shall indicate Installer's acceptance of the areas and conditions as satisfactory.

3.2 PREPARATION

- A. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:
 1. Notify Architect and Project Manager no fewer than 2 weeks (ten working days) in advance of proposed interruption of electric service.
 2. Indicate method of providing temporary electric service.
 3. Do not proceed with interruption of electric service without Project Manager's written permission.
 4. Comply with NFPA 70E.

3.3 ENCLOSURE ENVIRONMENTAL RATING APPLICATIONS

- A. Enclosed Switches and Circuit Breakers: Provide enclosures at installed locations with the following environmental ratings.
 1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.
 2. Outdoor Locations: NEMA 250, Type 3R Type 4X.
 3. Kitchen and Wash-Down Areas: NEMA 250, Type 4X, stainless steel.

3.4 INSTALLATION

- A. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
- B. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.
- C. Temporary Lifting Provisions: Remove temporary lifting of eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.
- D. Install fuses in fusible devices.
- E. Comply with NFPA 70 and NECA 1.

3.5 IDENTIFICATION

- A. Comply with requirements in Section 260553 "Identification for Electrical Systems."
 - 1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
 - 2. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.6 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections for Switches:
 - 1. Visual and Mechanical Inspection:
 - a. Inspect physical and mechanical condition.
 - b. Inspect anchorage, alignment, grounding, and clearances.
 - c. Verify that the unit is clean.
 - d. Verify blade alignment, blade penetration, travel stops, and mechanical operation.
 - e. Verify that fuse sizes and types match the Specifications and Drawings.
 - f. Verify that each fuse has adequate mechanical support and contact integrity.
 - g. Verify that operation and sequencing of interlocking systems is as described in the Specifications and shown on the Drawings.
 - h. Verify correct phase barrier installation.
 - i. Verify lubrication of moving current-carrying parts and moving and sliding surfaces.
- C. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.

3.7 ADJUSTING

- A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.
- B. Set field-adjustable circuit-breaker trip ranges as specified in Section 260573.16 "Coordination Studies."

END OF SECTION 26 2816

**SECTION 26 5119
LED INTERIOR LIGHTING**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Division 26 Common Work Results for Electrical and Common Electrical Materials and Methods section apply to work specified in this is section.

1.2 SUMMARY

- A. Section includes:
 - 1. Interior LED luminaries, lamps, and drivers.
 - 2. Luminaire supports.
- B. Related Requirements:
 - 1. Section 260923 "Lighting Control Devices" for automatic control of lighting, including time switches, photoelectric relays, occupancy sensors, and multipole lighting relays and contactors.

1.3 DEFINITIONS

- A. CCT: Correlated color temperature.
- B. CRI: Color Rendering Index.
- C. Fixture: See "Luminaire."
- D. IP: International Protection or Ingress Protection Rating.
- E. LED: Light-emitting diode.
- F. Lumen: Measured output of lamp and luminaire, or both.
- G. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.4 SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Arrange in order of luminaire designation.
 - 2. Include data on features, accessories, and finishes.
 - 3. Include physical description and dimensions of luminaires.
 - 4. Include emergency lighting units, including batteries and chargers.
 - 5. Include life, output (lumens, CCT, and CRI), and energy-efficiency data.
 - 6. Photometric data and adjustment factors based on laboratory tests, complying with IES "Lighting Measurements Testing and Calculation Guides" for each luminaire type. The adjustment factors shall be for lamps and accessories identical to those indicated for the luminaire as applied in this Project.
 - a. Manufacturers' Certified Data: Photometric data certified by manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.
 - b. Testing Agency Certified Data: For indicated luminaires, photometric data certified by a qualified independent testing agency. Photometric data for remaining luminaires shall be certified by manufacturer.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For luminaires and lighting systems to include in operation and maintenance manuals.
 - 1. Provide a list of all luminaire types used on Project; use ANSI and manufacturers' codes.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Drivers: One for every 10 of each type installed. Furnish at least one of each type.

2. Diffusers and Lenses: One for every 100 of each type and rating installed. Furnish at least one of each type.

1.7 QUALITY ASSURANCE

- A. Luminaire Photometric Data Testing Laboratory Qualifications: Luminaire manufacturer's laboratory that is accredited under the NVLAP for Energy Efficient Lighting Products.
- B. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by an independent agency, with the experience and capability to conduct the testing indicated, that is an NRTL as defined by OSHA in 29 CFR 1910.7, accredited under the NVLAP for Energy Efficient Lighting Products, and complying with the applicable IES testing standards.
- C. Provide luminaires from a single manufacturer for each luminaire type.
- D. Each luminaire type shall be binned within a three-step MacAdam Ellipse to ensure color consistency among luminaires.
 1. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- E. CRI of 80. CCT :
 1. 3000-3500K for Private spaces including sleeping rooms or similar.
 2. 4000K for Academic or office building types.
- F. Rated lamp life of 35,000 (minimum) hours.
- G. Drivers shall be dimmable from 100 percent to 10 percent of maximum light output with 0-10V input signal.
- H. Driver shall be accessible when ceiling is finished without the use of an access panel.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Protect finishes of exposed surfaces by applying a strippable, temporary protective covering before shipping.

1.9 WARRANTY

- A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.
- B. Warranty Period: Five year(s) minimum from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide product or its listed engineer's approved equivalent product indicated on drawings.

2.2 LUMINAIRE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Recessed luminaires shall comply with NEMA LE 4.
- C. NRTL Compliance: Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by an NRTL.
- D. FM Global Compliance: Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by FM Global.

2.3 MATERIALS

- A. Metal Parts:
 1. Free of burrs and sharp corners and edges.
 2. Sheet metal components shall be steel unless otherwise indicated.
 3. Form and support to prevent warping and sagging.
- B. Diffusers:
 1. Prismatic
 2. Acrylic Diffusers: One hundred percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

3. Lens Thickness: At least 0.125 inch (3.175 mm) minimum unless otherwise indicated.
- C. Housings: Refer to Lighting Fixture Schedule on Drawings.

2.4 METAL FINISHES

- A. Variations in finishes are unacceptable in the same piece. Variations in finishes of adjoining components are acceptable if they are within the range of approved Samples and if they can be and are assembled or installed to minimize contrast.

2.5 LUMINAIRE SUPPORT

- A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.
- B. Single-Stem Hangers: 1/2-inch steel tubing with swivel ball fittings and ceiling canopy. Finish same as luminaire.
- C. Wires: ASTM A 641/A 641 M, Class 3, soft temper, zinc-coated steel, 12 gage.
- D. Rod Hangers: 3/16-inch minimum diameter, cadmium-plated, threaded steel rod.
- E. Hook Hangers: Integrated assembly matched to luminaire, line voltage, and equipment with threaded attachment, cord, and locking-type plug.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for luminaire to verify actual locations of luminaire and electrical connections before luminaire installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with NECA 1.
- B. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.
- C. Install drivers for each luminaire.
- D. Supports:
1. All fixtures to be supported securely from building structure and/or walls and the responsibility for mounting same shall be that of this Contractor.
 - a. Where surface mounted fixtures are mounted from "lay-in" type ceilings, the fixtures shall be supported independent of respective lay-in panel channel support system and fastened to the building structural system. Support from a minimum of 2-diagonally opposite corners.
 - b. Wall mounted fluorescent fixtures to have additional 1/4" toggle bolt (or equivalent) support at each end of module.
 2. Sized and rated for luminaire weight.
 3. Able to maintain luminaire position after cleaning.
 4. Provide support for luminaire without causing deflection of ceiling or wall.
 5. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and a vertical force of 400 percent of luminaire weight.
- E. Flush-Mounted Luminaires:
1. Attached to ceiling structural members from a minimum of 2-diagonally opposite corners.
 2. Trim ring flush with finished surface.
- F. Wall-Mounted Luminaires:
1. Attached using through bolts and backing plates on either side of wall.
 2. Do not attach luminaires directly to gypsum board for structural support.
- G. Suspended Luminaires:
1. Ceiling Mount Options:
 - a. Two 5/32-inch- diameter aircraft cable supports adjustable to 10 feet in length or as specified on drawings.

- b. Pendant mount with 5/32-inch- diameter aircraft cable supports adjustable to 10 feet in length or as specified on drawings.
 - c. Hook mount.
 - 2. Pendants and Rods: Where longer than 48 inches, brace to limit swinging.
 - 3. Stem-Mounted, Single-Unit Luminaires: Suspend with twin-stem hangers. Support with approved outlet box and accessories that hold stem and provide damping of luminaire oscillations. Support outlet box vertically to building structure using approved devices.
 - 4. Continuous Rows of Luminaires: Use tubing or stem for wiring at one point and wire support for suspension for each unit length of luminaire chassis, including one at each end.
 - 5. Do not use ceiling grid as support for pendant luminaires. Connect support wires or rods to building structure.
- H. Ceiling-Grid-Mounted Luminaires:
 - 1. Secure to any required outlet box.
 - 2. Secure luminaire to the luminaire opening using approved fasteners in a minimum of four locations, spaced near corners of luminaire.
 - 3. Use approved devices and support components to connect luminaire to ceiling grid and building structure in a minimum of four locations, spaced near corners of luminaire.
- I. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables" for wiring connections.

3.3 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.4 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
 - 2. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.
- B. Luminaire will be considered defective if it does not pass operation tests and inspections.
- C. Prepare test and inspection reports.

3.5 STARTUP SERVICE

- A. Comply with requirements for startup of lighting controls for specialty lighting and lighting controls.

3.6 ADJUSTING

- A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting the direction of aim of luminaires to suit occupied conditions. Make up to two visits to Project during other-than-normal hours for this purpose. Some of this work may be required during hours of darkness.
 - 1. During adjustment visits, inspect all luminaires. Replace lamps or luminaires that are defective.
 - 2. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
 - 3. Adjust the aim of luminaires in the presence of the Architect

END OF SECTION 26 5119

**SECTION 26 5213
EMERGENCY AND EXIT LIGHTING**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Division 26 Common Work Results for Electrical and Common Electrical Materials and Methods section apply to work specified in this is section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Emergency lighting units.
 - 2. Exit signs.
 - 3. Luminaire supports.

1.3 DEFINITIONS

- A. CCT: Correlated color temperature.
- B. CRI: Color Rendering Index.
- C. Emergency Lighting Unit: A lighting unit with internal or external emergency battery powered supply and the means for controlling and charging the battery and unit operation.
- D. Lumen: Measured output of lamp and luminaire, or both.
- E. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.4 SUBMITTALS

- A. Product Data: For each type of emergency lighting unit, exit sign, and emergency lighting support.
 - 1. Include data on features, accessories, and finishes.
 - 2. Include physical description of the unit and dimensions.
 - 3. Battery and charger for light units.
 - 4. Include life, output of luminaire (lumens, CCT, and CRI), and energy-efficiency data.
 - 5. Include photometric data and adjustment factors based on laboratory tests, complying with IES LM-45, for each luminaire type.
 - a. Manufacturers' Certified Data: Photometric data certified by manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.

1.5 SUBMITTALS

- A. Qualification Data: For testing laboratory providing photometric data for luminaires.
- B. Product Certificates: For each type of luminaire.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For luminaires and lighting systems to include in emergency, operation, and maintenance manuals.
 - 1. Provide a list of all lamp types used on Project; use ANSI and manufacturers' codes.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Drivers: One for every 10 of each type and rating installed. Furnish at least one of each type.
 - 2. Luminaire-mounted, emergency battery pack: One for every 20 emergency lighting units. Furnish at least one of each type.
 - 3. Diffusers and Lenses: One for every 100 of each type and rating installed. Furnish at least one of each type.

4. Guards: One for every 20 of each type and rating installed. Furnish at least one of each type.
5. Self-contained/unitized fixture: One complete replacement for every 10 luminaires provided.

1.8 QUALITY ASSURANCE

- A. Luminaire Photometric Data Testing Laboratory Qualifications: Luminaire manufacturer's laboratory that is accredited under the National Volunteer Laboratory Accreditation Program for Energy Efficient Lighting Products.
- B. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by an independent agency, with the experience and capability to conduct the testing indicated, that is an NRTL as defined by OSHA in 29 CFR 1910.7, accredited under the National Volunteer Laboratory Accreditation Program for Energy Efficient Lighting Products, and complying with the applicable IES testing standards.
- C. FM Global Compliance: Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by FM Global.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Protect finishes of exposed surfaces by applying a strippable, temporary protective covering before shipping.

1.10 WARRANTY

- A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.
 1. Warranty Period: 5 year(s) minimum from date of Substantial Completion.
- B. Special Warranty for Emergency Lighting Batteries: Manufacturer's standard form in which manufacturer of battery-powered emergency lighting unit agrees to repair or replace components of rechargeable batteries that fail in materials or workmanship within specified warranty period.
 1. Warranty Period for Emergency Power Unit Batteries: Five years minimum from date of Substantial Completion. Full warranty shall apply for the entire warranty period.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR EMERGENCY LIGHTING

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. NRTL Compliance: Fabricate and label emergency lighting units, exit signs, and batteries to comply with UL 924.
- C. Comply with NFPA 70 and NFPA 101.
- D. Comply with NEMA LE 4 for recessed luminaires.
- E. Comply with UL 1598 for fluorescent luminaires.
- F. Lamp Base: Comply with ANSI C81.61 or IEC 60061-1.
- G. Bulb Shape: Complying with ANSI C79.1.
- H. Internal Type Emergency Power Unit: Self-contained, modular, battery-inverter unit, factory mounted within luminaire body.
 1. Emergency Connection: Operate one driver continuously at an output of minimum 1100 lumens each upon loss of normal power. Connect unswitched circuit to battery-inverter unit and switched circuit to luminaire ballast.
 2. Operation: Relay automatically turns lamp on when power-supply circuit voltage drops to 80 percent of nominal voltage or below. Lamp automatically disconnects from battery when voltage approaches deep-discharge level. When normal voltage is restored, relay disconnects driver from battery, and battery is automatically recharged and floated on charger.
 3. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:

- a. Ambient Temperature: Less than 0 deg F or exceeding 104 deg F, with an average value exceeding 95 deg F over a 24-hour period.
- b. Ambient Storage Temperature: Not less than minus 4 deg F and not exceeding 140 deg F.
- c. Humidity: More than 95 percent (condensing).
- d. Altitude: Exceeding 3300 feet.
- 4. Nightlight Connection: Operate driver continuously at 40 percent minimum of rated light output.
- 5. Test Push-Button and Indicator Light: Visible and accessible without opening luminaire or entering ceiling space.
 - a. Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
 - b. Indicator Light: LED indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.
- 6. Battery: Sealed, maintenance-free, nickel-cadmium type.
- 7. Charger: Fully automatic, solid-state, constant-current type with sealed power transfer relay.
- 8. Remote Test: Switch in handheld remote device aimed in direction of tested unit initiates coded infrared signal. Signal reception by factory-installed infrared receiver in tested unit triggers simulation of loss of its normal power supply, providing visual confirmation of either proper or failed emergency response.
- 9. Integral Self-Test: Factory-installed electronic device automatically initiates code-required test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and a flashing red LED.

2.2 EMERGENCY LIGHTING

- A. Refer to Electrical Drawings for interior luminaire schedule.
- B. Emergency lighting shall be provided for the following spaces listed below.
 - 1. Corridors: Generator/night light or battery if no generator is available.
 - 2. Stairs: 50% Battery with occupancy sensors to dim to 50% and 50% generator night light.
 - 3. Classrooms/lecture halls: 2x4's, 2x2's, downlights – integral battery. Specialty lighting or pendants separate emergency battery wallpack.

2.3 MATERIALS

- A. Metal Parts:
 - 1. Free of burrs and sharp corners and edges.
 - 2. Sheet metal components shall be steel unless otherwise indicated.
 - 3. Form and support to prevent warping and sagging.
- B. Doors, Frames, and Other Internal Access:
 - 1. Smooth operating, free of light leakage under operating conditions.
 - 2. Designed to permit relamping without use of tools.
 - 3. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.
- C. Diffusers and Globes:
 - 1. Prismatic glass or Prismatic acrylic.
 - 2. Acrylic: 100 percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
 - 3. Lens Thickness: At least 0.125 inch minimum unless otherwise indicated.
- D. Housings:
 - 1. Extruded aluminum housing and heat sink.
 - 2. Painted finish.

2.4 METAL FINISHES

- A. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.5 LUMINAIRE SUPPORT COMPONENTS

- A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.
- B. Support Wires: ASTM A 641/A 641M, Class 3, soft temper, zinc-coated steel, 12 gage.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for conditions affecting performance of luminaires.
- B. Examine roughing-in for luminaire to verify actual locations of luminaire and electrical connections before luminaire installation.
- C. Examine walls, floors, roofs, and ceilings for suitable conditions where emergency lighting luminaires will be installed.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with NECA 1.
- B. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.
- C. Install lamps in each luminaire.
- D. Supports:
 - 1. Sized and rated for luminaire and emergency power unit weight.
 - 2. Able to maintain luminaire position when testing emergency power unit.
 - 3. Provide support for luminaire and emergency power unit without causing deflection of ceiling or wall.
 - 4. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire and emergency power unit weight and vertical force of 400 percent of luminaire weight.
- E. Wall-Mounted Luminaire Support:
 - 1. Attached to structural members in walls.
 - 2. Do not attach luminaires directly to gypsum board.
- F. Suspended Luminaire Support:
 - 1. Pendants and Rods: Where longer than 48 inches, brace to limit swinging.
 - 2. Stem-Mounted, Single-Unit Luminaires: Suspend with twin-stem hangers. Support with approved outlet box and accessories that hold stem and provide damping of luminaire oscillations. Support outlet box vertically to building structure using approved devices.
 - 3. Continuous Rows of Luminaires: Use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of luminaire chassis, including one at each end.
 - 4. Do not use ceiling grid as support for pendant luminaires. Connect support wires or rods to building structure.
- G. Ceiling Grid Mounted Luminaires:
 - 1. Secure to any required outlet box.
 - 2. Secure emergency power unit using approved fasteners in a minimum of four locations, spaced near corners of emergency power unit.
 - 3. Use approved devices and support components to connect luminaire to ceiling grid and building structure in a minimum of four locations, spaced near corners of luminaire.

3.3 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.4 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.
- B. Luminaire will be considered defective if it does not pass operation tests and inspections.
- C. Prepare test and inspection reports.

3.5 STARTUP SERVICE

- A. Perform startup service:
 - 1. Charge emergency power units and batteries minimum of 24 hours and conduct 90 minute discharge test.

3.6 ADJUSTING

- A. Adjustments: Within 12 months of date of Substantial Completion, provide on-site visit to do the following:
 - 1. Inspect all luminaires. Replace lamps, emergency power units, batteries, signs, or luminaires that are defective.
 - a. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.

END OF SECTION 26 5213

SECTION 27 0000
GENERAL REQUIREMENTS FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. General requirements applying to all Division 27 specifications.

1.2 DEFINITIONS

- A. Acceptance: shall be defined as Owner's notification to Contractor that the work, as defined herein, has been delivered and installed in accordance with this RFP and all associated Appendices, Amendments and Change Orders and that Contractor has satisfactorily completed all System Testing and Documentation as specified herein.
- B. Addendum: shall refer to changes made to the Construction Documents prior to award of Contract.
- C. Audio/Video: shall refer equipment and cabling supporting the transmission, amplification, and distribution of sound and video signals.
- D. Backbone: shall mean the fiber optic, multipair copper, or coaxial cabling connecting Technology Rooms.
- E. BICSI: Building Industry Consulting Services International.
- F. Building: shall refer to the Site where those portions of the Work shall include the internal horizontal and/or vertical fiber, copper and/or coaxial cabling within a given physical structure.
- G. Campus: shall refer to all buildings and facilities located on the Site.
- H. Communications: shall refer Telephone and Data Network equipment and cabling. The term "Communications" shall be used interchangeably with "telecommunications", and "telecom" in these Documents and Drawings.
- I. Construction Bulletin: shall refer to the changes made to the Construction Documents after award of Contract.
- J. Construction Management Company: shall mean the contracting company responsible for the general construction and commission of a new building or building renovation project and its site project management staff.
- K. Contract Agreement: shall mean The Construction Management or General Contractor Company's Subcontract Agreement.
- L. Contract Documents: shall refer to these written specifications and Drawings, including all Addenda, and Construction Bulletins.
- M. Contractor: shall mean the successful bidder selected to perform all or a portion of the installation work for the structured cabling project as described in these Specifications.
- N. Documentation: shall mean all current product descriptions, technical manuals, supporting materials; warranties and Contractor produced detailed technical drawings and illustrations, including copies thereof, which are to be provided by Contractor to Owner pursuant to these Specifications.
- O. Drawings: shall mean the graphic and pictorial portions of the Contract Documents showing the design location and dimensions of the Services, generally including plans, elevations, sections, details, schedules and diagrams.
- P. Furnish: shall mean to supply and deliver to the Project Site, ready for unloading, unpacking, assembly, installation, and similar operations.
- Q. Horizontal Cabling: shall mean the cabling connecting Work Area Outlet jack modules to their associated termination panel.
- R. Install: shall mean work that includes the actual unloading, unpacking, assembly, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- S. Materials: shall mean the materials, products, supplies and components, which are to be provided by the Contractor for incorporation into, or in connection with the installation of the structured cabling system, including those items listed in this RFP and Appendices.

- T. Project: shall mean the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by Owner or by separate Contractors.
- U. Project Manager: shall mean and include the sole representative of either party, and such representative shall have full responsibility for coordination of the activities of his or her respective party.
- V. Provide: shall mean to furnish and install, complete and ready for the intended use.
- W. Registered Communications Distribution Designer (RCDD): BICSI credential awarded to Telecommunications Designer Professionals. Contractor must employ an RCDD per the Contractor Qualifications section.
- X. Security: refers to Physical Access Control, Intrusion Detection, and Video Surveillance Systems work described in the Contract Documents. Refer to 28-series Specifications for additional information.
- Y. Services: shall mean those Contractor obligations including, but not limited to, Materials, installation labor, testing, project management and Documentation that are to be provided by Contractor to Owner pursuant to the specific Contract Documents and RFP.
- Z. Site: shall be defined as the land, building and environment provided by Owner where work is to take place and Services and Materials are to be rendered as defined herein.
- AA. Specifications: shall mean that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, installation standards and methods, and installation workmanship for the Work, and performance of related Services.
- BB. Structured Cabling System: shall mean all spaces, pathways, cabling, and termination equipment supporting the Telephone and Data Networks within the Building.
- CC. Subcontractor: is a person, entity or business concern who has a direct contract with Contractor to perform all or a portion of the Work at the Site. The term Subcontractor does not include a separate Contractor or Subcontractors of a separate Contractor.
- DD. Technology: refers to Communications, Security, and Audio/Video work described in the Contract Documents.
- EE. Technology Room: refers to spaces containing equipment and cabling terminations serving the Building Telephone and Data Networks. The term "Technology Room" shall be used interchangeably with "Communications Room", "Telecommunications Room", and "Telecom Room" in these Documents and Drawings.
- FF. Work Area Outlet: shall mean the assembly encompassing a faceplate or enclosure populated with jack module(s) serving Communications equipment.

1.3 AGENCIES, REFERENCE STANDARDS AND CODES

- A. Agencies
 - 1. ANSI American National Standards Institute
 - 2. BICSI Building Industry Consulting Service International
 - 3. EIA Electronic Industries Association
 - 4. FCC Federal Communications Commission
 - 5. FOTP Fiber Optic Testing Procedures
 - 6. IEEE Institute of Electrical and Electronic Engineers, Inc.
 - 7. NBC National Building Code
 - 8. NFPA National Fire Protection Association
 - 9. NEC National Electrical Code
 - 10. TIA Telecommunications Industry Association
 - 11. UL Underwriters Laboratories
- B. Codes and Standards (Latest issue and addenda, if more recent than edition shown)
 - 1. ADA Standards for Accessible Design 28 CFR Part 36
 - 2. American Society for Testing Materials (ASTM)*
 - 3. ANSI/TIA-568.1-D - Commercial Building Telecommunications Infrastructure Standard (through Addendum 1, March 6, 2018)

4. ANSI/TIA-568.2-D - Balanced Twisted-Pair Telecommunications Cabling and Components Standard (through Addendum 1, April 9, 2019)
 5. ANSI/TIA-568.3-D - Optical Fiber Cabling And Components Standard (through Addendum 1, January 17, 2019)
 6. ANSI/TIA-568.4-D - Broadband Coaxial Cabling and Components Standard (June 27, 2017)
 7. ANSI/TIA-569-E - Telecommunications Pathways and Spaces (May 23, 2019)
 8. ANSI/TIA-606-C - Administration Standard for Telecommunications Infrastructure (June 19, 2017)
 9. ANSI/TIA-607-D - Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises (July 29, 2019)
 10. ANSI/TIA-526-7-A - Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant, Adoption of IEC 61280-4-2 edition 2: Fiber-Optic Communications Subsystem Test Procedures - Part 4-2: Installed Cable Plant - Single-Mode Attenuation and Optical Return Loss Measurement (July 29, 2015)
 11. ANSI/TIA-526-14-C - Optical Power Loss Measurement of Installed Multimode Fiber Cable Plant; Modification of IEC 61280-4-1 edition 2, Fiber-Optic Communications Subsystem Test Procedures- Part 4-1: Installed Cable Plant-Multimode Attenuation Measurement (April 2015)
 12. ANSI/TIA -758-B - Customer-Owned Outside Plant Telecommunications Infrastructure Standard (March 27, 2012)
 13. BICSI TDM, Cabling Installation, LAN Design, and Customer-Owned Outside Plant Manuals-Latest Editions
 14. Chapter 208- State of Texas Communications Wiring Standard
 15. International Standards Organization/International Electrotechnical Commission (ISO/IEC) IS 11801, 2000*
 16. National Electric Code (NEC), Latest Issue
 17. National Electrical Manufacturers Association (NEMA)*
 18. OSHA - U.S. Department of Labor Occupational Safety & Health Administration
 19. UL - Underwriters Laboratories (UL) Cable Certification and Follow Up Program*
 20. University of Houston *Network Infrastructure Standards* (available on the University Information Technology web site)
- C. Acronyms and Abbreviations
1. ADA Americans with Disabilities Act
 2. ANSI American National Standards Institute
 3. ASTM American Society for Testing and Materials
 4. AWG American Wire Gauge
 5. BMS Building Management Systems
 6. BCT Bonding Conductor for Telecommunications
 7. BICSI Building Industry Consulting Services International
 8. CO-OSP Customer Owned Outside Plant
 9. EF Entrance Facility
 10. EIA Electronic Industries Alliance
 11. EMI Electromagnetic Interference
 12. FCC Federal Communications Commission
 13. Gb/s Gigabits per Second
 14. HC Horizontal Cross-Connect
 15. HVAC Heating, Ventilation, and Air Conditioning
 16. IEEE Institute of Electrical and Electronics Engineers
 17. IP Internet Protocol
 18. ISO International Organization for Standardization
 19. LAN Local Area Network
 20. Mb/s Megabits Per Second
 21. MC Main Cross-Connect
 22. NEMA National Electrical Manufacturers Association

23.	NESCO	National Electrical Safety Code
24.	NFPA	National Fire Protection Association
25.	NIC	Not in Contract
26.	NVR	Network Video Recorder
27.	PBB	Primary Bonding Busbar
28.	PoE	Power over Ethernet
29.	PM	Project Manager
30.	RCDD	Registered Communications Distribution Designer
31.	RFP	Request for Proposal
32.	SBB	Secondary Bonding Busbar
33.	SCS	Structured Cabling System
34.	TBB	Telecommunications Bonding Backbone
35.	TIA	Telecommunications Industry Association
36.	TE	Telecommunications Enclosure
37.	TR	Technology Room / Telecommunications Room
38.	UL	Underwriters Laboratories
39.	UTP	Unshielded Twisted-Pair
40.	WAN	Wide Area Network
41.	WAP	Wireless Access Point
42.	Wi-Fi	Wireless Telecommunications defined by IEEE 802.11

1.4 CONTRACTOR QUALIFICATIONS

- A. All contractors engaging in this work must meet the following:
1. Contractor shall be fully qualified to perform installations as described on the Drawings and within these Specifications. The following qualifications apply to all Work unless otherwise noted. Owner reserves the right to wave any or all of these requirements.
 2. Contractor shall have been active in bidding, being awarded, and performing Work consistent with that indicated on the Drawings and in the Specifications for a period not less than five (5) years.
 3. Contractor shall possess current installation and maintenance training and certifications by all applicable manufacturers. Contractor must possess all respective certifications prior to bidding any project. Certifications that are Site specific and not universal shall not be recognized by The Owner.
 4. Contractor shall possess current BICSI certifications for the installation and maintenance of all low voltage cabling and associated equipment.
 5. Contractor shall not utilize apprentice or trainee personnel for the termination of low voltage structured cabling. Furthermore, apprentices or trainees may only assist in the pulling of low voltage structured cabling. The primary laborer for installing low voltage structured cabling must be a certified installer.
 6. All installation personnel assigned to the task of pulling or terminating cabling shall possess a current certification by the manufacturer for the specified cabling and connectivity products.
 7. Contractor's installation staff shall consist of 30% BICSI certified installation personnel.
 - a. The remaining installation staff shall be minimally certified with either the connectivity or cabling manufacturer.
 8. Contractor shall have a dedicated BICSI RCDD assigned to the project as Project Manager.
 - a. Contractor's RCDD/Project Manager shall be the sole point of contact for The Owner and/or Construction Manager.
 - b. The RCDD/Project Manager shall provide regular project updates to the Construction Manager as to percentage of job completed broken down by category of work, for example, horizontal cabling, backbone copper, backbone fiber, etc., the status of any unforeseen circumstances, and/or changes to the project design necessitated by field conditions.

1.5 ENVIRONMENTAL DUST PREVENTION

- A. Contractor shall take appropriate safeguards to prevent dust or fumes caused by construction activities (such as drilling or cutting concrete, drywall and brick; grinding or welding metals, or use of paints or solvents) from contacting nearby equipment, adjacent offices or any areas where potential damage, harm or injury may occur.
- B. Contractor shall be responsible for all environmental dust containment requirements within and around the area of Work and ensure that all environmental dust is contained by usage of a ceiling to floor barrier unit.
- C. All environmental dust containment associated with the installation of the low voltage cabling system(s) in Health Care Environments (when applicable) shall comply with the following minimum environmental dust prevention requirements are as follows:
 - 1. All inpatient-care nursing areas shall require the use of Contractor provided environmental containment unit to be erected from the floor to ceiling for ceiling tile removal and the installation of low voltage cabling.
 - 2. All inpatient-care areas shall require the use of Contractor provided environmental containment unit with negative air pressure and High Efficiency Particulate Air Filtration (HEPA) to be erected from the floor to the ceiling for ceiling tile removal and the installation of low voltage cabling.
 - 3. All environmental containment units shall be vacuumed out prior to dismantling.
 - 4. All environmental containment units shall be dismantled and stored during all breaks/lunch.
 - 5. Under no circumstances shall a wall or ceiling tile remain open during breaks/lunch, overnight or over a weekend.

1.6 WORKMANSHIP

- A. All Materials shall be installed in compliance with the recommendations of the respective manufacturer, current industry standards, these Specifications, the National Electrical Code, and all applicable state and local building and fire codes.
- B. All work shall conform to the requirements of the Specifications. The installation, construction, cable terminations, and splicing shall be performed by workers trained and skilled in this type of work.
- C. Contractor shall meet all OSHA requirements related to safety and equipment operation.
- D. Contractor shall be responsible for repairing all building and outside cable plant faults, due to Contractor's installation defects, poor workmanship, and/or negligence, at no additional cost to The Owner prior to acceptance of the Work.
- E. Owner personnel and/or agents shall have free access to the work at all times.

1.7 VERIFICATION OF DETAILS

- A. Contractor shall become familiar with details of work in the field and shall advise Owner in writing of any discrepancy in the design prior to commencement of Work.
- B. Contractor shall acknowledge that it has investigated and satisfied itself as to all the conditions affecting the Work. Any failure by Contractor to become acquainted with the available information shall not relieve Contractor from responsibility for estimating properly the difficulty or cost of successfully performing the requested Work. Owner shall assume no responsibility for any erroneous conclusions or misinterpretations made by Contractor based on information made available by Owner.
- C. Errors and/or omissions from the Specifications or Drawings detailing the tasks necessary to perform the Work and carry out the intent of the design or that are customarily performed shall not relieve Contractor from performing such omitted details of the Work.
- D. Contractor shall be responsible to verify quantities for all equipment, cabling, components, and Materials prior to submitting a bid. Contractor shall accept full responsibility for accurately estimating the Work and Materials based on the Specifications and Drawings.

1.8 PERMITS AND FEES

- A. Secure and pay for permits and inspections required for the Work. Submit certificates of approval to The Construction Manager.
- B. Give authorities proper notice as required by law relative to the Work in their charge. Comply with the regulations regarding temporary enclosures, obstructions or excavations and pay all legal fees involved.
- C. Work shall be installed in accordance with all applicable provisions of the National Electrical Code, as interpreted by the local authority having jurisdiction, as well as any further modifications or regulations published by local or state authorities.

1.9 LABOR AND MATERIALS

- A. Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water heat utilities, transportation and other facilities and services necessary for the proper execution and completion of the Work.
- B. Contractor shall enforce strict discipline and order among Contractor's employees and Subcontractors in performance of the Work.
- C. Contractor retains title to all Materials until fully installed and accepted by Owner.
- D. Contractor shall not utilize unfit persons or persons not skilled in tasks assigned to them.

1.10 SAFETY

- A. Contractor shall adhere to the latest edition of the American National Standard Institute (ANSI)
- B. National Electrical Safety Code (NESC), OSHA Standards, and all local fire and safety regulations.
- C. Owner reserves the right to inspect Contractor's work at any time to ensure compliance with the aforementioned documents and specific safety procedures stated herein.
- D. Contractor shall be responsible to follow all safety requirements, conditions and procedures as set forth by Owner.
- E. Should the Contractor violate any safety procedures or requirements, Owner reserves the right to issue a stop work order. The stop work order shall remain in effect until Contractor has resolved the violation. Responsibility for the stop work order shall rest solely with Contractor with no cost or schedule impact to Owner.

1.11 PROTECTION OF PERSONS AND PROPERTY

- A. Contractor shall be responsible to provide all safety equipment and for the enforcement of all safety requirements including, but not limited to, use of hard hats, safety glasses, hearing protection, safety belts, tool tethers while working overhead, safety cones, and preventing personnel from working overhead while others are working underneath.
- B. Contractor shall provide protection of persons and property throughout the progress of the Work. Contractor shall provide the necessary safety equipment, barricades and signs to protect personnel and property, of their own, their employees, Subcontractor's employees, and other trades working on the Site.
- C. Contractor agrees to exercise reasonable care to avoid damage to Owner's facilities and property of others. Contractor shall assume full responsibility for all damages to such Owner facilities arising out of or caused by the conduct or property of Contractor's negligence. Contractor shall make an immediate report to Owner of occurrence of any such damage and hereby agrees to repair or replace at Contractor's expense, or to reimburse Owner, or such other parties for expenses incurred by them in making necessary repairs and replacements.

1.12 CLEANING

- A. In performance of the Work, Contractor shall make every reasonable effort to protect floors, carpets, ceiling tiles, walls, and other property from damage, and shall restore all such property, subject to the Work, to conditions substantially the same as when Work began.
- B. Contractor shall be responsible for daily cleanup and removal (within Contractor's work areas) of all non-salvageable materials and debris resulting from the execution of Work. Contractor

shall be responsible for removal of materials and debris from Site. Oil waste, rags or flammable materials must be removed from the building immediately after use.

- C. Contractor shall ensure that all work in finished areas of the building is cleaned and restored to the same conditions as before the Work. All salvageable materials not used or not yet installed shall be properly stored and secured.
- D. Contractor shall properly firestop all rated penetrations.

1.13 EXPLOSIVES

- A. Explosives shall not be used under any circumstances without the written approval of Owner.

1.14 STORAGE SPACE

- A. Storage space is limited and/or not secure. Storage of Materials shall be the responsibility of Contractor. Outside space for placement of a construction trailer or storage container must be coordinated through the Construction Manager. All costs associated with a construction trailer and/or storage container shall be included in Contractor's bid proposal.
- B. Contractor shall furnish and pay for all utilities, insurance, and security for any construction trailer and/or storage container placed on Site. Contractor shall be responsible for all connections to utility sources, including any required hardware and/or equipment required for making the connections.
- C. Contractor shall remove all construction trailers and/or storage containers placed on the Site by the Contractor or their subcontractors within ten (10) calendar days of notice from Construction Manager, or ten (10) calendar days of Project completion date.
- D. Contractor shall restore the site of the construction trailer and/or storage containers to its original condition. Contractor shall be responsible for all removal and restoration costs.

1.15 RESPONSIBILITY FOR TOOLS AND EQUIPMENT

- A. Contractor shall be responsible to supply, maintain and secure all tools, ladders, lift equipment and safety equipment. Owner shall not accept any responsibility for the loss, theft, disappearance, or damage to equipment, tools, materials, or supplies of Contractor, its employees, agents, or Subcontractors.

1.16 CHANGE ORDERS

- A. All change orders shall be approved in writing by the Construction Manager. Under no circumstances shall verbal statement(s) be considered binding.
- B. Justification for changes requiring cost increases or schedule delays shall be required in writing.
- C. Action on the change or Work affected by the change shall not be performed until Contractor receives written approval from the Construction Manager.
- D. Any work performed by Contractor on a change order without following Owner procedures shall be at the risk and expense of Contractor, and at no cost to Owner.
- E. As requested by Owner, Contractor shall perform all necessary appraisals and field surveys to provide an estimate of the cost and schedule impact of the change request.
- F. Based on the information provided in the change request, field notes and surveys, Contractor shall provide Construction Manager with a written proposal with detailed unit prices for all labor and Materials. Where applicable all Materials and labor shall be priced in accordance with the Unit Prices in the Contractor's base bid proposal. Contractor shall ensure that all information and pricing submitted with the proposal are complete and shall meet the intent of the change request.
- G. Change order pricing shall remain effective for a period of 90 (ninety) days from date of receipt by Construction Manager. Construction Manager will evaluate the change request considering the cost and/or schedule impact on the Project and either approve or disapprove followed by notification to Contractor.
- H. Upon receipt of written approval, Contractor shall assign a change order number to the change request. Approved changes shall be invoiced upon completion and acceptance. Change orders shall be separately itemized on all invoices.

1.17 WARRANTY

- A. Contractor shall warrant that the Work shall be free of defects in material and workmanship for a period of one year from the date of Acceptance. Contractor shall promptly and at its own cost and expense correct Work that is rejected by Owner or Work that fails to conform to the requirements of these Specifications.
- B. Contractor shall assign to Owner all manufacturers' warranties relating to any of the equipment and materials, specifically the respective manufacturers' extended warranties. Contractor shall deliver to Owner copies of all such warranties.
- C. Contractor shall warrant that it has obtained all applicable licenses for Owner to use the Materials and has paid all required royalties for use of the system for its expected useful life.
- D. Contractor warrants that it has absolute title to and full right to sell said Materials to Owner as components of the system, and there are no liens, claims, or encumbrances of any kind whatsoever against said Materials. Materials shall remain as so warranted at the time of delivery and final installation.
- E. Contractor's warranty excludes remedy for damage or defect caused by abuse, modifications not executed by Contractor, improper or insufficient maintenance, improper operation, normal wear and tear and normal usage.
- F. No inspection, acceptance of, or payment for the Work by Owner shall constitute waiver of any warranties.

1.18 SUBMITTALS

- A. CONTRACTOR CERTIFICATIONS:
 - 1. Submit documentation demonstrating contractor qualifications required in the 27-series specifications, including but not limited to:
 - a. BICSI Membership
 - b. RCDD Certificate(s)
 - c. BICSI certified installer certificate(s)
 - d. Manufacturer certification(s)
- B. SHOP DRAWINGS:
 - 1. Prepare shop drawings and product data sheets for technology equipment with adequate details and scales as necessary to show construction in a clear and concise manner.
 - 2. Indicate operating characteristics for each required item and design conditions. Submit the actual cable test data as generated by the manufacturer for the stock to be utilized for construction. Contractor shall review each submittal prior to submission, and check for compliance with Contract Documents. Corrections shall be noted. Mark with approval stamp prior to submission. Submittals that do not bear Contractor's approval stamp will be returned without action.
 - 3. Shop drawings and product data shall include (as applicable):
 - a. Copper Cabling
 - b. Fiber Cabling
 - c. Coaxial Cabling
 - d. Low Voltage Protection Devices
 - e. Faceplates
 - f. Jacks/Inserts
 - g. Patch Panels
 - h. 110 Wiring Blocks
 - i. Fiber Connectors
 - j. Coupler Panels
 - k. Fiber Termination Panels
 - l. Racks
 - m. Cable Tray
 - n. Cable Runway
 - o. Back Boxes
 - p. Firestop Details

- q. Cable and Component Mounting Hardware
 - r. Technology Grounding System Materials
 - s. UPS Systems
 - t. CATV/Broadband Distribution System Cable, Components and Connectors
Distributed Antenna Systems (DAS)
 - u. 802.11 Wireless Antenna Systems
4. The submittals shall be reviewed for general compliance and not for dimensions, quantities, etc. The submittals that are returned shall be used for procurement. The responsibility of correct procurement remains solely with Contractor. The submittal review shall not relieve Contractor of responsibility for errors or omissions and deviations from the Contract requirements.
 5. Contractor shall note in red on the submittal any change in design or dimension on the items submitted including changes made by the manufacturer that may differ from catalog information.
 6. Contractor agrees that shop drawing submittals, processed by the Architect, Technology Engineer, or Owner are not change orders or a means for equipment substitution.
 7. Contractor further agrees that the purpose of shop drawing submittals is to demonstrate Contractors understanding of the design intent. This understanding is demonstrated by articulating which equipment and material is required, and by what methods of fabrication and installation shall be utilized.
 8. Contractor agrees that if deviations, discrepancies or conflicts between shop drawing submittals and Contract Documents are discovered, either prior to or after shop drawings submittals are processed, Contract Drawings and Specifications shall take precedent and be followed.
 9. Shop Drawings shall be submitted in electronic format. The file format shall be Adobe portable data file (.pdf).
 10. Submit only one shop drawing package per specification section (i.e. all equipment associated with a specification section **MUST** be submitted together.) **Multiple submittals for the same specification section will be rejected.**
 11. Revised shop drawing submittals must contain the complete submittal with all data sheets in addition to the revised.
 12. Data sheets with multiple model numbers must have the applicable model number clearly marked.
 13. Shop drawing submittals must contain a table of contents sheet listing all materials/manufacturer model-numbers within the submittal in the order that they appear.

1.19 PROJECT COMPLETION AND CLOSEOUT

- A. Project completion shall be defined at a minimum by the following requirements.
 1. Contractor shall submit all applicable as-built Documentation to Construction Manager for review and written acceptance as required elsewhere in these Specifications.
 2. At the discretion of Owner, Contractor shall provide demonstration of system performance. Upon completion of each system demonstration, Owner shall provide a written acceptance of each system
 3. Contractor shall submit all test results, record drawings, and all other documents necessary to commence the warranty periods for all equipment and devices as provided under the scope of the Project. Contractor shall provide proof of these submissions to Construction Manager.
 4. Construction Manager shall provide a final punch list to Contractor. Contractor shall rectify all items on this list, or at the discretion of Owner provide a credit back to Owner based on unit pricing garnered at the time of the bid. If no such unit pricing is available, a mutually agreed upon price, based on current recognized market value, shall be utilized.

1.20 PROJECT MANAGEMENT

- A. Contractor shall provide a Project Manager to manage and coordinate the Labor and Materials supplied by Contractor for the Work as described in the site-specific RFP documents.

- B. Contractor's Project Manager shall be a single point of contact to the Construction Manager and Owner.
- C. Contractor's Project Manager shall be responsible for fulfilling all project submittals and communications as stated herein and in the Contract Documents.
- D. Contractor's Project Manager shall plan, direct and control all portions of the Work as described on the Drawings and in the Specifications. Contractor shall conduct all phases of Work relevant to the project and any Change Orders in such a manner as to assure minimum interference to any Owner related or other building construction related activities in the areas of work.
- E. Contractor's Project Manager shall attend regularly scheduled meetings with Construction Manager. The purpose of these meetings shall be to discuss Work progress, scheduling, identify problem areas, as well as opportunities to improve efficiency by recommending alternative procedures. Contractor's Project Manager shall contact Construction Manager after contract award, but prior to installation start-up to determine the date of the Project Kickoff Meeting. At the Kickoff Meeting the frequency, day and time of the project meetings will be jointly established.
- F. Upon completion of the project, including submission of all as-built drawings and documentation, Contractor's Project Manager and Construction Manager shall hold a Project Closeout Meeting. The purpose of this meeting shall be to discuss remaining contractual issues; warranty start date and Contractor's warranty call procedures and review all final as-built documentation for completeness and accuracy.

1.21 PROJECT SCHEDULE

- A. Contractor shall be required to adhere to the project milestone and implementation schedule contained in the Contract Documents and agreed to as part of Contractor's proposal. Upon award of Contract, Contractor shall submit a detailed implementation schedule to Construction Manager. Contractor's Project Manager shall provide weekly updates as to the progress of performance compared to the project schedule. Any changes to the schedule shall be reviewed and approved in writing by the Construction Manager. Approved schedule changes as revised shall be reflected in the project schedule presented at the next project meeting.
- B. Contractor shall be responsible to meet schedule milestones and completion timeframes. Delays shall not be permitted unless approved in writing by Construction Manager. Contractor shall be responsible to make up for all schedule changes resulting in lost time that are caused by Contractor's inability to plan or properly coordinate his work effort in accordance with the Project Schedule.

