

Oak Brook Park District  
Tennis Center HVAC Upgrade Project  
Bid Packet



Revised March 22, 2017

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ALTERNATE 1 SPECIFICATIONS

TECHNICAL SPECIFICATIONS

(Note: The Technical Specifications bound into this packet contain the Project Manual, which is paginated separately from the bid packet document. Also included with the Technical Specifications, but under separate cover, is a set of Drawings prepared by Kluber, Inc.)

APPENDIX

- Oak Brook Park District Prevailing Wage Resolution and July 2015 pay rates from the Illinois Department of Labor.
- Park District Risk Management Association (PDRMA) Fact Sheet: “Fire Equipment Self-Inspection Program, Frequency of Inspection and Maintenance Procedures, and Inspection Forms.” Procedures and forms for the testing of the Fire Suppression System. Contractor shall be responsible for the testing of the system after performing the work for the Project. Contractor shall provide test results to the Owner.
- Park District Risk Management Association (PDRMA) Fact Sheet: “Cutting Welding Procedures.” Contractor shall implement the safety measures as stated in this Fact Sheet when conducting “Hot Work.”

**INVITATION TO BID  
OAK BROOK PARK DISTRICT  
TENNIS CENTER HVAC UPGRADE PROJECT**

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The Oak Brook Park District (the “District”) is accepting bids for the Tennis Center HVAC Upgrade Project.

Specifications and Contract Documents may be obtained beginning March 22, 2017, at the Administrative Office at the District’s Family Recreation Center, 1450 Forest Gate Road, Oak Brook, IL 60523, Monday - Friday, 9:00 a.m. – 5:00 p.m., or in PDF format at the District’s website: [http://www.obparks.org/general\\_information/bid.asp](http://www.obparks.org/general_information/bid.asp).

A mandatory pre-bid meeting will be held on March 30, 2017, at 10:00 a.m., at the District’s Tennis Center, 1300 Forest Gate Road, Oak Brook, IL. Failure to attend may lead to disqualification of the bid.

Each bid must be placed in a sealed opaque envelope with the Bidder’s name, the date and time of the bid deadline and marked “**Sealed Bid**: – Oak Brook Park District Tennis Center HVAC Upgrade Project,” and addressed to the Oak Brook Park District, 1450 Forest Gate Road, Oak Brook, IL 60523, **Attention: Executive Director**. Bids will be received until 10:00 a.m. on April 7, 2017, at which time the bid proposals will be publicly opened and read aloud at the District’s Administrative Office, located at the District’s Family Recreation Center, 1450 Forest Gate Road, Oak Brook, IL 60523.

The Oak Brook Park District Board of Park Commissioners reserves the right to waive all technicalities, to accept or reject any or all bids, to accept only portions of a proposal and reject the remainder without disclosure for any reason. Failure to make such a disclosure will not result in accrual of any right, claim or cause of action by any Bidder against the Oak Brook Park District.

Bids shall not include federal excise tax or state sales tax for materials and equipment to be incorporated in, or fully consumed in the performance of, the work. An Exemption Certificate will be furnished by the Oak Brook Park District on request of the Bidder, for use in connection with this project only.

The Work of this Project is subject to the Illinois *Prevailing Wage Act*, 820 ILCS 130/0.01 *et seq.* A prevailing wage determination has been made by the District, which is the same as that determined by the Illinois Department of Labor for public works projects in DuPage County. The Contract entered into for the Work will be drawn in compliance with said law and proposals should be prepared accordingly and provide for payment of all laborers, workmen, and mechanics needed to perform the Work at no less than the prevailing rate of wages (or the prevailing rate for legal holiday and overtime work) for each craft, type of worker, or mechanic.

All bid proposals must be accompanied by a bid bond or bank cashier’s check payable to the Oak Brook Park District for ten percent (10%) of the amount of the bid as provided in the Instructions to Bidders. No proposals or bids will be considered unless accompanied by such bond or check.

The Contractor selected will also be required to comply with all applicable federal, state and local laws, rules, regulations and executive orders including but not limited to those pertaining to equal employment opportunity.

The District encourages women and minority business firms to submit bids and encourages bidders to utilize minority businesses for supplies, equipment and services.

Laure Kosey, Executive Director  
Oak Brook Park District



**INSTRUCTIONS TO BIDDERS  
OAK BROOK PARK DISTRICT  
TENNIS CENTER HVAC UPGRADE PROJECT**

**INSTRUCTIONS TO BIDDERS**

The Oak Brook Park District and Owner are one and the same. "Architect" or "Engineer" shall mean Kluber, Inc. which shall, through its designated representative, provide administration of the Contract for this Project.

The words "Contractor" and "Bidder" shall mean the party bidding for or entering the Contract for the performance of the Work covered by the written Specifications and Drawings, and his/her legal representatives or authorized agents.

**A. BID DOCUMENTS**

1. Bid Documents for this Project will be available for examination and can be obtained from the Oak Brook Park District, 1450 Forest Gate Road, Oak Brook, IL 60523 (the "District"), Monday - Friday, 9:00 a.m. – 5:00 p.m., or in PDF format at the District's website:  
[http://www.obparks.org/general\\_information/bid.asp](http://www.obparks.org/general_information/bid.asp).
2. **A mandatory pre-bid meeting will be held on March 30, 2017, at 10:00 a.m., at the District's Tennis Center, 1300 Forest Gate Road, Oak Brook, IL.**

**B. BID FORM**

1. Each bid shall be made on the "Bid Form" furnished by the District. The Bid Form shall be executed properly and all writing, including all signatures, shall be with black ink. Failure to use the Bid Form provided could result in rejection of the bid.
2. All applicable blank spaces on the "Bid Form" shall be fully completed, including the List of Subcontractors and the Bidder's Reference List, and all amounts shall be in words as well as in figures where applicable.
3. The bid shall bear the legal name of the business organization. The signatures shall be in longhand and executed by a duly authorized official of the Bidder's organization and the name of the official and title shall be typed below the signature.
4. Erasures, interlineations, corrections, or other changes on the "Bid Form" shall be explained or noted over the signature of the Bidder. No bid submitted with deviations or reservations from the full contract called for will be considered.
5. Bidders' prices are to include the delivery of all materials; including plant, equipment, supplies, tools, scaffolding, transportation, insurances, bonds, warranties, and all other items and facilities, and the performance of all labor and services,

necessary for the proper completion of the Work except as may be otherwise expressly provided in the Contract Documents. Bids shall not include federal excise tax or state sales tax for materials to be incorporated in, or totally consumed in the prosecution of, the Work. An exemption certificate will be furnished by the Park District upon request of the Bidder.

6. Bidder must acknowledge all Addenda received in the spaces provided on the Contractor Bid Form. By submitting a bid, Bidder indicates that all considerations issued by Addendum are incorporated in the bid.
7. Attached to the Bid Form will be one or more certifications regarding the Bidder's compliance with applicable laws. **Failure of a Bidder to complete/submit a required certification shall be the basis for immediate rejection of that Bidder's bid.** The certification of the successful Bidder shall become a part of the Contract with the Park District.
8. The bids shall be sealed in an opaque envelope, marked with the name of the Bidder, the date and time of the bid, and addressed as follows:

Sealed Bid: the Tennis Center HVAC Upgrade Project  
Oak Brook Park District  
1450 Forest Gate Road  
Oak Brook, IL 60523

9. Bid documents shall be delivered or mailed in time for delivery to the foregoing address no later than April 7, 2017 at 10:00 a.m. Oral bids or oral modifications to bids will not be considered. It is the sole responsibility of the Bidder to see that his bid is received in proper time. **No faxed or e-mail bid or modification of a bid will be considered.** The Park District is not responsible for the premature opening of bids not marked as required. Any bid opened prematurely due to the failure of the Bidder to mark the envelope in accordance with these Bid Documents will be considered non-responsive.
10. No bid can be withdrawn prior to the opening of the bids unless a written request for any such withdrawal, showing good cause for said withdrawal, is first delivered to the District at the foregoing address prior to commencement of the opening of bids. No Bidder may withdraw a bid after opening of the bids.
11. Bids will be publicly opened on the due date.

### **C. REQUIREMENTS OF BIDDERS**

Bidders must be able to demonstrate that they: 1) have experience in performing and have successfully performed and are still actively engaged in performing work similar in kind and scope to the Work of the Project; and 2) are able to show that they have adequate laborers and materials to successfully complete the Work as indicated in the Bid Documents and

within the time required by the Bid Documents. The Contractor shall not have been debarred or determined ineligible for public contracts by any governmental agency.

The following information must be attached to the bid proposal. Failure to do so may result in disqualification of the Bidder.

1. On a separate sheet, list all construction projects your organization has in progress, giving the name of the project, project description, project address, owner and telephone number, architect and telephone number, contract amount, percent complete, and scheduled completion date.

2. On the Bidder's Reference List form provided herein, list at least three (3) construction projects your organization has completed in the past five (5) years, which are comparable in scope, giving the name of the project, project description, project address, owner and telephone number.

3. On the List of Subcontractors form provided herein, provide a list of anticipated subcontractors, if any, including their firm names, addresses and telephone numbers. All subcontractors to be used shall be approved by the Owner. If the Contractor subcontracts any part of the Work for this project, the Contractor shall not under any circumstances be relieved of his liabilities and obligations; any subcontractor for this project will be recognized only in the capacity of an employee of the Contractor.

4. On a separate sheet, list all administrative proceedings and litigation filed by or against Bidder in the past five (5) years, including the name and case number, name/jurisdiction of the court or administrative agency, and a summary of each claim/case, including current status and if no longer pending, the disposition. The foregoing includes but is not limited to information regarding any proceedings and actions taken by any governmental agency to debar or disqualify the Bidder from bidding on public contracts, including the name of the agency initiating the proceeding/action, the nature of the proceeding/action, the claimed basis for the proceeding/action and the current status or disposition of the proceeding/action.

Other required submittals include: Bid Form; Contractor's Compliance and Certification Attachment/ Substance Abuse Prevention Program Certification. **Failure of a Bidder to complete/submit these documents shall be the basis for immediate rejection of that Bidder's bid.**

#### **D. MODIFICATION OF BIDS**

Any Bidder may modify his bid by written notice (signed by the Bidder) at any time prior to the scheduled closing time for receipt of bids, provided that such written notice is received by the District prior to the closing time. Modifications of bid submittals sent by facsimile will not be permitted.

**E. EXAMINATION OF CONTRACT DOCUMENTS AND SITE**

Each Bidder shall visit the site(s) of the proposed Work and fully acquaint himself with conditions, as they exist, and shall undertake such additional inquiry and investigation as he shall deem necessary so that he may fully understand the requirements, facilities, possible difficulties and restrictions attending the execution of the Work under the Contract. Bidder shall thoroughly examine and be familiar with all of the Bid Documents including, but not limited to, the Drawings and the written Specifications. Any conflicts or discrepancies found between or among Bid Documents including, but not limited to, the Drawings and written Specifications and the site conditions, or any errors, omissions or ambiguities in the Drawings or written Specifications shall be immediately reported to the Park District and written clarification requested prior to submission of a bid.

The failure or omission of any Bidder to obtain, receive or examine any form, instrument, or information or to visit the Project site(s), and become knowledgeable with respect to conditions there existing, or to seek needed clarification shall in no way relieve any Bidder from any obligations with respect to his bid. By submitting a bid, the Bidder agrees, represents and warrants that he has undertaken such investigation as he deemed necessary, has examined the site(s) and the Bid Documents, has obtained all needed clarifications and where the Bid Documents indicate in any part of the Work, that a given result be produced, that the Bid Documents are adequate and the required result can be produced as indicated in the Specifications and Drawing(s). Once the award has been made, failure to have undertaken and completed the foregoing tasks shall not be cause to alter the original Contract or to request additional compensation.

**F. ACCEPTANCE OR REJECTION OF BIDS**

The Park District may accept the bid of, and award the contract for the Work to, the lowest responsive and responsible Bidder as determined by and in the sole discretion of the Park District.

The Owner reserves the right to (1) reject all bids; (2) reject only certain bids which are non-conforming or non-responsive to the bid requirements; (3) accept only a portion, part or specific items of Work of all and reject others, as the Owner shall in its sole discretion determine to be in its best interest; and/or (4) award the Contract to the responsible Bidder submitting the lowest bid responsive to the bidding requirements. No bid will be accepted from or Contract awarded to any person, firm or corporation that is in arrears or is in default to the Park District upon any debt or contract, or that is a defaulter, as surety or otherwise, upon any obligation to said Park District or that has failed to perform faithfully any previous contract with the Park District.

In the event of a rejection of a portion, part, or certain items of Work of all bids, the bid of each Bidder shall automatically be deemed reduced by the amount of such rejected part or item at the unit price or other cost designated therefore by that Bidder on its submitted Contractor Bid Form. The successful Bidder so selected may not refuse to enter into a Contract with the Owner on the basis that the Owner awarded a Contract for

less than all portions or items of the Work specified in the Bid Documents. The Oak Brook Park District Board of Park Commissioners reserves the right to waive any technicalities or irregularities, and to disregard any informality on the bids and bidding, when in its opinion the best interest of the Park District will be served by such actions and in accordance with applicable law.

## **G. SURETY**

All bids must be accompanied by a bid bond or bank cashier's check payable to the Oak Brook Park District for ten percent (10 %) of the amount of the bid and drawn on a responsive and responsible bank doing business in the United States. All bids not accompanied by a bid security, when required, will be rejected.

The bid security of all except the three (3) lowest responsive and responsible Bidders will be returned after the decision to accept or reject bids by the Oak Brook Park District Board of Park Commissioners. The bid security of the successful Bidder will be returned after acceptance by the Park District of an acceptable Performance Bond, Labor and Materials/Payment Bond and a certificate of insurance naming the Oak Brook Park District as the certificate holder and as additional insured, and the successful Bidder has executed and returned to the Park District the Contract for the Work presented by the Park District.

Prior to beginning Work, the successful Bidder shall furnish a Performance Bond, and Labor and Materials/Payment Bond in the amount of 110% of the Contract Sum, using a form similar to the AIA-A312-2010 form, or its current equivalent, or one acceptable to Owner, cosigned by a surety company licensed to conduct business in the State of Illinois and with at least an "A" rating and a financial rating of at least "X" in the latest edition of the Best Insurance Guide. Said bond shall guarantee the faithful performance of the Work in accordance with the Contract, the payment of all indebtedness incurred for labor and materials, and guarantee correction of Work. The cost of each bond shall be included in the Contract Sum. The Bidder and all Subcontractors shall name the Park District as an obligee on all bonds. Said bonds shall meet the requirements of the Illinois Public Construction Bond Act, 30 ILCS 550/0.01 *et seq.* and any further amendments thereto. Bidder shall include in its Performance Bond and Labor and Material Payment Bond such language as shall guarantee the faithful performance of the Prevailing Wage Act as required in these Bid Documents.

The Performance Bond and Labor and Material Payment Bond will become a part of the Contract. The failure of the successful Bidder to enter into the Contract and supply the required bonds and evidence of insurance within ten (10) days after the Contract is presented for signature, or within such extended period as the Park District may grant, shall constitute a default, and the Park District may either award the Contract to the next responsible Bidder, or re-advertise for bids. In the event of a default, the Owner need not return the defaulting Bidder's bid surety and may charge against the defaulting Bidder for the full difference between the amount for the bid and the amount for which a Contract for the Work is subsequently executed, irrespective of whether the amount thus due exceeds the amount of the defaulting Bidder's bid surety, provided that the District's retention of the bid

guarantee shall not preclude the District from holding the Bidder fully liable for any and all damages which are in excess of said partial liquidated damages, and which shall otherwise be incurred by the District, including reasonable attorneys' fees, arising from the Bidder's failure to enter into said Contract and to deliver the same back to the District within said ten (10) day period.

In addition to the required performance and labor and material payment bonds, the successful Bidder shall furnish a maintenance bond and/or irrevocable letter of credit in the amount of the Contract to guarantee the Work performed under the Contract against defective workmanship and/or defective materials of any nature for a period of not less than twenty-four (24) months from the date of acceptance of the Work, materials or equipment provided. The maintenance bond shall be in a form acceptable to District. A letter of credit furnished in lieu of maintenance bond shall be in a form designated by the District's attorneys. The District reserves the right to waive the maintenance bond in its own interests.

#### **H. WITHDRAWAL OF BID**

Bidders may withdraw or cancel their bids at any time prior to the advertised bid opening time by signing and submitting a request for said withdrawal. After the bid opening time, no bid shall be withdrawn or canceled for a period of sixty (60) calendar days.

#### **I. ACCEPTANCE AND CONTRACT**

Owner will award the Contract to the lowest most responsible and responsive Bidder, as determined by Owner. In considering the Bidder's responsibility, the Owner may evaluate, among other factors, the ability of the Bidder to provide experienced labor sufficient in numbers to timely and properly complete the services, conformity with the Specifications, serviceability, quality, and the financial capability of the Bidder, and the performance of the Bidder on other projects.

The Owner shall have the right to accept Alternates in any order or combination, unless otherwise specifically provided in the Bid Documents, and to determine the low Bidder on the basis of the sum of the Base Bid and Alternates accepted.

Bids will be awarded to one Bidder for the entire Project or to any series of Bidders for an appropriate proportion of the Project. If specified in the Bid Form, awards will be based upon the submitted unit prices.

The acceptance of a bid will be by a Notice of Award, signed by a duly authorized representative of the Park District; no other act by the Park District shall constitute the acceptance of a bid. The acceptance of a bid by the Park District shall bind the successful Bidder to execute and perform the Work of the Contract. The successful Bidder to whom the Contract is awarded by the Park District shall sign and deliver to the Park District for execution by the Park District all required copies of the Contract, along with all required insurance and surety documents within ten (10) days after presentation to him of the

Contract for signature. In case the Bidder shall fail or neglect to do so, he will be considered as having abandoned the Contract, and as being in default to the Owner. The Owner may thereupon re-advertise or otherwise award said Contract and forfeit the Bid Security.

The Invitation to Bid, Instructions to Bidders, General Conditions, Supplementary and/or Special Conditions, if any, Drawings, Specifications, Contractor Bid Form, Addenda, if any, Contractors Compliance and Certifications Attachment, and Substance Abuse Certification and the Prevailing Wage Determination and Supersedes Notice comprise the Bid Documents. The Bid Documents, together with the Standard Form of Agreement Between Owner and Contractor, Project of Limited Scope, AIA Document A107-2007, as modified by the Park District and included in these Bid Documents, and the Performance Bond and Labor Material Payment Bond and proof of insurance comprise the Contract Documents.

## **J. INTERPRETATION OF THE CONTRACT DOCUMENTS**

The Park District shall in all cases determine the amount or quantity of the several kinds of Work which are to be paid for under this Contract, and shall decide all questions which may arise relative to the execution of the Contract on the part of the Contractor, and all estimates and decisions shall be final and conclusive. The Park District shall have the right to make alterations in the lines, grades, plans, forms, or dimensions of the Work herein contemplated either before or after the commencement of the Work. If such alterations diminish the quantity of the Work to be done, they shall not constitute a claim for damage or for anticipated profits on the work dispensed with, or if they increase the amount of Work, such increase shall be paid according to the quantity actually done and at the price or prices stipulated for such Work in the Contract. The Park District reserves the right to approve, an equal to or superior to product or equipment required under the Specifications, or to reject as not being and equal to or superior to the product or equipment required under the Specifications. If the Bidder is in doubt as to the interpretation of any part of the Bid Documents, or finds errors, discrepancies or omissions from any part of the Contract Documents, he must submit a written request for interpretation thereof not later than five (5) days prior to opening of bids to the Park District. Address all communications to the Architect. If an error or omission is discovered in the Bid Documents after the bid opening, the Park District reserves the right: i) to determine whether to require the submission of new bids; or ii) if the error or omission is of such a nature that it was reasonably discoverable upon a careful review of the Bid Documents, to award the Contract to the lowest responsive and responsible Bidder as determined by the Park District and to require that Contractor to perform the Work in accordance with an issued correction by the Park District and for the amount bid by the Contractor. Such decisions are final and not subject to recourse. Errors and omissions made by the Bidder cannot be corrected after the bid opening.

**K. ADDENDA**

Any interpretation, correction to, or addition to the Bid Documents will be made by written Addendum and will be delivered by email to each prime Bidder of record. The written Addenda constitute the only interpretations of the Bid Documents; the Park District accepts no responsibility for any other claimed interpretations or communications.

It is the responsibility of each Bidder to verify that he has received all Addenda prior to submitting a bid. It is also the responsibility of each Bidder to verify that all subcontractors and material suppliers whose prices are incorporated in the Bidder's bid are familiar with the Bid Documents in their entirety, including all Addenda issued up to the time of bid opening.

In the event a conflict or omission is discovered in the Bid Documents after the issuing of the last Addendum such that an interpretation cannot be issued by the Park District prior to bidding, the Bidder is directed to estimate on and provide the quantity and quality of material and labor consistent with the overall represented and indicated Work so as to provide all materials, equipment, labor, and services necessary for the completion of the Work in accordance with the Bid Documents.

**L. SUBSTITUTIONS DURING BIDDING**

Unless otherwise indicated, the use of brand names in the Specifications is used for the purpose of establishing a grade or quality. Bidders proposing to use an alternate that is equal to or superior to in every respect to that required by the Specifications must request approval in writing to the Park District at least seven (7) business days prior to the bid opening and mark the item as 'or approved equal'.

Additionally, Bidders requesting approval for use of an alternate must provide certification by the manufacturer that the substitute proposed is equal to or superior in every respect to that required by the Contract Documents, and that its in-place performance will be equal to or superior to the product or equipment specified in the application indicated. The Bidder, in submitting the request for substitution, waives the right to additional payment or an extension of Contract Time because of the failure of the substitute to perform as represented in the request for substitution.

The Park District may request additional information or documentation necessary for evaluation of the request for substitution. The Park District will notify all Bidders of acceptance of the proposed substitute by means of an Addendum to the Bid Documents. Park District's approval of a substitute during bidding does not relieve the Contractor of the responsibility to submit required shop drawings and to comply with all other requirements of the Contract Documents, including but not limited to proper performance of all components of the Work and suitability for the uses specified.



Bids proposing alternates not previously approved by the Park District will be considered non-responsive and rejected. The Park District reserves the right to determine whether a substituted selection, in its judgment, is equal to or better quality and therefore an acceptable alternate. Such decisions are final and not subject to recourse.

**CONDITIONS OF THE CONTRACT  
OAK BROOK PARK DISTRICT  
TENNIS CENTER HVAC UPGRADE PROJECT**

**GENERAL CONDITIONS**

The General Conditions are the General Conditions of the Contract for Construction, AIA Document A107-2007, as modified by the Park District and included in these Bid Documents (the "General Conditions").

**SUPPLEMENTARY CONDITIONS**

The General Conditions are hereby amended to include the following:

**1. COMMENCEMENT AND COMPLETION DATE**

The Work for the Contract shall commence on June 12, 2017, or on such earlier date as may be agreed upon by the parties. The Project shall be Substantially Complete on or before August 18, 2017 and Final Completion shall be September 1, 2017, unless otherwise extended by agreement of the parties pursuant to the General Conditions.

**2. USE OF THE SITE**

The Contractor shall confine all equipment, the storage of materials and the operations of its workers, to limits indicated by law, ordinances, permits, or directions of the Owner and shall not unreasonably encumber the site with such materials. The site shall not be utilized for the storage of vehicles, materials, equipment, or fixtures not intended for the Work to be performed.

**3. COOPERATION WITH UTILITIES**

The Contractor shall notify all utility companies, public and private, in advance of commencing performance of the Work. The responsibility for moving water lines, gas lines, wire lines, service connections, water and gas meter boxes, water and gas valve boxes, light standards, cable ways, signals and all other utility appurtenances which are within the limits of the proposed construction will be assumed by the Contractor, at no additional compensation.

The Contractor shall verify the location of all utilities prior to the start of construction and shall be responsible for the preservation of existing utility installation and the cost of providing precautionary supports, braces, etc. to insure against damage to said utility installation.

The cost to repair and replace any new or existing utilities damaged will be paid for by the Contractor.

It is understood and agreed that the Contractor has considered in its bid all of the permanent and temporary utility appurtenances in their present or relocated positions and that no additional compensation will be allowed for delays, inconvenience, or damage sustained by the Contractor, due to any interference from the said utility appurtenances or the operation of moving them either by the utility company or by the Contractor, or on account of any special construction methods required in performing the Work due to the existence of said appurtenances whether in their present or relocated positions.

**4. PROTECTION OF PROPERTY -SAFETY RESPONSIBILITY**

In accordance with the Specifications, the Contractor shall protect all existing property and improvements within the Project site and those adjacent to the Owner's property in a manner agreed upon between the Owner and Contractor. The Contractor shall be responsible for the repair cost of any damage created by its operations or the operations of any subcontractors.

Contractor shall comply with State and Federal regulations as outlined in the latest revision of the Federal Construction Safety Standards and with applicable provisions and regulations of Occupation Safety and Health Administration (OSHA), Standards of the William-Steiger Occupational Health and Safety Act of 1970 (revised). The Contractor and Owner shall each be responsible for their respective agents and employees.

The Contractor shall be obligated to indemnify, hold harmless and protect the Owner, its officers, employees and agents, from any actions or suits instituted as a direct or indirect result of any injury or damage consequent upon any failure to use or misuse by the Contractor, its agents and employees and any subcontractor, its agents and employees, of any ladder, support or other mechanical contrivance erected or constructed by any person or any or all kinds of equipment whether or not Owner or furnished by the Owner.

**5. INSURANCE**

**BIDDER'S ATTENTION IS DIRECTED TO THE INSURANCE REQUIREMENTS BELOW. IT IS HIGHLY RECOMMENDED THAT THE BIDDER CONFER WITH ITS INSURANCE CARRIER REGARDING THESE REQUIREMENTS. FAILURE TO MEET THESE REQUIREMENTS IS CAUSE FOR CANCELLATION OF THE CONTRACT.**

The successful Bidder shall obtain insurance of the types and in the amounts listed below.

**a. Commercial General and Umbrella Liability Insurance**

The successful Bidder shall maintain commercial general liability (CGL) and, if necessary, commercial umbrella insurance with a limit of not less than \$2,000,000 each occurrence. If such CGL insurance contains a general aggregate limit, it shall apply separately to this project/location.

CGL insurance shall be written on Insurance Services Office (ISO) occurrence form CG 00 01 10 93, or a substitute form providing equivalent coverage, and shall cover liability arising from premises, operations, independent contractors, products-completed operations, personal injury and advertising injury, and liability assumed under an insured contract (including the tort liability of another assumed in a business contract).

The District, its elected and appointed officials, employees, agents and volunteers shall be included as an additional named insured under the CGL, using ISO additional insured endorsement CG 20 26 or a substitute providing equivalent coverage, and under the commercial umbrella, if any. This insurance shall apply as primary insurance with respect to any other insurance or self-insurance afforded to District. Any insurance or self-insurance maintained by the District shall be deemed excess of such bidder's insurance and shall not contribute with it.

**b. Business Auto and Umbrella Liability Insurance**

The successful Bidder shall maintain business auto liability and, if necessary, commercial umbrella liability insurance with a limit of not less than \$1,000,000 each accident. Such insurance shall cover liability arising out of any auto including owned, hired and non-owned autos.

Business auto insurance shall be written on Insurance Services Office (ISO) form CA 00 01, CA 00 05, CA 00 12, CA 00 20, or a substitute form providing equivalent liability coverage. If necessary, the policy shall be endorsed to provide contractual liability coverage equivalent to that provided in the 1990 and later editions of CA 00 01.

**c. Workers Compensation Insurance**

The successful Bidder shall maintain workers compensation and employers liability insurance. The commercial umbrella and/or employers liability limits shall not be less than \$1,000,000 each accident for bodily injury by accident or \$1,000,000 each employee for bodily injury by disease.

Such Bidder waives all rights against District and its officers, officials, employees, volunteers and agents for recovery of damages arising out of or incident to such Bidder's activities.

**d. General Insurance Provisions**

i. Evidence of Insurance: The successful Bidder shall furnish the District with a certificate(s) of insurance and applicable policy

endorsement(s), executed by a duly authorized representative of each insurer, showing compliance with the insurance requirements set forth above.

All certificates shall provide for 30 days' written notice to the District prior to the cancellation or material change of any insurance referred to therein. Written notice to the District shall be by certified mail, return receipt requested.

Failure of the District to demand such certificate, endorsement or other evidence of full compliance with these insurance requirements, or failure of the District to identify a coverage deficiency from evidence that is provided, shall not be construed as a waiver of such Bidder's obligation to maintain such insurance.

The District shall have the right, but not the obligation, of prohibiting such Bidder from entering the premises until such certificates or other evidence that insurance has been placed in complete compliance with these requirements is received and approved by District.

Failure to maintain the required insurance may result in termination of the Contract entered by the parties at the District's option.

Such Bidder shall provide certified copies of all insurance policies required above within 10 days of the District's written request for said copies.

ii. Acceptability of Insurers: All insurance companies shall maintain a rating no less than A-VII from A.M. Best, based on the most recent edition of the A.M. Best's Key Rating Guide. If the Best's rating is less than A-VII or a Best's rating is not obtained, the District has the right to reject insurance written by an insurer it deems unacceptable.

iii. Deductibles and Self-Insured Retentions: Any deductibles or self-insured retentions must be declared to the District. At the option of the District, the successful Bidder may be asked to eliminate such deductibles or self-insured retentions as respects the District, its officers, officials, employees, volunteers and agents, or such Bidder may be required to procure a bond guaranteeing payment of losses and other related costs, including, but not limited to, investigations, claims administration and defense expenses.

**e. Subcontractors**

Contractor shall cause each subcontractor employed by Contractor to purchase and maintain insurance of the type specified above. When

requested by the Owner, Contractor shall furnish copies of certificates of insurance evidencing coverage for each subcontractor.

**6. INDEMNIFICATION**

To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner and its officers, officials, employees, volunteers and agents from and against all claims, damages, losses and expenses including but not limited to legal fees (attorney's and paralegals' fees and court costs), arising out of or resulting from the performance of the Contractor's work, provided that any such claim, damage, loss or expense (i) is attributable to bodily injury, sickness, disease or death, or injury to or destruction of tangible property, other than the work itself, including the loss of use resulting there from and (ii) is caused in whole or in part by any wrongful or negligent act or omission of the Contractor, any subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or otherwise reduce any other right or obligation of indemnity which would otherwise exist as to any party or person described in this Paragraph. Contractor shall similarly protect, indemnify and hold and save harmless the Owner, its officers, officials, employees, volunteers and agents against and from any and all claims, costs, causes, actions and expenses including but not limited to legal fees, incurred by reason of Contractor's breach of any of its obligations under, or Contractor's default of, any provision of the Contract.

Nothing contained herein shall be construed as prohibiting the District, its officers, employees or agents from defending, through the selection and use of their own agents, attorneys and experts, any claims, suits, demands, proceedings or actions brought against them. The District's participation in its defense shall not remove the successful Bidder's duty to indemnify, defend and hold the District harmless as set forth herein.

The indemnification required hereunder shall not be limited by reason of the enumeration of insurance coverage herein provided.

The successful Bidder's indemnification of the District shall survive the termination or expiration of the Contract.

**7. WARRANTY**

A. The Work performed and the materials and equipment installed under this Contract shall be in compliance with the Contract Documents and must be guaranteed by the Contractor and the Surety for a period of twenty four (24) months from Final Completion against defective workmanship and material of any nature. On all material or equipment incorporated, the Contractor and its Surety must guarantee that the type, quality, design and performance will fully meet the requirements of the Specifications and Drawings.

- B. A Maintenance Bond or Irrevocable Letter of Credit meeting the requirements set forth in the Instructions to Bidders shall be furnished by the Contractor to guarantee the Work performed, and the materials and equipment provided under the Contract.
- C. The Contractor shall provide the Owner with manufacturer's warranties for all materials and equipment installed under the Contract.

## **8 Ownership of Plans and Specifications**

All Plans and Specifications and copies thereof furnished by the Owner, are the Owner's property. They are not to be used on any other work or project and, with the exception of one complete set, are to be returned to the Owner on request, at the completion of the work.

- A. **Record Drawings on Site**  
The Contractor shall keep one record copy of the Specifications, Addenda, notifications, and Shop Drawings at the site in good order and annotated to show all changes made during the progress of the Work. These shall be available to the Owner and shall be delivered to Owner upon completion of the Project.
- B. **Basis of Payment for Contractor Record Drawings**  
The cost of furnishing one (1) set of as-built Record Drawings shall be considered as incidental to the price of the Contract.
- C. **Final Payment to the Contractor shall not be made until the completed Record Drawings (in acceptable condition and with appropriate detail) are delivered to the Owner.**

## **SPECIAL CONDITIONS**

### **1. LIQUIDATED DAMAGES**

Time is of the essence of the contract. Should the Contractor fail to complete the Work on or before the Final Completion date stipulated in the Contract or within such extended time as may have been allowed, the Contractor shall be liable and shall pay to the Owner the sum of \$150 per calendar day, not as a penalty but as liquidated damages, for each day of overrun in the Contract Time or such extended time as may have been allowed. The liquidated damages for failure to complete the Contract on time are approximate, due to the impracticality of calculating and proving actual delay costs. The costs of delay represented by the liquidated damage amount are understood to be a fair and reasonable estimate of the costs that will be borne by the Owner during extended and delayed performance by the Contractor for the Work. The liquidated damage amount specified will accrue and be assessed until Final Completion of the total physical Work of the Contract even though the Work may be substantially complete. The Owner will deduct these liquidated damages from any monies due or to become due to the Contractor from the Owner.

2. The Tennis Center shall remain open to the public for the duration of the Project. As such, Contractor shall maintain the Project site in a manner that ensures safe access to the Tennis Center's amenities by the public, Park District staff and others requiring access to the Tennis Center. Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.



**BID FORM**  
**OAK BROOK PARK DISTRICT**  
**TENNIS CENTER HVAC UPGRADE PROJECT**

TO: Oak Brook Park District  
1450 Forest Gate Road  
Oak Brook, IL 60523

FROM: \_\_\_\_\_  
NAME OF BIDDER

\_\_\_\_\_

STREET ADDRESS

\_\_\_\_\_

CITY STATE ZIP

\_\_\_\_\_

PHONE

**FOR:** Tennis Center HVAC Upgrade Project

By submission of its bid, the Bidder acknowledges, agrees, represents, declares and warrants:

- A. That he has carefully examined the written Specifications and Drawings and is thoroughly familiar therewith, and that he has visited the site of the proposed Work to arrive at a clear understanding of the conditions under which the Work is to be done, and that he has compared the site with the Drawings and Specifications and has satisfied himself as to all conditions affecting the execution of the Work;
- B. That all modifications have been submitted with this bid;
- C. That he has checked carefully the bid figures and understands that he shall be responsible for any errors or omissions based on these Specifications and alternates as submitted on the Bid Proposal Form;
- D. That it is understood and agreed that the Oak Brook Park District reserves the right to accept or reject any or all bids, or to combine or separate any section or work, and to waive any technicalities;
- E. To hold the bid open for sixty (60) days subsequent to the date of the bid opening;
- F. To enter into and execute a Contract with the Owner within ten (10) days after the date of the Notice of Award, if awarded on the basis of this bid, and in connection therewith to:

- (a) Furnish all bonds and insurance required by the Contract Documents;
- (b) Accomplish the Work in accordance with the Contract Documents; and
- (c) Complete the Work within the time requirements as set forth in the Bid Documents.

- G. That if this bid is accepted, the Bidder is to provide all of the necessary equipment, tools, apparatus, labor, and other means of construction, and to do all of the Work and to furnish all of the materials specified in the Bid Documents in the manner and at the time therein prescribed, and in accordance with the requirements set forth;
- H. To commence Work as specified in the Instructions to Bidders, and to prosecute the Work in such a manner, and with sufficient materials, equipment and labor as will ensure its completion within reasonable time, it being understood and agreed that the completion within such reasonable time is an essential part of this Contract;
- I. That any and all prices stated in the proposal include all costs of labor, materials, equipment, insurance, bonds, overhead and profit, and any and all other costs normal to doing business.

**CONTRACTOR MUST BID ON BOTH BASE BID AND ALTERNATE BID**

The Alternate bid quoted on this Bid Proposal Form will be reviewed and accepted or rejected at Owner’s option. If accepted, the Alternate Bid will be identified in the Owner-Contractor Agreement. The Owner shall have the right to determine the low Bidder on the basis of the sum of the Base Bid and Alternates accepted.

The undersigned Bidder agrees that if the Owner accepts the Base Bid and any or all of the Alternate Bids, it will perform the Work per the Contract for the following prices.

Description	Bid Price
<b>Base Bid</b>	\$
<b>Alternate Bid: State the amount to be deducted from the Base Bid to alter the base bid work as specified in the Alternate 1 Specifications.</b>	\$

The undersigned Bidder hereby acknowledges the receipt of the following addenda (if any) distributed by the Park District.

Addendum No. \_\_\_\_\_ Date: \_\_\_\_\_  
 Addendum No. \_\_\_\_\_ Date: \_\_\_\_\_

The Work for the Contract shall commence on June 12, 2017, or on such earlier date as may be agreed upon by the parties. The Project shall be Substantially Complete on or before August 18, 2017 with Final Completion on September 1, 2017, unless otherwise extended by agreement of the parties pursuant to the General Conditions.

The undersigned Bidder agrees that if this bid is accepted by the Park District, it will perform all Work in accordance with the requirements of the Contract.

DATED THIS \_\_\_\_\_ DAY OF \_\_\_\_\_, 2017.

\_\_\_\_\_  
Full Name of Bidder (Print)

(a) Individual      ( )  
(b) Partnership    ( )  
(c) Corporation    ( )

Name and Title of Authorized Agent  
if Corporation or Partnership (Print): \_\_\_\_\_

\_\_\_\_\_  
Full Name and Title of Bidder (Signature)

\_\_\_\_\_  
Street Address

\_\_\_\_\_  
City/State/Zip

\_\_\_\_\_  
Phone

\_\_\_\_\_  
Email

**LIST OF SUBCONTRACTORS**

Bidder submits a list of subcontractors for each trade relative to the Work to be performed under the Contract with the District, and agrees that if selected the successful Contractor, the Bidder will promptly confer with the District’s agents on the question of which subcontractors the Bidder proposes to use, including submission of their qualifications. ***Note that the demolition subcontractor must have a minimum of three (3) years of documented experience with demolition projects.*** It is agreed that the District may substitute for any proposed subcontractor, another subcontractor for the trade against whose standing and ability the Bidder makes no objection in writing, and the Bidder will use all such finally selected subcontractors at the amount named in their respective subcontracts, and be in every way responsible for them and their work as if they had been originally named in the Bidder’s bid, the unit, total and alternate Contract prices being adjusted to confirm thereto.

Subcontractor Name & Address                      Classification of Work                      Amount of Subcontract

1.		
2.		
3.		
4.		

**BIDDER'S REFERENCE LIST**

Each Bidder must list the name, address, phone number and project name for at least three (3) projects performed for governmental entities of similar scope and complexity as the Tennis Center HVAC Upgrade Project in the past five (5) years. Bidder may include, as a separate attachment, additional information or references on projects completed.

1. \_\_\_\_\_  
Name of Park District, School District, or Municipality

\_\_\_\_\_

Contact Person

\_\_\_\_\_

Phone Number                                      E-Mail

\_\_\_\_\_

Description of Work performed                                      Project Value

2. \_\_\_\_\_  
Name of Park District, School District, or Municipality

\_\_\_\_\_

Contact Person

\_\_\_\_\_

Phone Number                                      E-Mail

\_\_\_\_\_

Description of Work performed                                      Project Value

3. \_\_\_\_\_  
Name of Park District, School District, Municipality

\_\_\_\_\_

Contact Person

\_\_\_\_\_

Phone Number                                      E-Mail

\_\_\_\_\_

Description of Work performed                                      Project Value

## CONTRACTOR COMPLIANCE AND CERTIFICATIONS ATTACHMENT

**Note: The following certifications form an integral part of the Agreement between the Owner and Contractor. Breach by Contractor of any of the certifications may result in immediate termination of the Contractor's services by Owner.**

THE UNDERSIGNED CONTRACTOR HEREBY ACKNOWLEDGES, CERTIFIES, AFFIRMS AND AGREES AS FOLLOWS:

- A. Contractor has carefully read and understands the contents, purpose and legal effect of this document as stated above and hereafter in this document. The certifications contained herein are true, complete and correct in all respects.
- B. Contractor shall abide by and comply with, and in contracts which it has with all persons providing any of the services or Work on this Project on its behalf shall require compliance with, all applicable Federal, State and local laws and rules and regulations including without limitation those relating to 1) fair employment practices, affirmative action and prohibiting discrimination in employment; 2) workers' compensation; 3) workplace safety; 4) wages and claims of laborers, mechanics and other workers, agents, or servants in any manner employed in connection with contracts involving public funds or the development or construction of public works, buildings or facilities; and 5) steel products procurement.
- C. All contracts for this Project are subject to the provisions of the Illinois Prevailing Wage Act (820 ILCS 130/0.01 *et seq.*), providing for the payment of the prevailing rate of wage to all laborers, workmen and mechanics engaged in the Work. Contractor shall pay prevailing rates of wages in accordance with the wage determination included with the Contract Documents and any subsequent determinations issued by the Illinois Department of Labor which shall supersede the determination included in the Contract Documents, all in accordance with applicable law. Contractor is responsible for determining the applicable prevailing wage rates at the time of bid submission and at the time of performance of the Work. Failure of Contractor to make such determination shall not relieve it of its obligations in accordance with the Contract Documents. Contractor shall also comply with all other requirements of the Act including without limitation those pertaining to inclusion of required language in subcontracts, job site posting, maintenance and submission of certified payroll records and inspection of records. Contractor is not barred from entering into public contracts under Section 11a of the Illinois Prevailing Wage Act due to its having been found to have disregarded its obligations under the Act.
- D. To the best of Contractor's knowledge, no officer or employee of Contractor has been convicted of bribery or attempting to bribe an officer or employee of the State of Illinois, or any unit of local government, nor has any officer or employee made an admission of guilt of such conduct which is a matter of record.

- E. Contractor is not barred from bidding on or entering into public contracts due to having been convicted of bid-rigging or bid rotating under paragraphs 33E-3 or 33E-4 of the Illinois Criminal Code. Contractor also certifies that no officers or employees of the Contractor have been so convicted and that Contractor is not the successor company or a new company created by the officers or owners of one so convicted. Contractor further certifies that any such conviction occurring after the date of this certification will be reported to the Owner, immediately in writing, if it occurs during the bidding process, or otherwise prior to entering into the Contract therewith.
- F. Pursuant to the Illinois Human Rights Act (775 ILCS 5/2-105), Contractor has a written sexual harassment policy that includes, at a minimum, the following information: (i) a statement on the illegality of sexual harassment; (ii) the definition of sexual harassment under State law; (iii) a description of sexual harassment utilizing examples; (iv) the Contractor's internal complaint process including penalties; (v) the legal recourse, investigative and complaint process available through the Illinois Department of Human Rights and the Human Rights Commission and directions on how to contact both; and (vi) protection against retaliation as provided by Section 6-101 of the Illinois Human Rights Act. Contractor further certifies that such policy shall remain in full force and effect. A copy of the policy shall be provided to the Illinois Department of Human Rights upon request.
- G. (i) Contractor's bid proposal was made without any connection or common interest in the profits anticipated to be derived from the Contract by Contractor with any other persons submitting any bid or proposal for the Contract; (ii) the Contract terms are in all respects fair and the Contract will be entered into by Contractor without collusion or fraud; (iii) no official, officer or employee of the Owner has any direct or indirect financial interest in Contractor's bid proposal or in Contractor, (iv) the Contractor has not directly or indirectly provided, and shall not directly or indirectly provide, funds or other consideration to any person or entity (including, but not limited to, the Owner and the Owner's employees and agents), to procure improperly special or unusual treatment with respect to this Agreement or for the purpose of otherwise improperly influencing the relationship between the Owner and the Contractor. Additionally, the Contractor shall cause all of its officers, directors, employees, (as the case may be) to comply with the restrictions contained in the preceding sentence.
- H Contractor knows and understands the Equal Employment Opportunity Clause administrated by the Illinois Department of Human Rights, which is incorporated herein by this reference, and agrees to comply with the provisions thereof. Contractor further certifies that Contractor is an "equal opportunity employer" as defined by Section 2000 (e) of Chapter 21, Title 42 of the United States Code Annotated and Executive Orders #11246 and #11375 as amended, which are incorporated herein by this reference.
- I. Neither Contractor nor any substantially owned affiliated company is participating or shall participate in an international boycott in violation of the provisions of the U.S. Export Administration Act of 1979 or the regulations of the U.S. Department of Commerce promulgated under that Act.

- J. Contractor is not barred from contracting with the Owner because of any delinquency in the payment of any tax administrated by the Illinois Department of Revenue, unless it is being contested. Contractor further certifies that it understands that making a false statement regarding delinquency in taxes is a Class A misdemeanor and, in addition, voids the Contract and allows the Owner, a municipal entity, to recover in a civil action all amounts paid to the Contractor.
  
- K. If Contractor has 25 or more employees at the time of letting of the Contract, Contractor knows, understands and acknowledges its obligations under the Illinois Drug Free Workplace Act (30 ILCS 580/1 *et seq.*) and certifies that it will provide a drug-free workplace by taking the actions required under, and otherwise implementing on a continuing basis, Section 3 of the Drug Free Workplace Act. Contractor further certifies that it has not been debarred and is not ineligible for award of this Contract as the result of a violation of the Illinois Drug Free Workplace Act.
  
- L. Contractor knows, understands and acknowledges its obligations under the Substance Abuse Prevention on Public Works Act, 820 ILCS 265/1 *et seq.* A true and complete copy of Contractor's Substance Abuse Prevention Program Certification is attached to and made a part of this Contractor Compliance and Certification Attachment.
  
- M. The Contractor shall comply with the requirements and provisions of the Freedom of Information Act (5 ILCS 140/1 *et. seq.*) and, upon request of the Oak Brook Park District's designated Freedom of Information Act Officer (FOIA Officer), Contractor shall within two (2) business days of said request, turn over to the FOIA Officer any record in the possession of the Contractor that is deemed a public record under FOIA.

CONTRACTOR

By: \_\_\_\_\_

Its: \_\_\_\_\_

STATE OF \_\_\_\_\_ )  
 \_\_\_\_\_ )SS  
 COUNTY OF \_\_\_\_\_ )

I, the undersigned, a notary public in and for the State and County, aforesaid, hereby certify that \_\_\_\_\_ appeared before me this day and, being first duly sworn on oath, acknowledged that he/she executed the foregoing instrument as his/her free act and deed and as the act and deed of the Contractor.

Dated: \_\_\_\_\_

(SEAL)

\_\_\_\_\_  
 (Notary Public)



SUBSTANCE ABUSE PREVENTION PROGRAM CERTIFICATION

The Substance Abuse Prevention on Public Works Projects Act, 820 ILCS 265/1 et seq., (“Act”) prohibits any employee of the Contractor or any Subcontractor on a public works project to use, possess or be under the influence of a drug or alcohol, as those terms are defined in the Act, while performing work on the project. The Contractor/Subcontractor **[circle one]**, by its undersigned representative, hereby certifies and represents to the Oak Brook Park District that **[Contractor/Subcontractor must complete either Part A or Part B below]:**

A. The Contractor/Subcontractor **[circle one]** has in place for all of its employees not covered by a collective bargaining agreement that deals with the subject of the Act a written substance abuse prevention program, a true and correct copy of which is attached to this certification, which meets or exceeds the requirements of the Substance Abuse Prevention on Public Works Act, 820 ILCS 265/1 et seq. **[Contractor/Subcontractor must attach a copy of its substance abuse prevention program to this Certification.]**

\_\_\_\_\_  
Name of Contractor/Subcontractor (print or type)

\_\_\_\_\_  
Name and Title of Authorized Representative (print or type)

\_\_\_\_\_ Dated: \_\_\_\_\_  
Signature of Authorized Representative

B. The Contractor/Subcontractor **[circle one]** has one or more collective bargaining agreements in effect for all of its employees that deal with the subject matter of the Substance Abuse Prevention on Public Works Projects Act, 820 ILCS 265/1 et seq.

\_\_\_\_\_  
Name of Contractor/Subcontractor (print or type)

\_\_\_\_\_  
Name and Title of Authorized Representative (print or type)

\_\_\_\_\_ Dated: \_\_\_\_\_  
Signature of Authorized Representative

**IMPORTANT NOTICE OF RESPONSIBILITY FOR PERIODIC REVISIONS TO PREVAILING WAGE RATES**

Revisions of the following Prevailing Wage Rates are made periodically by the Illinois Department of Labor. These may be accessed by computer at <http://www.illinois.gov/idol/Laws-Rules/CONMED/Pages/Rates.aspx>. As required by the Prevailing Wage Act, any and all such revisions supersede the Park District's June determination. Bidders and contractors performing work on this Project are responsible for determining the applicable prevailing wage rates at the time of bid submission and performance of the Work. Failure of a bidder/contractor to make such determination shall not relieve it of its obligations in accordance with the Contract Documents. In consideration for the award to it of the contract for this Project, the contractor agrees that the foregoing notice satisfies any obligation of the public body in charge of this Project to notify the contractor of periodic changes in the prevailing wage rates and the contractor agrees to assume and be solely responsible for, as a material obligation of the contractor under the contract, the obligation to determine periodic revisions of the prevailing wage rates, to notify its subcontractors of such revisions, to post such revisions as required for the posting of wage rates under the Act, and to pay and require its subcontractors to pay wages in accordance with such revised rates.

**DOCUMENT A107  
STANDARD FORM OF AGREEMENT  
BETWEEN OWNER AND CONTRACTOR,  
PROJECT OF LIMITED SCOPE**



**AIA**<sup>®</sup>

# Document A107™ – 2007

## **Standard Form of Agreement Between Owner and Contractor for a Project of Limited Scope**

**AGREEMENT** made as of the     day of     in the year Two Thousand Seventeen  
*(In words, indicate day, month and year.)*

**BETWEEN** the Owner:  
*(Name, legal status, address and other information)*

Oak Brook Park District  
1450 Forest Gate Road  
Oak Brook, IL 60523

and the Contractor:  
*(Name, legal status, address and other information)*

for the following Project:  
*(Name, location and detailed description)*

Tennis Center HVAC Upgrade Project

Oak Brook Park District  
1450 Forest Gate Road  
Oak Brook, IL 60523

The Project includes replacement of new HVAC system, including alteration of upper level and lower level mechanical systems, and acoustical ceiling and lighting replacements in the District's Tennis Center, and all other and incidental and collateral work necessary to properly complete the Project as indicated in the Contract Documents.

The Architect:  
*(Name, legal status, address and other information)*

Kluber Architects + Engineers  
10 S. Shumway Avenue  
Batavia, IL 60510

The Owner and Contractor agree as follows.

**ADDITIONS AND DELETIONS:**  
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

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### ARTICLE 1 THE WORK OF THIS CONTRACT

The Contractor shall execute the Work indicated in the Contract Documents, except as specifically stated in the Contract Documents to be the responsibility of others.

### ARTICLE 2 DATE OF COMENCEMENT, SUBSTANTIAL COMPLETION AND FINAL COMPLETION

§ 2.1 The date of commencement shall be August 18, 2017; however, the Contractor shall not commence performance of the Work until it has provided to Owner required performance and labor and material bonds and evidence of required insurance as provided in the Contract Documents. Delay in the commencement of the Work due to the Contractor's failure to provide these documents in a timely manner shall not change the date of commencement for purposes of measurement of the Contract Time and shall not be the basis for an extension of the dates of Substantial Completion or Final Completion.

Init.

*(Insert the date of commencement, if it differs from the date of this Agreement or, if applicable, state that the date will be fixed in a notice to proceed.)*

§ 2.2 The Contract Time shall be measured from the date of commencement.