1.22 QUALITY CONTROL

- A. Contractor shall provide quality control throughout the duration of the Project. Contractor's Project Manager shall conduct regular weekly inspections of all Work under Contractor's control.
- B. Contractor shall warrant the installation against all product defects, and shall warrant that all approved cabling components meet or exceed the requirements of the ANSI/TIA/EIA standards and addendum, and the ISO/IEC 11801 including amendments.
- C. Contractor shall ensure that all Work is performed in accordance with Drawings and Specifications.
- D. Contractor shall be responsible to identify and notify Construction Manager immediately of any issues causing the cabling and/or equipment to be installed in such a way as to cause that part of the installation to be in violation of the accepted standards and practices governing these types of installations. Failure to do so shall place the burden of the necessary repairs on Contractor.
- E. Upon completion of all Work, including testing and labeling, Contractor shall conduct a final inspection and punch list with the Construction Manager. Prior to final Acceptance of any portion of the Materials and/or Work, Contractor shall ensure that all deficiencies are corrected.

1.23 ADMINISTRATION

- A. As-Built Drawings: Contractor shall provide as-built drawings as follows:

1. Electronically generated on the most current version of floor plans.
 2. All telecom spaces must be labeled.
 3. All telecom outlets must be indicated with a triangle and the full outlet label.
 4. Main cable routes must be indicated.
 5. Floor-to-floor pathways must be indicated.
 6. Outside-plant pathways must be indicated.
- B. Cable and Equipment Identification:
1. Provide Labeling per Owner's standards.

1.24 MATERIALS MANAGEMENT

- A. Contractor shall provide Materials management for all equipment, tools, materials, and hardware supplied by Contractor.
- B. Contractor shall order the required Materials, track the orders through delivery, confirm receipt of Materials, store Materials, and distribute Materials to the Site as required.
- C. Contractor shall be responsible to ensure that the Materials are properly stored and secured and conform to Owner requirements as described in this Specification.
- D. Contractor, at no cost to Owner, shall replace all Materials believed and/or found to be defective, damaged, stolen or missing.
- E. Material orders and acknowledged ship dates shall be included in updates to the project schedule.

1.25 SUBCONTRACTS MANAGEMENT

- A. Contractor may hire, as necessary, qualified Subcontractors for the installation of all or any portion of the network in accordance with the provisions and requirements in these Specifications.
- B. Contractor shall include in their proposals the names of all Subcontractors that are proposed or planned to participate in the work. Owner reserves the right to reject any proposed Subcontractors in whole or in part.
- C. Any Subcontractor used to perform backbone or horizontal cabling Work shall be fully certified by the Specified manufacturers. Subcontractor shall also meet all other qualifications as required of the Contractor listed elsewhere in these Specifications.
- D. Contractor shall have sole responsibility for managing, coordinating, quality control and evaluating the efforts of the Contractor's subcontracted labor, including pre-installation walk-through, supervision, project communications, project meetings, material storage, security, phone service, and change order notification and preparation.

END OF SECTION 27 0000

**SECTION 27 0500
FIRESTOPPING FOR COMMUNICATIONS PATHWAYS**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the contract, including general and supplementary conditions and Division 01 specification sections, apply to 270500.
- B.

1.2 SUMMARY

- A. Furnish and install fire stopping for fire rated construction in the following areas:
 - 1. All openings in fire rated floors and wall assemblies accommodating penetrating items such as cables, conduits, raceways, cable trays, etc.
 - 2. Openings at each floor level in shafts or stairwells.
 - 3. Empty openings in fire rated construction made by Contractor but not utilized for the aforementioned materials.

1.3 QUALITY ASSURANCE

- A. General
 - 1. Fire stopping materials shall conform to Flame (F) and Temperature (T) ratings required by local building code and as tested by nationally accepted test agencies per ASTM E-184 or UL 1479 fire tests in a configuration that is representative of field conditions. The F rating must be a minimum of one (1) hour but not less than the fire resistance of the assembly being penetrated.
 - 2. Fire stopping material shall be non-halogenated, lead and asbestos free and shall not incorporate nor require the use of hazardous solvents.
 - 3. Firestop products that dissolve in water after curing are not acceptable.
 - 4. Fire stopping materials shall not shrink upon drying as evidenced by cracking or pulling back from contact surfaces.
 - 5. All fire stopping materials shall be manufactured by one manufacturer. Deviations from the specified manufacturer shall not be permitted without written approval from Owner.
 - 6. Fire stopping shall be performed by a Contractor trained or approved by the firestop manufacturer. (A manufacturer's willingness to sell its products to a contractor does not itself confer qualification on the buyer.) Each installer of the system must be trained and possess a valid FIT I Certification. A company certification shall not be accepted.
 - 7. Contractor shall be responsible for the correct replacement of firestop material in all existing wall and floor penetrations used as pathways for any cabling installed by Contractor.
 - 8. Contractor shall install a firestop label at each point of penetration. Label shall include type of firestop system installed and the date of installation.
 - 9. Conform to the manufacturer's printed instructions for installation in accordance with a UL rated system or engineering judgment of the manufacturer.
 - 10. During delivery and storage, Contractor shall ensure manufacturer's original, unopened, undamaged containers, identification labels intact identifying product and manufacturer, date of manufacture; lot number; shelf life, if applicable; qualified testing and inspection agency's classification marking; and mixing instruction for multicomponent products.
 - 11. Contractor shall handle and store products according to manufacturer's recommendations published in technical materials. Leave products wrapped or otherwise protected, and in clean, dry storage conditions until required for installation. Store materials protected from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer.
- B. Codes and Standards
 - 1. ASTM E 84 - Surface Burning Characteristics of Building Materials
 - 2. ASTM E 119 - Fire Tests of Building Construction and Materials
 - 3. ASTM E 814 - Fire Tests of Penetration Firestop Systems
 - 4. ANSI/UL263 - Fire Tests of Building Construction and Materials

5. ANSI/UL723 - Surface Burning Characteristics of Building Materials
6. ANSI/UL1479 - Fire Tests of Through Penetration Firestops
7. Underwriters Laboratories Inc. (UL) – Fire Resistance Directory
8. National Fire Protection Association (NFPA) – NFPA 101: Life Safety Code
9. National Fire Protection Association (NFPA) – NFPA 70: National Electrical Code. AST
10. Ohio Building Code
11. AHJ (Authority Having Jurisdiction)

PART 2 - PRODUCTS

2.1 EQUIPMENT AND MATERIALS

- A. All firestop materials shall be installed prior to expiration of shelf life.
- B. Use only firestopping products that have been tested for specific fire resistance rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire rating involved for each separate instance.
- C. Re-Enterable Firestop Assemblies:
 1. Approved manufacturer/model:
 - a. Specified Technologies Inc. (STI) - SpecSeal® Series SSS Sealant
 - b. SpecSeal® Series LCI Sealant
 - c. Hilti
- D. Firestop Sealants: Single component latex formulations that upon cure do not re-emulsify during exposure to moisture.
 1. Approved manufacturer/model:
 - a. Specified Technologies Inc. (STI) - SpecSeal® Series SSS Sealant
 - b. SpecSeal® Series LCI Sealant
 - c. Hilti
- E. Firestop Putty: STI SpecSeal® Brand intumescent, non-hardening, water resistant putties containing no solvents, inorganic fibers or silicone compounds, the following products are acceptable:
 1. Approved manufacturer/model:
 - a. Specified Technologies Inc. (STI)
 - b. SpecSeal® Series SSP Putty
 - c. Hilti
- F. Firestop Pillows: STI SpecSeal® Brand re-enterable, non-curing, mineral fiber core encapsulated on six sides with intumescent coating contained in a flame-retardant poly bag, the following products are acceptable:
 1. Approved manufacturer/model:
 - a. Specified Technologies Inc. (STI)
 - b. SpecSeal® Series SSB Pillows
 - c. Hilti
- G. Fire Rated Cable Pathways: STI EZ-PATH™ Brand device modules comprised of steel raceway with intumescent foam pads allowing 0 to 100 percent cable fill, the following products are acceptable:
 1. Approved manufacturer/model:
 - a. Specified Technologies Inc. (STI)
 - b. EZ-PATH™ Fire Rated Pathway
 - c. Hilti
- H. Firestop Plugs: Re-enterable, foam rubber plug impregnated with intumescent material for use in blank openings and cable sleeves, the following products are acceptable:
 1. Approved manufacture/model:
 - a. Specified Technologies Inc. (STI)
 - b. SpecSeal Series FP Firestop Plug
 - c. Hilti
- I. Fire-Rated Cable Grommet: Molded two-piece grommet made from plenum grade polymer with a foam inner core for sealing individual cable penetrations up to 0.27 in. (7 mm) diameter, the following products are acceptable:

1. Approved manufacturer/model:
 - a. Specified Technologies Inc. (STI) - Ready Firestop Grommet
 - b. Approved equal.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General

1. Conform to the manufacturer's printed instructions for installation and when applicable, curing in accordance with temperature requirements.
2. Coordinate this Work as required with all other trades.
3. Fire stopping shall precede finishing of gypsum board.
4. Where fire stopping is installed at locations that shall remain exposed in the completed work, provide protection as necessary to prevent damage to adjacent surfaces and finishes, and protect as necessary against damage from other construction activities.

B. Performance Requirements

1. Fire rated pathway devices shall be the preferred product and shall be installed in all locations where frequent cable moves, add-ons and changes will occur, such devices shall:
 - a. Meet the hourly rating of the floor or wall penetrated.
 - b. Permit the allowable cable load to range from 0% to 100% visual fill thereby eliminating the need to calculate allowable fill ratios.
 - c. Not require any additional action on the part of the installer to open or close the pathway device or activate the internal smoke and fire seal, such as, but not limited to opening or closing of doors; twisting an inner liner or removal or replacement of any material such as, but not limited to, sealant, caulk, putty, pillows, bags, foam plugs, foam blocks, or any other material.
2. Fire rated pathway devices shall be the preferred product and shall be installed in all locations where frequent cable moves, add-ons and changes will occur, such devices shall:
 - a. Permit multiple devices to be ganged together to increase overall cable capacity.
 - b. Allow for retrofit to install around existing cables.
 - c. Include an optional means to lengthen the device to facilitate installation in thicker barriers without degrading fire or smoke sealing properties or inhibiting ability of device to permit cable moves, add-ons, or changes.
3. Where single cables (up to 0.27 in. (7 mm) diameter) penetrate gypsum board/stud wall assemblies, a fire-rated cable grommet may be substituted. Acceptable products shall be molded from plenum-grade polymer and conform to the outer diameter of the cable forming a tight seal for fire and smoke. Additionally, acceptable products shall lock into the barrier to secure cable penetration.
4. Where non- mechanical products are utilized, provide products that upon curing do not re- emulsify, dissolve, leach, and/or otherwise breakdown and deteriorate over time from exposure to atmospheric moisture, sweating pipes, ponding water or other forms of moisture characteristic during or after construction.
5. Where it is not practical to use a mechanical device, openings within floors and walls designed to accommodate telecommunications and data cabling shall be provided with re-enterable products that do not cure or dry.

C. Inspection

1. Examine all areas and conditions where firestop is to be installed and notify Construction Manager of conditions detrimental to the proper and timely completion of the work. Do not proceed with work until Contractor, in a manner acceptable to Construction Manager, has corrected unsatisfactory conditions.
2. Verify that surfaces shall be free of dirt, grease, oil, scale, laitance, rust, release agents, water repellants, and any other substances that may inhibit optimum adhesion.
3. Provide masking and temporary covering to protect adjacent surfaces.

D. Conditions Requiring Fire stopping

1. Contractor shall be responsible to verify the fire rating of each wall, and supply firestop materials that meet or exceed the rating.
2. Provide fire stopping for conditions specified elsewhere whether or not fire stopping is indicated and, if indicated whether such material is designed as insulation, safig, or otherwise.
3. All fire stopping shall be installed in accordance with the UL rated system designed for the application.
4. Insulation types specified in other sections shall not be installed in lieu of fire stopping material specified.
5. Grout, Mortar or Gypsum based products shall not be installed in lieu of fire stopping material specified.
6. All smoke walls (smoke barriers, smoke partitions, etc.), rated or non-rated, shall be fire stopped with systems designed to maintain a minimum 1-hour rating or that which is equal to the rating of the wall, whichever is greater.
7. Provide firestopping for penetrations including conduits, raceways, cables, cable trays or other equipment that pass through one or both surfaces of a fire rated floor or wall.
8. Except for floor on grade, provide fire stopping for penetrations that occur through a structural floor or roof and a space that would otherwise remain open between the surfaces of the penetration and the edge of the adjoining structural floor or roof.
9. Where a penetration occurs through fire rated walls or partitions of hollow-type construction, provide fire stopping to fill spaces around the penetration, on each side of the wall or partition.
10. The requirements for penetrations shall apply whether or not sleeves have been provided, and whether or not penetrations are to be equipped with escutcheons or other trim. If penetrations are sleeved, firestop annular space, if any, between sleeve and wall opening.
11. Provide fire stopping to fill miscellaneous voids and blank openings in fire rated construction where existing raceways, conduits, cables, cable trays or other equipment have been removed.

E. Preparation

1. Surface to receive firestop shall be free of dirt, dust, grease, oil, oil from release agents, or other matter that would impair the bond of the firestop material to the substrate or penetrating items.
2. Substrate shall be frost-free.

F. Installation

1. Sleeves and core-drilled holes shall be sized at least 1-1/2" larger in diameter than penetrating items.
2. Installation of firestop shall be performed by applicators/installers qualified and trained by the Manufacturer. Installation shall be performed in strict accordance with the Manufacturer's detailed installation procedures.
3. Apply firestop in strict accordance with UL rated system designs, and Manufacturer's recommendations.
4. Coordinate with plumbing, mechanical, electrical, and other trades to assure that all conduits, raceways, cables, cable trays, and other equipment that penetrate fire rated construction have been permanently installed prior to installation of firestop. Schedule and sequence the work to assure that partitions and other construction that would conceal penetrations are not erected prior to the installation of firestop.
5. Gun grade sealants and putties shall be tooled into place to insure proper adhesion to penetrations and surrounding surfaces.
6. Install dams when required to contain firestopping materials within openings, and as required to accomplish required fire resistance rating.
7. Placement of dams shall not interfere with functions or adversely affect the appearance of adjacent construction.
8. Install work in full accordance with the rules, regulations, and safety requirements of Federal, State, County and City authorities having jurisdiction over premises. Do not

construe this as relieving Contractor from compliance with any requirements of the Specifications that are in excess of Code requirements and not in conflict therewith.

9. Correct unacceptable fire stopping and provide additional inspection to verify compliance with this Specification at no additional cost.
10. Finish surfaces of fire stopping that is to remain exposed in the completed work to a uniform and level condition.

END OF SECTION 27 0500

**SECTION 27 0526
BONDING FOR COMMUNICATIONS SYSTEMS**

PART 1 - GENERAL GUIDELINES

1.1 SUMMARY

A. GENERAL DESCRIPTION

1. 27 05 26 will define the general requirements needed for a Telecommunications Grounding and Bonding System that shall be followed for all technology projects unless otherwise noted.
2. Refer to ANSI/TIA-607-C-2015 Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises, for additional information.

1.2 SECTION 27 05 26 ENCOMPASSES

A. PATHWAYS AND SPACES

1. Cable Tray
2. Conduits
3. Equipment Racks and Cabinets
4. Equipment
5. Static Dissipative Floors
6. Armored Cabling
7. Telecommunications Entrance Facility
8. Miscellaneous

B. CONDUCTOR SIZING AND APPLICATION

1. Telecommunications Bonding Conductors
2. Busbar grounding Conductor
3. Entrance Facility Conductor
4. Telecommunications Bonding Backbone [TBB]
5. Telecommunications Bonding Conductor [TBC]

C. BUSBARS AND PROTECTORS

1. Primary Bonding Busbar [PBB]
2. Secondary Bonding Busbar(s) [SBB]
3. Lightning Protection

1.3 REQUIREMENTS

- A. All equipment shall be UL® Listed
- B. All equipment and installation practices shall comply with the National Electric Code [NEC] ANSI/NFPA-70 Most Current Revision
- C. All equipment and installation practices shall comply with the Local Electric Code and/or Authority Having Jurisdiction [AHJ]
- D. All equipment and installation practices shall comply with the Commercial Building Grounding (Earthing) Requirements for Telecommunications Standard ANSI/TIA-607-C
- E. All equipment and installation practices shall comply with the Customer Owned Outside Plant Standard ANSI/TIA-758-B Most Current Revision
- F. All equipment and installation practices shall comply with the BICSI Telecommunications Distribution Methods Manual [TDMM] Most Current Revision

PART 2 - PRODUCTS

2.1 PRIMARY BONDING BUSBAR [PBB]

A. General Requirements for the primary bonding busbar [PBB]

1. The thickness of the PBB shall be ¼" (6.35mm). The PBB should be sized to accommodate ALL required bonds + 25% spare for the designated space. The length and width of the PBB are not specified herein but shall be specified on the technology construction drawings. As a minimum, a 4" (100mm) X 20" (508mm) X ¼" (6.35mm) busbar shall be provided.

2. The PBB shall be insulated from its support using an insulator that is listed for the purpose by a nationally recognized testing laboratory [NRTL]. A minimum of 2" (50mm) separation from the wall is recommended to allow access to the rear of the busbar.
3. The PBB shall have a minimum No. 2 AWG insulated copper bonding conductor with CAD weld bonding to building steel or approved grounding system and crimp lug bonding to busbar.

B. Primary Bonding Busbar

1. Panduit® Telecommunications Grounding Busbar Part # GB4B0624TPI-1 OR approved equivalent
2. Busbar Grounding Conductor NO. 2 copper, Stranded Green Insulation Sheath. Any Manufacturer
3. Busbar Grounding Conductor NO. 6 copper, Stranded Green Insulation Sheath. Any Manufacturer
4. Panduit® Compression Lug No. 2 AWG Part # LCC2-14AW-Q OR approved equivalent
5. Panduit® Compression Lug No. 6 AWG Part # LCCX6-14AB-L OR approved equivalent

2.2 SECONDARY BUSBAR [SBB]

A. General Requirements for the secondary bonding busbar [SBB]

1. The thickness of the PBB shall be ¼" (6.35mm). The SBB should be sized to accommodate ALL required bonds + 25% spare for the designated space. The length and width of the SBB are not specified herein but shall be specified on the technology construction drawings. As a minimum, a 2" (100mm) X 12" (508mm) X ¼" (6.35mm) busbar shall be provided.
2. The SBB shall be insulated from its support using an insulator that is listed for the purpose by a nationally recognized testing laboratory [NRTL]. A minimum of 2" (50mm) separation from the wall is recommended to allow access to the rear of the busbar.
3. The PBB shall have a minimum No. 2 AWG insulated copper bonding conductor with CAD weld bonding to building steel or approved grounding system and crimp lug bonding to busbar.

B. Secondary Bonding Busbar(s)

1. Panduit® Telecommunications Grounding Busbar Part # GB2B0306TPI-1 OR approved equivalent
2. Busbar Grounding Conductor NO. 2 copper, Stranded Green Insulation Sheath. Any Manufacturer
3. Busbar Grounding Conductor NO. 6 copper, Stranded Green Insulation Sheath. Any Manufacturer
4. Panduit® Compression Lug, No. 2 AWG Part # LCC2-14AW-Q OR approved equivalent
5. Panduit® Compression Lug, No. 6 AWG Part # LCCX6-14AB-L OR approved equivalent

2.3 EQUIPMENT BONDING MATERIALS

A. Equipment rack/cabinet bonding

1. Busbar Grounding Conductor NO. 6 copper, Stranded Green Insulation Sheath. Any Manufacturer
2. Chatsworth® Ground Terminal Block, Part # 40167-001 OR approved equivalent

B. Metallic Cable Tray (Ladder or Basket)

1. Panduit® Straight Tongue Lug, No. 6 AWG Part # PNL-250-Q OR approved equivalent
2. Chatsworth® Ground Terminal Block, Part # 40167-001 OR approved equivalent
3. Panduit® Compression Lug, No. 6 AWG Part # LCCX6-14AB-L OR approved equivalent

C. Anti-Static Floor Conductor

1. Busbar Grounding Conductor NO. 6 copper, Stranded Green Insulation Sheath. Any Manufacturer
2. Panduit® Compression Lug, No. 6 AWG Part # LCCX6-14AB-L OR approved equivalent

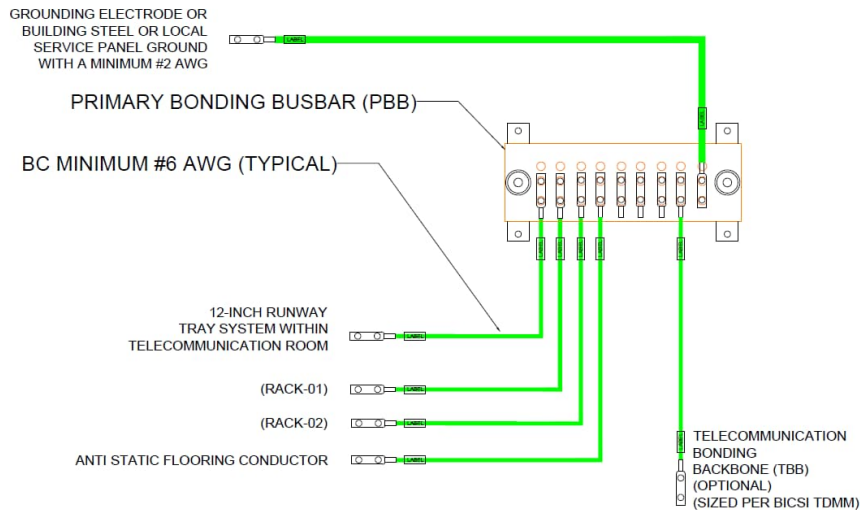
D. Fiber Optic Enclosure

1. Busbar Grounding Conductor NO. 6 copper, Stranded Green Insulation Sheath. Any Manufacturer

- 2. Panduit® Compression Lug, No. 6 AWG Part # LCAS6-10F-L OR approved equivalent
- E. Conduit Sleeves (Outdoor)
 - 1. Bonding provided by Electrical Contractor

PART 3 - EXECUTION
3.1 INSTALLATION

- A. At a minimum, the PBB shall be bonded to one or more of the following as applicable:
 - 1. Main Electrical Service Ground Electrode System – Minimum No. 2 AWG insulated copper bonding conductor
 - 2. Building Steel - Minimum No. 2 AWG insulated copper bonding conductor, CAD Weld bonding
 - 3. Local Service Panel Ground - Minimum No. 6 AWG insulated copper bonding conductor
 - 4. Telecommunications Bonding Backbone (TBB) (where required on construction drawings) – Size per BICSI® TDMM most current edition
 - 5. Racks, Cabinets, Cable Trays, Enclosures and Anti-Static Flooring - Minimum No. 6 AWG insulated copper bonding conductor
 - 6. Non-UL Listed Continuous Bonded Cable Tray – Minimum No. 6 AWG insulated copper bonding conductor spanning joints per manufacturer specifications.
- B. At a minimum, the SBB shall be bonded to one or more of the following as applicable:
 - 1. Main Electrical Service Ground Electrode System – Minimum No. 2 AWG insulated copper bonding conductor
 - 2. Building Steel - Minimum No. 2 AWG insulated copper bonding conductor, CAD Weld bonding
 - 3. Local Service Panel Ground - Minimum No. 6 AWG insulated copper bonding conductor
 - 4. Telecommunications Bonding Backbone (TBB)(where required on construction drawings) – Size per BICSI® TDMM most current edition
 - 5. Racks, Cabinets, Cable Trays, Enclosures and Anti-Static Flooring - Minimum No. 6 AWG insulated copper bonding conductor
 - 6. Non-UL Listed Continuous Bonded Cable Tray – Minimum No. 6 AWG insulated copper bonding conductor spanning joints per manufacturer specifications.



END OF SECTION 27 0526

**SECTION 27 0528
PATHWAYS FOR COMMUNICATIONS SYSTEMS**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Division 26 Common Work Results for Electrical and Common Electrical Materials and Methods section apply to work specified in this is section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Metal conduits and fittings.
 - 2. Nonmetallic conduits and fittings.
 - 3. Optical-fiber-cable innerduct pathways and fittings.
 - 4. Flexible textile innerduct pathways placed within conduits.
 - 5. Metal wireways and auxiliary gutters.
 - 6. Nonmetallic wireways and auxiliary gutters.
 - 7. Metallic surface pathways.
 - 8. Nonmetallic surface pathways.
 - 9. Tele-power poles.
 - 10. J-Hooks.
 - 11. Boxes, enclosures, and cabinets.
 - 12. Polymer-concrete handholes and boxes for exterior underground cabling.

1.3 DEFINITIONS

- A. ARC: Aluminum rigid conduit.
- B. GRC: Galvanized rigid conduit.
- C. IMC: Intermediate metal conduit.
- D. RTRC: Reinforced thermosetting resin conduit.

1.4 SUBMITTALS

- A. Product data for the following:
 - 1. Surface pathways
 - 2. Wireways and fittings.
 - 3. Tele-power poles.
 - 4. Boxes, enclosures, and cabinets.
 - 5. Underground handholes and boxes.
- B. Shop Drawings: For custom enclosures and cabinets and custom underground handholes and boxes. Include plans, elevations, sections, and attachment details.

PART 2 - PRODUCTS

2.1 METAL CONDUITS AND FITTINGS

- A. Description: Metal raceway of circular cross section with manufacturer-fabricated fittings.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. AFC Cable Systems; a part of Atkore International.
 - 2. Allied Tube & Conduit; a part of Atkore International.
 - 3. Alpha Wire.
 - 4. Anamet Electrical, Inc.
 - 5. Electri-Flex Company.
 - 6. O-Z/Gedney; a brand of Emerson Industrial Automation.
 - 7. Picoma Industries, Inc.
 - 8. Plasti-Bond.
 - 9. Republic Conduit.

10. Southwire Company.
 11. Thomas & Betts Corporation; A Member of the ABB Group.
 12. Western Tube and Conduit Corporation.
 13. Wheatland Tube Company.
- C. General Requirements for Metal Conduits and Fittings:
1. Listed and labeled as defined in NFPA 70, by a nationally recognized testing laboratory, and marked for intended location and application.
 2. Comply with most current revision of TIA-569
- D. GRC: Comply with ANSI C80.1 and UL 6.
- E. ARC: Comply with ANSI C80.5 and UL 6A.
- F. PVC-Coated Steel Conduit: PVC-coated GRC.
1. Comply with NEMA RN 1.
 2. Coating Thickness: 0.040 inch, minimum.
- G. EMT: Comply with ANSI C80.3 and UL 797.
- H. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.
1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 1203 and NFPA 70.
 2. Fittings for EMT:
 - a. Material: Steel
 - b. Type: Set screw.
 3. Expansion Fittings: PVC or steel to match conduit type, complying with UL-467, rated for environmental conditions where installed, and including flexible external bonding jumper.
 4. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch, with overlapping sleeves protecting threaded joints.
- I. Joint Compound for IMC, GRC, or ARC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.2 NONMETALLIC CONDUITS AND FITTINGS

- A. Description: Nonmetallic raceway of circular section with manufacturer-fabricated fittings.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. AFC Cable Systems; a part of Atkore International.
 2. Allied Tube & Conduit; a part of Atkore International.
 3. Anamet Electrical, Inc.
 4. Arnco Corporation.
 5. CANTEX INC.
 6. Carlon; a brand of Thomas & Betts Corporation.
 7. CertainTeed Corporation.
 8. Condux International, Inc.
 9. Dura-Line.
 10. Electri-Flex Company.
 11. Kraloy.
 12. Lamson & Sessions.
 13. Niedax Inc.
 14. RACO; Hubbell.
 15. Thomas & Betts Corporation; A Member of the ABB Group.
- C. General Requirements for Nonmetallic Conduits and Fittings:
1. Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
 2. Comply with TIA-569-D.
- D. RNC: Type EPC-40-PVC, complying with NEMA TC 2 and UL 651 unless otherwise indicated.
- E. Rigid HDPE: Comply with UL 651A.
- F. Continuous HDPE: Comply with UL 651A.
- G. RTRC: Comply with UL 2515A and NEMA TC 14.

H. Fittings: Comply with NEMA TC 3; match to conduit or tubing type and material.

2.3 OPTICAL-FIBER-CABLE INNERDUCT PATHWAYS AND FITTINGS

- A. Description: Comply with UL 2024; flexible-type pathway (innerduct) with a circular cross section, approved for plenum and riser installation unless otherwise indicated.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Alpha Wire.
 - 2. Carlon; a brand of Thomas & Betts Corporation.
 - 3. Dura-Line.
 - 4. Endot Industries Inc.
 - 5. IPEX USA LLC.
- C. Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
- D. Comply with TIA-569-D.

2.4 FLEXIBLE TEXTILE INNERDUCT PATHWAYS PLACED WITHIN CONDUITS

- A. Description: Flexible Textile Innerduct to be placed within conduits for the purpose of installing optical-fiber-cable.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
MaxCell Group/TVC Communications
600 Plum Creek Dr. Wadsworth, OH. 44281
1-888-387-3828
- C. MATERIALS
 - 1. White Polyester and Nylon resin polymer
- D. TEXTILE INNERDUCT
 - 1. Detectable Outdoor Textile Innerduct: Micro (33mm), 2-inch, 3-inch and 4-inch single or multi-cell polyester/nylon textile innerduct containing 1250lb polyester flat woven pull tape, and a solid copper, polyvinyl color coated conductor (19AWG minimum) for tracing and rated for a minimum of 6 amps and 600 volts. Conductor shall be placed in the sidewall edge fold of the textile sleeve.
 - 2. Indoor Textile Innerduct (Riser-listed): Micro (33mm), 2-inch, 3-inch and 4-inch single or multi-cell nylon textile innerduct containing 1250lb polyester flat woven pull tape which meets UL2024A for flame propagation and smoke density values for general applications.
- E. TEXTILE INNERDUCT FITTINGS
 - 1. Conduit Plugs: Compression-type conduit plugs with locking nuts for sealing and securing one or more textile innerducts within a 4-inch inside diameter conduit, e.g.: a 4-inch plug with nine holes for cables in a 3 pack (9-cell) configuration
 - 2. Termination Bags: Inflation-type bags for sealing and securing around one or more textile innerducts and cables within 2-inch outside diameter or larger conduit, Raychem Inflata-Seals.
- F. PULL TAPE
 - 1. Pull Tape: measuring and pulling tape constructed of synthetic fiber, printed with accurate sequential footage marks. Color-coded.

2.5 METAL WIREWAYS AND AUXILIARY GUTTERS

- A. Description: Sheet metal trough of rectangular cross section fabricated to required size and shape, without holes or knockouts, and with hinged or removable covers.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. B-line, an Eaton business.
 - 2. Hoffman; a brand of nVent.
 - 3. MonoSystems, Inc.
 - 4. Legrand.
- C. General Requirements for Metal Wireways and Auxiliary Gutters:

1. Comply with UL 870 and NEMA 250, Type 1 and/or Type 3R unless otherwise indicated, and sized according to NFPA 70.
 2. Metal wireways installed outdoors shall be listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
 3. Comply with TIA-569-D.
- D. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- E. Wireway Covers: Hinged type unless otherwise indicated.
- F. Finish: Manufacturer's standard enamel finish.

2.6 NONMETALLIC WIREWAYS AND AUXILIARY GUTTERS

- A. Description: Fiberglass polyester, extruded and fabricated to required size and shape, without holes or knockouts. Cover shall be gasketed with oil-resistant gasket material and fastened with captive screws treated for corrosion resistance. Connections shall be flanged and have stainless-steel screws and oil-resistant gaskets.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Allied Moulded Products, Inc.
 2. Carlon; a brand of Thomas & Betts Corporation.
 3. Hoffman; a brand of nVent.
 4. Niedax Inc.
- C. General Requirements for Nonmetallic Wireways and Auxiliary Gutters:
1. Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
 2. Comply with TIA-569-D.
- D. Fittings and Accessories: Couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings shall match and mate with wireways as required for complete system.

2.7 SURFACE METAL PATHWAYS

- A. Description: Galvanized steel with snap-on covers, complying with UL 5.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. MonoSystems, Inc.
 2. Niedax Inc.
 3. Panduit Corp.
 4. Wiremold / Legrand.
- C. Finish: Manufacturer's standard enamel finish in color selected by Architect.
- D. Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
- E. Comply with TIA-569-D.

2.8 SURFACE NONMETALLIC PATHWAYS:

- A. Description: Two- or three-piece construction, complying with UL 5A, and manufactured of rigid PVC.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Carlon; a brand of Thomas & Betts Corporation.
 2. MonoSystems, Inc.
 3. Panduit Corp.
 4. Quazite: Hubbell Power Systems, Inc.
 5. Wiremold / Legrand.
- C. Finish: Texture and color selected by Architect from manufacturer's standard colors.
- D. Product shall comply with UL 94 V-0 requirements for self-extinguishing characteristics.

- E. Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
- F. Comply with TIA-569-D.

2.9 TELE-POWER POLES:

- A. Description: Prefabricated, finished metal pole with prewired power and communications outlets.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. MonoSystems, Inc.
 - 2. Panduit Corp.
 - 3. Wiremold / Legrand.
- C. Material: Galvanized steel with ivory baked-enamel finish or as specified on drawings. .
- D. Fittings and Accessories: Dividers, end caps, covers, cutouts, wiring harnesses, devices, mounting materials, and other fittings shall match and mate with tele-power pole as required for complete system.
- E. Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
- F. Comply with TIA-569-D.

2.10 J-HOOKS

- A. Description: Prefabricated sheet metal cable supports for telecommunications cable.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. MonoSystems, Inc.
 - 2. Panduit Corp.
 - 3. Wiremold / Legrand.
 - 4. Erico (Caddy Clip)
- C. Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
- D. Comply with TIA-569-D.
- E. Galvanized steel
 - 1. Non-metallic J-hooks will not be acceptable.
- F. J shape.

2.11 BOXES, ENCLOSURES, AND CABINETS

- A. Description: Enclosures for communications.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. FSR Inc.
 - 2. Hoffman; a brand of nVent.
 - 3. RACO; Hubbell.
 - 4. RANDL
 - 5. Thomas & Betts Corporation; A Member of the ABB Group.
 - 6. Wiremold / Legrand.
- C. General Requirements for Boxes, Enclosures, and Cabinets:
 - 1. Comply with TIA-569-D.
 - 2. Boxes, enclosures, and cabinets installed in wet locations shall be listed and labeled as defined in NFPA 70, by an NRTL, and marked for use in wet locations.
 - 3. Box extensions used to accommodate new building finishes shall be of same material as recessed box.
 - 4. Device Box Dimensions: 5 inches square by 2-7/8 inches deep.
- D. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.
- E. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.
- F. Metal Floor Boxes:

1. Material: Cast metal for on-grade or sheet metal for above grade.
 2. Type: Fully adjustable.
 3. Shape: Rectangular.
 4. Metal floor boxes shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- G. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- H. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, cast aluminum with gasketed cover.
- I. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 1 and/or Type 3R, with continuous-hinge cover with flush latch unless otherwise indicated.
1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
 2. Nonmetallic Enclosures:
 - a. Material: Plastic.
 - b. Finished inside with radio-frequency-resistant paint.
 3. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.
- J. Cabinets:
1. NEMA 250, Type 1 galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
 2. Hinged door in front cover with flush latch and concealed hinge.
 3. Key latch to match panelboards.
 4. Metal barriers to separate wiring of different systems and voltage.
 5. Accessory feet where required for freestanding equipment.
 6. Nonmetallic cabinets shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.12 POLYMER-CONCRETE HANDHOLES

- A. Description: Molded of sand and aggregate; bound together with polymer resin; and reinforced with steel, fiberglass, or a combination of the two.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Armorcast Products Company.
 2. NewBasis.
 3. Oldcastle Precast, Inc.
 4. Quazite: Hubbell Power Systems, Inc.
- C. General Requirements for Polymer Concrete Handholes:
1. Boxes and handholes for use in underground systems shall be listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
 2. Boxes installed in wet areas shall be listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
 3. Comply with TIA-569-D and SCTE 77.
- D. Configuration: Designed for flush burial with open bottom unless otherwise indicated.
- E. Cover: Weatherproof, structural load rating consistent with enclosure and handhole location. Concrete rated up 20,000 lb secured with stainless steel bolts.
1. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
 2. Cover Legend: Molded lettering, "COMMUNICATIONS".
- F. Conduit Entrance Provisions: Conduit-terminating fittings shall mate with entering ducts for secure, fixed installation in enclosure wall.
- G. Handholes: 12 inches wide by 24 inches long or larger.

2.13 SOURCE QUALITY CONTROL FOR UNDERGROUND ENCLOSURES

- A. Handhole and Pull-Box Prototype Test: Test prototypes of handholes and boxes for compliance with SCTE 77. Strength tests shall be for specified tier ratings of products supplied.
1. Tests of materials shall be performed by an independent testing agency.

2. Strength tests of complete boxes and covers shall be by either an independent testing agency or manufacturer. A qualified registered professional engineer shall certify tests by manufacturer.
3. Testing machine pressure gages shall have current calibration certification complying with ISO 9000 and ISO 10012, and traceable to NIST standards.

PART 3 - EXECUTION

3.1 PATHWAY APPLICATION

- A. Outdoors: Apply pathway products as specified below unless otherwise indicated:
 1. Exposed Conduit: GRC.
 2. Concealed Conduit, Aboveground: GRC.
 3. Underground Conduit: RNC, Type EPC-40-PVC,.
 4. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.
 5. Flexible textile innerduct pathways placed within conduits.
- B. Indoors: Apply pathway products as specified below unless otherwise indicated:
 1. Exposed, Not Subject to Physical Damage: EMT or RNC.
 2. Exposed and Subject to Severe Physical Damage: GRC. Pathway locations include the following:
 - a. Loading dock.
 - b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
 - c. Mechanical rooms.
 - d. Gymnasiums.
 3. Concealed in Ceilings and Interior Walls and Partitions: EMT.
 4. Damp or Wet Locations: GRC or RNC
 5. Pathways for Optical-Fiber or Communications Cable in Spaces Used for Environmental Air: EMT with flexible textile innerduct pathway.
 6. Pathways for Optical-Fiber or Communications-Cable Risers in Vertical Shafts: EMT with flexible textile innerduct pathway.
 7. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4 stainless steel units in institutional and commercial kitchens and damp or wet locations.
- C. Minimum Pathway Size: 1-1/4 inch trade size for horizontal copper cables, and 4" and larger for backbone unless noted otherwise on drawings.
- D. Pathway Fittings: Compatible with pathways and suitable for use and location.
 1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
 2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with this type of conduit. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.
 3. EMT: Use set-screw, steel fittings. Comply with NEMA FB 2.10.
- E. Install surface pathways only where indicated on Drawings.
- F. Do not install nonmetallic conduit where ambient temperature exceeds 120 deg F.

3.2 INSTALLATION

- A. All metal pathways shall be bonded. See detail notes and related specification sections for specifics.
- B. Comply with the following standards for installation requirements except where requirements on Drawings or in this Section are stricter:
 1. NECA 1.
 2. NECA/BICSI 568.
 3. TIA-569-D.
 4. NECA 101
 5. NECA 102.
 6. NECA 105.
 7. NECA 111.

- C. Comply with NFPA 70 limitations for types of pathways allowed in specific occupancies and number of floors.
- D. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation for penetrations through fire-rated walls, ceilings, and assemblies.
- E. Comply with requirements in Section 270529 "Hangers and Supports for Communications Systems" for hangers and supports.
- F. Comply with requirements in Section 270544 "Sleeves and Sleeve Seals for Communications Pathways and Cabling" for sleeves and sleeve seals for communications.
- G. Keep pathways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal pathway runs above water and steam piping.
- H. Complete pathway installation before starting conductor installation.
- I. Arrange stub-ups so curved portions of bends are not visible above finished slab.
- J. Install no more than the equivalent of two 90-degree bends in any pathway run.
- K. Support within 12 inches of changes in direction.
- L. All conduits bends shall have bend-radii of no less than 6X the outside diameter of conduit.
- M. Conceal rigid conduit within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
- N. Support conduit within 12 inches of enclosures to which attached.
- O. Pathways Embedded in Slabs:
 - 1. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support. Secure pathways to reinforcement at maximum 10-foot intervals.
 - 2. Arrange pathways to cross building expansion joints at right angles with expansion fittings. Comply with requirements for expansion joints specified in this article.
 - 3. Arrange pathways to keep a minimum of 2 inches of concrete cover in all directions.
 - 4. Do not embed threadless fittings in concrete unless specifically approved by Architect for each specific location.
 - 5. Change from nonmetallic conduit and fittings to GRC and fittings before rising above floor.
- P. Stub-ups to Above Recessed Ceilings:
 - 1. Use EMT, IMC, or RMC for pathways.
 - 2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.
- Q. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of pathway and fittings before making up joints. Follow compound manufacturer's written instructions.
- R. Coat field-cut threads on PVC-coated pathway with a corrosion-preventing conductive compound prior to assembly.
- S. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install insulated bushings on conduits terminated with locknuts.
- T. Install pathways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus one additional quarter-turn.
- U. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure, to assure a continuous ground path.
- V. Cut conduit perpendicular to the length. For conduits of 2-inch trade size and larger, use roll cutter or a guide to ensure cut is straight and perpendicular to the length.
- W. Install pull wires in empty pathways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire. Secure pull wire, so it cannot fall into conduit. Cap pathways designated as spare alongside pathways in use.
- X. Surface Pathways:
 - 1. Install surface pathway for surface telecommunications outlet boxes only where indicated on Drawings.
 - 2. Install surface pathway with a minimum 2-inch radius control at bend points.

3. Secure surface pathway with screws or other anchor-type devices at intervals not exceeding 48 inches and with no less than two supports per straight pathway section. Support surface pathway according to manufacturer's written instructions. Tape and glue are not acceptable support methods.
- Y. Pathways for Optical-Fiber and Communications Cable: Install pathways, metal and nonmetallic, rigid and flexible, as follows:
1. 1-1/4-Inch Trade Size and Larger: Install pathways in maximum lengths of 75 feet.
 2. Install with a maximum of two 90-degree bends or equivalent for each length of pathway unless Drawings show stricter requirements. Separate lengths with pull or junction boxes or terminations at distribution frames or cabinets where necessary to comply with these requirements.
- Z. Install pathway-sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed pathways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install pathway-sealing fittings according to NFPA 70.
- AA. Install devices to seal pathway interiors at accessible locations. Locate seals, so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all pathways at the following points:
1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 2. Where an underground service pathway enters a building or structure.
 3. Where otherwise required by NFPA 70.
 4. Refer to specification 270544, Sleeves and Sleeve Seals for communications pathway and cabling
- BB. Comply with manufacturer's written instructions for solvent welding PVC conduit and fittings.
- CC. Expansion-Joint Fittings:
1. Install in each run of aboveground RNC that is located where environmental temperature change may exceed 30 deg F, and that has straight-run length that exceeds 25 feet. Install in each run of aboveground RMC and EMT that is located where environmental temperature change may exceed 100 deg F, and that has straight-run length that exceeds 100 feet.
 2. Install type and quantity of fittings that accommodate temperature change listed for each of the following locations:
 - a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F temperature change.
 - b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F temperature change.
 - c. Indoor Spaces Connected with Outdoors without Physical Separation: 125 deg F temperature change.
 - d. Attics: 135 deg F temperature change.
 3. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F of temperature change for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.00078 inch per foot of length of straight run per deg F of temperature change for metal conduits.
 4. Install expansion fittings at all locations where conduits cross building or structure expansion joints.
 5. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.
- DD. J-Hooks:
1. Size to allow a minimum of 25 percent future capacity without exceeding design capacity limits.
 2. Shall be supported by dedicated support wires. Do not use ceiling grid support wire or support rods.
 3. Hook spacing shall allow no more than 6 inches of slack. The lowest point of the cables shall be no less than 6 inches adjacent to ceilings, mechanical ductwork and fittings,

- luminaires, power conduits, power and telecommunications outlets, and other electrical and communications equipment.
- 4. Space hooks no more than 4 foot o.c., randomly spaced.
- 5. Provide a hook at each change in direction.
- 6. Grounding of J-Hooks
 - a. J-Hooks shall be bonded together with #12 awg.
- EE. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.
- FF. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall. Prepare block surface to provide a flat surface for a raintight connection between box and cover plate or supported equipment and box.
- GG. Horizontally separate boxes mounted on opposite sides of walls, so they are not in the same vertical channel.
- HH. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.
- II. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.
- JJ. Set metal floor boxes level and flush with finished floor surface.
- KK. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

3.3 INSTALLATION OF UNDERGROUND CONDUIT

- A. Direct-Buried Conduit:
 - 1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom as specified in Section 312000 "Earth Moving" for pipe of less than 6 inches in nominal diameter.
 - 2. Install backfill as specified in Section 312000 "Earth Moving."
 - 3. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as specified in Section 312000 "Earth Moving."
 - 4. Install manufactured duct elbows for stub-ups at poles and equipment and at building entrances through floor unless otherwise indicated. Encase elbows for stub-up ducts throughout length of elbow.
 - 5. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through floor.
 - a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches of concrete around conduit for a minimum of 12 inches on each side of the coupling.
 - b. For stub-ups at equipment mounted on outdoor concrete bases and where conduits penetrate building foundations, extend steel conduit horizontally a minimum of 60 inches from edge of foundation or equipment base. Install insulated grounding bushings on terminations at equipment.
 - 6. Underground Warning Tape: Comply with requirements in Section 270553 "Identification for Communications Systems."

3.4 INSTALLATION OF UNDERGROUND HANDHOLES AND BOXES

- A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.
- B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.
- C. Elevation: In paved areas, set so cover surface will be flush with finished grade. Set covers of other enclosures 1 inch above finished grade.

- D. Install handholes with bottom below frost line, below grade.
- E. Install removable hardware, including pulling eyes, cable stanchions, cable arms, and insulators, as required for installation and support of cables and conductors and as indicated. Select arm lengths to be long enough to provide spare space for future cables, but short enough to preserve adequate working clearances in enclosure.
- F. Field cut openings for conduits according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

3.5 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR COMMUNICATIONS PENETRATIONS

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 270544 "Sleeves and Sleeve Seals for Communications Pathways and Cabling."

3.6 FIRESTOPPING

- A. Install firestopping at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

3.7 PROTECTION

- A. Protect coatings, finishes, and cabinets from damage or deterioration.
 - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 - 2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 27 0528

**SECTION 27 0529
HANGERS AND SUPPORTS FOR COMMUNICATIONS SYSTEMS**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Division 26 Common Work Results for Electrical and Common Electrical Materials and Methods section apply to work specified in this is section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Steel slotted support systems for communication raceways.
 - 2. Aluminum slotted support systems for communication raceways.
 - 3. Nonmetallic slotted support systems for communication raceways.
 - 4. Conduit and cable support devices.
 - 5. Support for conductors in vertical conduit.
 - 6. Structural steel for fabricated supports and restraints.
 - 7. Mounting, anchoring, and attachment components, including powder-actuated fasteners, mechanical expansion anchors, concrete inserts, clamps, through bolts, toggle bolts, and hanger rods.
 - 8. Fabricated metal equipment support assemblies.

1.3 SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:
 - a. Slotted support systems, hardware, and accessories.
 - b. Clamps.
 - c. Hangers.
 - d. Sockets.
 - e. Eye nuts.
 - f. Fasteners.
 - g. Anchors.
 - h. Saddles.
 - i. Brackets.
 - 2. Include rated capacities and furnished specialties and accessories.
- B. Shop Drawings: Signed and sealed by a qualified professional engineer. For fabrication and installation details for communications hangers and support systems.
 - 1. Trapeze hangers. Include product data for components.
 - 2. Steel slotted-channel systems.
 - 3. Aluminum slotted-channel systems.
 - 4. Nonmetallic slotted-channel systems.
 - 5. Equipment supports.
 - 6. Vibration Isolation Base Details: Detail fabrication, including anchorages and attachments to structure and to supported equipment. Include adjustable motor bases, rails, and frames for equipment mounting.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design hanger and support system.
- B. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame Rating: Class 1.

2. Self-extinguishing according to ASTM D 635.

2.2 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Preformed steel channels and angles with minimum 13/32-inch-diameter holes at a maximum of 8 inches o.c. in at least one surface.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Allied Tube & Conduit; a part of Atkore International.
 - b. B-line, an Eaton business.
 - c. Flex-Strut Inc.
 - d. Gripple Inc.
 - e. GS Metals Corp.
 - f. G-Strut.
 - g. Haydon Corporation.
 - h. Metal Ties Innovation.
 - i. MIRO Industries.
 - j. Thomas & Betts Corporation; A Member of the ABB Group.
 - k. Unistrut; Part of Atkore International.
 - l. Wesanco, Inc.
 2. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.
 3. Material for Channel, Fittings, and Accessories: Galvanized steel.
 4. Channel Width: Selected for applicable load criteria.
 5. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
 6. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
 7. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
 8. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
 9. Channel Dimensions: Selected for applicable load criteria.
- B. Conduit and Cable Support Devices: Steel clamps, hangers, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- C. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for nonarmored communications conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be made of malleable iron.
- D. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M steel plates, shapes, and bars; black and galvanized.
- E. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
1. Powder-Actuated Fasteners: Threaded-steel stud for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Hilti, Inc.
 - 2) ITW Ramset/Red Head; Illinois Tool Works, Inc.
 - 3) MKT Fastening, LLC.
 - 4) Simpson Strong-Tie Co., Inc.
 2. Mechanical-Expansion Anchors: Insert-wedge-type zinc-coated steel for use in hardened portland cement concrete, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) B-line, an Eaton business.

- 2) Empire Tool and Manufacturing Co., Inc.
- 3) Hilti, Inc.
- 4) ITW Ramset/Red Head; Illinois Tool Works, Inc.
- 5) MKT Fastening, LLC.
3. Concrete Inserts: Steel or malleable-iron, slotted support system units are similar to MSS Type 18 units and comply with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units are suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
6. Toggle Bolts: Stainless-steel springhead type.
7. Hanger Rods: Threaded steel.

2.3 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

- A. Description: Welded or bolted structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.
- B. Materials: Comply with requirements in Section 055000 "Metal Fabrications" for steel shapes and plates.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Comply with the following standards for application and installation requirements of hangers and supports, except where requirements on Drawings or in this Section are stricter:
 1. NECA 1.
 2. NECA/BICSI 568.
 3. TIA-569-D.
 4. NECA 101
 5. NECA 102.
 6. NECA 105.
 7. NECA 111.
- B. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation for penetrations through fire-rated walls, ceilings, and assemblies.
- C. Comply with requirements for pathways specified in Section 270528 "Pathways for Communications Systems."
- D. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMTs, IMCs, and RMCs as required by NFPA 70. Minimum rod size shall be 1/4 inch in diameter.
- E. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted or other support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
 1. Secure raceways and cables to these supports with two-bolt conduit clamps.
- F. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

- A. Raceway Support Methods: In addition to methods described in NECA 1, EMT and RMC may be supported by openings through structure members, according to NFPA 70.
- B. Strength of Support Assemblies: Where not indicated, select sizes of components, so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.
- C. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten communications items and their supports to building structural elements by the following methods unless otherwise indicated by code:
 1. To Wood: Fasten with lag screws or through bolts.

2. To New Concrete: Bolt to concrete inserts.
 3. To Masonry: Use approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
 4. To Existing Concrete: Use expansion anchor fasteners.
 5. Instead of expansion anchors, powder-actuated-driven threaded studs, provided with lock washers and nuts, may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
 6. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts.
 7. To Light Steel: Sheet metal screws.
 8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.
- D. Drill holes for expansion anchors in concrete at locations and to depths that avoid the need for reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Comply with installation requirements in Section 055000 "Metal Fabrications" for site-fabricated metal supports.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor communications materials and equipment.
- C. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.
- B. Touchup: Comply with requirements in Section 099113 "Exterior Painting" Section 099123 "Interior Painting" and Section 099600 "High-Performance Coatings" for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas, and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 27 0529

SECTION 27 0544
SLEEVES AND SLEEVE SEALS FOR COMMUNICATIONS PATHWAYS AND CABLING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Division 26 Common Work Results for Electrical and Common Electrical Materials and Methods section apply to work specified in this is section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Sleeves for pathway and cable penetration of non-fire-rated construction walls and floors.
 - 2. Sleeve-seal systems.
 - 3. Sleeve-seal fittings.
 - 4. Grout.
 - 5. Silicone sealants.
- B. Related Requirements:
 - 1. Section 078413 "Penetration Firestopping" for penetration firestopping installed in fire-resistance-rated walls, horizontal assemblies, and smoke barriers, with and without penetrating items.

1.3 SUBMITTALS

- A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 SLEEVES

- A. Wall Sleeves:
 - 1. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, plain ends.
 - 2. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.
- B. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies: Galvanized-steel sheet; 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint, with tabs for screw-fastening the sleeve to the board.
- C. PVC-Pipe Sleeves: ASTM D 1785, Schedule 40.
- D. Molded-PVC Sleeves: With nailing flange for attaching to wooden forms.
- E. Molded-PE or -PP Sleeves: Removable, tapered-cup shaped, and smooth outer surface with nailing flange for attaching to wooden forms.
- F. Sleeves for Rectangular Openings:
 - 1. Material: Galvanized-steel sheet.
 - 2. Minimum Metal Thickness:
 - a. For sleeve cross-section rectangle perimeter less than 50 inches and with no side larger than 16 inches, thickness shall be 0.052 inch.
 - b. For sleeve cross-section rectangle perimeter 50 inches or more and one or more sides larger than 16 inches, thickness shall be 0.138 inch.

2.2 SLEEVE-SEAL SYSTEMS

- A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and pathway or cable.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. GPT Industries, Linkseal

2.3 GROUT

- A. Description: Nonshrink; recommended for interior and exterior sealing openings in non-fire-rated walls or floors.
- B. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
- C. Design Mix: 5000-psi, 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 SLEEVE INSTALLATION FOR NON-FIRE-RATED ELECTRICAL PENETRATIONS

- A. Comply with NECA 1.
- B. Comply with NEMA VE 2 for cable tray and cable penetrations.
- C. Sleeves for Conduits Penetrating Above-Grade Non-Fire-Rated Concrete and Masonry-Unit Floors and Walls:
 - 1. Interior Penetrations of Non-Fire-Rated Walls and Floors:
 - a. Seal annular space between sleeve and pathway using joint sealant appropriate for size, depth, and location of joint. Joint sealant shall not be installed within pathway. Comply with requirements in Section 079200 "Joint Sealants."
 - b. Seal space outside of sleeves with mortar or grout for less than 2" diameter, use Linkseals for 2" or greater. Pack sealing material solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect material while curing.
 - 2. Space between cable and interior sleeve:
 - a. Above grade interior penetration for fire and acoustical rated walls and floors: Hilti firestop plug CFS-PL.
 - b. Below grade exterior penetration: Raychem RDSS Rayflate duct sealing system.
 - c. Above grade interior environmental (warm to cold location, non-conditioned and conditioned spaces, pressurized spaces): Hilti firestop plug CFS-PL.
 - 3. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
 - 4. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and pathway or cable unless sleeve seal is to be installed.
 - 5. Install sleeves for wall penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of walls. Cut sleeves to length for mounting flush with both surfaces of walls. Deburr after cutting.
 - 6. Install sleeves for floor penetrations. Extend sleeves installed in floors 2 inches above finished floor level. Install sleeves during erection of floors.
- D. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies:
 - 1. Use circular metal sleeves unless penetration arrangement requires rectangular sleeved opening.
 - 2. Seal space outside of sleeves with approved joint compound for gypsum board assemblies.
- E. Roof-Penetration Sleeves: Seal penetration of individual pathways and cables with flexible boot-type flashing units applied in coordination with roofing work.
- F. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- G. Underground, Exterior-Wall and Floor Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch annular clear space between pathway or cable and sleeve for installing sleeve-seal system.

3.2 SLEEVE-SEAL-SYSTEM INSTALLATION

- A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at pathway entries into building.
- B. Install type and number of sealing elements recommended by manufacturer for pathway or cable material and size. Position pathway or cable in center of sleeve. Assemble mechanical

sleeve seals and install in annular space between pathway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.3 SLEEVE-SEAL-FITTING INSTALLATION

- A. Install sleeve-seal fittings in new walls and slabs as they are constructed. Sleeves over 6'-0" shall be provided with insulated ground bushings both ends.
- B. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position waterstop flange to be centered in concrete slab or wall.
- C. Secure nailing flanges to concrete forms.
- D. Using grout, seal the space around outside of sleeve-seal fittings.

END OF SECTION 27 0544

**SECTION 27 0553
IDENTIFICATION FOR COMMUNICATIONS SYSTEMS**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Division 26 Common Work Results for Electrical and Common Electrical Materials and Methods section apply to work specified in this is section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Color and legend requirements for labels and signs.
 - 2. Labels.
 - 3. Bands and tubes.
 - 4. Signs.
 - 5. Cable ties.

1.3 SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for communications identification products.
- B. Identification Schedule:
 - 1. Outlets: Scaled drawings indicating location and proposed designation.
 - 2. Backbone Cabling: Riser diagram showing each communications room, backbone cable, and proposed backbone cable designation.
 - 3. Racks: Scaled drawings indicating location and proposed designation.
 - 4. Patch Panels: Enlarged scaled drawings showing rack row, number, and proposed designations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Comply with NFPA 70 and TIA 606-B.
- B. Comply with ANSI Z535.4 for safety signs and labels.
- C. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
 - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 COLOR AND LEGEND REQUIREMENTS

- A. Equipment Identification Labels:
 - 1. Black letters on a white field.

2.3 LABELS

- A. Vinyl Wraparound Labels: Preprinted, flexible labels laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing label ends.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Brady Corporation.
 - b. Champion America.
 - c. Grafoplast Wire Markers.
 - d. HellermannTyton.
 - e. LEM Products Inc.
 - f. Marking Services, Inc.

- g. Panduit Corp.
- h. Seton Identification Products.
- B. Self-Adhesive Wraparound Labels: Preprinted, 3-mil-thick, polyester flexible labels with acrylic pressure-sensitive adhesive.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. A'n D Cable Products.
 - b. Brady Corporation.
 - c. Brother International Corporation.
 - d. emedco.
 - e. Grafoplast Wire Markers.
 - f. Ideal Industries, Inc.
 - g. LEM Products Inc.
 - h. Marking Services, Inc.
 - i. Panduit Corp.
 - j. Seton Identification Products.
 - 2. Self-Lamination: Clear; UV-, weather- and chemical-resistant; self-laminating protective shields over the legend. Labels sized such that the clear shield overlaps the entire printed legend.
 - 3. Marker for Labels: Machine-printed, permanent, waterproof black ink recommended by printer manufacturer.
- C. Self-Adhesive Labels: Vinyl, thermal, transfer-printed, 3-mil-thick, multicolor, weather- and UV-resistant, pressure-sensitive adhesive labels, configured for intended use and location.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. A'n D Cable Products.
 - b. Brady Corporation.
 - c. Brother International Corporation.
 - d. emedco.
 - e. Grafoplast Wire Markers.
 - f. HellermannTyton.
 - g. Ideal Industries, Inc.
 - h. LEM Products Inc.
 - i. Marking Services, Inc.
 - j. Panduit Corp.
 - k. Seton Identification Products.
 - 2. Minimum Nominal Size:
 - a. 1-1/2 by 6 inches for raceway and conductors.
 - b. 3-1/2 by 5 inches for equipment.
 - c. As required by authorities having jurisdiction.

2.4 UNDERGROUND-LINE WARNING TAPE

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Brady Corporation.
 - 2. Ideal Industries, Inc.
 - 3. LEM Products Inc.
 - 4. Marking Services, Inc.
 - 5. Reef Industries, Inc.
 - 6. Seton Identification Products.
- B. Tape:
 - 1. Recommended by manufacturer for the method of installation and suitable to identify and locate underground communications utility lines.
 - 2. Printing on tape shall be permanent and shall not be damaged by burial operations.

3. Tape material and ink shall be chemically inert and not subject to degradation when exposed to acids, alkalis, and other destructive substances commonly found in soils.
- C. Color and Printing:
 1. Comply with ANSI Z535.1, ANSI Z535.2, ANSI Z535.3, and ANSI Z535.4.
 2. Inscriptions for Orange-Colored Tapes: "OPTICAL-FIBER CABLE".
- D. Tag: Type IID:
 1. Reinforced, detectable three-layer laminate, consisting of a printed pigmented woven scrim, a solid aluminum-foil core, and a clear protective film that allows inspection of the continuity of the conductive core; bright-colored, continuous-printed on one side with the inscription of the utility, compounded for direct-burial service.
 2. Width: 3 inches.
 3. Overall Thickness: 8 mils.
 4. Foil Core Thickness: 0.35 mil.
 5. Weight: 34 lb/1000 sq. ft..
 6. Tensile according to ASTM D 882: 300 lbf and 12,500 psi.

2.5 SIGNS

- A. Laminated-Acrylic or Melamine-Plastic Signs:
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Brady Corporation.
 - b. Carlton Industries, LP.
 - c. emedco.
 - d. Marking Services, Inc.
 2. Engraved legend.
 3. Thickness:
 - a. For signs up to 20 sq. in., minimum 1/16 inch thick.
 - b. For signs larger than 20 sq. in., 1/8 inch thick.
 - c. Engraved legend with black letters on white face.
 - d. Punched or drilled for mechanical fasteners with 1/4-inch grommets in corners for mounting.
 - e. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

2.6 CABLE TIES

- A. Description: Cable ties utilized to fasten labels and tags to backbone cable.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. HellermannTyton.
 2. Ideal Industries, Inc.
 3. Marking Services, Inc.
 4. Panduit Corp.
- C. Plenum-Rated Cable Ties: Self-extinguishing, UV stabilized, one piece, and self-locking.
 1. Minimum Width: 3/16 inch.
 2. Tensile Strength at 73 deg F according to ASTM D 638: 7000 psi.
 3. UL 94 Flame Rating: 94V-0.
 4. Temperature Range: Minus 50 to plus 284 deg F.
 5. Color: Black.

2.7 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Retain paint system applicable for surface material and location (exterior or interior).
- B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Self-Adhesive Identification Products: Before applying communications identification products, clean substrates of substances that could impair bond, using materials and methods recommended by manufacturer of identification product.

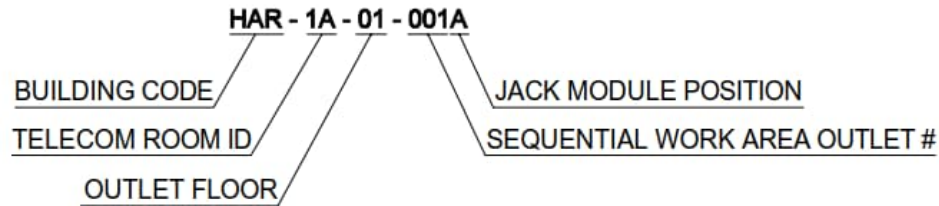
3.2 INSTALLATION

- A. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and operation and maintenance manual. Use consistent designations throughout Project.
- B. Install identifying devices before installing acoustical ceilings and similar concealment.
- C. Verify identity of each item before installing identification products.
- D. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and operation and maintenance manual.
- E. Apply identification devices to surfaces that require finish after completing finish work.
- F. Install signs with approved legend to facilitate proper identification, operation, and maintenance of communications systems and connected items.
- G. Elevated Components: Increase sizes of labels, signs, and letters to those appropriate for viewing from the floor.
- H. Vinyl Wraparound Labels:
 - 1. Secure tight to surface of raceway or cable at a location with high visibility and accessibility.
 - 2. Attach labels that are not self-adhesive type with clear vinyl tape, with adhesive appropriate to the location and substrate.
 - 3. Provide label 6 inches from cable end.
- I. Self-Adhesive Wraparound Labels:
 - 1. Secure tight to surface at a location with high visibility and accessibility.
 - 2. Provide label 6 inches from cable end.
- J. Self-Adhesive Labels:
 - 1. On each item, install unique designation label that is consistent with wiring diagrams, schedules, and operation and maintenance manual.
 - 2. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on 1-1/2-inch-high label; where two lines of text are required, use labels 2 inches high.
- K. Underground-Line Warning Tape:
 - 1. During backfilling of trenches, install continuous underground-line warning tape directly above cable or raceway at 6 to 8 inches below finished grade. Use multiple tapes where width of multiple lines installed in a common trench or concrete envelope exceeds 16 inches overall.
 - 2. Limit use of underground-line warning tape to direct-buried cables.

3.3 IDENTIFICATION SCHEDULE

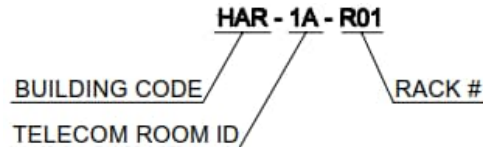
- A. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment. Install access doors or panels to provide view of identifying devices.
- B. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, pull points, and locations with high visibility. Identify by system and circuit designation.
- C. Accessible Fittings for Raceways and Cables within Buildings: Identify covers of each junction and pull box with self-adhesive labels containing wiring system legend.
 - 1. System legends shall be as follows:
 - a. Telecommunications.
- D. Faceplates: Label individual faceplates with mechanically-printed labels. Place label behind label window on faceplate. Each faceplate shall be labeled with its unique alphanumeric designation composed of the following, in the order listed:
 - 1. 3-Digit Building designation (confirm with Owner).

2. 2-Digit Telecom room designation (confirm with Owner).
3. 2-Digit Work area outlet's floor.
4. Three digit sequence to represent faceplate (e.g. "001", "002", "003", etc.) and letter to designate.
5. Jack position (e.g. A, B, C, or D).
6. Example: The example faceplate label below indicates a faceplate located on the first floor of Harbourt Hall containing two jack modules connected to telecom room "1A" and terminated on patch panel ports "001A" and "001B" respectively.

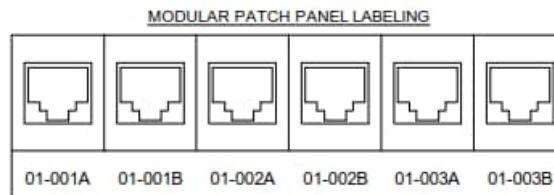
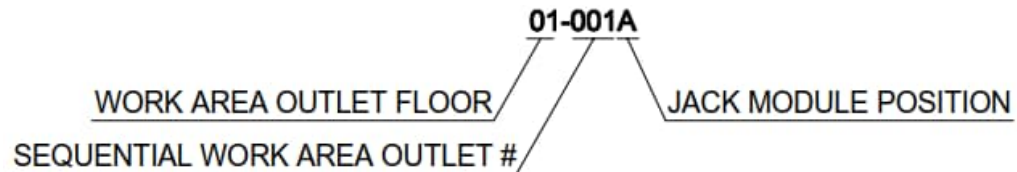


E. Equipment Room Labeling:

1. Racks: Identify front of each rack on top rail with nylon plates embossed with rack label.
 - a. Building designation (confirm with Owner)
 - b. Telecom room designation.
 - c. Rack number.
 - d. Example: The example rack label below indicates the first rack located in telecom room "1A" in Harbourt Hall.



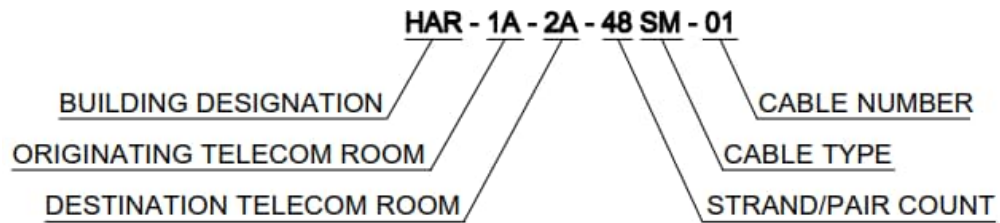
2. Patch Panels: Label each patch panel port with a mechanically produced label with the terminating cable's faceplate identifier:
 - a. Two digit work area outlets floor.
 - b. Three digit work area outlet number (sequence to reflect corresponding faceplate label) + letter to designate jack position.
 - c. Example: The example patch panel port label below indicates a port terminating the cable from floor 01 jack, position "A" located in work area outlet "001."



F. Backbone:

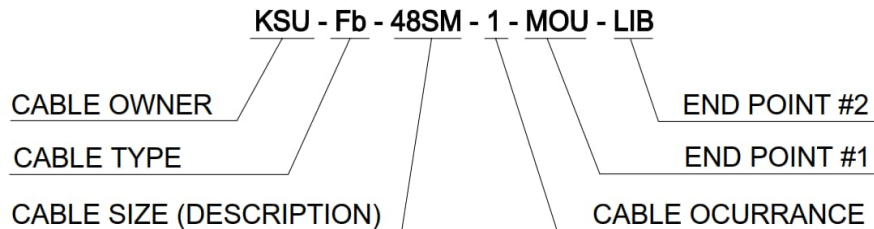
1. Intra-building backbone cable

- a. 3-Digit Building designation.
- b. Origination Telecom Room.
- c. Destination Telecom Room.
- d. Strand-count + Type: e.g. "SM" (singlemode fiber),"MM" (multimode fiber), "C3" (CAT3).
- e. 2-digit sequential cable number (e.g. 01, 02.. etc)
- f. Example: The example backbone cable label below indicates the first 48-strand singlemode fiber optic cable originating in closet "1A" and terminating in closet "2A".



2. Inter-building backbone cable

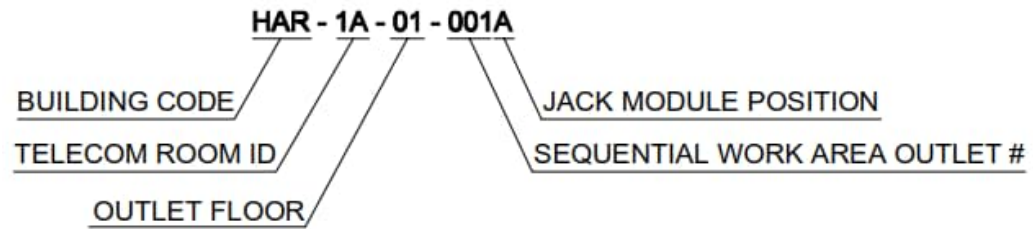
- a. 3-Digit cable owner (i.e. KSU, ATT, TWC).
- b. 2-Digit cable type (i.e. Fb, Cu, Cx).
- c. Up to 10-Digit cable size (i.e. 100pr, RG11, OMM/65m, etc.).
- d. Occurrence of this cable (i.e. 1, 2, 3, etc.).
- e. End point #1 (i.e. Bldg. TLA, MH#, splice #, etc.).
- f. End point #2 (i.e. Bldg. MOU, MH#, splice #, etc.).
- g. Example: The example backbone cable label below indicates a Kent State University 48-strand singlemode fiber optic cable originating in Moulton Hall and terminating in the Library.



G. Horizontal Cables: Label each cable with a vinyl-wraparound label indicating the following, in the order listed:

- 1. 3-Digit Building designation (confirm with Owner).
- 2. 2-Digit Telecom room designation (confirm with Owner).
- 3. 2-Digit Work area outlet's floor.
- 4. Three digit sequence to represent faceplate (e.g. "001", "002", "003", etc.) and letter to designate jack position (e.g. "A", "B", etc.)

5. Example: The example horizontal cable label below indicates a cable originating from patch panel port "001A" in Harbourt Hall telecom room "1A" connecting jack module "A" within work area outlet "001" located on floor "01".



- H. Locations of Underground Lines: Underground-line warning tape for copper, coaxial, hybrid copper/fiber, and optical-fiber cable.
- I. Instructional Signs: Self-tapping.
- J. Equipment Identification Labels:
1. Equipment: Laminated-acrylic or melamine-plastic sign.
 2. Equipment to Be Labeled:
 - a. Racks

END OF SECTION 27 0553

**SECTION 27 1100
COMMUNICATIONS EQUIPMENT ROOM FITTINGS**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Division 26 Common Work Results for Electrical and Common Electrical Materials and Methods section apply to work specified in this is section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Backboards.
- B. Related Requirements:
 - 1. Section 270536 "Cable Trays for Communications Systems" for cable trays and accessories.
 - 2. Section 271313 "Communications Copper Backbone Cabling" for copper data cabling associated with system panels and devices.
 - 3. Section 271323 "Communications Optical Fiber Backbone Cabling" for optical-fiber data cabling associated with system panels and devices.
 - 4. Section 271333 "Communications Coaxial Backbone Cabling" for coaxial data cabling associated with system panels and devices.
 - 5. Section 271513 "Communications Copper Horizontal Cabling" for copper data cabling associated with system panels and devices.
 - 6. Section 271533 "Communications Coaxial Horizontal Cabling" for coaxial data cabling associated with system panels and devices.

1.3 DEFINITIONS

- A. Access Provider: An operator that provides a circuit path or facility between the service provider and user. An access provider can also be a service provider.
- B. BICSI: Building Industry Consulting Service International.
- C. RCDD: Registered communications distribution designer.
- D. Service Provider: The operator of a telecommunications transmission service delivered through access provider facilities.
- E. TGB: Telecommunications grounding bus bar.
- F. TMGB: Telecommunications main grounding bus bar.

1.4 SUBMITTALS

- A. Product Data Sheet: For each type of product.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Cabling installer must have personnel certified by BICSI on staff.
 - 1. Layout Responsibility: Preparation of Shop Drawings shall be under direct supervision of RCDD.
 - 2. Installation Supervision: Installation shall be under direct supervision of Technician, who shall be present at all times when Work of this Section is performed at Project site.
 - 3. Field Inspector: Currently registered by BICSI as RCDD to perform the on-site inspection.

PART 2 - PRODUCTS

2.1 BACKBOARDS

- A. Backboards: Plywood, 3/4 by 48 by 96 inches. Fire rated plywood is not permitted.
- B. Backboard Paint: Cover front, back, and all edges with gray fire retardant paint.

PART 3 - EXECUTION

3.1 ENTRANCE FACILITIES

- A. Comply with requirements in Section 270528 "Pathways for Communications Systems" for materials and installation requirements for buried pathways.

3.2 INSTALLATION

- A. Comply with NECA 1.
- B. Comply with BICSI's "Telecommunications Distribution Methods Manual" for layout of communications equipment spaces.
- C. Comply with BICSI's "Information Technology Systems Installation Methods Manual" for installation of equipment in communications equipment spaces.
- D. Bundle, lace, and train conductors and cables to terminal points without exceeding manufacturer's limitations on bending radii. Install lacing bars and distribution spools.
- E. Coordinate layout and installation of communications equipment in tracks and in room.
 - 1. Meet jointly with Owner to exchange information and agree on details of equipment configurations and installation interfaces.
 - 2. Record agreements reached in meetings and distribute them to other participants.
 - 3. Adjust configurations and locations of distribution frames, cross-connects, and patch panels in equipment rooms to accommodate and optimize configurations and space requirements of communications equipment.
 - 4. Adjust configurations and locations of equipment with distribution frames, cross-connects, and patch panels of cabling systems of other communications, electronic safety and security, and related systems that share space in equipment room.
- F. Coordinate location of power raceways and receptacles with locations of communications equipment requiring electrical power to operate.
- G. Backboards:
 - 1. Cover all walls with 3/4" plywood from 6 inches to 8 feet, 6 inches above finished floor.
 - 2. Paint all sides of backboard with two coats of fire retardant paint.
 - 3. Comply with requirements for backboard installation in BICSI's "Information Technology Systems Installation Methods Manual" and TIA-569-D.
 - 4. Fire rated plywood is not permitted, all backboards shall be painted as described.

3.3 SLEEVE AND SLEEVE SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 270544 "Sleeves and Sleeve Seals for Communications Pathways and Cabling."

3.4 FIRESTOPPING

- A. Comply with requirements in Section 078413 "Penetration Firestopping."
- B. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals." Telecom cabling contractor is responsible for firestopping between cables and sleeving.
- C. Comply with TIA-569-D, Annex A, "Firestopping."
- D. Comply with BICSI's "Information Technology Systems Installation Methods Manual," "Firestopping Practices".
- E. Install firestop plugs (Hilti CFS-PL series or approved equal) on all conduit penetrations in telecom spaces.

END OF SECTION 27 1100

**SECTION 27 1116
COMMUNICATIONS RACKS, FRAMES, AND ENCLOSURES**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Division 26 Common Work Results for Electrical and Common Electrical Materials and Methods section apply to work specified in this is section.

1.2 SUMMARY

- A. Section Includes:
 - 1. 19-inch equipment racks.
 - 2. 4-post 19-inch equipment racks.
 - 3. Power strips.
 - 4. Wire ladder pathways within telecom rooms.
 - 5. Grounding.
 - 6. Labeling.
- B. Related Requirements:
 - 1. Section 271110 "Communications Equipment Room Fittings" for backboards and accessories.
 - 2. Section 270526 "Grounding and Bonding for Telecommunications Equipment" for TMGBs and TGBs.
 - 3. Section 270536 "Cable Trays for Communications Systems" for cable trays and cable tray accessories.
 - 4. Section 271313 "Communications Copper Backbone Cabling" for copper data cabling associated with system panels and devices.
 - 5. Section 271323 "Communications Optical Fiber Backbone Cabling" for optical-fiber data cabling associated with system panels and devices.
 - 6. Section 271333 "Communications Coaxial Backbone Cabling" for coaxial data cabling associated with system panels and devices.
 - 7. Section 271513 "Communications Copper Horizontal Cabling" for copper data cabling associated with system panels and devices.
 - 8. Section 271533 "Communications Coaxial Horizontal Cabling" for coaxial data cabling associated with system panels and devices.

1.3 DEFINITIONS

- A. BICSI: Building Industry Consulting Service International.
- B. LAN: Local area network.
- C. RCDD: Registered communications distribution designer.
- D. TGB: Telecommunications grounding bus bar.
- E. TMGB: Telecommunications main grounding bus bar.

1.4 SUBMITTALS

- A. Product Data Sheet: For each type of product.
- B. Qualification Data: For Installer, qualified layout technician, installation supervisor, and field inspector.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Cabling installer must have personnel certified by BICSI on staff.
 - 1. Layout Responsibility: Preparation of Shop Drawings shall be under direct supervision of RCDD.
 - 2. Installation Supervision: Installation shall be under direct supervision of Technician, who shall be present at all times when Work of this Section is performed at Project site.
 - 3. Field Inspector: Currently registered by BICSI as RCDD to perform on-site inspection.

PART 2 - PRODUCTS

2.1 19-INCH EQUIPMENT RACKS

- A. Description: Two and four post racks with threaded rails designed for mounting telecommunications equipment. Width is compatible with EIA/ECIA 310-E, 19-inch equipment mounting with an opening of 17.72-inches between rails.
- B. Manufacturers: Subject to compliance with requirements,[provide products by one of the following:
 - 1. Chatsworth Products, Inc (CPI)
- C. General Requirements:
 - 1. Frames: Modular units designed for telecommunications terminal support and coordinated with dimensions of units to be supported.
 - 2. Material: Extruded aluminum.
 - 3. Finish: Manufacturer's standard, baked-polyester powder coat.
 - 4. Color: Black
- D. 2-Post Floor-Mounted Racks:
 - 1. Provide three (or quantity per Project Drawings) 2-post racks in new telecom rooms.
 - 2. Overall Height: 84 inches
 - 3. Color: Black
 - 4. Upright Depth: 3 inches
 - 5. Load Rating: 1000 lb.
 - 6. Number of Rack Units per Rack: 45
 - a. Numbering: Every rack unit, on interior of rack.
 - 7. Threads: 12-24.
 - 8. Base shall have a minimum of four mounting holes for permanent attachment to floor.
 - 9. Top shall have provisions for attaching to cable tray or ceiling.
 - 10. Manufacturer/Model: Chatsworth 46353-703.
- E. 4-Post Floor-Mounted Racks:
 - 1. Provide one 4-post rack (or quantity per Project Drawings) in each new telecom room.
 - 2. Overall Height: 84 inches.
 - 3. Color: Black
 - 4. Load Rating: 2000 lb.
 - 5. Number of Rack Units per Rack: 45
 - a. Numbering: Every rack unit, on interior of rack.
 - 6. Threads: 12-24.
 - 7. Base shall have a minimum of four mounting holes for permanent attachment to floor.
 - 8. Top shall have provisions for attaching to cable tray or ceiling.
 - 9. Manufacturer/Model: Chatsworth Quad-Rack 50120-703.
- F. Vertical Cable Management Panels:
 - 1. Provide one vertical cable management panel on each side of rack and between each rack.
 - 2. Metal, with integral wire retaining fingers.
 - 3. Baked-polyester powder coat finish.
 - 4. Color: Black
 - 5. 6" wide vertical cable management panels shall have front channels, with covers.
 - 6. Install 20" vertical wire ladder at rear of channel to serve as cable pathway between overhead wire ladder and termination panels.
 - 7. Manufacturer/Model: Chatsworth 30092-703.
- G. Interbay Wire Management Panel
 - 1. Equip each rack with the following (beginning at top of rack):
 - a. Rack Unit 01: 1RU Wire Manager: Chatsworth 10610-19.
 - b. Rack Units 02 – 04: 3RU Wire Manager: Chatsworth 30339-719.
 - c. Above, below, and between copper termination panels: Chatsworth 30339-719.

2.2 POWER STRIPS

- A. Power Strips: Comply with UL 1363.

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Provide one at each vertical wire management panel vertically on wire ladder.
3. 20-A, 120-V ac, NEMA WD 6, Configuration 5-20R receptacles.
4. Metered.
5. Use Chatsworth 12848-756.

2.3 WIRE LADDER

- A. Install wire ladder in accordance to section 270536 "Cable Trays for Communication Systems".
- B. Provide overhead, wire ladder pathways to support all new cabling at 28% fill.
 1. Provide minimum 20" wire ladder pathway at 90° AFF around perimeter of room and above rack assembly.
 2. Minimize cable pathways to rack by connecting the overhead wire ladder pathway above rack assembly to the perimeter wire ladder with minimum 20" wire ladder. Two in front and two in rear.
 3. Use Chatsworth 11252-720 or as noted on Drawings.
- C. Provide minimum 12" wall-mounted wire ladder pathway on rear wall.
 1. One horizontal wire ladder run the length of wall at 30" AFF to bottom of wire ladder.
 2. One vertical wire ladder run between the overhead wire ladder and the horizontal wire ladder.
 3. Provide vertical wire ladder pathway between all floor/wall conduit banks and the overhead wire ladder pathway.
 - a. Vertical wire ladder sized minimally to same width as conduit bank.
 4. Use Chatsworth 11252-712

2.4 GROUNDING

- A. Comply with requirements in Section 270526 "Grounding and Bonding for Communications Systems" for grounding conductors and connectors.
- B. Integral rack grounding lug (located on rail upright) accepting conductors ranging from No. 14 to No. 2/0 AWG, NRTL listed as complying with UL 467, and complying with TIA-606-B. Pre-drilling shall be with holes for use with lugs specified in this Section.

2.5 LABELING

- A. Comply with TIA-606-B and UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.
- B. Rack Labeling Scheme: Refer to 270553, Identification for Communication Systems.
- C. Label racks from left to right (as viewed from front of rack assembly).

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with NECA 1.
- B. Comply with BICSI TDMM for layout of communications equipment spaces.
- C. Comply with BICSI ITSIMM for installation of communications equipment spaces.
- D. Bundle, lace, and train conductors and cables to terminal points without exceeding manufacturer's limitations on bending radii. Install lacing bars and distribution spools.
- E. Coordinate layout and installation of communications equipment in racks and room.
 1. Meet jointly with Owner to exchange information and agree on details of equipment configurations and installation interfaces.
 2. Record agreements reached in meetings and distribute them to other participants.
 3. Adjust configurations and locations of distribution frames, and patch panels in equipment spaces to accommodate and optimize configuration and space requirements of telecommunications equipment.
 4. Adjust configurations and locations of equipment with distribution frames, cross-connects, and patch panels of cabling systems of other communications, electronic safety and security, and related systems that share space in equipment room.

- F. Clearances
 - 1. Provide 3.5-ft clearance in front and rear of rack assembly. Assuming 24"x24" plan view of rack.
 - 2. Notify Owner if clearances are not achievable.
- G. Coordinate location of power raceways and receptacles with locations of communications equipment requiring electrical power to operate.

3.2 GROUNDING

- A. Comply with NECA/BICSI 607.
- B. Install grounding according to BICSI ITSIMM, "Bonding, Grounding (Earthing) and Electrical Protection" Ch.
- C. Bond all metallic telecom racking and pathways to TGB with #6 green.
- D. Bond wire ladder sections together with grounding jumpers to provide continuity through entire assembly.
- E. Locate TGB to minimize length of bonding conductors. Fasten to wall, allowing at least 2 inches of clearance behind TGB. Connect TGB with a minimum No. 4 AWG grounding electrode conductor from TGB to suitable electrical building ground. Connect rack TGB to near TGB or the TMGB.
 - 1. Bond the shield of shielded cable to patch panel, and bond patch panel to TGB or TMGB.

3.3 IDENTIFICATION

- A. Coordinate system components, wiring, and cabling complying with TIA-606-B. Comply with requirements in Section 270553 "Identification for Electrical Systems."
- B. Comply with requirements in Section 099123 "Interior Painting" for painting backboards.
- C. Paint and label colors for equipment identification shall comply with TIA-606-B for Class 3 level of administration.
- D. Labels shall be machine printed. Type shall be 1/8 inch in height.

3.4 EQUIPMENT RACK OCCUPANCY

- A. Provide dedicated duplex receptacle on dedicated emergency circuit (if available) on back of each rack vertical with management, off-center at 18" AFF.
- B. Provide maximum of five (5) 48 port patch panels per rack.
- C. No more than 50% of rack shall be used, reserve 50% of rack for network electronic equipment.

END OF SECTION 27 1116

**SECTION 27 1513
COMMUNICATIONS COPPER HORIZONTAL CABLING**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Division 26 Common Work Results for Electrical and Common Electrical Materials and Methods section apply to work specified in this is section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Enhanced Category 5 (CAT5e) UTP.
 - 2. CAT5e Connectivity Hardware.
 - 3. Augmented Category 6(CAT6a) UTP.
 - 4. CAT6a Connectivity Hardware
 - 5. Cabling identification products.

1.3 DEFINITIONS

- A. Cross-Connect: A facility enabling the termination of cable elements and their interconnection or cross-connection.
- B. EMI: Electromagnetic interference.
- C. IDC: Insulation displacement connector.
- D. LAN: Local area network.
- E. Jack: Also commonly called an "outlet," it is the fixed, female connector.
- F. Plug: Also commonly called a "connector," it is the removable, male telecommunications connector.
- G. RCDD: Registered Communications Distribution Designer.
- H. UTP: Unscreened (unshielded) twisted pair.

1.4 COPPER HORIZONTAL CABLING DESCRIPTION

- A. Horizontal cable cabling system shall provide interconnections patch panels and work area outlets, wireless access points, security cameras, etc.
 - 1. Horizontal cabling shall contain no transition points or consolidation points between the horizontal cross-connect and the telecommunications equipment outlet without prior permission from Owner.
 - 2. Bridged taps and splices shall not be installed in the horizontal cabling.
- B. The maximum allowable horizontal cable length is 295 feet. This maximum allowable length does not include an allowance for the length of 16 feet to the workstation equipment or in the horizontal cross-connect.

1.5 SUBMITTALS

- A. Product Data sheet: For each type of product.
- B. Qualification Data: For RCDD, Installer, installation supervisor, and field inspector.

1.6 CLOSE OUT SUBMITTALS

- A. As Built Drawings: Reviewed by RCDD.
 - 1. Updated Jack List. Every cable has its own line with connectivity code in Excel and PDF.
 - 2. As-Built Drawings
 - a. Floor plan with outlet locations, connectivity code and outlet number in PDF format.
- B. Test Reports for all installed cables.
 - 1. Each test report must indicate full Class 3 cable label.
 - 2. Test reports must indicate pass or fail.
 - 3. All failed cables shall be replaced.

4. Cables with marginal test results shall be replaced.
5. Submit to Owner in PDF format.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff.
 1. Layout Responsibility: Preparation of Shop Drawings, cabling administration Drawings, and field testing program development by an RCDD.
 2. Installation Supervision: Installation shall be under the direct supervision of Technician, who shall be present at all times when Work of this Section is performed at Project site.
 3. Testing Supervisor: Currently certified by BICSI as an RCDD to supervise on-site testing.

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install cables and connecting materials until wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Horizontal cabling system shall comply with transmission standards in TIA-568-C.1, when tested according to test procedures of this standard.
- B. Telecommunications Pathways and Spaces: Comply with TIA-569-D.
- C. Grounding: Comply with TIA-607-B.

2.2 GENERAL CABLE CHARACTERISTICS

- A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with the applicable standard and NFPA 70 for the following types:
 1. Communications, Plenum Rated: Type CMP complying with UL 1685.

2.3 ENHANCED CATEGORY-FIVE (CAT5e) UTP

- A. Description: Four-pair, balanced-twisted pair cable, certified to meet transmission characteristics of Category 5e cable at frequencies up to 100 MHz.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Berk-Tek Leviton; a Nexans/Leviton alliance.
 2. CommScope, Inc.
 3. General Cable; General Cable Corporation.
 4. Superior Essex.
- C. Standard: Comply with ICEA S-90-661, NEMA WC 63.1, and TIA-568-C.2 for Category 5e cables.
- D. Cable Rating: Plenum.
- E. Jacket:
 1. Yellow
- F. Basis of design Manufacturer/Model: Commscope 5E55

2.4 CAT5e CONNECTIVITY HARDWARE

- A. Description: Hardware designed to terminate UTP cabling.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Hubbell
- C. General Requirements for Twisted Pair Cable Hardware:
 1. Comply with the performance requirements of CAT5e UTP.
 2. Comply with TIA-568-C.2, IDC type, with modules designed for punch-down caps or tools.
 3. Cables shall be terminated with connecting hardware of same category or higher.

- D. Patch Panel: Modular panels housing numbered jack units with IDC-type connectors at each jack location for permanent termination of pair groups of installed cables.
 - 1. Features:
 - a. Universal T568A and T568B wiring labels.
 - b. Labeling areas adjacent to conductors.
 - c. 48 ports.
 - 2. Manufacturer/Model: Hubbell P5E48U.
- E. Modular Jacks:
 - 1. Female; eight position; modular; fixed telecommunications connector designed for termination of a single four-pair, 100-ohm, unshielded or shielded twisted pair cable.
 - 2. Designed to snap into faceplate.
 - 3. Standard: Comply with TIA-568-C.2.
 - 4. Marked to indicate transmission performance.
 - 5. Color: Black
 - 6. Manufacturer/Model: Hubbell HXJ5EBK
- F. Faceplates:
 - 1. Vertical single gang faceplates designed to mount to single gang wall boxes.
 - 2. Plastic Faceplate: High-impact plastic. Coordinate color with Section 262726 "Wiring Devices."
 - 3. For use with snap-in jacks accommodating any combination of twisted pair, optical fiber, and coaxial work area cords.
 - 4. Color: Gray
 - 5. Insert blank modules (color to match faceplate) in all unused ports.
 - 6. 4-Port Angled Flush-Mount:
 - a. Manufacture/Model: Hubbell AFP14G
 - 7. Wallphone
 - a. Manufacture/Model: Leviton 4108W-0SP
 - 8. 2-Port Flush-Mount
 - a. Manufacture/Model: Hubbell IFP12GY
 - 9. 1-Port Surface-Mount
 - a. Manufacture/Model: Hubbell ISM1GY
 - 10. 2-Port Surface-Mount
 - a. Manufacture/Model: Hubbell ISM2GY
 - 11. Coordinate faceplates within specialized enclosures, outlet boxes, and modular furniture systems with manufacture to ensure proper fit.
- G. Dust Covers
 - 1. In all residence halls, equip jack modules with dust covers.
 - a. Manufacturer/Model: HXJDC25.