§ 2.3 The Contractor shall achieve Final Completion of the entire Work not later than September 1, 2017 *(Insert number of calendar days. Alternatively, a calendar date may be used when coordinated with the date of commencement. If appropriate, insert requirements for earlier Substantial Completion of certain portions of the Work.)*

*(Table deleted)*

, subject to adjustments of this Contract Time, authorized by Change Order, as provided in the Contract Documents, The Owner and Contractor agree that the amount of time given to the Contractor under the Contract to achieve Final Completion is a reasonable amount of time considering the requirements of the Contract Documents.

*(Insert provisions, if any, for liquidated damages relating to failure to achieve Final Completion on time or for bonus payments for early completion of the Work.)*

Time is of the essence of the contract. Should the Contractor fail to complete the Work on or before the Final Completion date stipulated in the Contract or within such extended time as may have been allowed, the Contractor shall be liable and shall pay to the Owner the sum of \$150 per calendar day, not as a penalty but as liquidated damages, for each day of overrun in the Contract Time or such extended time as may have been allowed. The liquidated damages for failure to complete the Contract on time are approximate, due to the impracticality of calculating and proving actual delay costs. The costs of delay represented by the liquidated damage amount are understood to be a fair and reasonable estimate of the costs that will be borne by the Owner during extended and delayed performance by the Contractor for the Work. The liquidated damage amount specified will accrue and be assessed until Final Completion of the total physical Work of the Contract even though the Work may be substantially complete. The Owner will deduct these liquidated damages from any monies due or to become due to the Contractor from the Owner.

### ARTICLE 3 CONTRACT SUM

§ 3.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be one of the following:

*(Check the appropriate box.)*

- Stipulated Sum, in accordance with Section 3.2 below
- Cost of the Work plus the Contractor's Fee, in accordance with Section 3.3 below
- Cost of the Work plus the Contractor's Fee with a Guaranteed Maximum Price, in accordance with Section 3.4 below

*(Based on the selection above, complete Section 3.2, 3.3 or 3.4 below.)*

§ 3.2 The Stipulated Sum shall be \_\_\_\_\_ Dollars (\$ \_\_\_\_\_) subject to additions and deductions as provided in the Contract Documents.

§ 3.2.1 The Stipulated Sum is based upon and includes the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:

*(State the numbers or other identification of accepted alternates. If the bidding or proposal documents permit the Owner to accept other alternates subsequent to the execution of this Agreement, attach a schedule of such other alternates showing the amount for each and the date when that amount expires.)*

NA

**§ 3.2.2** Unit prices, if any:

*(Identify and state the unit price, and state the quantity limitations, if any, to which the unit price will be applicable.)*

Item	Units and Limitations	Price Per Unit (\$0.00)
------	-----------------------	-------------------------

**§ 3.2.3** Allowances included in the stipulated sum, if any:

*(Identify allowance and state exclusions, if any, from the allowance price.)*

Item	Allowance
------	-----------

*(Paragraphs deleted)*

**§ 3.2.4** Adjustments to the Contract Sum: Adjustments to the contract Sum for changes in the Work other than changes in the Work involving items for which unit prices were requested by Owner and provided in Contractor's Submitted Bid Proposal, shall be made as follows:

1. In the manner agreed to by the Parties, or in the absence of agreement then the combined allowance for overhead and profit in connection with changes to the Work shall be the lesser of the amount, if any, included in the Contractor's bid proposal, or the following:
  - a. Five percent (5%) of the cost of the change in the Work involved if performed by the Contractor not involving Subcontractors, or
  - b. Five percent (5%) of the cost of the change in the Work involved performed by Subcontractors, plus two percent (2%) of the cost of the change in the Work for the Contractor's supervision of the work performed by the Subcontractors.

When both additions and credits covering related Work are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

**§ 3.2.5** Overtime, if and when specifically authorized in advance in writing by the Owner shall be paid by the Owner on the basis of premium payment if any, plus the cost of insurance and taxes based on the premium payment period. No overhead or profit may be charged for overtime. The Contractor shall not be entitled to any payment for overtime necessitated by the failure of the Contractor to perform the Work in accordance with the Contract Documents including without limitation to the Contractor's failure to prosecute the Work diligently and on an uninterrupted basis and with a sufficient work force so as to achieve completion of the Work within the time and in the manner contemplated by the Contract Documents or otherwise due to the fault of the Contractor. In such instances if the Owner requires the Contractor to perform Work on an overtime basis, all costs for and associates with such overtime shall be borne by the Contractor.

*(Paragraphs deleted)*

*(Table deleted)*

*(Paragraphs deleted)*

*(Table deleted)*

#### **ARTICLE 4 PAYMENTS**

##### **§ 4.1 PROGRESS PAYMENTS**

**§ 4.1.1** Based upon Applications for Payment properly completed and accompanied by all supporting documentation and other submittals required by the Contract Documents, submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, and agreed to by the Owner and not subsequently nullified by the Architect in accordance with the Contract Documents, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

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§ 4.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month.

§ 4.1.3 Provided that an Application for Payment, which is in proper form and accompanied by required supporting documents and submittals, in form and substance as required by the Contract Documents is received by the Architect not later than the 10<sup>TH</sup> day of a month, certified for payment by the Architect and not subsequently nullified by the Architect in accordance with the Contract Documents, the Owner shall make payment of the certified amount to the Contractor not later than the fifteenth day of the following month. If an Application for Payment is received by the Architect after the date fixed above, payment shall be made by the Owner not later than forty-five ( 45 ) days after the Architect receives the Application for Payment in proper form and accompanied by required supporting documents and submittals and certifies payment to the Owner. Contractor is solely responsible for any delays in payment due in whole or in part to Contractor's failure to submit its payment application timely, in proper form and accompanied by all supporting documents and submittals required under the Contract.

*(Federal, state or local laws may require payment within a certain period of time.)*

§ 4.1.4 Retainage, if any, shall be withheld as follows: Ten Percent (10%) of the Contract Sum shall be retained until Final Completion.

§ 4.1.5 Payments due and unpaid under the Contract

*(Paragraphs deleted)*

, and any penalties associated with the same, shall be paid in accordance with the provisions of, the Illinois Local Government Prompt Payment Act.

## § 4.2 FINAL PAYMENT

§ 4.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

- .1 the Contractor has achieved Final Completion for the Contractor's responsibility to correct Work as provided in Sections 9.4 and 18.2, and to satisfy other requirements, if any, which extend beyond final payment;
- .2 the contractor has submitted a final accounting for the Cost of the Work, where payment is on the basis of the Cost of the Work with or without a guaranteed maximum price; and
- .3 a final Certificate for Payment has been issued by the Architect.

§ 4.2.2 The Subject to Section 4.2.1, the Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the Architect's final Certificate for Payment and approval by the owner.

## ARTICLE 5 DISPUTE RESOLUTION THIS ARTICLE IS INTENTIONALLY DELETED

*(Paragraphs deleted)*

## ARTICLE 6 ENUMERATION OF CONTRACT DOCUMENTS

§ 6.1 The Contract Documents are defined in Article 7 and, except for Modifications issued after execution of this Agreement, are enumerated in the sections below.

§ 6.1.1 The Agreement is this executed AIA Document A107-2007, Standard Form of Agreement Between Owner and Contractor for a Project of Limited Scope, as modified for this Project by Owner.

§ 6.1.2 The Supplementary, Special and other Conditions of the Contract are those included in the Project Manual dated March 22, 2017.

§ 6.1.3 The Specifications:

*(Either list the Specifications here or refer to an exhibit attached to this Agreement.)*



The Specifications are those included in the Project Manual dated March 22, 2017.

	Title	Date	Pages
§ 6.1.4	The Drawings:		
	<i>(Either list the Drawings here or refer to an exhibit attached to this Agreement.)</i>		
	The Drawings are those included in the Project Manual dated March 22, 2017.		

Number	Title	Date
§ 6.1.5	The Addenda, if any:	

Number	Date	Pages
Portions of Addenda relating to bidding requirements are not part of the Contract Documents unless the bidding requirements are enumerated in this Article 6.		

§ 6.1.6 Additional documents, if any, forming part of the Contract Documents:

.1  
*(Paragraphs deleted)*

**Other documents forming a part of the Contract Documents;**

*(List here any additional documents that are intended to form part of the Contract Documents.)*

- a. Project Manual for Tennis Center HVAC Upgrade Project, dated March 22, 2017, a copy of which is attached and incorporated in this Agreement as **Exhibit A**.
- b. Contractor's Compliance and Certification, a copy of which is attached to and incorporated in this Agreement as **Exhibit B**.
- c. Insurance Requirements and certificate attached to and incorporated in this Agreement as **Exhibit C**.
- d. Performance Bond and Labor Material Payment Bond, copies of which are attached to and incorporated in this Agreement as **Exhibits D-1 and D-2**.
- e. Contractor's Proposal, dated \_\_\_\_\_, attached to and incorporated in this Agreement as **Exhibit E**.

## ARTICLE 7 GENERAL CONDITIONS

### § 7.1 THE CONTRACT DOCUMENTS

The Contract Documents are enumerated in Article 6 and consist of this Agreement (including, if applicable, Supplementary and other Conditions and Requirements of the of the Contract as included in the Project Manual, ), Drawings, Specifications, Addenda issued prior to the execution of this Agreement, other documents listed in this Agreement and Modifications issued after execution of this Agreement. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, or (3) a Construction Change Directive The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor whether as specifically indicated or reasonably inferable from what is indicated in order to produce a first class work product.. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

### § 7.2 THE CONTRACT

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be

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construed to create a contractual relationship of any kind between any persons or entities other than the Owner and the Contractor.

### § 7.3 THE WORK

The term "Work" means the construction and services indicated by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

### § 7.4 INSTRUMENTS OF SERVICE

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

### § 7.5 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE

§ 7.5.1 The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' or the Owner's reserved rights.

§ 7.5.2 The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce the Instruments of Service provided to them solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect's consultants.

§ 7.5.3 The Owner is the owner of the Contract Documents. The Contractor may retain one record set for use with this Project only. All copies of the Contract Documents except the Contractor's record set, shall be returned or suitably accounted for to the Owner on request upon completion of the Work.

### § 7.6 TRANSMISSION OF DATA IN DIGITAL FORM

If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmission, unless otherwise provided in the Agreement or in the Contract Documents.

## ARTICLE 8 OWNER

### § 8.1 INFORMATION AND SERVICES REQUIRED OF THE OWNER

§ 8.1.1 The Owner shall furnish all necessary surveys and a legal description of the site.

§ 8.1.2 Subject to the Contractor's duties and obligations under the Contract Documents in general and 9.1.1 of this Agreement in particular, the Contractor shall be entitled to reasonably rely on the accuracy of information furnished by the Owner. The Contractor shall in all instances but shall exercise proper precautions relating to the safe performance of the Work.

§ 8.1.3 Except for permits and fees that are stated to be the responsibility of the Contractor under the Contract Documents, the Owner shall secure and pay for other necessary approvals, easements, assessments and charges required for the construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

### § 8.2 OWNER'S RIGHT TO STOP THE WORK

If the Contractor fails to correct Work which is not in accordance with the requirements of the Contract Documents, or fails or refuses to provide a sufficient amount of properly supervised and coordinated labor, material or equipment so as to be able to complete the Work within the Contract Time, or fails to pay subcontractors or material suppliers timely or to remove and discharge within ten days any lien filed upon the Owner's property or funds by anyone claiming by, through or under the Contractor, or disregards the instructions of the Architect or Owner when based on the requirements of the Contract Documents, or otherwise fails to carry out the Work in accordance with

the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order is eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity.

### § 8.3 OWNER'S RIGHT TO CARRY OUT THE WORK

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents, or fails to perform a duty under or comply with a provision of the Contract Documents and fails within a seven-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, or fails within such seven-day period to eliminate (or diligently commence to eliminate) the cause of any stop work order issued under Section 8.2 thereof, the Owner, without prejudice to any other remedy the Owner may have, may correct such deficiencies and may deduct the actual cost thereof, including Owner's expenses and compensation for the Architect's services made necessary thereby, from the payment then or thereafter due the Contractor.

§ 8.4 The rights and remedies of Owner stated in this Article 8 shall be in addition to and not in limitation of any other rights of the Owner granted in the Contract Documents or at law or in equity.

## ARTICLE 9 CONTRACTOR

### § 9.1 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

§ 9.1.1 By its execution of the Contract, the Contractor acknowledges, agrees, represents, and warrants that: (a) the Contractor has carefully and thoroughly examined the Contract Documents, and the Contract Documents are full and complete, include all items necessary for the proper execution and completion of the Work, are sufficient to have enabled the Contractor to determine the cost of the Work and the time required for performance of the Work and to enable Contractor to construct the Work indicated therein in accordance with laws, ordinances, codes, regulations and rules applicable to the Work, and otherwise to fulfill all its obligations thereunder, including, but not limited to, Contractor's obligation to construct the Work for an amount not in excess of the Contract Sum on or before the date(s) of Substantial and Final Completion established in the Contract; (b) the omission from the Contract Documents of minor details which ordinarily form a part of first class work and are necessary to the completion of the Work as indicated, shall not be cause for any extra cost but shall be included as if specifically mentioned or detailed; (c) the Contractor has visited and examined the Project site and surrounding areas, examined all physical, legal and other conditions affecting the Work and correlated its personal observations with the requirements of the Contract Documents, and understands, is familiar with, and satisfied itself as to the same, including, without limitation: (i) the nature, location, and character of the Project and the site, including, without limitation surface conditions of the site and subsurface conditions observable or ascertainable upon the exercise of reasonable diligence including all structures and obstructions thereon and thereunder, both natural and manmade and all surface and subsurface water conditions of the site and the surrounding area; (ii) the nature, location, and character of the general area in which the Project is located, including without limitation, its generally prevailing climatic conditions, available labor supply and labor costs, and available equipment supply and equipment costs; (iii) the availability, quality, quantity and cost of all labor, materials, supplies, tools, equipment and professional services necessary to complete the Work in the manner and within the cost and time frame indicated by the Contract Documents.

By its execution of the Contract, the Contractor acknowledges, agrees, represents and warrants that it has carefully examined the Drawings, Specifications and other Contract Documents and having visited the Project site it has no actual knowledge of any discrepancies, omissions, ambiguities, or conflicts in or between the Contract Documents except those, if any, which have been clarified by Architect by Addenda to the Contractor's satisfaction, and that if it becomes aware of any such discrepancies, omissions, ambiguities, or conflicts, it has an obligation to and will immediately notify Owner and Architect of such fact, and will not proceed until it shall have received the written interpretation of Owner or Architect. If any such differences or conflicts which were ascertainable by careful review of the documents were not called to the Owner's and Architect's attention prior to submission by the Contractor of its bid proposal, the Architect shall decide which of the conflicting requirements will govern based upon the most stringent or highest quality of the requirements and, subject to the approval of the Owner, the Contractor shall perform the Work at no additional cost and/or time to the Owner in accordance with the Architect's decision.

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**§ 9.1.2** Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 8.1.1, shall take field measurements of any existing conditions related to that portion of the Work and shall evaluate any conditions at the site affecting it. The Contractor shall promptly report to the Architect any errors, inconsistencies, or omissions discovered by or made known to the Contractor. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor with considerable experience in the type of work being performed for this Project and not as a licensed design professional unless otherwise specifically provided in the Contract Documents.

**§ 9.1.3** The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, if imputation of such knowledge would be reasonable for a contractor with experience in the type of Work being performed for this Project, the Contractor shall carefully review and promptly report to the Architect any nonconformity discovered by or made known to the Contractor.

## **§ 9.2**

**§ 9.2.1** The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention under the full-time supervision of an approved site superintendent or foreman capable of communicating clearly with the Architect and Owner in the English language. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences and procedures, and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters.

**§ 9.2.2** The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for or on behalf of the Contractor or any of its Subcontractors.

**§9.2.3** The Contractor has the responsibility to ensure that all material suppliers and Subcontractors, their agents, and employees adhere to the Contract Documents, and that they order materials on time, taking into account the current market and delivery conditions and that they provide materials on time. The Contractor shall coordinate its Work with that of all others on the Project including deliveries, storage, installations, and construction utilities. The Contractor shall be responsible for the space requirements, locations, and routing of its equipment. In areas and locations where the proper and most effective space requirements, locations, and routing cannot be made as indicated, the Contractor shall meet with all others involved, before installation, to plan the most effective and efficient method of overall installation.

## **§ 9.3 LABOR AND MATERIALS**

**§ 9.3.1** Unless otherwise provided in the Contract Documents, the 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 proper execution and completion of the Work whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

**§ 9.3.2** The Contractor shall enforce strict discipline and good order among the Contractor's employees, Subcontractors and other persons carrying out the Work. The Contractor shall not employ or permit employment of, or contract with unfit persons or persons not skilled and experienced in tasks assigned to them.

*(Paragraphs deleted)*

**§9.3.3** The Contractor shall only employ labor on the Project or in connection with the Work capable of working harmoniously with all trades, crafts and any other individuals associated with the Project. The Contractor shall also use its reasonable best efforts to minimize the likelihood of any strike, work stoppage or other labor disturbance. The Contractor shall comply with all requirements of OSHA and shall indemnify and hold harmless the Owner against and from any claims, losses, damages or expenses it may incur as a result of the failure of the Contractor or any of its Subcontractors to comply with OSHA requirements.

**§9.3.4** If the Work is to be performed by trade unions, the Contractor shall make all necessary arrangements to reconcile, without delay, damage, or cost to the Owner and without recourse to the Architect, Owner's representative or the Owner, any conflict between the Contract Documents and any agreements or regulations of any kind at any time in force among members of councils which regulate or distinguish what activities shall not be

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included in the Work of any particular trade. In case the progress of the Work is affected by any undue delay in furnishing or installing any items or materials or equipment required under the Contract Documents because of the conflict involving any such agreement or regulations, the Architect or Owner's representative with the Owner's approval may require that other materials or equipment of equal kind and quality be provided at no additional cost to the Owner.

§ 9.3.5 The Contractor may make a substitution equivalent to or superior to the specified materials only with the consent of the Owner, after evaluation by the Architect and approval by the Owner and in accordance with a Modification.

§ 9.3.6 The Contractor shall carefully inspect all materials delivered on and to the Project site and reject defective materials without waiting for the Architect or Owner to observe the materials.

§9.3.7 The Contractor shall deliver, handle, store and install materials in accordance with manufacturers' or suppliers' instructions.

§9.3.8 Before ordering any material or doing any Work, the Contractor shall verify all measurements at the Project Site and Contractor shall be responsible for the correctness of same. No extra charge or compensation will be allowed to the Contractor on account of any difference between actual dimensions and the measurements shown by the Project Drawings.

§9.3.9 If any person employed by the Contractor on the Work shall appear to the Owner to be incompetent or conduct himself in a disorderly or improper manner, such person or persons shall be removed from the Work immediately on the request of the Owner. Said removal shall not create any additional cost to Owner and shall not extend the time for completion of the Work.

§9.4 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or specifically specify otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from faults and defects. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse of persons other than the Contractor or a Subcontractor, alterations to the Work not executed by the Contractor or a Subcontractor, improper or insufficient maintenance or improper operation. This warranty shall not be affected by the specification of any product or procedure unless the Contractor objects promptly to such product or procedure in writing including a supportable and verifiable basis as to why and how the warranty will be affected or cannot be provided for the specified product or procedure and advising the Architect and Owner of possible substitute products or procedures which will not affect the warrant. This warranty shall not be restricted by the limitations of any manufacturer's or supplier's warranty. Inability, failure or refusal of the Subcontractor or supplier responsible for the defective materials, equipment or Work to correct the same shall not excuse the Contractor from performing under the warranty. If required by the Architect or the Owner, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials being furnished.

All warranties shall include labor and materials and shall be signed by the manufacturer or Subcontractor as the case may be and countersigned by the Contractor. All warranties shall be addressed to the Owner and delivered to the Owner upon completion of the Work and before or with the submission of request for final payment. Except as otherwise provided in this Agreement or elsewhere in the Contract Documents, or in any Certificate of Substantial or Partial Completion approved by the Owner and Contractor and/or Subcontractor, as applicable, all warranties shall become effective on the date of Final Completion of the entire Work unless otherwise provided in any Certificate of Partial or Substantial Completion approved by the Owner and the Contractor or Subcontractor, as applicable, but only with respect to warranties for that specific portion of the Work, and shall run for a twelve (12) month period, unless a longer period is provided for in the Contract Documents or by law. Where warranties overlap, the more stringent requirement shall govern. The Contractor shall consult with the Owner prior to the submission of any application to the appropriate permitting agency or authority in order to afford Owner the opportunity to obtain a waiver or reduction of any fees or costs associated therewith.

Defective materials, equipment or workmanship occurring within the Warranty period may be repaired where such produces results conforming to the Contract Documents relating to appearance, performance and reliability. Where

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the nature of the defective materials, equipment or workmanship is such that acceptable results cannot be obtained by repair, such defective items shall be removed and replaced with new materials, equipment or workmanship complying with the Contract Documents.

**§9.5** The Contractor shall pay sales, consumer, use and other similar taxes that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect. Because the Owner is an Illinois unit of local government, the Illinois sales tax is not applicable to materials, equipment and supplies incorporated in the Work or wholly consumed in the performance of the Work. The Owner will provide its sales tax exemption number for use by Contractor in purchasing such materials, equipment and supplies for this Project.

**§9.6**

**§ 9.6.1 – Intentionally omitted.**

**§ 9.6.2** The Contractor shall comply with and give notices and permit inspections required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to or bearing on the performance of the Work or having jurisdiction over the Work. The Contractor shall promptly notify the Architect and Owner if any of the Contract Documents appear to be a variance therewith. If the Contractor performs Work knowing it to be contrary, or had it carried out its obligations under the Contract Documents generally, and Section 9.1.1 of this Agreement in particular, should reasonably have known it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

The Contractor shall include in the Contract Sum all allowances, if any, stated in the Contract Documents. The Owner shall select materials and equipment under allowances with reasonable promptness. Allowance amounts shall include the costs to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts. Allowance amounts shall also include the Contractor's costs for unloading and handling at the site, labor, installation, overhead, and profit.

**§ 9.7 – Intentionally omitted.**

**§ 9.8**

**§ 9.8.1** The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's approval a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project as approved by the Architect and Owner, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

**§ 9.8.2** The Contractor shall perform the Work in strict accordance with the most recent schedule submitted to and approved by the Owner and Architect.

**§ 9.9**

**§ 9.9.1** The Contractor shall review for compliance with the Contract Documents and submit to the Architect Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents in coordination with the Contractor's construction schedule and in such sequence as to allow the Architect reasonable time for review. By submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them; (2) determined and verified materials, field measurements and field construction criteria related thereto; and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents. The Work shall be in accordance with approved submittals.

*(Paragraphs deleted)*

**§ 9.10**

**§ 9.10.1 General Use.** The Contractor shall enforce the Owner's instructions regarding the conduct and use of the site by his employees.

**§ 9.10.2 Property Corners.** Existing property corners on the site shall be replaced by a registered Land Surveyor at the Contractor's expense.

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### § 9.10.3 Parking & Traffic.

.1 Parking of construction vehicles on the site by the Contractor shall not inhibit construction nor prevent access for emergency or other official vehicles. Parking of private vehicles on the site by the Contractor is prohibited unless said vehicle is necessary in the execution of the Contract. No construction vehicles shall be parked near or under any existing vegetation on the site.

.2 Construction traffic and staging shall be permitted only within construction limits as indicated on plan. The contractor is responsible for repair of any areas disturbed outside of this area, including grading and sodding. No staging will be permitted on existing asphalt without Owner's prior written consent. The cost to repair any damage to existing asphalt will be backcharged to the Contractor.

**§ 9.10.4 Fencing.** The Contractor will be responsible for erecting and maintaining construction fencing around the limits of the Project site at all times of construction. Failure to erect or maintain this fencing will result in the correction of the problem by the Park District at the expense of the Contractor. The Contractor's expense will be back charged to the contract, and may include, but are not limited to, the cost of any materials and staff time. This fence must be installed and fully erected before construction operations beginning and tied-up at the end of each working day. All construction fencing must conform to the following specification.

.1 Flexible Safety Fence. High density poly fabric, rigid 2" mesh design, heavy duty strength, 4' high, safety orange.

.2 Posts. Minimum 14 gauge painted green steel channel posts, min, 5'-6" long driven 18" into the ground, Post spacing shall be 12' O.C. with fence tied to each post top, middle and bottom.

.3 Tie Material. Heavy gauge vinyl coated wire.

**§ 9.10.5 Water Removal.** If, during construction, standing water caused by heavy rains or poor drainage becomes a hazard in the proper execution of the Contract, it shall be the responsibility of the Contractor to provide and make payment for removal of said water to existing drainage swales, storm sewers or other natural or man-made drainage ways.

**§ 9.11** The Contractor shall keep the Project site and surrounding areas free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove, and properly and lawfully dispose of as applicable, waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials from and about the Project. The Contractor shall clean up and keep all streets, sidewalks and other public ways used for access to the Project site free from accumulation of spillage of fill or soils or other materials caused by operations under the Contract. The Contractor shall strictly comply with all laws and regulations pertaining to same be solely responsible for, and shall pay any fines or penalties assessed as the result of, any violation.

**§ 9.12** The Contractor shall provide the Owner and Architect and government inspectors access to the Work in preparation and progress wherever located.

**§ 9.13-9.14** are deleted intentionally.

### § 9.15

**§ 9.15.1** To the fullest extent permitted by law, the Contractor waives any rights of contribution against, and shall indemnify and hold harmless the Owner and the Architect and their officers, officials, employees, volunteers and agents from and against all claims, damages, losses and expenses including but not limited to legal fees (attorney's and paralegals' fees and court costs), arising out of or resulting from the performance of the Contractor's work, provided that any such claim, damage, loss or expense (i) is attributable to bodily injury, sickness, disease or death, or injury to or destruction of tangible property, other than the work itself, including the loss of use resulting there from and (ii) is caused in whole or in part by any wrongful or negligent act or omission of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or otherwise reduce any other right or obligation of indemnity which would otherwise exist as to any party or person described in this Paragraph. Contractor shall similarly protect, indemnify and hold and save harmless the Owner, its

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officers, officials, employees, volunteers and agents against and from any and all claims, costs, causes, actions and expenses including but not limited to legal fees, incurred by reason of Contractor's breach of any of its obligations under, or Contractor's default of, any provision of the Contract.

"Claims," "damages," "losses" and "expenses" as these words are used in this Agreement shall be construed to include, but not limited to (1) injury or damage consequent upon the failure of or use or misuse by Contractor, its Subcontractors, agents, servants or employees, of any hoist, rigging, blocking, scaffolding, or any and all other kinds of items of equipment or other mechanical or structural contrivance erected or constructed by any person, or any or all other kinds of equipment whether or not the same be owned, furnished or loaned by Owner; (2) all attorneys' fees and costs incurred in bringing an action to enforce the provisions of this indemnity or any other indemnity contained herein; (3) (3) all costs and expenses incurred by the indemnified party and (4) error or omission or defect in any submission made to Architect / Architect for its approval or review.

§ 9.15.2 In claims against any person or entity indemnified under this Section 9.15 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section 9.15.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

§ 9.15.3 The indemnification obligations of the Contractor under this Contract are limited only to the extent required under the Construction Contract Indemnification for Negligence Act (740 ILCS 35/0.01 et seq.).

## ARTICLE 10 ARCHITECT

§ 10.1 The Architect and /or any other person designated in writing by the Owner will provide administration of the Contract and will be an Owner's representative during construction, until the date the Architect issues the final Certificate for Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents, unless otherwise modified in writing in accordance with other provisions of the Contract.

§ 10.2 The Architect will visit the site and observe the Work at intervals appropriate to the stage of the construction to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general, if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents.

§ 10.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and report to the Owner (1) known deviations from the Contract Documents and from the most recent construction schedule submitted by the Contractor, and (2) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 10.4 Based on the Architect's observations and evaluations of the quality and progress of the Work and of the Contractor's Applications for Payment, the Architect will review and certify to the Owner the amounts due the Contractor and will, subject to approval by the Owner issue Certificates for Payment in such amounts.

§ 10.5 The Architect has authority to reject Work that does not conform to the Contract Documents and to require inspection or testing of the Work.

§ 10.6 The Architect will review and approve or take other appropriate action upon the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.



§ 10.7 The Architect will interpret and make recommendations to Owner on matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor.

§ 10.8 Omitted.

§ 10.9 Duties, responsibilities and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner and Architect.

§ 10.10 Nothing contained in this agreement is intended to modify or shall modify the provisions of the Agreement between the Owner and Architect for this Project.

#### ARTICLE 11 SUBCONTRACTORS

§ 11.1 A Subcontractor is a person or entity who or which has a direct contract with the Contractor to perform a portion of the Work at the site.

§ 11.2 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through and to the Architect the name, trade, and subcontract amount of each Subcontractor for each of the principal portions of the Work and the name of each person or entity proposed as a manufacturer or supplier of any principal product identified in the Specifications. The Contractor shall not contract with any Subcontractor or supplier to whom the Owner or Architect has made reasonable written objection within ten days after receipt of the Contractor's list of Subcontractors and suppliers. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 11.3 All subcontract shall be in writing and shall specifically provide that the Owner is an intended third-party beneficiary of such subcontract and that the Owner shall have the right to enforce the Subcontractor's obligations thereunder after the occurrence of a default under the Contract by the contractor. By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by the terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities which the Contractor, by these Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by these Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar written agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement which may be at variance with the Contract Documents. Subcontractors shall similarly make copies of applicable portions of such documents available to their representatives proposed Sub-subcontractors.

§ 11.4 All subcontract agreements shall conform to the requirements of the Contract Documents and the Contractor hereby irrevocably assigns to the Owner and Owner's permitted assigns all its interest in any subcontract agreements and purchase orders now existing or hereinafter entered into the contractor for performance of any part of the Work, which assignment will be effective in the event of the Contractor's failure to perform the Work in accordance with the Contract Documents and upon acceptance by the Owner in writing and only as to those subcontract agreements and purchase orders that Owner designates in said writing. It is agreed and understood that the Owner may accept said assignment at any time during the course of construction prior to Final Completion. The Contractor shall promptly submit to the Owner a true and complete copy of each subcontract upon execution of same. Each subcontract shall contain a contingent assignment of the subcontract to the Owner, consistent with this Subparagraph. Upon acceptance by the Owner of a subcontract; (1) the Contractor shall promptly furnish to the Owner true and complete copies of the designated subcontract agreements and purchase orders, both as may have been amended by approved change order together with copies of any and all such amendments, and (2) the Owner shall only be required to compensate the designated Subcontractor(s) or supplier(s) for compensation accruing to

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such party(ies) for Work done or materials delivered from and after the date on which the Owner accepts the subcontract agreement(s) or purchase order(s). All sums due and owing by the Contractor to the designated Subcontractor(s) or supplier(s) for work performed or material supplied prior to the Owner's acceptance of the subcontract agreement(s) or purchase order(s) shall constitute a debt between such parties and the Contractor. It is further agreed that no subcontract agreement or purchase order shall contain any restriction that would prohibit assignment under the terms and conditions stated hereinabove. It is further agreed and understood that such assignment is part of the consideration to Owner for entering into the Contract with the Contractor and may not be withdrawn prior to Final Completion.

#### **ARTICLE 12 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS**

§ 12.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under conditions of the contract identical or substantially similar to these, including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such claim as provided in Article 21.

§ 12.2 The Contractor shall afford the Owner and separate contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's activities with theirs as required by the Contract Documents.

§ 12.3 The Owner shall be reimbursed by the Contractor for costs incurred by the Owner which are payable to a separate contractor because of delays, improperly timed activities or defective construction of the Contractor. The Owner shall be responsible to the Contractor for costs incurred by the Contractor because of delays, improperly timed activities, damage to the Work or defective construction of a separate contractor.

#### **ARTICLE 13 CHANGES IN THE WORK**

§ 13.1 By appropriate Modification, changes in the Work may be accomplished after execution of the Contract. The Owner, without invalidating the Contract, may order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, with the Contract Sum and Contract Time being adjusted if and as appropriate accordingly. Such changes in the Work shall be authorized by written Change Order signed by the Owner, Contractor and Architect, or by written Construction Change Directive signed by the Owner and Architect.

§ 13.2 Adjustments in the Contract Sum and Contract Time resulting from a change in the Work shall be determined by mutual agreement of the parties or, in the case of a Construction Change Directive signed only by the Owner and Architect, by the Contractor's cost of labor, material, equipment, and unless the additional cost was calculated using unit prices as provided elsewhere in this Agreement reasonable overhead and profit calculated in accordance with this Agreement, unless the parties agree on another method for determining the cost or credit. Pending final determination of the total cost of a Construction Change Directive, the Contractor may request payment for Work completed pursuant to the Construction Change Directive. The Architect will make an interim determination of the amount of payment due for purposes of certifying the Contractor's monthly Application for Payment subject to the Owner's approval. When the Owner and Contractor agree on adjustments to the Contract Sum and Contract Time arising from a Construction Change Directive, the Architect will prepare a Change Order. Pending final determination of cost to the Owner or extension of time to the Contractor, unless otherwise directed by Owner, Contractor shall continue to perform the Work in accordance with the Contract Documents.

§ 13.3 The Architect will have authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes shall be effected by written order and shall be binding on the Owner and Contractor. The Contractor shall carry out such written orders promptly.

§ 13.4 If concealed or unknown physical conditions are encountered at the Project site that differ materially from those indicated in the Contract Documents or from those conditions ordinarily found to exist, and the Contractor could not have discovered same in the exercise of reasonable diligence as required under Subsection 9.1.1 of this Agreement, the Contract Sum and Contract Time shall be equitably adjusted as mutually agreed between the Owner and Contractor; provided that the Contractor provides notice to the Owner and Architect promptly and before conditions are disturbed.

§ 13.5 Agreement on any Change Order shall constitute a final settlement, and accord and satisfaction between the Owner and Contractor, of all matters relating to the change in the Work which is the subject of the Change Order, including, but not limited to, all direct and indirect costs associated with such change and any and all adjustments to the Contract Sum, Contract Time and Construction Schedule. In the event a Change Order increases the Contract Sum, the Contractor shall include the Work covered by such Change Order in Applications for Payment as if such Work were originally part of the Contract Documents.

§ 13.6 No change in the Work, whether by way of alteration or addition to the Work, shall be the bases of an addition to the Contract Sum or change in the Contract Time unless and until such alteration or addition has been authorized by a Change Order executed and issued in accordance with and in strict compliance with the requirements of the Contract Documents and applicable law. Accordingly, no course of conduct or dealing between the parties, nor any express or implied acceptance of alterations or additions to the Work and no claim that the Owner has been unjustly enriched shall be the basis of any claim to an increase in the Contract Sum or change in the Contract Time.

#### ARTICLE 14 TIME

§ 14.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 14.2 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work and for Final Completion of the Work.

§ 14.3 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 14.4 The respective dates of Substantial Completion and Final Completion are the dates certified by the Architect and approved by the Owner in accordance with Section 15.

§ 14.5 If the Contractor is delayed at any time in the commencement or progress of the Work by changes ordered in the Work, by labor disputes, fire, unusual delay in deliveries, abnormal adverse weather conditions not reasonably anticipatable, unavoidable casualties or any causes beyond the Contractor's control, or by other causes which the Architect determines and the Owner agrees may justify delay, then as the Contractor's sole remedy the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine. Notwithstanding the foregoing, delays of the Contractor to carry out its obligations under or in accordance with the provisions of the Contract, shall not extend the Contract Time.

§ 14.6 The Contractor shall carry the Work forward regularly, diligently, uninterruptedly and expeditiously and in a good workmanlike and professional manner at such a rate of progress and with an adequate work force as will insure the completion of the Work in accordance with the Contract Documents by the date established in the Contract. It is expressly understood and agreed by and between Contractor and Owner that the time for completion of the Work is a reasonable time, taking into consideration the average climatic range, usual industrial conditions, and all other conditions and actors prevailing in this locality.

#### ARTICLE 15 PAYMENTS AND COMPLETION

##### § 15.1 APPLICATIONS FOR PAYMENT

§ 15.1.1 Where the Contract is based on a Stipulated Sum or the Cost of the Work with a Guaranteed Maximum Price, at least ten days before the date established for each progress payment, the Contractor shall submit to the Architect and Owner, before the first Application for Payment, a schedule of values, allocating the entire Contract Sum to the various portions of the Work, prepared in such form and supported by such data to substantiate its accuracy as the Architect or Owner may require. This schedule, unless objected to by the Architect, shall be used in reviewing the Contractor's Applications for Payment.

§ 15.1.2 With each Application for Payment where the Contract Sum is based upon the Cost of the Work, or the Cost of the Work with a Guaranteed Maximum Price, the Contractor shall submit payrolls, petty cash accounts, receipted invoices or invoices with check vouchers attached, and any other evidence required by the Owner to demonstrate that cash disbursements already made by the Contractor on account of the Cost of the Work equal or

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exceed (1) progress payments already received by the Contractor, less (2) that portion of those payments attributable to the Contractor's Fee; plus (3) payrolls for the period covered by the present Application for Payment.

§ 15.1.3 Unless approved in advance by the Owner in writing payment shall be made only account of materials and equipment incorporated in the Work. If approved in advance by the Owner payment shall be made on account of materials and equipment delivered and suitably stored and protected from damage and loss at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment stored, and protected from damage and loss, off the site at a location agreed upon in writing. The Owner may condition such approvals on such terms as the Owner in its discretion deems necessary for its protection.

§ 15.1.4 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, be free and clear of liens, claims, security interests or other encumbrances adverse to the Owner's interests.

§ 15.1.5 Failure to supply waivers of lien or acceptable evidence of payment of all current accounts incurred by this Contract work will be considered grounds for withholding final payment.

§ 15.1.6 The first payment application shall be accompanied by the Contractor's Partial Waiver of Lien only, for the full amount of the payment. Each subsequent monthly payment application shall be accompanied by the Contractor Partial Waiver, and by the Partial lien Waivers of Subcontractor and Suppliers who were included in the immediately preceding payment application to the extent of that payment. Application for Final Payment shall be accompanied by Final Waivers of Lien from the Contractor, Subcontractors and Suppliers who have not previously furnished such Final Waivers. Final Waivers shall be for the full amount of the Contract. All applications for payment shall be accompanied by affidavits, in triplicate, from the Contractor and Subcontractors containing such information and in such form as to comply with the Illinois Mechanics Lien Act (770 ILCS 60/0.01 *et seq.*) and showing in detail the sources of all labor and materials used and contracted to be used on the Project, including names and addresses of subcontractors and material suppliers; amounts paid and remaining to be paid to each; together with all documents as shall be necessary, in the sole judgment of the Architect and Owner, to waive all claims of liens to date and comply with all applicable state and local laws.

- (i) All waivers (partial and final) shall include language as applicable indicating either that:
  - a. all material were taken from fully paid stock and delivered to job site in our own vehicles and all labor has been fully paid in accordance with prevailing wage laws; or
  - b. materials were provided by the following suppliers for whom waivers of lien are attached and all labor has been fully paid in accordance with prevailing wage laws.

## § 15.2 CERTIFICATES FOR PAYMENT

§ 15.2.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, and subject to Owner's approval either issue to the Owner for review and concurrence a Certificate for Payment for such amount as the Architect believes is properly due, and/or or notify the Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Section 15.2.3.

§ 15.2.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, but not to the Contractor, based on the Architect's observations and evaluations of the Work at the site and the data comprising the Application for Payment that the Work has progressed to the point indicated and that to the best of the Architect's knowledge, information and belief the quality and quantity of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Architect. The issuance of a Certificate for Payment will further constitute a representation to the Owner but not to the Contractor that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed construction means, methods, techniques,

sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment, or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 15.2.3 The Architect, after consultation with the Owner may decide to certify payment and may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 15.2.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 15.2.1. The Architect may also decide not to certify payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 9.2.2, because of, but not limited to:

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor and such security is acceptable under applicable Illinois law to protect the lien rights of third parties;
- .3 failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or a separate contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay;  
or
- .7 failure to carry out the Work in accordance with the Contract Documents.

§ 15.2.4 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 15.2.5 No interest will be paid on amounts withheld.

### § 15.3 PROGRESS PAYMENTS

§ 15.3.1 The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to sub-subcontractors in similar manner. This provision is not to be construed as a "conditional payment" or "pay when paid" clause. In the event that payment to the Contractor is delayed without fault of the Subcontractor, payment to the Subcontractor shall be made within a reasonable time after work is properly performed by a subcontractor irrespective of any delay in payment to the Contractor.

§ 15.3.2 Neither the Owner nor Architect shall have an obligation to pay or see to the payment of money to a Subcontractor except as may otherwise be required by law.

§ 15.3.3 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 15.3.4 Anything to the contrary contained or implied herein notwithstanding, no progress payment need be made by Owner until such time as Contractor, Subcontractors or any other persons performing the Work or furnishing materials or equipment for the Project furnishes such documents as Owner may reasonably require (including without limitation sworn notarized contractor's statement, affidavits and waivers of lien).

### § 15.4 SUBSTANTIAL COMPLETION

§ 15.4.1 "Substantial Completion" means the date that all of the Work has been completed to the point where it can be occupied and used for all purposes intended by Owner and has been accepted by Owner to receive all required occupancy permits.

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"Punch List Items" mean and shall be limited to uncompleted items of Work (a) that do not interfere with the use and occupancy of any area of the Site for its intended purpose and (b) that, as a group, are capable of being completed by the Contractor within thirty (30) days of issuance of any Punch List. The "Punch List" is the list containing the Punch List Items.

§ 15.4.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect and to the Owner a comprehensive list of items to be completed or corrected prior to final payment. The Contractor shall proceed promptly and expeditiously to complete and correct all items on the list. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 15.4.3 Upon receipt of the Contractor's list, the Architect and the Owner will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's or Owner's inspection discloses an item, whether or not included in the Contractor's list, which is not in accordance with the Contract Documents and is necessary for Owner's occupancy or utilization of the Work, the Contractor shall before issuance of a Certificate of Substantial Completion, complete such items upon notification from the Architect and Owner. The cost of this and any additional inspections required to establish Substantial Completion due to the failure of the Contractor to properly complete all items of the Work necessary for the Owner's use or occupancy of the Work shall be charged to the Contractor. When the Architect determines that the Work or designated portion thereof is substantially complete, the Architect will issue a Certificate of Substantial Completion to the Owner for review and concurrence by the Owner which shall establish the date of Substantial Completion, establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and fix the time within which the Contractor shall finish all items on the punch list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Final Completion of the Work or designated portion thereof with the exception of the items of Work contained in the Punch List accompanying the Certificate of Substantial Completion. With respect to Work enumerated on the Punch List, the guarantee or warranty period shall commence upon Contractor's completion and Owner's approval of the Punch List items.

§ 15.4.4 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate.

#### § 15.5 FINAL COMPLETION AND FINAL PAYMENT

§ 15.5.1 Upon receipt of the Contractor's written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, and the Architect has advised Owner of that finding and Owner has not advised Architect of any objection to such finding, the Architect will promptly issue a final Certificate for Payment to the Owner but not to the Contractor stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions stated in Section 15.5.2 as precedent to the Contractor's being entitled to final payment have been fulfilled. The Owner's failure to object to, and the Owner's acceptance of, the Architect's findings and/or certifications hereunder shall not constitute Owner's acceptance of Work not complying with the Contract Documents, or Owner's waiver of any claims or remedies it may have with respect to any such defective or delayed Work.

§ 15.5.2 Final payment shall not become due until the Contractor has fully performed the contract, including but not limited to delivery of all manufacturer's and supplier's warranties, operating manuals, as-build drawings, and consent of the surety to final payment, pursuant to the Contract Documents, and has delivered to the Owner a complete release of all liens arising out of this Contract or receipts in full covering all labor, materials and equipment for which a lien could be filed, or a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including costs and reasonable attorneys' fees.

§ 15.5.3 The  
*(Paragraphs deleted)*

final payment by Owner shall not relieve the Contractor of the responsibility for the correction of any and all defects in the work performed. Contractor shall correct all defects as notified for the applicable warranty period after final payment.

§ 15.5.4 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

## ARTICLE 16 PROTECTION OF PERSONS AND PROPERTY

### § 16.1 SAFETY PRECAUTIONS AND PROGRAMS

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract. The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to

- .1 employees and other persons performing any of the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities bearing on safety of persons and property and their protection from damage, injury or loss. The Contractor shall promptly remedy damage and loss to property caused in whole or in part by the Contractor, a Subcontractor, a sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 16.1.2 and 16.1.3, except for damage or loss attributable to acts or omissions of the Owner or Architect or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 9.15.

### § 16.2 HAZARDOUS MATERIALS

§ 16.2.1 The Contractor is responsible for compliance with the requirements of the Contract Documents regarding hazardous materials. If the Contractor encounters a hazardous material or substance not brought on site by Contractor, and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Architect in writing. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shutdown, delay and start-up.

§ 16.2.2 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area, if in fact, the material or substance presents the risk of bodily injury or death as described in Section 16.2.1 and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss or expense is due to the fault or negligence of the party seeking indemnity.

§ 16.2.3 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred.

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## ARTICLE 17 INSURANCE AND BONDS

§ 17.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor, or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- .a claims under workers' or workmen's compensation, disability benefit and other similar employee benefit acts which are applicable to the Work to be performed;
- .b claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- .c claims for damages insured by usual personal injury liability coverage which are sustained (i) by a person as a result of an offense directly or indirectly related to employment of such person by the Contractor, or (ii) by another person;
- .d claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- .e claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle; and
- .f claims involving contractual liability insurance applicable to the Contractor's obligations under Section 9.15 above.

§ 17.1.1 The insurance required by Section 17.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverage shall be written on an occurrence basis and shall be maintained without interruption from date of commencement of the Work until date of final payment and termination of any coverage required to be maintained after final payment.

§ 17.1.2 In furtherance and not in limitation of its obligations under this Section 17.1, Contractor shall maintain insurance in accordance with Exhibit C attached to and incorporated in this Agreement by this reference.

### § 17.2

*(Paragraphs deleted)*

#### OWNER'S LIABILITY AND PROPERTY INSURANCE

§ 17.2.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance in the amount of the initial Contract Sum as well as subsequent modifications thereto for the entire Work at the site on a replacement cost basis without voluntary deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Article 15.5 or until no person or entity other than the Owner has an insurable interest in the property required by this Paragraph 17.2.1 to be covered, whichever is earlier. This insurance shall include the respective interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Work.

§ 17.2.2 Property insurance shall be on a course of construction policy form and shall insure against the perils of fire and extended coverage and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, false work, windstorm, testing and start-up, temporary buildings and debris removal, including demolition, and shall cover reasonable compensation for the Architect's, any of the Owner's Consultant's services and expenses required as a result of such insured loss. Coverage for other perils shall not be required unless otherwise provided in the Contract Documents. Property insurance provided by the Owner shall not cover Contractor's, Subcontractor's or Sub-subcontractor's liability or any tools, apparatus, machinery, scaffolding, hoists, forms, staging, shoring or other similar items commonly referred to as construction equipment, which may be on the site and the capital value of which is not included in the Work. The Contractor shall make his own arrangements for any insurance he may require on such construction equipment.

§ 17.2.3 The Contractor shall effect insurance which will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work.



§ 17.2.4 If the property insurance requires minimum deductibles and such deductibles are identified in the Contract Documents, the Contractor shall pay costs not covered because of deductibles. If the Owner or insurer increases the required minimum deductibles above the amounts so identified or if the Owner elects to purchase this insurance with voluntary deductible amounts, the Owner shall be responsible for payment of the additional costs not covered because of such increased or voluntary deductibles. If deductibles are not identified in the Contract Documents, the Owner shall pay costs not covered because of deductibles.

§ 17.2.5 Unless otherwise provided in the Contract Documents, this property insurance shall cover portions of the Work stored off the site and paid for by Owner after written approval of the Owner at the value established in the approval, and also portions of the Work in transit and paid for by Owner.

§ 17.2.6 Partial occupancy or use shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

§ 17.2.7 The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Contractor Subcontractors and Sub-subcontractors in the Work, and the Owner and the Contractor shall be named insureds.

§ 17.2.8 If the Contractor requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

§ 17.2.9 Notwithstanding any provision contained in Article 17, the Owner's obligation to purchase insurance shall herein be deemed satisfied by the Owner's membership in a self-insured risk management agency or pool. The Contractor agrees that any obligation the Owner has to purchase property insurance shall be satisfied by the Owner's membership in a self-insured risk management agency or pool. The Contractor further agrees that it will only have rights allowable to it under any coverage provided through the Owner's membership in a self-insured risk management agency or pool.

### § 17.3 PERFORMANCE BOND AND PAYMENT BOND

§ 17.3.1 The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract.

*(Paragraphs deleted)*

### § 17.4

§ 17.4.1 – Intentionally omitted.

§ 17.4.2 If required by the Owner the Contractor, before commencing the Work, shall furnish a Performance Bond and a Labor and Material Payment Bond. The Performance Bond shall be in an amount equal to 110% of the full amount of the Contract Sum as security for the faithful performance of the obligations of the Contract Documents, including the payment of prevailing wages in accordance with Article 24 of this Agreement, and the Labor and Material Payment Bond shall be in an amount equal to 110% of the full amount of the Contract Sum as security for required payments to all persons performing labor and furnishing materials in connection with the Work. Such bonds shall be on AIA Document A-312 (2010 Edition), issued by the American Institute of Architects, shall be issued by a surety satisfactory to the Owner, and shall name the Owner as primary co-obligee. Such bonds shall be from an Illinois Admitted Bonding Company acceptable to the Owner and having a minimum policy holder rating of "B+" in the latest edition of Best's Insurance Guide in effect as of the date of the Contract. Bonds shall remain in full force and effect for at least one year following the date of Final Completion of the Work or for the entire duration of the longest warranty period provided for the Work, whichever is longer. The cost of the bonds is to be included in the Contract Sum stated by the Contractor in its Bid Proposal.

§17.4.3 The Contractor shall (i) furnish with all bonds a certified copy of the power of attorney from the Surety Company stating that the person executing said bond is duly authorized by the Surety Company to execute said

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bond; (ii) furnish a certified copy of the certificate from said Surety Company's state showing said Surety Company licensed and authorized to transact business and execute said bond in Illinois; and (iii) if requested by Owner, furnish a copy of current financial statements of said Surety Company.

§ 17.4.4 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a true and correct copy of the bonds or shall authorize a copy to be furnished.

## ARTICLE 18 CORRECTION OF WORK

§ 18.1 The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense. If prior to the date of Final Completion the Contractor, a Subcontractor, or anyone for who either of them is responsible, uses or damages any portion of the Work, including but not limited to mechanical, electrical, plumbing or other building system, machinery, equipment or other mechanical device, the Contractor shall cause such item to be replaced or if permitted by the Owner restored to "like new" condition, at no expense to the Owner.

§ 18.2 In addition to the Contractor's obligations under Section 9.4, if, within one year after the date of Final Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 15.4.3, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so. The Owner shall give such notice promptly after discovery of the condition. The obligation under this Section 18.2 shall survive acceptance of the Work under the Contract and termination of the Contract. Corrective Work shall be warranted to be free from defects for a period equal to the longer of twelve (12) months after the completion of the corrective Work or one (1) year from the date of Final Completion of the Work, or such longer period of time as may be prescribed by law or in equity or by the terms of any applicable special warranty. Notwithstanding the foregoing, Contractor shall correct Work deficiently or defectively performed and replace defective or non-conforming materials and equipment, even though such deficiency, defect or non-conformity may be discovered more than one (1) year after Final Completion, if the correction is of a latent defect and arises from poor workmanship or improper materials or equipment, or is required to be made to Work, materials or equipment covered by the Contractor or a Subcontractor contrary to the Architect's or Owner's request or to the request of a governmental officer, or to the requirements of the Contract Documents or Governmental Requirements, and was therefore not visible for inspection by the Architect, Owner or governmental officer, as applicable, at the time of inspection. Contractor shall, within a reasonable time under the circumstances, after receipt of written notice thereof, correct, repair, replace and otherwise make good any defects or non-conformity in the Work.