2.5 CATEGORY 6a TWISTED PAIR CABLE

- A. Description: Four-pair, balanced-twisted pair cable, with internal spline, certified to meet transmission characteristics of Category 6a cable at frequencies up to 500MHz.
- B. Standard: Comply with TIA-568-C.2 for Category 6a cables.
- C. Conductors: 100-ohm, 23 AWG solid copper.
- D. Shielding/Screening: Unshielded twisted pairs (UTP)
- E. Cable Rating: Plenum.
- F. Jacket: Blue.
- G. Manufacture/Model: Uniprise CMP-00423UNP10G-06

2.6 CAT6a CONNECTIVITY HARDWARE

- A. Description: Hardware designed to terminate UTP cabling.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Uniprise
- C. General Requirements for Twisted Pair Cable Hardware:

1. Comply with the performance requirements of CAT6a UTP.
 2. Comply with TIA-568-C.2, IDC type, with modules designed for punch-down caps or tools.
 3. Cables shall be terminated with connecting hardware of same category or higher.
- D. Patch Panel: Modular panels housing numbered jack units with IDC-type connectors at each jack location for permanent termination of pair groups of installed cables.
1. Features:
 - a. Universal T568A and T568B wiring labels.
 - b. Labeling areas adjacent to conductors.
 2. 48-Port Patch Panel
 - a. Manufacturer/Model: Uniprise UNP10G-48P
- E. Modular Jacks:
1. Female; eight position; modular; fixed telecommunications connector designed for termination of a single four-pair, 100-ohm, unshielded or shielded twisted pair cable.
 2. Designed to snap into faceplate.
 3. Standard: Comply with TIA-568-C.2.
 4. Marked to indicate transmission performance.
 5. Color: Black
 6. Manufacturer/Model: Uniprise UNJ10G-BK
- F. Faceplates:
1. Vertical single gang faceplates designed to mount to single gang wall boxes.
 2. Plastic Faceplate: High-impact plastic. Coordinate color with Section 262726 "Wiring Devices."
 3. For use with snap-in jacks accommodating any combination of twisted pair, optical fiber, and coaxial work area cords.
 4. Color: Gray
 5. Insert blank modules (color to match faceplate) in all unused ports.
 6. 4-Port Angled Flush-Mount:
 - a. Manufacture/Model: Uniprise M14AS-270
 7. Wallphone
 - a. Manufacture/Model: Leviton: 4108W-0SP
 8. 2-Port Flush-Mount
 - a. Manufacture/Model: Uniprise M12L-270
 9. 1-Port Surface-Mount
 - a. Manufacture/Model: Uniprise M101SMB-B-270
 10. 2-Port Surface-Mount
 - a. Manufacture/Model: Uniprise M102SMB-B-270
 11. Coordinate faceplates within specialized enclosures, outlet boxes, and modular furniture systems with manufacture to ensure proper fit.
- G. Dust Covers
1. In all residence halls, equip jack modules with dust covers.
 - a. Manufacturer/Model: Uniprise M20AP-270

2.7 LIGHTING PROTECTION

- A. Outdoor or buried drop cable must be protected at both ends.
1. Drops serving Talk-a-Phones shall be CAT 3 buried drop rated cable and use Manufacturer/Model: Circa 502-A350.
 2. All other outdoor drops use buried drop rated CAT 6a cable with Manufacturer/Model: Porta Systems 505E4-65

2.8 IDENTIFICATION PRODUCTS

- A. Comply with TIA-606-B and UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

2.9 GROUNDING

- A. Comply with requirements in Section 270526 "Grounding and Bonding for Communications Systems" for grounding conductors and connectors.
- B. Comply with TIA-607-B.

PART 3 - EXECUTION

3.1 WIRING METHODS

- A. Wiring Method: Install cables in raceways and cable trays, except in accessible ceiling spaces, and attics, where unenclosed wiring method may be used. Conceal raceway and cables, except in unfinished spaces.
 - 1. Install plenum cable in environmental air spaces, including plenum ceilings.
 - 2. Comply with requirements for raceways and boxes specified in Section 270528 "Pathways for Communications Systems."
- B. Wiring Method: Conceal conductors and cables in accessible ceilings, walls, and floors where possible.
- C. Wiring within Enclosures: Bundle, lace, and train cables within enclosures. Connect to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools. Install conductors parallel with or at right angles to sides and back of enclosure.

3.2 INSTALLATION OF PATHWAYS

- A. Comply with requirements for demarcation point, cabinets, and racks specified in Section 271100 "Communications Equipment Room Fittings."
- B. Comply with Section 270528 "Pathways for Communications Systems."
- C. Comply with Section 270529 "Hangers and Supports for Communications Systems."
- D. Comply with Section 270536 "Cable Trays for Communications Systems."
- E. Drawings indicate general arrangement of pathways and fittings.

3.3 INSTALLATION OF TWISTED-PAIR HORIZONTAL CABLES

- A. Comply with NECA 1 and NECA/BICSI 568.
- B. General Requirements for Cabling:
 - 1. Terminate cabling per T-568B.
 - 2. Comply with TIA-568-C.0, TIA-568-C.1, and TIA-568-C.2.
 - 3. Comply with BICSI's "Information Transport Systems Installation Methods Manual (ITSIMM), Ch. 5, "Copper Structured Cabling Systems," "Cable Termination Practices" Section.
 - 4. All termination methods shall meet TIA-568 requirements and manufacturer recommendations.
 - 5. Do not untwist twisted pair cables more than 1/2 inch from the point of termination to maintain cable geometry.
 - 6. Terminate all conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.
 - 7. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches and not more than 6 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
 - 8. Install lacing bars to restrain cables, prevent straining connections, and prevent bending cables to smaller radii than minimums recommended by manufacturer.
 - 9. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI Information Transport Systems Installation Methods Manual , Ch. 5, "Copper Structured Cabling Systems," "Cable Termination Practices" Section. Use lacing bars and distribution spools.
 - 10. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation, and replace it with new cable.

11. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.
 12. In the communications equipment room, install a 10-foot-long service loop. At wall outlet above ceiling, install 6 foot service loop in ceiling space.
 13. Pulling Cable: Comply with BICSI Information Transport Systems Installation Methods Manual, Ch. 5, "Copper Structured Cabling Systems," "Pulling and Installing Cable" Section. Monitor cable pull tensions.
- C. Open-Cable Installation:
1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
 2. Suspend twisted pair cabling, not in a wireway or pathway, a minimum of 8 inches above ceilings by cable supports with random spacing not more than 60 inches apart.
 3. Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.
- D. Installation of Cable Routed Exposed under Raised Floors:
1. Install plenum-rated cable only.
 2. Install cabling after the flooring system has been installed in raised floor areas.
- E. Group connecting hardware for cables into separate logical fields.
- F. Separation from EMI Sources:
1. Comply with recommendations from BICSI's "Telecommunications Distribution Methods Manual" and TIA-569-D for separating unshielded copper communication cable from potential EMI sources, including electrical power lines and equipment.
 2. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:
 - a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 5 inches.
 - b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 12 inches.
 - c. Electrical Equipment Rating More Than 5 kVA: A minimum of 24 inches.
 3. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:
 - a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 2-1/2 inches.
 - b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 6 inches.
 - c. Electrical Equipment Rating More Than 5 kVA: A minimum of 12 inches.
 4. Separation between communications cables in grounded metallic raceways, power lines, and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:
 - a. Electrical Equipment Rating Less Than 2 kVA: No requirement.
 - b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 3 inches.
 - c. Electrical Equipment Rating More Than 5 kVA: A minimum of 6 inches.
 5. Separation between Communications Cables and Electrical Motors and Transformers, 5 kVA or HP and Larger: A minimum of 48 inches.
 6. Separation between Communications Cables and Fluorescent Fixtures: A minimum of 5 inches.

3.4 FIRESTOPPING

- A. Comply with requirements in Section 078413 "Penetration Firestopping."
- B. Comply with TIA-569-D, Annex A, "Firestopping."
- C. Comply with "Firestopping Systems" Article in BICSI's "Telecommunications Distribution Methods Manual."

3.5 GROUNDING

- A. Install grounding according to the "Grounding, Bonding, and Electrical Protection" chapter in BICSI's "Telecommunications Distribution Methods Manual."
- B. Comply with TIA-607-B and NECA/BICSI-607.

3.6 IDENTIFICATION

- A. Identify system components, wiring, and cabling complying with TIA-606-B. Comply with requirements for identification specified in Section 270553 "Identification for Communications Systems."
 - 1. Administration Class: Class 3.
- B. Cabling Administration Drawings: Show building floor plans with cabling administration-point labeling. Identify labeling convention and show labels for telecommunications closets, terminal hardware and positions, horizontal cables, work areas and workstation terminal positions, grounding buses and pathways, and equipment grounding conductors.
- C. Cable and Wire Identification:
 - 1. Label each cable within 4 inches of each termination and tap, where it is accessible in a cabinet or junction or outlet box, and elsewhere as indicated.
 - 2. Each wire connected to building-mounted devices is not required to be numbered at the device if wire color is consistent with associated wire connected and numbered within panel or cabinet.
 - 3. Identification within Connector Fields in Equipment Rooms and Wiring Closets: Label each connector and each discrete unit of cable-terminating and -connecting hardware.

3.7 FIELD QUALITY CONTROL

- A. Tests and Inspections:
 - 1. Visually inspect jacket materials for NRTL certification markings. Inspect cabling terminations in communications equipment rooms for compliance with color-coding for pin assignments, and inspect cabling connections for compliance with TIA-568-C.1.
 - 2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
 - 3. Test twisted pair cabling for DC loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination but not cross-connection.
 - a. Test instruments shall meet or exceed applicable requirements in most current revision of the TIA-568-C.2. Perform tests with a tester that complies with performance requirements in "Test Instruments (Normative)" Annex, complying with measurement accuracy specified in "Measurement Accuracy (Informative)" Annex. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
 - b. Field tester must be calibrated to the type, manufacturer and catalog number of the cable to be tested.
 - c. Any measurements that fall within the tester's margin of error will be considered failed
 - d. All failed cables must be removed, replaced and retested at the contractor's expense until they achieve a repeatable passing measurement is taken.
- B. Data for each measurement shall be documented. Data for submittals shall be printed in a summary report that is formatted similarly to Table 10.1 in BICSI's "Telecommunications Distribution Methods Manual," or shall be transferred from the instrument to the computer, saved as text files, printed, and submitted.
- C. Test to be performed per cable category (5e or 6A) as specified by BICSI section or manual.
- D. Prepare test and inspection reports in PDF format.
 - 1. Submit per Section Closeout Submittals.

END OF SECTION 27 1513

PREVAILING WAGE

SECTION 6

INSTRUCTIONS FOR PREPARING CERTIFIED PAYROLL REPORTS

General:

Contractors and subcontractors are required by law to submit certified payroll reports for work on projects covered by Ohio's Prevailing Wage Law. This form meets the reporting requirements established by Ohio Revised Code Chapter 4115. The use of this form is not mandatory; employers may submit their own forms provided that all of the required information is included. This form may be reproduced, or additional copies obtained from:

Ohio Department of Commerce
Bureau of Wage and Hour Administration
6606 Tussing Road
Reynoldsburg, Ohio 43068 (614) 644-2239

Certified Payroll Heading:

Employer name and address: Company's full name and address. Indicate if the company is a subcontractor, if so; list the name of the General or Prime.

Project: Name and location of the project, including county.

Contracting Public Authority: Name and address of the contracting public authority.

Week Ending: Month, day, and year for last day of reporting period.

Payroll #: Indicates first, second, third, etc., payroll filed by the company for the project.

Page indicator: Number of pages included in the report.

Project Number: Determined by the public authority. If there is no number leave blank.

Payroll Information by column:

1. Employee Name, Address and Last Four Digits of Social Security Number: This information must be provided for all employees that perform physical labor on the project. Corporate officers, partners, and salaried employees are considered employees and must be paid the prevailing rate. Individual sole proprietors do not have to pay themselves prevailing rate but must report their hours on the project.
2. Work Class: List classification of work actually performed by employee. If unsure of work classification, consult the Ohio Bureau of Employment Services, Wage and Hour Division. Employees working more than one classification should have separate line entries for each classification. Indicate what year/level for Apprentices. Be specific when using laborer and operator classifications, for example, Backhoe Operator or Asphalt Laborer.
3. Hours Worked, Day & Date: In the first row of column 3 enter days of pay period example, M T W T H F S S U. The second row is for the date that corresponds with each day for the pay period. In the employee information section enter the number of hours worked on the prevailing wage project and which day the hours were worked. Separate rows are labeled for (ST) straight time hours and (OT) overtime hours. All hours worked after 40, must be paid at the appropriate overtime rate.
4. Project Total Hours: Total the hours entered for pay period.
5. Base Rate: Enter actual rate per hour paid to the employee. The overtime hourly rate is time and one-half the base rate listed in the prevailing wage schedule plus fringe benefits at straight time rate. The prevailing wage schedule lists the base rate plus fringe benefit amounts. These amounts added together equal the total prevailing wage rate. Employers must pay this total amount in one of three ways.
 - a) Total rate may be paid in entirety in the base rate to the employee; in which case, the cash designation will be checked for fringe benefits.
 - b) Total rate may be paid as listed in prevailing wage rate schedule with total fringe amounts paid approved plans.
 - c) Total rate may be paid with a combination of base rate and fringe payments to approved plans in amounts other than those listed in schedule.
6. Project Gross: Enter total gross wages earned on the project for straight time and overtime. Project hours X base rate should equal project gross.
7. Fringes: If fringe benefits are paid in the hourly base rate, indicate this by marking the cash space. If fringe benefits are paid to approved plans as listed in the prevailing wage rate schedule, mark the space Approved Plans. If fringe benefits are paid partially in the base rate and partially to approved plans, mark the space Cash & Approved plans. List the hourly amount paid to approved plans for each fringe. If payments are not made on a per hour basis, calculate the hourly fringe credit by dividing the yearly employer contribution by the lesser of: hours actually worked in the year (these must be documented) or 2080. Fringe benefits include: Employer's share of health insurance, life insurance, retirement plan, bonus/profit sharing, sick pay, holiday pay, personal leave, vacation, and education/training programs.
8. Total Hours All Jobs: Total all hours worked during the pay period including non-prevailing wage jobs.
9. Total Gross All Jobs: Gross amount earned in the pay period for all hours worked.
10. Self explanatory
11. Self explanatory
12. Self explanatory

CERTIFIED PAYROLL REPORT

Employer Name and Address			Name of General/Prime Contractor				Project Name and Location					Contracting Public Authority				
Check if Subcontractor <input type="checkbox"/>		Week Ending:			Payroll #:		Page ___ of ___			Project Number:						
1. Employee Name, Address SSN		2. Work Class	3. Hours Worked Day & Date			4. Project Total Hrs	5. Base Rate	6. Project Gross	7. Fringes: Cash ___ Appd Plans ___ Cash & Approved Plans			8. Total Hrs All Jobs	9. Total Gross All Jobs	10. Taxes Withheld	11. Other Deducts	12. Net Paid
									H & W	Pens	Vac	Apo	Other			
			OT													
			ST													
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Date _____ My signature on this form signifies that I pay, or supervise the payment of the employees shown above. I am certifying: 1) That during the pay period reported on this form, all hours worked on this project have been paid at the appropriate prevailing wage rate for the class of work done. 2) That fringe benefits have been paid as indicated above. 3) That no rebates or deductions have been or will be made, directly or indirectly from the total wages earned, other than permissible deductions as defined in the Ohio Revised Code Chapter 4115. 4) That apprentices are registered with the U.S. Department of Labor Bureau of Apprenticeship and Training. The willful falsification of any of the above statements may subject the contractor or subcontractor to civil or criminal prosecution.

NAME AND TITLE _____ SIGNATURE _____

PLEASE BE ADVISED THAT THIS FORM IS INTENDED TO BE USED AS A SAMPLE ONLY. IT IS NOT INTENDED TO BE THE ACTUAL PAYROLL REPORT TO BE FILED. IN ORDER TO COMPLY WITH THE STATE STATUTE REGARDING THE FILING OF CERTIFIED PAYROLL REPORTS, THE REPORT FILED BY YOUR COMPANY MUST INCLUDE A STATEMENT CERTIFYING THAT THE "PAYROLL IS CORRECT AND COMPLETE AND THE WAGES PAID ARE NOT LESS THAN THOSE REQUIRED BY THE CONTRACT". IF YOU HAVE ANY QUESTIONS REGARDING THE FILING OF CERTIFIED PAYROLL REPORTS, PLEASE CONTACT THE OHIO BUREAU OF EMPLOYMENT SERVICES, WAGE AND HOUR DIVISION AT (614)-644-2239.

CERTIFICATION

Date

I, _____ (Name of signatory part) _____ (Title)

do hereby certify:

(1) That I pay or supervise the payment of the persons employed by

_____ on the _____
(Contractor or subcontractor) (Building or work)

_____ ; that during payroll period

commencing on the _____ day of _____ 20__ and

ending the _____ day of _____ 20__ all laborers

and mechanics employed on said project have been paid at the prevailing rate of wages for laborers and mechanics for the class of work called for by said project, and that no rebates have been or will be made either directly or indirectly to or on behalf of said

_____ (Contractor or subcontractor)

from the total wages earned by any person and that no deduction have been made either directly or indirectly from the total wages earned by any person, other than permissible deductions as defined in Chapter 4115. Ohio Revised Code, and described below:

(2) That this and all payrolls required to be submitted for the above period are correct and complete; that the prevailing wage rates for laborers and mechanics are not less than the prevailing wage rates then payable in the same trade or occupation in the locality where the work is being performed, as determined by the Ohio Department of Industrial Relations; and, that the classifications set forth for each laborer and mechanic conform with the work performed,

(3) That apprentices employed during the above period are duly registered in a bona fide apprenticeship program registered with the State Apprenticeship Council.

(4) That:

(a) WHERE FRINGE BENEFITS ARE PAID TO APPROVED PLANS, FUNDS, OR PROGRAMS

- In addition to the base hourly wage rates paid to each laborer or mechanic listed in the above referenced payroll, payments of fringe benefits as determined by the Ohio Department of Industrial Relations have been made to

_____ in the amount of: \$ _____ for the benefit of such employees, except as noted in Section 4(c) below.

(b) WHERE FRINGE BENEFITS ARE PAID IN CASH

- Each laborer or mechanic listed in the above referenced payroll has been paid as indicated on the payroll, an amount not less than the sum of the applicable basic hourly wage ratio plus the amount of the required fringe benefits as determined by the Ohio Department of Industrial Relations, except as noted in Section 4(c) below.

(c) EXCEPTIONS

EXCEPTION (CRAFT)	EXPLANATION

Ohio Bureau of Employment Services
Wage and Hour Division

Remarks: 145 South Front Street
PO Box 1618
Columbus, Ohio 43216-1618

Name and Title	Signature
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6.2.1

(SAMPLE)

AFFIDAVIT OF CONTRACTOR OR SUBCONTRACTOR

PREVAILING WAGES

Name of Company _____

I, _____, (Name of person signing affidavit) Title _____

do hereby certify that the wages paid to all employees for the full number of hours worked in connection with the Contract to the Improvement, Repair and Construction of:

(Project Name & Location)

during the following period from _____ to _____

is in accordance with the prevailing wage prescribed by the contractor document.

I further certify that no rebates or deductions for any wages due any person have been directly or indirectly made other than those provided by law.

(Signature of Officer or Agent)

Sworn to and subscribed in my presence this _____ day of _____, 20__.

(Notary Public)

The above affidavit must be executed and sworn to by the officer or agent or the Contractor or Subcontractor who supervises the payment of employees, before the owner will release the surety and/or make a final payment due under the terms of the Contract.

WAGE RATES

CURRENT PREVAILING
SUMMIT COUNTY

Prevailing Wage Rate Skilled Crafts

Name of Union: Asbestos Local 3 Heat & Frost Insulators

Change # : LCN01-2022sksLoc3

Craft : Asbestos Worker Effective Date : 09/21/2022 Last Posted : 09/21/2022

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Asbestos Insulation Worker	\$41.23		\$14.40	\$10.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$65.63	\$86.25
Fire Stop Specialist	\$41.23		\$14.40	\$10.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$65.63	\$86.25
Fire Stop Technician	\$34.10		\$14.40	\$4.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$52.50	\$69.55
Apprentice	Percent											
1st year	50.20	\$20.70	\$14.40	\$1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$36.10	\$46.45
2nd year	63.68	\$26.26	\$14.40	\$2.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$42.66	\$55.78
3rd year	69.25	\$28.55	\$14.40	\$3.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$45.95	\$60.23
4th year	82.70	\$34.10	\$14.40	\$4.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$52.50	\$69.55

Special Calculation Note : There are no special calculations for this classification.

Ratio :

3 Journeymen to 1 Apprentice per shop

Jurisdiction (* denotes special jurisdictional note) :

ASHLAND, ASHTABULA*, CARROLL, COLUMBIANA, COSHOCTON, CUYAHOGA, ERIE*, GEAUGA, HARRISON, HOLMES, HURON, LAKE, LORAIN, MAHONING, MEDINA, PORTAGE, RICHLAND, STARK, SUMMIT, TRUMBULL, TUSCARAWAS, WAYNE

Special Jurisdictional Note : Ashtabula (the townships of Ashtabula, Austinburg, Geneva, Jefferson, Plymouth & Saybrook), The remainder of Ashtabula County will be considered open counties on a 90 day basis automatically renewable unless revoked by the Union upon 15 day written notice by the employers. Erie (to Sandusky limits)

Details :

Mechanics & apprentices engaged in the manufacture, fabrication, assembling, molding, handling, erection, spraying, pouring, mixing, hanging, clean-up, preparation, application, adjusting, alteration, repairing, dismantling, reconditioning, testing & maintenance of Heat & Frost Insulation such as Magnesia, Asbestos, Hair Felt, Wool Felt, Cork, Mineral Wool, Infusorial Earth, Mercerized Silk, Flax, Fiber, Fire Felt, Asbestos Paper, Asbestos Curtain, Asbestos Millboard, Fiberglass, Foam glass, Styrofoam, Polyurethane, fire stopping, smoke stopping, all recyclable material, soundproofing, all penetrations, any flexible or rigid fireproofing, all jacketing systems including metal, lead, and PVC or other material.

Prevailing Wage Rate Skilled Crafts

Name of Union: Asbestos Local 207 OH

Change # : LCN01-2018fbLoc207OH

Craft : Asbestos Worker Effective Date : 08/23/2018 Last Posted : 08/23/2018

	BHR	Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification											
Asbestos Abatement	\$25.50	\$7.25	\$6.45	\$0.65	\$0.00	\$0.00	\$0.07	\$0.00	\$0.00	\$39.92	\$52.67
Trainee	\$16.50	\$7.25	\$1.50	\$0.65	\$0.00	\$0.00	\$0.07	\$0.00	\$0.00	\$25.97	\$34.22

Special Calculation Note :

Ratio :

3 Journeymen to 1 Trainee

Jurisdiction (* denotes special jurisdictional note) :

ADAMS, ASHLAND, ASHTABULA*, ATHENS, AUGLAIZE, BROWN, BUTLER*, CARROLL, CHAMPAIGN, CLARK, CLERMONT, CLINTON, COLUMBIANA, COSHOCTON, CRAWFORD, CUYAHOGA, DARKE, DELAWARE, FAIRFIELD, FAYETTE, FRANKLIN, GEAUGA, GREENE, GUERNSEY, HAMILTON, HARDIN, HARRISON, HIGHLAND, HOCKING, HOLMES, HURON, KNOX, LAKE, LICKING, LOGAN, LORAIN, MADISON, MAHONING, MARION, MEDINA, MIAMI, MONTGOMERY, MORGAN, MORROW, MUSKINGUM, NOBLE, PERRY, PICKAWAY, PORTAGE, PREBLE, RICHLAND, ROSS, SHELBY, STARK, SUMMIT, TRUMBULL, TUSCARAWAS, UNION, VINTON, WARREN*, WAYNE

Special Jurisdictional Note : Butler County:(townships of Fairfield,Hanover,Liberty,Milford,Morgan,Oxford,Ripley,Ross,StClair,Union & Wayne.) (Lemon & Madison) Warren County: (townships of: Deerfield, Hamilton, Harlan, Salem, Union & Washington). (Clear Creek, Franklin, Mossie, Turtle Creek & Wayney). Ashtabula County: (post offices & townships of Ashtabula, Austinburg, Geneva, Harperfield, Jefferson, Plymouth & Saybrook) (townships of Andover, Cherry Valley, Colbrook, Canneaut, Denmark, Dorset, East Orwell, Hartsgrove, Kingville, Lenox, Monroe,Morgan,New Lyme,North Kingsville, Orwell, Pierpoint, Richmond Rock Creek, Rome, Sheffield, Trumbull, Wayne, Williamsfield & Windsor) Erie County:(post offices & townships of Berlin, Berlin Heights,Birmingham,Florence ,Huron, Milan, Shinrock & Vermillion)

Details :

Asbestos & lead paint abatement including, but not limited to the removal or encapsulation of asbestos & lead paint, all work in conjunction with the preparation of the removal of same & all work in conjunction with the clean up after said removal. The removal of all insulation materials, whether they contain asbestos or not, from mechanical systems (pipes, boilers, ducts, flues, breaching, etc.) is recognized as being the exclusive work of the Asbestos Abatement Workers.

On all mechanical systems (pipes, boilers, ducts, flues, breaching, etc.) that are going to be demolished, the removal of all insulating materials whether they contain asbestos or not shall be the exclusive work of the Laborers.

An Abatement Journeyman is anyone who has more than 300 hours in the Asbestos Abatement field.

Prevailing Wage Rate

Skilled Crafts

Name of Union: Asbestos Local 84 Heat & Frost Insulators

Change # : LCN01-2023ibLoc84

Craft : Asbestos Worker Effective Date : 02/15/2023 Last Posted : 02/15/2023

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Asbestos Insulation Worker	\$34.57		\$7.90	\$9.50	\$0.36	\$0.00	\$6.39	\$0.24	\$0.00	\$0.00	\$58.96	\$76.24
Apprentice	Percent											
1st Year	50.02	\$17.29	\$7.90	\$9.50	\$0.36	\$0.00	\$6.39	\$0.24	\$0.00	\$0.00	\$41.68	\$50.33
2nd Year	60.00	\$20.74	\$7.90	\$9.50	\$0.36	\$0.00	\$6.39	\$0.24	\$0.00	\$0.00	\$45.13	\$55.50
3rd Year	70.00	\$24.20	\$7.90	\$9.50	\$0.36	\$0.00	\$6.39	\$0.24	\$0.00	\$0.00	\$48.59	\$60.69
4th Year	80.00	\$27.66	\$7.90	\$9.50	\$0.36	\$0.00	\$6.39	\$0.24	\$0.00	\$0.00	\$52.05	\$65.87

Special Calculation Note : Other is Industry and Labor Management Fund

Ratio :
Journeyman to 1 Apprentice per shop

Jurisdiction (* denotes special jurisdictional note)
ASHLAND, ASHTABULA*, CARROLL, COLUMBIANA, COSHOCTON, HARRISON, HOLMES, MAHONING, MEDINA, PORTAGE, RICHLAND, STARK, SUMMIT, TRUMBULL, TUSCARAWAS, WAYNE

Special Jurisdictional Note : Ashtabula County: except for the townships of Ashtabula, Austinburg, Geneva, Harpersfield, Jefferson, Plymouth and Saybrook.

Details :

The removal of all insulation materials, whether they contain asbestos or not, from mechanical systems (pipes, boilers, ducts, flues, breaching, etc.) is recognized as being the exclusive work of the Asbestos Workers.

In all mechanical systems (pipes, boilers, ducts, flues, breaching, etc.) that are going to be demolished, the removal of all insulating materials whether they contain asbestos or not shall be the exclusive work of the Laborers.

Prevailing Wage Rate Skilled Crafts

Name of Union: Boilermaker Local 744

Change # : LCNO1-2019fbLoc744

Craft : Boilermaker Effective Date : 04/03/2019 Last Posted : 04/03/2019

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Boilermaker	\$38.05		\$7.07	\$16.07	\$0.74	\$0.00	\$5.08	\$0.75	\$0.00	\$0.00	\$67.76	\$86.78
Apprentice	Percent											
1st 6 months	70.02	\$26.64	\$7.07	\$16.07	\$0.74	\$0.00	\$5.08	\$0.75	\$0.00	\$0.00	\$56.35	\$69.67
2nd 6 months	72.52	\$27.59	\$7.07	\$16.07	\$0.74	\$0.00	\$5.08	\$0.75	\$0.00	\$0.00	\$57.30	\$71.10
3rd 6 months	75.00	\$28.54	\$7.07	\$16.07	\$0.74	\$0.00	\$5.08	\$0.75	\$0.00	\$0.00	\$58.25	\$72.52
4th 6 months	77.51	\$29.49	\$7.07	\$16.07	\$0.74	\$0.00	\$5.08	\$0.75	\$0.00	\$0.00	\$59.20	\$73.95
5th 6 months	80.00	\$30.44	\$7.07	\$16.07	\$0.74	\$0.00	\$5.08	\$0.75	\$0.00	\$0.00	\$60.15	\$75.37
6th 6 months	85.03	\$32.35	\$7.07	\$16.07	\$0.74	\$0.00	\$5.08	\$0.75	\$0.00	\$0.00	\$62.06	\$78.24
7th 6 months	90.00	\$34.25	\$7.07	\$16.07	\$0.74	\$0.00	\$5.08	\$0.75	\$0.00	\$0.00	\$63.96	\$81.08
8th 6 months	95.00	\$36.15	\$7.07	\$16.07	\$0.74	\$0.00	\$5.08	\$0.75	\$0.00	\$0.00	\$65.86	\$83.93
Helper	60.00	\$22.83	\$7.07	\$16.07	\$0.74	\$0.00	\$5.08	\$0.75	\$0.00	\$0.00	\$52.54	\$63.96

Special Calculation Note : Other is Supplemental Health

Ratio :

5 Journeymen to 1 Apprentice to 1 Helper

Jurisdiction (* denotes special jurisdictional note) :

ASHTABULA, CARROLL, COSHOCTON, CUYAHOGA, GEAUGA, HARRISON, HOLMES, LAKE, LORAIN, MAHONING, MEDINA, PORTAGE, STARK, SUMMIT, TRUMBULL, TUSCARAWAS, WAYNE

Special Jurisdictional Note :

Details :

Prevailing Wage Rate Skilled Crafts

Name of Union: Bricklayer Local 36 Zone 2 Tile Finisher

Change # : LCN01-2022sksLoc7

Craft : Bricklayer Effective Date : 05/18/2022 Last Posted : 05/18/2022

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Bricklayer Tile Finisher	\$25.48		\$8.89	\$3.83	\$0.60	\$0.00	\$1.50	\$0.00	\$0.00	\$0.00	\$40.30	\$53.04
Apprentice	Percent											
1st 6 months	60.00	\$15.29	\$8.89	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$24.18	\$31.82
2nd 6 months	70.00	\$17.84	\$8.89	\$3.83	\$0.60	\$0.00	\$1.50	\$0.00	\$0.00	\$0.00	\$32.66	\$41.57
3rd 6 months	75.00	\$19.11	\$8.89	\$3.83	\$0.60	\$0.00	\$1.50	\$0.00	\$0.00	\$0.00	\$33.93	\$43.49
4th 6 months	80.00	\$20.38	\$8.89	\$3.83	\$0.60	\$0.00	\$1.50	\$0.00	\$0.00	\$0.00	\$35.20	\$45.40
5th 6 months	85.00	\$21.66	\$8.89	\$3.83	\$0.60	\$0.00	\$1.50	\$0.00	\$0.00	\$0.00	\$36.48	\$47.31
6th 6 months	90.00	\$22.93	\$8.89	\$3.83	\$0.60	\$0.00	\$1.50	\$0.00	\$0.00	\$0.00	\$37.75	\$49.22

Special Calculation Note : Classification title contains "Bricklayer" because contract originates within the Bricklayer Local.

Note that the classification description is clarified after the local union number at the top of the page.

Ratio :

- 1-4 Journeymen to 1 Apprentice
- 5-10 Journeymen to 2 Apprentices
- 11-16 Journeymen to 3 Apprentices

Jurisdiction (* denotes special jurisdictional note) :

PORTAGE, SUMMIT

Special Jurisdictional Note :

Details :

The rate of Sewer Bricklayer will be \$.50 cents per above the building bricklayer's rate. Men working from cable or rope hung scaffold shall receive .50 cents per hour above building bricklayer rate.

Prevailing Wage Rate Skilled Crafts

Name of Union: Bricklayer Local 36 Zone 2 Tile Layer

Change # : LCN01-2022sksLoc7

Craft : Bricklayer Effective Date : 05/18/2022 Last Posted : 05/18/2022

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Bricklayer Tile Layer	\$30.91		\$8.95	\$3.83	\$0.66	\$0.00	\$1.50	\$0.00	\$0.00	\$0.00	\$45.85	\$61.30
Tile Layer Apprentice	Percent											
1st 30 days	60.00	\$18.55	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$18.55	\$27.82
1st 6 months	60.00	\$18.55	\$8.95	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$27.50	\$36.77
2nd 6 months	65.00	\$20.09	\$8.95	\$3.83	\$0.66	\$0.00	\$1.50	\$0.00	\$0.00	\$0.00	\$35.03	\$45.08
3rd 6 months	70.00	\$21.64	\$8.95	\$3.83	\$0.66	\$0.00	\$1.50	\$0.00	\$0.00	\$0.00	\$36.58	\$47.40
4th 6 months	75.00	\$23.18	\$8.95	\$3.83	\$0.66	\$0.00	\$1.50	\$0.00	\$0.00	\$0.00	\$38.12	\$49.71
5th 6 months	80.00	\$24.73	\$8.95	\$3.83	\$0.66	\$0.00	\$1.50	\$0.00	\$0.00	\$0.00	\$39.67	\$52.03
6th 6 months	85.00	\$26.27	\$8.95	\$3.83	\$0.66	\$0.00	\$1.50	\$0.00	\$0.00	\$0.00	\$41.21	\$54.35
7th 6 months	90.00	\$27.82	\$8.95	\$3.83	\$0.66	\$0.00	\$1.50	\$0.00	\$0.00	\$0.00	\$42.76	\$56.67
8th 6 months	95.00	\$29.36	\$8.95	\$3.83	\$0.66	\$0.00	\$1.50	\$0.00	\$0.00	\$0.00	\$44.30	\$58.99

Special Calculation Note : Classification title contains "Bricklayer" because contract originates within the Bricklayer Local.

Note that the classification description is clarified after the local union number at the top of the page.

Ratio :

- 1-4 Journeyman to 1 Apprentice
- 5-10 Journeymen to 2 Apprentice
- 11-16 Journeymen to 3 Apprentices

Jurisdiction (* denotes special jurisdictional note) :

PORTAGE, SUMMIT

Special Jurisdictional Note :

Details :

Prevailing Wage Rate Skilled Crafts

Name of Union: Bricklayer Local 5 Marble Mason

Change # : LCN01-2022sksLoc5

Craft : Bricklayer Effective Date : 06/01/2022 Last Posted : 06/01/2022

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Bricklayer Horizontal Marble Mason	\$25.91		\$9.70	\$9.45	\$0.66	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$45.72	\$58.67
Masonry Maintenance Specialist	\$12.96		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$12.96	\$19.44
Apprentice	Percent											
1st 6 Months	60.00	\$15.55	\$9.70	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$25.25	\$33.02
2nd 6 Months	65.00	\$16.84	\$9.70	\$1.60	\$0.66	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.80	\$37.22
3rd 6 Months	70.00	\$18.14	\$9.70	\$9.45	\$0.66	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$37.95	\$47.02
4th 6 Months	75.00	\$19.43	\$9.70	\$9.45	\$0.66	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$39.24	\$48.96
5th 6 Months	80.00	\$20.73	\$9.70	\$9.45	\$0.66	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$40.54	\$50.90
6th 6 Months	85.00	\$22.02	\$9.70	\$9.45	\$0.66	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$41.83	\$52.85
MASON TRAINEES												
1st 90 Days	45.00	\$11.66	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$11.66	\$17.49
1st year after 90 Days	45.00	\$11.66	\$9.70	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$21.36	\$27.19
2nd Year	50.00	\$12.96	\$9.70	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$22.66	\$29.13

Special Calculation Note : No special calculations for this skilled craft wage rate are required at this time.

Classification title contains "Bricklayer" because contract originates within the Bricklayer Local.

Ratio :

1-2 Journeyman to 1 Apprentice
3-4 Journeyman to 2 Apprentices
5-6 Journeyman to 2 Apprentices
6-10 Journeyman to 3 Apprentices

1 Apprentice permits 1 Mason Trainee
2 Apprentice permits 1 Mason Trainee
3 Apprentice permits 2 Mason Trainee
4 Apprentice permits 2 Mason Trainee

Special Jurisdictional Note :**Details :**

In the mutual interest of both Employer and Union and to promote the masonry industry, it is agreed that the Employer may work with the Union and the Local Educational Partners in the jurisdiction of this agreement to employ School to work students provided that no conflicts exist with any Federal or State Laws. Employer must be party to a bonified Apprenticeship and Training program registered with the State of Ohio (OSAC). It is further agreed by both parties that the wages for the Masonry Maintenance Specialist shall be forty-five percent (45%) of the journeyman rate with no fringe benefits or as specified by the Local Educational Partner in the jurisdiction of the agreement.

Jurisdiction (* denotes special jurisdictional note) :

ASHTABULA, CUYAHOGA, GEAUGA, LAKE,
LORAIN, MEDINA, PORTAGE, SUMMIT

Prevailing Wage Rate Skilled Crafts

Name of Union: Bricklayer Local 5 Marble, Terrazzo & Mosaic

Change # : LCN01-2022sksLoc5

Craft : Bricklayer Effective Date : 06/01/2022 Last Posted : 06/01/2022

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Bricklayer Marble, Terrazzo, Mosaic	\$36.71		\$9.70	\$9.45	\$0.77	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$56.63	\$74.98
Swing Scaffold Workers	\$37.71		\$9.70	\$9.45	\$0.77	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.63	\$76.48
Stack	\$37.21		\$9.70	\$9.45	\$0.77	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$57.13	\$75.73
Masonry Maintenance	\$16.52		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$16.52	\$24.78
Apprentice	Percent											
1st 6 months	60.00	\$22.03	\$9.70	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$31.73	\$42.74
2nd 6 months	65.00	\$23.86	\$9.70	\$9.45	\$0.77	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$43.78	\$55.71
3rd 6 months	70.00	\$25.70	\$9.70	\$9.45	\$0.77	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$45.62	\$58.47
4th 6 months	75.00	\$27.53	\$9.70	\$9.45	\$0.77	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$47.45	\$61.22
5th 6 months	80.00	\$29.37	\$9.70	\$9.45	\$0.77	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$49.29	\$63.97
6th 6 months	85.00	\$31.20	\$9.70	\$9.45	\$0.77	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$51.12	\$66.73
7th 6 months	90.00	\$33.04	\$9.70	\$9.45	\$0.77	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$52.96	\$69.48
8th 6 months	95.00	\$34.87	\$9.70	\$9.45	\$0.77	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$54.79	\$72.23
MASON TRAINEES 1st 90 Days	45.00	\$16.52	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$16.52	\$24.78
1st Year after 90 Days	45.00	\$16.52	\$9.70	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$26.22	\$34.48
2nd Year	50.02	\$18.36	\$9.70	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.06	\$37.24

Special Calculation Note : Classification title contains "Bricklayer" because contract originates within the Bricklayer Local.

Ratio :

- 1-2 Journeyman to 1 Apprentice
- 3-4 Journeyman to 2 Apprentices
- 5-6 Journeyman to 3 Apprentices
- 7-10 Journeyman to 4 Apprentices

Jurisdiction (* denotes special jurisdictional note) :

ASHTABULA, GEauga, LAKE, PORTAGE, SUMMIT

- 1 Apprentice permits 1 Mason Trainee
- 2 Apprentice permits 1 Mason Trainee
- 3 Apprentice permits 2 Mason Trainee
- 4 Apprentice permits 2 Mason Trainee

Special Jurisdictional Note :

Details :

In the mutual interest of both Employer and Union and to promote the masonry industry, it is agreed that the Employer may work with the Union and the Local Educational Partners in the jurisdiction of this agreement to employ School to work students provided that no conflicts exist with any Federal or State Laws. Employer must be party to a bonified Apprenticeship and Training program registered with the State of Ohio (OSAC). It is further agreed by both parties that the wages for the Masonry Maintenance Specialist shall be forty-five percent (45%) of the journeyman rate with no fringe benefits or as specified by the Local Educational Partner in the jurisdiction of the agreement.

Prevailing Wage Rate Skilled Crafts

Name of Union: Bricklayer Local 5 Tile & Marble Finisher

Change # : LCN01-2022sksLoc5

Craft : Bricklayer Effective Date : 05/18/2022 Last Posted : 05/18/2022

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Bricklayer Tile Marble Finisher	\$29.43		\$9.70	\$5.15	\$0.65	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$44.93	\$59.64
Apprentice Tile Marble Finishers												
Percent												
1st 6 months	60.00	\$17.66	\$9.70	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$27.36	\$36.19
2nd 6 months	70.00	\$20.60	\$9.70	\$5.15	\$0.65	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$36.10	\$46.40
3rd 6 months	75.00	\$22.07	\$9.70	\$5.15	\$0.65	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$37.57	\$48.61
4th 6 months	80.00	\$23.54	\$9.70	\$5.15	\$0.65	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$39.04	\$50.82
5th 6 months	85.00	\$25.02	\$9.70	\$5.15	\$0.65	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$40.52	\$53.02
6th 6 months	90.00	\$26.49	\$9.70	\$5.15	\$0.65	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$41.99	\$55.23

Special Calculation Note : Classification title contains "Bricklayer" because contract originates within the Bricklayer Local. Note that the classification description is clarified after the local union number at the top of the page.

Ratio :

- 1-2 Journeymen to 1 Apprentice
- 3- 4 Journeymen to 2 Apprentice
- 5-6 Journeymen to 3 Apprentice
- 7-8 Journeymen to 4 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

- ASHTABULA, CUYAHOGA, GEAUGA, LAKE, LORAIN, MEDINA, PORTAGE, SUMMIT

Special Jurisdictional Note :

Details :

Tile Finishers:do all the cleaning, acid washing,grouting,by any methods or means. Also unpacking of all tiles,opening of all mastic containers,mixing of all mortar,thin-set and epoxy materials,also the distribution of it. They shall handle and distribute all materials such as sand,cement,lime,tile,all types of tile panels,prefabricated tile units, plastic materials and protective covering of all tile.Clean up and removal of always used in connection of said work.

Terrazzo Finishers:Assisting in grinding, and handling of material whether by hand or wheel barrow, or power buggies, including sand Portland cement, resinous cement and admixtures, aggregates of marble, stone or other compositions, bonding adhesives, sealers, waxes, and coatings used for Terrazzo Mosaic work, preparing, mixing by hand or machine, and distributing (spreading) all kinds of underbed or underlayment necessary and all scratch coat used for terrazzo and mosaic work. Also the rubbing, grinding, cleaning, sealing and polishing same either by hand or machine. will assist in the installation of the sand bed, tar paper, wire lath, divider strips, and rolling procedures and acid etching of all concrete floors that require it before installation. Shall handle all materials and assist in the installation of all types of terrazzo floors whether conventional or thin-set variety.

Marble Finishers:Loading and unloading handling and distributing of marble materials including the mixing of all materials used for the installation of marble, such as cement underbeds for the floors, thin-set or epoxies including but not limited to plastic materials. Clean up and removal of all waster material of said work. Cleaning and grouting of all marble and slate, and all polishing of marble and slate floors.

Prevailing Wage Rate Skilled Crafts

Name of Union: Bricklayer Local 5 Terrazzo Finisher

Change # : LCN01-2022sksLoc5

Craft : Bricklayer Effective Date : 05/18/2022 Last Posted : 05/18/2022

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Bricklayer Terrazzo Finisher	\$29.43		\$9.70	\$5.15	\$0.65	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$44.93	\$59.64
Apprentice Terrazzo Finishers												
	Percent											
1st 6 months	60.00	\$17.66	\$9.70	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$27.36	\$36.19
2nd 6 months	70.00	\$20.60	\$9.70	\$5.15	\$0.65	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$36.10	\$46.40
3rd 6 months	75.00	\$22.07	\$9.70	\$5.15	\$0.65	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$37.57	\$48.61
4th 6 months	80.00	\$23.54	\$9.70	\$5.15	\$0.65	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$39.04	\$50.82
5th 6 months	85.00	\$25.02	\$9.70	\$5.15	\$0.65	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$40.52	\$53.02
6th 6 months	90.00	\$26.49	\$9.70	\$5.15	\$0.65	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$41.99	\$55.23

Special Calculation Note : Classification title contains "Bricklayer" because contract originates within the Bricklayer Local. Note that the classification description is clarified after the local union number at the top of the page.

Ratio :

- 1-2 Journeymen to 1 Apprentice
- 3- 4 Journeymen to 2 Apprentices
- 5- 6 Journeymen to 3 Apprentices
- 7- 8 Journeymen to 4 Apprentices

Jurisdiction (* denotes special jurisdictional note) :

ASHTABULA, CUYAHOGA, GEAUGA, LAKE, LORAIN, MEDINA, PORTAGE, SUMMIT

Special Jurisdictional Note :

Details :

Tile Finishers:do all the cleaning, acid washing,grouting,by any methods or means. Also unpacking of all tiles,opening of all mastic containers,mixing of all mortar,thin-set and epoxy materials,also the distribution of it. They shall handle and distribute all materials such as sand,cement,lime,tile,all types of tile panels,prefabricated tile units, plastic materials and protective covering of all tile.Clean up and removal of always used in connection of said work.

Terrazzo Finishers:Assisting in grinding, and handling of material whether by hand or wheel barrow, or power buggies, including sand Portland cement, resinous cement and admixtures, aggregates of marble, stone or other compositions, bonding adhesives, sealers, waxes, and coatings used for Terrazzo Mosaic work, preparing, mixing by hand or machine, and distributing (spreading) all kinds of underbed or underlayment necessary and all scratch coat used for terrazzo and mosaic work. Also the rubbing, grinding, cleaning, sealing and polishing same either by hand or machine. will assist in the installation of the sand bed, tar paper, wire lath, divider strips, and rolling procedures and acid etching of all concrete floors that require it before installation. Shall handle all materials and assist in the installation of all types of terrazzo floors whether conventional or thin-set variety.