§ 18.3 If the Contractor fails to correct defective or nonconforming Work within a reasonable time, the Owner may correct it in accordance with Section 8.3.

§ 18.4 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 18.5 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 18.6 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor's correction or removal of the Work that is not in accordance with the requirements of the Contract Documents.

## ARTICLE 19 MISCELLANEOUS PROVISIONS

### § 19.1 ASSIGNMENT OF CONTRACT

Neither party to the Contract shall assign the Contract without written consent of the other, except that the Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the

Project if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate such assignment.

#### § 19.2 GOVERNING LAW

The Contract shall be governed by the law of the place where the Project is located.

#### § 19.3 TESTS AND INSPECTIONS

Tests, inspections and approvals of portions of the Work required by the Contract Documents or by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities shall be made at an appropriate time. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect and the Owner timely notice of when and where tests and inspections are to be made so that the Architect and the Owner may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating the costs to the Contractor, unless such tests, inspection or approvals were necessitated by the Contractor's failure to perform the Work in accordance with the Contract Documents in which event the Contractor shall bear the costs.

*(Paragraphs deleted)*

#### § 20.1 TERMINATION OR SUSPENSION OF THE CONTRACT

If the Architect fails to certify payment and Architect has not notified the Contractor as provided in 15.2.1 of the reason for withholding certification or the Owner fails to make payment and has not notified Contractor of the reason for withholding payment as provided in Section , this Agreement through no fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, and such failure continues for a period of 90 days after notice from the Contractor , the Contractor may, as its sole remedy , upon seven additional days' written notice to the Owner and the Architect, terminate the Contract unless this reason is cured prior to the expiration of the notice period, and recover from Owner payment of Work properly executed in accordance with the Contract Documents (the basis for such payment shall be as provided in the Contract) provided said Work was authorized in advance by Owner. The Owner shall have the right to cure any defect or default prior to the date of termination stated in any written notice from Contractor as provided herein, in which event Contractor shall continue with the Work. If the Contractor terminates the Work and receives payment in connection with his equipment, tools or materials such items shall be left and remain on the Site if the Owner so elects. Owner shall not be responsible for damages for loss of anticipated profits on Work not performed. .

#### § 20.2 TERMINATION BY THE OWNER FOR CAUSE

##### § 20.2.1

*(Paragraphs deleted)*

If the Contractor shall institute proceedings or consent to proceeding requesting relief or arrangement under the Federal Bankruptcy Act or any applicable Federal or State Law, or if a petition under any federal or state insolvency law is filed against the Contractor and such petition is not dismissed within sixty (60) days from the date of the filing, or if the Contractor admits in writing his inability to pay his debts generally as they become due, or if he makes a general assignment for the benefit of his creditors, or if a receiver, liquidator, trustee, or assignee is appointed on account of his bankruptcy or insolvency; or if a receiver of all or any substantial portion of the Contractor's properties is appointed; or if the Contractor abandons the Work; or if he fails, except in cases for which extension of time is provided, to prosecute promptly and diligently the Work or to supply enough properly skilled workmen or proper materials for the Work; or if the Contractor submits an application for payment, sworn statement, waiver of lien, affidavit or document of any nature whatsoever which is intentionally falsified; or if the Contractor fails to make prompt payment to Subcontractors for materials or labor

*(Paragraphs deleted)*

or otherwise breaches obligations under any subcontract with a Subcontractor; or if a lien or a notices of lien is filed against any part of the Project or Project funds or if the Contractor disregards any laws, statutes, ordinances, rules, regulations or orders of any governmental body or public or quasi-public authority having jurisdiction of the Work or the Project premises; or if the Contractor otherwise violates any material provision of the Contract Documents, then, without prejudice to any right or remedy available Owner may, after giving the Contractor seven (7) days' written notice, terminate the Contractor, and take possession of the Project and all materials, equipment, tools,

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construction equipment and machinery thereon owned by the Contractor and accept assignment of Subcontracts and may complete the Work by whatever reasonable method the Owner may deem expedient. If requested by the Owner, the Contractor shall remove any part or all of this equipment, machinery and supplies from the Project within seven (7) days from the date of such request, and in such event at the Contractor's expense. Upon request of the Contractor, the Owner shall furnish to the Contractor a reasonably detailed accounting of the costs incurred by the Owner in completing the Work.

§ 20.2.2 When the Owner terminates the Contract for one of the reasons stated in Section 20.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished. .

§ 20.2.3 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's and consultants services and expenses made necessary thereby legal fees, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Architect, upon application, and this obligation for payment shall survive termination of the Contract.

§ 20.2.4 The Owner's right to terminate the contract pursuant to Section 20.2 shall be in addition to and not in limitation of its right to stop the Work without terminating the Contract as provided elsewhere in this Agreement.

### § 20.3 TERMINATION BY THE OWNER FOR CONVENIENCE

§20.3.1 The Owner may, at any time, terminate the Contract in whole or in part for the Owner's convenience and without cause. Termination by the Owner under this Section 20.3 shall be by a written notice of termination specifying the extent of termination and the effective date.

§20.3.2 Upon receipt of a notice of termination for convenience, the Contractor shall immediately, in accordance with instructions from the Owner, proceed with performance of the following duties:

1. cease operation as specified in the notice;
2. place no further orders and enter into no further Subcontracts for materials, labor, services, equipment, or facilities except as necessary to complete continued portions of the Contract;
3. terminate all subcontracts and orders to the extent they relate to the Work terminated;
4. proceed to complete the performance of Work not terminated; and
5. take actions that may be necessary, or that the Owner may direct, for the protection and preservation of the terminated work.

§20.3.3 In the event of termination by Owner for convenience, the sum payable to the Contractor for the Work shall be prorated based upon the amount of properly performed Work completed. Owner shall receive proper credit for sums already paid. Upon any such termination, all obligations of Owner (other than payment of sums due Contractor for services properly performed but not previously paid prior to the date of termination) shall cease as of the effective date of termination.

§20.3.4 The Owner shall be credited for (1) payments previously made to the Contractor for the terminated portion of the Work, and (2) claims which the Owner has against the Contractor under the Contract.

### §20.4 SUSPENSION BY THE OWNER FOR CONVENIENCE

§20.4.1 The Owner may without cause order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

§20.4.2 If suspension, delay or interruption ordered by the Owner constitutes in the aggregate more than twenty percent (20%) of the total number of days scheduled for completion, an adjustment shall be made for increases in the cost of the performance of this Contract, excluding profit caused by such suspension, delay or interruption. No adjustment shall be made to the extent:

- .1 That the performance is, was, or would have been so suspended, delayed or interrupted by another cause, including without limitation the fault or negligence of the Contractor or any Subcontractor;



or  
.2 That an equitable adjustment is made or denied under another provision of this Contract.

§20.4.3 Adjustments made in the cost of performance may have a mutually agreed fixed or percentage fee.

## ARTICLE 21 CLAIMS AND DISPUTES

### § 21.1 CLAIMS FOR CONSEQUENTIAL DAMAGES

The Contractor waives Claims against the Owner for consequential damages arising out of or relating to this Contract. This waiver includes, but is not limited to damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit arising from the Work.

This waiver is applicable, without limitation, to all consequential damages due to Owner's termination in accordance with Article 20.

In any suit or action arising under this Contract the Owner shall be entitled to an award of reasonable attorney's fees and costs of litigation.

## ARTICLE 22 OTHER CONDITIONS OR PROVISIONS

§ 22.1 The Contractor shall be responsible for the supply and maintenance of any and all temporary equipment, utilities, and facilities necessary to properly and safely complete and protect the Work, including without limitation those required by winter conditions. Contractor shall provide and erect barricades and other safeguards adequate to warn of danger at the site and to protect persons and property from injury resulting from the Work.

§ 22.2 The Contractor shall limit material and equipment storage to the immediate area of Work and such other areas as Owner may designate. The Contractor shall promptly remove and properly dispose off site all construction material, trash, garbage and other debris.

§ 22.3 The Contractor shall notify Architect and Owner in advance (to the extent practicable. notice shall be made at least 48 hours in advance) of any and all deliveries of major materials to the Project Site and shall give notice of receipt of materials and equipment that Architect or Owner has indicated or customarily would want to inspect prior to commencement of the Work. Prior to resumption of the Work in the event of a temporary suspension lasting longer than 72 hours, and at such other time intervals during the process of the Work as requested by Owner, in order to permit Owner to properly coordinate its normal operations and facilities requirements with the Work.

§22.4 The following definitions are added to the Contract:

"Final completion" means the date the Contract has been fully performed, all the Work has been completed in accordance with the Contract Documents and the Owner has approved Final Payment to the Contractor.

"Indicated" and "shown" mean as described, detailed, discussed, scheduled, referenced, or called for in. or reasonably inferable from the Contract Documents in order to produce a first class Work product.

"Provide" or derivatives thereof means the Contractor shall properly fabricate, supply, furnish or procure all labor, materials, equipment, apparatus, and accessory appurtenances necessary to transport, deliver, install, erect and construct the specified item, complete, in place and ready for operation and use, including any final connections, in strict accordance with the Drawings, Specifications and other Contract Documents. The words "Contractor shall" are implied and shall be so understood whenever the direction or term "provide" is used.

"Unit Price" is an amount stated in the Contractor's bid proposal or in the Contract Documents as a price per unit of measurement for materials, equipment or services for a portion of the Work as described in the Bidding Documents or the Contract Documents. A Unit Price includes all costs associated with the performance of the portion of the Work for which the Unit Price is provided, including but not limited to labor, materials, equipment, loading, transportation, handling, unloading, overhead and profit.

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§22.5 Except as otherwise specifically provided in the Contract Documents, if and to the extent of any inconsistency, ambiguity, conflict, discrepancy or error in the Contract Document, and otherwise in interpreting the Contract Documents, the Parties shall give precedence to the Contract Documents in the following order of priority:

- (i) Modifications.
- (ii) This Agreement except that the Supplementary and Special Conditions shall take precedence over the General Conditions of the Contract.
- (iii) Construction Drawings.

#### ARTICLE 23 • EQUAL EMPLOYMENT OPPORTUNITY

§23.1 The Contractor shall maintain and shall require its Subcontractors to maintain policies of employment as follows:

§23.1.1 In the event of the Contractor's non-compliance with the provisions of this equal opportunity clause, the Illinois Human Rights Act or the Rules and Regulations of the Illinois Department of Human Rights ("Department"). Contractor may be declared ineligible for future contracts or subcontracts with the State of Illinois or any of its political subdivisions or municipal corporations, and the Contract may be cancelled or voided in whole or in part, and such other sanctions or penalties may be imposed or remedies invoked as provided by statute or regulation. During the performance of this Contract, Contractor agrees as follows:

- 1) That it will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation or preference, marital status, national origin or ancestry, citizenship status, age, physical or mental disability unrelated to a person's ability to perform the essential functions of the job, association with a person with a disability, military status or an unfavorable discharge from military service, or record of arrest; and further that it will examine all job classifications to determine if minority persons or women are underutilized and will take appropriate affirmative action to rectify any such underutilization.
- 2) That, if it hires additional employees in order to perform this Contract or any portions thereof, it will determine the availability (in accordance with the Department's Rules and Regulations) of minorities and women in the area(s) from which it may reasonably recruit and it will hire for each job classification for which employees are hired in such a way that minorities and women are not underutilized.
- 3) That, in all solicitations or advertisements for employees placed by it or on its behalf, it will state that all applicants will be afforded equal opportunity without discrimination because of race, color, religion, sex, sexual orientation, marital status, national origin or ancestry, citizenship status, age, physical or mental handicap or disability unrelated to a person's ability to perform the essential function of the job, or association with a person with a disability, military status or an unfavorable discharge from military service, or record of arrest.
- 4) That it will send to each labor organization or representative of workers with which it has or is bound by a collective bargaining or other agreement or understanding, a notice advising such labor organization or representative of the Contractor's obligations under the Illinois Human Rights Act and the Department's rules and regulations. If any such labor organization or representative fails or refuses to cooperate with the Contractor in its efforts to comply with such Act and rules and regulations, the Contractor will promptly notify the Department and the Owner and will recruit employees from other sources when necessary to fulfill its obligations thereunder.
- 5) That it will submit reports as required by the Department's rules and regulations, furnish all relevant information as may from time to time be requested by the Department or the Owner, and in all respects comply with the Illinois Human Rights Act and the Department's rules and regulations.
- 6) That it will permit access to all relevant books, records, accounts and work sites by personnel of the Owner and the Department for purposes of investigation to ascertain Department's rules and regulations.

- 7) That it will include verbatim or by reference the provisions of this clause in every subcontract it awards under which any portion of the Contract obligations are undertaken or assumed, so that such provisions will be binding upon such subcontractor. In the same manner as with other provisions of this Contract. The Contractor will be liable for compliance with applicable provisions of this clause by such subcontractors; and further it will promptly notify the Owner and the Department in the event any subcontractor fails or refuses to comply therewith. In addition, the Contractor will not utilize any subcontractor declared by the Illinois Human Rights Commission to be ineligible (or contracts or subcontracts with the State of Illinois or any of its political subdivisions or municipal corporations.

**§23.1.2** The Contractor is encouraged to utilize qualified minority businesses as subcontractors for supplies, services and construction.

#### **ARTICLE 24- COMPLIANCE WITH LAWS/PREVAILING RATES OF WAGES**

**§24.1** The Contractor shall comply with all federal, state, county and local laws, codes, rules and regulations applicable to the Work including without limitation all building codes, permit conditions, the American with Disabilities Act and the equal employment opportunity clause of the Illinois Human Rights Act and the rules and regulations of the Illinois Department of Human Rights, the Illinois Prevailing Wage Act, and all laws and regulations pertaining to occupational and work safety, hours of operation and disposal of construction debris. A copy of the Contractor's certification of compliance with applicable laws is attached to and made a part of this Agreement.

The Contractor shall comply with the requirements of the Illinois Prevailing Wage Act (820 ILCS 130/0.01 *et seq.*) and the Park District's Ordinances requiring payment of prevailing wages. The Contractor shall pay or cause to be paid not less than the prevailing rate of hourly wage in the county the work is performed as determined by the Illinois Department of Labor for the month in which the work is performed including but not limited to all laborers, workers and mechanics. All contractors and subcontractors rendering services under this contract must comply with all requirements under the Act, including but not limited to, all wage, notice and record keeping duties.

The Contractor is required to verify current prevailing wage prior to the first day of each month and to pay the then-current prevailing wage rate as determined by the Illinois Department of Labor, regardless of the rates contained in the Contract Documents. Any increases in costs to the Contractor due to the changes in the prevailing wage during the term of this Contract shall be at the expense of Contractor and not at the expense of Owner. Current prevailing wage rates are published at the following:

<http://www.illinois.gov/idol/Laws-Rules/CONMED/Pages/Rates.aspx> . . The Contractor agrees to indemnify and hold harmless the Park District for any violations of the Prevailing Wage Act.

The Contractor shall also: (1) insert into each subcontract and the project specifications for each subcontract, a written stipulation that the subcontractor shall not pay less than the prevailing rate of hourly wage to all laborers, workers, and mechanics performing work under the contract; and (2) require each subcontractor to insert into each lower-tiered contract and the project specifications for each lower-tiered subcontract. a stipulation that the subcontractor shall not pay less than prevailing rate of hourly wage to all laborers, workers, and mechanics performing work under the contract.

The Contractor shall include on all bonds and shall cause all subcontractors' bonds required under the Contract Documents to guarantee compliance with the Prevailing Wage Act.

Additionally, the Contractor and each subcontractor shall make and keep, for a period of not less than 5 years from the date of the last payment on a contract or subcontract, records of all laborers, mechanics, and other workers employed by them on the Project; the records shall include each worker's name, address, telephone number when available, social security number, classification or classifications, the hourly wages paid in each pay period, the number of hours worked each day, and the starting and ending times of work each day. The Contractor shall submit monthly, no later than the 10<sup>th</sup> day of each calendar month, in person, by mail, or electronically a certified payroll to the Park District with each monthly pay request in the form required by the Illinois Prevailing Wage Act. The certified payroll shall be accompanied by a statement signed by the Contractor or subcontractor which states that: (i) he or she has examined the certified payroll and such records are true and accurate; (ii) the hourly rate paid to each

worker is not less than the general prevailing rate of hourly wages required by this Act; and (iii) the Contractor or subcontractor is aware that filing a certified payroll that he or she knows to be false is a Class A misdemeanor. The Contractor may rely on the certification of a lower tier subcontractor, provided the Contractor does not knowingly rely upon a subcontractor's false certification. The records submitted in accordance with this payroll submittal provision shall be considered public records pursuant to Section 5 of the Prevailing Wage Act, 820 ILCS 130/5 (2004, as amended by P.A. 94-515). The Park District may, at its option, immediately terminate the Contract in the event that Contractor violates any provision of this paragraph or the Prevailing Wage Act.

Contractor shall also post the prevailing wage rates for each craft or type of worker or mechanic needed to complete the project at either: (1) a location on the project site easily accessible to the workers engaged on the project; or (2) in lieu of posting on the project site, if the Contractor has a business location where laborers, workers, and mechanics may regularly visit, the Contractor may either post the prevailing rate of wages in each county the Contractor works in a conspicuous location or provide the laborers, workers or mechanics engaged on the project a written notice indicating the prevailing rate of wages for the project.

Upon seven business days' notice, the Contractor and each subcontractor shall make available for inspection and copying at a location within this State during reasonable hours, the records identified in 820 ILCS 130/5(a)(1) to the Owner, and its officers and agents.

This Agreement entered into as of the day and year first written above.

OAK BROOK PARK DISTRICT

\_\_\_\_\_  
*OWNER (Signature)*

\_\_\_\_\_  
*CONTRACTOR (Signature)*

\_\_\_\_\_  
*(Printed name and title)*

\_\_\_\_\_  
*(Printed name and title)*

*(Table deleted)*

*(Paragraphs deleted)*



# **Additions and Deletions Report for AIA® Document A107™ – 2007**

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## **PAGE 1**

**AGREEMENT** made as of the     day of     in the year Two Thousand Seventeen

...

Oak Brook Park District  
1450 Forest Gate Road  
Oak Brook, IL 60523

...

*(Name, location and detailed description)*

Tennis Center HVAC Upgrade Project

Oak Brook Park District  
1450 Forest Gate Road  
Oak Brook, IL 60523

...

The Project includes replacement of new HVAC system, including alteration of upper level and lower level mechanical systems, and acoustical ceiling and lighting replacements in the District's Tennis Center, and all other and incidental and collateral work necessary to properly complete the Project as indicated in the Contract Documents.

\_\_\_\_\_

**The Architect:**  
*(Name, legal status, address and other information)*

Kluber Architects + Engineers  
10 S. Shumway Avenue  
Batavia, IL 60510

## **PAGE 2**

### **21 CLAIMS AND DISPUTES**

#### **EXHIBIT A — DETERMINATION OF THE COST OF THE WORK**

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User Notes:

(1769236357)

The Contractor shall execute the Work ~~described indicated~~ in the Contract Documents, except as specifically ~~indicated stated~~ in the Contract Documents to be the responsibility of others.

~~ARTICLE 2 — DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION~~  
~~ARTICLE 2 DATE OF COMENCEMENT, SUBSTANTIAL COMPLETION AND FINAL COMPLETION~~

~~§ 2.1 The date of commencement of the Work shall be the date of this Agreement unless a different date is stated below or provision is made for the date to be fixed in a notice to proceed issued by the Owner, shall be August 18, 2017; however, the Contractor shall not commence performance of the Work until it has provided to Owner required performance and labor and material bonds and evidence of required insurance as provided in the Contract Documents. Delay in the commencement of the Work due to the Contractor's failure to provide these documents in a timely manner shall not change the date of commencement for purposes of measurement of the Contract Time and shall not be the basis for an extension of the dates of Substantial Completion or Final Completion.~~

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~~§ 2.3 The Contractor shall achieve Substantial-Final Completion of the entire Work not later than (—) days from the date of commencement, or as follows: September 1, 2017~~

...

<b>Portion of Work</b>	<b>Substantial Completion Date</b>
------------------------	------------------------------------

, subject to adjustments of this Contract ~~Time as provided in the~~ Time, authorized by Change Order, as provided in the Contract Documents. The Owner and Contractor agree that the amount of time given to the Contractor under the Contract to achieve Final Completion is a reasonable amount of time considering the requirements of the Contract Documents.

*(Insert provisions, if any, for liquidated damages relating to failure to achieve Substantial-Final Completion on time or for bonus payments for early completion of the Work.)*

...

Time is of the essence of the contract. Should the Contractor fail to complete the Work on or before the Final Completion date stipulated in the Contract or within such extended time as may have been allowed, the Contractor shall be liable and shall pay to the Owner the sum of \$150 per calendar day, not as a penalty but as liquidated damages, for each day of overrun in the Contract Time or such extended time as may have been allowed. The liquidated damages for failure to complete the Contract on time are approximate, due to the impracticality of calculating and proving actual delay costs. The costs of delay represented by the liquidated damage amount are understood to be a fair and reasonable estimate of the costs that will be borne by the Owner during extended and delayed performance by the Contractor for the Work. The liquidated damage amount specified will accrue and be assessed until Final Completion of the total physical Work of the Contract even though the Work may be substantially complete. The Owner will deduct these liquidated damages from any monies due or to become due to the Contractor from the Owner.

...

Stipulated Sum, in accordance with Section 3.2 below

...

§ 3.2 The Stipulated Sum shall be (\$—), subject— Dollars  
(\$— subject to additions and deductions as provided in the Contract Documents.

§ 3.2.1 The Stipulated Sum is based upon and includes the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:

NA

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~~§ 3.3 COST OF THE WORK PLUS CONTRACTOR'S FEE~~

~~§ 3.3.1 The Cost of the Work is as defined in Exhibit A, Determination of the Cost of the Work.~~

~~§ 3.3.2 The Contractor's Fee:~~

~~(State a lump sum, percentage of Cost of the Work or other provision for determining the Contractor's Fee and the method of adjustment to the Fee for changes in the Work.)~~

~~§ 3.4 COST OF THE WORK PLUS CONTRACTOR'S FEE WITH A GUARANTEED MAXIMUM PRICE~~

~~§ 3.4.1 The Cost of the Work is as defined in Exhibit A, Determination of the Cost of the Work.~~

~~§ 3.4.2 The Contractor's Fee:~~

~~(State a lump sum, percentage of Cost of the Work or other provision for determining the Contractor's Fee and the method of adjustment to the Fee for changes in the Work.)~~

~~§ 3.4.3 GUARANTEED MAXIMUM PRICE~~

~~§ 3.4.3.1 The sum of the Cost of the Work and the Contractor's Fee is guaranteed by the Contractor not to exceed (\$—), subject to additions and deductions by changes in the Work as provided in the Contract Documents. Such maximum sum is referred to in the Contract Documents as the Guaranteed Maximum Price. Costs which would cause the Guaranteed Maximum Price to be exceeded shall be paid by the Contractor without reimbursement by the Owner.~~

~~(Insert specific provisions if the Contractor is to participate in any savings.)~~

~~§ 3.4.3.2 The Guaranteed Maximum Price is based on the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:~~

~~§ 3.4.3.3 Unit Prices, if any:~~

~~(Identify and state the unit price, and state the quantity limitations, if any, to which the unit price will be applicable.)~~

~~§ 3.2.4 Adjustments to the Contract Sum: Adjustments to the contract Sum for changes in the Work other than changes in the Work involving items for which unit prices were requested by Owner and provided in Contractor's Submitted Bid Proposal, shall be made as follows:~~

- ~~1. In the manner agreed to by the Parties, or in the absence of agreement then the combined allowance for overhead and profit in connection with changes to the Work shall be the lesser of the amount, if any, included in the Contractor's bid proposal, or the following:~~
  - ~~a. Five percent (5%) of the cost of the change in the Work involved if performed by the Contractor not involving Subcontractors, or~~
  - ~~b. Five percent (5%) of the cost of the change in the Work involved performed by Subcontractors, plus two percent (2%) of the cost of the change in the Work for the Contractor's supervision of the work performed by the Subcontractors.~~

When both additions and credits covering related Work are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 3.2.5 Overtime, if and when specifically authorized in advance in writing by the Owner shall be paid by the Owner on the basis of premium payment if any, plus the cost of insurance and taxes based on the premium payment period. No overhead or profit may be charged for overtime. The Contractor shall not be entitled to any payment for overtime necessitated by the failure of the Contractor to perform the Work in accordance with the Contract Documents including without limitation to the Contractor's failure to prosecute the Work diligently and on an uninterrupted basis and with a sufficient work force so as to achieve completion of the Work within the time and in the manner contemplated by the Contract Documents or otherwise due to the fault of the Contractor. In such instances if the Owner requires the Contractor to perform Work on an overtime basis, all costs for and associates with such overtime shall be borne by the Contractor.

<b>Item</b>	<b>Units and Limitations</b>	<b>Price Per Unit (\$0.00)</b>
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~~§ 3.4.3.4 Allowances included in the Guaranteed Maximum Price, if any:  
(Identify and state the amounts of any allowances, and state whether they include labor, materials, or both.)~~

<b>Item</b>	<b>Allowance</b>
-------------	------------------

~~§ 3.4.3.5 Assumptions, if any, on which the Guaranteed Maximum Price is based:~~

...

§ 4.1.1 Based upon Applications for Payment properly completed and accompanied by all supporting documentation and other submittals required by the Contract Documents, submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, and agreed to by the Owner and not subsequently nullified by the Architect in accordance with the Contract Documents, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 4.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:  
month.

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§ 4.1.3 Provided that an Application for ~~Payment~~ Payment, which is in proper form and accompanied by required supporting documents and submittals, in form and substance as required by the Contract Documents is received by the Architect not later than the 10<sup>TH</sup> day of a month, certified for payment by the Architect and not subsequently nullified by the Architect in accordance with the Contract Documents, the Owner shall make payment of the certified amount to the Contractor not later than the fifteenth day of the following month. If an Application for Payment is received by the Architect after the date fixed above, payment shall be made by the Owner not later than forty-five (45) days after the Architect receives the Application for ~~Payment~~ Payment in proper form and accompanied by required supporting documents and submittals and certifies payment to the Owner. Contractor is solely responsible for any delays in payment due in whole or in part to Contractor's failure to submit its payment application timely, in proper form and accompanied by all supporting documents and submittals required under the Contract.

...

§ 4.1.4 Retainage, if any, shall be withheld as follows: Ten Percent (10%) of the Contract Sum shall be retained until Final Completion.

...

§ 4.1.5 Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

*(Insert rate of interest agreed upon, if any.)*

—%—, and any penalties associated with the same, shall be paid in accordance with the provisions of, the Illinois Local Government Prompt Payment Act.

...

- .1 the Contractor has ~~fully performed the Contract except~~ achieved Final Completion for the Contractor's responsibility to correct Work as provided in ~~Section~~ Sections 9.4 and 18.2, and to satisfy other requirements, if any, which extend beyond final payment;

...

§ 4.2.2 The Subject to Section 4.2.1, the Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the Architect's final Certificate for ~~Payment~~, or as follows:

Payment and approval by the owner.

**ARTICLE 5 DISPUTE RESOLUTION THIS ARTICLE IS INTENTIONALLY DELETED**

**§ 5.1 BINDING DISPUTE RESOLUTION**

For any claim subject to, but not resolved by, mediation pursuant to Section 21.3, the method of binding dispute resolution shall be as follows:

*(Check the appropriate box. If the Owner and Contractor do not select a method of binding dispute resolution below, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, claims will be resolved in a court of competent jurisdiction.)*

~~Arbitration pursuant to Section 21.4 of this Agreement~~

~~Litigation in a court of competent jurisdiction~~

~~Other (Specify)~~

...

§ 6.1.1 The Agreement is this executed AIA Document A107-2007, Standard Form of Agreement Between Owner and Contractor for a Project of Limited ~~Scope~~ Scope, as modified for this Project by Owner.

§ 6.1.2 The ~~Supplementary and other Conditions of the Contract:~~

Supplementary, Special and other Conditions of the Contract are those included in the Project Manual dated March 22, 2017.

Document	Title	Date	Pages
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The Specifications are those included in the Project Manual dated March 22, 2017.

Section	Title	Date	Pages
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...

The Drawings are those included in the Project Manual dated March 22, 2017.

...

- .1 ~~Exhibit A, Determination of the Cost of the Work, if applicable.~~
- .2 ~~AIA Document E201™ 2007, Digital Data Protocol Exhibit, if completed, or the following:~~

**Other documents forming a part of the Contract Documents;**

- .3 ~~Other documents:~~

*(List here any additional documents that are intended to form part of the Contract Documents.)*

- a. Project Manual for Tennis Center HVAC Upgrade Project , dated March 22, 2017, a copy of which is attached and incorporated in this Agreement as Exhibit A.
- b. Contractor's Compliance and Certification, a copy of which is attached to and incorporated in this Agreement as Exhibit B.
- c. Insurance Requirements and certificate attached to and incorporated in this Agreement as Exhibit C.
- d. Performance Bond and Labor Material Payment Bond, copies of which are attached to and incorporated in this Agreement as Exhibits D-1 and D-2.
- e. Contractor's Proposal, dated \_\_\_\_\_, attached to and incorporated in this Agreement as Exhibit E.

...

**ARTICLE 7 — GENERAL PROVISIONS**

**ARTICLE 7 — GENERAL CONDITIONS**

The Contract Documents are enumerated in Article 6 and consist of this Agreement (including, if applicable, Supplementary and other Conditions ~~of the Contract~~), and Requirements of the of the Contract as included in the Project Manual, ), Drawings, Specifications, Addenda issued prior to the execution of this Agreement, other documents listed in this Agreement and Modifications issued after execution of this Agreement. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect or (3) a Construction Change Directive The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor Contractor whether as specifically indicated or reasonably inferable from what is indicated in order to produce a first class work product.. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

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The term "Work" means the construction and services required indicated by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

...

**§ 7.5.1** ~~The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and will retain all common law, statutory and other reserved rights, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to~~



meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' or the Owner's reserved rights.

...

§ 7.5.3 The Owner is the owner of the Contract Documents. The Contractor may retain one record set for use with this Project only. All copies of the Contract Documents except the Contractor's record set, shall be returned or suitably accounted for to the Owner on request upon completion of the Work.

...

§ 8.1.2 The Contractor shall be entitled to Subject to the Contractor's duties and obligations under the Contract Documents in general and 9.1.1 of this Agreement in particular, the Contractor shall be entitled to reasonably rely on the accuracy of information furnished by the Owner-Owner. The Contractor shall in all instances but shall exercise proper precautions relating to the safe performance of the Work.

§ 8.1.3 Except for permits and fees that are stated to be the responsibility of the Contractor under the Contract Documents, including those required under Section 9.6.1, the Owner shall secure and pay for other necessary approvals, easements, assessments and charges required for the construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

...

If the Contractor fails to correct Work which is not in accordance with the requirements of the Contract Documents, or repeatedly fails or refuses to provide a sufficient amount of properly supervised and coordinated labor, material or equipment so as to be able to complete the Work within the Contract Time, or fails to pay subcontractors or material suppliers timely or to remove and discharge within ten days any lien filed upon the Owner's property or funds by anyone claiming by, through or under the Contractor, or disregards the instructions of the Architect or Owner when based on the requirements of the Contract Documents, or otherwise fails to carry out the Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order is eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity.

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If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents, and fails within a ten-day or fails to perform a duty under or comply with a provision of the Contract Documents and fails within a seven-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, or fails within such seven-day period to eliminate (or diligently commence to eliminate) the cause of any stop work order issued under Section 8.2 thereof, the Owner, without prejudice to any other remedy the Owner may have, may correct such deficiencies and may deduct the reasonable-actual cost thereof, including Owner's expenses and compensation for the Architect's services made necessary thereby, from the payment then or thereafter due the Contractor.

§ 8.4 The rights and remedies of Owner stated in this Article 8 shall be in addition to and not in limitation of any other rights of the Owner granted in the Contract Documents or at law or in equity.

...

§ 9.1.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents. By its execution of the Contract, the Contractor acknowledges, agrees, represents, and warrants that: (a) the Contractor has carefully and thoroughly examined the Contract Documents, and the Contract Documents are full and complete, include all items necessary for the proper execution and completion of the Work, are sufficient to have enabled the Contractor to determine the cost of the

Work and the time required for performance of the Work and to enable Contractor to construct the Work indicated therein in accordance with laws, ordinances, codes, regulations and rules applicable to the Work, and otherwise to fulfill all its obligations thereunder, including, but not limited to, Contractor's obligation to construct the Work for an amount not in excess of the Contract Sum on or before the date(s) of Substantial and Final Completion established in the Contract; (b) the omission from the Contract Documents of minor details which ordinarily form a part of first class work and are necessary to the completion of the Work as indicated, shall not be cause for any extra cost but shall be included as if specifically mentioned or detailed; (c) the Contractor has visited and examined the Project site and surrounding areas, examined all physical, legal and other conditions affecting the Work and correlated its personal observations with the requirements of the Contract Documents, and understands, is familiar with, and satisfied itself as to the same, including, without limitation: (i) the nature, location, and character of the Project and the site, including, without limitation surface conditions of the site and subsurface conditions observable or ascertainable upon the exercise of reasonable diligence including all structures and obstructions thereon and thereunder, both natural and manmade and all surface and subsurface water conditions of the site and the surrounding area; (ii) the nature, location, and character of the general area in which the Project is located, including without limitation, its generally prevailing climatic conditions, available labor supply and labor costs, and available equipment supply and equipment costs; (iii) the availability, quality, quantity and cost of all labor, materials, supplies, tools, equipment and professional services necessary to complete the Work in the manner and within the cost and time frame indicated by the Contract Documents.

By its execution of the Contract, the Contractor acknowledges, agrees, represents and warrants that it has carefully examined the Drawings, Specifications and other Contract Documents and having visited the Project site it has no actual knowledge of any discrepancies, omissions, ambiguities, or conflicts in or between the Contract Documents except those, if any, which have been clarified by Architect by Addenda to the Contractor's satisfaction, and that if it becomes aware of any such discrepancies, omissions, ambiguities, or conflicts, it has an obligation to and will immediately notify Owner and Architect of such fact, and will not proceed until it shall have received the written interpretation of Owner or Architect. If any such differences or conflicts which were ascertainable by careful review of the documents were not called to the Owner's and Architect's attention prior to submission by the Contractor of its bid proposal, the Architect shall decide which of the conflicting requirements will govern based upon the most stringent or highest quality of the requirements and, subject to the approval of the Owner, the Contractor shall perform the Work at no additional cost and/or time to the Owner in accordance with the Architect's decision.

§ 9.1.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 8.1.1, shall take field measurements of any existing conditions related to that portion of the Work and shall observe-evaluate any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor The Contractor shall promptly report to the Architect any errors, inconsistencies, or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. Contractor. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor with considerable experience in the type of work being performed for this Project and not as a licensed design professional unless otherwise specifically provided in the Contract Documents.

§ 9.1.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall-if imputation of such knowledge would be reasonable for a contractor with experience in the type of Work being performed for this Project, the Contractor shall carefully review and promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require. Contractor.

## § 9.2 SUPERVISION AND CONSTRUCTION PROCEDURES

§ 9.2.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention-attention under the full-time supervision of an approved site superintendent or foreman capable of communicating clearly with the Architect and Owner in the English language. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences and procedures, and for coordinating all portions



of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters.

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§9.2.3 The Contractor has the responsibility to ensure that all material suppliers and Subcontractors, their agents, and employees adhere to the Contract Documents, and that they order materials on time, taking into account the current market and delivery conditions and that they provide materials on time. The Contractor shall coordinate its Work with that of all others on the Project including deliveries, storage, installations, and construction utilities. The Contractor shall be responsible for the space requirements, locations, and routing of its equipment. In areas and locations where the proper and most effective space requirements, locations, and routing cannot be made as indicated, the Contractor shall meet with all others involved, before installation, to plan the most effective and efficient method of overall installation.

...

§ 9.3.2 The Contractor shall enforce strict discipline and good order among the Contractor's ~~employees~~ employees, Subcontractors and other persons carrying out the Work. The Contractor shall not ~~permit employment of~~ employ or permit employment of, or contract with unfit persons or persons not skilled and experienced in tasks assigned to them.

~~§ 9.3.3 The Contractor may make a substitution only with the consent of the Owner, after evaluation by the Architect and in accordance with a Modification.~~

**§ 9.4 WARRANTY**

The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation or normal wear and tear under normal usage.

**§ 9.5 TAXES**

The Contractor shall pay sales, consumer, use and other similar taxes that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

**§ 9.6 PERMITS, FEES, NOTICES, AND COMPLIANCE WITH LAWS**

§9.3.3 The Contractor shall only employ labor on the Project or in connection with the Work capable of working harmoniously with all trades, crafts and any other individuals associated with the Project. The Contractor shall also use its reasonable best efforts to minimize the likelihood of any strike, work stoppage or other labor disturbance. The Contractor shall comply with all requirements of OSHA and shall indemnify and hold harmless the Owner against and from any claims, losses, damages or expenses it may incur as a result of the failure of the Contractor or any of its Subcontractors to comply with OSHA requirements.

§9.3.4 If the Work is to be performed by trade unions, the Contractor shall make all necessary arrangements to reconcile, without delay, damage, or cost to the Owner and without recourse to the Architect, Owner's representative or the Owner, any conflict between the Contract Documents and any agreements or regulations of any kind at any time in force among members of councils which regulate or distinguish what activities shall not be included in the Work of any particular trade. In case the progress of the Work is affected by any undue delay in furnishing or installing any items or materials or equipment required under the Contract Documents because of the conflict involving any such agreement or regulations, the Architect or Owner's representative with the Owner's approval may require that other materials or equipment of equal kind and quality be provided at no additional cost to the Owner.

§ 9.3.5 The Contractor may make a substitution equivalent to or superior to the specified materials only with the consent of the Owner, after evaluation by the Architect and approval by the Owner and in accordance with a Modification.

§ 9.3.6 The Contractor shall carefully inspect all materials delivered on and to the Project site and reject defective materials without waiting for the Architect or Owner to observe the materials.

§9.3.7 The Contractor shall deliver, handle, store and install materials in accordance with manufacturers' or suppliers' instructions.

§9.3.8 Before ordering any material or doing any Work, the Contractor shall verify all measurements at the Project Site and Contractor shall be responsible for the correctness of same. No extra charge or compensation will be allowed to the Contractor on account of any difference between actual dimensions and the measurements shown by the Project Drawings.

§9.3.9 If any person employed by the Contractor on the Work shall appear to the Owner to be incompetent or conduct himself in a disorderly or improper manner, such person or persons shall be removed from the Work immediately on the request of the Owner. Said removal shall not create any additional cost to Owner and shall not extend the time for completion of the Work.

§9.4 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or specifically specify otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from faults and defects. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse of persons other than the Contractor or a Subcontractor, alterations to the Work not executed by the Contractor or a Subcontractor, improper or insufficient maintenance or improper operation. This warranty shall not be affected by the specification of any product or procedure unless the Contractor objects promptly to such product or procedure in writing including a supportable and verifiable basis as to why and how the warranty will be affected or cannot be provided for the specified product or procedure and advising the Architect and Owner of possible substitute products or procedures which will not affect the warrant. This warranty shall not be restricted by the limitations of any manufacturer's or supplier's warranty. Inability, failure or refusal of the Subcontractor or supplier responsible for the defective materials, equipment or Work to correct the same shall not excuse the Contractor from performing under the warranty. If required by the Architect or the Owner, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials being furnished.

All warranties shall include labor and materials and shall be signed by the manufacturer or Subcontractor as the case may be and countersigned by the Contractor. All warranties shall be addressed to the Owner and delivered to the Owner upon completion of the Work and before or with the submission of request for final payment. Except as otherwise provided in this Agreement or elsewhere in the Contract Documents, or in any Certificate of Substantial or Partial Completion approved by the Owner and Contractor and/or Subcontractor, as applicable, all warranties shall become effective on the date of Final Completion of the entire Work unless otherwise provided in any Certificate of Partial or Substantial Completion approved by the Owner and the Contractor or Subcontractor, as applicable, but only with respect to warranties for that specific portion of the Work, and shall run for a twelve (12) month period, unless a longer period is provided for in the Contract Documents or by law. Where warranties overlap, the more stringent requirement shall govern. The Contractor shall consult with the Owner prior to the submission of any application to the appropriate permitting agency or authority in order to afford Owner the opportunity to obtain a waiver or reduction of any fees or costs associated therewith.

Defective materials, equipment or workmanship occurring within the Warranty period may be repaired where such produces results conforming to the Contract Documents relating to appearance, performance and reliability. Where the nature of the defective materials, equipment or workmanship is such that acceptable results cannot be obtained by repair, such defective items shall be removed and replace with new materials, equipment or workmanship complying with the Contract Documents.

§9.5 The Contractor shall pay sales, consumer, use and other similar taxes that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect. Because the

Owner is an Illinois unit of local government, the Illinois sales tax is not applicable to materials, equipment and supplies incorporated in the Work or wholly consumed in the performance of the Work. The Owner will provide its sales tax exemption number for use by Contractor in purchasing such materials, equipment and supplies for this Project.

#### **§9.6**

~~§ 9.6.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as other permits, fees, licenses and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.~~

#### ~~– Intentionally omitted.~~

§ 9.6.2 The Contractor shall comply with and give notices and permit inspections required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to or bearing on the performance of the Work or having jurisdiction over the Work. The Contractor shall promptly notify the Architect and Owner if any of the Contract Documents appear to be a variance therewith. If the Contractor performs Work knowing it to be contrary, or had it carried out its obligations under the Contract Documents generally, and Section 9.1.1 of this Agreement in particular, should reasonably have known it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

The Contractor shall include in the Contract Sum all allowances, if any, stated in the Contract Documents. The Owner shall select materials and equipment under allowances with reasonable promptness. Allowance amounts shall include the costs to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts. Allowance amounts shall also include the Contractor's costs for unloading and handling at the site, labor, installation, overhead, and profit.

#### **§ 9.7 ALLOWANCES**

~~The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. The Owner shall select materials and equipment under allowances with reasonable promptness. Allowance amounts shall include the costs to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts. Allowance amounts shall not include the Contractor's costs for unloading and handling at the site, labor, installation, overhead, and profit. – Intentionally omitted.~~

#### **§ 9.8 CONTRACTOR'S CONSTRUCTION SCHEDULES**

§ 9.8.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information approval a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, Project as approved by the Architect and Owner, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

§ 9.8.2 The Contractor shall perform the Work in general strict accordance with the most recent schedule submitted to and approved by the Owner and Architect.

#### **§ 9.9 SUBMITTALS**

§ 9.9.1 The Contractor shall review for compliance with the Contract Documents and submit to the Architect Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents in coordination with the Contractor's construction schedule and in such sequence as to allow the Architect reasonable time for review. By submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them; (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so, thereto; and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents. The Work shall be in accordance with approved submittals.

~~§ 9.9.2 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents.~~

#### **~~§ 9.10 USE OF SITE~~**

~~The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.~~

#### **~~§ 9.11 CUTTING AND PATCHING~~**

~~The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly.~~

#### **~~§ 9.12 CLEANING UP~~**

~~The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus material from and about the Project.~~

#### **~~§ 9.13 ROYALTIES, PATENTS AND COPYRIGHTS~~**

~~The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner or Architect. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a copyright or a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Architect.~~

#### **~~§ 9.14 ACCESS TO WORK~~**

~~The Contractor shall provide the Owner and Architect access to the Work in preparation and progress wherever located.~~

#### **§ 9.10**

**§ 9.10.1 General Use.** The Contractor shall enforce the Owner's instructions regarding the conduct and use of the site by his employees.

**§ 9.10.2 Property Corners.** Existing property corners on the site shall be replaced by a registered Land Surveyor at the Contractor's expense.

#### **§ 9.10.3 Parking & Traffic.**

**.1 Parking of construction vehicles on the site by the Contractor shall not inhibit construction nor prevent access for emergency or other official vehicles. Parking of private vehicles on the site by the Contractor is prohibited unless said vehicle is necessary in the execution of the Contract. No construction vehicles shall be parked near or under any existing vegetation on the site.**

**.2 Construction traffic and staging shall be permitted only within construction limits as indicated on plan. The contractor is responsible for repair of any areas disturbed outside of this area, including grading and sodding. No staging will be permitted on existing asphalt without Owner's prior written consent. The cost to repair any damage to existing asphalt will be backcharged to the Contractor.**

**§ 9.10.4 Fencing.** The Contractor will be responsible for erecting and maintaining construction fencing around the limits of the Project site at all times of construction. Failure to erect or maintain this fencing will result in the correction of the problem by the Park District at the expense of the Contractor. The Contractor's expense will be back charged to the contract, and may include, but are not limited to, the cost of any materials and staff time. This fence must be installed and fully erected before construction operations beginning and tied-up at the end of each working day. All construction fencing must conform to the following specification.

**.1 Flexible Safety Fence.** High density poly fabric, rigid 2" mesh design, heavy duty strength, 4' high, safety orange.

**.2 Posts.** Minimum 14 gauge painted green steel channel posts, min, 5'-6" long driven 18" into the ground.



Post spacing shall be 12' O.C. with fence tied to each post top, middle and bottom.

.3 Tie Material. Heavy gauge vinyl coated wire.

§ 9.10.5 Water Removal. If, during construction, standing water caused by heavy rains or poor drainage becomes a hazard in the proper execution of the Contract, it shall be the responsibility of the Contractor to provide and make payment for removal of said water to existing drainage swales, storm sewers or other natural or man-made drainage ways.

§ 9.11 The Contractor shall keep the Project site and surrounding areas free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove, and properly and lawfully dispose of as applicable, waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials from and about the Project. The Contractor shall clean up and keep all streets, sidewalks and other public ways used for access to the Project site free from accumulation of spillage of fill or soils or other materials caused by operations under the Contract. The Contractor shall strictly comply with all laws and regulations pertaining to same be solely responsible for, and shall pay any fines or penalties assessed as the result of, any violation.

§ 9.12 The Contractor shall provide the Owner and Architect and government inspectors access to the Work in preparation and progress wherever located.

§ 9.13-9.14 are deleted intentionally.

#### § 9.15 INDEMNIFICATION

§ 9.15.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, waives any rights of contribution against, and shall indemnify and hold harmless the Owner and the Architect and their officers, officials, employees, volunteers and agents from and against all claims, damages, losses and expenses including but not limited to legal fees (attorney's and paralegals' fees and court costs), arising out of or resulting from the performance of the Work, Contractor's work, provided that any such claim, damage, loss or expense (i) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a property, other than the work itself, including the loss of use resulting there from and (ii) is caused in whole or in part by any wrongful or negligent act or omission of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts they any of them may be liable, regardless of whether or not such claim, damage, loss or expense it is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations otherwise reduce any other right or obligation of indemnity which would otherwise exist as to a party or person described in this Section 9.15.1 any party or person described in this Paragraph. Contractor shall similarly protect, indemnify and hold and save harmless the Owner, its officers, officials, employees, volunteers and agents against and from any and all claims, costs, causes, actions and expenses including but not limited to legal fees, incurred by reason of Contractor's breach of any of its obligations under, or Contractor's default of, any provision of the Contract.

"Claims," "damages," "losses" and "expenses" as these words are used in this Agreement shall be construed to include, but not limited to (1) injury or damage consequent upon the failure of or use or misuse by Contractor, its Subcontractors, agents, servants or employees, of any hoist, rigging, blocking, scaffolding, or any and all other kinds of items of equipment or other mechanical or structural contrivance erected or constructed by any person, or any or all other kinds of equipment whether or not the same be owned, furnished or loaned by Owner; (2) all attorneys' fees and costs incurred in bringing an action to enforce the provisions of this indemnity or any other indemnity contained herein; (3) (3) all costs and expenses incurred by the indemnified party and (4) error or omission or defect in any submission made to Architect / Architect for its approval or review.

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§ 9.15.3 The indemnification obligations of the Contractor under this Contract are limited only to the extent required under the Construction Contract Indemnification for Negligence Act (740 ILCS 35/0.01 et seq.).

§ 10.1 The Architect and/or any other person designated in writing by the Owner will provide administration of the Contract and will be an Owner's representative during construction, until the date the Architect issues the final Certificate for Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents, unless otherwise modified in writing in accordance with other provisions of the Contract.

§ 10.2 The Architect will visit the site and observe the Work at intervals appropriate to the stage of the construction to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general, if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents.

...

§ 10.4 Based on the Architect's observations and evaluations of the quality and progress of the Work and of the Contractor's Applications for Payment, the Architect will review and certify to the Owner the amounts due the Contractor and ~~will will, subject to approval~~ by the Owner issue Certificates for Payment in such amounts.

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§ 10.7 The Architect will interpret and ~~decide~~ make recommendations to Owner on matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. ~~The Architect will make initial decisions on all claims, disputes and other matters in question between the Owner and Contractor but will not be liable for results of any interpretations or decisions rendered in good faith.~~

§ 10.8 ~~The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.~~ Omitted.

§ 10.9 Duties, responsibilities and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the ~~Owner, Contractor and Architect.~~ Consent shall not be unreasonably withheld. Owner and Architect.

§ 10.10 Nothing contained in this agreement is intended to modify or shall modify the provisions of the Agreement between the Owner and Architect for this Project.

...

§ 11.1 A Subcontractor is a person or entity who or which has a direct contract with the Contractor to perform a portion of the Work at the site.

§ 11.2 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through ~~the Architect the names of the Subcontractors or suppliers~~ and to the Architect the name, trade, and subcontract amount of each Subcontractor for each of the principal portions of the Work of the Work and the name of each person or entity proposed as a manufacturer or supplier of any principal product identified in the Specifications. The Contractor shall not contract with any Subcontractor or supplier to whom the Owner or Architect has made reasonable written objection within ten days after receipt of the Contractor's list of Subcontractors and suppliers. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 11.3 ~~Contracts between the Contractor and Subcontractors shall (1) All subcontract shall be in writing and shall specifically provide that the Owner is an intended third-party beneficiary of such subcontract and that the Owner~~

shall have the right to enforce the Subcontractor's obligations thereunder after the occurrence of a default under the Contract by the contractor. By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by the terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, which the Contractor, by the Contract Documents, assumes toward the Owner and Architect, and (2) allow the Subcontractor responsibilities which the Contractor, by these Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by these Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar written agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement which may be at variance with the Contract Documents. Subcontractors shall similarly make copies of applicable portions of such documents available to their representatives proposed Sub-subcontractors.

§ 11.4 All subcontract agreements shall conform to the requirements of the Contract Documents and the Contractor hereby irrevocably assigns to the Owner and Owner's permitted assigns all its interest in any subcontract agreements and purchase orders now existing or hereinafter entered into the contractor for performance of any part of the Work, which assignment will be effective in the event of the Contractor's failure to perform the Work in accordance with the Contract Documents and upon acceptance by the Owner in writing and only as to those subcontract agreements and purchase orders that Owner designates in said writing. It is agreed and understood that the Owner may accept said assignment at any time during the course of construction prior to Final Completion. The Contractor shall promptly submit to the Owner a true and complete copy of each subcontract upon execution of same. Each subcontract shall contain a contingent assignment of the subcontract to the Owner, consistent with this Subparagraph. Upon acceptance by the Owner of a subcontract; (1) the Contractor shall promptly furnish to the Owner true and complete copies of the designated subcontract agreements and purchase orders, both as may have been amended by approved change order together with copies of any and all such amendments, and (2) the Owner shall only be required to compensate the designated Subcontractor(s) or supplier(s) for compensation accruing to such party(ies) for Work done or materials delivered from and after the date on which the Owner accepts the subcontract agreement(s) or purchase order(s). All sums due and owing by the Contractor to the designated Subcontractor(s) or supplier(s) for work performed or material supplied prior to the Owner's acceptance of the subcontract agreement(s) or purchase order(s) shall constitute a debt between such parties and the Contractor. It is further agreed that no subcontract agreement or purchase order shall contain any restriction that would prohibit assignment under the terms and conditions stated hereinabove. It is further agreed and understood that such assignment is part of the consideration to Owner for entering into the Contract with the Contractor and may not be withdrawn prior to Final Completion.