Marble Finishers:Loading and unloading handling and distributing of marble materials including the mixing of all materials used for the installation of marble, such as cement underbeds for the floors, thin-set or epoxies including but not limited to plastic materials. Clean up and removal of all waster material of said work. Cleaning and grouting of all marble and slate, and all polishing of marble and slate floors.

Prevailing Wage Rate Skilled Crafts

Name of Union: Bricklayer Local 7

Change # : LCR02-2022sksLoc7

Craft : Bricklayer Effective Date : 09/21/2022 Last Posted : 09/21/2022

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Bricklayer	\$33.56		\$8.75	\$8.39	\$0.75	\$0.00	\$3.00	\$0.00	\$0.00	\$0.00	\$54.45	\$71.23
Pointer Caulker Cleaner	\$33.56		\$8.75	\$8.39	\$0.75	\$0.00	\$3.00	\$0.00	\$0.00	\$0.00	\$54.45	\$71.23
Swing Scaffold Workers	\$34.06		\$8.75	\$8.39	\$0.75	\$0.00	\$3.00	\$0.00	\$0.00	\$0.00	\$54.95	\$71.98
Sewer Stack	\$34.06		\$8.75	\$8.39	\$0.75	\$0.00	\$3.00	\$0.00	\$0.00	\$0.00	\$54.95	\$71.98
Hot Pay	\$34.56		\$8.75	\$8.39	\$0.75	\$0.00	\$3.00	\$0.00	\$0.00	\$0.00	\$55.45	\$72.73
Stone Mason	\$33.56		\$8.75	\$8.39	\$0.75	\$0.00	\$3.00	\$0.00	\$0.00	\$0.00	\$54.45	\$71.23
Apprentice	Percent											
1st 6 Months	60.00	\$20.14	\$8.75	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.89	\$38.95
2nd 6 Months	65.00	\$21.81	\$8.75	\$8.39	\$0.75	\$0.00	\$3.00	\$0.00	\$0.00	\$0.00	\$42.70	\$53.61
3rd 6 Months	70.00	\$23.49	\$8.75	\$8.39	\$0.75	\$0.00	\$3.00	\$0.00	\$0.00	\$0.00	\$44.38	\$56.13
4th 6 Months	75.00	\$25.17	\$8.75	\$8.39	\$0.75	\$0.00	\$3.00	\$0.00	\$0.00	\$0.00	\$46.06	\$58.65
5th 6 Months	80.00	\$26.85	\$8.75	\$8.39	\$0.75	\$0.00	\$3.00	\$0.00	\$0.00	\$0.00	\$47.74	\$61.16
6th 6 Months	85.00	\$28.53	\$8.75	\$8.39	\$0.75	\$0.00	\$3.00	\$0.00	\$0.00	\$0.00	\$49.42	\$63.68
7th 6 Months	90.00	\$30.20	\$8.75	\$8.39	\$0.75	\$0.00	\$3.00	\$0.00	\$0.00	\$0.00	\$51.09	\$66.20
8th 6 Months	95.00	\$31.88	\$8.75	\$8.39	\$0.75	\$0.00	\$3.00	\$0.00	\$0.00	\$0.00	\$52.77	\$68.71

Special Calculation Note : No special calculations for this skilled craft wage rate are required at this time.

Ratio :

- 1 journeyman to 1 apprentice
- 2-6 journeyman to 2 apprentice
- 7-12 journeyman to 3 apprentice
- 13-18 journeyman to 4 apprentice

Jurisdiction (* denotes special jurisdictional note) :

PORTAGE, SUMMIT

Special Jurisdictional Note :

Details :

Prevailing Wage Rate Skilled Crafts

Name of Union: Bricklayer Local 7 Marble Mason

Change # : LCN01-2013fbLoc7

Craft : Bricklayer Effective Date : 06/26/2013 Last Posted : 06/26/2013

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Bricklayer Marble Mason	\$29.67		\$6.40	\$2.55	\$0.60	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$39.22	\$54.06
Terrazzo Worker	\$29.67		\$6.40	\$2.55	\$0.60	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$39.22	\$54.06
Apprentice	Percent											
1st 6 Months	60.00	\$17.80	\$6.40	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$24.20	\$33.10
2nd 6 Months	70.00	\$20.77	\$6.40	\$2.55	\$0.60	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$30.32	\$40.70
3rd 6 Months	75.00	\$22.25	\$6.40	\$2.55	\$0.60	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$31.80	\$42.93
4th 6 Months	80.00	\$23.74	\$6.40	\$2.55	\$0.60	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$33.29	\$45.15
5th 6 Months	85.00	\$25.22	\$6.40	\$2.55	\$0.60	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$34.77	\$47.38
6th 6 Months	90.00	\$26.70	\$6.40	\$2.55	\$0.60	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$36.25	\$49.60

Special Calculation Note : No special calculations for this skilled craft wage rate are required at this time.

Classification title contains "Bricklayer" because contract originates within the Bricklayer Local. Note that the classification description is clarified after the local union number at the top of the page.

Ratio : **Jurisdiction (* denotes special jurisdictional note) :**

1 Journeymen to 1 Apprentice
5 Journeymen to 1 Apprentice
10 Journeymen to 2 Apprentice
15 Journeymen to 3 Apprentice

PORTAGE, SUMMIT

Special Jurisdictional Note :

Details :

Prevailing Wage Rate Skilled Crafts

Name of Union: Cement Mason Bricklayer Local 97 HevHwy A

Change # : LCN01-2022sksHvyHwy

Craft : Bricklayer Effective Date : 06/08/2022 Last Posted : 06/08/2022

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Cement Mason Bricklayer Sewer Water Works A	\$31.40		\$9.75	\$8.30	\$0.50	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$49.95	\$65.65
Apprentice	Percent											
1st year	70.00	\$21.98	\$9.75	\$8.30	\$0.50	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$40.53	\$51.52
2nd year	80.00	\$25.12	\$9.75	\$8.30	\$0.50	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$43.67	\$56.23
3rd year	90.00	\$28.26	\$9.75	\$8.30	\$0.50	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$46.81	\$60.94

Special Calculation Note : NOT FOR BUILDING CONSTRUCTION.

Ratio :

- 3 Journeymen to 1 Apprentice
- 6 Journeymen to 2 Apprentice
- 9 Journeymen to 3 Apprentice
- 12 Journeymen to 4 Apprentice
- 15 Journeymen to 5 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

ADAMS, ALLEN, ASHLAND, ASHTABULA, ATHENS, AUGLAIZE, BELMONT, BROWN, BUTLER, CARROLL, CHAMPAIGN, CLARK, CLERMONT, CLINTON, COLUMBIANA, COSHOCTON, CRAWFORD, CUYAHOGA, DARKE, DEFIANCE, DELAWARE, ERIE, FAIRFIELD, FAYETTE, FRANKLIN, FULTON, GALLIA, GEAUGA, GREENE, GUERNSEY, HAMILTON, HANCOCK, HARDIN, HARRISON, HENRY, HIGHLAND, HOCKING, HOLMES, HURON, JACKSON, JEFFERSON, KNOX, LAKE, LAWRENCE, LICKING, LOGAN, LORAIN, LUCAS, MADISON, MAHONING, MARION, MEDINA, MEIGS, MERCER, MIAMI, MONROE, MONTGOMERY, MORGAN, MORROW, MUSKINGUM, NOBLE, OTTAWA, PAULDING, PERRY, PICKAWAY, PIKE, PORTAGE, PREBLE, PUTNAM, RICHLAND, ROSS, SANDUSKY, SCIOTO, SENECA, SHELBY, STARK, SUMMIT, TRUMBULL, TUSCARAWAS, UNION, VAN WERT, VINTON, WARREN, WASHINGTON, WAYNE

Special Jurisdictional Note :

Details :

- (A) Highway Construction, Sewer, Waterworks And Utility Construction, Industrial & Building Site Heavy Construction, Airport Construction Or Railroad Construction Work.
- (B) Power Plant, Tunnels, Amusement Park, Athletic Stadium Site Work ,Pollution Control,Sewer Plant, Waste Plant, & Water Treatment Facilities, Construction.

Prevailing Wage Rate Skilled Crafts

Name of Union: Cement Mason Bricklayer Local 97 HevHwy B

Change # : LCN01-2022sksHvyHwy

Craft : Bricklayer Effective Date : 06/08/2022 Last Posted : 06/08/2022

	BHR	Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification											
Cement Mason Bricklayer Power Plants Tunnels Amusement Parks B	\$32.39	\$9.75	\$8.30	\$0.51	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$50.95	\$67.15
Apprentice	Percent										
1st year	70.00	\$22.67	\$9.75	\$8.30	\$0.51	\$0.00	\$0.00	\$0.00	\$0.00	\$41.23	\$52.57
2nd year	80.00	\$25.91	\$9.75	\$8.30	\$0.51	\$0.00	\$0.00	\$0.00	\$0.00	\$44.47	\$57.43
3rd year	90.00	\$29.15	\$9.75	\$8.30	\$0.51	\$0.00	\$0.00	\$0.00	\$0.00	\$47.71	\$62.29

Special Calculation Note : NOT FOR BUILDING CONSTRUCTION.

Ratio :

- 3 Journeymen to 1 Apprentice
- 6 Journeymen to 2 Apprentice
- 9 Journeymen to 2 Apprentice
- 12 Journeymen to 4 Apprentice
- 15 Journeymen to 5 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

- ADAMS, ALLEN, ASHLAND, ASHTABULA, ATHENS, AUGLAIZE, BELMONT, BROWN, BUTLER, CARROLL, CHAMPAIGN, CLARK, CLERMONT, CLINTON, COLUMBIANA, COSHOCTON, CRAWFORD, CUYAHOGA, DARKE, DEFIANCE, DELAWARE, ERIE, FAIRFIELD, FAYETTE, FRANKLIN, FULTON, GALLIA, GEauga, GREENE, GUERNSEY, HAMILTON, HANCOCK, HARDIN, HARRISON, HENRY, HIGHLAND, HOCKING, HOLMES, HURON, JACKSON, JEFFERSON, KNOX, LAKE, LAWRENCE, LICKING, LOGAN, LORAIN, LUCAS, MADISON, MAHONING, MARION, MEDINA, MEIGS, MERCER, MIAMI, MONROE, MONTGOMERY, MORGAN, MORROW, MUSKINGUM, NOBLE, OTTAWA, PAULDING, PERRY, PICKAWAY, PIKE, PORTAGE, PREBLE, PUTNAM, RICHLAND, ROSS, SANDUSKY, SCIOTO, SENECA, SHELBY, STARK, SUMMIT, TRUMBULL, TUSCARAWAS, UNION, VAN WERT, VINTON, WARREN, WASHINGTON, WAYNE

Special Jurisdictional Note :

Details :

- (A) Highway Construction, Sewer, Waterworks And Utility Construction, Industrial & Building Site Heavy Construction, Airport Construction Or Railroad Construction Work.
- (B) Power Plant, Tunnels, Amusement Park, Athletic Stadium Site Work ,Pollution Control,Sewer Plant, Waste Plant, & Water Treatment Facilities, Construction.

Prevailing Wage Rate

Skilled Crafts

Name of Union: Bricklayer Local 23 Heavy Hwy (A)

Change # : LCN01-2023ibLoc23HevHwyA

Craft : Bricklayer Effective Date : 06/07/2023 Last Posted : 06/07/2023

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Cement Mason Bricklayer Sewer Water Works A	\$32.40		\$9.75	\$9.03	\$0.52	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$51.70	\$67.90
Apprentice	Percent											
1st year	70.00	\$22.68	\$9.75	\$9.03	\$0.52	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$41.98	\$53.32
2nd year	80.00	\$25.92	\$9.75	\$9.03	\$0.52	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$45.22	\$58.18
3rd year	90.00	\$29.16	\$9.75	\$9.03	\$0.52	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$48.46	\$63.04

Special Calculation Note : NOT FOR BUILDING CONSTRUCTION.

Ratio :

- Journeyman to 1 Apprentice
- Journeyman to 2 Apprentice
- Journeyman to 3 Apprentice
- 2 Journeyman to 4 Apprentice
- 5 Journeyman to 5 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

ADAMS, ALLEN, ASHLAND, ASHTABULA, ATHENS, AUGLAIZE, BELMONT, BROWN, BUTLER, CARROLL, CHAMPAIGN, CLARK, CLERMONT, CLINTON, COLUMBIANA, COSHOCTON, CRAWFORD, CUYAHOGA, DARKE, DEFIANCE, DELAWARE, ERIE, FAIRFIELD, FAYETTE, FRANKLIN, FULTON, GALLIA, GEAUGA, GREENE, GUERNSEY, HAMILTON, HANCOCK, HARDIN, HARRISON, HENRY, HIGHLAND, HOCKING, HOLMES, HURON, JACKSON, JEFFERSON, KNOX, LAKE, LAWRENCE, LICKING, LOGAN, LORAIN, LUCAS, MADISON, MAHONING, MARION, MEDINA, MEIGS, MERCER, MIAMI, MONROE, MONTGOMERY, MORGAN, MORROW, MUSKINGUM, NOBLE, OTTAWA, PAULDING, PERRY, PICKAWAY, PIKE, PORTAGE, PREBLE, PUTNAM, RICHLAND, ROSS, SANDUSKY, SCIOTO, SENECA, SHELBY, STARK, SUMMIT, TRUMBULL, TUSCARAWAS, UNION, VAN WERT, VINTON, WARREN, WASHINGTON, WAYNE

Special Jurisdictional Note :

Details :

- 1) Highway Construction, Sewer, Waterworks And Utility Construction, Industrial & Building Site Heavy Construction, Airport Construction Or Railroad Construction Work.
- 2) Power Plant, Tunnels, Amusement Park, Athletic Stadium Site Work ,Pollution Control, Sewer Plant, Waste Plant, & Water Treatment Facilities, Construction.

Prevailing Wage Rate Skilled Crafts

Name of Union: Bricklayer Local 23 Heavy Hwy (B)

Change # : LCN01-2023ibLoc23HevHwyB

Craft : Bricklayer Effective Date : 06/07/2023 Last Posted : 06/07/2023

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Cement Mason Bricklayer Power Plants Tunnels Amusement Parks B	\$33.39		\$9.75	\$9.03	\$0.53	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$52.70	\$69.39
Apprentice	Percent											
1st year	70.00	\$23.37	\$9.75	\$9.03	\$0.53	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$42.68	\$54.37
2nd year	80.00	\$26.71	\$9.75	\$9.03	\$0.53	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$46.02	\$59.38
3rd year	90.00	\$30.05	\$9.75	\$9.03	\$0.53	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$49.36	\$64.39

Special Calculation Note : NOT FOR BUILDING CONSTRUCTION.

Ratio :

- Journeyman to 1 Apprentice
- Journeyman to 2 Apprentice
- Journeyman to 2 Apprentice
- 2 Journeyman to 4 Apprentice
- 5 Journeyman to 5 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

ADAMS, ALLEN, ASHLAND, ASHTABULA, ATHENS, AUGLAIZE, BELMONT, BROWN, BUTLER, CARROLL, CHAMPAIGN, CLARK, CLERMONT, CLINTON, COLUMBIANA, COSHOCTON, CRAWFORD, CUYAHOGA, DARKE, DEFIANCE, DELAWARE, ERIE, FAIRFIELD, FAYETTE, FRANKLIN, FULTON, GALLIA, GEAUGA, GREENE, GUERNSEY, HAMILTON, HANCOCK, HARDIN, HARRISON, HENRY, HIGHLAND, HOCKING, HOLMES, HURON, JACKSON, JEFFERSON, KNOX, LAKE, LAWRENCE, LICKING, LOGAN, LORAIN, LUCAS, MADISON, MAHONING, MARION, MEDINA, MEIGS, MERCER, MIAMI, MONROE, MONTGOMERY, MORGAN, MORROW, MUSKINGUM, NOBLE, OTTAWA, PAULDING, PERRY, PICKAWAY, PIKE, PORTAGE, PREBLE, PUTNAM, RICHLAND, ROSS, SANDUSKY, SCIOTO, SENECA, SHELBY, STARK, SUMMIT, TRUMBULL, TUSCARAWAS, UNION, VAN WERT, VINTON, WARREN, WASHINGTON, WAYNE

Special Jurisdictional Note :

Details :

- A) Highway Construction, Sewer, Waterworks And Utility Construction, Industrial & Building Site Heavy Construction, Airport Construction Or Railroad Construction Work.
- B) Power Plant, Tunnels, Amusement Park, Athletic Stadium Site Work ,Pollution Control,Sewer Plant, Waste Plant, & Water treatment Facilities, Construction.

Prevailing Wage Rate Skilled Crafts

Name of Union: Bricklayer Local 23 (Akron)

Change # : LCN01-2023ibLoc23Akron

Craft : Bricklayer Effective Date : 06/01/2023 Last Posted : 05/31/2023

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Bricklayer	\$34.80		\$8.75	\$8.39	\$0.76	\$0.00	\$3.00	\$0.00	\$0.00	\$0.00	\$55.70	\$73.10
Boiler Painter Caulker Cleaner	\$34.80		\$8.75	\$8.39	\$0.76	\$0.00	\$3.00	\$0.00	\$0.00	\$0.00	\$55.70	\$73.10
Boiler Scaffolding Workers	\$35.30		\$8.75	\$8.39	\$0.76	\$0.00	\$3.00	\$0.00	\$0.00	\$0.00	\$56.20	\$73.85
Boiler Stack	\$35.30		\$8.75	\$8.39	\$0.76	\$0.00	\$3.00	\$0.00	\$0.00	\$0.00	\$56.20	\$73.85
Hot Pay	\$35.80		\$8.75	\$8.39	\$0.76	\$0.00	\$3.00	\$0.00	\$0.00	\$0.00	\$56.70	\$74.60
Stone Mason	\$34.80		\$8.75	\$8.39	\$0.76	\$0.00	\$3.00	\$0.00	\$0.00	\$0.00	\$55.70	\$73.10
Apprentice	Percent											
1st 6 Months	60.00	\$20.88	\$8.75	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$29.63	\$40.07
2nd 6 Months	65.00	\$22.62	\$8.75	\$8.39	\$0.76	\$0.00	\$3.00	\$0.00	\$0.00	\$0.00	\$43.52	\$54.83
3rd 6 Months	70.00	\$24.36	\$8.75	\$8.39	\$0.76	\$0.00	\$3.00	\$0.00	\$0.00	\$0.00	\$45.26	\$57.44
4th 6 Months	75.00	\$26.10	\$8.75	\$8.39	\$0.76	\$0.00	\$3.00	\$0.00	\$0.00	\$0.00	\$47.00	\$60.05
5th 6 Months	80.00	\$27.84	\$8.75	\$8.39	\$0.76	\$0.00	\$3.00	\$0.00	\$0.00	\$0.00	\$48.74	\$62.66
6th 6 Months	85.00	\$29.58	\$8.75	\$8.39	\$0.76	\$0.00	\$3.00	\$0.00	\$0.00	\$0.00	\$50.48	\$65.27
7th 6 Months	90.00	\$31.32	\$8.75	\$8.39	\$0.76	\$0.00	\$3.00	\$0.00	\$0.00	\$0.00	\$52.22	\$67.88
8th 6 Months	95.00	\$33.06	\$8.75	\$8.39	\$0.76	\$0.00	\$3.00	\$0.00	\$0.00	\$0.00	\$53.96	\$70.49

Special Calculation Note : No special calculations for this skilled craft wage rate are required at this time.

Ratio :
 -6 journeyman to 1 apprentice
 -12 journeyman to 2 apprentice
 -18 journeyman to 3 apprentice
 -24 journeyman to 4 apprentice

Jurisdiction (* denotes special jurisdictional note) :
 PORTAGE, SUMMIT

Special Jurisdictional Note :

Details :

Prevailing Wage Rate Skilled Crafts

Name of Union: Bricklayer Local 23 (Cleveland Marble Finisher)

Change # : LCN01-2023ibLoc23ClevMarFin

Contract : Bricklayer Effective Date : 05/24/2023 Last Posted : 05/24/2023

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Bricklayer Tile Marble Finisher	\$30.55		\$9.95	\$5.15	\$0.66	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$46.31	\$61.59
Apprentice Tile Marble Finishers	Percent											
1st 6 months	60.00	\$18.33	\$9.95	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.28	\$37.44
2nd 6 months	70.02	\$21.39	\$9.95	\$5.15	\$0.66	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$37.15	\$47.85
3rd 6 months	75.00	\$22.91	\$9.95	\$5.15	\$0.66	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$38.67	\$50.13
4th 6 months	80.00	\$24.44	\$9.95	\$5.15	\$0.66	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$40.20	\$52.42
5th 6 months	85.00	\$25.97	\$9.95	\$5.15	\$0.66	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$41.73	\$54.71
6th 6 months	90.00	\$27.50	\$9.95	\$5.15	\$0.66	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$43.25	\$57.00

Special Calculation Note : Classification title contains "Bricklayer" because contract originates within the Bricklayer Local. Note that the classification description is clarified after the local union number at the top of the page.

Ratio :
 2 Journeymen to 1 Apprentice
 4 Journeymen to 2 Apprentice
 6 Journeymen to 3 Apprentice
 8 Journeymen to 4 Apprentice

Jurisdiction (* denotes special jurisdictional note) :
 ASHTABULA, CUYAHOGA, GEAUGA, LAKE, LORAIN,
 MEDINA, PORTAGE, SUMMIT

Special Jurisdictional Note :

Details :
 Tile Finishers:do all the cleaning, acid washing,grouting,by any methods or means. Also unpacking of all tiles,opening of all mastic containers,mixing of all mortar,thin-set and epoxy materials,also the distribution of it. They shall handle and distribute all materials such as sand,cement,lime,tile,all types of tile panels,prefabricated tile units, plastic materials and protective covering of all tile.Clean up and removal of ways used in connection of said work.

Terrazzo Finishers:Assisting in grinding, and handling of material whether by hand or wheel barrow, or power buggies, including sand Portland cement, resinous cement and admixtures, aggregates of marble, stone or other compositions, bonding adhesives, sealers, waxes, and coatings used for Terrazzo Mosaic work, preparing, mixing by hand or machine, and distributing (spreading) all kinds of underbed or underlayment necessary and all scratch coat used for terrazzo and mosaic work. Also the rubbing, grinding, cleaning, sealing and polishing same either by hand or machine. will assist in the installation of the sand bed, tar paper, wire lath, divider strips, and rolling procedures and acid etching of all concrete floors that require it before installation. Shall handle all materials and assist in the installation of all types of terrazzo floors whether conventional or thin-set variety.

Marble Finishers>Loading and unloading handling and distributing of marble materials including the mixing of all materials used for the installation of marble, such as cement underbeds for the floors, thin-set or epoxies including but not limited to plastic materials. Clean up and removal of all waster material of said work. Cleaning and grouting of all marble and slate, and all polishing of marble and slate floors.

Prevailing Wage Rate Skilled Crafts

Name of Union: Bricklayer Local 23 (Cleveland Marble Mason)

Change # : LCN01-2023ibLoc23ClevMarMas

Contract : Bricklayer Effective Date : 05/24/2023 Last Posted : 05/24/2023

Classification	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Bricklayer Horizontal Marble Mason	\$27.10		\$9.85	\$9.45	\$0.67	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$47.07	\$60.62
Masonry Maintenance Specialist	\$13.55		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$13.55	\$20.33
Apprentice	Percent											
1st 6 Months	60.00	\$16.26	\$9.85	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$26.11	\$34.24
2nd 6 Months	65.00	\$17.62	\$9.85	\$1.60	\$0.67	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$29.74	\$38.54
3rd 6 Months	70.00	\$18.97	\$9.85	\$9.45	\$0.67	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$38.94	\$48.42
4th 6 Months	75.00	\$20.33	\$9.85	\$9.45	\$0.67	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$40.30	\$50.46
5th 6 Months	80.00	\$21.68	\$9.85	\$9.45	\$0.67	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$41.65	\$52.49
6th 6 Months	85.02	\$23.04	\$9.85	\$9.45	\$0.67	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$43.01	\$54.53
MASON TRAINEES												
1st 90 Days	45.00	\$12.20	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$12.20	\$18.29
1st year after 90 Days	45.00	\$12.20	\$9.85	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$22.05	\$28.14
2nd Year	50.00	\$13.55	\$9.85	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$23.40	\$30.18

Special Calculation Note : No special calculations for this skilled craft wage rate are required at this time.

Classification title contains "Bricklayer" because contract originates within the Bricklayer Local.

Ratio :
 2 Journeyman to 1 Apprentice
 4 Journeyman to 2 Apprentices
 6 Journeyman to 2 Apprentices
 10 Journeyman to 3 Apprentices

Jurisdiction (* denotes special jurisdictional note) :
 ASHTABULA, CUYAHOGA, GEAUGA, LAKE, LORAIN, MEDINA,
 PORTAGE, SUMMIT

Apprentice permits 1 Mason Trainee
 Apprentice permits 1 Mason Trainee
 Apprentice permits 2 Mason Trainee
 Apprentice permits 2 Mason Trainee

Special Jurisdictional Note :

Details :

In the mutual interest of both Employer and Union and to promote the masonry industry, it is agreed that the Employer may work with the Union and the Local Educational Partners in the jurisdiction of this agreement to employ School to work students provided that no conflicts exist with any Federal or State Laws. Employer must be party to a bonified Apprenticeship and Training program registered with the State of Ohio (OSAC). It is further agreed by both parties that the wages for the Masonry Maintenance Specialist shall be forty-five percent (45%) of the journeyman rate with no fringe benefits or as specified by the Local Educational Partner in the jurisdiction of the agreement.

Prevailing Wage Rate Skilled Crafts

Name of Union: Bricklayer Local 23 (Cleveland Zone 2 Tile Finisher)

Change # : LCN01-2023ibLoc23ClevZone2TF

Craft : Bricklayer Effective Date : 05/03/2023 Last Posted : 05/03/2023

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Bricklayer Tile Finisher	\$26.19		\$9.14	\$3.83	\$0.62	\$0.00	\$1.75	\$0.00	\$0.00	\$0.00	\$41.53	\$54.63
Apprentice	Percent											
1st 6 months	60.00	\$15.71	\$9.14	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$24.85	\$32.71
2nd 6 months	70.00	\$18.33	\$9.14	\$3.83	\$0.62	\$0.00	\$1.75	\$0.00	\$0.00	\$0.00	\$33.67	\$42.84
3rd 6 months	75.00	\$19.64	\$9.14	\$3.83	\$0.62	\$0.00	\$1.75	\$0.00	\$0.00	\$0.00	\$34.98	\$44.80
4th 6 months	80.00	\$20.95	\$9.14	\$3.83	\$0.62	\$0.00	\$1.75	\$0.00	\$0.00	\$0.00	\$36.29	\$46.77
5th 6 months	85.00	\$22.26	\$9.14	\$3.83	\$0.62	\$0.00	\$1.75	\$0.00	\$0.00	\$0.00	\$37.60	\$48.73
6th 6 months	90.00	\$23.57	\$9.14	\$3.83	\$0.62	\$0.00	\$1.75	\$0.00	\$0.00	\$0.00	\$38.91	\$50.70

Special Calculation Note : Classification title contains "Bricklayer" because contract originates within the Bricklayer Local.

Note that the classification description is clarified after the local union number at the top of the page.

Ratio :
 -4 Journeymen to 1 Apprentice
 -10 Journeymen to 2 Apprentices
 -1-16 Journeymen to 3 Apprentices

Jurisdiction (* denotes special jurisdictional note)
 PORTAGE, SUMMIT

Special Jurisdictional Note :

Details :
 The rate of Sewer Bricklayer will be \$.50 cents per above the building bricklayer's rate. Men working from cable or rope hanging scaffold shall receive .50 cents per hour above building bricklayer rate.

Prevailing Wage Rate Skilled Crafts

Name of Union: Bricklayer Local 23 (Cleveland Zone 2 Tile Layer)

Change # : LCN01-2023ibLoc23ClevZone2TL

Contract : Bricklayer Effective Date : 05/03/2023 Last Posted : 05/03/2023

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Bricklayer Tile Layer	\$32.05		\$9.20	\$3.83	\$0.67	\$0.00	\$1.50	\$0.00	\$0.00	\$0.00	\$47.25	\$63.27
File Layer	Percent											
1st 30 days	60.00	\$19.23	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$19.23	\$28.84
1st 6 months	60.00	\$19.23	\$9.20	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.43	\$38.04
2nd 6 months	65.00	\$20.83	\$9.20	\$3.83	\$0.67	\$0.00	\$1.50	\$0.00	\$0.00	\$0.00	\$36.03	\$46.45
3rd 6 months	70.00	\$22.43	\$9.20	\$3.83	\$0.67	\$0.00	\$1.50	\$0.00	\$0.00	\$0.00	\$37.64	\$48.85
4th 6 months	75.00	\$24.04	\$9.20	\$3.83	\$0.67	\$0.00	\$1.50	\$0.00	\$0.00	\$0.00	\$39.24	\$51.26
5th 6 months	80.00	\$25.64	\$9.20	\$3.83	\$0.67	\$0.00	\$1.50	\$0.00	\$0.00	\$0.00	\$40.84	\$53.66
6th 6 months	85.00	\$27.24	\$9.20	\$3.83	\$0.67	\$0.00	\$1.50	\$0.00	\$0.00	\$0.00	\$42.44	\$56.06
7th 6 months	90.00	\$28.84	\$9.20	\$3.83	\$0.67	\$0.00	\$1.50	\$0.00	\$0.00	\$0.00	\$44.05	\$58.47
8th 6 months	95.00	\$30.45	\$9.20	\$3.83	\$0.67	\$0.00	\$1.50	\$0.00	\$0.00	\$0.00	\$45.65	\$60.87

Special Calculation Note : Classification title contains "Bricklayer" because contract originates within the Bricklayer Local.

Note that the classification description is clarified after the local union number at the top of the page.

Ratio :

- 4 Journeyman to 1 Apprentice
- 10 Journeymen to 2 Apprentices
- 16 Journeymen to 3 Apprentices

Jurisdiction (* denotes special jurisdictional note)
PORTAGE, SUMMIT

Special Jurisdictional Note :

Details :

Prevailing Wage Rate

Skilled Crafts

Name of Union: Cement Mason Statewide HwyHwy

Change # : LCN01-2023ibCementHwyHwy

Rate : Cement Mason Effective Date : 05/01/2023 Last Posted : 04/26/2023

Classification	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Cement Mason	\$33.74		\$8.50	\$7.55	\$0.65	\$0.00	\$2.25	\$0.07	\$0.00	\$0.00	\$52.76	\$69.63
Apprentice	Percent											
1st Year	70.00	\$23.62	\$8.50	\$7.55	\$0.65	\$0.00	\$2.25	\$0.07	\$0.00	\$0.00	\$42.64	\$54.45
2nd Year	80.00	\$26.99	\$8.50	\$7.55	\$0.65	\$0.00	\$2.25	\$0.07	\$0.00	\$0.00	\$46.01	\$59.51
3rd Year	90.00	\$30.37	\$8.50	\$7.55	\$0.65	\$0.00	\$2.25	\$0.07	\$0.00	\$0.00	\$49.39	\$64.57

Special Calculation Note : Other \$0.07 is for International Training Fund

Ratio :

Journeyman to 1 Apprentice
to 1 thereafter

Jurisdiction (* denotes special jurisdictional note) :

ADAMS, ALLEN, ASHLAND, ASHTABULA*, ATHENS, AUGLAIZE, BELMONT, BROWN, BUTLER, CARROLL, CHAMPAIGN, CLARK, CLERMONT, CLINTON, COLUMBIANA, COSHOCTON, CRAWFORD, CUYAHOGA* DARKE, DEFIANCE, DELAWARE, ERIE, FAIRFIELD, FAYETTE, FRANKLIN, FULTON*, GALLIA, GEAUGA*, GREENE, GUERNSEY, HAMILTON, HANCOCK*, HARDIN, HARRISON, HENRY*, HIGHLAND, HOCKING, HOLMES, HURON, JACKSON, JEFFERSON, KNOX, LAKE*, LAWRENCE, LICKING, LOGAN, LORAIN, LUCAS*, MADISON, MAHONING, MARION, MEDINA, MEIGS, MERCER, MIAMI, MONROE, MONTGOMERY, MORGAN, MORROW, MUSKINGUM, NOBLE, OTTAWA, PAULDING, PERRY, PICKAWAY, PIKE, PORTAGE, PREBLE, PUTNAM*, RICHLAND, ROSS, SANDUSKY, SCIOTO, SENECA, SHELBY, STARK, SUMMIT, TRUMBULL, TUSCARAWAS, UNION, VAN WERT, VINTON, WARREN, WASHINGTON, WAYNE, WILLIAMS, WOOD*, WYANDOT

Special Jurisdictional Note : (A) Highway Construction, Sewer, Waterworks And Utility Construction, Industrial & Building Site, Heavy

Construction, Airport Construction Or Railroad Construction Work, Power Plant, Tunnels, Amusement Park, Athletic Stadium Site Work, Pollution Control, Sewer Plant, Waste & Water Plant, Water Treatment Facilities Construction.

For Power Plant, Tunnels, Amusement Park, Athletic Stadium Site Work, Pollution Control, Sewer Plant, Waste & Water Plant, Water Treatment Facility Construction work in the following Counties: Ashtabula, Cuyahoga, Fulton, Geauga, Hancock, Henry, Lake, Lucas, Putnam and Wood Counties, those counties will use the Cement Mason Statewide Heavy Highway Exhibit B District 1 Wage Rate.

Details :

This rate replaces the previous Cement Mason Heavy Highway Statewide Rates (Exhibit A and Exhibit B rates), except for Cement Mason Statewide Heavy Highway Exhibit B Dist 1. sks

Prevailing Wage Rate Skilled Crafts

Name of Union: Cement Mason Statewide HevHwy Exhibit A District II

Change # : OCN01-2021fbCementHevHwy

Craft : Cement Mason Effective Date : 05/01/2021 Last Posted : 04/23/2021

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Cement Mason	\$31.15		\$8.25	\$7.35	\$0.65	\$0.00	\$2.25	\$0.07	\$0.00	\$0.00	\$49.72	\$65.29
Apprentice	Percent											
1st Year	70.00	\$21.80	\$8.25	\$7.35	\$0.65	\$0.00	\$2.25	\$0.07	\$0.00	\$0.00	\$40.37	\$51.28
2nd Year	80.00	\$24.92	\$8.25	\$7.35	\$0.65	\$0.00	\$2.25	\$0.07	\$0.00	\$0.00	\$43.49	\$55.95
3rd Year	90.00	\$28.03	\$8.25	\$7.35	\$0.65	\$0.00	\$2.25	\$0.07	\$0.00	\$0.00	\$46.60	\$60.62

Special Calculation Note : Other \$0.07 is for International Training Fund

Ratio :

1 Journeymen to 1 Apprentice
2 to 1 thereafter

Jurisdiction (* denotes special jurisdictional note) :

ALLEN, AUGLAIZE, BROWN, BUTLER, CARROLL, CLERMONT, COLUMBIANA, DEFIANCE, ERIE, HAMILTON, HARDIN, HIGHLAND, HOLMES, HURON, LOGAN, LORAIN, MAHONING, MEDINA, MERCER, OTTAWA, PAULDING, PORTAGE, SANDUSKY, SENECA, STARK, SUMMIT, TRUMBULL, TUSCARAWAS, VAN WERT, WARREN, WAYNE, WILLIAMS

Special Jurisdictional Note : (A) Highway Construction, Sewer, Waterworks And Utility Construction, Industrial & Building Site, Heavy Construction, Airport Construction Or Railroad Construction Work.

Details :

Prevailing Wage Rate Skilled Crafts

Name of Union: Cement Mason Statewide HevHwy Exhibit B District II

Change # : OCN01-2021fbCementHevHwy

Craft : Cement Mason Effective Date : 05/01/2021 Last Posted : 04/23/2021

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Cement Mason	\$32.02		\$8.25	\$7.35	\$0.65	\$0.00	\$2.25	\$0.07	\$0.00	\$0.00	\$50.59	\$66.60
Apprentice	Percent											
1st Year	70.00	\$22.41	\$8.25	\$7.35	\$0.65	\$0.00	\$2.25	\$0.07	\$0.00	\$0.00	\$40.98	\$52.19
2nd Year	80.00	\$25.62	\$8.25	\$7.35	\$0.65	\$0.00	\$2.25	\$0.07	\$0.00	\$0.00	\$44.19	\$56.99
3rd Year	90.00	\$28.82	\$8.25	\$7.35	\$0.65	\$0.00	\$2.25	\$0.07	\$0.00	\$0.00	\$47.39	\$61.80

Special Calculation Note : Other \$0.07 is for International Training Fund.

Ratio :

1 Journeymen to 1 Apprentice
2 to 1 thereafter

Jurisdiction (* denotes special jurisdictional note) :

ALLEN, AUGLAIZE, BROWN, BUTLER, CARROLL, CLERMONT, COLUMBIANA, DEFIANCE, ERIE, HAMILTON, HARDIN, HIGHLAND, HOLMES, HURON, LOGAN, LORAIN, MAHONING, MEDINA, MERCER, OTTAWA, PAULDING, PORTAGE, SANDUSKY, SENECA, STARK, SUMMIT, TRUMBULL, TUSCARAWAS, VAN WERT, WARREN, WAYNE, WILLIAMS

Special Jurisdictional Note : (B) Power Plant, Tunnels, Amusement Park, Athletic Stadium Site Work ,Pollution Control,Sewer Plant, Waste Plant, & Water Treatment Facilities, Construction.

Details :

Prevailing Wage Rate Skilled Crafts

Name of Union: Cement Mason & Plasterer Local 109

Change # : LCN01-2022sksLoc109

Craft : Cement Effective Date : 06/01/2022 Last Posted : 06/01/2022

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Cement Mason	\$31.74		\$9.09	\$7.35	\$0.70	\$0.00	\$4.74	\$0.07	\$0.00	\$0.00	\$53.69	\$69.56
Plasterer	\$30.61		\$8.75	\$7.35	\$0.70	\$0.00	\$4.75	\$0.07	\$0.00	\$0.00	\$52.23	\$67.53
Apprentice Cement Mason	Percent											
1st year	70.00	\$22.22	\$9.09	\$7.35	\$0.70	\$0.00	\$4.74	\$0.07	\$0.00	\$0.00	\$44.17	\$55.28
2nd year	79.98	\$25.39	\$9.09	\$7.35	\$0.70	\$0.00	\$4.74	\$0.07	\$0.00	\$0.00	\$47.34	\$60.03
3rd year	90.00	\$28.57	\$9.09	\$7.35	\$0.70	\$0.00	\$4.74	\$0.07	\$0.00	\$0.00	\$50.52	\$64.80
Plasterer Apprentice												
1st year	67.53	\$21.43	\$8.75	\$7.35	\$0.70	\$0.00	\$4.75	\$0.07	\$0.00	\$0.00	\$43.05	\$53.77
2nd year	77.17	\$24.49	\$8.75	\$7.35	\$0.70	\$0.00	\$4.75	\$0.07	\$0.00	\$0.00	\$46.11	\$58.36
3rd year	86.80	\$27.55	\$8.75	\$7.35	\$0.70	\$0.00	\$4.75	\$0.07	\$0.00	\$0.00	\$49.17	\$62.95

Special Calculation Note : Other is for International Training.

Ratio :

- 1 Journeymen to 1 Apprentice
- 5 Journeymen to 2 Apprentice
- 10 Journeyman to 3 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

- CARROLL, HOLMES, MEDINA, PORTAGE,
- STARK, SUMMIT, TUSCARAWAS, WAYNE

Special Jurisdictional Note :

Details :

- Finishers when applying colorshake shall be paid an additional \$2.00 per DAY.
- Swing Scaffolds up to 50 feet shall be paid \$0.25 above the Journeymen rate.
- Swing Scaffolds over 50 feet shall be paid \$0.35 above the Journeymen rate.

Prevailing Wage Rate Skilled Crafts

Name of Union: Carpenter Commercial NE Zone 1A

Change # : OCR01-2022sksLocNEZone1A

Craft : Carpenter Effective Date : 06/15/2022 Last Posted : 06/15/2022

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Carpenter	\$31.84		\$7.88	\$10.98	\$0.50	\$0.00	\$3.04	\$0.12	\$0.00	\$0.00	\$54.36	\$70.28
Apprentice	Percent											
1st 3 months	60.00	\$19.10	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$19.10	\$28.66
2nd 3 months	60.00	\$19.10	\$7.88	\$0.00	\$0.50	\$0.00	\$0.00	\$0.12	\$0.00	\$0.00	\$27.60	\$37.16
2nd 6 months is 1st year	60.00	\$19.10	\$7.88	\$0.00	\$0.50	\$0.00	\$0.00	\$0.12	\$0.00	\$0.00	\$27.60	\$37.16
3rd 6 months	60.00	\$19.10	\$7.88	\$0.00	\$0.50	\$0.00	\$0.00	\$0.12	\$0.00	\$0.00	\$27.60	\$37.16
4th 6 months	60.00	\$19.10	\$7.88	\$0.00	\$0.50	\$0.00	\$0.00	\$0.12	\$0.00	\$0.00	\$27.60	\$37.16
5th 6 months	70.00	\$22.29	\$7.88	\$7.69	\$0.50	\$0.00	\$2.13	\$0.12	\$0.00	\$0.00	\$40.61	\$51.75
6th 6 months	75.00	\$23.88	\$7.88	\$8.24	\$0.50	\$0.00	\$2.28	\$0.12	\$0.00	\$0.00	\$42.90	\$54.84
7th 6 months	80.00	\$25.47	\$7.88	\$8.78	\$0.50	\$0.00	\$2.43	\$0.12	\$0.00	\$0.00	\$45.18	\$57.92
8th 6 months	85.00	\$27.06	\$7.88	\$9.33	\$0.50	\$0.00	\$2.58	\$0.12	\$0.00	\$0.00	\$47.47	\$61.01

Special Calculation Note : *Other is International Training

Ratio :

2 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

MEDINA, PORTAGE, SUMMIT

Special Jurisdictional Note :

Details :

Prevailing Wage Rate Skilled Crafts

Name of Union: Carpenter Commercial Zone NEO 1B

Change # : LCN01-2023ibLocNEZone1A

Craft : Carpenter Effective Date : 08/30/2023 Last Posted : 08/30/2023

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Carpenter	\$34.53		\$7.98	\$10.98	\$0.60	\$0.00	\$3.34	\$0.13	\$0.00	\$0.00	\$57.56	\$74.82
Apprentice	Percent											
1st 3 months	60.00	\$20.72	\$7.98	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.70	\$39.06
2nd 3 months	60.00	\$20.72	\$7.98	\$0.00	\$0.60	\$0.00	\$3.34	\$0.13	\$0.00	\$0.00	\$32.77	\$43.13
2nd 6 months is 1st year	65.00	\$22.44	\$7.98	\$0.00	\$0.60	\$0.00	\$3.34	\$0.13	\$0.00	\$0.00	\$34.49	\$45.72
3rd 6 months	70.00	\$24.17	\$7.98	\$0.00	\$0.60	\$0.00	\$3.34	\$0.13	\$0.00	\$0.00	\$36.22	\$48.31
4th 6 months	75.00	\$25.90	\$7.98	\$0.00	\$0.60	\$0.00	\$3.34	\$0.13	\$0.00	\$0.00	\$37.95	\$50.90
5th 6 months	80.00	\$27.62	\$7.98	\$8.78	\$0.60	\$0.00	\$3.34	\$0.13	\$0.00	\$0.00	\$48.45	\$62.27
6th 6 months	85.00	\$29.35	\$7.98	\$9.33	\$0.60	\$0.00	\$3.34	\$0.13	\$0.00	\$0.00	\$50.73	\$65.41
7th 6 months	90.00	\$31.08	\$7.98	\$9.88	\$0.60	\$0.00	\$3.34	\$0.13	\$0.00	\$0.00	\$53.01	\$68.55
8th 6 months	95.00	\$32.80	\$7.98	\$10.43	\$0.60	\$0.00	\$3.34	\$0.13	\$0.00	\$0.00	\$55.28	\$71.69

Special Calculation Note : *Other is International Training

Ratio :

1 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

MEDINA, PORTAGE, SUMMIT

Special Jurisdictional Note :

Details :

Prevailing Wage Rate Skilled Crafts

Name of Union: Carpenter Floorlayer NE Zone 1A

Change # : OCR01-2022sksLocNEZone1A

Craft : Carpenter Effective Date : 06/15/2022 Last Posted : 06/15/2022

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Carpenter Floorlayer	\$31.84		\$7.88	\$10.98	\$0.50	\$0.00	\$3.04	\$0.14	\$0.00	\$0.00	\$54.38	\$70.30
Apprentice	Percent											
1st 3 months	60.00	\$19.10	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$19.10	\$28.66
2nd 3 months	60.00	\$19.10	\$7.88	\$0.00	\$0.50	\$0.00	\$0.00	\$0.14	\$0.00	\$0.00	\$27.62	\$37.18
2nd 6 months	60.00	\$19.10	\$7.88	\$0.00	\$0.50	\$0.00	\$0.00	\$0.14	\$0.00	\$0.00	\$27.62	\$37.18
3rd 6 months	60.00	\$19.10	\$7.88	\$0.00	\$0.50	\$0.00	\$0.00	\$0.14	\$0.00	\$0.00	\$27.62	\$37.18
4th 6 months	60.00	\$19.10	\$7.88	\$0.00	\$0.50	\$0.00	\$0.00	\$0.14	\$0.00	\$0.00	\$27.62	\$37.18
5th 6 months	70.00	\$22.29	\$7.88	\$7.69	\$0.50	\$0.00	\$2.13	\$0.14	\$0.00	\$0.00	\$40.63	\$51.77
6th 6 months	75.00	\$23.88	\$7.88	\$8.24	\$0.50	\$0.00	\$2.28	\$0.14	\$0.00	\$0.00	\$42.92	\$54.86
7th 6 months	80.00	\$25.47	\$7.88	\$8.78	\$0.50	\$0.00	\$2.43	\$0.14	\$0.00	\$0.00	\$45.20	\$57.94
8th 6 months	85.00	\$27.06	\$7.88	\$9.33	\$0.50	\$0.00	\$2.58	\$0.14	\$0.00	\$0.00	\$47.49	\$61.03

Special Calculation Note : *other is International Training

Ratio :

2 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

MEDINA, PORTAGE, SUMMIT

Special Jurisdictional Note :

Details :

Prevailing Wage Rate Skilled Crafts

Name of Union: Carpenter Floorlayer Zone NEO 1B

Change # : LCN01-2023ibLocNEZone1B

Craft : Carpenter Effective Date : 08/30/2023 Last Posted : 08/30/2023

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Carpenter Floorlayer	\$34.53		\$7.98	\$10.98	\$0.60	\$0.00	\$3.34	\$0.15	\$0.00	\$0.00	\$57.58	\$74.85
Apprentice	Percent											
1st 3 months	60.00	\$20.72	\$7.98	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.70	\$39.06
2nd 3 months	60.00	\$20.72	\$7.98	\$0.00	\$0.60	\$0.00	\$3.34	\$0.15	\$0.00	\$0.00	\$32.79	\$43.15
2nd 6 months	65.00	\$22.44	\$7.98	\$0.00	\$0.60	\$0.00	\$3.34	\$0.15	\$0.00	\$0.00	\$34.51	\$45.74
3rd 6 months	70.00	\$24.17	\$7.98	\$0.00	\$0.60	\$0.00	\$3.34	\$0.15	\$0.00	\$0.00	\$36.24	\$48.33
4th 6 months	75.00	\$25.90	\$7.98	\$0.00	\$0.60	\$0.00	\$3.34	\$0.15	\$0.00	\$0.00	\$37.97	\$50.92
5th 6 months	80.00	\$27.62	\$7.98	\$8.78	\$0.60	\$0.00	\$3.34	\$0.15	\$0.00	\$0.00	\$48.47	\$62.29
6th 6 months	85.00	\$29.35	\$7.98	\$9.33	\$0.60	\$0.00	\$3.34	\$0.15	\$0.00	\$0.00	\$50.75	\$65.43
7th 6 months	90.00	\$31.08	\$7.98	\$9.88	\$0.60	\$0.00	\$3.34	\$0.15	\$0.00	\$0.00	\$53.03	\$68.57
8th 6 months	95.00	\$32.80	\$7.98	\$10.43	\$0.60	\$0.00	\$3.34	\$0.15	\$0.00	\$0.00	\$55.30	\$71.71

Special Calculation Note : *other is International Training

Ratio :

1 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

MEDINA, PORTAGE, SUMMIT

Special Jurisdictional Note :

Details :

Prevailing Wage Rate Skilled Crafts

Name of Union: Carpenter Hev Hwy Zone NHH C1-C

Change # : LCN01-2023ibLocNEZoneNHH C1-C

Craft : Carpenter Effective Date : 08/30/2023 Last Posted : 08/30/2023

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Carpenter	\$34.34		\$7.98	\$10.98	\$0.60	\$0.00	\$3.34	\$0.13	\$0.00	\$0.00	\$57.37	\$74.54
Apprentice	Percent											
1st 3 Months	60.00	\$20.60	\$7.98	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.58	\$38.89
2nd 3 Months	60.00	\$20.60	\$7.98	\$0.00	\$0.60	\$0.00	\$3.34	\$0.13	\$0.00	\$0.00	\$32.65	\$42.96
2nd 6 Months	65.00	\$22.32	\$7.98	\$0.00	\$0.60	\$0.00	\$3.34	\$0.13	\$0.00	\$0.00	\$34.37	\$45.53
3rd 6 Months	70.00	\$24.04	\$7.98	\$0.00	\$0.60	\$0.00	\$3.34	\$0.13	\$0.00	\$0.00	\$36.09	\$48.11
4th 6 Months	75.00	\$25.76	\$7.98	\$0.00	\$0.60	\$0.00	\$3.34	\$0.13	\$0.00	\$0.00	\$37.81	\$50.68
5th 6 Months	80.00	\$27.47	\$7.98	\$8.78	\$0.60	\$0.00	\$3.34	\$0.13	\$0.00	\$0.00	\$48.30	\$62.04
6th 6 Months	85.00	\$29.19	\$7.98	\$9.33	\$0.60	\$0.00	\$3.34	\$0.13	\$0.00	\$0.00	\$50.57	\$65.16
7th 6 Months	90.00	\$30.91	\$7.98	\$9.88	\$0.60	\$0.00	\$3.34	\$0.13	\$0.00	\$0.00	\$52.84	\$68.29
8th 6 Months	95.00	\$32.62	\$7.98	\$10.43	\$0.60	\$0.00	\$3.34	\$0.13	\$0.00	\$0.00	\$55.10	\$71.41

Special Calculation Note : Other: Training

Ratio :

1 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

MEDINA, PORTAGE, SUMMIT

Special Jurisdictional Note :

Details :

Prevailing Wage Rate Skilled Crafts

Name of Union: Carpenter Pile Driver Hev Hwy Zone NHH P2-B

Change # : LCN01-2023ibLocNEZoneP2-B

Craft : Carpenter Effective Date : 08/30/2023 Last Posted : 08/30/2023

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Carpenter Pile Driver	\$33.97		\$7.93	\$11.33	\$0.60	\$0.00	\$5.20	\$0.18	\$0.00	\$0.00	\$59.21	\$76.20
Diver	\$50.96		\$7.93	\$11.33	\$0.60	\$0.00	\$5.20	\$0.18	\$0.00	\$0.00	\$76.20	\$101.68
Certified Welder	\$35.02		\$7.93	\$11.33	\$0.60	\$0.00	\$5.20	\$0.18	\$0.00	\$0.00	\$60.26	\$77.77
Apprentice	Percent											
1st 6 months	60.00	\$20.38	\$7.93	\$11.33	\$0.60	\$0.00	\$5.20	\$0.18	\$0.00	\$0.00	\$45.62	\$55.81
2nd 6 months	65.00	\$22.08	\$7.93	\$11.33	\$0.60	\$0.00	\$5.20	\$0.18	\$0.00	\$0.00	\$47.32	\$58.36
3rd 6 months	70.00	\$23.78	\$7.93	\$11.33	\$0.60	\$0.00	\$5.20	\$0.18	\$0.00	\$0.00	\$49.02	\$60.91
4th 6 months	75.00	\$25.48	\$7.93	\$11.33	\$0.60	\$0.00	\$5.20	\$0.18	\$0.00	\$0.00	\$50.72	\$63.46
5th 6 months	80.00	\$27.18	\$7.93	\$11.33	\$0.60	\$0.00	\$5.20	\$0.18	\$0.00	\$0.00	\$52.42	\$66.00
6th 6 months	85.00	\$28.87	\$7.93	\$11.33	\$0.60	\$0.00	\$5.20	\$0.18	\$0.00	\$0.00	\$54.11	\$68.55
7th 6 months	90.00	\$30.57	\$7.93	\$11.33	\$0.60	\$0.00	\$5.20	\$0.18	\$0.00	\$0.00	\$55.81	\$71.10
8th 6 months	95.00	\$32.27	\$7.93	\$11.33	\$0.60	\$0.00	\$5.20	\$0.18	\$0.00	\$0.00	\$57.51	\$73.65

Special Calculation Note : *Other is Training

Ratio :

1 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

ASHLAND, ASHTABULA, CUYAHOGA, ERIE, GEauga, HURON, LAKE, LORAIN, MEDINA, PORTAGE, RICHLAND, SUMMIT

Special Jurisdictional Note :

Prevailing Wage Rate Skilled Crafts

Name of Union: Carpenter Insulation NE Zone 1A

Change # : LCN01-2022sksLocNEZone1A

Craft : Carpenter Effective Date : 06/15/2022 Last Posted : 06/15/2022

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Carpenter Insulation	\$25.47		\$7.88	\$10.98	\$0.50	\$0.00	\$3.04	\$0.12	\$0.00	\$0.00	\$47.99	\$60.72
Apprentice												
	Percent											
1st 3 months	50.00	\$12.74	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$12.74	\$19.10
2nd 3 months	50.00	\$12.74	\$7.88	\$0.00	\$0.50	\$0.00	\$0.00	\$0.12	\$0.00	\$0.00	\$21.23	\$27.60
2nd 6 months	50.00	\$12.74	\$7.88	\$0.00	\$0.50	\$0.00	\$0.00	\$0.12	\$0.00	\$0.00	\$21.23	\$27.60
3rd 6 months	55.00	\$14.01	\$7.88	\$0.00	\$0.50	\$0.00	\$0.00	\$0.12	\$0.00	\$0.00	\$22.51	\$29.51
4th 6 months	60.00	\$15.28	\$7.88	\$0.00	\$0.50	\$0.00	\$0.00	\$0.12	\$0.00	\$0.00	\$23.78	\$31.42
5th 6 months	70.00	\$17.83	\$7.88	\$7.69	\$0.50	\$0.00	\$2.13	\$0.12	\$0.00	\$0.00	\$36.15	\$45.06
6th 6 months	75.00	\$19.10	\$7.88	\$8.24	\$0.50	\$0.00	\$2.28	\$0.12	\$0.00	\$0.00	\$38.12	\$47.67
7th 6 months	80.00	\$20.38	\$7.88	\$8.78	\$0.50	\$0.00	\$2.43	\$0.12	\$0.00	\$0.00	\$40.09	\$50.27
8th 6 months	85.00	\$21.65	\$7.88	\$9.33	\$0.50	\$0.00	\$2.58	\$0.12	\$0.00	\$0.00	\$42.06	\$52.88

Special Calculation Note : *Other is Training

Ratio :

2 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

MEDINA, PORTAGE, SUMMIT

Special Jurisdictional Note :

Details :

Prevailing Wage Rate Skilled Crafts

Name of Union: Carpenter Millwright NE Zone M1

Change # : OCR02-2022sksLocNEZoneM1

Craft : Carpenter Effective Date : 06/29/2022 Last Posted : 06/29/2022

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Carpenter Millwright	\$31.40		\$7.90	\$11.33	\$0.50	\$0.00	\$5.00	\$0.17	\$0.00	\$0.00	\$56.30	\$72.00
Certified Welder	\$32.40		\$7.90	\$11.33	\$0.50	\$0.00	\$5.00	\$0.17	\$0.00	\$0.00	\$57.30	\$73.50
Layout man on Monorail	\$33.15		\$7.90	\$11.33	\$0.50	\$0.00	\$5.00	\$0.17	\$0.00	\$0.00	\$58.05	\$74.62
Apprentice	Percent											
1st 6 months	60.00	\$18.84	\$7.90	\$11.33	\$0.50	\$0.00	\$5.00	\$0.17	\$0.00	\$0.00	\$43.74	\$53.16
2nd 6 months	60.00	\$18.84	\$7.90	\$11.33	\$0.50	\$0.00	\$5.00	\$0.17	\$0.00	\$0.00	\$43.74	\$53.16
3rd 6 months	62.00	\$19.47	\$7.90	\$11.33	\$0.50	\$0.00	\$5.00	\$0.17	\$0.00	\$0.00	\$44.37	\$54.10
4th 6 months	65.50	\$20.57	\$7.90	\$11.33	\$0.50	\$0.00	\$5.00	\$0.17	\$0.00	\$0.00	\$45.47	\$55.75
5th 6 months	69.00	\$21.67	\$7.90	\$11.33	\$0.50	\$0.00	\$5.00	\$0.17	\$0.00	\$0.00	\$46.57	\$57.40
6th 6 months	72.52	\$22.77	\$7.90	\$11.33	\$0.50	\$0.00	\$5.00	\$0.17	\$0.00	\$0.00	\$47.67	\$59.06
7th 6 months	76.00	\$23.86	\$7.90	\$11.33	\$0.50	\$0.00	\$5.00	\$0.17	\$0.00	\$0.00	\$48.76	\$60.70
8th 6 months	80.00	\$25.12	\$7.90	\$11.33	\$0.50	\$0.00	\$5.00	\$0.17	\$0.00	\$0.00	\$50.02	\$62.58

Special Calculation Note : Other is Training.

Ratio :

2 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

ASHLAND, ASHTABULA, CUYAHOGA, ERIE, GEAUGA, HURON, LAKE, LORAIN, MEDINA, PORTAGE, RICHLAND, SUMMIT

Special Jurisdictional Note :

Details :

The term "Millwright and Machine Erectors" jurisdiction shall mean the unloading, hoisting, rigging, skidding, moving, dismantling, aligning, erecting, assembling, repairing, maintenance and adjusting of all structures, processing areas either under cover, under ground or elsewhere, required to process material, handle, manufacture or service, be it powered or receiving power manually, by steam, gas, electricity, gasoline, diesel, nuclear, solar, water, air or chemically, and in industries such as and including, which are identified for the purpose of description, but not limited to, the following: woodworking plants; canning industries; steel mills; coffee roasting plants; paper and pulp; cellophane; stone crushing; gravel and sand washing and handling; refineries; grain storage and handling; asphalt plants; sewage disposal; water plants; laundries; bakeries; mixing plants; can, bottle and bag packing plants; textile mills; paint mills; breweries; milk processing plants; power plants; aluminum processing or manufacturing plants; and amusement and entertainment fields. The installation of mechanical equipment in atomic energy plants; installation of reactors in power plants; installation of control rods and equipment in reactors; and installation of mechanical equipment in rocket missile bases, launchers, launching gantry, floating bases, hydraulic escape doors and any and all component parts thereto, either assembled, semi-assembled or disassembled. The installation of, but not limited to, the following: setting-up of all engines, motors, generators, air compressors, fans, pumps, scales, hoppers, conveyors of all types, sizes and their supports; escalators; man lifts; moving sidewalks; hoists; dumb waiters; all types of feeding machinery; amusement devices; mechanical pin setters and spotters in bowling alleys; refrigeration equipment; and the installation of all types of equipment necessary and required to process material either in the manufacturing or servicing. The handling and installation of pulleys, gears, sheaves, fly wheels, air and vacuum drives, worm drives and gear drives directly or indirectly coupled to motors, belts, chains, screws, legs, boots, guards, booth tanks, all bin valves, turn heads and indicators, shafting, bearings, cable sprockets, cutting all key seats in new and old work, troughs, chippers, filters, calendars, rolls, winders, rewinders, slitters, cutters, wrapping machines, blowers, forging machines, rams, hydraulic or otherwise, planing, extruder, ball, dust collectors, equipment in meat packing plants, splicing of ropes and cables. The laying-out, fabrication and installation of protection equipment including machinery guards, making and setting of templates for machinery, fabrication of bolts, nuts, pans, drilling of holes for any equipment which the Millwrights install regardless of materials; all welding and burning regardless of type, fabrication of all lines, hose or tubing used in lubricating machinery installed by Millwrights; grinding, cleaning, servicing and any machine work necessary for any part of any equipment installed by the Millwrights; and the break-in and trial run of any equipment or machinery installed by the Millwrights. It is agreed the Millwrights shall use the layout tools and optic equipment necessary to perform their work.

Prevailing Wage Rate Skilled Crafts

Name of Union: Carpenter Millwright NE Zone M1-A

Change # : LCN01-2023ibLocNEZoneM1-A

Craft : Carpenter Effective Date : 08/30/2023 Last Posted : 08/30/2023

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Carpenter Millwright	\$33.69		\$7.99	\$11.33	\$0.60	\$0.00	\$5.42	\$0.18	\$0.00	\$0.00	\$59.21	\$76.06
Certified Welder	\$34.69		\$7.99	\$11.33	\$0.60	\$0.00	\$5.42	\$0.18	\$0.00	\$0.00	\$60.21	\$77.56
Layout man on Monorail	\$36.22		\$7.99	\$11.33	\$0.60	\$0.00	\$5.42	\$0.18	\$0.00	\$0.00	\$61.74	\$79.85
Apprentice	Percent											
1st 6 months	60.00	\$20.21	\$7.99	\$11.33	\$0.60	\$0.00	\$5.42	\$0.18	\$0.00	\$0.00	\$45.73	\$55.84
2nd 6 months	65.00	\$21.90	\$7.99	\$11.33	\$0.60	\$0.00	\$5.42	\$0.18	\$0.00	\$0.00	\$47.42	\$58.37
3rd 6 months	70.00	\$23.58	\$7.99	\$11.33	\$0.60	\$0.00	\$5.42	\$0.18	\$0.00	\$0.00	\$49.10	\$60.89
4th 6 months	75.00	\$25.27	\$7.99	\$11.33	\$0.60	\$0.00	\$5.42	\$0.18	\$0.00	\$0.00	\$50.79	\$63.42
5th 6 months	80.00	\$26.95	\$7.99	\$11.33	\$0.60	\$0.00	\$5.42	\$0.18	\$0.00	\$0.00	\$52.47	\$65.95
6th 6 months	85.00	\$28.64	\$7.99	\$11.33	\$0.60	\$0.00	\$5.42	\$0.18	\$0.00	\$0.00	\$54.16	\$68.47
7th 6 months	90.00	\$30.32	\$7.99	\$11.33	\$0.60	\$0.00	\$5.42	\$0.18	\$0.00	\$0.00	\$55.84	\$71.00
8th 6 months	95.00	\$32.01	\$7.99	\$11.33	\$0.60	\$0.00	\$5.42	\$0.18	\$0.00	\$0.00	\$57.53	\$73.53

Special Calculation Note : Other is Training.

Ratio :

1 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

ASHLAND, ASHTABULA, CUYAHOGA, ERIE, GEAUGA, HURON, LAKE, LORAIN, MEDINA, PORTAGE, RICHLAND, SUMMIT

Special Jurisdictional Note :

Details :

The term "Millwright and Machine Erectors" jurisdiction shall mean the unloading, hoisting, rigging, skidding, moving, dismantling, aligning, erecting, assembling, repairing, maintenance and adjusting of all structures, processing areas either under cover, under ground or elsewhere, required to process material, handle, manufacture or service, be it powered or receiving power manually, by steam, gas, electricity, gasoline, diesel, nuclear, solar, water, air or chemically, and in industries such as and including, which are identified for the purpose of description, but not limited to, the following: woodworking plants; canning industries; steel mills; coffee roasting plants; paper and pulp; cellophane; stone crushing; gravel and sand washing and handling; refineries; grain storage and handling; asphalt plants; sewage disposal; water plants; laundries; bakeries; mixing plants; can, bottle and bag packing plants; textile mills; paint mills; breweries; milk processing plants; power plants; aluminum processing or manufacturing plants; and amusement and entertainment fields. The installation of mechanical equipment in atomic energy plants; installation of reactors in power plants; installation of control rods and equipment in reactors; and installation of mechanical equipment in rocket missile bases, launchers, launching gantry, floating bases, hydraulic escape doors and any and all component parts thereto, either assembled, semi-assembled or disassembled. The installation of, but not limited to, the following: setting-up of all engines, motors, generators, air compressors, fans, pumps, scales, hoppers, conveyors of all types, sizes and their supports; escalators; man lifts; moving sidewalks; hoists; dumb waiters; all types of feeding machinery; amusement devices; mechanical pin setters and spotters in bowling alleys; refrigeration equipment; and the installation of all types of equipment necessary and required to process material either in the manufacturing or servicing. The handling and installation of pulleys, gears, sheaves, fly wheels, air and vacuum drives, worm drives and gear drives directly or indirectly coupled to motors, belts, chains, screws, legs, boots, guards, booth tanks, all bin valves, turn heads and indicators, shafting, bearings, cable sprockets, cutting all key seats in new and old work, troughs, chippers, filters, calendars, rolls, winders, rewinders, slitters, cutters, wrapping machines, blowers, forging machines, rams, hydraulic or otherwise, planing, extruder, ball, dust collectors, equipment in meat packing plants, splicing of ropes and cables. The laying-out, fabrication and installation of protection equipment including machinery guards, making and setting of templates for machinery, fabrication of bolts, nuts, pans, drilling of holes for any equipment which the Millwrights install regardless of materials; all welding and burning regardless of type, fabrication of all lines, hose or tubing used in lubricating machinery installed by Millwrights; grinding, cleaning, servicing and any machine work necessary for any part of any equipment installed by the Millwrights; and the break-in and trial run of any equipment or machinery installed by the Millwrights. It is agreed the Millwrights shall use the layout tools and optic equipment necessary to perform their work.

Prevailing Wage Rate Skilled Crafts

Name of Union: Carpenter Pile Driver NE Zone P1

Change # : OCR01-2022sksLocNEZoneP1

Craft : Carpenter Effective Date : 06/15/2022 Last Posted : 06/15/2022

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Carpenter Pile Driver	\$31.68		\$7.84	\$11.33	\$0.50	\$0.00	\$4.78	\$0.17	\$0.00	\$0.00	\$56.30	\$72.14
Diver	\$47.52		\$7.84	\$11.33	\$0.50	\$0.00	\$4.78	\$0.17	\$0.00	\$0.00	\$72.14	\$95.90
Certified Welder	\$32.73		\$7.84	\$11.33	\$0.50	\$0.00	\$4.78	\$0.17	\$0.00	\$0.00	\$57.35	\$73.71
Apprentice	Percent											
1st 6 months	60.00	\$19.01	\$7.84	\$11.33	\$0.50	\$0.00	\$4.78	\$0.17	\$0.00	\$0.00	\$43.63	\$53.13
2nd 6 months	60.00	\$19.01	\$7.84	\$11.33	\$0.50	\$0.00	\$4.78	\$0.17	\$0.00	\$0.00	\$43.63	\$53.13
3rd 6 months	62.00	\$19.64	\$7.84	\$11.33	\$0.50	\$0.00	\$4.78	\$0.17	\$0.00	\$0.00	\$44.26	\$54.08
4th 6 months	65.50	\$20.75	\$7.84	\$11.33	\$0.50	\$0.00	\$4.78	\$0.17	\$0.00	\$0.00	\$45.37	\$55.75
5th 6 months	69.00	\$21.86	\$7.84	\$11.33	\$0.50	\$0.00	\$4.78	\$0.17	\$0.00	\$0.00	\$46.48	\$57.41
6th 6 months	72.50	\$22.97	\$7.84	\$11.33	\$0.50	\$0.00	\$4.78	\$0.17	\$0.00	\$0.00	\$47.59	\$59.07
7th 6 months	76.00	\$24.08	\$7.84	\$11.33	\$0.50	\$0.00	\$4.78	\$0.17	\$0.00	\$0.00	\$48.70	\$60.74
8th 6 months	80.00	\$25.34	\$7.84	\$11.33	\$0.50	\$0.00	\$4.78	\$0.17	\$0.00	\$0.00	\$49.96	\$62.64

Special Calculation Note : *Other is Training

Ratio :

2 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

ASHLAND, ASHTABULA, CUYAHOGA, ERIE, GEAUGA, HURON, LAKE, LORAIN, MEDINA, PORTAGE, RICHLAND, SUMMIT

Special Jurisdictional Note :

Details :

Pile Drivers duties shall include but not limited to: Pile driving, milling, fashioning, joining assembling,

erecting, fastening, or dismantling of all material of wood, plastic, metal, fiber, cork and composition and all other substitute materials: pile driving, cutting, fitting and placing of lagging, and the handling, cleaning, erecting, installing and dismantling of machinery, equipment and erecting pre-engineered metal buildings. Pile Drivers work but not limited to: unloading, assembling, erection, repairs, operation, signaling, dismantling and reloading all equipment that is used for pile driving including pile butts is defined as sheeting or scrap piling. Underwater work that may be required in connection with the installation of piling. The driver and his tender work as a team and shall arrive at their own financial arrangements with the contractor. Any configuration of wood, steel, concrete or composite that is jettied, driven or vibrated onto the ground by conventional pile driving equipment for the purpose of supporting a future load that may be permanent or temporary. The construction of all wharves and docks, including the fabrication and installation of floating docks. Driving bracing, plumbing, cutting off and capping of all piling whether wood, metal, pipe piling or composite, loading, unloading, erecting, framing, dismantling, moving and handling of pile driving equipment piling used in the construction and repair of all wharves, docks, piers, trestles, caissons, cofferdams and erection of all sea walls and breakwaters. All underwater and marine work on bulkheads, wharves, docks, shipyards, caissons, piers, bridges, pipeline, work, viaducts, marine cable and trestles, as well as salvage and reclamation work where divers are employed. Rate shall include carpenters, acoustic and ceiling installers, drywall installers, pile drivers and floorlayers.

Prevailing Wage Rate Skilled Crafts

Name of Union: Carpenter NE District Industrial Dock & Door

Change # : LCN01-2014fbCarpNEStatewide

Craft : Carpenter Effective Date : 03/05/2014 Last Posted : 03/05/2014

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Carpenter	\$19.70		\$5.05	\$1.00	\$0.15	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$25.90	\$35.75
Trainee	Percent											
1st Year	60.00	\$11.82	\$5.05	\$1.00	\$0.15	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$18.02	\$23.93
2nd Year	80.20	\$15.80	\$5.05	\$1.00	\$0.15	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$22.00	\$29.90

Special Calculation Note : No special calculations for this skilled craft wage rate are required at this time.

Ratio :

1 Journeymen to 1 Trainee

Jurisdiction (* denotes special jurisdictional note) :

ADAMS, ALLEN, ASHLAND, ASHTABULA, ATHENS, AUGLAIZE, BELMONT, BROWN, BUTLER, CARROLL, CHAMPAIGN, CLARK, CLERMONT, CLINTON, COLUMBIANA, COSHOCTON, CRAWFORD, CUYAHOGA, DARKE, DEFIANCE, DELAWARE, ERIE, FAIRFIELD, FAYETTE, FRANKLIN, FULTON, GALLIA, GEAUGA, GREENE, GUERNSEY, HAMILTON, HANCOCK, HARDIN, HARRISON, HENRY, HIGHLAND, HOCKING, HOLMES, HURON, JACKSON, JEFFERSON, KNOX, LAKE, LAWRENCE, LICKING, LOGAN, LORAIN, LUCAS, MADISON, MAHONING, MARION, MEDINA, MEIGS, MERCER, MIAMI, MONROE, MONTGOMERY, MORGAN, MORROW, MUSKINGUM, NOBLE, OTTAWA, PAULDING, PERRY, PICKAWAY, PIKE, PORTAGE, PREBLE, PUTNAM, RICHLAND, ROSS, SANDUSKY, SCIOTO, SENECA, SHELBY, STARK, SUMMIT, TRUMBULL, TUSCARAWAS, UNION, VAN WERT, VINTON, WARREN, WASHINGTON, WAYNE, WILLIAMS, WOOD, WYANDOT

Special Jurisdictional Note : Industrial Dock and Door is the installation of overhead doors, roll up doors and dock leveling equipment

Details :

10/27/10 New Contract jc

Prevailing Wage Rate

Skilled Crafts

Name of Union: Electrical Local 306 Inside

Change # : LCN01-2023ibLoc306in

Contract : Electrical Effective Date : 06/07/2023 Last Posted : 06/07/2023

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Electrician	\$40.15		\$11.31	\$1.20	\$0.90	\$0.00	\$9.25	\$0.00	\$0.00	\$0.00	\$62.81	\$82.89
Cable Splicer	\$44.17		\$11.31	\$1.33	\$0.99	\$0.00	\$9.25	\$0.00	\$0.00	\$0.00	\$67.05	\$89.13
Apprentice	Percent											
1st period	40.00	\$16.06	\$11.31	\$0.48	\$0.36	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.21	\$36.24
2nd period	45.00	\$18.07	\$11.31	\$0.54	\$0.41	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$30.33	\$39.36
3rd period	50.00	\$20.07	\$11.31	\$0.60	\$0.45	\$0.00	\$4.63	\$0.00	\$0.00	\$0.00	\$37.07	\$47.10
4th period	60.00	\$24.09	\$11.31	\$0.72	\$0.54	\$0.00	\$5.55	\$0.00	\$0.00	\$0.00	\$42.21	\$54.25
5th period	70.00	\$28.10	\$11.31	\$0.84	\$0.63	\$0.00	\$6.48	\$0.00	\$0.00	\$0.00	\$47.37	\$61.42
6th period	80.00	\$32.12	\$11.31	\$0.96	\$0.72	\$0.00	\$7.40	\$0.00	\$0.00	\$0.00	\$52.51	\$68.57

Special Calculation Note :

Ratio :

- 3 Journeymen to 2 Apprentice
- 6 Journeymen to 4 Apprentice
- 9 Journeymen to 6 Apprentice
- 10-12 Journeymen to 8 Apprentice
- 13-15 Journeymen to 10 Apprentice

Jurisdiction (* denotes special jurisdictional note)

MEDINA*, PORTAGE*, SUMMIT, WAYNE*

The first person assigned to a job site shall be a Journeyman

Fireman

Special Jurisdictional Note :

Medina County the following townships are included: (Brunswick, Chatham, Granger, Guilford, Harrisville, Linckley, Homer, Lafayette, Medina, Montville, Sharon, Spencer, Wadsworth, Westfield and York).

Portage County the following townships are included: (Atwater, Aurora, Brimfield, Deerfield, Franklin, Mantua, Randolph, Ravenna, Rootstown, Shalersville, Streetsboro and Suffield).

Wayne County the following townships are included: (Baughman, Cannaan, Chester, Chippewa, Congress, Green, Milton, and Wayne).

Details :

This rate covers both Commercial and Industrial. High work a premium rate of shall be paid at (3%) per hour for all work performed over (30') free-fall and for work in a mine. Line work is excluded.

Prevailing Wage Rate Skilled Crafts

Name of Union: Electrical Local 306 Inside Lt Commercial Northern

Change # : LCN02-2023ibLoc306in

Craft : Electrical Effective Date : 06/14/2023 Last Posted : 06/14/2023

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Electrician	\$40.15		\$10.60	\$1.20	\$0.90	\$0.00	\$9.25	\$1.00	\$0.00	\$0.00	\$63.10	\$83.17
Cable Splicer	\$44.17		\$10.60	\$1.33	\$0.99	\$0.00	\$9.25	\$1.00	\$0.00	\$0.00	\$67.34	\$89.42
CE-3 12,001- 14,000 Hrs	\$27.59		\$6.51	\$0.83	\$0.82	\$0.00	\$0.83	\$0.10	\$0.00	\$0.00	\$36.68	\$50.47
CE-2 10,001- 12,000 Hrs	\$21.68		\$6.51	\$0.65	\$0.82	\$0.00	\$0.65	\$0.10	\$0.00	\$0.00	\$30.41	\$41.25
CE-1 8,001- 10,000 Hrs	\$19.71		\$6.51	\$0.59	\$0.82	\$0.00	\$0.59	\$0.10	\$0.00	\$0.00	\$28.32	\$38.18
CW-4 6,001- 8,000 Hrs	\$17.74		\$6.51	\$0.53	\$0.82	\$0.00	\$0.53	\$0.10	\$0.00	\$0.00	\$26.23	\$35.10
CW-3 4,001- 6,000 Hrs	\$15.77		\$6.51	\$0.47	\$0.82	\$0.00	\$0.47	\$0.10	\$0.00	\$0.00	\$24.14	\$32.03
CW-2 2,001- 4,000 Hrs	\$14.78		\$6.51	\$0.44	\$0.82	\$0.00	\$0.44	\$0.10	\$0.00	\$0.00	\$23.09	\$30.48
CW-1 0- 2,000 Hrs	\$13.80		\$6.51	\$0.41	\$0.82	\$0.00	\$0.41	\$0.10	\$0.00	\$0.00	\$22.05	\$28.95
Apprentice	Percent											
1st period	40.00	\$16.06	\$10.60	\$0.48	\$0.36	\$0.00	\$0.00	\$1.00	\$0.00	\$0.00	\$28.50	\$36.53
2nd period	45.00	\$18.07	\$10.60	\$0.54	\$0.41	\$0.00	\$0.00	\$1.00	\$0.00	\$0.00	\$30.62	\$39.65
3rd period	50.02	\$20.08	\$10.60	\$0.60	\$0.45	\$0.00	\$4.63	\$1.00	\$0.00	\$0.00	\$37.36	\$47.40
4th period	60.00	\$24.09	\$10.60	\$0.72	\$0.54	\$0.00	\$5.55	\$1.00	\$0.00	\$0.00	\$42.50	\$54.54
5th period	70.02	\$28.11	\$10.60	\$0.84	\$0.63	\$0.00	\$6.48	\$1.00	\$0.00	\$0.00	\$47.66	\$61.72
6th period	80.00	\$32.12	\$10.60	\$0.96	\$0.72	\$0.00	\$7.40	\$1.00	\$0.00	\$0.00	\$52.80	\$68.86

Special Calculation Note : Other is for Retirement Health and Welfare and Administration Fund for CE/CW.

Ratio :

Each job site
 2 Apprentices to 3 Journeymen or fraction thereof:
 1 - 3 Journeymen to 2 Apprentice
 4 - 6 Journeymen to 4 Apprentice
 7 - 9 Journeymen to 6 Apprentice
 10-12 Journeymen to 8 Apprentice
 13-15 Journeymen to 10 Apprentice

First person assigned to a job site shall be a Journeyman Wireman

Construction Electrician and Construction Wireman

Ratio

There shall be a minimum ratio of one inside Journeyman Wireman to every (4) employees of different classifications per jobsite. An Inside Journeyman Wireman is required on the project as the fifth (5th) worker or when apprentices are used.

Special Jurisdictional Note :

Medina County the following townships are included: (Brunswick, Chatham, Granger, Guilford, Harrisville, Hinckley, Homer, Lafayette, Medina, Montville, Sharon, Spencer, Wadsworth, Westfield and York).

Portage County the following townships are included: (Atwater, Aurora, Brimfield, Deerfield, Franklin, Mantua, Randolph, Ravenna, Rootstown, Shalersville, Streetsboro and Suffield).

Wayne County the following townships are included: (Baughman, Canaan, Chester, Chippewa, Congress, Green, Milton, and Wayne).

The scope of work for the light commercial agreement shall apply to the following small medical clinics, stand-alone doctor and dentist offices with up to 600 amp service (not attached to a hospital), gas stations/convenience stores, fast food restaurants and franchised chain restaurants including independent bars and taverns, places of worship, funeral homes, nursing homes, assisted living facilities and day-care facilities under 15,000 sq ft, small office, retail/wholesale facilities under 15,000 sq ft with less than 10 units attached, storage units, car washes, express hotels and motels (4 stories or less) without conference or restaurants facilities, residential units (subject to Davis Bacon Rates) small stand-alone manufacturing facilities when free standing and not part of a larger facility (less than 15,000 sq ft) solar projects (500 panels or less) unless other wise covered under this agreement, lighting retrofits (when not associated with remodels involving branch re-circuiting) Lighting retrofits shall be defined as the changing of lamps and ballasts in existing light fixtures and shall also include the one for one replacement of existing fixtures.

Details :

This rate covers both Commercial and Industrial. High work a premium rate of shall be paid at (3%) per hour for all work performed over (30') free-fall and for work in a mine. Line work is excluded.

Jurisdiction (* denotes special jurisdictional note) :

MEDINA*, PORTAGE*, SUMMIT, WAYNE*

Prevailing Wage Rate Skilled Crafts

Name of Union: Electrical Local 306 Lightning Rod

Change # : LCN01-2023ibLoc306LR

Craft : Voice Data Video Effective Date : 08/30/2023 Last Posted : 08/30/2023

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Electrical Lightning Protection Installer	\$33.15		\$7.75	\$0.99	\$0.00	\$3.90	\$1.99	\$0.00	\$0.00	\$0.00	\$47.78	\$64.35
Trainee Experience Level	Percent											
1st Day- 6 months	50.02	\$16.58	\$7.75	\$0.50	\$0.00	\$0.44	\$0.99	\$0.00	\$0.00	\$0.00	\$26.26	\$34.55
2nd 6 months	55.00	\$18.23	\$7.75	\$0.55	\$0.00	\$0.49	\$1.09	\$0.00	\$0.00	\$0.00	\$28.11	\$37.23
3rd 6 months	60.00	\$19.89	\$7.75	\$0.60	\$0.00	\$0.97	\$1.19	\$0.00	\$0.00	\$0.00	\$30.40	\$40.34
4th 6 months	65.00	\$21.55	\$7.75	\$0.65	\$0.00	\$1.05	\$1.29	\$0.00	\$0.00	\$0.00	\$32.29	\$43.06
3rd Year	70.02	\$23.21	\$7.75	\$0.70	\$0.00	\$1.65	\$1.39	\$0.00	\$0.00	\$0.00	\$34.70	\$46.31
4th Year	80.00	\$26.52	\$7.75	\$0.80	\$0.00	\$1.89	\$1.59	\$0.00	\$0.00	\$0.00	\$38.55	\$51.81
5th Year	90.02	\$29.84	\$7.75	\$0.90	\$0.00	\$2.12	\$1.79	\$0.00	\$0.00	\$0.00	\$42.40	\$57.32

Special Calculation Note :

Ratio :

1 Journeyman to 1 Trainee

Jurisdiction (* denotes special jurisdictional note) :

MEDINA*, PORTAGE*, SUMMIT, WAYNE*

Special Jurisdictional Note : In Medina County the following townships are included: (Brunswick, Chatham, Granger, Guilford, Harrisville, Hinckley, Homer, Lafayette, Medina, Montville, Sharon, Spencer, Wadsworth, Westfield and York). In Portage County the following townships are included: (Atwater, Aurora, Brimfield, Deerfield, Franklin, Mantua, Randolph, Ravenna, Rootstown, Shalersville, Streetsboro and Suffield). In Wayne County the following townships are included: (Baughman, Canaan, Chester, Chippewa, Congress, Green, Milton, and Wayne).

Details :

Prevailing Wage Rate Skilled Crafts

Name of Union: Electrical Local 306 Voice Data Video

Change # : LCN01-2023ibLoc306VDV

Craft : Voice Data Video Effective Date : 01/11/2023 Last Posted : 01/11/2023

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Journeyman Tech	\$26.23		\$9.60	\$0.82	\$0.41	\$1.18	\$3.30	\$0.51	\$0.00	\$0.00	\$42.05	\$55.16
Cable Puller	\$15.21		\$7.03	\$0.48	\$0.24	\$0.68	\$0.48	\$0.51	\$0.00	\$0.00	\$24.63	\$32.24
Journeyman Tech w/ BICSI copper OR fiber training	\$26.75		\$9.60	\$0.84	\$0.42	\$1.20	\$3.30	\$0.51	\$0.00	\$0.00	\$42.62	\$56.00
Journeyman/Tech w/ BICSI copper AND fiber training	\$27.28		\$9.60	\$0.86	\$0.43	\$1.23	\$3.30	\$0.51	\$0.00	\$0.00	\$43.21	\$56.85
Journeyman Tech w/ BICSI Tech	\$27.80		\$9.60	\$0.87	\$0.44	\$1.25	\$3.30	\$0.51	\$0.00	\$0.00	\$43.77	\$57.67
Apprentice	Percent											
1st Period	60.00	\$15.74	\$7.03	\$0.49	\$0.25	\$0.71	\$0.49	\$0.51	\$0.00	\$0.00	\$25.22	\$33.09
2nd Period	65.00	\$17.05	\$7.03	\$0.53	\$0.27	\$0.77	\$0.53	\$0.51	\$0.00	\$0.00	\$26.69	\$35.21
3rd Period	75.00	\$19.67	\$7.03	\$0.62	\$0.31	\$0.89	\$0.62	\$0.51	\$0.00	\$0.00	\$29.65	\$39.49
4th Period	85.00	\$22.30	\$7.03	\$0.70	\$0.35	\$1.00	\$0.70	\$0.51	\$0.00	\$0.00	\$32.59	\$43.73

Special Calculation Note : Other is Retiree Health Fund.

Ratio :
1 Journeyman to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :
MEDINA*, PORTAGE*, SUMMIT, WAYNE*

Special Jurisdictional Note : In Medina County the following townships are included: Brunswick, Chatham, Granger, Guilford, Harrisville, Hinckley, Homer, Lafayette, Medina, Montville, Sharon, Spencer, Wadsworth, Westfield and York.

In Portage County the following townships are included: Atwater, Aurora, Brimfield, Deerfield, Franklin, Mantua, Randolph, Ravenna, Rootstown, Shalersville, Streetsboro and Suffield.

In Wayne County the following townships are included: Baughman, Canaan, Chester, Chippewa, Congress, Green, Milton, and Wayne.

Details :
The following work is EXCLUDED from the Teledata Technician scope of work:

Installation of computer systems in industrial applications such as assembly lines, robotics, computer controller manufacturing systems.

Installation of conduit and/or raceways shall be installed by Inside Wireman . On sites where there is no Inside Wireman employed, the Teledata Technician may install raceway or conduit not greater than 10 foot.

Fire Alarm work is excluded on all new construction sites or wherever the fire alarm system is installed in conduit.

All HVAC control work.

hrs												
2nd 1000 hrs	65.00	\$31.58	\$7.00	\$0.95	\$0.32	\$0.00	\$7.58	\$0.75	\$0.00	\$0.00	\$48.18	\$63.98
3rd 1000 hrs	70.00	\$34.01	\$7.00	\$1.02	\$0.34	\$0.00	\$8.16	\$0.75	\$0.00	\$0.00	\$51.28	\$68.29
4th 1000 hrs	75.00	\$36.44	\$7.00	\$1.09	\$0.36	\$0.00	\$8.75	\$0.75	\$0.00	\$0.00	\$54.39	\$72.61
5th 1000 hrs	80.00	\$38.87	\$7.00	\$1.17	\$0.39	\$0.00	\$9.33	\$0.75	\$0.00	\$0.00	\$57.51	\$76.95
6th 1000 hrs	85.00	\$41.30	\$7.00	\$1.24	\$0.41	\$0.00	\$9.91	\$0.75	\$0.00	\$0.00	\$60.61	\$81.26
7th 1000 hrs	90.00	\$43.73	\$7.00	\$1.31	\$0.44	\$0.00	\$10.50	\$0.75	\$0.00	\$0.00	\$63.73	\$85.60

Special Calculation Note : Other is Health Retirement Account

Operator "A"

John Henry Rock Drill, D-6 (or equivalent) and above, Trackhoe Digger, (320 Track excavator), Cranes (greater than 25 tons and less than 45 tons).

Operator "B"

Cranes (greater than 6 tons and up to 25 tons), Backhoes, Road Tractor, Dozer up to D-5, Pressure Digger-wheeled or tracked, all Tension wire Stringing equipment.

Operator "C"

Trench, Backhoe, Riding type vibratory Compactor, Ground Rod Driver, Boom Truck (6 ton & below), Skid Steer loaders, Material Handler.

All Operators of cranes 45 ton or larger shall be paid the journeyman rate of pay. \$0.30 is for Health Retirement account.

Ratio :

Journeyman to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note)

ADAMS, ASHLAND, ASHTABULA, ATHENS, AUGLAIZE, BELMONT, BROWN, BUTLER, CARROLL, CHAMPAIGN, CLARK, CLERMONT, CLINTON, COLUMBIANA, COSHOCTON, CRAWFORD, CUYAHOGA, DARKE, DELAWARE, FAIRFIELD, FAYETTE, FRANKLIN, GALLIA, GEauga, GREENE, GUERNSEY, HAMILTON, HARRISON, HIGHLAND, HOCKING, HOLMES, JACKSON, JEFFERSON, KNOX, LAKE, LAWRENCE, LICKING, LOGAN, LORAIN, MADISON, MAHONING, MARION, MEDINA, MEIGS, MERCER, MIAMI, MONROE, MONTGOMERY, MORGAN, MORROW, MUSKINGUM, NOBLE, PERRY, PICKAWAY, PIKE, PORTAGE, PREBLE, RICHLAND, ROSS, SCIOTO, SHELBY, STARK, SUMMIT, TRUMBULL, TUSCARAWAS, UNION, VINTON, WARREN, WASHINGTON, WAYNE

Special Jurisdictional Note :

Details :

Welder - Arc Welding will be paid \$.30 above Journeyman rate. Additional compensation of 10% over the Journeyman and Journeyman Technician for performing work on structures outside of buildings such as water towers, smoke stacks, radio and television towers, more than 75' above the ground.

Prevailing Wage Rate

Skilled Crafts

Name of Union: Electrical Local 71 Outside Utility Power

Change # : LCN01-2023ibLoc7

Craft : Lineman Effective Date : 03/01/2023 Last Posted : 03/01/2023

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Electrical Lineman	\$46.03		\$7.00	\$1.38	\$0.46	\$0.00	\$11.05	\$0.75	\$0.00	\$0.00	\$66.67	\$89.68
Substation Technician	\$46.03		\$7.00	\$1.38	\$0.46	\$0.00	\$11.05	\$0.75	\$0.00	\$0.00	\$66.67	\$89.68
Cable Splicer	\$48.21		\$7.00	\$1.45	\$0.48	\$0.00	\$11.57	\$0.75	\$0.00	\$0.00	\$69.46	\$93.56
Operator A	\$41.26		\$7.00	\$1.24	\$0.41	\$0.00	\$9.90	\$0.75	\$0.00	\$0.00	\$60.56	\$81.19
Operator B	\$36.47		\$7.00	\$1.09	\$0.36	\$0.00	\$8.75	\$0.75	\$0.00	\$0.00	\$54.42	\$72.65
Operator C	\$29.28		\$7.00	\$0.88	\$0.29	\$0.00	\$7.03	\$0.75	\$0.00	\$0.00	\$45.23	\$59.87
Groundman 0-12 months Exp	\$23.02		\$7.00	\$0.69	\$0.23	\$0.00	\$5.52	\$0.75	\$0.00	\$0.00	\$37.21	\$48.72
Groundman 0-12 months Exp w/CDL	\$25.32		\$7.00	\$0.76	\$0.25	\$0.00	\$6.08	\$0.75	\$0.00	\$0.00	\$40.16	\$52.82
Groundman 1 yr or more	\$25.32		\$7.00	\$0.76	\$0.25	\$0.00	\$6.08	\$0.75	\$0.00	\$0.00	\$40.16	\$52.82
Groundman 1 yr or more w/CDL	\$29.92		\$7.00	\$0.90	\$0.30	\$0.00	\$7.18	\$0.75	\$0.00	\$0.00	\$46.05	\$61.01
Equipment Mechanic A	\$36.47		\$7.00	\$1.09	\$0.36	\$0.00	\$8.75	\$0.75	\$0.00	\$0.00	\$54.42	\$72.65
Equipment Mechanic B	\$32.88		\$7.00	\$0.99	\$0.33	\$0.00	\$7.89	\$0.75	\$0.00	\$0.00	\$49.84	\$66.28
Equipment Mechanic C	\$29.28		\$7.00	\$0.88	\$0.29	\$0.00	\$7.03	\$0.75	\$0.00	\$0.00	\$45.23	\$59.87
Line Truck w/uuger	\$32.28		\$7.00	\$0.97	\$0.32	\$0.00	\$7.75	\$0.75	\$0.00	\$0.00	\$49.07	\$65.21
Apprentice	Percent											
1st 1000 hrs	60.00	\$27.62	\$7.00	\$0.83	\$0.28	\$0.00	\$6.63	\$0.75	\$0.00	\$0.00	\$43.11	\$56.92

hrs												
3rd 1000 hrs	70.00	\$32.22	\$7.00	\$0.97	\$0.32	\$0.00	\$7.73	\$0.75	\$0.00	\$0.00	\$48.99	\$65.10
4th 1000 hrs	75.00	\$34.52	\$7.00	\$1.04	\$0.35	\$0.00	\$8.28	\$0.75	\$0.00	\$0.00	\$51.94	\$69.20
5th 1000 hrs	80.00	\$36.82	\$7.00	\$1.10	\$0.37	\$0.00	\$8.84	\$0.75	\$0.00	\$0.00	\$54.88	\$73.30
6th 1000 hrs	85.00	\$39.13	\$7.00	\$1.17	\$0.39	\$0.00	\$9.39	\$0.75	\$0.00	\$0.00	\$57.83	\$77.39
7th 1000 hrs	90.00	\$41.43	\$7.00	\$1.24	\$0.41	\$0.00	\$9.94	\$0.75	\$0.00	\$0.00	\$60.77	\$81.48

Special Calculation Note : Other is Health Retirement Account

Operator "A"

John Henry Rock Drill, D-6 (or equivalent) and above, Trackhoe Digger, (320 Track excavator), Cranes (greater than 25 tons and less than 45 tons).