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§ 13.1 By appropriate Modification, changes in the Work may be accomplished after execution of the Contract. The Owner, without invalidating the Contract, may order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, with the Contract Sum and Contract Time being adjusted if and as appropriate accordingly. Such changes in the Work shall be authorized by written Change Order signed by the Owner, Contractor and Architect, or by written Construction Change Directive signed by the Owner and Architect.

§ 13.2 Adjustments in the Contract Sum and Contract Time resulting from a change in the Work shall be determined by mutual agreement of the parties or, in the case of a Construction Change Directive signed only by the Owner and Architect, by the Contractor's cost of labor, material, equipment, and ~~reasonable overhead and profit~~, unless the additional cost was calculated using unit prices as provided elsewhere in this Agreement ~~reasonable overhead and profit calculated in accordance with this Agreement~~, unless the parties agree on another method for determining the cost or credit. Pending final determination of the total cost of a Construction Change Directive, the Contractor may request payment for Work completed pursuant to the Construction Change Directive. The Architect will make an interim determination of the amount of payment due for purposes of certifying the Contractor's monthly Application for ~~Payment~~-Payment subject to the Owner's approval. When the Owner and Contractor agree on adjustments to the



Contract Sum and Contract Time arising from a Construction Change Directive, the Architect will prepare a Change Order. Pending final determination of cost to the Owner or extension of time to the Contractor, unless otherwise directed by Owner, Contractor shall continue to perform the Work in accordance with the Contract Documents.

...

§ 13.4 If concealed or unknown physical conditions are encountered at the Project site that differ materially from those indicated in the Contract Documents or from those conditions ordinarily found to exist, and the Contractor could not have discovered same in the exercise of reasonable diligence as required under Subsection 9.1.1 of this Agreement, the Contract Sum and Contract Time shall be equitably adjusted as mutually agreed between the Owner and Contractor; provided that the Contractor provides notice to the Owner and Architect promptly and before conditions are disturbed.

§ 13.5 Agreement on any Change Order shall constitute a final settlement, and accord and satisfaction between the Owner and Contractor, of all matters relating to the change in the Work which is the subject of the Change Order, including, but not limited to, all direct and indirect costs associated with such change and any and all adjustments to the Contract Sum, Contract Time and Construction Schedule. In the event a Change Order increases the Contract Sum, the Contractor shall include the Work covered by such Change Order in Applications for Payment as if such Work were originally part of the Contract Documents.

§ 13.6 No change in the Work, whether by way of alteration or addition to the Work, shall be the bases of an addition to the Contract Sum or change in the Contract Time unless and until such alteration or addition has been authorized by a Change Order executed and issued in accordance with and in strict compliance with the requirements of the Contract Documents and applicable law. Accordingly, no course of conduct or dealing between the parties, nor any express or implied acceptance of alterations or additions to the Work and no claim that the Owner has been unjustly enriched shall be the basis of any claim to an increase in the Contract Sum or change in the Contract Time.

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§ 14.2 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work and for Final Completion of the Work.

...

§ 14.4 ~~The date of Substantial Completion is the date certified by the Architect in accordance with Section 15.4.3-~~ respective dates of Substantial Completion and Final Completion are the dates certified by the Architect and approved by the Owner in accordance with Section 15.

§ 14.5 If the Contractor is delayed at any time in the commencement or progress of the Work by changes ordered in the Work, by labor disputes, fire, unusual delay in deliveries, abnormal adverse weather conditions not reasonably anticipatable, unavoidable casualties or any causes beyond the Contractor's control, or by other causes which the Architect determines and the Owner agrees may justify delay, then as the Contractor's sole remedy the Contract Time shall be extended by Change Order for such reasonable time as the Architect may ~~determine, subject to the provisions of Article 21-~~ determine. Notwithstanding the foregoing, delays of the Contractor to carry out its obligations under or in accordance with the provisions of the Contract, shall not extend the Contract Time.

§ 14.6 The Contractor shall carry the Work forward regularly, diligently, uninterruptedly and expeditiously and in a good workmanlike and professional manner at such a rate of progress and with an adequate work force as will insure the completion of the Work in accordance with the Contract Documents by the date established in the Contract. It is expressly understood and agreed by and between Contractor and Owner that the time for completion of the Work is a reasonable time, taking into consideration the average climatic range, usual industrial conditions, and all other conditions and actors prevailing in this locality.

...

§ 15.1.1 Where the Contract is based on a Stipulated Sum or the Cost of the Work with a Guaranteed Maximum Price, at least ten days before the date established for each progress payment, the Contractor shall submit to the ~~Architect, Architect and Owner~~, before the first Application for Payment, a schedule of values, allocating the entire Contract Sum to the various portions of the Work, prepared in such form and supported by such data to substantiate its accuracy as the Architect or Owner may require. This schedule, unless objected to by the Architect, shall be used in reviewing the Contractor's Applications for Payment.

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§ 15.1.3 ~~Payments~~ Unless approved in advance by the Owner in writing payment shall be made only account of materials and equipment incorporated in the Work. If approved in advance by the Owner payment shall be made on account of materials and equipment delivered and suitably stored and protected from damage and loss at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment stored, and protected from damage, damage and loss, off the site at a location agreed upon in writing. The Owner may condition such approvals on such terms as the Owner in its discretion deems necessary for its protection.

§ 15.1.4 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, ~~to the best of the Contractor's knowledge, information and belief~~, be free and clear of liens, claims, security interests or other encumbrances adverse to the Owner's interests.

§ 15.1.5 Failure to supply waivers of lien or acceptable evidence of payment of all current accounts incurred by this Contract work will be considered grounds for withholding final payment.

§ 15.1.6 The first payment application shall be accompanied by the Contractor's Partial Waiver of Lien only, for the full amount of the payment. Each subsequent monthly payment application shall be accompanied by the Contractor Partial Waiver, and by the Partial lien Waivers of Subcontractor and Suppliers who were included in the immediately preceding payment application to the extent of that payment. Application for Final Payment shall be accompanied by Final Waivers of Lien from the Contractor, Subcontractors and Suppliers who have not previously furnished such Final Waivers. Final Waivers shall be for the full amount of the Contract. All applications for payment shall be accompanied by affidavits, in triplicate, from the Contractor and Subcontractors containing such information and in such form as to comply with the Illinois Mechanics Lien Act (770 ILCS 60/0.01 et seq.) and showing in detail the sources of all labor and materials used and contracted to be used on the Project, including names and addresses of subcontractors and material suppliers; amounts paid and remaining to be paid to each; together with all documents as shall be necessary, in the sole judgment of the Architect and Owner, to waive all claims of liens to date and comply with all applicable state and local laws.

- (i) All waivers (partial and final) shall include language as applicable indicating either that:
- a. all material were taken from fully paid stock and delivered to job site in our own vehicles and all labor has been fully paid in accordance with prevailing wage laws; or
  - b. materials were provided by the following suppliers for whom waivers of lien are attached and all labor has been fully paid in accordance with prevailing wage laws.

§ 15.2.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, ~~either issue to the Owner a Certificate for Payment, with a copy to the Contractor, and subject to Owner's approval either issue to the Owner for review and concurrence a Certificate for Payment for such amount as the Architect determines is properly due, or notify the Contractor and believes is properly due, and/or or notify the Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Section 15.2.3.~~

§ 15.2.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, but not to the Contractor, based on the Architect's observations and evaluations of the Work at the site and the data

comprising the Application for Payment, ~~that, to the best of the Architect's knowledge, information and belief,~~ Payment that the Work has progressed to the point indicated and that to the best of the Architect's knowledge, information and belief the quality and quantity of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Architect. The issuance of a Certificate for Payment will further constitute a representation to the Owner but not to the Contractor that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment, or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

~~§ 15.2.3 The Architect Architect, after consultation with the Owner may decide to certify payment and may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 15.2.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 15.2.1. If the Contractor and the Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment. The Architect may also decide not to certify payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 9.2.2, because of of, but not limited to:~~

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- .2 ~~third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor, Contractor and such security is acceptable under applicable Illinois law to protect the lien rights of third parties;~~

...

- .7 ~~repeated failure to carry out the Work in accordance with the Contract Documents.~~

...

§ 15.2.5 No interest will be paid on amounts withheld.

§ 15.3.1 The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to sub-subcontractors in similar manner. This provision is not to be construed as a "conditional payment" or "pay when paid" clause. In the event that payment to the Contractor is delayed without fault of the Subcontractor, payment to the Subcontractor shall be made within a reasonable time after work is properly performed by a subcontractor irrespective of any delay in payment to the Contractor.

...

§ 15.3.4 Anything to the contrary contained or implied herein notwithstanding, no progress payment need be made by Owner until such time as Contractor, Subcontractors or any other persons performing the Work or furnishing materials or equipment for the Project furnishes such documents as Owner may reasonably require (including without limitation sworn notarized contractor's statement, affidavits and waivers of lien).

~~§ 15.4.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use. "Substantial Completion" means the date that all of the Work has been completed to the point where it can be occupied and used for all purposes intended by Owner and has been accepted by Owner to receive all required occupancy permits.~~

"Punch List Items" mean and shall be limited to uncompleted items of Work (a) that do not interfere with the use and occupancy of any area of the Site for its intended purpose and (b) that, as a group, are capable of being completed by the Contractor within thirty (30) days of issuance of any Punch List. The "Punch List" is the list containing the Punch List Items.

~~§ 15.4.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect and to the Owner a comprehensive list of items to be completed or corrected prior to final payment. The Contractor shall proceed promptly and expeditiously to complete and correct all items on the list. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.~~

~~§ 15.4.3 Upon receipt of the Contractor's list, the Architect and the Owner will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's or Owner's inspection discloses an item, whether or not included in the Contractor's list, which is not in accordance with the Contract Documents and is necessary for Owner's occupancy or utilization of the Work, the Contractor shall before issuance of a Certificate of Substantial Completion, complete such items upon notification from the Architect and Owner. The cost of this and any additional inspections required to establish Substantial Completion due to the failure of the Contractor to properly complete all items of the Work necessary for the Owner's use or occupancy of the Work shall be charged to the Contractor. When the Architect determines that the Work or designated portion thereof is substantially complete, the Architect will issue a Certificate of Substantial Completion to the Owner for review and concurrence by the Owner which shall establish the date of Substantial Completion, establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and fix the time within which the Contractor shall finish all items on the punch list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial-Final Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion with the exception of the items of Work contained in the Punch List accompanying the Certificate of Substantial Completion. With respect to Work enumerated on the Punch List, the guarantee or warranty period shall commence upon Contractor's completion and Owner's approval of the Punch List items.~~

~~§ 15.4.4 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment of retainage applying to such Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.~~

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~~§ 15.5.1 Upon receipt of the Contractor's written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, and the Architect has advised Owner of that finding and Owner has not advised Architect of any objection to such finding, the Architect will promptly issue a final Certificate for Payment to the Owner but not to the Contractor stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions stated in Section 15.5.2 as precedent to the Contractor's being entitled to final payment have been fulfilled. The Owner's failure to object to, and the Owner's acceptance of, the Architect's findings and/or certifications hereunder shall not constitute Owner's acceptance of Work not complying with the Contract Documents, or Owner's waiver of any claims or remedies it may have with respect to any such defective or delayed Work.~~



§ 15.5.2 Final payment shall not become due until the Contractor has fully performed the contract, including but not limited to delivery of all manufacturer's and supplier's warranties, operating manuals, as-build drawings, and consent of the surety to final payment, pursuant to the Contract Documents, and has delivered to the Owner a complete release of all liens arising out of this Contract or receipts in full covering all labor, materials and equipment for which a lien could be filed, or a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including costs and reasonable attorneys' fees.

§ 15.5.3 ~~The making of final payment shall constitute a waiver of claims by the Owner except those arising from~~  
~~.1 — liens, claims, security interests or encumbrances arising out of the Contract and unsettled;~~  
~~.2 — failure of the Work to comply with the requirements of the Contract Documents; or~~  
~~.3 — terms of special warranties required by the Contract Documents.~~ final payment by Owner shall not relieve the Contractor of the responsibility for the correction of any and all defects in the work performed. Contractor shall correct all defects as notified for the applicable warranty period after final payment.

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- .1 ~~employees~~ employees and other persons performing any of the Work and other persons who may be affected thereby;

§ 16.2.1 The Contractor is responsible for compliance with the requirements of the Contract Documents regarding hazardous materials. If the Contractor encounters a hazardous material or substance not ~~addressed in the Contract Documents, brought on site by Contractor,~~ and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Architect in writing. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shutdown, delay and start-up.

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§ 17.1 The Contractor shall purchase ~~from,~~ from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, ~~insurance for protection from claims under workers' compensation acts and other employee benefit acts which are applicable, claims for damages because of bodily injury, including death, and claims for damages, other than to the Work itself, to property which located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations and completed operations under the Contract, under the Contract and for which the Contractor may be legally liable,~~ whether such operations be by the ~~Contractor~~ Contractor, or by a Subcontractor or by anyone directly or indirectly employed by any of them. ~~This insurance shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater, and shall include contractual liability insurance applicable to the Contractor's obligations under Section 9.15. Certificates of Insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work. Each policy shall contain a provision that the policy will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. The Contractor shall cause the commercial liability coverage required by the Contract Documents to include: (1) the Owner, the Architect and the Architect's Consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations.~~ them, or by anyone for whose acts any of them may be liable:

- .a claims under workers' or workmen's compensation, disability benefit and other similar employee benefit acts which are applicable to the Work to be performed;  
.b claims for damages because of bodily injury, occupational sickness or disease, or death of the

Contractor's employees:

- .c claims for damages insured by usual personal injury liability coverage which are sustained (i) by a person as a result of an offense directly or indirectly related to employment of such person by the Contractor, or (ii) by another person;
- .d claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- .e claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle; and
- .f claims involving contractual liability insurance applicable to the Contractor's obligations under Section 9.15 above.

§ 17.1.1 The insurance required by Section 17.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverage shall be written on an occurrence basis and shall be maintained without interruption from date of commencement of the Work until date of final payment and termination of any coverage required to be maintained after final payment.

§ 17.1.2 In furtherance and not in limitation of its obligations under this Section 17.1, Contractor shall maintain insurance in accordance with Exhibit C attached to and incorporated in this Agreement by this reference.

**§ 17.2 OWNER'S LIABILITY INSURANCE**

~~The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance.~~

**OWNER'S LIABILITY AND PROPERTY INSURANCE**

§ 17.2.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance in the amount of the initial Contract Sum as well as subsequent modifications thereto for the entire Work at the site on a replacement cost basis without voluntary deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Article 15.5 or until no person or entity other than the Owner has an insurable interest in the property required by this Paragraph 17.2.1 to be covered, whichever is earlier. This insurance shall include the respective interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Work.

§ 17.2.2 Property insurance shall be on a course of construction policy form and shall insure against the perils of fire and extended coverage and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, false work, windstorm, testing and start-up, temporary buildings and debris removal, including demolition, and shall cover reasonable compensation for the Architect's, any of the Owner's Consultant's services and expenses required as a result of such insured loss. Coverage for other perils shall not be required unless otherwise provided in the Contract Documents. Property insurance provided by the Owner shall not cover Contractor's, Subcontractor's or Sub-subcontractor's liability or any tools, apparatus, machinery, scaffolding, hoists, forms, staging, shoring or other similar items commonly referred to as construction equipment, which may be on the site and the capital value of which is not included in the Work. The Contractor shall make his own arrangements for any insurance he may require on such construction equipment.

§ 17.2.3 The Contractor shall effect insurance which will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work.

§ 17.2.4 If the property insurance requires minimum deductibles and such deductibles are identified in the Contract Documents, the Contractor shall pay costs not covered because of deductibles. If the Owner or insurer increases the required minimum deductibles above the amounts so identified or if the Owner elects to purchase this insurance with voluntary deductible amounts, the Owner shall be responsible for payment of the additional costs not covered because of such increased or voluntary deductibles. If deductibles are not identified in the Contract Documents, the Owner shall pay costs not covered because of deductibles.

§ 17.2.5 Unless otherwise provided in the Contract Documents, this property insurance shall cover portions of the Work stored off the site and paid for by Owner after written approval of the Owner at the value established in the approval, and also portions of the Work in transit and paid for by Owner.

§ 17.2.6 Partial occupancy or use shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

§ 17.2.7 The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Contractor Subcontractors and Sub-subcontractors in the Work, and the Owner and the Contractor shall be named insureds.

§ 17.2.8 If the Contractor requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

§ 17.2.9 Notwithstanding any provision contained in Article 17, the Owner's obligation to purchase insurance shall herein be deemed satisfied by the Owner's membership in a self-insured risk management agency or pool. The Contractor agrees that any obligation the Owner has to purchase property insurance shall be satisfied by the Owner's membership in a self-insured risk management agency or pool. The Contractor further agrees that it will only have rights allowable to it under any coverage provided through the Owner's membership in a self-insured risk management agency or pool.

### **§ 17.3 PROPERTY INSURANCE PERFORMANCE BOND AND PAYMENT BOND**

~~§ 17.3.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance on an "all risk" or equivalent policy form, including builder's risk, in the amount of the initial Contract Sum, plus the value of subsequent modifications and cost of materials supplied and installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 15.5 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 17.3.1 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and sub-subcontractors in the Project. The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract.~~

~~§ 17.3.2 The Owner shall file a copy of each policy with the Contractor before an exposure to loss may occur. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days' prior written notice has been given to the Contractor.~~

~~§ 17.3.3 The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Architect, Architect's consultants, separate contractors described in Article 12, if any, and any of their subcontractors, sub-subcontractors, agents and employees for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to Section 17.3 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors described in Article 12, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.~~

~~§ 17.3.4 A loss insured under the Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any~~



~~applicable mortgagee clause. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their sub-subcontractors in similar manner.~~

#### **§ 17.4 PERFORMANCE BOND AND PAYMENT BOND**

~~§ 17.4.1 The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract.~~

~~– Intentionally omitted.~~

~~§ 17.4.2 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished. If required by the Owner the Contractor, before commencing the Work, shall furnish a Performance Bond and a Labor and Material Payment Bond. The Performance Bond shall be in an amount equal to 110% of the full amount of the Contract Sum as security for the faithful performance of the obligations of the Contract Documents, including the payment of prevailing wages in accordance with Article 24 of this Agreement, and the Labor and Material Payment Bond shall be in an amount equal to 110% of the full amount of the Contract Sum as security for required payments to all persons performing labor and furnishing materials in connection with the Work. Such bonds shall be on AIA Document A-312 (2010 Edition), issued by the American Institute of Architects, shall be issued by a surety satisfactory to the Owner, and shall name the Owner as primary co-obligee. Such bonds shall be from an Illinois Admitted Bonding Company acceptable to the Owner and having a minimum policy holder rating of "B+" in the latest edition of Best's Insurance Guide in effect as of the date of the Contract. Bonds shall remain in full force and effect for at least one year following the date of Final Completion of the Work or for the entire duration of the longest warranty period provided for the Work, whichever is longer. The cost of the bonds is to be included in the Contract Sum stated by the Contractor in its Bid Proposal.~~

~~§17.4.3 The Contractor shall (i) furnish with all bonds a certified copy of the power of attorney from the Surety Company stating that the person executing said bond is duly authorized by the Surety Company to execute said bond; (ii) furnish a certified copy of the certificate from said Surety Company's state showing said Surety Company licensed and authorized to transact business and execute said bond in Illinois; and (iii) if requested by Owner, furnish a copy of current financial statements of said Surety Company.~~

~~§ 17.4.4 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a true and correct copy of the bonds or shall authorize a copy to be furnished.~~

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~~§ 18.1 The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense, unless compensable under Section A.2.7.3 in Exhibit A, Determination of the Cost of the Work, expense. If prior to the date of Final Completion the Contractor, a Subcontractor, or anyone for who either of them is responsible, uses or damages any portion of the Work, including but not limited to mechanical, electrical, plumbing or other building system, machinery, equipment or other mechanical device, the Contractor shall cause such item to be replaced or if permitted by the Owner restored to "like new" condition, at no expense to the Owner.~~

~~§ 18.2 In addition to the Contractor's obligations under Section 9.4, if, within one year after the date of Substantial Final Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 15.4.3, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition, so. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. The obligation under this Section 18.2 shall~~

survive acceptance of the Work under the Contract and termination of the Contract. Corrective Work shall be warranted to be free from defects for a period equal to the longer of twelve (12) months after the completion of the corrective Work or one (1) year from the date of Final Completion of the Work, or such longer period of time as may be prescribed by law or in equity or by the terms of any applicable special warranty. Notwithstanding the foregoing, Contractor shall correct Work deficiently or defectively performed and replace defective or non-conforming materials and equipment, even though such deficiency, defect or non-conformity may be discovered more than one (1) year after Final Completion, if the correction is of a latent defect and arises from poor workmanship or improper materials or equipment, or is required to be made to Work, materials or equipment covered by the Contractor or a Subcontractor contrary to the Architect's or Owner's request or to the request of a governmental officer, or to the requirements of the Contract Documents or Governmental Requirements, and was therefore not visible for inspection by the Architect, Owner or governmental officer, as applicable, at the time of inspection. Contractor shall, within a reasonable time under the circumstances, after receipt of written notice thereof, correct, repair, replace and otherwise make good any defects or non-conformity in the Work.

§ 18.3 If the Contractor fails to correct defective or nonconforming Work within a reasonable time, the Owner may correct it in accordance with Section 8.3.

...

§ 18.5 ~~The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Article 18. Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.~~

§ 18.6 ~~The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor's correction or removal of the Work that is not in accordance with the requirements of the Contract Documents.~~

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~~The Contract shall be governed by the law of the place where the Project is located, except that if the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 21.4. located.~~

...

Tests, inspections and approvals of portions of the Work required by the Contract Documents or by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities shall be made at an appropriate time. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect and the Owner timely notice of when and where tests and inspections are to be made so that the Architect and the Owner may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating the costs to ~~the Contractor.~~ the Contractor, unless such tests, inspection or approvals were necessitated by the Contractor's failure to perform the Work in accordance with the Contract Documents in which event the Contractor shall bear the costs.

#### ~~§ 19.4 COMMENCEMENT OF STATUTORY LIMITATION PERIOD~~

~~The Owner and Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of the final dispute resolution method selected in the Agreement within the period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all claims and causes of action not commenced in accordance with this Section 19.4.~~

**ARTICLE 20 — TERMINATION OF THE CONTRACT**

**§ 20.1 ~~TERMINATION BY THE CONTRACTOR~~TERMINATION OR SUSPENSION OF THE CONTRACT**

~~If the Architect fails to certify payment as provided in Section 15.2.1 for a period of 30 days through no fault of the Contractor, or if and Architect has not notified the Contractor as provided in 15.2.1 of the reason for withholding certification or the Owner fails to make payment as provided in Section 4.1.3 for a period of 30 days, the Contractor may, and has not notified Contractor of the reason for withholding payment as provided in Section , this Agreement through no fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, and such failure continues for a period of 90 days after notice from the Contractor , the Contractor may, as its sole remedy , upon seven additional days' written notice to the Owner and the Architect, terminate the Contract and recover from the Owner payment for Work executed, including reasonable overhead and profit, costs incurred by reason of such termination, and damages, unless this reason is cured prior to the expiration of the notice period, and recover from Owner payment of Work properly executed in accordance with the Contract Documents (the basis for such payment shall be as provided in the Contract) provided said Work was authorized in advance by Owner. The Owner shall have the right to cure any defect or default prior to the date of termination stated in any written notice from Contractor as provided herein, in which event Contractor shall continue with the Work. If the Contractor terminates the Work and receives payment in connection with his equipment, tools or materials such items shall be left and remain on the Site if the Owner so elects. Owner shall not be responsible for damages for loss of anticipated profits on Work not performed. .~~

...

**§ 20.2.1 The Owner may terminate the Contract if the Contractor**

- ~~1~~ **1** ~~repeatedly refuses or fails to supply enough properly skilled workers or proper materials;~~
- ~~2~~ **2** ~~fails to make~~ If the Contractor shall institute proceedings or consent to proceeding requesting relief or arrangement under the Federal Bankruptcy Act or any applicable Federal or State Law, or if a petition under any federal or state insolvency law is filed against the Contractor and such petition is not dismissed within sixty (60) days from the date of the filing, or if the Contractor admits in writing his inability to pay his debts generally as they become due, or if he makes a general assignment for the benefit of his creditors, or if a receiver, liquidator, trustee, or assignee is appointed on account of his bankruptcy or insolvency; or if a receiver of all or any substantial portion of the Contractor's properties is appointed; or if the Contractor abandons the Work; or if he fails, except in cases for which extension of time is provided, to prosecute promptly and diligently the Work or to supply enough properly skilled workmen or proper materials for the Work; or if the Contractor submits an application for payment, sworn statement, waiver of lien, affidavit or document of any nature whatsoever which is intentionally falsified; or if the Contractor fails to make prompt payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;
- ~~3~~ **3** ~~repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of a public authority; or~~
- ~~4~~ **4** ~~otherwise is guilty of substantial breach of a provision of the Contract Documents or otherwise breaches obligations under any subcontract with a Subcontractor; or if a lien or a notices of lien is filed against any part of the Project or Project funds or if the Contractor disregards any laws, statues, ordinances, rules, regulations or orders of any governmental body or public or quasi-public authority having jurisdiction of the Work or the Project premises; or if the Contractor otherwise violates any material provision of the Contract Documents, then, without prejudice to any right or remedy available Owner may, after giving the Contractor seven (7) days' written notice, terminate the Contractor, and take possession of the Project and all materials, equipment, tools, construction equipment and machinery thereon owned by the Contractor and accept assignment of Subcontracts and may complete the Work by whatever reasonable method the Owner may deem expedient. If requested by the Owner, the Contractor shall remove any part or all of this equipment, machinery and supplies from the Project within seven (7) days from the date of such request, and in such event at the Contractor's expense. Upon request f the Contractor, the Owner shall furnish to the Contractor a reasonably detailed accounting of the costs incurred by the Owner in completing the Work.~~

**§ 20.2.2** ~~When any of the above reasons exists, the Owner, upon certification by the Architect that sufficient cause exists to justify such action, may, without prejudice to any other remedy the Owner may have and after giving the Contractor seven days' written notice, terminate the Contract and take possession of the site and of all materials,~~



equipment, tools, and construction equipment and machinery thereon owned by the Contractor and may finish the Work by whatever reasonable method the Owner may deem expedient. Upon request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work. The Owner terminates the Contract for one of the reasons stated in Section 20.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 20.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 20.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished. If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's and consultants services and expenses made necessary thereby legal fees, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Architect, upon application, and this obligation for payment shall survive termination of the Contract.

§ 20.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Architect, upon application, and this obligation for payment shall survive termination of the Contract. The Owner's right to terminate the contract pursuant to Section 20.2 shall be in addition to and not in limitation of its right to stop the Work without terminating the Contract as provided elsewhere in this Agreement.

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The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause. The Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed. §20.3.1 The Owner may, at any time, terminate the Contract in whole or in part for the Owner's convenience and without cause. Termination by the Owner under this Section 20.3 shall be by a written notice of termination specifying the extent of termination and the effective date.

§20.3.2 Upon receipt of a notice of termination for convenience, the Contractor shall immediately, in accordance with instructions from the Owner, proceed with performance of the following duties:

1. cease operation as specified in the notice;
2. place no further orders and enter into no further Subcontracts for materials, labor, services, equipment, or facilities except as necessary to complete continued portions of the Contract;
3. terminate all subcontracts and orders to the extent they relate to the Work terminated;
4. proceed to complete the performance of Work not terminated; and
5. take actions that may be necessary, or that the Owner may direct, for the protection and preservation of the terminated work.

§20.3.3 In the event of termination by Owner for convenience, the sum payable to the Contractor for the Work shall be prorated based upon the amount of properly performed Work completed. Owner shall receive proper credit for sums already paid. Upon any such termination, all obligations of Owner (other than payment of sums due Contractor for services properly performed but not previously paid prior to the date of termination) shall cease as of the effective date of termination.

§20.3.4 The Owner shall be credited for (1) payments previously made to the Contractor for the terminated portion of the Work, and (2) claims which the Owner has against the Contractor under the Contract.

## §20.4 SUSPENSION BY THE OWNER FOR CONVENIENCE

§20.4.1 The Owner may without cause order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

§20.4.2 If suspension, delay or interruption ordered by the Owner constitutes in the aggregate more than twenty percent (20%) of the total number of days scheduled for completion, an adjustment shall be made for increases in the cost of the performance of this Contract, excluding profit caused by such suspension, delay or interruption. No adjustment shall be made to the extent:

- .1 That the performance is, was, or would have been so suspended, delayed or interrupted by another cause, including without limitation the fault or negligence of the Contractor or any Subcontractor;  
or
- .2 That an equitable adjustment is made or denied under another provision of this Contract.

§20.4.3 Adjustments made in the cost of performance may have a mutually agreed fixed or percentage fee.

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§ 21.1 ~~Claims, disputes and other matters in question~~ CLAIMS FOR CONSEQUENTIAL DAMAGES

The Contractor waives Claims against the Owner for consequential damages arising out of or relating to this Contract, including those alleging an error or omission by the Architect but excluding those arising under Section 16.2, shall be referred initially to the Architect for decision. Such matters, except those waived as provided for in Section 21.8 and Sections 15.5.3 and 15.5.4, shall, after initial decision by the Architect or 30 days after submission of the matter to the Architect, be subject to mediation as a condition precedent to binding dispute resolution. Contract. This waiver includes, but is not limited to damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit arising from the Work.

This waiver is applicable, without limitation, to all consequential damages due to Owner's termination in accordance with Article 20.

In any suit or action arising under this Contract the Owner shall be entitled to an award of reasonable attorney's fees and costs of litigation.

ARTICLE 22 OTHER CONDITIONS OR PROVISIONS

§ 22.1 The Contractor shall be responsible for the supply and maintenance of any and all temporary equipment, utilities, and facilities necessary to properly and safely complete and protect the Work, including without limitation those required by winter conditions. Contractor shall provide and erect barricades and other safeguards adequate to warn of danger at the site and to protect persons and property from injury resulting from the Work.

§ 22.2 The Contractor shall limit material and equipment storage to the immediate area of Work and such other areas as Owner may designate. The Contractor shall promptly remove and properly dispose off site all construction material, trash, garbage and other debris.

§ 22.3 The Contractor shall notify Architect and Owner in advance (to the extent practicable, notice shall be made at least 48 hours in advance) of any and all deliveries of major materials to the Project Site and shall give notice of receipt of materials and equipment that Architect or Owner has indicated or customarily would want to inspect prior to commencement of the Work. Prior to resumption of the Work in the event of a temporary suspension lasting longer than 72 hours, and at such other time intervals during the process of the Work as requested by Owner, in order to permit Owner to properly coordinate its normal operations and facilities requirements with the Work.

§22.4 The following definitions are added to the Contract:

"Final completion" means the date the Contract has been fully performed, all the Work has been completed in accordance with the Contract Documents and the Owner has approved Final Payment to the Contractor.

"Indicated" and "shown" mean as described, detailed, discussed, scheduled, referenced, or called for in, or reasonably inferable from the Contract Documents in order to produce a first class Work product.

"Provide" or derivatives thereof means the Contractor shall properly fabricate, supply, furnish or procure all labor, materials, equipment, apparatus, and accessory appurtenances necessary to transport, deliver, install, erect and

construct the specified item, complete, in place and ready for operation and use, including any final connections, in strict accordance with the Drawings, Specifications and other Contract Documents. The words "Contractor shall" are implied and shall be so understood whenever the direction or term "provide" is used.

"Unit Price" is an amount stated in the Contractor's bid proposal or in the Contract Documents as a price per unit of measurement for materials, equipment or services for a portion of the Work as described in the Bidding Documents or the Contract Documents. A Unit Price includes all costs associated with the performance of the portion of the Work for which the Unit Price is provided, including but not limited to labor, materials, equipment, loading, transportation, handling, unloading, overhead and profit.

§22.5 Except as otherwise specifically provided in the Contract Documents, if and to the extent of any inconsistency, ambiguity, conflict, discrepancy or error in the Contract Document, and otherwise in interpreting the Contract Documents, the Parties shall give precedence to the Contract Documents in the following order of priority:

- (i) Modifications.
- (ii) This Agreement except that the Supplementary and Special Conditions shall take precedence over the General Conditions of the Contract.
- (iii) Construction Drawings.

#### **ARTICLE 23 • EQUAL EMPLOYMENT OPPORTUNITY**

§23.1 The Contractor shall maintain and shall require its Subcontractors to maintain policies of employment as follows:

§23.1.1 In the event of the Contractor's non-compliance with the provisions of this equal opportunity clause, the Illinois Human Rights Act or the Rules and Regulations of the Illinois Department of Human Rights ("Department"). Contractor may be declared ineligible for future contracts or subcontracts with the State of Illinois or any of its political subdivisions or municipal corporations, and the Contract may be cancelled or voided in whole or in part, and such other sanctions or penalties may be imposed or remedies invoked as provided by statute or regulation. During the performance of this Contract, Contractor agrees as follows:

- 1) That it will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation or preference, marital status, national origin or ancestry, citizenship status, age, physical or mental disability unrelated to a person's ability to perform the essential functions of the job, association with a person with a disability, military status or an unfavorable discharge from military service, or record of arrest; and further that it will examine all job classifications to determine if minority persons or women are underutilized and will take appropriate affirmative action to rectify any such underutilization.
- 2) That, if it hires additional employees in order to perform this Contract or any portions thereof, it will determine the availability (in accordance with the Department's Rules and Regulations) of minorities and women in the area(s) from which it may reasonably recruit and it will hire for each job classification for which employees are hired in such a way that minorities and women are not underutilized.
- 3) That, in all solicitations or advertisements for employees placed by it or on its behalf, it will state that all applicants will be afforded equal opportunity without discrimination because of race, color, religion, sex, sexual orientation, marital status, national origin or ancestry, citizenship status, age, physical or mental handicap or disability unrelated to a person's ability to perform the essential function of the job, or association with a person with a disability, military status or an unfavorable discharge from military service, or record of arrest.
- 4) That it will send to each labor organization or representative of workers with which it has or is bound by a collective bargaining or other agreement or understanding, a notice advising such labor organization or representative of the Contractor's obligations under the Illinois Human Rights Act and the Department's rules and regulations. If any such labor organization or representative fails or refuses to cooperate with the Contractor in its efforts to comply with such Act and rules and regulations, the Contractor will promptly notify the Department and the Owner and will recruit

employees from other sources when necessary to fulfill its obligations thereunder.

- 5) That it will submit reports as required by the Department's rules and regulations, furnish all relevant information as may from time to time be requested by the Department or the Owner, and in all respects comply with the Illinois Human Rights Act and the Department's rules and regulations.
- 6) That it will permit access to all relevant books, records, accounts and work sites by personnel of the Owner and the Department for purposes of investigation to ascertain Department's rules and regulations.
- 7) That it will include verbatim or by reference the provisions of this clause in every subcontract it awards under which any portion of the Contract obligations are undertaken or assumed, so that such provisions will be binding upon such subcontractor. In the same manner as with other provisions of this Contract. The Contractor will be liable for compliance with applicable provisions of this clause by such subcontractors; and further it will promptly notify the Owner and the Department in the event any subcontractor fails or refuses to comply therewith. In addition, the Contractor will not utilize any subcontractor declared by the Illinois Human Rights Commission to be ineligible (or contracts or subcontracts with the State of Illinois or any of its political subdivisions or municipal corporations.

§23.1.2 The Contractor is encouraged to utilize qualified minority businesses as subcontractors for supplies, services and construction.

#### **ARTICLE 24- COMPLIANCE WITH LAWS/PREVAILING RATES OF WAGES**

§24.1 The Contractor shall comply with all federal, state, county and local laws, codes, rules and regulations applicable to the Work including without limitation all building codes, permit conditions, the American with Disabilities Act and the equal employment opportunity clause of the Illinois Human Rights Act and the rules and regulations of the Illinois Department of Human Rights, the Illinois Prevailing Wage Act, and all laws and regulations pertaining to occupational and work safety, hours of operation and disposal of construction debris. A copy of the Contractor's certification of compliance with applicable laws is attached to and made a part of this Agreement.

The Contractor shall comply with the requirements of the Illinois Prevailing Wage Act (820 ILCS 130/0.01 *et seq.*) and the Park District's Ordinances requiring payment of prevailing wages. The Contractor shall pay or cause to be paid not less than the prevailing rate of hourly wage in the county the work is performed as determined by the Illinois Department of Labor for the month in which the work is performed including but not limited to all laborers, workers and mechanics. All contractors and subcontractors rendering services under this contract must comply with all requirements under the Act, including but not limited to, all wage, notice and record keeping duties.

The Contractor is required to verify current prevailing wage prior to the first day of each month and to pay the then-current prevailing wage rate as determined by the Illinois Department of Labor, regardless of the rates contained in the Contract Documents. Any increases in costs to the Contractor due to the changes in the prevailing wage during the term of this Contract shall be at the expense of Contractor and not at the expense of Owner. Current prevailing wage rates are published at the following: <http://www.illinois.gov/idol/Laws-Rules/CONMED/Pages/Rates.aspx> . . The Contractor agrees to indemnify and hold harmless the Park District for any violations of the Prevailing Wage Act.

The Contractor shall also: (1) insert into each subcontract and the project specifications for each subcontract, a written stipulation that the subcontractor shall not pay less than the prevailing rate of hourly wage to all laborers, workers, and mechanics performing work under the contract; and (2) require each subcontractor to insert into each lower-tiered contract and the project specifications for each lower-tiered subcontract. a stipulation that the subcontractor shall not pay less than prevailing rate of hourly wage to all laborers, workers, and mechanics performing work under the contract.

The Contractor shall include on all bonds and shall cause all subcontractors' bonds required under the Contract Documents to guarantee compliance with the Prevailing Wage Act.



Additionally, the Contractor and each subcontractor shall make and keep, for a period of not less than 5 years from the date of the last payment on a contract or subcontract, records of all laborers, mechanics, and other workers employed by them on the Project; the records shall include each worker's name, address, telephone number when available, social security number, classification or classifications, the hourly wages paid in each pay period, the number of hours worked each day, and the starting and ending times of work each day. The Contractor shall submit monthly, no later than the 10<sup>th</sup> day of each calendar month, in person, by mail, or electronically a certified payroll to the Park District with each monthly pay request in the form required by the Illinois Prevailing Wage Act. The certified payroll shall be accompanied by a statement signed by the Contractor or subcontractor which states that: (i) he or she has examined the certified payroll and such records are true and accurate; (ii) the hourly rate paid to each worker is not less than the general prevailing rate of hourly wages required by this Act; and (iii) the Contractor or subcontractor is aware that filing a certified payroll that he or she knows to be false is a Class A misdemeanor. The Contractor may rely on the certification of a lower tier subcontractor, provided the Contractor does not knowingly rely upon a subcontractor's false certification. The records submitted in accordance with this payroll submittal provision shall be considered public records pursuant to Section 5 of the Prevailing Wage Act, 820 ILCS 130/5 (2004, as amended by P.A. 94-515). The Park District may, at its option, immediately terminate the Contract in the event that Contractor violates any provision of this paragraph or the Prevailing Wage Act.

Contractor shall also post the prevailing wage rates for each craft or type of worker or mechanic needed to complete the project at either: (1) a location on the project site easily accessible to the workers engaged on the project; or (2) in lieu of posting on the project site, if the Contractor has a business location where laborers, workers, and mechanics may regularly visit, the Contractor may either post the prevailing rate of wages in each county the Contractor works in a conspicuous location or provide the laborers, workers or mechanics engaged on the project a written notice indicating the prevailing rate of wages for the project.

Upon seven business days' notice, the Contractor and each subcontractor shall make available for inspection and copying at a location within this State during reasonable hours, the records identified in 820 ILCS 130/5(a)(1) to the Owner, and its officers and agents.

This Agreement entered into as of the day and year first written above.

OAK BROOK PARK DISTRICT

\_\_\_\_\_  
*OWNER (Signature)*

\_\_\_\_\_  
*CONTRACTOR (Signature)*

\_\_\_\_\_  
*(Printed name and title)*

\_\_\_\_\_  
*(Printed name and title)*

~~§ 21.2 If a claim, dispute or other matter in question relates to or is the subject of a mechanic's lien, the party asserting such matter may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.~~

~~§ 21.3 The parties shall endeavor to resolve their disputes by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with their Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to this Agreement, and filed with the person or entity administering the mediation. The request may be made concurrently with the binding dispute resolution but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.~~

~~§ 21.4 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any claim, subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association, in accordance with the Construction Industry Arbitration Rules in effect on the date of this Agreement. Demand for arbitration shall be~~

~~made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.~~

~~§ 21.5 Either party, at its sole discretion, may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation; (2) the arbitrations to be consolidated substantially involve common questions of law or fact; and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).~~

~~§ 21.6 Any party to an arbitration may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of a Claim not described in the written Consent.~~

~~§ 21.7 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement shall be specifically enforceable under applicable law in any court having jurisdiction thereof.~~

~~§ 21.8 CLAIMS FOR CONSEQUENTIAL DAMAGES~~

~~The Contractor and Owner waive claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes~~

- ~~.1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and~~
- ~~.2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.~~

~~This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 20. Nothing contained in this Section 21.8 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.~~

~~This Agreement entered into as of the day and year first written above.~~

\_\_\_\_\_  
*OWNER (Signature)*

\_\_\_\_\_  
*CONTRACTOR (Signature)*

\_\_\_\_\_  
*(Printed name and title)*

\_\_\_\_\_  
*(Printed name and title)*

**Certification of Document's Authenticity**  
**AIA® Document D401™ – 2003**

I, Nicole L. Karas, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with its associated Additions and Deletions Report and this certification at 13:23:05 on 03/22/2017 under Order No. 1549258185\_1 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A107™ – 2007, Standard Form of Agreement Between Owner and Contractor for a Project of Limited Scope, as published by the AIA in its software, other than those additions and deletions shown in the associated Additions and Deletions Report.

*Nicole Karas*

\_\_\_\_\_  
(Signed)

\_\_\_\_\_  
Attorney

(Title)

\_\_\_\_\_  
3/22/17

(Dated)

# ALTERNATE 1: SPECIFICATIONS

State the amount to be deducted from the Base Bid to alter the base bid work in Existing Reception Area 212, Existing Merchandise Sales Area 213 and Existing Lounge Area 214 as follows and as indicated on the Drawings:

1. Set elevation of new acoustical ceiling grid at 9'-5" A.F.F in lieu of 11'-0", except where indicated otherwise.
2. Maintain the existing D-shaped gypsum drywall soffit above the reception desk, including the downlighting. Demolish luminous ceiling and lighting inside soffit area. Replace with orthogonal acoustical panel ceiling and grid and (1) Type A light fixture at same elevation as existing luminous ceiling. Eliminate new downlighting shown in (eliminated) new soffit shown at back wall behind reception desk area.
3. Eliminate new perimeter soffits and, instead, refinish existing gypsum drywall surfaces above existing ceiling and laminate a single layer of gypsum drywall to concrete masonry unit surfaces above existing ceiling. Install new perimeter downlighting in acoustical ceiling.
4. Preserve existing supply and return air duct mains as indicated on Drawing M210. Clean existing ductwork mains to remain. Patch and insulate unused takeoffs to match existing. Connect new variable air volume boxes and diffusers to existing main supply and return ductwork.
5. Revise ceiling height for fire protection sprinkler heads as indicated on Drawing F310.
6. Revise lighting as indicated on Drawing E320.

Oak Brook Park District Tennis Center  
HVAC Upgrade Project  
Technical Specifications

Project Manual

The Bid Drawings are also included as part of the technical specifications and are provided under separate cover.

**SECTION 00 01 01  
PROJECT TITLE PAGE**

**PROJECT MANUAL**

**FOR**

**TENNIS CENTER HVAC UPGRADE  
1300 FOREST GATE ROAD  
OAK BROOK, ILLINOIS 60523**

**OWNER**

**OAK BROOK PARK DISTRICT  
1450 FOREST GATE ROAD  
OAK BROOK, ILLINOIS 60523**

**ARCHITECT/ENGINEER**

**KLUBER ARCHITECTS + ENGINEERS  
10 S. SHUMWAY AVE.  
BATAVIA, ILLINOIS 60510**

**SECTION 00 01 07  
SEALS PAGE**

**1.01 DESIGN PROFESSIONALS' SEALS**

A. ARCHITECT

B. MECHANICAL ENGINEER

C. ELECTRICAL ENGINEER

**END OF DOCUMENT**



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**GENERAL**

G100 COVER SHEET

**ARCHITECTURAL**

A210 PARTIAL UPPER AND LOWER LEVEL DEMOLITION PLANS  
A310 PARTIAL UPPER AND LOWER LEVEL FLOOR PLANS  
A410 PARTIAL UPPER AND LOWER LEVEL REFLECTED CEILING PLANS  
A1200 SECTION DETAILS AND WALL TYPES

**MECHANICAL**

M210 PARTIAL UPPER AND LOWER LEVEL MECHANICAL DEMOLITION PLANS  
M310 PARTIAL UPPER AND LOWER VENTILATION FLOOR PLANS  
M410 PARTIAL UPPER AND LOWER PIPING FLOOR PLANS  
M510 TEMPERATURE CONTROL SCHEMATICS  
M610 MECHANICAL SCHEDULES AND DETAILS

**FIRE PROTECTION**

F310 PARTIAL UPPER LEVEL FIRE PROTECTION PLANS

**ELECTRICAL**

E310 PARTIAL LOWER LEVEL ELECTRICAL AND ELECTRICAL DEMOLITION  
PLANS  
E320 PARTIAL UPPER LEVEL ELECTRICAL AND ELECTRICAL DEMOLITION  
PLANS

**END OF DOCUMENT**

**SECTION 01 10 00  
SUMMARY**

**PART 1 GENERAL**

**1.01 PROJECT**

- A. Project Name: TENNIS CENTER HVAC UPGRADE.
- B. Owner's Name: Oak Brook Park District.
- C. Architect's Name: Kluber Architects + Engineers.
- D. The Project consists of the alteration of upper level and lower level mechanical systems. Work also includes acoustical ceiling and lighting replacement.

**1.02 DESCRIPTION OF ALTERATIONS WORK**

- A. Scope of demolition and removal work is shown on drawings.
- B. Scope of alterations work is shown on drawings.
- C. HVAC: Replace existing system with new construction.
- D. Electrical Power and Lighting: Replace existing system with new construction.
- E. Fire Suppression Sprinklers: Alter existing system and add new construction, keeping existing in operation.
- F. Fire Alarm: Alter existing system and add new construction, keeping existing in operation.

**1.03 OWNER OCCUPANCY**

- A. Owner intends to continue to occupy adjacent portions of the existing building during the entire construction period.
- B. Owner intends to occupy the Project after ductwork and ceilings are installed..
- C. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.
- D. Schedule the Work to accommodate Owner occupancy.

**1.04 CONTRACTOR USE OF SITE AND PREMISES**

- A. Provide access to and from site as required by law and by Owner:
  - 1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
  - 2. Do not obstruct roadways, sidewalks, or other public ways without permit.
- B. Utility Outages and Shutdown:
  - 1. Limit disruption of utility services to hours the building is unoccupied.
  - 2. Do not disrupt or shut down life safety systems, including but not limited to fire sprinklers and fire alarm system, without 7 days notice to Owner and authorities having jurisdiction.
  - 3. Prevent accidental disruption of utility services to other facilities.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

**SECTION 01 30 00  
ADMINISTRATIVE REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Preconstruction meeting.
- B. Site mobilization meeting.
- C. Progress meetings.
- D. Construction progress schedule.
- E. Submittals for review, information, and project closeout.
- F. Architect/Engineer-provided CAD files.
- G. Number of copies of submittals.
- H. Submittal procedures.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 70 00 - Execution and Closeout Requirements: Additional coordination requirements.
- B. Section 01 78 00 - Closeout Submittals: Project record documents.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 PRECONSTRUCTION MEETING**

- A. Architect will schedule a meeting after Notice of Award.
- B. Attendance Required:
  - 1. Owner.
  - 2. Architect.
  - 3. Contractor.
- C. Agenda:
  - 1. Execution of Owner-Contractor 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. Designation of personnel representing the parties to Contract and Architect.
  - 6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
  - 7. Scheduling.
  - 8. Scheduling activities of a Geotechnical Engineer.



- D. Record minutes and distribute copies within two days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

### **3.02 SITE MOBILIZATION MEETING**

- A. Architect will schedule a meeting at the Project site prior to Contractor occupancy. May be combined with Preconstruction Meeting.
- B. Attendance Required:
  - 1. Contractor.
  - 2. Owner.
  - 3. Architect.
  - 4. Major Subcontractors.
- C. Agenda:
  - 1. Use of premises by Owner and Contractor.
  - 2. Owner's requirements and occupancy prior to completion.
  - 3. Construction facilities and controls provided by Owner.
  - 4. Temporary utilities provided by Owner.
  - 5. Survey and building layout.
  - 6. Security and housekeeping procedures.
  - 7. Schedules.
  - 8. Application for payment procedures.
  - 9. Procedures for testing.
  - 10. Procedures for maintaining record documents.
  - 11. Requirements for start-up of equipment.
  - 12. Inspection and acceptance of equipment put into service during construction period.
- D. Record minutes and distribute copies within two days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

### **3.03 PROGRESS MEETINGS**

- A. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- B. Attendance Required:
  - 1. Contractor.
  - 2. Owner.
  - 3. Architect.
  - 4. Contractor's Superintendent.
  - 5. Major Subcontractors.
- C. 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. Maintenance of progress schedule.
7. Corrective measures to regain projected schedules.
8. Planned progress during succeeding work period.
9. Maintenance of quality and work standards.
10. Effect of proposed changes on progress schedule and coordination.
11. Other business relating to Work.

D. Record minutes and distribute copies within two days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

### **3.04 CONSTRUCTION PROGRESS SCHEDULE**

- A. Within 7 days after date of the Agreement, submit preliminary schedule .
- B. If preliminary schedule requires revision after review, submit revised schedule within 7 days.
- C. Submit updated schedule with each Application for Payment.

### **3.05 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 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 78 00 - Closeout Submittals.

### **3.06 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 knowledge as contract administrator or for Owner. No action will be taken.

### **3.07 SUBMITTALS FOR PROJECT CLOSEOUT**

- A. Submit Correction Punch List for Substantial Completion.
- B. Submit Final Correction Punch List for Substantial Completion.
- C. 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. Bonds.
5. Other types as indicated.

D. Submit for Owner's benefit during and after project completion.

### **3.08 ARCHITECT/ENGINEER-PROVIDED CAD FILES**

A. After the execution of the Contract, Architect will provide, free of charge, upon receipt of a properly completed and signed request utilizing "Electronic Data Transfer Consent Form" at the end of this Specification Section, CAD files depicting graphic information for the project as follows:

1. Architectural Floor Plans: Column grid, walls, floors, stairs, doors, windows, room numbers, ceiling grid, mechanical diffusers, plumbing fixtures, sprinkler heads (if depicted in Bid Documents) and lights.

B. Contractor acknowledges and accepts that the Architectural Floor Plans do not contain structural, mechanical, electrical, plumbing, fire protection and other building systems information depicted in the Bidding Documents. Examples of information not contained in these files include, but are not limited to, title blocks, keynotes, schedules, mechanical ductwork and equipment, electrical device symbols, circuit numbers and home runs, plumbing equipment, piping runs and riser diagrams, and architectural/engineering text or details. No other CAD files, data or information will be provided.

C. Only requests from Prime Contractors will be honored. Subcontractors must obtain the files from their respective Prime Contractors.