Operator "B"

Cranes (greater than 6 tons and up to 25 tons), Backhoes, Road Tractor, Dozer up to D-5, Pressure Digger-wheeled or tracked, all Tension wire Stringing equipment.

Operator "C"

Trench, Backhoe, Riding type vibratory Compactor, Ground Rod Driver, Boom Truck (6 ton & below), Skid Steer loaders, Material Handler.

Ratio :

1) Journeyman Lineman to (1) Apprentice

Jurisdiction (* denotes special jurisdictional note)

ADAMS, ASHLAND, ASHTABULA, ATHENS, AUGLAIZE, BELMONT, BROWN, BUTLER, CARROLL, CHAMPAIGN, CLARK, CLERMONT, CLINTON, COLUMBIANA, COSHOCTON, CRAWFORD, CUYAHOGA, DARKE, DELAWARE, FAIRFIELD, FAYETTE, FRANKLIN, GALLIA, GEAUGA, GREENE, GUERNSEY, HAMILTON, HARRISON, HIGHLAND, HOCKING, HOLMES, JACKSON, JEFFERSON, KNOX, LAKE, LAWRENCE, LICKING, LOGAN, LORAIN, MADISON, MAHONING, MARION, MEDINA, MEIGS, MERCER, MIAMI, MONROE, MONTGOMERY, MORGAN, MORROW, MUSKINGUM, NOBLE, PERRY, PICKAWAY, PIKE, PORTAGE, PREBLE, RICHLAND, ROSS, SCIOTO, SHELBY, STARK, SUMMIT, TRUMBULL, TUSCARAWAS, UNION, VINTON, WARREN, WASHINGTON, WAYNE

Special Jurisdictional Note : 0.30 is for Health Retirement Account.

Details :

Welding - Arc Welding will be paid \$.30 above Journeyman rate. Additional compensation of 10% over the Journeyman Lineman and Journeyman Technician for performing work on structures outside of buildings such as water towers, smoke stacks, radio and television towers, more than 75' above the ground.

Prevailing Wage Rate Skilled Crafts

Name of Union: Electrical Local 71 Outside (North Central Ohio)

Change # : LCN01-2023ibLoc71CentralOhio

Craft : Lineman Effective Date : 03/01/2023 Last Posted : 03/01/2023

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Electrical Lineman	\$43.02		\$7.00	\$1.29	\$0.43	\$0.00	\$8.60	\$0.56	\$0.00	\$0.00	\$60.90	\$82.41
Traffic Signal & Lighting Journeyman	\$41.43		\$7.00	\$1.24	\$0.41	\$0.00	\$8.29	\$0.56	\$0.00	\$0.00	\$58.93	\$79.64
Equipment Operator	\$37.78		\$7.00	\$1.13	\$0.38	\$0.00	\$7.56	\$0.56	\$0.00	\$0.00	\$54.41	\$73.30
Groundman 0-12 months (W/O CDL)	\$22.91		\$7.00	\$0.69	\$0.23	\$0.00	\$4.58	\$0.56	\$0.00	\$0.00	\$35.97	\$47.42
Groundman 0-12 months (W/CDL) plus	\$25.03		\$7.00	\$0.75	\$0.25	\$0.00	\$5.01	\$0.56	\$0.00	\$0.00	\$38.60	\$51.12
Groundsman greater than 1 Year (W/CDL)	\$27.71		\$7.00	\$0.81	\$0.28	\$0.00	\$5.43	\$0.56	\$0.00	\$0.00	\$41.79	\$55.65
Traffic Signal Apprentices												
1st 1,000 hours	\$24.86		\$7.00	\$0.75	\$0.25	\$0.00	\$4.97	\$0.56	\$0.00	\$0.00	\$38.39	\$50.82
2nd 1,000 hours	\$26.93		\$7.00	\$0.81	\$0.27	\$0.00	\$5.39	\$0.56	\$0.00	\$0.00	\$40.96	\$54.43
3rd 1,000 hours	\$29.00		\$7.00	\$0.87	\$0.29	\$0.00	\$5.80	\$0.56	\$0.00	\$0.00	\$43.52	\$58.02
4th 1,000 hours	\$31.07		\$7.00	\$0.93	\$0.31	\$0.00	\$6.21	\$0.56	\$0.00	\$0.00	\$46.08	\$61.62
5th 1,000 hours	\$33.14		\$7.00	\$0.99	\$0.33	\$0.00	\$6.63	\$0.56	\$0.00	\$0.00	\$48.65	\$65.22
5th 1,000 hours	\$37.29		\$7.00	\$1.12	\$0.37	\$0.00	\$7.46	\$0.56	\$0.00	\$0.00	\$53.80	\$72.45
Apprentice Lineman	Percent											
1st 1,000 Hours	60.00	\$25.81	\$7.00	\$0.77	\$0.26	\$0.00	\$5.16	\$0.56	\$0.00	\$0.00	\$39.56	\$52.47

Hours												
3rd 1,000 Hours	70.00	\$30.11	\$7.00	\$0.90	\$0.30	\$0.00	\$6.02	\$0.56	\$0.00	\$0.00	\$44.89	\$59.95
4th 1,000 Hours	75.00	\$32.27	\$7.00	\$0.97	\$0.32	\$0.00	\$6.54	\$0.56	\$0.00	\$0.00	\$47.66	\$63.79
5th 1,000 Hours	80.00	\$34.42	\$7.00	\$1.03	\$0.34	\$0.00	\$6.88	\$0.56	\$0.00	\$0.00	\$50.23	\$67.43
6th 1,000 Hours	85.00	\$36.57	\$7.00	\$1.10	\$0.37	\$0.00	\$7.31	\$0.56	\$0.00	\$0.00	\$52.91	\$71.19
7th 1,000 Hours	90.00	\$38.72	\$7.00	\$1.16	\$0.39	\$0.00	\$7.74	\$0.56	\$0.00	\$0.00	\$55.57	\$74.93

Special Calculation Note : Other is Safety & Education Fund (\$0.06) and HRA (\$0.50).

Ratio :
Journeyman to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note)
BELMONT, CARROLL, HARRISON, HOLMES,
JEFFERSON, MEDINA, PORTAGE, STARK, SUMMIT,
WAYNE

Special Jurisdictional Note :

Details :
A groundman when directed shall assist a Journeyman in the performance of his/her work on the ground, including the use of hand tools. A Groundman under no circumstances shall climb poles, towers, ladders, or work from an elevated platform or bucket truck.

No more than three (3) Groundmen shall work alone. Jobs with more than three Groundmen shall be supervised by a Groundcrew Foreman, Journeyman Lineman, Journeyman Traffic Signal Technician or an Equipment Operator.

Scope of Work: installation and maintenance of highway and street lighting, highway and street sign lighting, electronic message boards and traffic control systems, camera systems, traffic signal work, substation and line construction including overhead and underground projects for private and industrial work as in accordance with the IBEW Constitution. This agreement includes the operation of all tools and equipment necessary for the installation of the above projects.

Prevailing Wage Rate Skilled Crafts

Name of Union: Electrical Local 71 Voice Data Video Outside

Change # : LCR01-2017fbLoc71VDV

Craft : Voice Data Video Effective Date : 10/18/2017 Last Posted : 10/18/2017

	BHR	Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification											
Electrical Installer Technician I	\$23.46	\$5.50	\$0.70	\$0.00	\$0.00	\$0.30	\$0.00	\$0.00	\$0.00	\$29.96	\$41.69
Installer Technician II	\$22.37	\$5.50	\$0.67	\$0.00	\$0.00	\$0.30	\$0.00	\$0.00	\$0.00	\$28.84	\$40.03
Equipment Operator I	\$22.37	\$5.50	\$0.67	\$0.00	\$0.00	\$0.30	\$0.00	\$0.00	\$0.00	\$28.84	\$40.03
Equipment Operator II	\$18.43	\$5.50	\$0.55	\$0.00	\$0.00	\$0.30	\$0.00	\$0.00	\$0.00	\$24.78	\$33.99
Installer/Repair Outside	\$22.37	\$5.50	\$0.67	\$0.00	\$0.00	\$0.30	\$0.00	\$0.00	\$0.00	\$28.84	\$40.03
Ground Driver W/CDL	\$15.83	\$5.50	\$0.47	\$0.00	\$0.00	\$0.30	\$0.00	\$0.00	\$0.00	\$22.10	\$30.01
Groundman	\$13.24	\$5.50	\$0.40	\$0.00	\$0.00	\$0.30	\$0.00	\$0.00	\$0.00	\$19.44	\$26.06
Cable Splicer	\$23.46	\$5.50	\$0.70	\$0.00	\$0.00	\$0.30	\$0.00	\$0.00	\$0.00	\$29.96	\$41.69

Special Calculation Note :

Ratio :

Jurisdiction (* denotes special jurisdictional note) :

ADAMS, ASHLAND, ASHTABULA, ATHENS, AUGLAIZE, BELMONT, BROWN, BUTLER, CARROLL, CHAMPAIGN, CLARK, CLERMONT, CLINTON, COLUMBIANA, COSHOCTON, CRAWFORD, CUYAHOGA, DARKE, DELAWARE, FAIRFIELD, FAYETTE, FRANKLIN, GALLIA, GEAUGA, GREENE, GUERNSEY, HAMILTON, HARRISON, HIGHLAND, HOCKING, HOLMES, JACKSON, JEFFERSON, KNOX, LAKE, LAWRENCE, LICKING, LOGAN, LORAIN, MADISON, MAHONING, MARION, MEDINA, MEIGS, MERCER, MIAMI, MONROE, MONTGOMERY, MORGAN, MORROW, MUSKINGUM, NOBLE, PERRY,

PICKAWAY, PIKE, PORTAGE, PREBLE, RICHLAND,
ROSS, SCIOTO, SHELBY, STARK, SUMMIT,
TRUMBULL, TUSCARAWAS, UNION, VINTON,
WARREN, WASHINGTON, WAYNE

Special Jurisdictional Note :

Details :

Cable Splicer: Inspect and test lines or cables, analyze results, and evaluate transmission characteristics. Cover conductors with insulation or seal splices with moisture-proof covering. Install, splice, test, and repair cables using tools or mechanical equipment. This will include the splicing of fiber.

Journeyman Technician I: Must know all aspects of telephone and cable work. This is to include aerial, underground, and manhole work. Must know how to climb and run bucket. Must have all the tools required to perform these tasks. Must be able to be responsible for the safety of the crew at all times. Must also have CDL license and have at least 5 years experience.

Installer/Repairman: Perform tasks of repairing, installing, and testing phone and CATV services.

Technician II: Have at least three years of telephone and CATV experience. Must have the knowledge of underground, aerial, and manhole work. Must be able to climb and operate bucket. Must have CDL. Must have all tools needed to perform these tasks.

Equipment Operator I: Able to operate a digger derrick or bucket truck. Have at least 5 years of experience and must have a valid CDL license.

Equipment Operator II: Able to operate a digger derrick or bucket truck. Have at least 3 years of experience and must have a valid CDL license.

Groundman W/CDL: Must have a valid CDL license and be able to perform tasks such as: climbing poles, pulling downguys, making up material, and getting appropriate tools for the job. Must have at least 5 year's experience.

Groundman: Perform tasks such as: climbing poles, pulling downguys, making up material, and getting appropriate tools for the job. Experience 0-5 years.

Prevailing Wage Rate Skilled Crafts

Name of Union: Elevator Local 45

Change # : LCN01-2023ibLoc45

Craft : Elevator Effective Date : 02/01/2023 Last Posted : 02/01/2023

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Elevator Mechanic	\$55.63		\$16.07	\$10.76	\$0.70	\$4.45	\$9.80	\$2.09	\$0.00	\$0.00	\$99.50	\$127.32
Assistant Mechanic	\$44.50		\$16.07	\$10.76	\$0.70	\$3.56	\$9.80	\$1.66	\$0.00	\$0.00	\$87.05	\$109.30
Helper	\$38.94		\$16.07	\$10.76	\$0.70	\$3.12	\$9.80	\$1.47	\$0.00	\$0.00	\$80.86	\$100.33
Apprentice	Percent											
Apprentice												
0-6 months Probation	50.00	\$27.82	\$0.00	\$0.00	\$0.00	\$1.67	\$0.00	\$0.00	\$0.00	\$0.00	\$29.48	\$43.39
1st year	55.00	\$30.60	\$16.07	\$10.76	\$0.70	\$1.84	\$9.80	\$1.15	\$0.00	\$0.00	\$70.92	\$86.21
2nd year	65.00	\$36.16	\$16.07	\$10.76	\$0.70	\$2.17	\$9.80	\$1.36	\$0.00	\$0.00	\$77.02	\$95.10
3rd year	70.00	\$38.94	\$16.07	\$10.76	\$0.70	\$2.34	\$9.80	\$1.47	\$0.00	\$0.00	\$80.08	\$99.55
4th year	80.00	\$44.50	\$16.07	\$10.76	\$0.70	\$2.67	\$9.80	\$1.66	\$0.00	\$0.00	\$86.16	\$108.42

Special Calculation Note : *Other is Holiday Pay

Ratio :

The total number of Helpers & Apprentices employed shall not exceed the number of Mechanics on any one job, except on jobs where (2) teams or more are working, (1) extra Helper or Apprentice may be employed for the first (2) teams and an extra Helper or Apprentice for each additional (3) teams.

Jurisdiction (* denotes special jurisdictional note) :

ASHLAND, CARROLL, COLUMBIANA, COSHOCTON, HARRISON, HOLMES, MAHONING, MEDINA, PORTAGE, RICHLAND, STARK, SUMMIT, TRUMBULL, TUSCARAWAS, WAYNE

Special Jurisdictional Note :

Details :

Vacation 6%/under 5 years based on regular hourly rate for all hours worked. 8%/over 5 years based on regular hourly rate for all hours worked.

Prevailing Wage Rate Skilled Crafts

Name of Union: Glazier Local 181

Change # : LCN02-2023ibLoc181

Craft : Glazier Effective Date : 05/01/2023 Last Posted : 04/26/2023

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Glazier	\$33.97		\$8.72	\$11.58	\$0.45	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$54.72	\$71.70
Apprentice	Percent											
1st 6 months	50.02	\$16.99	\$8.72	\$1.02	\$0.45	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$27.18	\$35.68
2nd 6 months	50.02	\$16.99	\$8.72	\$1.02	\$0.45	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$27.18	\$35.68
3rd 6 months	50.02	\$16.99	\$8.72	\$5.19	\$0.45	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$31.35	\$39.85
4th 6 months	55.00	\$18.68	\$8.72	\$5.61	\$0.45	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$33.46	\$42.81
5th 6 months	60.00	\$20.38	\$8.72	\$6.02	\$0.45	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$35.57	\$45.76
6th 6 months	70.00	\$23.78	\$8.72	\$6.86	\$0.45	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$39.81	\$51.70
7th 6 months	80.00	\$27.18	\$8.72	\$7.69	\$0.45	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$44.04	\$57.62
8th 6 months	90.00	\$30.57	\$8.72	\$8.53	\$0.45	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$48.27	\$63.56

Special Calculation Note : No special calculations for this classification.

Ratio :

2 Journeymen to 1 Apprentice
3 Journeymen to 1 Apprentice Thereafter

Jurisdiction (* denotes special jurisdictional note) :

ASHTABULA, CUYAHOGA, ERIE*, GEauga, HURON, LAKE, LORAIN, MEDINA*, PORTAGE*, SUMMIT*

Special Jurisdictional Note : Start at the intersection of Route 305 and the eastern boundary line of Portage County. Follow Route 305 west onto Route 82, follow Route 82 west to the intersection of Routes 82,8 and 271, follow Route 271 south to Medina County line west to Route 94, follow Route 94 south to Route 303, follow Route 303 west to Route 252, follow Route 252 south to Route 18, follow Route 18 west to Route 301, follow 301 south to Route 162, follow Route 162 west to Route 58, follow Route 58 south to the Ashland County line, follow the Ashland County line. The eastern part of Route 4 north to Lake Erie is the jurisdiction of Local 181. Local 181 has the jurisdiction on all projects built on the property which borders on the above Routes and/or intersections, wherever a County line is the divider between Local 181 and another Union, the jurisdiction is only to the county line.

Details :

High Pay: All work is defined for the purpose of the agreement as being work which requires that the employee be supported by equipment that hangs from or suspends from the wall or roof of a building or structure. This work shall receive and additional \$1.50 per hour.

Prevailing Wage Rate

Skilled Crafts

Name of Union: Glazier Local 1162

Change # : LCN01-2023ibLoc1162

Craft : Glazier Effective Date : 05/24/2023 Last Posted : 05/24/2023

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Glazier	\$29.37		\$7.50	\$6.79	\$0.38	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$44.04	\$58.73
Apprentice	Percent											
1st 6 months	55.00	\$16.15	\$7.50	\$6.79	\$0.38	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$30.82	\$38.90
2nd 6 months	60.00	\$17.62	\$7.50	\$6.79	\$0.38	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$32.29	\$41.10
3rd 6 months	65.00	\$19.09	\$7.50	\$6.79	\$0.38	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$33.76	\$43.31
4th 6 months	70.00	\$20.56	\$7.50	\$6.79	\$0.38	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$35.23	\$45.51
5th 6 months	75.02	\$22.03	\$7.50	\$6.79	\$0.38	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$36.70	\$47.72
6th 6 months	80.00	\$23.50	\$7.50	\$6.79	\$0.38	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$38.17	\$49.91
7th 6 months	85.00	\$24.96	\$7.50	\$6.79	\$0.38	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$39.63	\$52.12
8th 6 months	90.00	\$26.43	\$7.50	\$6.79	\$0.38	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$41.10	\$54.32

Special Calculation Note :

Ratio :

Journeyman to 1 Apprentice
 Journeyman to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note)

ASHLAND, CARROLL, COSHOCTON, HOLMES,
 MEDINA, PORTAGE, RICHLAND, STARK, SUMMIT,
 TUSCARAWAS, WAYNE

Special Jurisdictional Note :

Details :

Add \$1.25 per hour for High Pay which is all work that requires the employee be supported by equipment which hangs or depends from the roof of a building or structure including all repelling .

Prevailing Wage Rate Skilled Crafts

Name of Union: Ironworker Local 17

Change # : LCN01-2020fbLoc17

Craft : Ironworker Effective Date : 12/24/2020 Last Posted : 12/24/2020

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Ironworker	\$33.83		\$7.94	\$10.00	\$0.67	\$2.10	\$4.50	\$0.00	\$0.00	\$0.00	\$59.04	\$75.95
Apprentice	Percent											
1st 6 Months	50.00	\$16.91	\$7.94	\$10.00	\$0.67	\$2.10	\$4.50	\$0.00	\$0.00	\$0.00	\$42.13	\$50.58
2nd 6 Months	55.00	\$18.61	\$7.94	\$10.00	\$0.67	\$2.10	\$4.50	\$0.00	\$0.00	\$0.00	\$43.82	\$53.12
2nd Year 1st 6 Months	70.00	\$23.68	\$7.94	\$10.00	\$0.67	\$2.10	\$4.50	\$0.00	\$0.00	\$0.00	\$48.89	\$60.73
2nd Year 2nd 6 Months	75.00	\$25.37	\$7.94	\$10.00	\$0.67	\$2.10	\$4.50	\$0.00	\$0.00	\$0.00	\$50.58	\$63.27
3rd Year 1st 6 Months	80.00	\$27.06	\$7.94	\$10.00	\$0.67	\$2.10	\$4.50	\$0.00	\$0.00	\$0.00	\$52.27	\$65.81
3rd Year 2nd 6 Months	85.00	\$28.76	\$7.94	\$10.00	\$0.67	\$2.10	\$4.50	\$0.00	\$0.00	\$0.00	\$53.97	\$68.34
4th Year 1st 6 Months	90.00	\$30.45	\$7.94	\$10.00	\$0.67	\$2.10	\$4.50	\$0.00	\$0.00	\$0.00	\$55.66	\$70.88
4th Year 2nd 6 Months	95.00	\$32.14	\$7.94	\$10.00	\$0.67	\$2.10	\$4.50	\$0.00	\$0.00	\$0.00	\$57.35	\$73.42

Special Calculation Note : No special calculations for this skilled craft wage rate are required at this time.

Ratio :

4 Journeymen to 1 Apprentice on Structural Work
 3 Journeymen to 1 Apprentice on Rod Work
 2 Journeymen to 1 Apprentice on Finishing, Steel Sash, Stairway and Ornamental Work

Jurisdiction (* denotes special jurisdictional note) :

ASHTABULA, CUYAHOGA, ERIE, GEAUGA, HURON, LAKE, LORAIN, MEDINA, PORTAGE, SUMMIT

1 Apprentice for every Sheeting Gang
1 Journeymen to 2 Apprentice Roadway Signage and
Sound Barriers
2 Journeymen to 2 Apprentice Unloading and
Erection of Light Gauge Metal Trusses

Special Jurisdictional Note : West Boundary Line :Sandusky, Ohio: Boundary lines between Local 17 & Local 55 are as follows: Columbus Ave north to Sandusky Bay (and/or Lake Erie): Columbus Ave South to present Route 4: Route 4 South to present Route 99: from Route 99 south to old Route 224-all territory to the west of the boundary line to be the jurisdiction of Local 55.All territory to the East of the boundary line to be the jurisdiction of Local 17.Kelly's Island to be within jurisdiction of Local 17.All bridges,tunnels,viaducts,etc, relative to these boundary lines shall be the jurisdiction of Local 17

South Boundary Line:Canton, Ohio: Boundary lines between Local 17 & Local 550 are as follows: All territory north of old Route 224 line to be the jurisdiction of Local 17. All bridges,tunnels,viaducts,signs,etc, relative to old Route 224 line to be within the jurisdiction of Local 17. All territory south of old Route 224 line is to be within the jurisdiction of Local 550, except for everything within the city limits of Barberton which shall be the jurisdiction of Local 17. Reading from West to East: Route old 224 line: Greenwich Ave-Wooster Road or East Ave. Route old 224 line: New 224 line including Cloverleaf: East Waterloo Road: New 224 line-Attwood Road-Old 224. This will be considered to be the old Route 224 line,except for the city limits of Barberton, Ohio which shall be the jurisdiction of Local 17

Southeast Boundary : Between local 17 and Local 207 are as follows: West of a line from Middlefield to Shalersville to Deerfield, shall be under the jurisdiction of local 17. East of a line from Middlefield, to Shalersville to Deerfield, shall be under the jurisdiction of Local 207.

Local 17 & Local 207 have agreed that the Ohio County of Ashtabula shall be as follows: Everything North of Route 6, starting at the Geauga County line, proceeding east to State Route 45, shall be under the jurisdiction of Local 17. Everything South, starting at the Geauga County line shall be under local 207.

North Boundary: The East boundary line and the West boundary line continuing North halfway across Lake Erie.

Details :

Prevailing Wage Rate

Skilled Crafts

Name of Union: Labor Hwy 2

Change # : LCN01-2023ibLaborHwy2

Group : Laborer Group 1 Effective Date : 05/01/2023 Last Posted : 04/26/2023

Classification	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Laborer Group 1	\$35.05		\$8.20	\$4.05	\$0.45	\$0.00	\$1.00	\$0.00	\$0.10	\$0.00	\$48.85	\$66.37
Group 2	\$35.22		\$8.20	\$4.05	\$0.45	\$0.00	\$1.00	\$0.00	\$0.10	\$0.00	\$49.02	\$66.63
Group 3	\$35.55		\$8.20	\$4.05	\$0.45	\$0.00	\$1.00	\$0.00	\$0.10	\$0.00	\$49.35	\$67.12
Group 4	\$36.00		\$8.20	\$4.05	\$0.45	\$0.00	\$1.00	\$0.00	\$0.10	\$0.00	\$49.80	\$67.80
Watch Person	\$27.35		\$8.20	\$4.05	\$0.45	\$0.00	\$1.00	\$0.00	\$0.10	\$0.00	\$41.15	\$54.83
Apprentice	Percent											
0-1000 hrs	60.00	\$21.03	\$8.20	\$4.05	\$0.45	\$0.00	\$1.00	\$0.00	\$0.10	\$0.00	\$34.83	\$45.34
1001-2000 hrs	70.02	\$24.54	\$8.20	\$4.05	\$0.45	\$0.00	\$1.00	\$0.00	\$0.10	\$0.00	\$38.34	\$50.61
2001-3000 hrs	80.00	\$28.04	\$8.20	\$4.05	\$0.45	\$0.00	\$1.00	\$0.00	\$0.10	\$0.00	\$41.84	\$55.86
3001-4000 hrs	90.00	\$31.54	\$8.20	\$4.05	\$0.45	\$0.00	\$1.00	\$0.00	\$0.10	\$0.00	\$45.35	\$61.12
More Than 4000 hrs	100.00	\$35.05	\$8.20	\$4.05	\$0.45	\$0.00	\$1.00	\$0.00	\$0.10	\$0.00	\$48.85	\$66.37

Special Calculation Note : Watchman has no Apprentices. Tunnel Laborer rate with air-pressurized add \$1.00 to the above wage rate.

Ratio :

Journeyman to 1 Apprentice
 Journeyman to 1 Apprentice thereafter

Jurisdiction (* denotes special jurisdictional note)

ASHTABULA, ERIE, HURON, LORAIN, LUCAS,
 MAHONING, MEDINA, OTTAWA, PORTAGE,
 SANDUSKY, STARK, SUMMIT, TRUMBULL, WOOD

Special Jurisdictional Note : Hod Carriers and Common Laborers - Heavy, Highway, Sewer, Waterworks, Utility, Airport, Railroad, Industrial and Building Site, Sewer Plant, Waste Water Treatment Facilities Construction

Details :

Group 1

Laborer (Construction); Plant Laborer or Yardman, Right-of-way Laborer, Landscape Laborer, Highway Lighting Worker, Signalization Worker, (Swimming) Pool Construction Laborer, Utility Man, *Bridge Man, Handyman, Joint Setter, Laggerperson, Carpenter Helper, Waterproofing Laborer, Slurry Seal, Seal Coating, Surface Treatment or Road Mix Laborer, Grap Laborer & Grouter, Asphalt Laborer, Dump Man (batch trucks), Guardrail & Fence Installer, Mesh Handler & Place, Concrete Curing Applicator, Scaffold Erector, Sign Installer, Hazardous Waste (level D), Diver Helper, Zone Person and Traffic Control.

Brotherhood of Carpenters and Joiners of America and the Laborers' International Union of North America, which states in; the moving, cleaning, oiling and carrying to the next point of erection, and the stripping of forms which are not to be re-used, and forms on all flat arch work shall be done by members of the Laborers' International Union of North America."

Group 2

Asphalt Raker, Screwman or Paver, Concrete Puddler, Kettle Man (pipeline), All Machine-Driven Tools (Gas, Electric, Air), Mason Tender, Brick Paver, Mortar Mixer, Skid Steer, Sheeting & Shoring Person, Surface Grinder Person, Screedperson, Water Blast, Hand Held Wand, Power Buggy or Power Wheelbarrow, Paint Striper, Plastic fusing Machine Operator, Loading Machine Operator, Pug Mill Operator, Operator of All Vacuum Devices Wet or Dry, Handling of all Pumps 4 inches and under (gas, air or electric), Diver, Form Setter, Bottom Person, Welder Helper (pipeline), Concrete Saw Person, Cutting with Burning Torch, Pipe Layer, Hand Spiker (railroad), Underground Person (working in sewer and waterline, cleaning, repairing and reconditioning). Tunnel Laborer (without air), Caisson, Cofferdam (below 25 feet deep), Air Track and Wagon Drill, Sandblaster Nozzle Person, Hazardous Waste (level B), ***Lead Abatement, Hazardous Waste (level C)

**Includes the erecting of structures for the removal, including the encapsulation and containment of Lead abatement process.

Group 3

Clast and Powder Person, Muckers will be defined as shovel men working directly with the miners, Wrencher (mechanical joints & utility pipeline), Yarnier, Top Lander, Hazardous Waste (level A), Concrete Specialist, Curb Setter and Cutter, Grade Checker, Concrete Crew in Tunnels. Utility pipeline Tappers, Waterline, Caulker, Signal Person will receive the rate equal to the rate paid the Laborer classification for which the Laborer is signaling.

Group 4

Finer, Welder, Gunitite Nozzle Person

...) The Watchperson shall be responsible to patrol and maintain a safe traffic zone including but not limited to barrels, cones, signs, arrow boards, message boards etc.

The responsibility of a watchperson is to see that the equipment, job and office trailer etc. are secure.

Prevailing Wage Rate Skilled Crafts

Name of Union: Labor Local 894 Building

Change # : LCN01-2021fbLoc894

Craft : Laborer Effective Date : 01/12/2021 Last Posted : 01/12/2021

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Laborer Group 1	\$32.92		\$7.00	\$3.80	\$0.40	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$44.22	\$60.68
Laborer Group 2	\$33.07		\$7.00	\$3.80	\$0.40	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$44.37	\$60.91
Laborer Group 3	\$33.12		\$7.00	\$3.80	\$0.40	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$44.42	\$60.98
Laborer Group 4	\$33.42		\$7.00	\$3.80	\$0.40	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$44.72	\$61.43
Laborer Group 5	\$27.95		\$7.00	\$3.80	\$0.40	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$39.25	\$53.22
Apprentice	Percent											
1ST 1-1000 hrs	60.00	\$19.75	\$7.00	\$3.80	\$0.40	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$31.05	\$40.93
2nd 1000-2000 hrs	70.00	\$23.04	\$7.00	\$3.80	\$0.40	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$34.34	\$45.87
3rd 2000-3000 hrs	80.00	\$26.34	\$7.00	\$3.80	\$0.40	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$37.64	\$50.80
4th 3000-4000 hrs	90.00	\$29.63	\$7.00	\$3.80	\$0.40	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$40.93	\$55.74
More than 4000 hrs	100.00	\$32.92	\$7.00	\$3.80	\$0.40	\$0.00	\$0.00	\$0.00	\$0.10	\$0.00	\$44.22	\$60.68

Special Calculation Note : \$0.10 for LECET is for Labor Management

Ratio :

1 Apprentice to 1 Journeymen
1 Apprentice to 4 Journeymen

Jurisdiction (* denotes special jurisdictional note) :

MEDINA, PORTAGE, SUMMIT

Special Jurisdictional Note :

Details :

Group 1

Building & Construction Laborer, Welder Helper, Carpenter Tender, Landscape Laborer, Mason Tender, Concrete Bucket Tender, Concrete & Construction Specialist, Asbestos Laborer, Toxic/Hazardous Waste Laborer, Lead Removal, Level D

Group 2

Air Driven Boring Machine, Tamper Operator, Asphalt Raker, Paving Bed Maker, Concrete Puddler on Building Work, Concrete Batch Dumper, Materials Mixer, Wire Mesh Handler, Hook-up on Demolition Work, Scaffold Erector, Structural, Precast Erector, Power Tools - Air, Gas or Electric, Hazardous Waste Laborer, Lead Removal Level C

Group 3

Pipe Layer, Rock Driller, Mucker-Tunnel, Burner, Form Setter, Power Saw Jackhammer, Bottom Man, Hod Carrier, Power Buggy or Power Wheelbarrow, Bob Cat, Skid Steer Work and or similar, Hazardous Waste Laborer, Lead Removal Level B

Group 4

Gunnite Nozzle Man, Tunnel Miner, Water Link Caulker, Dynamite Man, Structural Precast Welder, Pump Hose Nozzle Man, Hazardous Waste Laborer, Lead Removal Level A

Group 5

Watchman

Hazardous Waste Removal and Lead Abatement:

For Laborers, working in an exclusive or "hot" area with toxic or hazardous materials, one of the following personal protective equipment ensembles will be required.

Level A

When the area has been determined to contain extremely toxic contaminants or contaminants unknown but may be expected to be extremely toxic and/or immediately dangerous to life and health. This ensemble includes a fully encapsulated chemical suit, self contained breathing apparatus (SCBA) or airline fed respirator, and various types and numbers of boots and gloves; cool vests and voice-activated radios are optional equipment sometimes worn.

Level B

Protective equipment includes a chemically resistant splash suit and a SCBA or airline respirator. This ensemble is required when the situation is very hazardous, such as oxygen deficient atmospheres, IDLH atmospheres, or confined space entries, but the risk of skin exposure is not as great as in Level A situation.

Level C

Protective equipment includes a protective suit and an air purifying respirator (APR) with the appropriate filter canisters. The ensemble is used when the contaminants are reliably known not to be hazardous to the skin and not IDLH (Immediately Dangerous to Life or Health) and correct filter protection is available.

Level D

Protective Equipment to be worn only in established "safe zones" may consist of, from normal work clothes to normal skin protection such as gloves, face shields goggles, coveralls and occasionally respiratory protection.

Prevailing Wage Rate Skilled Crafts

Name of Union: Operating Engineers - Building Local 18 - Zone I

Change # : LCN01-2023ibLoc18

Craft : Operating Engineer Effective Date : 05/01/2023 Last Posted : 04/26/2023

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Operator Group A	\$42.98		\$9.01	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.05	\$59.23	\$80.72
Operator Group B	\$42.88		\$9.01	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.05	\$59.13	\$80.57
Operator Group C	\$41.84		\$9.01	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.05	\$58.09	\$79.01
Operator Group D	\$40.62		\$9.01	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.05	\$56.87	\$77.18
Operator Group E	\$35.33		\$9.01	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.05	\$51.58	\$69.24
Master Mechanic	\$43.23		\$9.01	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.05	\$59.48	\$81.09
Crane 150'-180'	\$43.48		\$9.01	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.05	\$59.73	\$81.47
Crane 180'-249"	\$43.98		\$9.01	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.05	\$60.23	\$82.22
Crane 250' and over	\$44.23		\$9.01	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.05	\$60.48	\$82.59
Apprentice	Percent											
1st Year	50.00	\$21.49	\$9.01	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.05	\$37.74	\$48.49
2nd Year	60.00	\$25.79	\$9.01	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.05	\$42.04	\$54.93
3rd Year	70.00	\$30.09	\$9.01	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.05	\$46.34	\$61.38
4th Year	80.00	\$34.38	\$9.01	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.05	\$50.63	\$67.83
Field Mechanic Trainee												
1st Year	50.00	\$21.49	\$9.01	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.05	\$37.74	\$48.49
2nd Year	60.00	\$25.79	\$9.01	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.05	\$42.04	\$54.93
3rd Year	70.00	\$30.09	\$9.01	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.05	\$46.34	\$61.38
4th Year	80.00	\$34.38	\$9.01	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.05	\$50.63	\$67.83

Special Calculation Note : Other: Education & Safety Fund is \$0.09 per hour. *Misc is National Training Fund

Ratio :

For every (3) Operating Engineer Journeymen employed by the company, there may be employed (1) Registered Apprentice or Trainee Engineer through the referral when they are available. An Apprentice, while employed as part of a crew per Article VIII, paragraph 65 will not be subject to the apprenticeship ratios in this collective bargaining agreement

Jurisdiction (* denotes special jurisdictional note) :

SUMMIT, PORTAGE

Special Jurisdictional Note :

Details :

**Apprentices will receive a 10% increase on top of the percentages listed above provided they are operating mobile equipment. Mechanic Trainees will receive 10% if required to have a CDL.

Group A- Barrier Moving Machines; Boiler Operators or Compressor Operators, when compressor or boiler is mounted on crane (Piggyback Operation); Boom Trucks (all types); Cableways Cherry Pickers; Combination - Concrete Mixers & Towers; All Concrete Pumps with Booms; Cranes (all types); Compact Cranes, track or rubber over 4,000 pounds capacity; Cranes self-erecting, stationary, track or truck (all configurations); Derricks (all types); Draglines; Dredges (dipper, clam or suction) 3-man crew; Elevating Graders or Euclid Loaders; Floating Equipment; Forklift (rough terrain with winch/hoist); Gradalls; Helicopter Operators, hoisting building materials; Helicopter Winch Operators, Hoisting building materials; Hoes (All types); Hoists (with two or more drums in use); Horizontal Directional Drill; Hydraulic Gantry (lift system); Laser Finishing Machines; Laser Screed and like equipment; Lift Slab or Panel Jack Operators; Locomotives (all types); Maintenance Operator/Technician(Mechanic Operator/Technician and/or Welder); Mixers, paving (multiple drum); Mobile Concrete Pumps, with booms; Panelboards, (all types on site); Pile Drivers; Power Shovels; Prentice Loader; Rail Tamper (with automatic lifting and aligning device); Rotary Drills (all), used on caissons for foundations and sub-structure; Side Booms; Slip Form Pavers; Straddle Carriers (Building Construction on site); Trench Machines (over 24" wide); Tug Boats.

Group B - Articulating/end dumps (minus \$4.00/hour from Group B rate); Asphalt Pavers; Bobcat-type and/or skid steer loader with hoe attachment greater than 7000 lbs.; Bulldozers; CMI type Equipment; Concrete Saw, Vermeer-type; Endloaders; Hydro Milling Machine; Kolman-type Loaders (Dirt Loading); Lead Greasemen; Mucking Machines; Pettibone-Rail Equipment; Power Graders; Power Scoops; Power Scrapers; Push Cats; Rotomills (all), grinders and planers of all types.

Group C - A-Frames; Air Compressors, Pressurizing Shafts or Tunnels; All Asphalt Rollers; Bobcat-type and/or Skid Steer Loader with or without attachments; Boilers (15 lbs. pressure and over); All Concrete Pumps (without booms with 5 inch system); Fork Lifts (except masonry); Highway Drills - all types (with integral power); Hoists (with one drum); House Elevators (except those automatic call button controlled), Buck Hoists, Transport Platforms, Construction Elevators; Hydro Vac/Excavator (when a second person is needed, the rate of pay will be "Class E"); Man Lifts; Material hoist/elevators; Mud Jacks; Pressure Grouting; Pump Operators (installing or operating Well Points or other types of Dewatering Systems); Pumps (4 inches and over discharge); Railroad Tie (Inserter/Remover); Rotovator (Lime-Soil Stabilizer); Submersible Pumps (4"and over discharge); Switch & Tie Tampers (without lifting and aligning device); Trench Machines (24" and under); Utility Operators.

Group D - Backfillers and Tampers; Ballast Re-locator; Batch Plant Operators; Bar and Joint Installing Machines; Bull Floats; Burlap and Curing Machines; Clefplanes; Compressors, on building construction; Concrete Mixers, more than one bag capacity; Concrete Mixers, one bag capacity (side loaders); All Concrete Pumps (without boom with 4" or smaller system); Concrete Spreader; Conveyors, used for handling building materials; Crushers; Deckhands; Drum Fireman (in asphalt plants); Farm type tractors pulling attachments; Finishing Machines; Form Trenchers; Generators; Gunite Machines; Hydro-seeders; Pavement Breakers (hydraulic or cable); Post Drivers; Post Hole Diggers; Pressure Pumps (over 1/2") discharge); Road Widening Trenchers; Rollers (except asphalt); Self-propelled sub-graders; Shotcrete Machines; Tire Repairmen; Tractors, pulling sheepsfoot post roller or grader; VAC/ALLS; Vibratory Compactors, with integral power; Welders.

Group E - Allen Screed Paver (concrete); Boilers (less than 15 lbs. pressure); Cranes-Compact, track or rubber (under 4,000 pounds capacity); Directional Drill "Locator"; Fueling and greasing +\$3.00; Inboard/outboard Motor Boat Launches; Light Plant Operators; Masonry Fork Lifts; Oilers/Helpers; Power Driven Heaters (oil fired); Power Scrubbers; Power Sweepers; Pumps (under 4 inch discharge); Signalperson, Submersible Pumps (under 4" discharge).

Master Mechanics - Master Mechanic

Cranes 150' - 180' - Boom & Jib 150 - 180 feet

Cranes 180' - 249' - Boom & Jib 180 - 249 feet

Cranes 250' and over - Boom & Jib 250-feet or over

Prevailing Wage Rate Skilled Crafts

Name of Union: Operating Engineers - HevHwy Zone I

Change # : LCN01-2023ibLoc18hevhwyl

Craft : Operating Engineer Effective Date : 05/01/2023 Last Posted : 04/26/2023

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Operator Class A	\$42.98		\$9.01	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.05	\$59.23	\$80.72
Operator Class B	\$42.88		\$9.01	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.05	\$59.13	\$80.57
Operator Class C	\$41.84		\$9.01	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.05	\$58.09	\$79.01
Operator Class D	\$40.62		\$9.01	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.05	\$56.87	\$77.18
Operator Class E	\$35.33		\$9.01	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.05	\$51.58	\$69.24
Master Mechanic	\$43.23		\$9.01	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.05	\$59.48	\$81.09
Apprentice	Percent											
1st Year	50.00	\$21.49	\$9.01	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.05	\$37.74	\$48.49
2nd Year	60.00	\$25.79	\$9.01	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.05	\$42.04	\$54.93
3rd Year	70.00	\$30.09	\$9.01	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.05	\$46.34	\$61.38
4th Year	80.00	\$34.38	\$9.01	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.05	\$50.63	\$67.83
Field Mech Trainee												
1st year	50.00	\$21.49	\$9.01	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.05	\$37.74	\$48.49
2nd year	60.00	\$25.79	\$9.01	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.05	\$42.04	\$54.93
3rd year	70.00	\$30.09	\$9.01	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.05	\$46.34	\$61.38
4th year	80.00	\$34.38	\$9.01	\$6.25	\$0.85	\$0.00	\$0.00	\$0.09	\$0.00	\$0.05	\$50.63	\$67.83

Special Calculation Note : Other: Education & Safety Fund is \$0.09 per hour. *Misc is National Training

Ratio :

For every (3) Operating Engineer Journeymen employed by the company, there may be employed (1) Registered Apprentice or Trainee Engineer through the referral when they are available. An Apprentice, while employed as part of a crew per Article VIII, paragraph 69 will not be subject to the apprenticeship ratios in this collective bargaining agreement

Jurisdiction (* denotes special jurisdictional note) :

ASHTABULA, CUYAHOGA, ERIE, GEAUGA, LAKE, LORAIN, MEDINA, PORTAGE, SUMMIT

Special Jurisdictional Note :

Details :

**Apprentices will receive a 10% increase on top of the percentages listed above provided they are operating mobile equipment. Mechanic Trainees will receive 10% if required to have a CDL.

Class A - Air Compressors on Steel Erection; Asphalt Plant Engineers (Cleveland District Only); Barrier Moving Machine; Boiler Operators, Compressor Operators, or Generators, when mounted on a rig; Boom Trucks (all types); Cableways; Cherry Pickers; Combination- Concrete Mixers & Towers; Concrete Plants (over 4 yd capacity); Concrete Pumps; Cranes (all types); Compact Cranes track or rubber over 4,000 pounds capacity; Cranes self-erecting stationary, track or truck; Derricks (all types); Draglines; Dredges dipper, clam or suction; Elevating Graders or Euclid Loaders; Floating Equipment (all types); Gradalls; Helicopter Crew (Operator- hoist or winch); Hoes (all types); Hoisting Engines; Hoisting Engines, on shaft or tunnel work; Hydraulic Gantry (lifting system); Industrial-type Tractors; Jet Engine Dryer (D8 or D9) diesel Tractors; Locomotives (standard gauge); Maintenance Operators/Technicians (class A); Mixers, paving (single or double drum); Mucking Machines; Multiple Scrapers; Piledriving Machines (all types); Power Shovels, Prentice Loader; Quad 9 (double pusher); Rail Tamper (with automatic lifting and aligning device); Refrigerating Machines (freezer operation); Rotary Drills, on caisson work; Rough Terrain Fork Lift with winch/hoist; Side Booms; Slip Form Pavers; Survey Crew Party Chiefs; Tower Derricks; Tree Shredders; Trench Machines (over 24" wide); Truck Mounted Concrete Pumps; Tug Boats; Tunnel Machines and /or Mining Machines; Wheel Excavators.

Class B - Asphalt Pavers; Automatic Subgrade Machines, self-propelled (CMI-type); Bobcat-type and /or Skid Steer Loader with hoe attachment greater than 7000 lbs.; Boring Machine Operators (more than 48 inches); Bulldozers; Concrete Saws, Vermeer type; Endloaders; Horizontal Directional Drill (50,000 ft. lbs. thrust and over); Hydro Milling Machine; Kolman-type Loaders (production type-dirt); Lead Greasemen; Lighting and Traffic Signal Installation Equipment includes all groups or classifications; Maintenance Operators/Technicians, Class B; Material Transfer Equipment (shuttle buggy) Asphalt; Pettibone-Rail Equipment; Power Graders; Power Scrapers; Push Cats; Rotomills (all), Grinders and Planners of all types, Groovers (excluding walk-behinds); Trench Machines (24 inch wide and under).