D. In submitting a request, Contractor acknowledges that:

1. Architect/Engineer bears no responsibility for the data or its transmission,
2. Use of the data by the Contractor or his subcontractors in no way relieves the Contractor of his obligations under the Contract,
3. Contractor is solely liable for any and all claims arising from any and all products generated by the Contractor or its Subcontractors employing the data,
4. Contractor and its Subcontractors have a limited, non-exclusive license to use the data solely in connection with the Work of the Project, and that
5. Architect/Engineer retains all rights, including copyright, to the data.

### **3.09 NUMBER OF COPIES OF SUBMITTALS**

A. Documents for Review:

1. Small Size Sheets: Not Larger Than 11 x 17 inches. Submit two (2) paper copies, one of which will be retained by Architect. Contractor shall make his own copies from the original returned by the Architect.
  - a. Contractor's Option: In lieu of paper copies indicated above, submit in Adobe PDF electronic file format via email. Architect will return a reviewed copy in Adobe PDF electronic file format via email. Create PDFs at native size and right-side up; illegible files will be rejected.

2. Large Size Sheets: Larger Than 11 x 17 inches; 36 x 48 inches maximum. Submit two (2) paper copies, one of which will be retained by Architect. Electronic file format (PDF or other) is NOT acceptable. Contractor shall make his own copies from the original returned by the Architect.

B. Documents for Information: Submit one copy.

C. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.

1. After review, produce duplicates.

2. Retained samples will not be returned to Contractor unless specifically so stated.

### **3.10 SUBMITTAL PROCEDURES**

A. Shop Drawing Procedures:

1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting the Contract Documents and coordinating related Work.

2. Generic, non-project specific information submitted as shop drawings do not meet the requirements for shop drawings.

B. Transmit each submittal with a copy of approved submittal form.

C. Transmit each submittal with AIA Form G810.

D. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.

E. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.

F. Apply 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.

G. Deliver submittals to Architect at business address.

H. Schedule submittals to expedite the Project, and coordinate submission of related items.

I. For each submittal for review, allow 20 days excluding delivery time to and from the Contractor.

J. Clearly identify variations from the Contract Documents. Regardless of the type of variation, Contractor is solely responsible for errors in the field that arise from submittal variations from the requirements of the Contract Documents if those variations were not expressly noted to specifically identify for and describe to the reviewer the nature of the variation from the Contract Documents.

K. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.

L. Correlate submitted items with specified products; clearly indicate the specified product that corresponds to each submitted item.

- M. When options or optional features available for a Product are indicated in a submittal, and selections for those options/features are indicated in the Contract Documents, identify on the submittal the selection indicated in the Contract Documents.
- N. Provide space for Contractor and Architect review stamps.
- O. When revised for resubmission, using clouds, highlights or other means acceptable to the Architect, identify all changes made since previous submission. Resubmittals that do not clearly identify all changes may be delayed and/or returned to the Contractor unreviewed.
- P. The Contractor is entitled to one (1) resubmittal of any Shop Drawing, Product Data, or Closeout Submittal item rejected by the Architect or returned by the Architect for further action. Thereafter, the Contractor shall pay the cost of all further Architect's reviews of Shop Drawing, Product Data or Closeout Submittal, at a rate of \$200.00/hour. Cost of such further reviews will be deducted from the Contract Sum by Change Order.
- Q. Distribute reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.
- R. Submittals not requested will not be recognized or processed.
- S. Submittal reviews may be delayed and/or submittals may be returned unreviewed for any of the following reasons:
  - 1. Submittals submitted outside the scheduled dates of the Submittal Schedule.
  - 2. Submittals are incomplete or are missing information.
  - 3. Submittals are not submitted in accordance with procedures outlined in this Section (i.e. spec Section number not indicated, missing Contractor's review stamp, submitted items not correlated with specified products).

**END OF SECTION**

**SECTION 01 41 00  
REGULATORY REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. General.
- B. Definitions.
- C. Quality Assurance.
- D. Regulatory Requirements.

**1.02 RELATED SECTIONS**

- A. Section 01 10 00 - Summary.
- B. Section 01 42 00 - References.

**1.03 GENERAL**

- A. Comply with all applicable laws, rules, regulations, codes and ordinances.
- B. If the Contractor observes that the Contract Documents may be at variance with specified codes, notify the Architect immediately. Architect shall issue all changes in accordance with the General Conditions.
- C. It shall not be the Contractor's primary responsibility to make certain that the Contract Documents are in accordance with all applicable laws, rules and regulations, however, when the Contractor performs work knowing or having reason to know that the work in question is contrary to applicable laws, rules, and regulations, and fails to notify the Architect, the Contractor shall pay all costs arising therefrom.

**1.04 DEFINITIONS**

- A. Definitions:
  - 1. Codes: Codes are statutory requirements, rules or regulations of governmental entities.
  - 2. Standards: Standards are requirements that have been established as accepted criteria, set general consent.

**1.05 QUALITY ASSURANCE**

- A. The Architect/Engineer has designed the project to applicable code requirements and has copies of said codes available for the Contractor's inspection.
- B. The Contractor shall:
  - 1. Ensure that copies of codes and standards referenced herein or specified in individual specifications sections are available to Contractor's personnel, agents, and Sub-Contractors.
  - 2. Ensure that Contractor's personnel, agents, and Sub-Contractors are familiar with the workmanship and requirements of applicable codes and standards.



## 1.06 REGULATORY REQUIREMENTS

- A. Source and Requirements: Verify amendments with local code officials.
1. Local code requirements:
    - a. ICC International Building Code, 2009 Edition.
    - b. ICC International Mechanical Code, 2009 Edition.
    - c. ICC International Fire Code, 2009 Edition.
    - d. ICC International Property Maintenance Code, 2009 Edition.
    - e. ICC Electrical Code, 2000 Edition.
  2. State code requirements:
    - a. Capital Development Board (CDB):
      - 1) Illinois Accessibility Code, 1997 Edition.
      - 2) Illinois Energy Conservation Code (ICC International Energy Conservation Code, 2012 Edition, with State of Illinois modifications.
    - b. Illinois Department of Labor (IDOL): Safety Glazing Materials Act - Illinois Revised Statutes, chap. 111 1/2, paragraph 3101, et seq.
    - c. Illinois Department of Public Health (IDPH):
      - 1) Illinois Plumbing Code (Illinois Administrative Code, Title 77, Chapter I, Subchapter r, Part 890).
    - d. Illinois Environmental Protection Agency (IEPA):
      - 1) Air-Pollution Standards.
      - 2) Noise Pollution Standards.
      - 3) Water Pollution Standards.
      - 4) Public Water Supplies
      - 5) Solid Waste Standards.
      - 6) Illinois Recommended Standards for Sewage Works (Illinois Administrative Code, Title 35, Subtitle C, Chapter II, Part 370).
    - e. Illinois State Fire Marshal (OSFM):
      - 1) Boiler & Pressure Vessel Safety Code (Illinois Administrative Code, Title 44, Chapter I, Part 120).
      - 2) Illinois Rules & Regulations for Fire Prevention & Safety (as amended).
      - 3) Gasoline and Volatile Oils (Illinois Revised Statutes, chap. 17 1/2, paragraph 31, et seq.).
  3. Information and Requirements for Utility Services: Local utility companies.

### PART 2 PRODUCTS - NOT USED

### PART 3 EXECUTION - NOT USED

**END OF SECTION**

**SECTION 01 42 00  
REFERENCES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Drawing symbols, abbreviations and acronyms.
- B. Definitions of terms used throughout the Contract Documents.
- C. Explanation of specification format and content.
- D. Requirements relating to referenced standards.
- E. Applicability of referenced standards.
- F. List of industry organizations and certain of their respective documents.

**1.02 DRAWING SYMBOLS AND CONVENTIONS**

- A. Abbreviations and graphic symbols are defined on the General Notes, Symbols & Abbreviations sheet of the drawings.
- B. Generally, symbols used on the mechanical and electrical drawings conform to those recommended by ASHRAE, though, where appropriate, these symbols are supplemented by more specific symbols as recommended by ASME, ASPE, or the IEEE.

**1.03 DEFINITIONS**

- A. Where the terms "indicated", "noted", "scheduled", "shown", or "specified" are used it is to help locate the reference; no limitation on location is intended except as specifically noted.
- B. Where the terms "directed", "requested", "authorized", "approved", are used as in "directed by the Architect", no implied meaning shall be construed to extend the Architect's responsibilities into the Contractor's purview of construction supervision.
- C. Where the term "approved" is used in conjunction with the Architect's action on submittals, requests or applications it is limited to the duties of the Architect as described in the Agreement, and the General and Supplemental Conditions of the Contract. Such use of the term "approval" shall not limit or release the Contractor from his responsibility to fulfill Contract requirements.
- D. Where the term "regulations" is used it means all applicable statutes, laws, ordinances, and orders issued by authorities having jurisdiction, as well as construction industry standards, rules, or conventions that address performance of the Work.
- E. Where the term "furnish" is used it means supply, deliver, and unload to the construction site ready for assembly and incorporation into the Work.
- F. Where the term "install" is used it is meant to describe operations at the job site to include unloading, assembling, placing, anchoring, finishing, protecting, cleaning and all other similar operations required to fully incorporate an item into the Work.
- G. Where the term "provide" is used it means "furnish and install" as defined above.

H. The "Project Site" is the space available to the Contractor for performance of construction activities. The Project Site may be for the exclusive use of the Contractor and his activities or may be used in conjunction with others with others performing other construction or related activities on the Project. The Extent of the Project Site is indicated on the drawings.

#### **1.04 SPECIFICATION FORMAT AND CONTENT**

- A. These Specifications are based on the Construction Specification Institute's 49 Division format and numbering system.
- B. Language used in the Specifications and other Contract Documents is an abbreviated type. Implied words and meanings will appropriately interpreted.
- C. Requirements expressed in imperative and streamlined language are to be performed by the Contractor. At certain locations in the text, subjective language may be used to describe responsibilities that must be fulfilled indirectly by the Contractor or others.
  - 1. Whenever a colon (:) is used within a sentence or phrase, it shall be construed to mean the words "shall be".
- D. Use of certain terms such as "carpentry" is not intended to imply that certain activities must be performed by accredited or unionized individuals of a corresponding generic name. The Specifications do, however, require that certain construction activities shall be performed by specialists who are recognized experts in the operations to be performed. Specialists shall be used for said activities, however the final responsibility for fulfilling the requirements of the Contract remains the Contractor's.

#### **1.05 QUALITY ASSURANCE**

- A. For products or workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Conform to reference standard of date of issue specified in this section, except where a specific date is established by applicable code.
- C. Obtain copies of standards when required by the Contract Documents.
- D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.
- E. Should specified reference standards conflict with Contract Documents, request clarification from the Architect before proceeding.
- F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of the Architect shall be altered by the Contract Documents by mention or inference otherwise in any reference document.

#### **1.06 APPLICABILITY OF INDUSTRY STANDARDS**

- A. Construction industry standards shall have the same force and effect as if bound or copied directly in the Contract Documents, except where more stringent requirements are specified. All such applicable standards are made a part of the Contract Documents by reference.

1. Where compliance with two or more standards are referenced and conflicting requirements for quality or quantities occur, comply with the more stringent requirements. Refer questions regarding apparently conflicting standards to the Architect for a decision before proceeding.
2. The standard of quality or quantity levels specified, shown, or referenced shall be the minimum to be provided or performed. Refer questions regarding standards of minimum quality or quantity to the Architect before proceeding.

#### **1.07 CONSTRUCTION INDUSTRY ORGANIZATIONS AND DOCUMENTS**

- A. AA -- ALUMINUM ASSOCIATION, INC.
- B. AABC -- ASSOCIATED AIR BALANCE COUNCIL
- C. AAMA -- AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION
- D. AASHTO -- AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
- E. ACI -- AMERICAN CONCRETE INSTITUTE INTERNATIONAL
- F. AISC -- AMERICAN INSTITUTE OF STEEL CONSTRUCTION, INC.
- G. ANSI -- AMERICAN NATIONAL STANDARDS INSTITUTE
- H. ASHRAE -- AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS, INC.
- I. ASME -- THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS
  1. ASME A17.1 - Safety Code for Elevators and Escalators; 2004.
- J. ASTM -- AMERICAN SOCIETY FOR TESTING AND MATERIALS
- K. AWI -- ARCHITECTURAL WOODWORK INSTITUTE
- L. AWPA -- AMERICAN WOOD-PRESERVERS' ASSOCIATION
- M. AWS -- AMERICAN WELDING SOCIETY
- N. BHMA -- BUILDERS HARDWARE MANUFACTURERS ASSOCIATION
- O. BIA -- BRICK INDUSTRY ASSOCIATION
- P. CPSC -- CONSUMER PRODUCTS SAFETY COMMISSION
- Q. DHI -- DOOR AND HARDWARE INSTITUTE
- R. DIN -- DEUTSCHES INSTITUT FUR NORMUNG
- S. FM -- FACTORY MUTUAL RESEARCH CORPORATION
- T. ICC -- INTERNATIONAL CODE COUNCIL, INC.
- U. IEEE -- INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS
- V. ISO -- INTERNATIONAL STANDARDS ORGANIZATION
- W. MFMA -- MAPLE FLOORING MANUFACTURERS ASSOCIATION

- X. NAAMM -- THE NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS
- Y. NCMA -- NATIONAL CONCRETE MASONRY ASSOCIATION
- Z. NEBB -- NATIONAL ENVIRONMENTAL BALANCING BUREAU
- AA. NEMA -- NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
- AB. NFPA -- NATIONAL FIRE PROTECTION ASSOCIATION
- AC. NRCA -- NATIONAL ROOFING CONTRACTORS ASSOCIATION
- AD. PCI -- PRECAST/PRESTRESSED CONCRETE INSTITUTE
- AE. SDI -- STEEL DOOR INSTITUTE
- AF. SDI -- STEEL DECK INSTITUTE, INC.
- AG. SGCC -- SAFETY GLAZING CERTIFICATION COUNCIL
- AH. SIGMA - SEALED INSULATING GLASS MANUFACTURERS ASSOCIATION (See IGMA)
- AI. SJI -- STEEL JOIST INSTITUTE
- AJ. SMACNA -- SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION, INC.
- AK. SSPC -- THE SOCIETY FOR PROTECTIVE COATINGS
- AL. TCA -- TILE COUNCIL OF AMERICA, INC.
- AM. UL -- UNDERWRITERS LABORATORIES INC.
- AN. USG -- UNITED STATES GYPSUM
  - 1. USG (HB) - Gypsum Construction Handbook; Seventh Edition.
- AO. WWPA -- WESTERN WOOD PRODUCTS ASSOCIATION

**1.08 UNITED STATES GOVERNMENT AND RELATED AGENCIES/DOCUMENTS**

- A. CFR -- CODE OF FEDERAL REGULATIONS
- B. CPSC -- CONSUMER PRODUCTS SAFETY COMMISSION
- C. EPA -- ENVIRONMENTAL PROTECTION AGENCY
- D. FS -- FEDERAL SPECIFICATIONS AND STANDARDS (General Services Administration)
- E. GSA -- U.S. GENERAL SERVICES ADMINISTRATION
- F. USGS -- UNITED STATES GEOLOGICAL SURVEY

**1.09 STATE GOVERNMENT AND RELATED AGENCIES/DOCUMENTS**

- A. CDB -- ILLINOIS CAPITAL DEVELOPMENT BOARD
- B. IDOL -- ILLINOIS DEPARTMENT OF LABOR
- C. IDPH -- ILLINOIS DEPARTMENT OF PUBLIC HEALTH

D. IEPA -- ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

E. OSFM -- OFFICE OF THE ILLINOIS STATE FIRE MARSHAL.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**



**SECTION 01 50 00  
TEMPORARY FACILITIES AND CONTROLS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Temporary telecommunications services.
- B. Temporary sanitary facilities.
- C. Temporary Controls: Barriers, enclosures, and fencing.
- D. Security requirements.
- E. Vehicular access and parking.
- F. Waste removal facilities and services.

**1.02 TELECOMMUNICATIONS SERVICES**

- A. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization.
- B. Telecommunications services shall include:
  - 1. One (1) mobile cellular telephone for each of Contractor's and any Subcontractor's field personnel.

**1.03 TEMPORARY SANITARY FACILITIES**

- A. Use of existing facilities located at lower level is permitted.
- B. Maintain daily in clean and sanitary condition.
- C. At end of construction, return facilities to same or better condition as originally found.

**1.04 BARRIERS**

- A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- B. Provide barricades and covered walkways required by governing authorities for public rights-of-way .
- C. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

**1.05 FENCING**

- A. Provide 6 foot (1.8 m) high fence around construction site; equip with vehicular and pedestrian gates with locks.

**1.06 EXTERIOR ENCLOSURES**

- A. Provide temporary weather tight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required

ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

#### **1.07 INTERIOR ENCLOSURES.**

- A. Provide temporary partitions and ceilings as indicated to separate work areas from Owner-occupied areas, to prevent penetration of dust and moisture into Owner-occupied areas, and to prevent damage to existing materials and equipment.
- B. Construction: Framing and 1/2 inch (min.) plywood sheet materials with closed joints and sealed edges at intersections with existing surfaces.

#### **1.08 SECURITY**

- A. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.

#### **1.09 VEHICULAR ACCESS AND PARKING**

- A. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles.
- B. Coordinate access and haul routes with governing authorities and Owner.
- C. Provide and maintain access to fire hydrants, free of obstructions.
- D. Provide means of removing mud from vehicle wheels before entering streets.
- E. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.

#### **1.10 WASTE REMOVAL**

- A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.
- B. Provide containers with lids. Remove trash from site periodically.
- C. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.
- D. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

#### **PART 2 PRODUCTS - NOT USED**

#### **PART 3 EXECUTION - NOT USED**

**END OF SECTION**

**SECTION 01 60 00  
PRODUCT REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. General product requirements.
- B. Transportation, handling, storage and protection.
- C. Product option requirements.
- D. Substitution limitations and procedures.
- E. Procedures for Owner-supplied products.
- F. Maintenance materials, including extra materials, spare parts, tools, and software.

**1.02 SUBMITTALS**

- A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
  - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

**PART 2 PRODUCTS**

**2.01 NEW PRODUCTS**

- A. Provide new products unless specifically required or permitted by the Contract Documents.
- B. Designed, manufactured, and tested in accordance with industry standards.

**2.02 PRODUCT OPTIONS**

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, or equal to or superior product as approved by Architect in accordance with Section L of the Instruction to Bidders.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for equal to or superior to substitution for any manufacturer not named.

## **2.03 MAINTENANCE MATERIALS**

- A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.
- B. Deliver to Project site and place in location directed by Owner's representative; obtain Owner's signature on receipt for delivery prior to final payment. Submit signed receipts with Closeout Submittals.

## **PART 3 EXECUTION**

### **3.01 SUBSTITUTION PROCEDURES**

- A. Substitutions Prior To Bid Opening: Architect will consider a written request for substitution provided that such request is received at least seven (7) days prior to the Bid opening date. Requests received after that time will not be considered.
  - 1. If a request is approved, the Architect will issue an appropriate addendum not less than three (3) days prior to the Bid opening date.
- B. Substitutions After Notice of Award: Architect and Owner will consider a request for substitution only under one or more of the following conditions:
  - 1. Substitution is required for compliance with final interpretation of code requirements or insurance regulations.
  - 2. Specified product is not available through no fault of the Contractor.
  - 3. Specified product is not compatible with other specified materials/equipment.
  - 4. Manufacturer will not certify or warranty specified product as required.
  - 5. Owner shall have final approval of any substitutions requested after notice of award in accordance with Section 3.01B.
- C. A request for substitution constitutes a representation that the submitter:
  - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
  - 2. Agrees to provide the same warranty for the substitution as for the specified product.
  - 3. Agrees to coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
  - 4. Waives claims for additional costs or time extension that may subsequently become apparent.
  - 5. Agrees to reimburse Owner and Architect for review or redesign services associated with re-approval by authorities having jurisdiction over the Project.
- D. Substitutions of products or product characteristics/components/accessories will not be considered when they are indicated or implied on Contractor's submittals, without separate written request, or when acceptance will require revision to the Contract Documents, whether rejection of said substitutions is expressly identified by Architect on Contractor's submittals or not.

### **3.02 OWNER-SUPPLIED PRODUCTS**

- A. See Section 01 10 00 for identification of Owner-supplied products.
- B. Owner's Responsibilities:

1. Arrange for and deliver Owner reviewed shop drawings, product data, and samples, to Contractor.
2. Arrange and pay for product delivery to site.
3. On delivery, inspect products jointly with Contractor.
4. Submit claims for transportation damage and replace damaged, defective, or deficient items.
5. Arrange for manufacturers' warranties, inspections, and service.

C. Contractor's Responsibilities:

1. Review Owner reviewed shop drawings, product data, and samples.
2. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
3. Handle, store, install and finish products.
4. Repair or replace items damaged after receipt.
5. Make final connections to Owner-provided equipment, and test equipment.

### **3.03 TRANSPORTATION AND HANDLING**

- A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.
- B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.
- C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- D. Transport and handle products in accordance with manufacturer's instructions.
- E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.
- H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

### **3.04 STORAGE AND PROTECTION**

- A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.
- B. Store and protect products in accordance with manufacturers' instructions.
- C. Store with seals and labels intact and legible.
- D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
- E. For exterior storage of fabricated products, place on sloped supports above ground.

- F. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- G. Comply with manufacturer's warranty conditions, if any.
- H. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- I. Prevent contact with material that may cause corrosion, discoloration, or staining.
- J. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- K. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

**END OF SECTION**

**SECTION 01 70 00**  
**EXECUTION AND CLOSEOUT REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Examination, preparation, and general installation procedures.
- B. Pre-installation meetings.
- C. Cutting and patching.
- D. Surveying for laying out the work.
- E. Cleaning and protection.
- F. Starting of systems and equipment.
- G. Demonstration and instruction of Owner personnel.
- H. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.
- I. General requirements for maintenance service.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 30 00 - Administrative Requirements: Submittals procedures, Electronic document submittal service.
- B. Section 01 50 00 - Temporary Facilities and Controls: Temporary exterior enclosures.
- C. Section 01 78 00 - Closeout Submittals: Project record documents, operation and maintenance data, warranties and bonds.
- D. Section 01 79 00 - Demonstration and Training: Demonstration of products and systems to be commissioned and where indicated in specific specification sections
- E. Section 07 84 00 - Firestopping.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.
  - 1. On request, submit documentation verifying accuracy of survey work.
  - 2. Submit a copy of site drawing signed by the Land Surveyor, that the elevations and locations of the work are in conformance with Contract Documents.
  - 3. Submit surveys and survey logs for the project record.
- C. Demolition Plan: Submit demolition plan as specified by OSHA and local authorities.
  - 1. Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences. Include design drawings and calculations for bracing and shoring.
  - 2. Identify demolition firm and submit qualifications.



3. Include a summary of safety procedures.
- D. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
1. Structural integrity of any element of Project.
  2. Integrity of weather exposed or moisture resistant element.
  3. Efficiency, maintenance, or safety of any operational element.
  4. Visual qualities of sight exposed elements.
  5. Work of Owner or separate Contractor.

#### **1.04 QUALIFICATIONS**

- A. For survey work, employ a land surveyor registered in the State in which the Project is located and acceptable to Architect. Submit evidence of Surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate.
- B. For design of temporary shoring and bracing, employ a Professional Structural Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

#### **1.05 PROJECT CONDITIONS**

- A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.
- C. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- D. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
  1. Provide dust-proof barriers between construction areas and areas continuing to be occupied by Owner.
- E. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.
- F. Pest and Rodent Control: Provide methods, means, and facilities to prevent pests and insects from damaging the work.
- G. Rodent Control: Provide methods, means, and facilities to prevent rodents from accessing or invading premises.
- H. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

#### **1.06 COORDINATION**

- A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

- B. Notify affected utility companies and comply with their requirements.
- C. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- D. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- F. Coordinate completion and clean-up of work of separate sections.
- G. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

## **PART 2 PRODUCTS**

### **2.01 PATCHING MATERIALS**

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.
- B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.
- C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 60 00 - Product Requirements.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- E. Verify that utility services are available, of the correct characteristics, and in the correct locations.
- F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

### **3.02 PREPARATION**

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

### **3.03 PREINSTALLATION MEETINGS**

- A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.
- B. Require attendance of parties directly affecting, or affected by, work of the specific section.
- C. Notify Architect four days in advance of meeting date.
- D. Prepare agenda and preside at meeting:
  - 1. Review conditions of examination, preparation and installation procedures.
  - 2. Review coordination with related work.
- E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

### **3.04 LAYING OUT THE WORK**

- A. Verify locations of survey control points prior to starting work.
- B. Promptly notify Architect of any discrepancies discovered.
- C. Protect survey control points prior to starting site work; preserve permanent reference points during construction.
- D. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.
- E. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.
- F. Utilize recognized engineering survey practices.
- G. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
  - 1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
  - 2. Grid or axis for structures.
  - 3. Building foundation, column locations, ground floor elevations.
- H. Periodically verify layouts by same means.
- I. Maintain a complete and accurate log of control and survey work as it progresses.

### **3.05 GENERAL INSTALLATION REQUIREMENTS**

- A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
- B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- E. Make neat transitions between different surfaces, maintaining texture and appearance.

### **3.06 CUTTING AND PATCHING**

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. Perform whatever cutting and patching is necessary to:
  - 1. Complete the work.
  - 2. Fit products together to integrate with other work.
  - 3. Provide openings for penetration of mechanical, electrical, and other services.
  - 4. Match work that has been cut to adjacent work.
  - 5. Repair areas adjacent to cuts to required condition.
  - 6. Repair new work damaged by subsequent work.
  - 7. Remove samples of installed work for testing when requested.
  - 8. Remove and replace defective and non-conforming work.
- C. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.
- D. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
- E. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- F. Restore work with new products in accordance with requirements of Contract Documents.
- G. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- H. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 84 00, to full thickness of the penetrated element.
- I. Patching:
  - 1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
  - 2. Match color, texture, and appearance.

3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

### **3.07 PROGRESS CLEANING**

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

### **3.08 PROTECTION OF INSTALLED WORK**

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- G. Remove protective coverings when no longer needed; reuse or recycle plastic coverings if possible.

### **3.09 SYSTEM STARTUP**

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.
- C. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- D. Verify that wiring and support components for equipment are complete and tested.
- E. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.
- F. Submit a written report that equipment or system has been properly installed and is functioning correctly.

### **3.10 DEMONSTRATION AND INSTRUCTION**

A. See Section 01 79 00 - Demonstration and Training.

### **3.11 ADJUSTING**

A. Adjust operating products and equipment to ensure smooth and unhindered operation.

### **3.12 FINAL CLEANING**

A. Execute final cleaning prior to final project assessment.

1. Clean areas to be occupied by Owner prior to final completion before Owner occupancy.

B. Use cleaning materials that are nonhazardous.

C. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.

D. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.

E. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.

F. Clean filters of operating equipment.

G. Clean debris from roofs, gutters, downspouts, scuppers, overflow drains, area drains, and drainage systems.

H. Clean site; sweep paved areas, rake clean landscaped surfaces.

I. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

### **3.13 CLOSEOUT PROCEDURES**

A. Make submittals that are required by governing or other authorities.

B. Accompany Project Coordinator on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's Notice of Substantial Completion.

C. Notify Architect when work is considered ready for Architect's Substantial Completion inspection.

D. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's Substantial Completion inspection.

E. Conduct Substantial Completion inspection and create Final Correction Punch List containing Architect's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Architect.

F. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.

- G. Notify Architect when work is considered finally complete and ready for Architect's Substantial Completion final inspection.
- H. Complete items of work determined by Architect listed in executed Certificate of Substantial Completion.

### **3.14 MAINTENANCE**

- A. Provide service and maintenance of components indicated in specification sections.
- B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.
- C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.
- D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.
- E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

**END OF SECTION**



**SECTION 01 78 00  
CLOSEOUT SUBMITTALS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Project Record Documents.
- B. Operation and Maintenance Data.
- C. Warranties and bonds.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 30 00 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
- B. Individual Product Sections: Specific requirements for operation and maintenance data.
- C. Individual Product Sections: Warranties required for specific products or Work.

**1.03 SUBMITTALS**

- A. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.
- B. Operation and Maintenance Data:
  - 1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return one copy with comments.
  - 2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
  - 3. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
  - 4. Submit two sets of revised final documents in final form within 10 days after final inspection.
- C. Warranties and Bonds:
  - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
  - 2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
  - 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 PROJECT RECORD DOCUMENTS**

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
  - 1. Drawings.

2. Addenda.
  3. Change Orders and other modifications to the Contract.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
  - C. Store record documents separate from documents used for construction.
  - D. Record information concurrent with construction progress.
  - E. Record Drawings : Legibly mark each item to record actual construction including:
    1. Field changes of dimension and detail.
    2. Details not on original Contract drawings.

### **3.02 OPERATION AND MAINTENANCE DATA**

- A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
- B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
- D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

### **3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES**

- A. For Each Product, Applied Material, and Finish:
- B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.
- C. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

### **3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS**

- A. For Each Item of Equipment and Each System:
  1. Description of unit or system, and component parts.
  2. Identify function, normal operating characteristics, and limiting conditions.
  3. Include performance curves, with engineering data and tests.
  4. Complete nomenclature and model number of replaceable parts.
- B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

- C. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- D. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- E. Provide servicing and lubrication schedule, and list of lubricants required.
- F. Include manufacturer's printed operation and maintenance instructions.
- G. Include sequence of operation by controls manufacturer.
- H. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- I. Additional Requirements: As specified in individual product specification sections.

### **3.05 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS**

- A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.
- B. Where systems involve more than one specification section, provide separate tabbed divider for each system.
- C. Prepare instructions and data by personnel experienced in maintenance and operation of described products.
- D. Prepare data in the form of an instructional manual.
- E. Binders: Commercial quality, 8-1/2 by 11 inch (216 by 280 mm) three D side ring binders with durable plastic covers; 2 inch (50 mm) maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
- F. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.
- G. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.
- H. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.
- I. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.
- J. Text: Manufacturer's printed data, or typewritten data on 24 pound paper.
- K. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

### **3.06 WARRANTIES AND BONDS**

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.
- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Co-execute submittals when required.
- D. Retain warranties and bonds until time specified for submittal.

**END OF SECTION**

**SECTION 01 79 00  
DEMONSTRATION AND TRAINING**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Demonstration of products and systems where indicated in specific specification sections.
- B. Training of Owner personnel in operation and maintenance is required for:
  - 1. All software-operated systems.
  - 2. HVAC systems and equipment.
  - 3. Electrical systems and equipment.
  - 4. Items specified in individual product Sections.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 78 00 - Closeout Submittals: Operation and maintenance manuals.
- B. Other Specification Sections: Additional requirements for demonstration and training.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Training Plan: Owner will designate personnel to be trained; tailor training to needs and skill-level of attendees.
  - 1. Submit to Architect for transmittal to Owner.
  - 2. Submit not less than four weeks prior to start of training.
  - 3. Revise and resubmit until acceptable.
  - 4. Provide an overall schedule showing all training sessions.
  - 5. Include at least the following for each training session:
    - a. Identification, date, time, and duration.
    - b. Description of products and/or systems to be covered.
    - c. Name of firm and person conducting training; include qualifications.
    - d. Intended audience, such as job description.
    - e. Objectives of training and suggested methods of ensuring adequate training.
    - f. Methods to be used, such as classroom lecture, live demonstrations, hands-on, etc.
    - g. Media to be used, such as slides, hand-outs, etc.
    - h. Training equipment required, such as projector, projection screen, etc., to be provided by Contractor.
- C. Training Reports:
  - 1. Identification of each training session, date, time, and duration.
  - 2. Sign-in sheet showing names and job titles of attendees.
  - 3. List of attendee questions and written answers given, including copies of and references to supporting documentation required for clarification; include answers to questions that could not be answered in original training session.

## **1.04 QUALITY ASSURANCE**

- A. Instructor Qualifications: Familiar with design, operation, maintenance and troubleshooting of the relevant products and systems.
  - 1. Provide as instructors the most qualified trainer of those contractors and/or installers who actually supplied and installed the systems and equipment.
  - 2. Where a single person is not familiar with all aspects, provide specialists with necessary qualifications.

## **PART 2 PRODUCTS - NOT USED**

## **PART 3 EXECUTION**

### **3.01 DEMONSTRATION - GENERAL**

- A. Demonstrations conducted during system start-up do not qualify as demonstrations for the purposes of this section, unless approved in advance by Owner.
- B. Demonstration may be combined with Owner personnel training if applicable.
- C. Operating Equipment and Systems: Demonstrate operation in all modes, including start-up, shut-down, seasonal changeover, emergency conditions, and troubleshooting, and maintenance procedures, including scheduled and preventive maintenance.
  - 1. Perform demonstrations not less than two weeks prior to Substantial Completion.
  - 2. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- D. Non-Operating Products: Demonstrate cleaning, scheduled and preventive maintenance, and repair procedures.
  - 1. Perform demonstrations not less than two weeks prior to Substantial Completion.

### **3.02 TRAINING - GENERAL**

- A. Conduct training on-site unless otherwise indicated.
- B. Owner will provide classroom and seating at no cost to Contractor.
- C. Provide training in minimum two hour segments.
- D. Training schedule will be subject to availability of Owner's personnel to be trained; re-schedule training sessions as required by Owner; once schedule has been approved by Owner failure to conduct sessions according to schedule will be cause for Owner to charge Contractor for personnel "show-up" time.
- E. Review of Facility Policy on Operation and Maintenance Data: During training discuss:
  - 1. The location of the O&M manuals and procedures for use and preservation; backup copies.
  - 2. Typical contents and organization of all manuals, including explanatory information, system narratives, and product specific information.
  - 3. Typical uses of the O&M manuals.
- F. Product- and System-Specific Training:
  - 1. Review the applicable O&M manuals.

2. For systems, provide an overview of system operation, design parameters and constraints, and operational strategies.
  3. Review instructions for proper operation in all modes, including start-up, shut-down, seasonal changeover and emergency procedures, and for maintenance, including preventative maintenance.
  4. Provide hands-on training on all operational modes possible and preventive maintenance.
  5. Emphasize safe and proper operating requirements; discuss relevant health and safety issues and emergency procedures.
  6. Discuss common troubleshooting problems and solutions.
  7. Discuss any peculiarities of equipment installation or operation.
  8. Discuss warranties and guarantees, including procedures necessary to avoid voiding coverage.
  9. Review recommended tools and spare parts inventory suggestions of manufacturers.
  10. Review spare parts and tools required to be furnished by Contractor.
  11. Review spare parts suppliers and sources and procurement procedures.
- G. Be prepared to answer questions raised by training attendees; if unable to answer during training session, provide written response within three days.

**END OF SECTION**



**SECTION 02 41 00  
DEMOLITION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Selective demolition of building elements for alteration purposes.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 10 00 - Summary: Limitations on Contractor's use of site and premises.
- B. Section 01 50 00 - Temporary Facilities and Controls: Protective barriers and waste removal.
- C. Section 01 70 00 - Execution and Closeout Requirements: Project conditions and existing construction to remain.

**1.03 REFERENCE STANDARDS**

- A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.

**PART 2 PRODUCTS -- NOT USED**

**PART 3 EXECUTION**

**3.01 SCOPE**

- A. Remove portions of existing building surfaces to accommodate new materials installation.
- B. Remove concrete slabs on grade as indicated on drawings.
- C. Remove other items indicated, for salvage, relocation, and recycling.

**3.02 GENERAL PROCEDURES AND PROJECT CONDITIONS**

- A. Comply with other requirements specified in Section 01 70 00.
- B. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
  - 1. Obtain required permits.
  - 2. Provide, erect, and maintain temporary barriers and security devices.
  - 3. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
  - 4. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
  - 5. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
- C. If hazardous materials are discovered during removal operations, stop work and notify Architect and Owner; hazardous materials include regulated asbestos containing materials, lead, PCB's, and mercury.
- D. Perform demolition in a manner that maximizes salvage and recycling of materials.

1. Dismantle existing construction and separate materials.
2. Set aside reusable, recyclable, and salvageable materials; store and deliver to collection point or point of reuse.

### **3.03 SELECTIVE DEMOLITION FOR ALTERATIONS**

- A. Drawings showing existing construction are based on casual field observation and existing record documents only.
  1. Verify that construction are as shown.
  2. Report discrepancies to Architect before disturbing existing installation.
  3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.
- B. Separate areas in which demolition is being conducted from other areas that are still occupied.
  1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 01 50 00 .
- C. Remove existing work as indicated and as required to accomplish new work.
  1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction specified.
  2. Remove items indicated on drawings.
- D. Services (Including but not limited to HVAC, Plumbing, Fire Protection, and Electrical): Remove existing systems and equipment as indicated.
  1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.
  2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
  3. See Section 01 10 00 for other limitations on outages and required notifications.
  4. Verify that abandoned services serve only abandoned facilities before removal.
  5. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification.
- E. Protect existing work to remain.
  1. Prevent movement of structure; provide shoring and bracing if necessary.
  2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
  3. Repair adjacent construction and finishes damaged during removal work.
  4. Patch as specified for patching new work.

### **3.04 DEBRIS AND WASTE REMOVAL**

- A. Remove debris, junk, and trash from site.
- B. Leave site in clean condition, ready for subsequent work.
- C. Clean up spillage and wind-blown debris from public and private lands.

**END OF SECTION**

**SECTION 03 10 00  
CONCRETE FORMING AND ACCESSORIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Formwork for cast-in place concrete, with shoring, bracing and anchorage.
- B. Openings for other work.
- C. Form accessories.
- D. Form stripping.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 20 00 - Concrete Reinforcing.
- B. Section 03 30 00 - Cast-in-Place Concrete.

**1.03 REFERENCE STANDARDS**

- A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials; 2010.
- B. ACI 301 - Specifications for Structural Concrete; 2010 (Errata 2012).
- C. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2011.
- D. ACI 347R - Guide to Formwork for Concrete; 2014.
- E. PS 1 - Structural Plywood; 2009.

**1.04 DESIGN REQUIREMENTS**

- A. Design, engineer and construct formwork, shoring and bracing to conform to design and code requirements; resultant concrete to conform to required shape, line and dimension.

**1.05 QUALITY ASSURANCE**

- A. Perform work of this section in accordance with ACI 347, ACI 301, and ACI 318.

**PART 2 PRODUCTS**

**2.01 FORMWORK - GENERAL**

- A. Provide concrete forms, accessories, shoring, and bracing as required to accomplish cast-in-place concrete work.
- B. Design and construct to provide resultant concrete that conforms to design with respect to shape, lines, and dimensions.
- C. Chamfer outside corners of beams, joists, columns, walls and locations shown on the drawings.
- D. Comply with applicable State and local codes with respect to design, fabrication, erection, and removal of formwork.
- E. Comply with relevant portions of ACI 347, ACI 301, and ACI 318.

## **2.02 WOOD FORM MATERIALS**

A. Form Materials: At the discretion of the Contractor.

## **2.03 FORMWORK ACCESSORIES**

A. Form Release Agent: Capable of releasing forms from hardened concrete without staining or discoloring concrete or forming bugholes and other surface defects, compatible with concrete and form materials, and not requiring removal for satisfactory bonding of coatings to be applied.

1. Composition: Colorless mineral oil-based compound.
2. Do not use materials containing diesel oil or petroleum-based compounds.

B. Filler Strips for Chamfered Corners: Rigid plastic type; 3/4 x 3/4 inch size; maximum possible lengths.

C. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

### **3.02 ERECTION - FORMWORK**

A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.

B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.

C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.

D. Align joints and make watertight. Keep form joints to a minimum.

E. Obtain approval before framing openings in structural members that are not indicated on drawings.

F. Provide fillet and chamfer strips on external corners of exposed corners.

G. Coordinate this section with other sections of work that require attachment of components to formwork.

H. If formwork is placed after reinforcement, resulting in insufficient concrete cover over reinforcement, request instructions from Architect before proceeding.

### **3.03 APPLICATION - FORM RELEASE AGENT**

A. Apply form release agent on formwork in accordance with manufacturer's recommendations.

B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.

- C. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

### **3.04 INSERTS, EMBEDDED PARTS, AND OPENINGS**

- A. Provide formed openings where required for items to be embedded in passing through concrete work.
- B. Locate and set in place items that will be cast directly into concrete.
- C. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.
- D. Install accessories in accordance with manufacturer's instructions, so they are straight, level, and plumb. Ensure items are not disturbed during concrete placement.
- E. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

### **3.05 FORM CLEANING**

- A. Clean forms as erection proceeds, to remove foreign matter within forms.
- B. Clean formed cavities of debris prior to placing concrete.
  - 1. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.
  - 2. During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

### **3.06 FORMWORK TOLERANCES**

- A. Construct formwork to maintain tolerances required by ACI 117, unless otherwise indicated.

### **3.07 FIELD QUALITY CONTROL**

- A. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and to verify that supports, fastenings, wedges, ties, and items are secure.
- B. Do not reuse wood formwork more than 2 times for concrete surfaces to be exposed to view. Do not patch formwork.

### **3.08 FORM REMOVAL**

- A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.
- B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.
- C. Store removed forms to prevent damage to form materials or to fresh concrete. Discard damaged forms.

**END OF SECTION**



**SECTION 03 20 00  
CONCRETE REINFORCING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Reinforcing steel for cast-in-place concrete.
- B. Supports and accessories for steel reinforcement.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-in-Place Concrete.

**1.03 REFERENCE STANDARDS**

- A. ACI 301 - Specifications for Structural Concrete; 2010 (Errata 2012).
- B. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2011.
- C. ACI SP-66 - ACI Detailing Manual; 2004.
- D. ASTM A82/A82M - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement; 2007.
- E. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement; 2015.
- F. WWR-500- Manual of Standard Practice; Structural Welded Wire Reinforcement; Wire Reinforcement Institute; latest edition.
- G. CRSI (DA4) - Manual of Standard Practice; Concrete Reinforcing Steel Institute; latest edition.
- H. CRSI (P1) - Placing Reinforcing Bars; 2011.

**1.04 SUBMITTALS**

- A. Shop Drawings: Comply with requirements of ACI SP-66. Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.

**1.05 QUALITY ASSURANCE**

- A. Perform work of this section in accordance with ACI 301 and ACI 318.

**PART 2 PRODUCTS**

**2.01 REINFORCEMENT**

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 - 60,000 psi (420 MPa).
  - 1. Deformed billet-steel bars.
  - 2. Unfinished.
- B. Steel Welded Wire Reinforcement (WWR): Plain type; ASTM A1064/A1064M.
  - 1. Form: Flat Sheets.
  - 2. WWF: Wire Gauge: W6x6; W2.1 x W2.1.
- C. Reinforcement Accessories:



1. Tie Wire: Annealed, minimum 16 gage, 0.0508 inch (1.29 mm).
2. Chairs, Bolsters, Bar Supports, Spacers: Factory made wire bar supports sized and shaped for adequate support of reinforcement during concrete placement.

## **2.02 FABRICATION**

- A. Fabricate concrete reinforcing in accordance with CRSI (DA4) - Manual of Standard Practice.
- B. Welding of reinforcement is not permitted.
- C. Locate reinforcing splices not indicated on drawings at point of minimum stress.
  1. Review locations of splices with Architect.

## **PART 3 EXECUTION**

### **3.01 PLACEMENT**

- A. Place, support and secure reinforcement against displacement. Do not deviate from required position. Reinforcing "pull-up" during placement of concrete not acceptable.
- B. Accommodate placement of formed openings.
- C. Conform to applicable code for concrete cover over reinforcement.

### **3.02 FIELD QUALITY CONTROL**

- A. An independent testing agency, as specified in Section 01 40 00, will inspect installed reinforcement for conformance to contract documents before concrete placement.
- B. Provide free access to concrete operations at project site and cooperate with the appointed firm.

**END OF SECTION**

**SECTION 03 30 00  
CAST-IN-PLACE CONCRETE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Concrete Slabs on Grade.
- B. Joint devices and accessories associated with concrete work.
- C. Miscellaneous concrete elements, including equipment pads.
- D. Concrete curing.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 10 00 - Concrete Forming and Accessories.
- B. Section 03 20 00 - Concrete Reinforcing.

**1.03 REFERENCE STANDARDS**

- A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials; 2010.
- B. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; 1991 (Reapproved 2009).
- C. ACI 301 - Specifications for Structural Concrete; 2010 (Errata 2012).
- D. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000.
- E. ACI 305R - Hot Weather Concreting; 2010.
- F. ACI 306R - Cold Weather Concreting; 2010.
- G. ACI 308R - Guide to Curing Concrete; 2001 (Reapproved 2008).
- H. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2011.
- I. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2013.
- J. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2015.
- K. ASTM C150/C150M - Standard Specification for Portland Cement; 2015.
- L. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete; 2007.
- M. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a.
- N. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2011.
- O. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2013.
- P. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2015.

- Q. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types); 2004 (Reapproved 2013).

#### **1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.
- C. Mix Designs: Submit 15 days prior to start of work.
1. Submit for each type of concrete specified.
  2. Include back-up test data.
  3. Indicate proposed mix design complies with requirements of ACI 301, Section 4 - Concrete Mixtures.
  4. Indicate proposed mix design complies with requirements of ACI 318, Chapter 5 - Concrete Quality, Mixing and Placing.

#### **1.05 QUALITY ASSURANCE**

- A. Perform work of this section in accordance with ACI 301 and ACI 318.
- B. Acquire cement from same source and aggregate from same source for entire project.
- C. Follow recommendations of ACI 305R when concreting during hot weather.
- D. Follow recommendations of ACI 306R when concreting during cold weather.

### **PART 2 PRODUCTS**

#### **2.01 FORMWORK**

- A. Comply with requirements of Section 03 10 00.

#### **2.02 REINFORCEMENT**

- A. Comply with requirements of Section 03 20 00.

#### **2.03 CONCRETE MATERIALS**

- A. Cement: ASTM C150, Type I - Normal Portland type.
- B. Fine and Coarse Aggregates: ASTM C 33.
- C. Fly Ash: ASTM C618, Class C.
- D. Water: Clean and not detrimental to concrete.

#### **2.04 ADMIXTURES**

- A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.
- B. Air Entrainment Admixture: ASTM C260/C260M.

- C. High Range Water Reducing and Retarding Admixture: ASTM C494/C494M Type G.
- D. High Range Water Reducing Admixture: ASTM C494/C494M Type F.
- E. Water Reducing and Accelerating Admixture: ASTM C494/C494M Type E.
- F. Water Reducing and Retarding Admixture: ASTM C494/C494M Type D.
- G. Accelerating Admixture: ASTM C494/C494M Type C.
- H. Retarding Admixture: ASTM C494/C494M Type B.
- I. Water Reducing Admixture: ASTM C494/C494M Type A.

## **2.05 ACCESSORY MATERIALS**

- A. Bonding Agent: ASTM C 1059, Type II acrylic non-redispersable type.
- B. Liquid Curing Compound: ASTM C 309, Type 1, clear or translucent.

## **2.06 BONDING AND JOINTING PRODUCTS**

- A. Latex Bonding Agent: Non-redispersable acrylic latex, complying with ASTM C1059/C1059M, Type II.
  - 1. Products:
    - a. Kaufman Products Inc.; SureBond: [www.kaufmanproducts.net](http://www.kaufmanproducts.net).
    - b. SpecChem, LLC; Strong Bond Acrylic Bonder: [www.specchemllc.com/sle](http://www.specchemllc.com/sle).
    - c. W.R. Meadows, Inc.; ACRY-LOK-: [www.wrmeadows.com/sle](http://www.wrmeadows.com/sle).
    - d. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Slab Isolation Joint Filler: 1/2 inch (13 mm) thick, height equal to slab thickness, with removable top section that will form 1/2 inch (13 mm) deep sealant pocket after removal.
  - 1. Material: ASTM D1751, cellulose fiber.
- C. Slab Contraction Joint Device: Preformed linear strip intended for pressing into wet concrete to provide straight route for shrinkage cracking.

## **2.07 CURING MATERIALS**

- A. Curing Compound, Naturally Dissipating: Clear, water-based, liquid membrane-forming compound; complying with ASTM C309.
- B. Water: Potable, not detrimental to concrete.

## **2.08 CONCRETE MIX DESIGN**

- A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
- B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
  - 1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.
- C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended by manufacturer. Submit to Architect for review and approval.

D. Normal Weight Concrete: Type "A".

1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: 4,000 pounds per square inch (27.6 MPa).
2. Fly Ash Content: Maximum 15 percent of cementitious materials by weight.
3. Water-Cement Ratio: Maximum 48 percent by weight.
4. Total Air Content: 2 percent, determined in accordance with ASTM C 173/C 173M.
5. Maximum Slump: 4 inches (100 mm).
6. Maximum Aggregate Size: 3/4 inch (19 mm).

E. Normal Weight Concrete: Type "D".

1. Compressive Strength, when tested in accordance with ASTM C 39/C 39M at 28 days: 4,500 psi.
2. Fly Ash Content: Maximum 15 percent of cementitious materials by weight.
3. Water-Cement Ratio: Maximum 44 percent by weight.
4. Total Air Content: 6 percent, determined in accordance with ASTM C 173/C 173M.
5. Maximum Slump: 4 inches (100 mm).
6. Maximum Aggregate Size: 3/4 inch (19 mm).

## **2.09 MIXING**

- A. Transit Mixers: Comply with ASTM C94/C94M.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify lines, levels, and dimensions before proceeding with work of this section.

### **3.02 PREPARATION**

- A. Verify that forms are clean and free of rust before applying release agent.
- B. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.
- C. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.
1. Use latex bonding agent only for non-load-bearing applications.

### **3.03 PLACING CONCRETE**

- A. Place concrete in accordance with ACI 304R.
- B. Place concrete for floor slabs in accordance with ACI 302.1R.
- C. Notify Architect not less than 24 hours prior to commencement of placement operations.
- D. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
- E. Ensure reinforcement and embedded parts will not be disturbed during concrete placement.

### **3.04 SLAB JOINTING**

- A. Locate joint in center of long direction of the slab/pad.
- B. Anchor joint fillers and devices to prevent movement during concrete placement.
- C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.
  - 1. Install wherever necessary to separate slab from other building members, including columns, walls, equipment foundations, footings, stairs, manholes, sumps, and drains.
- D. Load Transfer Construction and Contraction Joints: Install load transfer devices as indicated; saw cut joint at surface as indicated for contraction joints.
- E. Saw Cut Contraction Joints: Saw cut joints before concrete begins to cool, within 4 to 12 hours after placing; use 3/16 inch (5 mm) thick blade and cut at least 1 inch (25 mm) deep but not less than one quarter (1/4) the depth of the slab.
- F. Install joint devices in accordance with manufacturer's instructions.
- G. Place concrete continuously between predetermined expansion, control, and construction joints.
- H. Do not interrupt successive placement; do not permit cold joints to occur.

### **3.05 FLOOR FLATNESS AND LEVELNESS TOLERANCES**

- A. Screed slabs on grade level, maintaining the following minimum F(F) Floor Flatness and F(L) Floor Levelness values when measured in accordance with ASTM E 1155/ASTM E 1155M.
  - 1. F(F): Specified Overall Value (SOV) of 35; Minimum Localized Value (MLV) of 24.
  - 2. F(L): Specified Overall Value (SOV) of 25; Minimum Localized Value (MLV) of 17.
- B. Correct the slab surface if tolerances are less than specified.
- C. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

### **3.06 CONCRETE FINISHING**

- A. Repair surface defects, including tie holes, immediately after removing formwork.
- B. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch (6 mm) or more in height.
- C. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch (6 mm) or more in height. Provide finish as follows:
  - 1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.
- D. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
  - 1. Other Surfaces to Be Left Exposed: Trowel as described in ACI 302.1R, minimizing burnish marks and other appearance defects.
  - 2. Provide 3/4" radiused edge on exposed slab edges, unless otherwise noted.

### 3.07 CURING AND PROTECTION

- A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
- C. Surfaces Not in Contact with Forms:
  - 1. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water ponding, water-saturated sand, water-fog spray, or saturated burlap.
    - a. Spraying: Spray water over floor slab areas and maintain wet.
    - b. Saturated Burlap: Saturate burlap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides; maintain in place.
  - 2. Final Curing: Begin after initial curing but before surface is dry.
    - a. Moisture-Retaining Sheet: Lap strips not less than 3 inches (75 mm) and seal with waterproof tape or adhesive; secure at edges.
    - b. Curing Compound: Apply in two coats at right angles, using application rate recommended by manufacturer.

### 3.08 FIELD QUALITY CONTROL

- A. Provide free access to concrete operations at project site and cooperate with appointed firm.

### 3.09 DEFECTIVE CONCRETE

- A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.
- B. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.
- C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.

### 3.10 PROTECTION

- A. Do not permit traffic over unprotected concrete floor surface until fully cured.

### 3.11 SCHEDULE - CONCRETE TYPES AND FINISHES

Location	Mix Type	Concrete Finish
A. Interior slab-on-grade	A	troweled
B. Equipment pads: Exterior	D	sides: smooth form top: non-slip

**END OF SECTION**

**SECTION 04 05 11  
MORTAR AND MASONRY GROUT**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Mortar for masonry.

**1.02 RELATED REQUIREMENTS**

- A. Section 04 20 02 - Single-Wythe Unit Masonry: Installation of mortar.

**1.03 REFERENCE STANDARDS**

- A. ASTM C5 - Standard Specification for Quicklime for Structural Purposes; 2010.
- B. ASTM C91/C91M - Standard Specification for Masonry Cement; 2012.
- C. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2011.
- D. ASTM C150/C150M - Standard Specification for Portland Cement; 2015.
- E. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2006 (Reapproved 2011).
- F. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2014a.
- G. ASTM C387/C387M - Standard Specification for Packaged, Dry, Combined Materials for Concrete and High Strength Mortar; 2011b.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Include design mix and indicate whether the Proportion or Property specification of ASTM C270 is to be used. Also include required environmental conditions and admixture limitations.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Maintain packaged materials clean, dry, and protected against dampness, freezing, and foreign matter.

**1.06 FIELD CONDITIONS**

- A. Maintain materials and surrounding air temperature to minimum 40 degrees F (5 degrees C) prior to, during, and 48 hours after completion of masonry work.
- B. Maintain materials and surrounding air temperature to maximum 90 degrees F (32 degrees C) prior to, during, and 48 hours after completion of masonry work.



## **PART 2 PRODUCTS**

### **2.01 MORTAR AND GROUT APPLICATIONS**

- A. At Contractor's option, mortar and grout may be field-mixed from packaged dry materials, made from factory premixed dry materials with addition of water only, or ready-mixed.
- B. Mortar Mix Designs: ASTM C270, Property Specification.
  - 1. Interior, Loadbearing Masonry: Type N.
  - 2. Interior, Non-loadbearing Masonry: Type N.

### **2.02 MATERIALS**

- A. Packaged Dry Material for Mortar for Unit Masonry: Premixed Portland cement, hydrated lime, and sand; complying with ASTM C387/C387M and capable of producing mortar of the specified strength in accordance with ASTM C270 with the addition of water only.
  - 1. Color: Standard gray.
- B. Packaged Dry Material for Mortar for Repointing: Premixed Portland cement, hydrated lime, and graded sand; capable of producing Type O mortar in accordance with ASTM C270 with the addition of water only.
  - 1. Color: Standard gray.
- C. Portland Cement: ASTM C150/C150M.
  - 1. Type: Type I - Normal.
  - 2. Color: Standard gray.
- D. Masonry Cement: ASTM C91.
  - 1. Type: Type N.
- E. Hydrated Lime: ASTM C207, Type S.
- F. Quicklime: ASTM C5, non-hydraulic type.
- G. Mortar Aggregate: ASTM C144.
- H. Water: Clean and potable.
- I. Bonding Agent: Latex type.

### **2.03 MORTAR MIXING**

- A. Thoroughly mix mortar ingredients using mechanical batch mixer, in accordance with ASTM C270 and in quantities needed for immediate use.
- B. Maintain sand uniformly damp immediately before the mixing process.
- C. Do not use anti-freeze compounds to lower the freezing point of mortar.
- D. If water is lost by evaporation, re-temper only within two hours of mixing.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Apply bonding agent to existing concrete surfaces.
- B. Plug clean-out holes for grouted masonry with block masonry units. Brace masonry to resist wet grout pressure.

### **3.02 INSTALLATION**

- A. Install mortar to requirements of section(s) in which masonry is specified.
- B. Remove excess mortar from grout spaces.

**END OF SECTION**

**SECTION 04 20 02**  
**SINGLE-WYTHE UNIT MASONRY**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Concrete masonry units.
- B. Reinforcement, anchorage, and accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 04 05 11 - Mortar and Masonry Grout: Mortar and grout for single wythe unit masonry.
- B. Section 07 84 00 - Firestopping: Firestopping at penetrations of masonry work.
- C. Section 07 90 05 - Joint Sealers: Sealing control and expansion joints.

**1.03 REFERENCE STANDARDS**

- A. ACI 530/530.1/ERTA - Building Code Requirements and Specification for Masonry Structures and Related Commentaries; 2011.
- B. ASTM A82/A82M - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement; 2007.
- C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- D. ASTM A641/A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire; 2009a (Reapproved 2014).
- E. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2015.
- F. ASTM C129 - Standard Specification for Nonloadbearing Concrete Masonry Units; 2011.
- G. ASTM C140/C140M - Standard Test Methods of Sampling and Testing Concrete Masonry Units and Related Units; 2014.
- H. UL (FRD) - Fire Resistance Directory; current edition.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for concrete masonry units and fabricated wire reinforcement.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

**1.05 QUALITY ASSURANCE**

- A. Comply with provisions of ACI 530/530.1/ERTA, except where exceeded by requirements of the contract documents.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

## **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

## **1.07 FIELD CONDITIONS**

- A. Maintain materials and surrounding air temperature to minimum 40 degrees F (5 degrees C) prior to, during, and 48 hours after completion of masonry work.
- B. Maintain materials and surrounding air temperature to maximum 90 degrees F (32 degrees C) prior to, during, and 48 hours after completion of masonry work.

## **PART 2 PRODUCTS**

### **2.01 CONCRETE MASONRY UNITS**

- A. Concrete Block: Comply with referenced standards and as follows:
  - 1. Size: Standard units with nominal face dimensions of 16 x 8 inches (400 x 200 mm) and nominal depths to match existing wall thicknesses for specific locations.
  - 2. Non-Loadbearing Units: ASTM C129.
    - a. Hollow block, as indicated.
    - b. Normal weight.

### **2.02 MORTAR MATERIALS**

- A. Mortar: As specified in Section 04 05 11.

### **2.03 REINFORCEMENT AND ANCHORAGE**

- A. Single Wythe Joint Reinforcement: Truss type; ASTM A1064/A1064M steel wire, mill galvanized to ASTM A641/A641M, Class 3; 0.1483 inch (3.8 mm) side rods with 0.1483 inch (3.8 mm) cross rods; width as required to provide not more than 1 inch (25 mm) and not less than 1/2 inch (13 mm) of mortar coverage on each exposure.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field conditions are acceptable and are ready to receive masonry.

### **3.02 PREPARATION**

- A. Direct and coordinate placement of metal anchors supplied for installation under other sections.
- B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

### **3.03 COURSING**

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

C. Concrete Masonry Units:

1. Bond: Running or Stacked to match existing.
2. Coursing: One unit and one mortar joint to equal 8 inches (200 mm).
3. Mortar Joints: Concave.

**3.04 PLACING AND BONDING**

- A. Lay hollow masonry units with face shell bedding on head and bed joints.
- B. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- C. Remove excess mortar as work progresses.
- D. Interlock intersections and external corners.
- E. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- F. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- G. Cut mortar joints flush where wall tile is scheduled or resilient base is scheduled.

**3.05 REINFORCEMENT AND ANCHORAGE**

- A. Install horizontal joint reinforcement 16 inches (400 mm) on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches (400 mm) each side of opening.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches (150 mm).

**3.06 TOLERANCES**

- A. Maximum Variation From Unit to Adjacent Unit: 1/16 inch (1.6 mm).
- B. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft (6 mm/3 m) and 1/2 inch in 20 ft (13 mm/6 m) or more.
- C. Maximum Variation from Plumb: 1/4 inch (6 mm) per story non-cumulative; 1/2 inch (13 mm) in two stories or more.
- D. Maximum Variation from Level Coursing: 1/8 inch in 3 ft (3 mm/m) and 1/4 inch in 10 ft (6 mm/3 m); 1/2 inch in 30 ft (13 mm/9 m).
- E. Maximum Variation of Joint Thickness: Head joint, minus 1/4 inch, plus 3/8 inch (minus 6.4 mm, plus 9.5 mm).
- F. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch (6 mm).

**3.07 CUTTING AND FITTING**

- A. Cut and fit for chases. Coordinate with other sections of work to provide correct size, shape, and location.

- B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

### **3.08 CLEANING**

- A. Remove excess mortar and mortar smears as work progresses.
- B. Use non-metallic tools in cleaning operations.

**END OF SECTION**

**SECTION 05 50 00  
METAL FABRICATIONS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

A. Shop fabricated steel items.

**1.02 RELATED REQUIREMENTS**

A. Section 03 30 00 - Cast-in-Place Concrete: Placement of metal fabrications in concrete.

B. Section 09 90 00 - Painting and Coating: Paint finish.

**1.03 REFERENCE STANDARDS**

A. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.

B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.

C. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2014.

D. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2014.

E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.

F. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.

G. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015.

H. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).

I. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

J. SSPC-SP 2 - Hand Tool Cleaning; 1982 (Ed. 2004).

**1.04 SUBMITTALS**

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.

1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

C. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.

1. Anchoring epoxy and expansion/wedge anchors.

D. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is accredited under IAS AC172.

## **1.05 QUALITY ASSURANCE**

A. Fabricator: Company holding the contract for the work of this Section must be a fabricator, not a broker, and must self-perform all the work of this Section.

## **PART 2 PRODUCTS**

### **2.01 MATERIALS - STEEL**

- A. Steel Angles, Plates, and Channels: ASTM A36/A36M.
- B. Steel W Shapes and Tees: ASTM A992/A992M.
- C. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.
- D. Bolts, Nuts, and Washers: ASTM A325 (ASTM A325M), Type 1, plain.
- E. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- F. Touch-Up Primer for Galvanized Surfaces: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction; compatible with scheduled painted finish or coating specified in related Sections.

### **2.02 ACCESSORY MATERIALS**

- A. Anchoring Epoxy: Refer to drawings. Acceptable manufacturer's include...
  - 1. Hilti: HIT-HY-150 fast curing injection system.
  - 2. Simpson Strong-Tie: SET-XP high-strength anchoring adhesive.
  - 3. Powers Fasteners: Pure110+ epoxy injection adhesive anchoring system.
- B. Expansion Anchors: Refer to drawings. Acceptable manufacturer's include...
  - 1. Hilti: Kwik Bolt 3 expansion anchor.
  - 2. Simpson Strong-Tie: Strong-Bolt 2 wedge anchor.

### **2.03 FABRICATION**

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Continuously seal joined members by continuous welds.
- D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- F. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.



## **2.04 FABRICATED ITEMS**

- A. Ledge Angles and Shelf Angles Not Attached to Structural Framing: For support of open metal grating; finish as scheduled below.

## **2.05 FINISHES - STEEL**

- A. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements.
- B. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements.

## **2.06 FABRICATION TOLERANCES**

- A. Squareness: 1/8 inch (3 mm) maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch (1.5 mm).
- C. Maximum Misalignment of Adjacent Members: 1/16 inch (1.5 mm).
- D. Maximum Bow: 1/8 inch (3 mm) in 48 inches (1.2 m).
- E. Maximum Deviation From Plane: 1/16 inch (1.5 mm) in 48 inches (1.2 m).

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field conditions are acceptable and are ready to receive work.

### **3.02 PREPARATION**

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

### **3.03 INSTALLATION**

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Field weld components where required .
- D. Field weld components indicated on drawings and shop drawings.
- E. Perform field welding in accordance with AWS D1.1/D1.1M.
- F. Obtain approval prior to site cutting or making adjustments not scheduled.
- G. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

### **3.04 TOLERANCES**

- A. Maximum Variation From Plumb: 1/4 inch (6 mm) per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch (6 mm).
- C. Maximum Out-of-Position: 1/4 inch (6 mm).

### **3.05 SCHEDULE**

- A. Interior Locations (Non-Corrosive Environments) Finish
  - 1. Ledge & Shelf angles

Galvanized

**END OF SECTION**

**SECTION 05 53 05  
METAL GRATINGS AND FLOOR PLATES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Formed metal floor gratings.
- B. Perimeter closure.

**1.02 RELATED REQUIREMENTS**

- A. Section 05 50 00 - Metal Fabrications.

**1.03 REFERENCE STANDARDS**

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.
- C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.
- E. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.
- F. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015.
- G. NAAMM MBG 531 - Metal Bar Grating Manual; 2009.
- H. NAAMM MBG 532 - Heavy Duty Metal Bar Grating Manual; 2009.
- I. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).
- J. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).
- K. SSPC-SP 2 - Hand Tool Cleaning; 1982 (Ed. 2004).

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide span and deflection tables.
- C. Shop Drawings: Indicate details of component supports, openings, perimeter construction details, and tolerances.
  - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Cross Bars: ASTM B211 (ASTM B211M) solid bars.

- B. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- C. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction; compatible with scheduled painted finish or coating specified in related Sections.

## **2.02 ACCESSORIES**

- A. Fasteners and Saddle Clips: Galvanized steel:
- B. Perimeter Closure: Of same material as grating.

## **2.03 FABRICATION**

- A. Fabricate grates and plates to sizes indicated.
- B. Bolt joints of intersecting metal sections.
- C. Fabricate support framing for openings.
- D. Top Surface: Serrated.

## **2.04 FINISHES**

- A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- B. Galvanizing for Steel Shapes: ASTM A123/A123M.
- C. Galvanizing for Steel Hardware: ASTM A153/A153M.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field measurements are as indicated on drawings.
- B. Verify that opening sizes and dimensional tolerances are acceptable.
- C. Verify that supports are correctly positioned.

### **3.02 INSTALLATION**

- A. Install components in accordance with manufacturer's instructions.
- B. Place frames in correct position, plumb and level.
- C. Mechanically cut galvanized finish surfaces. Do not flame cut.
- D. Anchor by bolting through saddle clips.
- E. Set perimeter closure flush with top of grating and surrounding construction.
- F. Secure to prevent movement.

### **3.03 TOLERANCES**

- A. Conform to NAAMM MBG 531.

**END OF SECTION**



**SECTION 06 10 00  
ROUGH CARPENTRY**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Fire retardant treated wood materials.

**1.02 REFERENCE STANDARDS**

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- B. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2007.
- C. AWPA U1 - Use Category System: User Specification for Treated Wood; American Wood-Preservers' Association; 2007.
- D. PS 1 - Structural Plywood; 2009.
- E. PS 20 - American Softwood Lumber Standard; 2010.

**1.03 DELIVERY, STORAGE, AND HANDLING**

- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.
- B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, or installation.

**PART 2 PRODUCTS**

**2.01 GENERAL REQUIREMENTS**

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
  - 1. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
  - 2. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee ([www.alsc.org](http://www.alsc.org)) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
- B. Lumber fabricated from old growth timber is not permitted.

**2.02 CONSTRUCTION PANELS**

- A. Other Applications:
  - 1. Plywood Concealed From View But Located Within Exterior Enclosure: PS 1, C-C Plugged or better, Exterior grade.
  - 2. Plywood Exposed to View But Not Exposed to Weather: PS 1, A-D, or better.
  - 3. Other Locations: PS 1, C-D Plugged or better.

## **2.03 ACCESSORIES**

### **A. Fasteners and Anchors:**

1. Metal and Finish: Hot-dipped galvanized steel per ASTM A 153/A 153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.

## **2.04 FACTORY WOOD TREATMENT**

### **A. Treated Lumber and Plywood: Comply with requirements of AWWA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.**

1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.

### **B. Fire Retardant Treatment:**

1. Interior Type A: AWWA Use Category UCFA, Commodity Specification H (Treatment C20 for lumber and C27 for plywood), low temperature (low hygroscopic) type, chemically treated and pressure impregnated; capable of providing a maximum flame spread rating of 25 when tested in accordance with ASTM E 84, with no evidence of significant combustion when test is extended for an additional 20 minutes.
  - a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
  - b. Treat rough carpentry items as scheduled.
  - c. Do not use treated wood in applications exposed to weather or where the wood may become wet.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION - GENERAL**

- A. Select material sizes to minimize waste.
- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.
- C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

### **3.02 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 framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to code authorities may be used in lieu of solid wood blocking.
- C. In metal stud walls, provide continuous blocking around door and window openings for anchorage of frames, securely attached to stud framing.

- D. 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.
- E. Specifically, provide the following non-structural framing and blocking:
  - 1. Cabinets and shelf supports.
  - 2. Wall brackets.
  - 3. Handrails.
  - 4. Grab bars.
  - 5. Towel and bath accessories.
  - 6. Wall-mounted door stops.
  - 7. Chalkboards and marker boards.
  - 8. Wall paneling and trim.
  - 9. Joints of rigid wall coverings that occur between studs.

### **3.03 TOLERANCES**

- A. Framing Members: 1/4 inch (6 mm) from true position, maximum.
- B. Variation from Plane (Other than Floors): 1/4 inch in 10 feet (2 mm/m) maximum, and 1/4 inch in 30 feet (7 mm in 10 m) maximum.

### **3.04 CLEANING**

- A. Waste Disposal:
  - 1. Comply with applicable regulations.
  - 2. Do not burn scrap on project site.
  - 3. Do not burn scraps that have been pressure treated.
  - 4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or "waste-to-energy" facilities.
- B. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.
- C. Prevent sawdust and wood shavings from entering the storm drainage system.

### **3.05 SCHEDULES**

- A. Blocking in Gypsum Board Walls: Fire retardant treated.
- B. Plywood Sheathing for backing in Gypsum Board Walls: Fire retardant treated.

**END OF SECTION**



**SECTION 07 84 00  
FIRESTOPPING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Firestopping materials.
- B. Firestopping of all penetrations of and joints in fire rated assemblies, whether indicated on drawings or not, and other openings indicated.
- C. Smoke-stopping of all penetrations of and joints in smoke partitions, whether indicated on drawings or not, and other openings indicated.

**1.02 RELATED REQUIREMENTS**

- A. Section 09 21 16 - Gypsum Board Assemblies: Gypsum wallboard fireproofing.

**1.03 REFERENCE STANDARDS**

- A. ASTM E814 - Standard Test Method for Fire Tests of Through-Penetration Fire Stops; 2013a.
- B. FM 4991 - Approval Standard for Firestop Contractors; 2013.
- C. UL (FRD) - Fire Resistance Directory; current edition.

**1.04 DEFINITIONS**

- A. Assembly: Particular arrangement of materials specific to given type of construction described or detailed in referenced documents.
- B. Barriers: Time rated fire walls, smoke barrier walls, time rated ceiling/floor assemblies and structural floors.
- C. Firestopping: Methods and materials applied in penetrations and unprotected openings to limit spread of heat, fire gasses and smoke.
- D. Penetration: Opening or foreign material passing through or into barrier or structural floor such that full thickness of rated materials is not obtained.
- E. Joint: Interruption to a fire-rated assembly occurring at interface between 1) adjacent sections of wall, 2) intersecting walls, 3) top of wall and ceiling, structural floor or roof deck, 4) wall and edge of structural floor, 5) adjacent sections of structural floor.
- F. System: Specific products and applications, classified and numbered by Underwriters Laboratories, Inc. to close specific barrier penetrations and joints.
- G. Sleeve: Metal fabrication or pipe section extending through thickness of barrier and used to permanently guard penetration. Sleeves are described as part of penetrating system in other sections and may or may not be required.

**1.05 SYSTEM DESCRIPTION**

- A. Design Requirements:

1. Fire-rated construction: Maintain barrier and structural floor fire resistance ratings including resistance to cold smoke at all penetrations, connections with other surfaces or types of construction, at separations required to permit building movement and sound or vibration absorption, and at other construction gaps.
2. Smoke barrier construction: Maintain barrier and structural floor resistance to cold smoke at all penetrations, connections with other surfaces and types of construction and at all separations required to permit building movement and sound or vibration absorption, and at other construction gaps.

## **1.06 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Schedule of Firestopping: List each type of penetration, fire rating of the penetrated assembly, and firestopping test or design number.
  1. Provide manufacturer's qualified engineering judgements for non-standard applications.
- C. Product Data: Provide data on product characteristics, performance ratings, and limitations.
- D. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

## **1.07 QUALITY ASSURANCE**

- A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with methods indicated.
  1. Listing in the current-year classification or certification books of UL will be considered as constituting an acceptable test report.
  2. Submission of actual test reports is required for assemblies for which none of the above substantiation exists.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Installer Qualifications: Company specializing in performing the work of this section and:
  1. Approved by Factory Mutual Research under FM Standard 4991, Approval of Firestop Contractors .
  2. With minimum 3 years documented experience installing work of this type.
  3. Able to show at least 5 satisfactorily completed projects of comparable size and type.
  4. Licensed by authority having jurisdiction.
  5. Approved by firestopping manufacturer.

## **1.08 MOCK-UP**

- A. Install one firestopping assembly representative of each fire rating design required on project.
  1. Where one design may be used for different penetrating items or in different wall constructions, install one assembly for each different combination.
- B. Obtain approval of authority having jurisdiction before proceeding.
- C. If accepted, mock-up will represent minimum standard for the Work.

- D. If accepted, mock-up may remain as part of the Work. Remove and replace mock-ups not accepted.

## **1.09 DELIVERY, STORAGE AND HANDLING**

- A. Deliver products in original, unopened packaging with legible manufacturer's identification.
- B. Coordinate delivery with scheduled installation date to minimize storage time at site.
- C. Store materials in a clean, dry, ventilated location. Protect materials from freezing if required by manufacturer.

## **1.10 FIELD CONDITIONS**

- A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation. Maintain minimum temperature before, during, and for 3 days after installation of materials.
- B. Provide ventilation in areas where solvent-cured materials are being installed.

## **PART 2 PRODUCTS**

### **2.01 FIRESTOPPING ASSEMBLIES**

- A. Firestopping: Any material meeting requirements.
  - 1. Fire Ratings: Use any system listed by UL or tested in accordance with ASTM E 814 that has F Rating equal to fire rating of penetrated assembly and T Rating Equal to F Rating and that meets all other specified requirements.

### **2.02 MATERIALS**

- A. Acceptable Manufacturers: As listed in UL (FRD) for specific UL Design Number.
- B. Fill, Void or Cavity Materials: Conform to UL (FRD) - XHHW.
- C. Firestop Devices: Conform to UL (FRD) - XHJI.
- D. Forming Materials: Conform to UL (FRD) - XHKU.
- E. Mechanical Joint Assemblies: Conform to UL (FRD) - XHLP.
- F. Packing Material: As required by specific UL Design Number for joint system or through-penetration firestop system.
- G. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Type required for tested assembly design.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify openings are ready to receive the work of this section.
  - 1. Verify barrier joints and penetrations are properly sized and in suitable condition for application of materials.

### **3.02 PREPARATION**

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter that could adversely affect bond of firestopping material.
- B. Remove incompatible materials that could adversely affect bond.

### **3.03 INSTALLATION**

- A. Install materials in manner described in UL (FRD) or fire test report and in accordance with manufacturer's instructions, completely closing openings.
- B. Do not cover installed firestopping until inspected by authority having jurisdiction.
- C. Install labelling required by code.

### **3.04 CLEANING AND PROTECTION**

- A. Protect adjacent surfaces from damage by material installation.
- B. Patch or replace firestopping damaged by work of other sections.

**END OF SECTION**

**SECTION 07 90 05  
JOINT SEALERS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Expansion joint sealers.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 84 00 - Firestopping: Firestopping sealants.
- B. Section 09 21 16 - Gypsum Board Assemblies: Acoustic sealant.

**1.03 REFERENCE STANDARDS**

- A. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014.
- B. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2013.
- C. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate the work with other sections referencing this section.

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating sealant chemical characteristics.
- C. Samples: Submit one samples, 2 inch (50.8 x 50.8 mm) in size illustrating sealant colors for selection.
- D. Manufacturer's Installation Instructions: Indicate special procedures.

**1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum 5 years experience.
- B. Applicator Qualifications: Company specializing in performing the work of this section with minimum three years documented experience and approved by manufacturer.

**1.07 FIELD CONDITIONS**

- A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

**1.08 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective work within a five year period after Date of Substantial Completion.

- C. Warranty: Include coverage for installed sealants and accessories which fail to achieve airtight seal, exhibit loss of adhesion or cohesion, or do not cure.

## **PART 2 PRODUCTS**

### **2.01 JOINT SEALANTS**

- A. Sealants and Primers - General: Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No.1168.
- B. Type S-1 - Acrylic Sealant: ASTM C920, Grade NS, Class 12-1/2, Uses NT, M, A, O; single component, solvent curing, non-staining, non-bleeding, non-sagging.
  - 1. Color: Match adjacent finished surfaces.
  - 2. Movement Capability: Plus and minus 12-1/2 percent.
- C. Type S-3 - Nonsag Polyurethane Sealant: ASTM C920, Grade NS, Class 25, Uses NT, I, M, A, G, O; single component, chemical curing, non-staining, non-bleeding, non-sagging type.
  - 1. Color: Match adjacent finished surfaces.
  - 2. Movement Capability: Plus and minus 25 percent.
- D. Type S-4 - Self-Leveling Polyurethane Sealant: ASTM C920, Grade P, Class 25 minimum; Uses T, I, M, A, O; single component, chemical curing, non-staining, non-bleeding, capable of continuous water immersion, self-leveling type.
  - 1. Color: Gray.
  - 2. Movement Capability: Plus and minus 25 percent.
  - 3. Service Temperature Range: -40 to 180 degrees F (-40 to 82 degrees C).
  - 4. Shore A Hardness Range: 20 to 35.
- E. Type S-5 - Self-leveling or Non-sag Silicone Sealant: ASTM D5893, Type S, Grade NS or P, Class 100/50 minimum; Uses T, A, G, M, O; single component, neutral curing, non-bleeding.
  - 1. Color: To be selected by Architect from manufacturer's standard range.
  - 2. Movement Capability: Plus 100 percent, minus 50 percent.
- F. Type S-7 - Nonsag Silyl-terminated Polyether Sealant: ASTM C920, Grade NS, Class 25 minimum, Uses NT, A, G, M, O; single component, non-sagging, non-staining, non-bleeding.
  - 1. Cure Type: Neutral.
  - 2. Color: Match adjacent finished surfaces.
  - 3. Movement Capability: Plus and minus 50 percent.

### **2.02 ACCESSORIES**

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that substrate surfaces are ready to receive work.
- B. Verify that joint backing and release tapes are compatible with sealant.

### **3.02 PREPARATION**

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean and prime joints in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Protect elements surrounding the work of this section from damage or disfigurement.

### **3.03 INSTALLATION**

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C1193.
- C. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- D. Install bond breaker where joint backing is not used.
- E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- F. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- G. Tool joints concave.

### **3.04 CLEANING**

- A. Clean adjacent soiled surfaces.

### **3.05 PROTECTION**

- A. Protect sealants until cured.

### **3.06 SCHEDULE**

- A. Control and Expansion Joints in Paving: Type S-4.
- B. Control, Expansion, and Soft Joints in Masonry, and Between Masonry and Adjacent Work: Type S-3, S-5 or S-7.
- C. Interior Joints for Which No Other Sealant is Indicated: Type S-1; .
- D. Control and Expansion Joints in Interior Concrete Slabs and Floors: Type S-4.

**SECTION 09 21 16  
GYPSUM BOARD ASSEMBLIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Metal deflection relief top track for wood stud partitions.
- B. Gypsum wallboard.
- C. Joint treatment and accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 10 00 - Rough Carpentry: Wood blocking product and execution requirements.

**1.03 REFERENCE STANDARDS**

- A. AISI S100-12 - North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute; 2012.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.
- C. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2015.
- D. ASTM C557 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing; 2003 (Reapproved 2009).
- E. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members; 2014.
- F. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2015.
- G. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2013.
- H. 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; 2015.
- I. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2014.
- J. ASTM C1047 - Standard Specification for Accessories For Gypsum Wallboard and Gypsum Veneer Base; 2014a.
- K. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2014.
- L. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2012.
- M. GA-216 - Application and Finishing of Gypsum Board; 2013.



## **1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate special details associated with fireproofing and acoustic seals.
- C. Product Data: Provide data on metal framing, gypsum board, accessories, and joint finishing system.
- D. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.

## **1.05 QUALITY ASSURANCE**

- A. Installer Qualifications: Company specializing in performing gypsum board application and finishing, with minimum 5 years of documented experience.

## **PART 2 PRODUCTS**

### **2.01 GYPSUM BOARD ASSEMBLIES**

- A. Provide completed assemblies complying with ASTM C840 and GA-216.
  - 1. See PART 3 for finishing requirements.

### **2.02 METAL FRAMING MATERIALS**

- A. Manufacturers - Metal Framing, Connectors, and Accessories:
  - 1. Clarkwestern Dietrich Building Systems LLC: [www.clarkdietrich.com](http://www.clarkdietrich.com).
  - 2. Marino: [www.marinoware.com](http://www.marinoware.com).
  - 3. Phillips Manufacturing Company: [www.phillipsmfg.com](http://www.phillipsmfg.com).
  - 4. The Steel Network, Inc: [www.SteelNetwork.com](http://www.SteelNetwork.com).
  - 5. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Non-Loadbearing Framing System Components: ASTM C645; sheet steel galvanized to G60 class.
  - 1. Studs: "C" shaped with flat or formed webs with knurled faces.
  - 2. Runners: 20 ga., U shaped, 2 inch minimum leg depth, web width sized to match wood studs specified in Section 06 10 00.
  - 3. Ceiling Channels: C-shaped.
  - 4. Furring: Hat-shaped sections, minimum depth of 7/8 inch (22 mm).
- C. Shaft Wall Studs and Accessories: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 and specified performance requirements.
  - 1. Products:
    - a. Same manufacturer as other framing materials.
    - b. Substitutions: See Section 01 60 00 - Product Requirements.
- D. Ceiling Hangers: Type and size as specified in ASTM C754 for spacing required.
- E. Partition Head to Structure Connections: Provide mechanical anchorage devices that accommodate deflection using slotted holes, screws and anti-friction bushings, preventing rotation of studs while maintaining structural performance of partition.

1. Structural Performance: Maintain lateral load resistance and vertical movement capacity required by applicable code, when evaluated in accordance with AISI S100-12.
2. Material: ASTM A653/A653M steel sheet, SS Grade 50/340, with G60/Z180 hot dipped galvanized coating.

## **2.03 BOARD MATERIALS**

### **A. Manufacturers - Gypsum-Based Board:**

1. American Gypsum Company: [www.americangypsum.com](http://www.americangypsum.com).
2. CertainTeed Corporation: [www.certainteed.com](http://www.certainteed.com).
3. Georgia-Pacific Gypsum: [www.gpgypsum.com](http://www.gpgypsum.com).
4. Lafarge North America Inc: [www.lafargenorthamerica.com](http://www.lafargenorthamerica.com).
5. National Gypsum Company: [www.nationalgypsum.com](http://www.nationalgypsum.com).
6. USG Corporation: [www.usg.com](http://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 vertical surfaces and ceilings, unless otherwise indicated.
2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
  - a. Mold-resistant board is required whenever board is being installed before the building is both 1) enclosed and 2) conditioned.
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:
  - a. Vertical Surfaces: 5/8 inch (16 mm).
  - b. Ceilings: 5/8 inch (16 mm).
5. Mold-Resistant Paper-Faced Products:
  - a. American Gypsum Company; M-Bloc.
  - b. American Gypsum Company; M-Bloc Type X.
  - c. Georgia-Pacific Gypsum; ToughRock Mold-Guard.
  - d. Georgia-Pacific Gypsum; ToughRock Fireguard X Mold-Guard.
  - e. National Gypsum Company; Gold Bond XP Gypsum Board .
  - f. Substitutions: See Section 01 60 00 - Product Requirements.

### **C. Gypsum Shaftwall or Coreboard: ASTM C 1396/C 1396M; Type X core; sizes to minimize joints in place; 1 inch (25 mm) thick; square, tongue and groove, or double beveled edges, ends square cut.**

## **2.04 ACCESSORIES**

### **A. Acoustic Sealant: Non-hardening, non-skinning, for use in conjunction with gypsum board.**

### **B. Finishing Accessories: ASTM C1047, galvanized steel or rolled zinc, unless otherwise indicated.**

1. Types: As detailed or required for finished appearance.
2. Special Shapes: In addition to conventional cornerbead and control joints, provide U-bead at exposed panel edges.
3. Manufacturers - Finishing Accessories:
  - a. Same manufacturer as framing materials.

- C. Joint Materials: ASTM C475 and as recommended by gypsum board manufacturer for project conditions.
  - 1. Tape: 2 inch (50 mm) wide, coated glass fiber tape for joints and corners, except as otherwise indicated.
  - 2. Ready-mixed vinyl-based joint compound.
- D. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inch (0.84 mm) in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion resistant.
- E. Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112 inch (0.84 to 2.84 mm) in Thickness: ASTM C954; steel drill screws, corrosion resistant.
- F. Anchorage to Substrate: Tie wire, nails, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.
- G. Adhesive for Attachment to Wood: ASTM C557.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

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

### **3.02 SHAFT WALL INSTALLATION**

- A. Shaft Wall Framing: Install in accordance with manufacturer's installation instructions.
  - 1. Fasten runners to structure with short leg to finished side, using appropriate power-driven fasteners at not more than 24 inches (600 mm) on center.
- B. Shaft Wall Liner: Cut panels to accurate dimension and install sequentially between special friction studs.

### **3.03 TOP RUNNER INSTALLATION**

- A. Install in accordance with ASTM C754 and manufacturer's instructions.
  - 1. Install as specified in Section 06 10 00.
- B. Suspended Ceilings and Soffits: Space framing and furring members as indicated.
- C. Studs: Space studs at 16 inches on center (at 406 mm on center).
  - 1. Extend partition framing to structure where indicated and to ceiling in other locations.
  - 2. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.
  - 3. Partitions Terminating at Structure: Attach top runner to structure, maintain clearance between top of studs and structure, and connect studs to track using specified mechanical devices in accordance with manufacturer's instructions; verify free movement of top of stud connections; do not leave studs unattached to track.
- D. Blocking: Install wood blocking for support of:
  - 1. Wall mounted items requiring support

### **3.04 BOARD INSTALLATION**

- A. Comply with ASTM C 840 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. Fire-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.
- D. Installation on Metal Framing: Use screws for attachment of gypsum board except face layer of non-rated double-layer assemblies, which may be installed by means of adhesive lamination.

### **3.05 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 (10 meters) apart on walls and ceilings over 50 feet (16 meters) long.
- B. Corner Beads: Install at external corners, using longest practical lengths.
- C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials and as indicated.

### **3.06 JOINT TREATMENT**

- A. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
  - 1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
  - 2. Level 3: Walls to receive tile finish.
  - 3. Level 1: Wall areas above finished ceilings not exposed to view, whether or not accessible in the completed construction.
- 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 (0.8 mm).
  - 2. 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.

### **3.07 TOLERANCES**

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet (3 mm in 3 m) in any direction.

**END OF SECTION**

**SECTION 09 51 00**  
**SUSPENDED ACOUSTICAL CEILINGS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Suspended metal grid ceiling system.
- B. Acoustical units.

**1.02 RELATED REQUIREMENTS**

- A. Section 21 13 00 - Fire Suppression Sprinklers: Sprinkler heads in ceiling system.
- B. Section 23 37 00 - Air Outlets and Inlets: Air diffusion devices in ceiling.
- C. Section 26 51 10 - Lighting: Light fixtures in ceiling system.

**1.03 REFERENCE STANDARDS**

- A. ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2013a.
- B. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels; 2013.
- C. ASTM E580/E580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions; 2014.
- D. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2014.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Do not install acoustical units until after interior wet work is dry.

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on suspension system components.
- C. Samples: Submit two samples 6 x 6 inch (152 x 152 mm) in size illustrating material and finish of acoustical units.
- D. Manufacturer's Installation Instructions: Indicate special procedures.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 01 60 00 - Product Requirements, for additional provisions.
  - 2. Extra Acoustical Units: Quantity equal to 5 percent of total installed.

**1.06 FIELD CONDITIONS**

- A. Maintain uniform temperature of minimum 60 degrees F (16 degrees C), and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

#### **A. Acoustic Tiles/Panels:**

1. Armstrong World Industries, Inc: [www.armstrong.com](http://www.armstrong.com).
2. CertainTeed Corporation: [www.certainteed.com](http://www.certainteed.com).
3. USG: [www.usg.com](http://www.usg.com).

#### **B. Suspension Systems:**

1. Armstrong World Industries, Inc: [www.armstrong.com](http://www.armstrong.com).  
Rockfon, LLC: [www.rockfon.com](http://www.rockfon.com).
2. USG: [www.usg.com](http://www.usg.com).

### **2.02 ACOUSTICAL UNITS**

#### **A. Acoustical Panels Type C1 (Upper Level): Painted mineral fiber, ASTM E1264 Type III, with the following characteristics:**

1. Size: 24 by 24 inches (600 by 600 mm).
2. Thickness: 5/8 inches (15 mm).
3. Composition: Wet felted.
4. Light Reflectance: 83 percent, determined as specified in ASTM E1264.
5. NRC Range: 0.50 to 0.60, determined as specified in ASTM E1264.
6. Ceiling Attenuation Class (CAC): 35, determined in accordance with 1.
7. Edge: Tegular or Reveal.
8. Surface Color: White.
9. Surface Pattern: Fine texture; no pattern.
10. Products:
  - a. Dune #1774 by Armstrong.
  - b. Sand Micro #SHM-150 by Certainteed.
  - c. Olympia Micro ClimaPlus #4221 by USG..
11. Suspension System: Exposed grid Type SS1.

#### **B. Acoustical Panels Type C2 (Lower Level): Vinyl-faced gypsum board; ASTM E1264 Type XX, Pattern G, with the following characteristics:**

1. VOC Content: Certified as Low Emission by one of the following :
  - a. GreenGuard Children and Schools; [www.greenguard.org](http://www.greenguard.org).
  - b. Product listing in the CHPS Low-Emitting Materials Product List at; [www.chps.net/manual/lem\\_table.htm](http://www.chps.net/manual/lem_table.htm).
2. Size: 24 by 24 inches (600 by 600 mm).
3. Light Reflectance: 77 percent, determined in accordance with 1.
4. Panel Edge: Square.
5. Surface Color: White.
6. Products:
  - a. Performa Vinylrock by Certainteed.
  - b. Sheetrock ClimaPlus by USG.
7. Suspension System: Exposed grid Type SS1.

## **2.03 SUSPENSION SYSTEM(S)**

- A. Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.
- B. Exposed Steel Suspension System Type SS1: Formed steel, commercial quality cold rolled; intermediate-duty.
  - 1. Profile: Tee; 15/16 inch (24 mm) wide face.
  - 2. Construction: Double web.
  - 3. Finish: White painted.
- C. Exposed Aluminum Suspension System Type SS2: Extruded aluminum; light-duty.
  - 1. Profile: Tee; 15/16 inch (24 mm) wide face.
  - 2. Finish: Painted white.

## **2.04 ACCESSORIES**

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.
- B. Perimeter Moldings: Same material and finish as grid.
  - 1. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that layout of hangers will not interfere with other work.

### **3.02 INSTALLATION - SUSPENSION SYSTEM**

- A. Install suspension system in accordance with ASTM C636/C636M, ASTM E580/E580M, and manufacturer's instructions and as supplemented in this section.
- B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
- C. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.
- D. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- E. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
- F. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- G. Support fixture loads using supplementary hangers located within 6 inches (150 mm) of each corner, or support components independently.

- H. Do not eccentrically load system or induce rotation of runners.
- I. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
  - 1. Use longest practical lengths.
  - 2. Overlap and rivet corners.

### **3.03 INSTALLATION - ACOUSTICAL UNITS**

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Fit border trim neatly against abutting surfaces.
- D. Install units after above-ceiling work is complete.
- E. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- F. Cutting Acoustical Units:
  - 1. Make field cut edges of same profile as factory edges.
- G. Where round obstructions occur, provide preformed closures to match perimeter molding.
- H. Install hold-down clips on panels within 20 ft (6 m) of an exterior door.

### **3.04 TOLERANCES**

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet (3 mm in 3 m).
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

**END OF SECTION**



**SECTION 09 90 00  
PAINTING AND COATING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Surface preparation.
- B. Field application of paints and other coatings.
- C. Scope: Finish all interior and exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
- D. 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. Floors, unless specifically so indicated.
  - 6. Glass.
  - 7. Concealed pipes, ducts, and conduits.

**1.02 REFERENCE STANDARDS**

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Samples For Selection: Submit two color fan/chain samples, illustrating range of colors and textures available for each surface finishing product scheduled.
- C. Samples For Verification: Submit three painted samples, illustrating selected colors and textures for each color and system selected with specified coats cascaded. Submit on cardstock sheet, 8½ x 11 inch (215 x 279 mm) in size.
  - 1. Identify each sample by:
    - a. Manufacturer, product name and product ID number.
    - b. Color name and number.
    - c. Sheen/gloss level.
    - d. Supplier/distributor.
    - e. Contact name and telephone number.
- 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.

#### **1.04 QUALITY ASSURANCE**

- A. Single Source Responsibility: Provide primer, undercoater and finish coat for paint and other coating products from a single manufacturer for consideration of warranty and Owner maintenance.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.
- C. Applicator Qualifications: Company specializing in performing the type of work specified with minimum 5 years documented experience and approved by manufacturer.
- D. Conform to federal, state and local regulations, including VOC rules, at the time of application.
- E. Equipment: Comply with current OSHA regulations.
- F. Products: Maintain at Project Site a copy of Material Safety Data Sheets for each product used.

#### **1.05 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 (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

#### **1.06 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 (7 degrees C) for interiors; 50 degrees F (10 degrees C) for exterior; unless required otherwise by manufacturer's instructions.
- E. Provide lighting level of 80 ft candles (860 lx) measured mid-height at substrate surface.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Provide all paint and coating products used in any individual system from the same manufacturer; no exceptions.
- B. Paints:
  - 1. Benjamin Moore & Co: [www.benjaminmoore.com](http://www.benjaminmoore.com).

2. PPG Paints: [www.ppgpaints.com](http://www.ppgpaints.com).
3. Sherwin-Williams Company: [www.sherwin-williams.com](http://www.sherwin-williams.com).
4. AkzoNobel: [www.akzonobel.com](http://www.akzonobel.com).

C. Substitutions: Not permitted.

## **2.02 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. Supply each coating material in quantity required to complete entire project's work from a single production run.
  3. 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: As follows unless other primer is required or recommended by manufacturer of top coats; 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.
  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.

## **2.03 PAINT SYSTEMS - INTERIOR**

- A. All Interior Surfaces Indicated to be Painted, Unless Otherwise Indicated: Including gypsum board, concrete masonry, and wood.
1. Top Coat(s): MPI Institutional Low Odor/VOC Interior Latex; MPI #143-148.
  2. Eggshell: MPI gloss level 3; use this sheen at all locations.

## **PART 3 EXECUTION**

### **3.01 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 mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- D. Seal surfaces that might cause bleed through or staining of topcoat.
- E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

F. Plaster Surfaces to be Painted: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.

### **3.02 APPLICATION**

- A. Apply products in accordance with manufacturer's instructions.
- B. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- C. Apply each coat to uniform appearance.
- D. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- E. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

**END OF SECTION**

**SECTION 21 05 00**  
**COMMON WORK RESULTS FOR FIRE SUPPRESSION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

A. Pipe, fittings, sleeves, escutcheons, seals, and connections for sprinkler systems.

**1.02 RELATED REQUIREMENTS**

A. Section 21 13 00 - Fire Suppression Sprinklers: Sprinkler systems design.

**1.03 REFERENCE STANDARDS**

- A. ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Welding, Brazing, and Fusing Qualifications; 2015.
- B. ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250; 2010.
- C. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300; 2011.
- D. ASME B16.4 - Gray Iron Threaded Fittings: Classes 125 and 250; 2011.
- E. ASME B16.5 - Pipe Flanges and Flanged Fittings NPS 1/2 Through NPS 24 Metric/Inch Standard; 2013.
- F. ASTM A47/A47M - Standard Specification for Ferritic Malleable Iron Castings; 1999 (Reapproved 2014).
- G. ASTM A536 - Standard Specification for Ductile Iron Castings; 1984 (Reapproved 2014).
- H. AWWA C606 - Grooved and Shouldered Joints; 2011.
- I. NFPA 13 - Standard for the Installation of Sprinkler Systems; 2016.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturers catalogue information. Indicate valve data and ratings.
- C. Shop Drawings: Indicate pipe materials used, jointing methods, supports, floor and wall penetration seals. Indicate installation, layout, weights, mounting and support details, and piping connections.
- D. Project Record Documents: Record actual locations of components and tag numbering.
- E. Operation and Maintenance Data: Include installation instructions and spare parts lists.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver and store valves in shipping containers, with labeling in place.

- B. Provide temporary protective coating on cast iron and steel valves.
- C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

## **PART 2 PRODUCTS**

### **2.01 FIRE PROTECTION SYSTEMS**

- A. Sprinkler Systems: Conform to NFPA 13.
- B. Welding Materials and Procedures: Conform to ASME BPVC-IX.

### **2.02 ABOVE GROUND PIPING**

- A. Steel Pipe: Schedule 40, black.
  - 1. Steel Fittings: ASME B16.5, steel flanges and fittings.
  - 2. Cast Iron Fittings: ASME B16.1, flanges and flanged fittings and ASME B16.4, threaded fittings.
  - 3. Malleable Iron Fittings: ASME B16.3, threaded fittings and ASTM A47/A47M.
  - 4. Mechanical Grooved Couplings: Malleable iron housing clamps to engage and lock, "C" shaped elastomeric sealing gasket, steel bolts, nuts, and washers; galvanized for galvanized pipe.

### **2.03 PIPE HANGERS AND SUPPORTS**

- A. Hangers for Pipe Sizes 1/2 to 1-1/2 inch (15 to 40 mm): Malleable iron, adjustable swivel, split ring.
- B. Hangers for Pipe Sizes 2 inches (50 mm) and Over: Carbon steel, adjustable, clevis.
- C. Vertical Support: Steel riser clamp.
- D. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.

### **2.04 MECHANICAL COUPLINGS**

- A. Rigid Mechanical Couplings for Grooved Joints:
  - 1. Dimensions and Testing: Comply with AWWA C606.
  - 2. Minimum Working Pressure: 300 psig (2065 kPa).
  - 3. Housing Material: Fabricate of ductile iron conforming to ASTM A536.
  - 4. Housing Coating: Factory applied orange enamel.
  - 5. Gasket Material: EPDM suitable for operating temperature range from minus 30 degrees F (minus 34 degrees C) to 230 degrees F (110 degrees C).
  - 6. Bolts and Nuts: Hot dipped galvanized or zinc electroplated steel

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Remove scale and foreign material, from inside and outside, before assembly.

C. Prepare piping connections to equipment with flanges or unions.

### **3.02 INSTALLATION**

A. Install sprinkler system and service main piping, hangers, and supports in accordance with NFPA 13.

B. Route piping in orderly manner, plumb and parallel to building structure. Maintain gradient.

C. Install piping to conserve building space, to not interfere with use of space and other work.

D. Group piping whenever practical at common elevations.

E. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

F. Pipe Hangers and Supports:

1. Install hangers to provide minimum 1/2 inch (15 mm) space between finished covering and adjacent work.
2. Place hangers within 12 inches (300 mm) of each horizontal elbow.
3. Use hangers with 1-1/2 inch (40 mm) minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
4. Support vertical piping at every other floor. Support riser piping independently of connected horizontal piping.
5. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.

G. Slope piping and arrange systems to drain at low points. Use eccentric reducers to maintain top of pipe level.

H. Prepare pipe, fittings, supports, and accessories for finish painting. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.

I. Do not penetrate building structural members unless indicated.

J. Provide sleeves when penetrating floors, walls, and partitions and seal pipe and sleeve penetrations to achieve fire resistance equivalent to fire separation required.

K. Escutcheons:

1. Install and firmly attach escutcheons at piping penetrations into finished spaces.
2. Provide escutcheons on both sides of partitions separating finished areas through which piping passes.
3. Use chrome plated escutcheons in occupied spaces and to conceal openings in construction.

L. When installing more than one piping system material, ensure system components are compatible and joined to ensure the integrity of the system. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.

### **3.03 CLEANING**

A. Upon completion of work, clean all parts of the installation.

- B. Clean equipment, pipes, valves, and fittings of grease, metal cuttings, and sludge that may have accumulated from the installation and testing of the system.

**END OF SECTION**



**SECTION 21 13 00  
FIRE SUPPRESSION SPRINKLERS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Wet-pipe sprinkler system.
- B. System design, installation, and certification.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 84 00 - Firestopping.
- B. Section 21 05 00 - Common Work Results for Fire Suppression: Pipe, fittings, and valves.

**1.03 REFERENCE STANDARDS**

- A. FM Approval Guide; Factory Mutual Global; current edition.
- B. NFPA 13 - Standard for the Installation of Sprinkler Systems; 2016.
- C. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on sprinklers, valves, and specialties, including manufacturers catalog information. Submit performance ratings, rough-in details, weights, support requirements, and piping connections.
- C. Shop Drawings:
  - 1. Indicate hydraulic calculations, detailed pipe layout, hangers and supports, sprinklers, components and accessories. Indicate system controls.
  - 2. Submit shop drawings to Authority Having Jurisdiction for approval. Submit proof of approval to Architect.
  - 3. Submit shop drawings to Kodiak Fire Protection Services, 9535 S. 49th Avenue, Oak Lawn, IL 60453, 708-341-1561.
- D. Project Record Documents: Record actual locations of sprinklers and deviations of piping from drawings. Indicate drain and test locations.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 01 60 00 - Product Requirements, for additional provisions.
  - 2. Extra Sprinklers: Type and size matching those installed, in quantity required by referenced NFPA design and installation standard.
  - 3. Sprinkler Wrenches: For each sprinkler type.

**1.05 QUALITY ASSURANCE**

- A. Conform to UL (DIR) requirements.

- B. Designer Qualifications: Design system under direct supervision of a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located. Or a holder of a valid NICET level III or IV Sprinkler Technician.
- C. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- D. Installer Qualifications: Company specializing in performing the work of this section with minimum 3 years experience approved by manufacturer.
- E. Equipment and Components: Provide products that bear UL (DIR) label or marking.

## **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Store products in shipping containers and maintain in place until installation. Provide temporary inlet and outlet caps. Maintain caps in place until installation.

## **PART 2 PRODUCTS**

### **2.01 SPRINKLER SYSTEM**

- A. Sprinkler System: Provide coverage for entire building.
- B. Water Supply: Determine volume and pressure from water flow test data.
- C. Provide fire department connections coordinate with local authority for exact location.
- D. Storage Cabinet for Spare Sprinklers and Tools: Steel, located adjacent to alarm valve.

### **2.02 SPRINKLERS**

- A. Suspended Ceiling Type: Semi-recessed pendant type with matching push on escutcheon plate.
  - 1. Response Type: Quick.
  - 2. Coverage Type: Standard.
  - 3. Finish: Chrome plated.
  - 4. Fusible Link: Glass bulb type temperature rated for specific area hazard.
- B. Exposed Area Type: Pendant type with guard.
  - 1. Response Type: Quick.
  - 2. Coverage Type: Standard.
  - 3. Finish: Brass.
  - 4. Fusible Link: Glass bulb type temperature rated for specific area hazard.
- C. Guards: Finish to match sprinkler finish.