Class C - A-Frames; Air Compressors, on tunnel work (low Pressure); Articulating/straight bed end dumps if assigned (minus \$4.00 per hour); Asphalt Plant Engineers (Portage and Summit Counties only); Bobcat-type and/or skid steer loader with or without attachments; Drones; Highway Drills (all types); HydroVac/Excavator (when a second person is needed, the rate of pay will be "Class E"); Locomotives (narrow gauge); Material Hoist/Elevators; Mixers, concrete (more than one bag capacity); Mixers, one bag capacity (side loader); Power Boilers (over 15 lbs. pressure); Pump Operators (installing or operating well Points); Pumps (4 inch and over discharge); Railroad Tie Inserter/Remover; Rollers, Asphalt; Rotovator (lime-soil Stabilizer); Switch & Tie Tampers (without lifting and aligning device); Utilities Operators, (small equipment); Welding Machines and Generators.

Class D - Backfillers and Tampers; Ballast Re-locator; Bar and Joint Installing Machines; Batch Plant Operators; Boring Machine Operators (48 inch or less); Bull Floats; Burlap and Curing Machines; Concrete Plants (capacity 4 yds. and under); Concrete Saws (multiple); Conveyors (highway); Crushers; Deckhands; Farm type tractors, with attachments (highway); Finishing Machines; Firemen, Floating Equipment (all types); Fork Lifts (highway), except masonry; Form Trenchers; Hydro Hammers; Hydro Seeders; Pavement Breakers (hydraulic or cable); Plant Mixers; Post Drivers; Post Hole Diggers; Power Brush Burners; Power Form Handling Equipment; Road Widening Trenchers; Rollers (brick, grade, macadam); Self-Propelled Power Spreaders; Self-Propelled Sub-Graders; Steam Firemen; Survey Instrument men; Tractors, pulling sheepsfoot rollers or graders; Vibratory Compactors, with integral power.

Class E - Compressors (portable, Sewer, Heavy and Highway); Cranes-Compact, track or rubber under 4,000 pound capacity; Drum Firemen (asphalt plant); Fueling and greasing (Primary Operator with Specialized CDL Endorsement Add \$3.00/hr); Generators; Inboard-Outboard Motor Boat Launches; Masonry Fork Lifts; Oil Heaters (asphalt plant); Oilers/Helpers; Power Driven Heaters (oil fired); Power Scrubbers; Power Sweepers; Pumps (under 4 inch discharge); Signalperson; Survey Rodmen or Chairmen; Tire Repairmen; VAC/ALLS.
Master Mechanic - Master Mechanic

Prevailing Wage Rate Skilled Crafts

Name of Union: Painter Local 841

Change # : LCN01-2021sksLoc841

Craft : Painter Effective Date : 11/17/2021 Last Posted : 11/17/2021

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Painter Brush Roll	\$28.18		\$6.85	\$7.50	\$0.35	\$0.00	\$0.65	\$0.00	\$0.00	\$0.00	\$43.53	\$57.62
Paperhanger	\$28.18		\$6.85	\$7.50	\$0.35	\$0.00	\$0.65	\$0.00	\$0.00	\$0.00	\$43.53	\$57.62
Painter Spray Gun Operator Any and All Coatings)	\$29.03		\$6.85	\$7.50	\$0.35	\$0.00	\$0.65	\$0.00	\$0.00	\$0.00	\$44.38	\$58.90
Swing Scaffold, Bosum Chair, & Window Jacks	\$28.93		\$6.85	\$7.50	\$0.35	\$0.00	\$0.65	\$0.00	\$0.00	\$0.00	\$44.28	\$58.75
Sandblast, Painting of Standpipes, etc. from Scaffolds Open Structural Steel, Standpipes and Water Towers	\$29.43		\$6.85	\$7.50	\$0.35	\$0.00	\$0.65	\$0.00	\$0.00	\$0.00	\$44.78	\$59.50
Epoxy Application	\$28.83		\$6.85	\$7.50	\$0.35	\$0.00	\$0.65	\$0.00	\$0.00	\$0.00	\$44.18	\$58.60
Synthetic Exterior, Lead Abatement, Asbestos Removal	\$29.43		\$6.85	\$7.50	\$0.35	\$0.00	\$0.65	\$0.00	\$0.00	\$0.00	\$44.78	\$59.50
Apprentice	Percent											
1st Year	53.24	\$15.00	\$6.85	\$2.72	\$0.35	\$0.00	\$0.65	\$0.00	\$0.00	\$0.00	\$25.57	\$33.07
2nd Year	60.00	\$16.91	\$6.85	\$3.14	\$0.35	\$0.00	\$0.65	\$0.00	\$0.00	\$0.00	\$27.90	\$36.35
3rd Year	70.00	\$19.73	\$6.85	\$3.57	\$0.35	\$0.00	\$0.65	\$0.00	\$0.00	\$0.00	\$31.15	\$41.01
4th Year	80.00	\$22.54	\$6.85	\$4.34	\$0.35	\$0.00	\$0.65	\$0.00	\$0.00	\$0.00	\$34.73	\$46.01

Special Calculation Note : Apprentice pay based on percentage of above appropriate classification.

Ratio :
1 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :
CARROLL, COSHOCTON, HOLMES, MEDINA, PORTAGE*, STARK, SUMMIT*, TUSCARAWAS, WAYNE

Special Jurisdictional Note : Summit Cnty: South of and including the Ohio Turnpike, Portage Cnty: North to and including the Ohio Turnpike

Details :

Prevailing Wage Rate Skilled Crafts

Name of Union: Painter Local 841 Bridge Painter

Change # : LCN01-2021sksLoc841

Craft : Painter Effective Date : 11/17/2021 Last Posted : 11/17/2021

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Painter Bridge Blaster Class 1	\$37.85		\$6.85	\$7.50	\$0.35	\$0.00	\$0.65	\$0.00	\$0.00	\$0.00	\$53.20	\$72.12
Class 2 Bridge Painter, Rigger, Containment Builder, Spot Blaster	\$34.85		\$6.85	\$7.50	\$0.35	\$0.00	\$0.65	\$0.00	\$0.00	\$0.00	\$50.20	\$67.62
Class 3 Equipment Operator/Field Mechanic, Grit Reclamation, Paint Mixer, Traffic Control, Boat Person, Dive (0-5 Years Exp)	\$27.85		\$6.85	\$7.50	\$0.35	\$0.00	\$0.65	\$0.00	\$0.00	\$0.00	\$43.20	\$57.13
Class 3 Equipment Operator/Field Mechanic, Grit Reclamation, Paint Mixer, Traffic Control, Boat Person, Dive (5 plus Years Exp).	\$30.85		\$6.85	\$7.50	\$0.35	\$0.00	\$0.65	\$0.00	\$0.00	\$0.00	\$46.20	\$61.63
Class 4 Concrete Sealing, Concrete Blasting/Power Washing/Etc.	\$30.85		\$6.85	\$7.50	\$0.35	\$0.00	\$0.65	\$0.00	\$0.00	\$0.00	\$46.20	\$61.63
Class 5 Quality Control/Quality Assurance Traffic Safety, Competent Person.	\$30.85		\$6.85	\$7.50	\$0.35	\$0.00	\$0.65	\$0.00	\$0.00	\$0.00	\$46.20	\$61.63
Apprentice	Percent											
1st Year	50.01	\$18.93	\$6.85	\$2.72	\$0.35	\$0.00	\$0.65	\$0.00	\$0.00	\$0.00	\$29.50	\$38.96
2nd Year	60.00	\$22.71	\$6.85	\$3.14	\$0.35	\$0.00	\$0.65	\$0.00	\$0.00	\$0.00	\$33.70	\$45.06
3rd year	70.00	\$26.50	\$6.85	\$3.57	\$0.35	\$0.00	\$0.65	\$0.00	\$0.00	\$0.00	\$37.92	\$51.16
4th Year	80.00	\$30.28	\$6.85	\$4.34	\$0.35	\$0.00	\$0.65	\$0.00	\$0.00	\$0.00	\$42.47	\$57.61

Special Calculation Note : Apprentice pay based on percentage of above appropriate classification.

Ratio :

1 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

CARROLL, COSHOCTON, HOLMES, MEDINA, PORTAGE*, STARK, SUMMIT*, TUSCARAWAS, WAYNE

Special Jurisdictional Note : Summit County: South of and including the Ohio Turnpike, Portage County: North to and including the Ohio Turnpike

Details :

Class 1 – Abrasive blasting of any kind

Class 2 – Bridge painting, coating applications of any kind. All steel surface preparation other than abrasive blasting. All necessary rigging and containment building and all remedial/ spot blasting.

Class 3 – Tend to all equipment including but not limited to abrasive blasting, power washing, spray painting, forklifts, hoists, truck, etc. Load and unloading trucks, handle materials, man safety boats, handle traffic control, clean up/ vacuum abrasive blast materials and related tasks.

Class 4 – All aspects of concrete coating/ sealing including but not limited to preparation, containment, etc.

Class 5 – Verify and record that all work is completed according to job specifications. Assure that all health and safety standards are adhered to. Assure all traffic is safely handled.

Prevailing Wage Rate Skilled Crafts

Name of Union: Painter Local 841 (Finisher/Taper)

Change # : LCN01-2021sksLoc841

Craft : Drywall Finisher Effective Date : 11/17/2021 Last Posted : 11/17/2021

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Painter Drywall Finisher/PainterTaper	\$29.43		\$6.85	\$7.50	\$0.35	\$0.00	\$0.65	\$0.00	\$0.00	\$0.00	\$44.78	\$59.50
Apprentice	Percent											
1st Year	50.98	\$15.00	\$6.85	\$2.72	\$0.35	\$0.00	\$0.65	\$0.00	\$0.00	\$0.00	\$25.57	\$33.08
2nd Year	65.00	\$19.13	\$6.85	\$3.52	\$0.35	\$0.00	\$0.65	\$0.00	\$0.00	\$0.00	\$30.50	\$40.06
3rd Year	80.00	\$23.54	\$6.85	\$4.34	\$0.35	\$0.00	\$0.65	\$0.00	\$0.00	\$0.00	\$35.73	\$47.51

Special Calculation Note : Apprentice pay based on percentage of above appropriate classification.

Ratio :

1 Journeyman to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

CARROLL, COSHOCTON, HOLMES, MEDINA, PORTAGE*, STARK, SUMMIT*, TUSCARAWAS, WAYNE

Special Jurisdictional Note : Summit County South of and including the Ohio Turnpike, Portage Cnty: North of and including the Ohio Turnpike

Details :

CLERMONT, CLINTON, COLUMBIANA,
COSHOCTON, CRAWFORD, CUYAHOGA,
DARKE, DEFIANCE, DELAWARE, ERIE,
FAIRFIELD, FAYETTE, FRANKLIN, FULTON,
GALLIA, GEAUGA, GREENE, GUERNSEY,
HAMILTON, HANCOCK, HARDIN,
HARRISON, HENRY, HIGHLAND, HOCKING,
HOLMES, HURON, JACKSON, JEFFERSON,
KNOX, LAKE, LAWRENCE, LICKING,
LOGAN, LORAIN, LUCAS, MADISON,
MAHONING, MARION, MEDINA, MEIGS,
MERCER, MIAMI, MONROE,
MONTGOMERY, MORGAN, MORROW,
MUSKINGUM, NOBLE, OTTAWA,
PAULDING, PERRY, PICKAWAY, PIKE,
PORTAGE, PREBLE, PUTNAM, RICHLAND,
ROSS, SANDUSKY, SCIOTO, SENECA,
SHELBY, STARK, SUMMIT, TRUMBULL,
TUSCARAWAS, UNION, VAN WERT,
VINTON, WARREN, WASHINGTON, WAYNE,
WILLIAMS, WOOD, WYANDOT

Special Jurisdictional Note :

Details :

Top Helper: Shall perform the responsibilities of a Helper and be responsible for the setup, break down, safety and quality of the company's product.

Helper : Shall be responsible for performing tasks in refinishing, compliance with safety procedures, setting up and breaking down job sites, scaffolding and swing stages and preparing surfaces for refinishing including but not limited to, masking and stripping and cleaning, oxidizing, polishing and scratch removal on various surfaces

Class A Workers: Less than 1 Year of Service.

Class B Workers: More than 1 and less than 8 Years of Service.

Class C Workers: More than 8 Years of Service.

Metal Polisher Scope of Work: Polishing, buffing, stripping, coloring, lacquering, spraying, cleaning and maintenance of ornamental and architectural metals, iron, bronze, nickel, aluminum and stainless steel and in mental specialty work, various stone finishes, stone specialty work and any other work pertaining to the finishing of metal, stones, woods, and any window washing/cleaning done in conjunction with this work, using chemicals, solvents, coatings and hand applied lacquer thinner, removing scratches from mirror finished metals, burnishing of bronze, statuary finishes on exterior and interior surfaces and the use of all tools required to perform such work, including but not limited to polishes, spray equipment and scaffolding.

Swing State Rate: All work on scaffold 4 sections or higher, including any boom lifts and swing stage scaffolds including the rigging and derigging of hanging/suspended swing stage systems and rappelling/bolson chair work, ADD \$1.50 per hour.

Prevailing Wage Rate Skilled Crafts

Name of Union: Painter Local 639 Zone 1 Sign

Change # : LCN01-2023ibLoc639Zone1Sign

Craft : Painter Effective Date : 07/05/2023 Last Posted : 07/05/2023

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Painter Sign Erector Service/Patteren/Metal Fab/Neon Class A	\$25.38		\$8.41	\$5.57	\$0.25	\$0.76	\$0.00	\$1.06	\$0.00	\$0.00	\$41.43	\$54.12
Painter Sign Erector/Service/Patteren/Metal Fab/Neon Class B	\$25.38		\$8.41	\$5.57	\$0.25	\$1.51	\$0.00	\$1.06	\$0.00	\$0.00	\$42.18	\$54.87
Painter Sign Erector/Service/Patteren/Metal Fab/Neon Class C	\$25.38		\$8.41	\$5.57	\$0.25	\$2.27	\$0.00	\$1.06	\$0.00	\$0.00	\$42.94	\$55.63
Painter Sign Erector/Service/Patteren/Metal Fab/Neon Class D	\$25.38		\$8.41	\$5.57	\$0.25	\$3.03	\$0.00	\$1.06	\$0.00	\$0.00	\$43.70	\$56.39
Computer Operator, Router, Spray Painter/Wood Class A	\$23.78		\$8.41	\$5.57	\$0.25	\$0.73	\$0.00	\$1.02	\$0.00	\$0.00	\$39.76	\$51.65
Computer Operator, Router, Spray Painter/Wood Class B	\$23.78		\$8.41	\$5.57	\$0.25	\$1.45	\$0.00	\$1.02	\$0.00	\$0.00	\$40.48	\$52.37
Computer Operator, Router, Spray Painter/Wood Class C	\$23.78		\$8.41	\$5.57	\$0.25	\$2.18	\$0.00	\$1.02	\$0.00	\$0.00	\$41.21	\$53.10
Computer Operator, Router, Spray Painter/Wood Class D	\$23.78		\$8.41	\$5.57	\$0.25	\$2.90	\$0.00	\$1.02	\$0.00	\$0.00	\$41.93	\$53.82
Final Assembly,Helper Class A	\$19.06		\$8.41	\$5.57	\$0.25	\$0.64	\$0.00	\$0.89	\$0.00	\$0.00	\$34.82	\$44.35
Final Assembly,Helper Class B	\$19.06		\$8.41	\$5.57	\$0.25	\$1.27	\$0.00	\$0.89	\$0.00	\$0.00	\$35.45	\$44.98
Final Assembly,Helper Class C	\$19.06		\$8.41	\$5.57	\$0.25	\$1.90	\$0.00	\$0.89	\$0.00	\$0.00	\$36.08	\$45.61
Final Assembly,Helper Class D	\$19.06		\$8.41	\$0.00	\$0.00	\$2.54	\$0.00	\$0.89	\$0.00	\$0.00	\$30.90	\$40.43
Apprentice	Percent											
1-2000 hrs	50.00	\$12.69	\$8.41	\$5.57	\$0.25	\$0.00	\$0.00	\$0.72	\$0.00	\$0.00	\$27.64	\$33.99
2001-3000 hrs	55.00	\$13.96	\$8.41	\$5.57	\$0.25	\$0.54	\$0.00	\$0.76	\$0.00	\$0.00	\$29.49	\$36.47
3001-4000 hrs	60.00	\$15.23	\$8.41	\$5.57	\$0.25	\$0.57	\$0.00	\$0.79	\$0.00	\$0.00	\$30.82	\$38.43
4001-5000 hrs	65.00	\$16.50	\$8.41	\$5.57	\$0.25	\$1.18	\$0.00	\$0.83	\$0.00	\$0.00	\$32.74	\$40.99
5001-6000 hrs	70.00	\$17.77	\$8.41	\$5.57	\$0.25	\$1.23	\$0.00	\$0.86	\$0.00	\$0.00	\$34.09	\$42.97
6001-7000 hrs	85.00	\$21.57	\$8.41	\$5.57	\$0.25	\$1.38	\$0.00	\$0.96	\$0.00	\$0.00	\$38.14	\$48.93
7001-8000 hrs	90.00	\$22.84	\$8.41	\$5.57	\$0.25	\$1.43	\$0.00	\$1.00	\$0.00	\$0.00	\$39.50	\$50.92

Special Calculation Note : Other is for paid holidays. Apprentice Pay Rate should be based on proper Classification.

Ratio :

Jurisdiction (* denotes special jurisdictional note) :

ASHLAND, ASHTABULA, CUYAHOGA, GEAUGA, LAKE, MEDINA, PORTAGE, RICHLAND, SUMMIT

Special Jurisdictional Note :

Details :

Class A Worker: More than 1 year but less that 2 years.

Class B Worker: More than 2 years but less than 10 years.

Class C Worker: More than 10 years but less that 20 years.

Class D Worker: More than 20 years

Prevailing Wage Rate Skilled Crafts

Name of Union: Painter Local 505

Change # : LCN01-2023ibLoc505

Craft : Drywall Finisher Effective Date : 01/18/2023 Last Posted : 01/18/2023

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Painter Drywall Finisher	\$30.99		\$8.32	\$6.08	\$0.40	\$0.00	\$4.02	\$0.00	\$0.00	\$0.00	\$49.81	\$65.30
Apprentice	Percent											
1st 6 months	55.00	\$17.04	\$8.32	\$1.84	\$0.40	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$27.60	\$36.13
2nd 6 months	55.00	\$17.04	\$8.32	\$1.94	\$0.40	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$27.70	\$36.23
3rd 6 months	55.00	\$17.04	\$8.32	\$2.39	\$0.40	\$0.00	\$2.21	\$0.00	\$0.00	\$0.00	\$30.36	\$38.89
4th 6 months	65.00	\$20.14	\$8.32	\$2.49	\$0.40	\$0.00	\$2.61	\$0.00	\$0.00	\$0.00	\$33.96	\$44.04
5th 6 months	75.00	\$23.24	\$8.32	\$2.94	\$0.40	\$0.00	\$3.02	\$0.00	\$0.00	\$0.00	\$37.92	\$49.54
6th 6 months	85.00	\$26.34	\$8.32	\$3.04	\$0.40	\$0.00	\$3.42	\$0.00	\$0.00	\$0.00	\$41.52	\$54.69

Special Calculation Note : No special calculation for this classification.

Ratio :

2 Journeyman to 1 Apprentice
3 Journeyman to 1 Apprentice after 9 total tapers

Jurisdiction (* denotes special jurisdictional note) :

ASHTABULA, CUYAHOGA, GEAUGA, LAKE,
LORAIN, PORTAGE*, SUMMIT*

Special Jurisdictional Note : Portage & Summit North of the East-West Turnpike.

Details :

Prevailing Wage Rate Skilled Crafts

Name of Union: Plumber Pipefitter Local 219

Change # : LCN01-2023ibLoc219

Craft : Plumbers Effective Date : 06/01/2023 Last Posted : 05/31/2023

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Plumber Pipefitter	\$43.22		\$8.96	\$12.15	\$1.83	\$1.25	\$4.00	\$0.10	\$0.00	\$0.00	\$71.51	\$93.12
Apprentice	Percent											
1st 12 months	50.00	\$21.61	\$8.96	\$0.50	\$1.83	\$1.25	\$1.50	\$0.10	\$0.00	\$0.00	\$35.75	\$46.56
3rd 6 months	60.00	\$25.93	\$8.96	\$12.15	\$1.83	\$1.25	\$4.00	\$0.10	\$0.00	\$0.00	\$54.22	\$67.19
4th 6 months	65.00	\$28.09	\$8.96	\$12.15	\$1.83	\$1.25	\$4.00	\$0.10	\$0.00	\$0.00	\$56.38	\$70.43
5th 6 months	70.00	\$30.25	\$8.96	\$12.15	\$1.83	\$1.25	\$4.00	\$0.10	\$0.00	\$0.00	\$58.54	\$73.67
6th 6 months	75.00	\$32.42	\$8.96	\$12.15	\$1.83	\$1.25	\$4.00	\$0.10	\$0.00	\$0.00	\$60.71	\$76.91
7th 6 months	80.00	\$34.58	\$8.96	\$12.15	\$1.83	\$1.25	\$4.00	\$0.10	\$0.00	\$0.00	\$62.87	\$80.15
8th 6 months	85.00	\$36.74	\$8.96	\$12.15	\$1.83	\$1.25	\$4.00	\$0.10	\$0.00	\$0.00	\$65.03	\$83.40
9th 6 months	90.00	\$38.90	\$8.96	\$12.15	\$1.83	\$1.25	\$4.00	\$0.10	\$0.00	\$0.00	\$67.19	\$86.64
10th 6 months	95.00	\$41.06	\$8.96	\$12.15	\$1.83	\$1.25	\$4.00	\$0.10	\$0.00	\$0.00	\$69.35	\$89.88

Special Calculation Note : Other is for International Training Fund

Ratio :

1 Apprentice for 2 Journeyman.

Jurisdiction (* denotes special jurisdictional note) :

MEDINA*, PORTAGE, SUMMIT*

Special Jurisdictional Note : Summit County: South of Route 303, except for the corporate limits of Hudson, Ohio, which shall be considered neutral territory, dependent on the contractor doing work from the jurisdiction of Local Unions #55 & #120 & 219.

Medina County: Route 18 from the eastern edge of Medina County west to eastern corporate limits of the City of Medina and on the county Road from the west corporate limits of the City of Medina, running due west to and through the community of Risley to the western edge of Medina County. All territory south of this line is the jurisdiction of Local #219. Work within the corporate limits of the City of Medina shall be neutral territory, dependent on the contractor doing the work from the jurisdiction of Locals #55, #120 & #219.

Details :

Prevailing Wage Rate Skilled Crafts

Name of Union: Plumber Local 219 Mechanical Equipment Service (HVAC)

Change # : LCN01-2023ibLoc219MES

Craft : Plumber Effective Date : 06/01/2023 Last Posted : 05/31/2023

	BHR	Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification											
Plumber Mechanical Equipment Journeyman	\$36.62	\$8.56	\$5.72	\$1.83	\$0.00	\$3.75	\$0.10	\$0.00	\$0.00	\$56.58	\$74.89

Special Calculation Note : Other is for International Training Fund

Ratio :

Jurisdiction (* denotes special jurisdictional note) :
MEDINA*, PORTAGE, SUMMIT*

Special Jurisdictional Note :

Summit County: South of Route 303, except for the corporate limits of Hudson, Ohio, which shall be considered neutral territory, dependent on the contractor doing work from the jurisdiction of Local Unions #55 & #120 & 219.

Medina County: Route 18 from the eastern edge of Medina County west to eastern corporate limits of the City of Medina and on the county Road from the west corporate limits of the City of Medina, running due west to and through the community of Risley to the western edge of Medina County. All territory south of this line is the jurisdiction of Local #219. Work within the corporate limits of the City of Medina shall be neutral territory, dependent on the contractor doing the work from the jurisdiction of Locals #55, #120 & #219.

Details :

Service and maintenance shall include, all the maintaining, cleaning, adjusting, repairing, altering, overhauling, dismantling, reconditioning, replacing, modifying, renovating, evacuating, charging, inspecting, operating, starting, calibrating, and balancing of any system or component part thereof. work performed by Service Journeymen & Apprentices shall include: all heating repairs & emergency service up to a capacity of 2,000,000 BTU input. Air conditioning repairs and emergency service up to and including 50 ton single systems. Refrigeration repairs and emergency service up to 50 HP on all low and medium temperature systems. Servicing of propane equipment. Preventive maintenance of all equipment listed above. Installation of heating systems up to 1,000,000 BTU/hr. input for the building or structure. Air conditioning single systems up to 20 ton. Refrigeration units, meat cases, florist boxes, bottle coolers, food freezers, water coolers-units up to 35 HP.

(A Mechanical Journeyman) must over 3 yrs accumulated at least 300 hrs class training, + 3 years experience, pass written exam prepared by joint labor management and administered by the union.

Prevailing Wage Rate Skilled Crafts

Name of Union: Roofer Local 88

Change # : LCN01-2023ibLoc88

Craft : Roofer Effective Date : 06/07/2023 Last Posted : 06/07/2023

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Roofer	\$30.07		\$9.50	\$9.80	\$0.40	\$0.00	\$1.50	\$0.18	\$0.00	\$0.00	\$51.45	\$66.49
HELPERS												
Helper -500 Hrs. 1st 6 months	\$16.84		\$2.25	\$0.00	\$0.40	\$0.00	\$1.50	\$0.18	\$0.00	\$0.00	\$21.17	\$29.59
Helper - 500 Hrs. 2nd 6 months	\$18.65		\$9.50	\$9.80	\$0.40	\$0.00	\$1.50	\$0.18	\$0.00	\$0.00	\$40.03	\$49.35
2nd year Helper	\$20.45		\$9.50	\$9.80	\$0.40	\$0.00	\$1.50	\$0.18	\$0.00	\$0.00	\$41.83	\$52.05
3rd year Helper	\$22.26		\$9.50	\$9.80	\$0.40	\$0.00	\$1.50	\$0.18	\$0.00	\$0.00	\$43.64	\$54.77
4th year Helper	\$24.06		\$9.50	\$9.80	\$0.40	\$0.00	\$1.50	\$0.18	\$0.00	\$0.00	\$45.44	\$57.47
5th year Helper	\$25.86		\$9.50	\$9.80	\$0.40	\$0.00	\$1.50	\$0.18	\$0.00	\$0.00	\$47.24	\$60.17
Apprentice	Percent											
1st 6 months w/500 hrs	56.00	\$16.84	\$9.50	\$9.80	\$0.40	\$0.00	\$1.50	\$0.18	\$0.00	\$0.00	\$38.22	\$46.64
2nd 6 months w/500 hrs	62.02	\$18.65	\$9.50	\$9.80	\$0.40	\$0.00	\$1.50	\$0.18	\$0.00	\$0.00	\$40.03	\$49.35
3rd 6 months w/500 hrs	68.00	\$20.45	\$9.50	\$9.80	\$0.40	\$0.00	\$1.50	\$0.18	\$0.00	\$0.00	\$41.83	\$52.05
4th 6 months w/500 hrs	74.02	\$22.26	\$9.50	\$9.80	\$0.40	\$0.00	\$1.50	\$0.18	\$0.00	\$0.00	\$43.64	\$54.77
5th 6 months w/500 hrs	80.00	\$24.06	\$9.50	\$9.80	\$0.40	\$0.00	\$1.50	\$0.18	\$0.00	\$0.00	\$45.44	\$57.46
6th 6 months w/500 hrs	86.00	\$25.86	\$9.50	\$9.80	\$0.40	\$0.00	\$1.50	\$0.18	\$0.00	\$0.00	\$47.24	\$60.17
7th 6 months w/500 hrs	92.02	\$27.67	\$9.50	\$9.80	\$0.40	\$0.00	\$1.50	\$0.18	\$0.00	\$0.00	\$49.05	\$62.89

Special Calculation Note : Roofers working in any form of coal tar pitch, whether hot or cold, installing and/or removing will be paid \$.25 more per hour.
Other \$0.18 is for C.I.D.B.

Ratio :

No helper shall be used on any one job unless 1 Journeymen, and 1 Apprentices are working on said job .One (1) Journeymen to One (1) Apprentice to One (1) Helper

Jurisdiction (* denotes special jurisdictional note) :

ASHLAND, CARROLL, COSHOCTON, CRAWFORD, HOLMES, HURON, LORAIN*, MEDINA, PORTAGE, RICHLAND, STARK, SUMMIT, TUSCARAWAS, WAYNE

Special Jurisdictional Note : In Lorain County (South of the Turnpike)

Details :

Prevailing Wage Rate Skilled Crafts

Name of Union: Sheet Metal Local 33 (Akron)

Change # : LCN01-2023ibLoc33Akron

Craft : Sheet Metal Worker Effective Date : 06/01/2023 Last Posted : 05/31/2023

	BHR	Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification											
Sheet Metal Worker	\$34.90	\$9.65	\$13.20	\$0.93	\$0.00	\$7.64	\$0.00	\$0.00	\$0.00	\$66.32	\$83.77
1st year	60.00	\$20.94	\$9.65	\$4.81	\$0.17	\$0.00	\$0.00	\$0.00	\$0.00	\$35.57	\$46.04
2nd year	65.02	\$22.69	\$9.65	\$5.97	\$0.93	\$0.00	\$3.82	\$0.00	\$0.00	\$43.06	\$54.41
3rd year	70.00	\$24.43	\$9.65	\$6.37	\$0.93	\$0.00	\$3.82	\$0.00	\$0.00	\$45.20	\$57.41
4th year	80.00	\$27.92	\$9.65	\$7.18	\$0.93	\$0.00	\$3.82	\$0.00	\$0.00	\$49.50	\$63.46

Special Calculation Note : No special calculations for this skilled craft wage rate are required at this time.

Ratio :

- 1 Journeymen to 1 Apprentice
 - 2 Journeymen to 1 Apprentice
 - 3 Journeymen to 2 Apprentice
 - 4 Journeymen to 2 Apprentice
 - 5-7 Journeymen to 3 Apprentice
 - 8-10 Journeymen to 4 Apprentice
 - 11-13 Journeymen to 5 Apprentice
 - 14, 15 Journeymen to 6 Apprentice
- and maintaining a three to one apprentice ratio thereafter.

Jurisdiction (* denotes special jurisdictional note)

- ASHLAND, CARROLL, COSHOCTON, CRAWFORD, HOLMES, MEDINA, PORTAGE, RICHLAND, STARK, SUMMIT, TUSCARAWAS, WAYNE

Special Jurisdictional Note :

Details :

Scope of Work: This Agreement covers the rates of pay and conditions of employment of all employees of the Employer engaged in, but not limited to, the a) manufacture, fabrication, assembling, handling, erection, installation, dismantling, conditioning, adjustment, alteration, repairing and servicing of all ferrous or non-ferrous metal work and all other materials used in lieu thereof and of all HVAC systems, air-veyor systems, exhaust systems, and air handling systems regardless of material used, including the setting of all equipment and all reinforcements in connection therewith; (b) all lagging over insulation and all duct-lining; (c) testing, servicing, and balancing of all air-handling equipment and duct work; (d) the preparation of all shop and field sketches, whether manually drawn or computer assisted, used in fabrication and erection, including those taken from original architectural and engineering drawings or sketches, and (e) metal roofing; and (f) all other work included in the jurisdictional claims of Sheet Metal Worker's International Association. Industrial Door-Installation and service of overhead doors roll up doors, docks and dock leveling.

Prevailing Wage Rate Skilled Crafts

Name of Union: Sheet Metal Local 33 Industrial Door

Change # : LCN01-2023ibLoc33IndustrialDoor

Craft : Sheet Metal Worker Effective Date : 08/02/2023 Last Posted : 08/02/2023

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Sheet Metal Worker	\$25.42		\$8.66	\$5.55	\$0.17	\$0.00	\$2.15	\$0.00	\$0.00	\$0.00	\$41.95	\$54.66
Trainees	Percent											
1st 60 days Probationary Perios	52.00	\$13.22	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$13.22	\$19.83
61st day-12 months	58.00	\$14.74	\$8.66	\$1.92	\$0.17	\$0.00	\$1.41	\$0.00	\$0.00	\$0.00	\$26.90	\$34.28
2nd yr	68.00	\$17.29	\$8.66	\$1.92	\$0.17	\$0.00	\$1.59	\$0.00	\$0.00	\$0.00	\$29.63	\$38.27
3rd yr	73.00	\$18.56	\$8.66	\$1.92	\$0.17	\$0.00	\$1.69	\$0.00	\$0.00	\$0.00	\$31.00	\$40.27
4th yr	80.00	\$20.34	\$8.66	\$1.92	\$0.17	\$0.00	\$1.80	\$0.00	\$0.00	\$0.00	\$32.89	\$43.05
5th yr	86.00	\$21.86	\$8.66	\$1.92	\$0.17	\$0.00	\$1.91	\$0.00	\$0.00	\$0.00	\$34.52	\$45.45

Special Calculation Note :

Ratio :

Jurisdiction (* denotes special jurisdictional note) :

ASHLAND, ASHTABULA, CARROLL, COLUMBIANA, COSHOCTON, CRAWFORD, CUYAHOGA, DEFIANCE, ERIE, FULTON, GEAUGA, HANCOCK, HENRY, HOLMES, HURON, LAKE, LORAIN, LUCAS, MAHONING, MEDINA, OTTAWA, PAULDING, PORTAGE, PUTNAM, RICHLAND, SANDUSKY, SENECA, STARK, SUMMIT, TRUMBULL, TUSCARAWAS, WAYNE, WILLIAMS, WOOD

Special Jurisdictional Note :

Details :

Prevailing Wage Rate Skilled Crafts

Name of Union: Sprinkler Fitter Local 669

Change # : LCN01-2022sksLoc669

Craft : Sprinkler Fitter Effective Date : 04/06/2022 Last Posted : 04/06/2022

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Sprinkler Fitter	\$43.75		\$10.99	\$7.10	\$0.52	\$0.00	\$5.12	\$0.00	\$0.00	\$0.00	\$67.48	\$89.35
Apprentice Indentured after April 1, 2013												
Percent												
CILASS 1	45.00	\$19.69	\$7.85	\$0.00	\$0.52	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$28.06	\$37.90
CLASS 2	50.02	\$21.88	\$7.85	\$0.00	\$0.52	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$30.25	\$41.20
CLASS 3	54.43	\$23.81	\$10.99	\$7.10	\$0.52	\$0.00	\$1.15	\$0.00	\$0.00	\$0.00	\$43.57	\$55.48
CLASS 4	59.43	\$26.00	\$10.99	\$7.10	\$0.52	\$0.00	\$1.15	\$0.00	\$0.00	\$0.00	\$45.76	\$58.76
CLASS 5	64.43	\$28.19	\$10.99	\$7.10	\$0.52	\$0.00	\$1.40	\$0.00	\$0.00	\$0.00	\$48.20	\$62.29
CLASS 6	69.43	\$30.38	\$10.99	\$7.10	\$0.52	\$0.00	\$1.40	\$0.00	\$0.00	\$0.00	\$50.39	\$65.57
CLASS 7	74.43	\$32.56	\$10.99	\$7.10	\$0.52	\$0.00	\$1.40	\$0.00	\$0.00	\$0.00	\$52.57	\$68.85
CLASS 8	79.42	\$34.75	\$10.99	\$7.10	\$0.52	\$0.00	\$1.40	\$0.00	\$0.00	\$0.00	\$54.76	\$72.13
CLASS 9	84.43	\$36.94	\$10.99	\$7.10	\$0.52	\$0.00	\$1.40	\$0.00	\$0.00	\$0.00	\$56.95	\$75.42
CLASS 10	89.44	\$39.13	\$10.99	\$7.10	\$0.52	\$0.00	\$1.40	\$0.00	\$0.00	\$0.00	\$59.14	\$78.70

Special Calculation Note :

Ratio :

1 Journeyman to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

ADAMS, ALLEN, ASHLAND, ASHTABULA, ATHENS, AUGLAIZE, BELMONT, BROWN, BUTLER, CARROLL, CHAMPAIGN, CLARK, CLERMONT, CLINTON, COLUMBIANA, COSHOCTON, CRAWFORD, DARKE, DEFIANCE, DELAWARE, ERIE, FAIRFIELD, FAYETTE, FRANKLIN, FULTON, GALLIA, GREENE, GUERNSEY, HAMILTON, HANCOCK, HARDIN, HARRISON, HENRY, HIGHLAND, HOCKING, HOLMES, HURON, JACKSON, JEFFERSON, KNOX, LAWRENCE, LICKING, LOGAN, LUCAS, MADISON, MAHONING, MARION, MEDINA, MEIGS, MERCER, MIAMI, MONROE, MONTGOMERY, MORGAN, MORROW, MUSKINGUM, NOBLE, OTTAWA, PAULDING, PERRY, PICKAWAY, PIKE, PORTAGE, PREBLE, PUTNAM, RICHLAND, ROSS, SANDUSKY, SCIOTO, SENECA, SHELBY, STARK, SUMMIT, TRUMBULL, TUSCARAWAS, UNION, VAN WERT, VINTON, WARREN, WASHINGTON, WAYNE, WILLIAMS, WOOD, WYANDOT

Special Jurisdictional Note :

Details :

Sprinkler Fitter work shall consist of the installation, dismantling, maintenance, repairs, adjustments, and corrections of all fire protection and fire control systems including the unloading, handling by hand, power equipment and installation of all piping or tubing, appurtenances and equipment pertaining thereto, including both overhead and underground water mains, fire hydrants and hydrant mains, standpipes and hose connections to sprinkler systems used in connection with sprinkler and alarm systems. Also all tanks and pumps connected thereto, also included shall be CO-2 and Cardox Systems, Dry Chemical Systems, Foam Systems and all other fire protection systems.

Prevailing Wage Rate Skilled Crafts

Name of Union: Truck Driver Bldg & Hwy Class 1
Locals 20,40,92,92b,100,175,284,438,377,637,908,957

Change # : LCN01-2023ibBldgHwy

Craft : Truck Driver Effective Date : 05/01/2023 Last Posted : 04/26/2023

Classification	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Truck Driver CLASS 1 4 wheel service, dump, and batch trucks; drivers on tandems; truck sweepers (not to include power sweepers & scrubbers)	\$31.24		\$7.75	\$9.20	\$0.20	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$48.39	\$64.01
Apprentice	Percent											
First 6 months	80.00	\$24.99	\$7.75	\$9.20	\$0.20	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$42.14	\$54.64
7-12 months	85.00	\$26.55	\$7.75	\$9.20	\$0.20	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$43.70	\$56.98
13-18 months	90.00	\$28.12	\$7.75	\$9.20	\$0.20	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$45.27	\$59.32
19-24 months	95.00	\$29.68	\$7.75	\$9.20	\$0.20	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$46.83	\$61.67
25-30 months	100.00	\$31.24	\$7.75	\$9.20	\$0.20	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$48.39	\$64.01

Special Calculation Note : No special calculations for this skilled craft wage rate are required at this time.

Ratio :

3 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

ADAMS, ALLEN, ASHLAND, ASHTABULA, ATHENS, AUGLAIZE, BELMONT, BROWN, BUTLER, CARROLL, CHAMPAIGN, CLARK, CLERMONT, CLINTON, COLUMBIANA, COSHOCTON, CRAWFORD, DARKE, DEFIANCE, DELAWARE, ERIE, FAIRFIELD, FAYETTE, FRANKLIN, FULTON, GALLIA, GREENE, GUERNSEY, HAMILTON, HANCOCK, HARDIN, HARRISON, HENRY, HIGHLAND, HOCKING, HOLMES, HURON, JACKSON, JEFFERSON, KNOX, LAWRENCE, LICKING, LOGAN, LORAIN, LUCAS, MADISON, MAHONING, MARION, MEDINA, MEIGS, MERCER, MIAMI, MONROE, MONTGOMERY, MORGAN, MORROW, MUSKINGUM, NOBLE, OTTAWA, PAULDING, PERRY, PICKAWAY, PIKE, PORTAGE, PREBLE, PUTNAM, RICHLAND, ROSS, SANDUSKY, SCIOTO, SENECA, SHELBY, STARK, SUMMIT, TRUMBULL, TUSCARAWAS, UNION, VAN WERT, VINTON, WARREN, WASHINGTON, WAYNE, WILLIAMS, WOOD, WYANDOT

Special Jurisdictional Note :

Details :

Prevailing Wage Rate Skilled Crafts

Name of Union: Truck Driver Bldg & HevHwy Class 2
Locals 20,40,92,92b,100,175,284,438,377,637,908,957

Change # : LCN01-2023ibBldgHevHwy

Craft : Truck Driver Effective Date : 05/01/2023 Last Posted : 04/26/2023

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Truck Driver CLASS 2 Tractor Trailer-Semi Tractor Trucks; Pole Trailers; Ready Mix Trucks; Fuel Trucks; 5 Axle & Over; Belly Dumps; Low boys - Heavy duty Equipment(irrespective of load carried) when used exclusively for transportation; Truck Mechanics (when needed)	\$31.66		\$7.75	\$9.20	\$0.20	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$48.81	\$64.64
Apprentice	Percent											
First 6 months	80.00	\$25.33	\$7.75	\$9.20	\$0.20	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$42.48	\$55.14
7-12 months	85.00	\$26.91	\$7.75	\$9.20	\$0.20	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$44.06	\$57.52
13-18 months	90.00	\$28.49	\$7.75	\$9.20	\$0.20	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$45.64	\$59.89
19-24 months	95.00	\$30.08	\$7.75	\$9.20	\$0.20	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$47.23	\$62.27
25-30 months	100.00	\$31.66	\$7.75	\$9.20	\$0.20	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$48.81	\$64.64

Special Calculation Note : No special calculations for this skilled craft wage rate are required at this time.

Ratio :

3 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

ADAMS, ALLEN, ASHLAND, ASHTABULA, ATHENS, AUGLAIZE, BELMONT, BROWN, BUTLER, CARROLL, CHAMPAIGN, CLARK, CLERMONT, CLINTON, COLUMBIANA, COSHOCTON, CRAWFORD, DARKE, DEFIANCE, DELAWARE, ERIE, FAIRFIELD, FAYETTE, FRANKLIN, FULTON, GALLIA, GREENE, GUERNSEY, HAMILTON, HANCOCK, HARDIN, HARRISON, HENRY, HIGHLAND, HOCKING, HOLMES, HURON, JACKSON, JEFFERSON, KNOX, LAWRENCE, LICKING, LOGAN, LORAIN, LUCAS, MADISON, MAHONING, MARION, MEDINA, MEIGS, MERCER, MIAMI, MONROE, MONTGOMERY, MORGAN, MORROW, MUSKINGUM, NOBLE, OTTAWA, PAULDING, PERRY, PICKAWAY, PIKE, PORTAGE, PREBLE, PUTNAM, RICHLAND, ROSS, SANDUSKY, SCIOTO, SENECA, SHELBY, STARK, SUMMIT, TRUMBULL, TUSCARAWAS, UNION, VAN WERT, VINTON, WARREN, WASHINGTON, WAYNE, WILLIAMS, WOOD, WYANDOT

Special Jurisdictional Note :

Details :

Prevailing Wage Rate Skilled Crafts

Name of Union: Truck Driver Bldg & HevHwy Class 3
Locals 20,40,92,92b,100,175,284,438,377,637,908,957

Change # : LCN01-2023ibBldgHevHwy3

Craft : Truck Driver Effective Date : 05/01/2023 Last Posted : 04/26/2023

	BHR		Fringe Benefit Payments					Irrevocable Fund		Total PWR	Overtime Rate	
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)			MISC (*)
Classification												
Truck Driver CLASS 3 Articulated Dump Trucks; Ridge-Frame Rock Trucks; Distributor Trucks)	\$32.66		\$7.75	\$9.20	\$0.20	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$49.81	\$66.14
Apprentice	Percent											
First 6 months	80.00	\$26.13	\$7.75	\$9.20	\$0.20	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$43.28	\$56.34
7-12 months	85.00	\$27.76	\$7.75	\$9.20	\$0.20	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$44.91	\$58.79
13-18 months	90.00	\$29.39	\$7.75	\$9.20	\$0.20	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$46.54	\$61.24
19-24 months	95.00	\$31.03	\$7.75	\$9.20	\$0.20	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$48.18	\$63.69
25-30 months	100.00	\$32.66	\$7.75	\$9.20	\$0.20	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$49.81	\$66.14

Special Calculation Note : No special calculations for this skilled craft wage rate are required at this time.

Ratio :

3 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

ADAMS, ALLEN, ASHLAND, ASHTABULA, ATHENS, AUGLAIZE, BELMONT, BROWN, BUTLER, CARROLL, CHAMPAIGN, CLARK, CLERMONT, CLINTON, COLUMBIANA, COSHOCTON, CRAWFORD, DARKE, DEFIANCE, DELAWARE, ERIE, FAIRFIELD, FAYETTE, FRANKLIN, FULTON, GALLIA, GREENE, GUERNSEY, HAMILTON, HANCOCK, HARDIN, HARRISON, HENRY, HIGHLAND, HOCKING, HOLMES, HURON, JACKSON, JEFFERSON, KNOX, LAWRENCE, LICKING, LOGAN, LORAIN, LUCAS, MADISON, MAHONING, MARION, MEDINA, MEIGS, MERCER, MIAMI, MONROE, MONTGOMERY, MORGAN, MORROW, MUSKINGUM, NOBLE, OTTAWA, PAULDING, PERRY, PICKAWAY, PIKE, PORTAGE, PREBLE, PUTNAM, RICHLAND, ROSS, SANDUSKY, SCIOTO, SENECA, SHELBY, STARK, SUMMIT, TRUMBULL, TUSCARAWAS, UNION, VAN WERT, VINTON, WARREN, WASHINGTON, WAYNE, WILLIAMS, WOOD, WYANDOT

Special Jurisdictional Note :

Details :