### **2.03 STAINLESS STEEL FLEXIBLE DROPS**

- A. Manufacturers:
  - 1. Aqua Flex.
  - 2. Victaulic Company.
- B. In lieu of rigid pipe offsets or return bends. Braided type 304 stainless steel flexible tube with male threaded pipe nipple for connection to branchline piping, and a zinc plated steel reducer with a

1/2" or 3/4" NPT female thread for connection to a sprinkler head. The hoses shall be factory-pressure tested to 400 psi.

- C. Flexible drop shall attach to the ceiling grid with open gate bracket and can be installed without the use of special tools.
- D. The braided drop shall be FM approved for sprinkler services to 200 psi.

### **PART 3 EXECUTION**

#### **3.01 INSTALLATION**

- A. Install in accordance with referenced NFPA design and installation standard.
- B. Install equipment in accordance with manufacturer's instructions.
- C. Place pipe runs to minimize obstruction to other work.
- D. Place piping in concealed spaces above finished ceilings.
- E. Center sprinklers in two directions in ceiling tile and provide piping offsets as required.
- F. Apply masking tape or paper cover to ensure concealed sprinklers, cover plates, and sprinkler escutcheons do not receive field paint finish. Remove after painting. Replace painted sprinklers.
- G. Flush entire piping system of foreign matter.
- H. Install guards on sprinklers .
- I. Hydrostatically test entire system.
- J. Require test be witnessed by Authority Having Jurisdiction.

#### **3.02 INTERFACE WITH OTHER PRODUCTS**

- A. Ensure required devices are installed and connected as required to fire alarm system.

#### **3.03 SCHEDULES**

- A. System Hazard Areas:
  - 1. Offices: Light Hazard.
  - 2. Other Areas: In accordance with NFPA 13.

**END OF SECTION**

**SECTION 23 01 30.51  
HVAC AIR DUCT CLEANING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Cleaning of HVAC duct system, equipment, and related components.

**1.02 DEFINITIONS**

- A. HVAC System: For purposes of this section, the surfaces to be cleaned include all interior surfaces of the heating, air-conditioning and ventilation system from the points where the air enters the system to the points where the air is discharged from the system, including the inside of air distribution equipment, coils, and condensate drain pans; see NADCA ACR for more details.

**1.03 REFERENCE STANDARDS**

- A. NADCA ACR - Assessment, Cleaning and Restoration of HVAC Systems; 2014.
- B. UL 181 - Standard for Factory-Made Air Ducts and Air Connectors; current edition, including all revisions.
- C. UL 181A - Closure Systems for Use with Rigid Air Ducts; Current Edition, Including All Revisions.

**1.04 QUALITY ASSURANCE**

- A. Cleaning Contractor Qualifications: Company specializing in the cleaning and restoration of HVAC systems as specified in this section.
  - 1. Certified by one of the following:
    - a. NADCA, National Air Duct Cleaners Association: [www.nadca.com](http://www.nadca.com)
    - b. Nationally recognized certification program and organization dedicated to the cleaning of HVAC systems.
  - 2. Having minimum of three years documented experience.
  - 3. Employing for this project a supervisor certified by same organization that certified the cleaning contractor.

**PART 2 PRODUCTS**

**2.01 TOOLS AND EQUIPMENT**

- A. Vacuum Devices and Other Tools: Exceptionally clean, in good working order, and sealed when brought into the facility.
- B. Vacuum Devices That Exhaust Air Inside Building, Including Hand-Held and Wet Vacuums: Equipped with HEPA filtration with 99.97 percent collection efficiency for minimum 0.3-micron size particles and DOP test number.
- C. Vacuum Devices That Exhaust Air Outside Building, Including Truck- and Trailer-Mounted Types: Equipped with particulate collection including adequate filtration to contain debris removed from the HVAC system; exhausted in manner that prevents contaminant re-entry to building; compliant with applicable regulations as to outdoor environmental contamination.

## **2.02 SURFACE TREATMENTS**

- A. Anti-Microbial Materials: EPA registered specifically for use on non-porous HVAC system surfaces and applied per manufacturer's instructions.

## **PART 3 EXECUTION**

### **3.01 PROJECT CONDITIONS**

- A. Comply with applicable federal, state, and local requirements.
- B. Perform cleaning, inspection, and remediation in accordance with the recommendations of NADCA "Assessment, Cleaning and Restoration of HVAC Systems" (ACR) and as specified herein.
- C. Where NADCA ACR uses the terms "recommended", "highly recommended", or "ideally" in regard to a certain procedure or activity, do that unless it is clearly inapplicable to the project.
- D. Obtain Owner's approval of proposed temporary locations for large equipment.
- E. Designate a decontamination area and obtain Owner's approval.
- F. When portions of the facility are to remain occupied or in operation during cleaning activities, provide adequate controls or containment to prevent access to spaces being cleaned by unauthorized persons and provide detailed instructions to Owner as to these controls or containment.
- G. If unforeseen mold or other biological contamination is encountered, notify Architect immediately, identifying areas affected and extent and type of contamination.

### **3.02 PREPARATION**

- A. When cleaning work might adversely affect life safety systems, including fire and smoke detection, alarm, and control, coordinate scheduling and testing and inspection procedures with authorities having jurisdiction.
- B. Ensure that electrical components that might be adversely affected by cleaning are de-energized, locked out, and protected prior to beginning work.
- C. Air-Volume Control Devices: Mark the original position of dampers and other air-directional mechanical devices inside the HVAC system prior to starting cleaning.
- D. Access to Concealed Spaces: Use existing service openings and make additional service openings as required to accomplish cleaning and inspection.
  - 1. Do not cut openings in non-HVAC components without obtaining the prior approval of Owner.
  - 2. Make new openings in HVAC components in accordance with NADCA Standard 05; do not compromise the structural integrity of the system.
  - 3. Do not cut service openings into flexible duct; disconnect at ends for cleaning and inspection.
- E. Ceiling Tile: Lay-in ceiling tile may be removed to gain access to HVAC systems during the cleaning process; protect tile from damage and reinstall upon completion; replace damaged tile.

### **3.03 CLEANING**

- A. Use any cleaning method recommended by NADCA ACR unless otherwise specified; do not use methods prohibited by NADCA ACR, or that will damage HVAC components or other work, or that will significantly alter the integrity of the system.
- B. Obtain Owner's approval before using wet cleaning methods; ensure that drainage is adequate before beginning.
- C. Ducts: Mechanically clean all portions of ducts.
- D. Hoses, Cables, and Extension Rods: Clean using suitable sanitary damp wipes at the time they are being removed or withdrawn from their normal position.
- E. Registers, Diffusers, and Grilles: When removing, take care to prevent containment exposure due to accumulated debris.
- F. Collect debris removed during cleaning; ensure that debris is not dispersed outside the HVAC system during the cleaning process.
- G. Store contaminated tools and equipment in polyethylene bags until cleaned in the designated decontamination area.

### **3.04 REPAIR**

- A. Repair openings cut in the ventilation system so that they do not significantly alter the airflow or adversely impact the facility's indoor air quality.
- B. At insulated ducts and components, accomplish repairs in such a manner as to achieve the equivalent thermal value.
- C. Reseal new openings in accordance with NADCA Standard 05.
- D. Reseal rigid fiber glass duct systems using closure techniques that comply with UL 181 or UL 181A.
- E. When new openings are intended to be capable of being re-opened in the future, clearly mark them and report their locations to Owner in project report documents.

### **3.05 FIELD QUALITY CONTROL**

- A. Ensure that the following field quality control activities are completed prior to application of any treatments or coatings and prior to returning HVAC system to normal operation.
- B. Visually inspect all portions of the cleaned components; if not visibly clean as defined in NADCA ACR, re-clean and reinspect.
- C. Notify Architect when cleaned components are ready for inspection.
- D. When directed, re-clean components until they pass.
- E. Contractor shall bear the costs of retesting due to inadequate cleaning.
- F. Submit evidence that all portions of the system required to be cleaned have been cleaned satisfactorily.

### **3.06 ANTI-MICROBIAL TREATMENT**

- A. When directed, apply anti-microbial treatment to internal surfaces.
- B. Apply anti-microbial agent after removal of surface deposits and debris.
- C. Apply anti-microbial treatments and coatings in strict accordance with the manufacturer's written recommendations and EPA registration listing.
- D. Spray coatings directly onto interior ductwork surfaces; do not "fog" into air stream.

### **3.07 ADJUSTING**

- A. After satisfactory completion of field quality control activities, restore adjustable devices to original settings, including, but not limited to, dampers, air directional devices, valves, fuses, and circuit breakers.

### **3.08 WASTE MANAGEMENT**

- A. Double-bag waste and debris in 6 mil, 0.006 inch (0.1524 mm) thick polyethylene plastic bags.
- B. Dispose of debris off-site in accordance with applicable federal, state and local requirements.

**END OF SECTION**

**SECTION 23 05 19  
METERS AND GAGES FOR HVAC PIPING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Pressure gages and pressure gage taps.
- B. Thermometers and thermometer wells.
- C. Static pressure gages.

**1.02 RELATED REQUIREMENTS**

- A. Section 23 09 23 - Direct-Digital Control System for HVAC.
- B. Section 23 21 13 - Hydronic Piping.

**1.03 REFERENCE STANDARDS**

- A. ASME B40.100 - Pressure Gauges and Gauge Attachments; 2013.
- B. ASTM E1 - Standard Specification for ASTM Liquid-in-Glass Thermometers; 2014.
- C. ASTM E77 - Standard Test Method for Inspection and Verification of Thermometers; 2014.
- D. UL 393 - Indicating Pressure Gauges for Fire-Protection Service; Current Edition, Including All Revisions.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide list that indicates use, operating range, total range and location for manufactured components.

**1.05 FIELD CONDITIONS**

- A. Do not install instrumentation when areas are under construction, except for required rough-in, taps, supports and test plugs.

**PART 2 PRODUCTS**

**2.01 PRESSURE GAGES**

- A. Pressure Gages: ASME B40.100, UL 393 drawn steel case, phosphor bronze bourdon tube, rotary brass movement, brass socket, with front recalibration adjustment, black scale on white background.
  - 1. Case: Steel with brass bourdon tube.
  - 2. Size: 4-1/2 inch (115 mm) diameter.
  - 3. Mid-Scale Accuracy: One percent.
  - 4. Scale: Psi.

**2.02 PRESSURE GAGE TAPPINGS**

- A. Gage Cock: Tee or lever handle, brass for maximum 150 psi (1034 kPa).



## **2.03 STEM TYPE THERMOMETERS**

- A. Thermometers - Adjustable Angle: Red- or blue-appearing non-toxic liquid in glass; ASTM E1; lens front tube, cast aluminum case with enamel finish, cast aluminum adjustable joint with positive locking device; adjustable 360 degrees in horizontal plane, 180 degrees in vertical plane.
  - 1. Size: 9 inch (225 mm) scale.
  - 2. Window: Clear Lexan.
  - 3. Stem: 3/4 inch (20 mm) NPT brass.
  - 4. Accuracy: 2 percent, per ASTM E77.
  - 5. Calibration: Degrees F.

## **2.04 THERMOMETER SUPPORTS**

- A. Socket: Brass separable sockets for thermometer stems with or without extensions as required, and with cap and chain.

## **2.05 TEST PLUGS**

- A. Test Plug: 1/4 inch (6 mm) or 1/2 inch (13 mm) brass fitting and cap for receiving 1/8 inch (3 mm) outside diameter pressure or temperature probe with Nordel core for temperatures up to 350 degrees F (176 degrees C).
- B. Test Kit: Carrying case, internally padded and fitted containing one 2-1/2 inch (60 mm) diameter pressure gages, one gage adapters with 1/8 inch (3 mm) probes, two 1 inch (25 mm) dial thermometers.

## **2.06 STATIC PRESSURE GAGES**

- A. 3-1/2 inch (90 mm) diameter dial in metal case, diaphragm actuated, black figures on white background, front recalibration adjustment, 2 percent of full scale accuracy.
- B. Inclined manometer, red liquid on white background with black figures, front recalibration adjustment, 3 percent of full scale accuracy.
- C. Accessories: Static pressure tips with compression fittings for bulkhead mounting, 1/4 inch (6 mm) diameter tubing.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Provide one pressure gage per pump, installing taps before strainers and on suction and discharge of pump. Pipe to gage.
- C. Install thermometers in piping systems in sockets in short couplings. Enlarge pipes smaller than 2-1/2 inch (60 mm) for installation of thermometer sockets. Ensure sockets allow clearance from insulation.
- D. Locate duct mounted thermometers minimum 10 feet (3 m) downstream of mixing dampers, coils, or other devices causing air turbulence.

- E. Provide instruments with scale ranges selected according to service with largest appropriate scale.
- F. Install gages and thermometers in locations where they are easily read from normal operating level. Install vertical to 45 degrees off vertical.
- G. Adjust gages and thermometers to final angle, clean windows and lenses, and calibrate to zero.

**END OF SECTION**

**SECTION 23 05 53**  
**IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Nameplates.
- B. Tags.
- C. Pipe markers.

**1.02 REFERENCE STANDARDS**

- A. ASME A13.1 - Scheme for the Identification of Piping Systems; 2007.
- B. ASTM D709 - Standard Specification for Laminated Thermosetting Materials; 2013.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Chart and Schedule: Submit valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.
- C. Project Record Documents: Record actual locations of tagged valves.

**PART 2 PRODUCTS**

**2.01 IDENTIFICATION APPLICATIONS**

- A. Air Handling Units: Nameplates.
- B. Control Panels: Nameplates.
- C. Piping: Pipe markers.
- D. Pumps: Nameplates.
- E. Thermostats: Nameplates.
- F. Valves: Tags.

**2.02 NAMEPLATES**

- A. Manufacturers:
  - 1. Kolbi Pipe Marker Co..
  - 2. Seton Identification Products.
  - 3. Substitutions: See Section 01 60 00 - Product Requirements.
  - 4. Letter Color: Black.
  - 5. Letter Height: 1/4 inch (6 mm).
  - 6. Background Color: white.

**2.03 TAGS**

- A. Manufacturers:

1. Brady Corporation.
  2. Kolbi Pipe Marker Co..
  3. Seton Identification Products.
- B. Plastic Tags: Laminated three-layer plastic with engraved black letters on light contrasting background color. Tag size minimum 1-1/2 inch (40 mm) diameter.
- C. Valve Tag Chart: Typewritten letter size list in anodized aluminum frame.

## **2.04 PIPE MARKERS**

- A. Manufacturers:
1. Brady Corporation.
  2. Kolbi Pipe Marker Co..
  3. Seton Identification Products.
- B. Color: Conform to ASME A13.1.
- C. Plastic Pipe Markers: Factory fabricated, flexible, semi- rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid being conveyed.
- D. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Degrease and clean surfaces to receive adhesive for identification materials.

### **3.02 INSTALLATION**

- A. Install nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.
- B. Install tags with corrosion resistant chain.
- C. Install plastic pipe markers in accordance with manufacturer's instructions.
- D. Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.
- E. Use tags on piping 3/4 inch (20 mm) diameter and smaller.
- F. Identify pipe service, flow direction, and pressure.
- G. Install pipe markers in clear view and align with axis of piping.
- H. Location of pipe identification not to exceed 20 feet (6 m) on straight runs including risers and drops, adjacent to each valve and Tee, at each side of penetration of structure or enclosure, and at each obstruction.

**END OF SECTION**

**SECTION 23 05 93**  
**TESTING, ADJUSTING, AND BALANCING FOR HVAC**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Testing, adjustment, and balancing of air systems.
- B. Testing, adjustment, and balancing of hydronic systems.
- C. Measurement of final operating condition of HVAC systems.

**1.02 REFERENCE STANDARDS**

- A. AABC MN-1 - AABC National Standards for Total System Balance; 2002.
- B. ASHRAE Std 111 - Measurement, Testing, Adjusting, and Balancing of Building HVAC Systems; 2008.
- C. NEBB (TAB) - Procedural Standards for Testing Adjusting and Balancing of Environmental Systems; 2015, Eighth Edition.
- D. SMACNA (TAB) - HVAC Systems Testing, Adjusting and Balancing; 2002.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
  - 1. Revise TAB plan to reflect actual procedures and submit as part of final report.
  - 2. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Architect and for inclusion in operating and maintenance manuals.
  - 3. Include actual instrument list, with manufacturer name, serial number, and date of calibration.
  - 4. Form of Test Reports: Where the TAB standard being followed recommends a report format use that; otherwise, follow ASHRAE Std 111.
  - 5. Units of Measure: Report data in both I-P (inch-pound) and SI (metric) units.
  - 6. Include the following on the title page of each report:
    - a. Name of Testing, Adjusting, and Balancing Agency.
    - b. Address of Testing, Adjusting, and Balancing Agency.
    - c. Telephone number of Testing, Adjusting, and Balancing Agency.
    - d. Project name.
    - e. Project location.
    - f. Project Architect.
    - g. Project Engineer.
    - h. Project Contractor.
    - i. Report date.

## **PART 2 PRODUCTS - NOT USED**

## **PART 3 EXECUTION**

### **3.01 GENERAL REQUIREMENTS**

- A. Perform total system balance in accordance with one of the following:
  - 1. AABC MN-1, AABC National Standards for Total System Balance.
  - 2. ASHRAE Std 111, Practices for Measurement, Testing, Adjusting and Balancing of Building Heating, Ventilation, Air-Conditioning, and Refrigeration Systems.
  - 3. NEBB Procedural Standards for Testing Adjusting Balancing of Environmental Systems.
  - 4. SMACNA (TAB).
- B. Begin work after completion of systems to be tested, adjusted, or balanced and complete work prior to Substantial Completion of the project.
- C. Where HVAC systems and/or components interface with life safety systems, including fire and smoke detection, alarm, and control, coordinate scheduling and testing and inspection procedures with the authorities having jurisdiction.
- D. TAB Agency Qualifications:
  - 1. Company specializing in the testing, adjusting, and balancing of systems specified in this section.
- E. TAB Supervisor Qualifications: Certified by same organization as TAB agency.

### **3.02 EXAMINATION**

- A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:
  - 1. Systems are started and operating in a safe and normal condition.
  - 2. Temperature control systems are installed complete and operable.
  - 3. Proper thermal overload protection is in place for electrical equipment.
  - 4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
  - 5. Duct systems are clean of debris.
  - 6. Fans are rotating correctly.
  - 7. Air coil fins are cleaned and combed.
  - 8. Access doors are closed and duct end caps are in place.
  - 9. Air outlets are installed and connected.
  - 10. Duct system leakage is minimized.
  - 11. Hydronic systems are flushed, filled, and vented.
  - 12. Pumps are rotating correctly.
  - 13. Proper strainer baskets are clean and in place.
  - 14. Service and balance valves are open.
- B. Submit field reports. Report defects and deficiencies that will or could prevent proper system balance.

### **3.03 ADJUSTMENT TOLERANCES**

- A. Air Handling Systems: Adjust to within plus or minus 5 percent of design for supply systems and plus or minus 10 percent of design for return and exhaust systems.
- B. Air Outlets and Inlets: Adjust total to within plus 10 percent and minus 5 percent of design to space. Adjust outlets and inlets in space to within plus or minus 10 percent of design.
- C. Hydronic Systems: Adjust to within plus or minus 10 percent of design.

### **3.04 RECORDING AND ADJUSTING**

- A. Ensure recorded data represents actual measured or observed conditions.
- B. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.
- C. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.
- D. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

### **3.05 AIR SYSTEM PROCEDURE**

- A. Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities at site altitude.
- B. Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.
- C. Measure air quantities at air inlets and outlets.
- D. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.
- E. Use volume control devices to regulate air quantities only to extend that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.
- F. Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary branch air quantities by damper regulation.
- G. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.
- H. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.
- I. Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.

- J. Where modulating dampers are provided, take measurements and balance at extreme conditions. Balance variable volume systems at maximum air flow rate, full cooling, and at minimum air flow rate, full heating.
- K. Measure building static pressure and adjust supply, return, and exhaust air systems to provide required relationship between each to maintain approximately 0.05 inches (12.5 Pa) positive static pressure near the building entries.
- L. For variable air volume system powered units set volume controller to air flow setting indicated. Confirm connections properly made and confirm proper operation for automatic variable air volume temperature control.

### **3.06 WATER SYSTEM PROCEDURE**

- A. Adjust water systems to provide required or design quantities.
- B. Use calibrated Venturi tubes, orifices, or other metered fittings and pressure gauges to determine flow rates for system balance. Where flow metering devices are not installed, base flow balance on temperature difference across various heat transfer elements in the system.
- C. Adjust systems to provide specified pressure drops and flows through heat transfer elements prior to thermal testing. Perform balancing by measurement of temperature differential in conjunction with air balancing.
- D. Effect system balance with automatic control valves fully open to heat transfer elements.
- E. Effect adjustment of water distribution systems by means of balancing cocks, valves, and fittings. Do not use service or shut-off valves for balancing unless indexed for balance point.

### **3.07 SCOPE**

- A. Test, adjust, and balance the following:
  - 1. HVAC Pumps
  - 2. Air Cooled Refrigerant Condensers
  - 3. Air Handling Units
  - 4. Fans
  - 5. Air Filters
  - 6. Air Terminal Units
  - 7. Air Inlets and Outlets

**END OF SECTION**



**SECTION 23 07 13  
DUCT INSULATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Duct insulation.

**1.02 REFERENCE STANDARDS**

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.
- B. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2014.
- C. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005.
- D. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.
- C. Manufacturer's Instructions: Indicate installation procedures necessary to ensure acceptable workmanship and that installation standards will be achieved.

**1.04 QUALITY ASSURANCE**

- A. Applicator Qualifications: Company specializing in performing the type of work specified in this section, with minimum three years of experience and approved by manufacturer.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Accept materials on site in original factory packaging, labelled with manufacturer's identification, including product density and thickness.
- B. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

**1.06 FIELD CONDITIONS**

- A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.
- B. Maintain temperature during and after installation for minimum period of 24 hours.

**PART 2 PRODUCTS**

**2.01 REGULATORY REQUIREMENTS**

- A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

## **2.02 GLASS FIBER, FLEXIBLE**

- A. Manufacturers:
  - 1. Knauf Fiber Glass.
  - 2. Johns Manville Corporation.
  - 3. Owens Corning Corp.
  - 4. CertainTeed Corporation.
- B. Vapor Barrier Jacket:
  - 1. Kraft paper with glass fiber yarn and bonded to aluminized film.
  - 2. Moisture Vapor Permeability: 0.04 perm inch (0.058 ng/Pa s m), when tested in accordance with ASTM E96/E96M.
  - 3. Secure with pressure sensitive tape.
- C. Vapor Barrier Tape:
  - 1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber based adhesive.
- D. Tie Wire: Annealed steel, 16 gage, 0.0508 inch diameter (1.29 mm diameter).

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that ducts have been tested before applying insulation materials.
- B. Verify that surfaces are clean, foreign material removed, and dry.

### **3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install in accordance with NAIMA National Insulation Standards.
- C. Insulated ducts conveying air below ambient temperature:
  - 1. Provide insulation with vapor barrier jackets.
  - 2. Finish with tape and vapor barrier jacket.
  - 3. Continue insulation through walls, sleeves, hangers, and other duct penetrations.
  - 4. Insulate entire system including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.
- D. Insulated ducts conveying air above ambient temperature:
  - 1. Insulate fittings and joints. Where service access is required, bevel and seal ends of insulation.
- E. External Duct Insulation Application:
  - 1. Secure insulation with vapor barrier with wires and seal jacket joints with vapor barrier adhesive or tape to match jacket.
  - 2. Secure insulation without vapor barrier with staples, tape, or wires.
  - 3. Install without sag on underside of duct. Use adhesive or mechanical fasteners where necessary to prevent sagging. Lift duct off trapeze hangers and insert spacers.
  - 4. Seal vapor barrier penetrations by mechanical fasteners with vapor barrier adhesive.

5. Stop and point insulation around access doors and damper operators to allow operation without disturbing wrapping.

### **3.03 SCHEDULES**

- A. Exhaust Ducts Within 10 ft (3 m) of Exterior Openings:
  1. Flexible Glass Fiber Duct Insulation: 2 inches thick.
- B. Outside Air Intake Ducts:
  1. Flexible Glass Fiber Duct Insulation: 2 inches thick.
- C. Supply Ducts:
  1. Flexible Glass Fiber Duct Insulation: 2 inches thick.
- D. Return Ducts:
  1. Flexible Glass Fiber Duct Insulation: 2 inches thick.

**END OF SECTION**

**SECTION 23 07 19  
HVAC PIPING INSULATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Piping insulation.
- B. Jackets and accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 23 21 13 - Hydronic Piping: Placement of hangers and hanger inserts.

**1.03 REFERENCE STANDARDS**

- A. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus; 2013.
- B. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2014.
- C. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation; 2015.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.
- E. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2014.
- F. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.
- C. Manufacturer's Instructions: Indicate installation procedures that ensure acceptable workmanship and installation standards will be achieved.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years of documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified in this section with minimum three years of experience.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

## **1.07 FIELD CONDITIONS**

- A. Maintain ambient conditions required by manufacturers of each product.
- B. Maintain temperature before, during, and after installation for minimum of 24 hours.

## **PART 2 PRODUCTS**

### **2.01 REGULATORY REQUIREMENTS**

- A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

### **2.02 GLASS FIBER**

- A. Manufacturers:
  - 1. CertainTeed Corporation.
  - 2. Johns Manville Corporation.
  - 3. Knauf Insulation.
  - 4. Owens Corning Corporation.
- B. Insulation: ASTM C547; rigid molded, noncombustible.
  - 1. 'K' ('Ksi') Value: ASTM C177, 0.24 at 75 degrees F (0.035 at 24 degrees C).
  - 2. Maximum Service Temperature: 850 degrees F (454 degrees C).
  - 3. Maximum Moisture Absorption: 0.2 percent by volume.
- C. Vapor Barrier Jacket: White kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E96/E96M of 0.02 perm-inches (0.029 ng/Pa s m).
- D. Vapor Barrier Lap Adhesive: Compatible with insulation.

### **2.03 FLEXIBLE ELASTOMERIC CELLULAR INSULATION**

- A. Manufacturer:
  - 1. Aeroflex USA, Inc.
  - 2. Armacell LLC.
  - 3. K-Flex USA LLC.
- B. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 1; use molded tubular material wherever possible.
  - 1. Minimum Service Temperature: Minus 40 degrees F (Minus 40 degrees C).
  - 2. Maximum Service Temperature: 220 degrees F (104 degrees C).
  - 3. Connection: Waterproof vapor barrier adhesive.
- C. Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that piping has been tested before applying insulation materials.
- B. Verify that surfaces are clean and dry, with foreign material removed.

### 3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install in accordance with NAIMA National Insulation Standards.
- C. Exposed Piping: Locate insulation and cover seams in least visible locations.
- D. Insulated pipes conveying fluids below ambient temperature; insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints.
- E. Glass fiber insulated pipes conveying fluids below ambient temperature:
  - 1. Provide vapor barrier jackets, factory-applied or field-applied; secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples and vapor barrier mastic.
  - 2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor barrier adhesive or PVC fitting covers.
- F. For hot piping conveying fluids over 140 degrees F (60 degrees C), insulate flanges and unions at equipment.
- G. Glass fiber insulated pipes conveying fluids above ambient temperature.
  - 1. Provide standard jackets, with or without vapor barrier, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples.
  - 2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.
- H. Inserts and Shields:
  - 1. Application: Piping 1-1/2 inches (40 mm) diameter or larger.
  - 2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
  - 3. Insert location: Between support shield and piping and under the finish jacket.
  - 4. Insert Configuration: Minimum 6 inches (150 mm) long, of same thickness and contour as adjoining insulation; may be factory fabricated.
  - 5. Insert Material: Hydrous calcium silicate insulation or other heavy density insulating material suitable for the planned temperature range.
- I. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions. At fire separations, refer to Section 07 84 00.

### 3.03 SCHEDULE

- A. Heating Systems:
  - 1. Heating Water Supply and Return:
    - a. Glass Fiber Insulation:
      - 1) Pipe Size Range: All sizes.
        - a) Thickness: 1-1/2 inch
      - 2) Runouts not over 12 feet in length.
        - a) Thickness: 1 inch.
- B. Cooling Systems:

1. Condensate Drains from Cooling Coils:
  - a. Glass Fiber Insulation:
    - 1) Pipe Size Range: All sizes.
      - a) Thickness: 1 inch.
2. Refrigerant Suction:
  - a. Flexible Elastomeric Cellular Insulation:
    - 1) Pipe Size Range: All sizes.
      - a) Thickness: 1 inch.
3. Refrigerant Liquid, Outdoors:
  - a. Flexible Elastomeric Cellular Insulation:
    - 1) Pipe Size Range: All sizes.
      - a) Thickness: 3/4 inch.

**END OF SECTION**

**SECTION 23 09 13**  
**INSTRUMENTATION AND CONTROL DEVICES FOR HVAC**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Thermostats.
- B. Humidistats.
- C. Control valves.
- D. Damper operators.
- E. Variable frequency drives.
- F. Air flow measuring station.
- G. Miscellaneous accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 23 09 23 - Direct-Digital Control System for HVAC.
- B. Section 23 21 13 - Hydronic Piping: Installation of control valves, flow switches, temperature sensor sockets, gauge taps.

**1.03 REFERENCE STANDARDS**

- A. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.
- B. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2015.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide description and engineering data for each control system component. Include sizing as requested. Provide data for each system component and software module.
- C. Shop Drawings: Indicate complete operating data, system drawings, wiring diagrams, and written detailed operational description of sequences. Submit schedule of valves indicating size, flow, and pressure drop for each valve. For automatic dampers indicate arrangement, velocities, and static pressure drops for each system.
- D. Project Record Documents: Record actual locations of control components, including panels, thermostats, and sensors. Accurately record actual location of control components, including panels, thermostats, and sensors.
  - 1. Revise shop drawings to reflect actual installation and operating sequences.
- E. Operation and Maintenance Data: Include inspection period, cleaning methods, recommended cleaning materials, and calibration tolerances.
- F. Warranty: Submit manufacturers warranty and ensure forms have been filled out in Owner s name and registered with manufacturer.



## 1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

## 1.06 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a two year period after Substantial Completion.

## PART 2 PRODUCTS

### 2.01 EQUIPMENT - GENERAL

- A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

### 2.02 CONTROL PANELS

- A. Unitized cabinet type for each system under automatic control with relays and controls mounted in cabinet and temperature indicators, pressure gauges, pilot lights, push buttons and switches flush on cabinet panel face.
- B. NEMA 250, general purpose utility enclosures with enamelled finished face panel.
- C. Provide common keying for all panels.

### 2.03 CONTROL VALVES

- A. Globe Pattern:
  - 1. Up to 2 inches (50 mm): Bronze body, bronze trim, rising stem, renewable composition disc, screwed ends.
  - 2. Hydronic Systems:
    - a. Rate for service pressure of 125 psig at 250 degrees F (860 kPa at 121 degrees C).
    - b. Replaceable plugs and seats of stainless steel.
    - c. Size for 3 psig (20 kPa) maximum pressure drop at design flow rate.
    - d. Two way valves shall have equal percentage characteristics, three way valves linear characteristics. Size two way valve operators to close valves against pump shut off head.
- B. Electronic Operators:
  - 1. Valves shall spring return to normal position as indicated on freeze, fire, or temperature protection.
  - 2. Select operator for full shut off at maximum pump differential pressure.
- C. Radiation Valves:
  - 1. Bronze body, bronze trim, 2 or 3 port as indicated, replaceable plugs and seats, union and threaded ends.
  - 2. Rate for service pressure of 125 psig at 250 degrees F (860 kPa at 121 degrees C).
  - 3. Size for 3 psig (20 kPa) maximum pressure drop at design flow rate.
  - 4. Two way valves shall have equal percentage characteristics, three way valves linear characteristics. Size two way valve operators to close valves against pump shut off head.

5. Operators (2 Position): Synchronous motor with enclosed gear train, dual return springs, valve position indicator; 24 v DC, 0.4 amp. Valves shall spring return to normal position for temperature protection.
6. Operators (Modulating): Self contained, linear motorized actuator with approximately 3/4 inch (19 mm) stroke, 60 second full travel with transformer and SPDT contacts: 24 v DC, 6 watt maximum input.

## 2.04 DAMPER OPERATORS

- A. General: Provide smooth proportional control with sufficient power for air velocities 20 percent greater than maximum design velocity and to provide tight seal against maximum system pressures. Provide spring return for two position control and for fail safe operation.
  1. Provide sufficient number of operators to achieve unrestricted movement throughout damper range.
  2. Provide one operator for maximum 36 sq ft (3.24 sq m) damper section.
- B. Electric Operators:
  1. Spring return, adjustable stroke motor having oil immersed gear train, with auxiliary end switch.

## 2.05 INPUT/OUTPUT SENSORS

- A. Temperature Sensors:
  1. Use thermistor or RTD type temperature sensing elements with characteristics resistant to moisture, vibration, and other conditions consistent with the application without affecting accuracy and life expectancy.
  2. Construct RTD of nickel or platinum with base resistance of 1000 ohms at 70 degrees F (26 degrees C).
  3. 100 ohm platinum RTD is acceptable if used with project DDC controllers.
  4. Temperature sensing device must be compatible with project DDC controllers.
  5. Performance Characteristics:
    - a. RTD:
      - 1) Room Sensor Accuracy: Plus/minus 0.50 degrees F (0.28 degrees C) minimum.
      - 2) Duct Averaging Accuracy: Plus/minus 0.50 degrees F (0.28 degrees C) minimum.
      - 3) All Other Accuracy: Plus/minus 0.75 degrees F (0.42 degrees C) minimum.
      - 4) Range: Minus 40 degrees F (Minus 40 degrees C) through 220 degrees F (104.4 degrees C) minimum.
    - b. Thermistor:
      - 1) Accuracy (All): Plus/minus 0.36 degrees F (0.20 degrees C) minimum.
      - 2) Range: Minus 25 degrees F (Minus 13 degrees C) through 122 degrees F (50 degrees C) minimum.
      - 3) Heat Dissipation Constant: 2.7 mW per degree C.
    - c. Temperature Transmitter:
      - 1) Accuracy: 0.10 degree F (0.06 degrees C) minimum or plus/minus 0.20 percent of span.
      - 2) Output: 4 - 20 mA.
    - d. Sensing Range:
      - 1) Provide limited range sensors if required to sense the range expected for a respective point.

- 2) Use RTD type sensors for extended ranges beyond minus 30 degrees F (minus 34.4 degrees) to 230 degrees F (114.4 degrees C).
  - 3) Use temperature transmitters in conjunction with RTD's when RTD's are incompatible with DDC controller direct temperature input.
- e. Wire Resistance:
- 1) Use appropriate wire size to limit temperature offset due to wire resistance to 1.0 degree F (0.56 degrees C) or use temperature transmitter when offset is greater than 1.0 degree F (0.56 degrees C) due to wire resistance.
- f. Outside Air Sensors: Watertight inlet fitting shielded from direct rays of the sun.
- g. Immersion Temperature Sensors: A sensor encased in a corrosion-resistant probe with an indoor junction box service entry body.
- h. Ceiling and Recessed Mount Temperature Sensors: Ceiling-mounted sensor in a low-profile housing.
- i. Temperature Averaging Elements:
- 1) Use on duct sensors for ductwork 10 sq ft (0.93 sq m) or larger.
  - 2) Use averaging elements where prone to stratification with sensor length 8 ft (2.5 m), or 16 ft (5 m).
  - 3) Provide for all mixed air and heating coil discharge sensors regardless of duct size.
- j. Insertion Elements:
- 1) Use in ducts not affected by temperature stratification or smaller than 11 sq inches (1 sq m).
  - 2) Provide dry type, insertion elements for liquids, installed in immersion wells, with minimum insertion length of 2.5 inches (60 mm).

B. Humidity Sensors:

1. Duct Mounted Sensor: Voltage type encased in a die-cast metal, weather-proof housing.
  - a. Input Power, Voltage Type: Class 2; 12-30 VDC/24 VAC, 15mA max.
  - b. Input Power, mA Type: Class 2; Loop powered 12-30 VDC only, 30 mA max.
  - c. Output Voltage type: 3-wire observed polarity.
  - d. Output mA type: 2-wire, not polarity sensitive (clipped and capped).
- e. Humidity:
  - 1) HS Element: Digitally profiled thin-film capacitive .
  - 2) Accuracy 1 percent at 10 to 80 percent relative humidity. at 77 degrees F (25 degrees C), multi-point calibration, NIST traceable.
    - a) Plus/minus 1 percent at 20-40 percent RH in mA output mode; (multi-point calibration, NIST traceable).
  - 3) Scaling: 0-100 percent RH.
- f. Temperature Effect:
  - 1) Duct Mounted: Plus/minus 0.18 percent per degree F (Plus/minus 0.10 percent per degree C).
- g. Hysteresis: 1.5 percent typical.
- h. Linearity: Included in accuracy specification.
- i. Reset Rate: 24 hours.
- j. Stability: Plus/minus 1 percent @ 68 degrees F (20 degrees C) annually, for two years.

C. Static Pressure (Air Pressure) Sensors:

1. Unidirectional with ranges not exceeding 150 percent of maximum expected input.
2. Temperature compensate with typical thermal error or 0.06 percent of full scale in temperature range of 40 to 100 degrees F (5 to 40 degrees C).
3. Accuracy: One percent of full scale with repeatability 0.3 percent.
4. Output: 0 - 5 vdc with power at 12 to 28 vdc.

D. Equipment Operation Sensors:

1. Status Inputs for Fans: Differential pressure switch with adjustable range of 0 to 5 inches wg (0 to 1250 Pa).
2. Status Inputs for Pumps: Differential pressure switch piped across pump with adjustable pressure differential range of 8 to 60 psi (50 to 400 kPa).
3. Status Inputs for Electric Motors: Current sensing relay with current transformers, adjustable and set to 175 percent of rated motor current.

## 2.06 TRANSMITTERS

A. Building Static Pressure Transmitter:

1. One pipe, differential type with temperature compensation, scale range 0.01 to 6.0 inch wg (.0025 to 1.5 kPa) positive or negative, and sensitivity of 0.0005 inch wg (0.125 Pa). Transmit electronic signal to receiver with matching scale range.

B. Air Pressure Transmitters:

1. General: Provide dry media differential pressure transducers to monitor duct and room pressure.
  - a. Media Compatibility: Dry air.
  - b. Input Power: Class 2; 12-30 VDC; 2 - wire: 20 mA max.
  - c. Output: Field selectable, 2-wire, loop-powered 4-20 mA (DC only, clipped & capped).
  - d. Pressure Ranges: 4 and 7, field selectable.
  - e. Response Time:
    - 1) Standard: T95 in 20 seconds.
    - 2) Fast: T95 in 2 seconds.
    - 3) Switch selectable.
  - f. Mode: Switch selectable, unidirectional.

C. Temperature Transmitters:

1. One pipe, directly proportional output signal to measured variable, linearity within plus or minus 1/2 percent of range for 200 degree F (93 degrees C) span and plus or minus 1 percent for 50 degree F (10 degrees C) span, with 50 degrees F (10 degree C). temperature range, compensated bulb, averaging capillary, or rod and tube operation on 20 psig (138 kPa) input pressure and 3 to 15 psig (20 to 100 kPa) output.

D. Humidity Transmitters:

1. One pipe, directly proportioned output signal to measured variable, linearity within plus or minus 1 percent for 70 percent relative humidity span, capable of withstanding 95 percent relative humidity without loss of calibration.

## 2.07 LOW COIL INPUT RELAYS

A. Manufacturers

1. Functional Devices, Inc.; RIB.
- B. Enclosed relay Hi/Low separation 20 amp DPDT +Override.
- C. UL Listed, UL916, UL864, C-UL and UL Accepted for use in Plenum, NEMA 1.
- D. Power input: 120 Vac, 50-60 Hz or 208-277 Vac, 50-60 Hz as applicable.
- E. Control Input: 5-25 Vac/dc, 50-60 Hz.
- F. Relay status: LED on = activated.

## **2.08 VARIABLE FREQUENCY DRIVES**

- A. Rated input voltage: See schedules.
- B. Variable torque horsepower: See schedules.
- C. Enclosure: Power electronics and control electronics housed in NEMA 1 enclosure.
- D. Electro-mechanical construction:
  1. Input voltage +/- 10 percent.
  2. Output current overload rating of 125 percent of motor FLA for 1 minute.
  3. Voltage source design using PWM inverter technology.
  4. Microprocessor based control circuit generating sine coded PWM output current waveform.
- E. Non-volatile memory (NV RAM); all programming is maintained when disconnected from power.
- F. Corrects displacement power factor to 98 percent throughout the motor speed range and eliminates power line notching, through the use of diode bridge input section or power factor correction capacitors and isolation transformer.
- G. Input phase insensitive, sequencing of the 3 phase input lines is not required.
- H. Fused DC bus with capacitive filtering.
- I. Insulated Gate Bipolar Transistors (IGBT) output, allowing motor noise, at 60 HZ, less than 2 dB (@ 1 meter) above that resulting from across the line operation.
- J. Three current transformers detect the output current to provide: Electronic thermal overload protection, Three phase current limit, Ground fault protection, Short circuit protection and Speed search capability.
- K. Digital operator keypad and display.
- L. Power electronics provides efficiency of 97 percent (minimum).
- M. Materials of construction UL 94-VO rated.
- N. Non-Fused disconnect provided for motor service.

## **2.09 AIR FLOW MEASURING STATION**

- A. Manufacturers:
  1. Ebtron, Inc.; Model Advantage II Gold Series.
  2. Johnson Controls.

3. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Thermal dispersion airflow measurement device. Measuring device shall consist of one or more multi-point measuring probes and a single microprocessor-based transmitter. Transmitter shall have an LCD display capable of displaying airflow and temperature. Airflow shall be field configurable to be displayed as a velocity or volumetric rate.
- C. Transmitter shall be operate on 24 VAC.
- D. Transmitter shall be capable of communicating with building automation system using one of the following interface options:
1. Linear analog output signal: Field selectable, fuse protected and isolated, 0-10 VDC and 4-20 mA (4-wire).
  2. RS-485: Field selectable ModBus.
  3. 10 Base-T Ethernet: Field selectable ModBus TCP and TCP/IP.
  4. LonWorks Free Topology.
- E. Sensors shall be fabricated of anodized aluminum alloy tube with 303/304 stainless steel mounting brackets.
- F. Airflow/temperature measuring devices shall be UL listed.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that systems are ready to receive work.
- C. Beginning of installation means installer accepts existing conditions.
- D. Coordinate installation of system components with installation of mechanical systems equipment such as air handling units and air terminal units.

### **3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Check and verify location of thermostats with plans and room details before installation. Locate 60 inches (1500 mm) above floor. Align with lighting switches and humidistats. 26 27 26.
- C. Mount outdoor reset thermostats and outdoor sensors indoors, with sensing elements outdoors with sun shield.
- D. Install damper motors on outside of duct in warm areas. Do not install motors in locations at outdoor temperatures.
- E. Mount control panels adjacent to associated equipment on vibration free walls or free standing angle iron supports. One cabinet may accommodate more than one system in same equipment room. Provide engraved plastic nameplates for instruments and controls inside cabinet and engraved plastic nameplates on cabinet face.

- F. Install "hand/off/auto" selector switches to override automatic interlock controls when switch is in "hand" position.
- G. Electrical material and installation shall be in accordance with appropriate requirements of Division 26.
1. Provide conduit and back boxes for products specified in this Section in accordance with the requirements of Division 26.
  2. Surface raceways are not permitted. Coordinate rough-ins at time of wall erection.
  3. Provide electrical wiring and final connections to products specified in this Section in accordance with the requirements of Section Division 26.
  4. Provide conduit for all control wiring exposed to view. This includes but is not limited to all storage rooms, mechanical rooms, and similar spaces.
  5. Provide conduit for all control wiring concealed in inaccessible spaces. This includes but is not limited to wiring above/behind drywall and plaster ("hard") ceilings or soffits, and wiring within vertical chase spaces, regardless of whether access doors are provided or not.
  6. Control wiring that is concealed above readily accessible ceilings such as acoustical lay-in ceilings, need not be run in conduit.

**END OF SECTION**

**SECTION 23 09 23**  
**DIRECT-DIGITAL CONTROL SYSTEM FOR HVAC**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. System description.
- B. Controllers.
- C. Power supplies and line filtering.
- D. System software.
- E. Controller software.
- F. HVAC control programs.
- G. Rough-in, wiring to, and final connections to products specified in this Section.

**1.02 RELATED REQUIREMENTS**

- A. Section 23 09 13 - Instrumentation and Control Devices for HVAC.

**1.03 REFERENCE STANDARDS**

- A. MIL-STD-810 - Environmental Engineering Considerations and Laboratory Tests; Revision G, 2014.
- B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

**1.04 OPEN, INTEROPERABLE, INTEGRATED ARCHITECTURES**

- A. The intent of this specification is to provide a peer-to-peer networked, stand-alone, distributed control system with the capability to integrate both the ANSI/ASHRAE Standard 135-1995 BACnet and LonWorks technology communication protocols in one open, interoperable system.
- B. The supplied computer software shall employ object-oriented technology (OOT) for representation of all data and control devices within the system. In addition, adherence to industry standards including ANSI/ASHRAE Standard 135-1995, BACnet and LonMark to assure interoperability between all system components is required. For each LonWorks device that does not have LonMark certification, the device supplier must provide a XIF file for the device. For each BACnet device, the device supplier must provide a PICS document showing the installed device = s-compliance level. Minimum compliance is Level 3; with the ability to support data read and write functionality. Physical connection of BACnet devices shall be via Ethernet.
- C. All components and controllers supplied under this contract shall be true peer-to-peer communicating devices. Components or controllers requiring polling by a host to pass data shall not be acceptable.
- D. The supplied system must incorporate the ability to access all data using Java enabled browsers without requiring proprietary operator interface and configuration programs. An Open Database Connectivity (ODBC) or Structured Query Language (SQL) compliant server database is required



for all system database parameter storage. This data shall reside on a supplier-installed server for all database access. Systems requiring proprietary database and user interface programs shall not be acceptable.

- E. The installed system shall provide secure password access to all features, functions and data contained in the overall Building Management Control System (BMCS). Secure Socket Layer (SSL) encryption shall be an available option for remote access.
- F. The installed system must be totally scalable to allow for future expansion with the addition of controllers and/or input/output devices. It shall not be necessary to remove equipment supplied under this contract to expand the system.
- G. The failure of any single component or network shall not interrupt the control functions of non-affected devices. A single network failure shall only affect shared communications or shared data; individual application controllers and network controllers shall continue normal operation minus only the data from a remote device from the affected network. Automatic default values for all network transported data shall be provide to allow continued operation until the network is restored.
- H. The BMCS shall provide support for ODBC or SQL. An embedded database must be an ODBC-compliant database or must provide an ODBC data access mechanism to read and write dated stored within it. A minimum offering would be the documentation of database schemes to allow users to read/write data into other applications using appropriate ODBS syntax.
- I. A hierarchical topology is required to assure reasonable system response times and to manage the flow and sharing of data.
  - 1. Maximum acceptable response time from any alarm occurrence (at the point of origin) to the point of annunciation shall not exceed 5 seconds for network connected user interfaces.
  - 2. Maximum acceptable response time from any alarm occurrence (at the point of origin) to the point of annunciation shall not exceed 60 seconds for remote or dial-up connected user interfaces.

## **1.05 WEB BROWSER CLIENTS**

- A. The system shall be capable of supporting an unlimited number of clients using a standard Web browser such as Internet Explorer. Systems requiring additional software (to enable a standard Web browser) to be resident on the client machine, or manufacturer-specific browsers shall not be acceptable.
- B. The Web browser software shall run on any operating system and system configuration that is supported by the Web browser. Systems that require specific machine requirements in terms of processor speed, memory, etc., in order to allow the Web browser to function with the BMCS shall not be acceptable.
- C. The Web browser shall provide the same view of the system, in terms of graphics, schedules, calendars, logs, etc., and provide the same interface methodology as is provided by the Graphical User Interface (GUI). Systems that require different views or that require different means of interacting with objects such as schedules, or logs, shall not be permitted.
- D. The Web browser client shall support at a minimum, the following functions;

1. User log-in identification and password shall be required. If an unauthorized user attempts access, a blank web page shall be displayed. Security using Java authentication and encryption techniques to prevent unauthorized access shall be implemented.
2. Graphical screens developed for the GUI shall be the same screens used for the Web browser client. Any animated graphical objects supported by the GUI shall be supported by the Web browser interface.
3. HTML programming shall not be required to display system graphics or data on a Web page. HTML editing of the Web page shall be allowed if the user desires a specific look or format.
4. Storage of the graphical screens shall be in the Network Area Controller (NAC) without requiring any graphics to be stored on the client machine. Systems that require graphics storage on each client are not acceptable.

## **1.06 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data for each system component and software module.
- C. Shop Drawings:
  1. Indicate trunk cable schematic showing programmable control unit locations, and trunk data conductors.
  2. Indicate system graphics indicating monitored systems, data (connected and calculated) point addresses, and operator notations. Provide demonstration diskette containing graphics.
  3. Show system configuration with peripheral devices, batteries, power supplies, diagrams, modems, and interconnections.
  4. Indicate description and sequence of operation of operating, user, and application software.
- D. Project Record Documents: Record actual locations of control components, including control units, thermostats, and sensors.
  1. Revise shop drawings to reflect actual installation and operating sequences.
- E. Operation and Maintenance Data:
  1. Include interconnection wiring diagrams complete field installed systems with identified and numbered, system components and devices.
  2. Include keyboard illustrations and step-by-step procedures indexed for each operator function.
  3. Include inspection period, cleaning methods, cleaning materials recommended, and calibration tolerances.
- F. Warranty: Submit manufacturer's warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.

## **1.07 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in performing the work of this section with minimum three years of documented experience and approved by manufacturer.

## **1.08 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Provide two year manufacturer's warranty for field programmable micro-processor based units.

## **1.09 PROTECTION OF SOFTWARE RIGHTS**

- A. Prior to delivery of software, the Owner and the party providing the software will enter into a software license agreement with provisions for the following:
  - 1. Limiting use of software to equipment provided under these specifications.
  - 2. Limiting copying.
  - 3. Preserving confidentiality.
  - 4. Prohibiting transfer to a third party.
- B. Provide owner administrative rights after warranty period expires.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Johnson Controls, Inc.; Existing Facility Explorer FX60
  - 1. Approved Installing Contractor;
    - a. Applied Controls, Inc., Warrenville, IL.

### **2.02 SYSTEM DESCRIPTION**

- A. Automatic temperature control field monitoring and control system using field programmable micro-processor based units.
- B. Existing building automation system is wireless JCI Facility Explorer system. Provide all material and labor to delete equipment being remove and add new equipment to building automation system.
- C. Provide all labor, materials, equipment and service necessary for a complete and operating Building Management and Control System (BMS), utilizing Direct Digital Controls as shown on the drawings and as described herein. Drawings are diagrammatic only. The BMS shall be capable of total integration of the facility infrastructure system with user access to all system data either locally over a secure intranet within the building or by remote access by a standard web browser over the internet. This shall include HVAC control energy management, alarm monitoring, and all trending, reporting and maintenance functions related to normal building operations as indicated on the drawings and elsewhere in this specifications.
- D. Base system on distributed system of fully intelligent, stand-alone controllers, operating in a multi-tasking, multi-user environment on token passing network, with central and remote hardware, software, and interconnecting wire and conduit.
- E. Include computer software and hardware, operator input/output devices, control units, local area networks (LAN), sensors, control devices, actuators.

- F. Controls for variable air volume terminals, radiation, reheat coils, unit heaters, fan coils, and the like when directly connected to the control units. Individual terminal unit control is specified in Section 23 09 13.
- G. Provide control systems consisting of thermostats, control valves, and operators, indicating devices, interface equipment and other apparatus and accessories required to operate mechanical systems, and to perform functions specified.
- H. Include installation and calibration, supervision, adjustments, and fine tuning necessary for complete and fully operational system.

## **2.03 CONTROLLERS**

### **A. BUILDING CONTROLLERS**

- 1. General:
  - a. Manage global strategies by one or more, independent, standalone, microprocessor based controllers.
  - b. Provide sufficient memory to support controller's operating system, database, and programming requirements.
  - c. Share data between networked controllers.
  - d. Controller operating system manages input and output communication signals allowing distributed controllers to share real and virtual object information and allowing for central monitoring and alarms.
  - e. Utilize real-time clock for scheduling.
  - f. Continuously check processor status and memory circuits for abnormal operation.
  - g. Controller to assume predetermined failure mode and generate alarm notification upon detection of abnormal operation.
  - h. Communication with other network devices to be based on assigned protocol.
- 2. Communication:
  - a. Controller to reside on a BACnet network using ISO 8802-3 (ETHERNET) Data Link/Physical layer protocol.
  - b. Perform routing when connected to a network of custom application and application specific controllers.
  - c. Provide service communication port for connection to a portable operator's terminal or hand held device with compatible protocol.
- 3. Anticipated Environmental Ambient Conditions:
  - a. Conditioned Space:
    - 1) Mount within dustproof enclosures.
    - 2) Rated for operation at 32 to 120 degrees F (0 to 50 degrees C).
- 4. Provisions for Serviceability:
  - a. Diagnostic LEDs for power, communication, and processor.
  - b. Make all wiring connections to field removable, modular terminal strips, or to a termination card connected by a ribbon cable.
- 5. Memory: In the event of a power loss, maintain all BIOS and programming information for a minimum of 72 hours.
- 6. Power and Noise Immunity:
  - a. Maintain operation at 90 to 110 percent of nominal voltage rating.

- b. Perform orderly shutdown below 80 percent of nominal voltage.
- c. Operation protected against electrical noise of 5 to 120 Hz and from keyed radios up to 5 W. at 3 feet (1 m).

## B. INPUT/OUTPUT INTERFACE

1. Hardwired inputs and outputs tie into the DDC system through building, custom application, or application specific controllers.
2. All Input/Output Points:
  - a. Protect controller from damage resulting from any point short-circuiting or grounding and from voltage up to 24 volts of any duration.
  - b. Provide universal type for building and custom application controllers where input or output is software designated as either binary or analog type with appropriate properties.
3. Binary Inputs:
  - a. Allow monitoring of On/Off signals from remote devices.
  - b. Provide wetting current of 12 mA minimum, compatible with commonly available control devices and protected against the effects of contact bounce and noise.
  - c. Sense dry contact closure with power provided only by the controller.
4. Pulse Accumulation Input Objects: Conform to all requirements of binary input objects and accept up to 10 pulses per second.
5. Analog Inputs:
  - a. Allow for monitoring of low voltage 0 to 10 VDC, 4 to 20 mA current, or resistance signals (thermistor, RTD).
  - b. Compatible with and field configurable to commonly available sensing devices.
6. Binary Outputs:
  - a. Used for On/Off operation or a pulsed low-voltage signal for pulse width modulation control.
  - b. Outputs provided with three position (On/Off/Auto) override switches.
  - c. Status lights for building and custom application controllers to be selectable for normally open or normally closed operation.
7. Analog Outputs:
  - a. Monitoring signal provides a 0 to 10 VDC or a 4 to 20 mA output signal for end device control.
  - b. Provide status lights and two position (AUTO/MANUAL) switch for building and custom application controllers with manually adjustable potentiometer for manual override on building and custom application controllers.
  - c. Drift to not exceed 0.4 percent of range per year.
8. Tri State Outputs:
  - a. Coordinate two binary outputs to control three point, floating type, electronic actuators without feedback.
  - b. Limit the use of three point, floating devices to the following zone and terminal unit control applications:
  - c. Control algorithms run the zone actuator to one end of its stroke once every 24 hours for verification of operator tracking.
9. System Object Capacity:
  - a. System size to be expandable to twice the number of input output objects required by providing additional controllers, including associated devices and wiring.

- b. Hardware additions or software revisions for the installed operator interfaces are not to be required for future, system expansions.

## 2.04 FIELD DEVICES

### A. Networked Thermostat (NT)

1. The NT shall communicate over the Field Controller Bus using BACnet Standard MS/TP Bus Protocol ASHRAE SSPC-135, Clause 9.
  - a. The NT shall be BACnet Testing Labs (BTL) certified and carry the BTL Label.
  - b. The NT shall be tested and certified as a BACnet Application Specific Controller (B-ASC).
  - c. A BACnet Protocol Implementation Conformance Statement shall be provided for the NT.
  - d. The Conformance Statement shall be submitted 10 days prior to bidding.
2. The Networked Thermostat shall support remote read/write and parameter adjustment from the web based User Interface through a Network Automation Engine.
3. The Networked Thermostat shall include an intuitive User Interface providing plain text messages.
  - a. Two line, 8 character backlit display
  - b. LED indicators for Fan, Heat, and Cool status
  - c. Five (5) User Interface Keys
    - 1) Mode
    - 2) Fan
    - 3) Override
    - 4) Degrees C/F
    - 5) Up/Down
  - d. The display shall continuously scroll through the following parameters:
    - 1) Room Temperature
    - 2) System Mode
    - 3) Schedule Status - Occupied/Unoccupied/Override
    - 4) Applicable Alarms
4. The Networked Thermostat shall provide the flexibility to support any one of the following inputs:
  - a. Integral Indoor Air Temperature Sensor
  - b. Duct Mount Air Temperature Sensor
  - c. Remote Indoor Air Temperature Sensor with Occupancy Override and LED Indicator
  - d. Two configurable binary inputs
5. The Networked Thermostat shall provide the flexibility to support any one of the following outputs:
  - a. Three Speed Fan Control
  - b. Two On/Off
  - c. Two Floating
  - d. Two Proportional (0 to 10V)
6. The Networked Thermostat shall provide a minimum of six (6) levels of keypad lockout.
7. The Networked Thermostat shall provide the flexibility to adjust the following parameters:
  - a. Adjustable Temporary Occupancy from 0 to 24 hours
  - b. Adjustable heating/cooling deadband from 2° F to 5° F
  - c. Adjustable heating/cooling cycles per hour from 4 to 8

8. Where required by application and indicated on plans or room schedules provide the Networked Thermostat with an integral Passive Infra-Red (PIR) occupancy sensor.
9. The Networked Thermostat shall employ nonvolatile electrically erasable programmable read-only memory (EEPROM) for all adjustable parameters.

## **2.05 WIRELESS FIELD BUS SYSTEM**

- A. The Wireless Field Bus System shall employ ZigBee technology to create a wireless mesh network to provide wireless connectivity for BAS BACnet devices at multiple system levels. This includes communications from Programmable Controllers to sensors and from Supervisory Controllers to these Programmable Controllers. Wireless devices shall co-exist on the same network with hardwired devices. Hardwired controllers shall be capable of retrofit to wireless devices with no special software.
- B. The Wireless Field Bus Coordinator shall provide a wireless interface between supported Programmable Controllers and Supervisory Controllers via the BACnet MS/TP field bus. Each wireless mesh network shall be provided with a Wireless Field Bus Coordinator for initiation and formation of the network
  1. The Wireless Field Bus Coordinator shall use direct sequence spread spectrum RF technology.
  2. The Wireless Field Bus Coordinator shall operate on the 2.4 GHZ ISM Band.
  3. The Wireless Field Bus Coordinator shall meet the IEEE 802.15.4 standard for low-power, low duty-cycle RF transmitting systems.
  4. The Wireless Field Bus Coordinator shall be FCC compliant to CFR Part 15 subpart B Class A.
  5. The Wireless Field Bus Coordinator shall operate as a bidirectional transceiver with the sensors and routers to confirm and synchronize data transmission.
  6. The Wireless Field Bus Coordinator shall be capable of communication with sensors and routers up to a maximum distance of 250 Feet (line of sight).
  7. The Wireless Field Bus Coordinator shall be assembled in a plenum rated plastic housing with flammability rated to UL94-5VB.
  8. The Wireless Field Bus Coordinator shall have LED indicators to provide diagnostic information required for efficient operation and commissioning.
- C. The Wireless Field Bus Router shall be used with any General Purpose Programmable Controller (PCG) to provide a wireless interface to supervisory controllers, via the Wireless Field Bus Coordinator, and associated Wireless Room Sensors.
  1. The Wireless Field Bus Router shall use direct sequence spread spectrum RF technology.
  2. The Wireless Field Bus Router shall operate on the 2.4 GHZ ISM Band.
  3. The Wireless Field Bus Router shall meet the IEEE 802.15.4 standard for low-power, low duty-cycle RF transmitting systems.
  4. The Wireless Field Bus Router shall be FCC compliant to CFR Part 15 subpart B Class A.
  5. The Wireless Field Bus Router shall operate as a bidirectional transceiver with other mesh network devices to ensure network integrity.
  6. The Wireless Field Bus Router shall be capable of communication with other mesh network devices at a maximum distance of 250 feet (line of sight).
  7. The Wireless Field Bus Router shall be assembled in a plenum rated plastic housing with flammability rated to UL94-5VB.

8. The Wireless Field Bus Router shall provide LED indication for use in commissioning and troubleshooting that can be disabled.
- D. The Wireless Room Sensors shall sense and transmit room temperature and/or humidity, room set point, room occupancy notification and low battery condition to an associated Wireless Field Bus Router.
1. The Wireless Sensors shall use direct sequence spread spectrum RF technology.
  2. The Wireless Sensors shall operate on the 2.4 GHZ ISM Band.
  3. The Wireless Sensors shall meet the IEEE 802.15.4 standard for low-power, low duty-cycle RF transmitting systems.
  4. The Wireless Sensors shall be FCC compliant to CFR Part 15 subpart B Class A.
  5. The Wireless Sensors shall be available with
    - a. Warmer/Cooler Set Point Adjustment
    - b. No Set Point Adjustment
    - c. Set Point Adjustment Scale - 55 to 85° F.
  6. Wireless sensors shall be provided with display of room temperature, signal strength, fan mode, occupancy and network status as required by application and indicated on plans or in schedules.
  7. The Wireless Sensors shall be assembled in NEMA 1 plastic housings.

## **2.06 One-to-One Wireless Room Sensing System**

- A. The One-To-One Wireless Receiver shall receive wireless Radio Frequency (RF) signals containing temperature and/or humidity data from multiple Wireless Room Sensors and communicate this information to a PCG controller via the Sensor/Actuator (SA) Bus.
1. The One-to-One Wireless Receiver shall use direct sequence spread spectrum RF technology.
  2. The One-to-One Wireless Receiver shall operate on the 2.4 GHZ ISM Band.
  3. The One-to-One Wireless Receiver shall meet the IEEE 802.15.4 standard for low-power, low duty-cycle RF transmitting systems.
  4. The One-to-One Wireless Receiver shall be FCC compliant to CFR Part 15 subpart B Class A.
  5. The One-to-One Wireless Receiver shall operate as a bidirectional transceiver with the sensors to confirm and synchronize data transmission.
  6. The One-to-One Wireless Receiver shall be capable of communication with from one to five Wireless Sensors up to a distance of 200 Feet.
  7. The One-to-One Wireless Receiver shall be assembled in a plenum rated plastic housing with flammability rated to UL94-5VB.
  8. The One-to-One Wireless Receiver shall have LED indicators to provide information regarding the following conditions:
    - a. Power
    - b. SA Bus - Receiver Activity/No Activity
    - c. Wireless RF - Transmission from sensors/No Transmission
    - d. Wireless Rapid Transmit Mode - No transmission/ weak signal/Adequate signal/Excellent signal
- B. The Wireless Sensors shall sense and report room temperatures to the One-to-One Wireless Receiver.
1. The Wireless Sensors shall use direct sequence spread spectrum RF technology.



2. The Wireless Sensors shall operate on the 2.4 GHZ ISM Band.
3. The Wireless Sensors shall meet the IEEE 802.15.4 standard for low-power, low duty-cycle RF transmitting systems.
4. The Wireless Sensors shall be FCC compliant to CFR Part 15 subpart B Class A.
5. The Wireless Sensors shall be available with
  - a. Warmer/Cooler Set Point Adjustment
  - b. No Set Point Adjustment
  - c. Set Point Adjustment Scale - 55 to 85° F.
6. The Wireless Sensors shall be assembled in NEMA 1 plastic housings.

## **2.07 POWER SUPPLIES AND LINE FILTERING**

### **A. Power Supplies:**

1. Provide UL listed control transformers with Class 2 current limiting type or over-current protection in both primary and secondary circuits for Class 2 service as required by the NEC.
2. Limit connected loads to 80 percent of rated capacity.
3. Match DC power supply to current output and voltage requirements.
4. Unit to be full wave rectifier type with output ripple of 5.0 mV maximum peak to peak.
5. Regulation to be 1 percent combined line and load with 100 microsecond response time for 50 percent load changes.
6. Provide over-voltage and over-current protection to withstand a 150 percent current overload for 3 seconds minimum without trip-out or failure.
7. Operational Ambient Conditions: 32 to 120 degrees F (0 to 50 degrees C).
8. EM/RF meets FCC Class B and VDE 0871 for Class B and MIL-STD 810 for shock and vibration.
9. Line voltage units UL recognized and CSA approved.

### **B. Power Line Filtering:**

1. Provide external or internal transient voltage and surge suppression component for all workstations and controllers.
2. Minimum surge protection attributes:
  - a. Dielectric strength of 1000 volts minimum.
  - b. Response time of 10 nanoseconds or less.
  - c. Transverse mode noise attenuation of 65 dB or greater.
  - d. Common mode noise attenuation of 150 dB or greater at 40 to 100 Hz.

## **2.08 LOCAL AREA NETWORK (LAN)**

- A. Provide communication between control units over local area network (LAN).
- B. Break in Communication Path: Alarm and automatically initiate LAN reconfiguration.
- C. LAN Data Speed: Minimum 19.2 Kb.
- D. Communication Techniques: Allow interface into network by multiple operation stations and by auto-answer/auto-dial modems. Support communication over telephone lines utilizing modems.
- E. Transmission Median: Fiber optic or single pair of solid 24 gauge twisted, shielded copper cable.

- F. Network Support: Time for global point to be received by any station, shall be less than 3 seconds. Provide automatic reconfiguration if any station is added or lost. If transmission cable is cut, reconfigure two sections with no disruption to system's operation, without operator intervention.

## 2.09 SYSTEM SOFTWARE

### A. Operating System:

1. Concurrent, multi-tasking capability.
  - a. Common Software Applications Supported: Microsoft Excel.
2. System Graphics:
  - a. Allow up to 10 graphic screens, simultaneously displayed for comparison and monitoring of system status.
  - b. Animation displayed by shifting image files based on object status.
  - c. Provide method for operator with password to perform the following:
    - 1) Move between, change size, and change location of graphic displays.
    - 2) Modify on-line.
    - 3) Add, delete, or change dynamic objects consisting of:
      - a) Analog and binary values.
      - b) Dynamic text.
      - c) Static text.
      - d) Animation files.
3. Custom Graphics Generation Package:
  - a. Create, modify, and save graphic files and visio format graphics in PCX formats.
  - b. HTML graphics to support web browser compatible formats.
  - c. Capture or convert graphics from AutoCAD.
4. Standard HVAC Graphics Library:
  - a. HVAC Equipment:
    - 1) Boilers.
    - 2) Air Handlers.
    - 3) Terminal HVAC Units.
  - b. Ancillary Equipment:
    - 1) Fans.
    - 2) Pumps.
    - 3) Coils.
    - 4) Valves.
    - 5) Dampers.

### B. Workstation System Applications:

1. Automatic System Database Save and Restore Functions:
  - a. Current database copy of each Building Controller is automatically stored on hard disk.
  - b. Automatic update occurs upon change in any system panel.
  - c. In the event of database loss in any system panel, the first workstation to detect the loss automatically restores the database for that panel unless disabled by the operator.
2. Manual System Database Save and Restore Functions by Operator with Password Clearance:
  - a. Save database from any system panel.

- b. Clear a panel database.
  - c. Initiate a download of a specified database to any system panel.
- 3. Software provided allows system configuration and future changes or additions by operators under proper password protection.
- 4. On-line Help:
  - a. Context-sensitive system assists operator in operation and editing.
  - b. Available for all applications.
  - c. Relevant screen data provided for particular screen display.
  - d. Additional help available via hypertext.
- 5. Security:
  - a. Operator log-on requires user name and password to view, edit, add, or delete data.
  - b. System security selectable for each operator.
  - c. System supervisor sets passwords and security levels for all other operators.
  - d. Operator passwords to restrict functions accessible to viewing and/or changing system applications, editor, and object.
  - e. Automatic, operator log-off results from keyboard or mouse inactivity during user-adjustable, time period.
  - f. All system security data stored in encrypted format.
- 6. System Diagnostics:
  - a. Operations Automatically Monitored:
    - 1) Workstations.
    - 2) Printers.
    - 3) Modems.
    - 4) Network connections.
    - 5) Building management panels.
    - 6) Controllers.
  - b. Device failure is annunciated to the operator.
- 7. Alarm Processing:
  - a. All system objects are configurable to "alarm in" and "alarm out" of normal state.
  - b. Configurable Objects:
    - 1) Alarm limits.
    - 2) Alarm limit differentials.
    - 3) States.
    - 4) Reactions for each object.
- 8. Alarm Messages:
  - a. Descriptor: English language.
  - b. Recognizable Features:
    - 1) Source.
    - 2) Location.
    - 3) Nature.
- 9. Configurable Alarm Reactions by Workstation and Time of Day:
  - a. Logging.
  - b. Printing.
  - c. Starting programs.
  - d. Displaying messages.

- e. Dialing out to remote locations.
  - f. Paging.
  - g. Providing audible annunciation.
  - h. Displaying specific system graphics.
10. Custom Trend Logs:
- a. Definable for any data object in the system including interval, start time, and stop time.
  - b. Trend Data:
    - 1) Sampled and stored on the building controller panel.
    - 2) Archivable on hard disk.
    - 3) Retrievable for use in reports, spreadsheets and standard database programs.
    - 4) Archival on LAN accessible storage media including hard disk, tape, Raid array drive, and virtual cloud environment.
    - 5) Protected and encrypted format to prevent manipulation, or editing of historical data and event logs.
11. Alarm and Event Log:
- a. View all system alarms and change of states from any system location.
  - b. Events listed chronologically.
  - c. Operator with proper security acknowledges and clears alarms.
  - d. Alarms not cleared by operator are archived to the workstation hard disk.
12. Object, Property Status and Control:
- a. Provide a method to view, edit if applicable, the status of any object and property in the system.
  - b. Status Available by the Following Methods:
    - 1) Menu.
    - 2) Graphics.
    - 3) Custom Programs.
13. Reports and Logs:
- a. Reporting Package:
    - 1) Allows operator to select, modify, or create reports.
    - 2) Definable as to data content, format, interval, and date.
    - 3) Archivable to hard disk.
  - b. Real-time logs available by type or status such as alarm, lockout, normal, etc.
  - c. Stored on hard disk and readily accessible by standard software applications, including spreadsheets and word processing.
  - d. Set to be printed on operator command or specific time(s).
14. Reports:
- a. Standard:
    - 1) Objects with current values.
    - 2) Current alarms not locked out.
    - 3) Disabled and overridden objects, points and SNVTs.
    - 4) Objects in manual or automatic alarm lockout.
    - 5) Objects in alarm lockout currently in alarm.
    - 6) Logs:
      - a) Alarm History.
      - b) System messages.

- c) System events.
      - d) Trends.
    - b. Custom:
      - 1) Daily.
      - 2) Weekly.
      - 3) Monthly.
      - 4) Annual.
      - 5) Time and date stamped.
      - 6) Title.
      - 7) Facility name.
    - c. Tenant Override:
      - 1) Monthly report showing total, requested, after-hours HVAC and lighting services on a daily basis for each tenant.
      - 2) Annual report showing override usage on a monthly basis.
    - d. Electrical, Fuel, and Weather:
      - 1) Electrical Meter(s):
        - a) Monthly showing daily electrical consumption and peak electrical demand with time and date stamp for each meter.
        - b) Annual summary showing monthly electrical consumption and peak demand with time and date stamp for each meter.
      - 2) Fuel Meter(s):
        - a) Monthly showing daily natural gas consumption for each meter.
        - b) Annual summary showing monthly consumption for each meter.
      - 3) Weather:
        - a) Monthly showing minimum, maximum, average outdoor air temperature and heating/cooling degree-days for the month.
- C. Workstation Applications Editors:
1. Provide editing software for all system applications at the PC workstation.
  2. Downloaded application is executed at controller panel.
  3. Full screen editor for each application allows operator to view and change:
    - a. Configuration.
    - b. Name.
    - c. Control parameters.
    - d. Set-points.
  4. Scheduling:
    - a. Monthly calendar indicates schedules, holidays, and exceptions.
    - b. Allows several related objects to be scheduled and copied to other objects or dates.
    - c. Start and stop times adjustable from master schedule.
  5. Custom Application Programming:
    - a. Create, modify, debug, edit, compile, and download custom application programming during operation and without disruption of all other system applications.
    - b. Programming Features:
      - 1) English oriented language, based on BASIC, FORTRAN, C, or PASCAL syntax allowing for free form programming.

- 2) Alternative language graphically based using appropriate function blocks suitable for all required functions and amenable to customizing or compounding.
- 3) Insert, add, modify, and delete custom programming code that incorporates word processing features such as cut/paste and find/replace.
- 4) Allows the development of independently, executing, program modules designed to enable and disable other modules.
- 5) Debugging/simulation capability that displays intermediate values and/or results including syntax/execution error messages.
- 6) Support for conditional statements (IF/THEN/ELSE/ELSE-F) using compound Boolean (AND, OR, and NOT) and/or relations (EQUAL, LESS THAN, GREATER THAN, NOT EQUAL) comparisons.
- 7) Support for floating-point arithmetic utilizing plus, minus, divide, times, square root operators; including absolute value; minimum/maximum value from a list of values for mathematical functions.
- 8) Language consisting of resettable, predefined, variables representing time of day, day of the week, month of the year, date; and elapsed time in seconds, minutes, hours, and days where the variable values can be used in IF/THEN comparisons, calculations, programming statement logic, etc.
- 9) Language having predefined variables representing status and results of the system software enables, disables, and changes the set points of the controller software.

## 2.10 CONTROLLER SOFTWARE

- A. All applications reside and operate in the system controllers and editing of all applications occurs at the operator workstation.
- B. System Security:
  1. User access secured via user passwords and user names.
  2. Passwords restrict user to the objects, applications, and system functions as assigned by the system manager.
  3. User Log On/Log Off attempts are recorded.
  4. Automatic Log Off occurs following the last keystroke after a user defined delay time.
- C. Object or Object Group Scheduling:
  1. Weekly Schedules Based on Separate, Daily Schedules:
    - a. Include start, stop, optimal stop, and night economizer.
    - b. 10 events maximum per schedule.
    - c. Start/stop times adjustable for each group object.
- D. Provide standard application for equipment coordination and grouping based on function and location to be used for scheduling and other applications.
- E. Alarms:
  1. Binary object is set to alarm based on the operator specified state.
  2. Analog object to have high/low alarm limits.
  3. All alarming is capable of being automatically and manually disabled.
  4. Alarm Reporting:
    - a. Operator determines action to be taken for alarm event.

- b. Alarms to be routed to appropriate workstation.
  - c. Reporting Options:
- F. Maintenance Management: System monitors equipment status and generates maintenance messages based upon user-designated run-time limits.
- G. Sequencing: Application software based upon specified sequences of operation shown on the Drawings.
- H. PID Control Characteristics:
- 1. Direct or reverse action.
  - 2. Anti-windup.
  - 3. Calculated, time-varying, analog value, positions an output or stages a series of outputs.
  - 4. User selectable controlled variable, set-point, and PED gains.
- I. Staggered Start Application:
- 1. Prevents all controlled equipment from simultaneously restarting after power outage.
  - 2. Order of equipment startup is user selectable.
- J. Energy Calculations:
- 1. Accumulated instantaneous power or flow rates are converted to energy use data.
  - 2. Algorithm calculates a rolling average and allows window of time to be user specified in minute intervals.
  - 3. Algorithm calculates a fixed window average with a digital input signal from a utility meter defining the start of the window period that in turn synchronizes the fixed-window average with that used by the power company.
- K. Anti-Short Cycling:
- 1. All binary output objects protected from short-cycling.
  - 2. Allows minimum on-time and off-time to be selected.
- L. On-Off Control with Differential:
- 1. Algorithm allows binary output to be cycled based on a controlled variable and set-point.
  - 2. Algorithm to be direct-acting or reverse-acting incorporating an adjustable differential.
- M. Run-Time Totalization:
- 1. Totalize run-times for all binary input objects.
  - 2. Provides operator with capability to assign high run-time alarm.

## **2.11 HVAC CONTROL PROGRAMS**

- A. General:
- 1. Support Inch-pounds and SI (metric) units of measurement.
  - 2. Identify each HVAC Control system.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.

- B. Verify that conditioned power supply is available to the control units and to the operator work station. Verify that field end devices, wiring, and pneumatic tubing is installed prior to installation proceeding.

### **3.02 INSTALLATION**

- A. Install control units and other hardware in position on permanent walls where not subject to excessive vibration.
- B. Install software in control units and in operator work station. Implement all features of programs to specified requirements and appropriate to sequence of operation.
- C. Provide conduit and electrical wiring in accordance with Division 26. Electrical material and installation shall be in accordance with appropriate requirements of Division 26.
  - 1. Provide conduit for all control wiring exposed to view. This includes but is not limited to all storage rooms, mechanical rooms, and similar spaces.
  - 2. Provide conduit for all control wiring concealed in inaccessible spaces. This includes but is not limited to wiring above/behind drywall and plaster ("hard") ceilings or soffits, and wiring within vertical chase spaces, regardless of whether access doors are provided or not.
  - 3. Control wiring that is concealed above readily accessible ceilings such as acoustical lay-in ceilings, need not be run in conduit.

### **3.03 MANUFACTURER'S FIELD SERVICES**

- A. Start and commission systems. Allow sufficient time for start-up and commissioning prior to placing control systems in permanent operation.
- B. Provide basic operator training for 2 persons on data display, alarm and status descriptors, requesting data, execution of commands and request of logs. Include a minimum of 2 hours dedicated instructor time. Provide training on site.

### **3.04 DEMONSTRATION AND INSTRUCTIONS**

- A. Demonstrate complete and operating system to Owner.

**END OF SECTION**



## SECTION 23 21 13 HYDRONIC PIPING

### PART 1 GENERAL

#### 1.01 SECTION INCLUDES

- A. Hydronic system requirements.
- B. Heating water piping, above grade.
- C. Pipe hangers and supports.
- D. Unions, flanges, mechanical couplings, and dielectric connections.
- E. Valves:
  - 1. Ball valves.
  - 2. Check valves.
- F. Flow controls.

#### 1.02 RELATED REQUIREMENTS

- A. Section 23 07 19 - HVAC Piping Insulation.
- B. Section 23 21 14 - Hydronic Specialties.

#### 1.03 REFERENCE STANDARDS

- A. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300; 2011.
- B. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2012.
- C. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2013.
- D. ASME B31.9 - Building Services Piping; 2014.
- E. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.
- F. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service; 2015.
- G. ASTM B32 - Standard Specification for Solder Metal; 2008 (Reapproved 2014).
- H. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2014.
- I. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric); 2013.
- J. ASTM F708 - Standard Practice for Design and Installation of Rigid Pipe Hangers; 1992 (Reapproved 2008).
- K. ASTM F1476 - Standard Specification for Performance of Gasketed Mechanical Couplings for Use in Piping Applications; 2007 (Reapproved 2013).
- L. AWS A5.8/A5.8M - Specification for Filler Metals for Brazing and Braze Welding; American Welding Society; 2011 and errata.

- M. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015.
- N. AWWA C606 - Grooved and Shouldered Joints; 2011.
- O. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2009.

#### **1.04 QUALITY ASSURANCE**

- A. Installer Qualifications: Company specializing in performing work of the type specified in this section, with minimum three years of experience.
- B. Provide all grooved joint couplings, fittings, valves, specialties, and grooving tools from a single manufacturer.

#### **1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
- B. Provide temporary protective coating on cast iron and steel valves.
- C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

#### **1.06 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Provide 50 year limited warranty on press fittings from date of installation.

### **PART 2 PRODUCTS**

#### **2.01 HYDRONIC SYSTEM REQUIREMENTS**

- A. Comply with ASME B31.9 and applicable federal, state, and local regulations.
- B. Piping: Provide piping, fittings, hangers and supports as required, as indicated, and as follows:
  - 1. Where more than one piping system material is specified, provide joining fittings that are compatible with piping materials and ensure that the integrity of the system is not jeopardized.
  - 2. Use non-conducting dielectric connections whenever jointing dissimilar metals.
  - 3. Grooved mechanical joints may be used in accessible locations only.
    - a. Accessible locations include those exposed on interior of building, in pipe chases, and in mechanical rooms, aboveground outdoors, and as approved by Architect.
    - b. Use rigid joints unless otherwise indicated.
  - 4. Provide pipe hangers and supports in accordance with ASME B31.9 or MSS SP-58 unless indicated otherwise.
- C. Pipe-to-Valve and Pipe-to-Equipment Connections: Use flanges, unions, or grooved couplings to allow disconnection of components for servicing; do not use direct welded, soldered, or threaded connections.
- D. Valves: Provide valves where indicated:

1. Provide drain valves where indicated, and if not indicated provide at least at main shut-off, low points of piping, bases of vertical risers, and at equipment. Use 3/4 inch (20 mm) gate valves with cap; pipe to nearest floor drain.
2. Isolate equipment using butterfly valves with lug end flanges or grooved mechanical couplings.
3. In heating water systems, butterfly valves may be used interchangeably with gate and globe valves.
4. For shut-off and to isolate parts of systems or vertical risers, use ball or butterfly valves.

## 2.02 HEATING WATER PIPING, ABOVE GRADE

- A. Steel Pipe: ASTM A53/A53M, Schedule 40, black, using one of the following joint types:
1. Welded Joints: ASTM A234/A234M, wrought steel welding type fittings; AWS D1.1/D1.1M welded.
- B. Mechanical Room Only: Steel Pipe; ASTM A-53, roll or cut grooved-ends as appropriate to material, wall thickness, pressures, size and joining method. Pipe ends to be grooved in accordance with current listed standards conforming to ANSI/AWWA C-606.
1. Fittings: Cast ductile iron conforming to ASTM A-536, Grade 65-45-12, forged steel conforming to ASTM A-234, Grade WPB 0.375" wall or fabricated from Std. Wt. carbon steel pipe conforming to ASTM A-53, Type F, E or S, Grade B. Provide fittings with an alkyd enamel finish or hot dip galvanized to ASTM A-153. Zinc electroplated fittings and couplings conform to ASTM B633.
  2. Couplings: Rigid type - coupling housings with offsetting, angle-pattern bolt pads shall be used to provide system rigidity and support and hanging in accordance with ANSI B31.1 and B31.9. 2" through 6", Victaulic Style 107, installation ready rigid coupling for direct stab installation without field disassembly. Steel bolts, nuts and washers.
  3. Gasket: Grade "EHP" EPDM compound with red color code designed for operating temperatures from -30 deg F to +250 deg F. Gasket shall conform to steel pipe outside diameter and coupling housing.
- C. Copper Tube: ASTM B88 (ASTM B88M), Type L (B), drawn, using one of the following joint types:
1. Fittings: ASME B16.18, cast brass/bronze or ASME B16.22, wrought copper and bronze.
  2. Solder Joints:
    - a. Solder: ASTM B32 lead-free solder, HB alloy (95-5 tin-antimony) or tin and silver.
    - b. Braze: 1 BCuP copper/silver alloy.
  3. Tee Connections: Mechanically extracted collars with notched and dimpled branch tube.
  4. Mechanical Press Sealed Fittings: Double pressed type complying with ASME B16.22, utilizing EPDM, non toxic synthetic rubber sealing elements. Sealing elements shall be factory installed by fitting manufacturer. Press ends shall have means to indicate non-pressed fitting during pressure test.
    - a. Manufacturers:
      - 1) Viega LLC.
      - 2) Nibco.

## 2.03 EQUIPMENT DRAINS AND OVERFLOWS

- A. Steel Pipe: ASTM A53/A53M, Schedule 40 galvanized; using one of the following joint types:
1. Threaded Joints: Galvanized cast iron, or ASME B16.3 malleable iron fittings.

2. Grooved Joints: AWWA C606 grooved pipe, fittings of same material, and mechanical couplings.
- B. Copper Tube: ASTM B88 (ASTM B88M), Type L (B), drawn; using one of the following joint types:
1. Solder Joints: ASME B16.18 cast brass/bronze or ASME B16.22 solder wrought copper fittings; ASTM B32 lead-free solder, HB alloy (95-5 tin-antimony) or tin and silver.
  2. Grooved Joints: AWWA C606 grooved pipe, fittings of same material, and mechanical couplings.

## **2.04 PIPE HANGERS AND SUPPORTS**

- A. Provide hangers and supports that comply with MSS SP-58.
1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
- B. Hangers for Pipe Sizes 1/2 to 1-1/2 Inch (13 to 38 mm): Carbon steel, adjustable swivel, split ring.
- C. Hangers for Hot Pipe Sizes 2 to 4 Inches (50 to 100 mm): Carbon steel, adjustable, clevis.
- D. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
- E. Wall Support for Pipe Sizes to 3 Inches (76 mm): Cast iron hook.
- F. Vertical Support: Steel riser clamp.
- G. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.
- H. Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded.
- I. Inserts: Malleable iron case of galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.
- J. In grooved installations, use rigid couplings with offsetting angle-pattern bolt pads or with wedge shaped grooves in header piping to permit support and hanging in accordance with ASME B31.9.

## **2.05 UNIONS, FLANGES, MECHANICAL COUPLINGS, AND DIELECTRIC CONNECTIONS**

- A. Unions for Pipe 2 Inches (50 mm) and Less:
1. Ferrous Piping: 150 psig (1034 kPa) malleable iron, threaded.
  2. Copper Pipe: Bronze, soldered joints.
- B. Flanges for Pipe 2 Inches (50 mm) and Greater:
1. Ferrous Piping: 150 psig (1034 kPa) forged steel, slip-on.
  2. Copper Piping: Bronze.
  3. Gaskets: 1/16 inch (1.6 mm) thick preformed neoprene.
- C. Mechanical Couplings for Grooved and Shouldered Joints: Two or more curved housing segments with continuous key to engage pipe groove, circular C-profile gasket, and bolts to secure and compress gasket.
1. Dimensions and Testing: In accordance with AWWA C606.
  2. Mechanical Couplings: Comply with ASTM F1476.
  3. Bolts and Nuts: Hot dipped galvanized or zinc-electroplated steel.

4. When pipe is field grooved, provide coupling manufacturer's grooving tools.

## **2.06 BALL VALVES**

### **A. Manufacturers:**

1. Nibco, Inc; Model S-585-70-66.
2. Watts.
3. Apollo.
4. Jomar.

### **B. Up To and Including 2 Inches (50 mm):**

1. Bronze one piece body, chrome plated brass ball, teflon seats and stuffing box ring, lever handle with balancing stops, solder ends with union.

## **2.07 SWING CHECK VALVES**

### **A. Manufacturers:**

1. Nibco, Inc.
2. Stockham.
3. Grinnell.
4. Jomar.

### **B. Up To and Including 2 Inches (50 mm):**

1. Bronze body, bronze trim, bronze rotating swing disc, with composition disc, solder ends.
2. Nibco Model S-433-Y.

### **C. Over 2 Inches (50 mm):**

1. Iron body, bronze trim, bronze faced rotating swing disc, renewable disc and seat, flanged ends.
2. Nibco Model F-918-B.

## **2.08 SPRING LOADED CHECK VALVES**

### **A. Manufacturers:**

1. Nibco, Inc.
2. Hammond Valve.
3. Milwaukee Valve Company.

- ### **B. Iron body, bronze trim, split plate, hinged with stainless steel spring, resilient seal bonded to body, wafer or threaded lug ends.**

## **2.09 FLOW CONTROLS**

- ### **A. Construction: Class 125, Brass or bronze body with union on inlet, temperature and pressure test plug on inlet and outlet, blowdown/backflush drain.**

- ### **B. Calibration: Control flow within 5 percent of selected rating, over operating pressure range of 10 times minimum pressure required for control, maximum minimum pressure 3.5 psi (24 kPa).**

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Prepare pipe for grooved mechanical joints as required by coupling manufacturer.
- C. Remove scale and dirt on inside and outside before assembly.
- D. Prepare piping connections to equipment using jointing system specified.
- E. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.

### **3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Press connections: Copper and copper alloy press connections shall be made in accordance with the manufacturer's installation instructions. The tubing shall be fully inserted into the fitting and the tubing marked at the shoulder of the fitting. The fitting alignment shall be checked against the mark on the tubing to assure the tubing is fully inserted in the fitting. The joints shall be pressed using the tool(s) approved by the manufacturer.
- C. Route piping in orderly manner, parallel to building structure, and maintain gradient.
- D. Install piping to conserve building space and to avoid interfere with use of space.
- E. Group piping whenever practical at common elevations.
- F. Sleeve pipe passing through partitions, walls and floors.
- G. Provide sleeve and watertight mechanical seal on all underground floor and wall penetrations.
- H. Slope piping and arrange to drain at low points.
- I. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- J. Pipe Hangers and Supports:
  - 1. Install in accordance with ASME B31.9, ASTM F708, or MSS SP-58.
  - 2. Support horizontal piping as scheduled.
  - 3. Install hangers to provide minimum 1/2 inch (13 mm) space between finished covering and adjacent work.
  - 4. Place hangers within 12 inches (300 mm) of each horizontal elbow.
  - 5. Use hangers with 1-1/2 inch (38 mm) minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
  - 6. Support vertical piping at every other floor. Support riser piping independently of connected horizontal piping.
  - 7. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
- K. Use eccentric reducers to maintain top of pipe level.

L. Install valves with stems upright or horizontal, not inverted.

### **3.03 SCHEDULES**

A. Hanger Spacing for Copper Tubing.

1. 1/2 inch (15 mm) and 3/4 inch (20 mm): Maximum span, 5 feet (1500 mm); minimum rod size, 1/4 inch (6 mm).
2. 1 inch (25 mm): Maximum span, 6 feet (1800 mm); minimum rod size, 1/4 inch (6 mm).
3. 1-1/2 inch (40 mm) and 2 inch (50 mm): Maximum span, 8 feet (2400 mm); minimum rod size, 3/8 inch (9 mm).

**END OF SECTION**

**SECTION 23 21 14  
HYDRONIC SPECIALTIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Air vents.
- B. Strainers.
- C. Combination pump discharge valves.
- D. Pressure-temperature test plugs.
- E. Balancing valves.
- F. Combination flow controls.
- G. Radiator valves.

**1.02 RELATED REQUIREMENTS**

- A. Section 23 21 13 - Hydronic Piping.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide product data for manufactured products and assemblies required for this project. Include component sizes, rough-in requirements, service sizes, and finishes. Include product description, model and dimensions.
- C. Project Record Documents: Record actual locations of flow controls.
- D. Maintenance Data: Include installation instructions, assembly views, lubrication instructions, and replacement parts list.

**1.04 DELIVERY, STORAGE, AND HANDLING**

- A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
- B. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- C. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

**PART 2 PRODUCTS**

**2.01 AIR VENTS**

- A. Manufacturers:
  - 1. ITT Bell & Gossett.
  - 2. Taco, Inc.
  - 3. Armstrong Fluid Technologies.



B. Manual Type: Short vertical sections of 2 inch (50 mm) diameter pipe to form air chamber, with 1/8 inch (3 mm) brass needle valve at top of chamber.

C. Float Type:

1. Brass or semi-steel body, copper, polypropylene, or solid non-metallic float, stainless steel valve and valve seat; suitable for system operating temperature and pressure; with isolating valve.
2. Cast iron body and cover, float, bronze pilot valve mechanism suitable for system operating temperature and pressure; with isolating valve.

## **2.02 STRAINERS**

A. Manufacturers:

1. Wilkins.
2. Watts Regulator.

B. Size 2 inch (50 mm) and Under:

1. Screwed brass or iron body for 175 psi (1200 kPa) working pressure, Y pattern with 1/32 inch (0.8 mm) stainless steel perforated screen.

## **2.03 COMBINATION PUMP DISCHARGE VALVES**

A. Valves: Straight or angle pattern, flanged cast-iron valve body with bolt-on bonnet for 175 psi (1200 kPa) operating pressure, non-slam check valve with spring-loaded bronze disc and seat, stainless steel stem, and calibrated adjustment permitting flow regulation.

## **2.04 PRESSURE-TEMPERATURE TEST PLUGS**

A. Construction: Brass body designed to receive temperature or pressure probe with removable protective cap, and Neoprene rated for minimum 200 degrees F (93 degrees C).

B. Application: Use extended length plugs to clear insulated piping.

## **2.05 BALANCING VALVES**

A. Size 2 inch (50 mm) and Smaller:

1. Provide ball style with flow balancing, flow measurement, and shut-off capabilities, memory stops, minimum of two metering ports and NPT threaded or soldered connections.
2. Metal construction materials consist of bronze or brass.
3. Non-metal construction materials consist of Teflon or EPDM.

## **2.06 COMBINATION FLOW CONTROLS**

A. Manufacturers:

1. ITT Bell & Gossett.
2. Armstrong Industries.
3. Tour & Anderson Hydronics.
4. Taco, Inc.

B. Construction:

1. Up to 2 inches; Bronze body, bronze trim.
2. Over 2 inches; Ductile iron body, bronze trim.

- C. Control Mechanism: Y-pattern globe valve and digital handwheel with memory stop, inside screw, rubber O-ring disc, solder or screwed ends. Valve shall provide precise flow measurement, precision flow balancing, positive shut-off with no drip seat and drain port for hose bib fitting.

## **2.07 RADIATOR VALVES**

- A. Angle or straight pattern, rising stem, inside screw globe valve for 125 psi (860 kPa) working pressure, with bronze body and integral union for screwed connections, renewable composition disc, plastic wheel handle for shut-off service, and lockshield key cap and set screw memory bonnet for balancing service.

## **2.08 MULTI-PORT PRESSURE MANIFOLD**

- A. Manufacturers:
  1. Flow Conditioning Corp: Trumpet Valve.
  2. Hydronic Monitor Co., Inc.
  3. Substitutions: See Section 01 60 00 - Product Requirements.
- B. One piece manifold of brass construction with ports for connection to hydronic system. Spring return pushbuttons, gauge connection port and test port connection for gauge calibration.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Install specialties in accordance with manufacturer's instructions.
- B. For automatic air vents in ceiling spaces or other concealed locations, provide vent tubing to nearest drain.
- C. Provide valved drain and hose connection on strainer blow down connection.
- D. Provide radiator valves on water inlet to terminal heating units such as radiation, unit heaters, and fan coil units.
- E. Provide relief valves on pressure tanks, low pressure side of reducing valves, heat exchangers, and expansion tanks.
- F. Multi-port pressure manifold shall be attached to system piping with heavy bracket at height to permit easy pushbutton operation and gauge observation.

**END OF SECTION**

## **SECTION 23 21 23 HYDRONIC PUMPS**

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Close-coupled pumps.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 23 21 13 - Hydronic Piping.

#### **1.03 REFERENCE STANDARDS**

- A. UL 778 - Standard for Motor-Operated Water Pumps; Current Edition, Including All Revisions.

#### **1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide certified pump curves showing performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable. Include electrical characteristics and connection requirements.
- C. Operation and Maintenance Data: Include installation instructions, assembly views, lubrication instructions, and replacement parts list.
- D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 01 60 00 - Product Requirements, for additional provisions.

#### **1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacture, assembly, and field performance of pumps, with minimum three years of documented experience.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Armstrong Fluid Technologies.
- B. ITT Bell & Gossett.
- C. Taco, Inc..

#### **2.02 HVAC PUMPS - GENERAL**

- A. Provide pumps that operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, and operate within 25 percent of midpoint of published maximum efficiency curve.
- B. Products Requiring Electrical Connection: Listed and classified by UL or testing agency acceptable to Authority Having Jurisdiction as suitable for the purpose specified and indicated.

## **2.03 CLOSE COUPLED PUMPS**

- A. Type: Horizontal shaft, single stage, close coupled, radially split casing, for 175 psi (1200 kPa) maximum working pressure.
- B. Casing: Cast iron, with suction and discharge gage ports, renewable bronze casing wearing rings, seal flush connection, drain plug, flanged suction and discharge.
- C. Impeller: Bronze, fully enclosed, keyed to motor shaft extension.
- D. Shaft: Stainless steel.
- E. Seal: Mechanical seal, 225 degrees F (107 degrees C) maximum continuous operating temperature.
- F. Seal: Packing gland with minimum four rings graphite impregnated packing and bronze lantern rings, 230 degrees F (110 degrees C) maximum continuous operating temperature.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Verify that electric power is available and of the correct characteristics.

### **3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Provide access space around pumps for service. Provide no less than minimum space recommended by manufacturer.
- C. Provide line sized shut-off valve and strainer on pump suction, and line sized soft seat check valve and balancing valve on pump discharge.
- D. Lubricate pumps before start-up.

**END OF SECTION**

**SECTION 23 23 00  
REFRIGERANT PIPING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Piping.
- B. Refrigerant.
- C. Filter-driers.
- D. Solenoid valves.
- E. Expansion valves.
- F. Flexible connections.

**1.02 RELATED REQUIREMENTS**

- A. Section 23 62 13 - Packaged Air-Cooled Refrigerant Compressor and Condenser Units.

**1.03 REFERENCE STANDARDS**

- A. AHRI 750 - Standard for Thermostatic Refrigerant Expansion Valves; 2007.
- B. AHRI 760 - Standard for Performance Rating of Solenoid Valves for Use With Volatile Refrigerants; 2007.
- C. ASHRAE Std 15 - Safety Standard for Refrigeration Systems; 2013.
- D. ASHRAE Std 34 - Designation and Safety Classification of Refrigerants; 2013.
- E. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2013.
- F. ASME B16.26 - Cast Copper Alloy Fittings for Flared Copper Tubes; 2013.
- G. ASME B31.5 - Refrigeration Piping and Heat Transfer Components; 2013.
- H. ASME B31.9 - Building Services Piping; 2014.
- I. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2014.
- J. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric); 2013.
- K. ASTM B280 - Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service; 2013.
- L. AWS A5.8M/A5.8 - Specification for Filler Metals for Brazing and Braze Welding; 2011-AMD 1.
- M. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2009.
- N. UL 429 - Electrically Operated Valves; Current Edition, Including All Revisions.

## 1.04 SYSTEM DESCRIPTION

- A. Where more than one piping system material is specified ensure system components are compatible and joined to ensure the integrity of the system is not jeopardized. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.
- B. Liquid Indicators:
  - 1. Use line size liquid indicators in main liquid line leaving condenser.
- C. Filter-Driers:
  - 1. Use a filter-drier immediately ahead of liquid-line controls, such as thermostatic expansion valves, solenoid valves, and moisture indicators.
  - 2. Use sealed filter-driers in low temperature systems.
  - 3. Use sealed filter-driers in systems utilizing hermetic compressors.
- D. Solenoid Valves:
  - 1. Use in liquid line of systems operating with single pump-out or pump-down compressor control.
  - 2. Use in liquid line of single or multiple evaporator systems.
  - 3. Use in oil bleeder lines from flooded evaporators to stop flow of oil and refrigerant into the suction line when system shuts down.
- E. Flexible Connectors: Utilize at or near compressors where piping configuration does not absorb vibration.

## 1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store piping and specialties in shipping containers with labeling in place.
- B. Protect piping and specialties from entry of contaminating material by leaving end caps and plugs in place until installation.
- C. Dehydrate and charge components such as piping and receivers, seal prior to shipment, until connected into system.

## PART 2 PRODUCTS

### 2.01 PIPING

- A. Copper Tube: ASTM B280, H58 hard drawn or O60 soft annealed.
  - 1. Fittings: ASME B16.22 wrought copper.
  - 2. Joints: Braze, AWS A5.8M/A5.8 BCuP silver/phosphorus/copper alloy.
- B. Copper Tube to 7/8 inch (22 mm) OD: ASTM B88 (ASTM B88M), Type K (A), annealed.
  - 1. Fittings: ASME B16.26 cast copper.
  - 2. Joints: Flared.
- C. Pipe Supports and Anchors:
  - 1. Provide hangers and supports that comply with MSS SP-58.
    - a. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
  - 2. Hangers for Pipe Sizes 2 Inches (50 mm) and Over: Carbon steel, adjustable, clevis.
  - 3. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.

4. Wall Support for Pipe Sizes to 3 Inches (75 mm): Cast iron hook.
5. Vertical Support: Steel riser clamp.
6. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.
7. Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded.
8. Inserts: Malleable iron case of galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.

## **2.02 REFRIGERANT**

- A. Refrigerant: Use only refrigerants that have ozone depletion potential (ODP) of zero and global warming potential (GWP) of less than 50.
- B. Refrigerant: R410A as defined in ASHRAE Std 34.

## **2.03 MOISTURE AND LIQUID INDICATORS**

- A. Indicators: Single port type, UL listed, with copper or brass body, flared or solder ends, sight glass, color coded paper moisture indicator with removable element cartridge and plastic cap; for maximum temperature of 200 degrees F (93 degrees C) and maximum working pressure of 500 psi (3450 kPa).

## **2.04 VALVES**

- A. Manufacturers:
  1. Hansen Technologies Corporation.
  2. Henry Technologies.
  3. Danfoss Automatic Controls.
- B. Diaphragm Packless Valves:
  1. UL listed, globe or angle pattern, forged brass body and bonnet, phosphor bronze and stainless steel diaphragms, rising stem and handwheel, stainless steel spring, nylon seat disc, solder or flared ends, with positive backseating; for maximum working pressure of 500 psi (3450 kPa) and maximum temperature of 275 degrees F (135 degrees C).
- C. Packed Angle Valves:
  1. Forged brass or nickel plated forged steel, forged brass seal caps with copper gasket, rising stem and seat with backseating, molded stem packing, solder or flared ends; for maximum working pressure of 500 psi (3450 kPa) and maximum temperature of 275 degrees F (135 degrees C).
- D. Ball Valves:
  1. Two piece bolted forged brass body with teflon ball seals and copper tube extensions, brass bonnet and seal cap, chrome plated ball, stem with neoprene ring stem seals; for maximum working pressure of 500 psi (3450 kPa) and maximum temperature of 300 degrees F (149 degrees C).
- E. Service Valves:
  1. Forged brass body with copper stubs, brass caps, removable valve core, integral ball check valve, flared or solder ends, for maximum pressure of 500 psi (3450 kPa).

## 2.05 STRAINERS

- A. Straight Line or Angle Line Type:
  - 1. Brass or steel shell, steel cap and flange, and replaceable cartridge, with screen of stainless steel wire or monel reinforced with brass; for maximum working pressure of 430 psi (2960 kPa).

## 2.06 FILTER-DRIERS

- A. Performance:
  - 1. Pressure Drop: 2 psi (14 kPa), maximum, when operating at full connected evaporator capacity.
  - 2. Design Working Pressure: 350 psi (2410 kPa), minimum.
- B. Cores: Molded or loose-fill molecular sieve desiccant compatible with refrigerant, activated alumina, activated charcoal, and filtration to 40 microns, with secondary filtration to 20 microns; of construction that will not pass into refrigerant lines.
- C. Construction: UL listed.
  - 1. Sealed Type: Copper shell.
  - 2. Connections: As specified for applicable pipe type.

## 2.07 SOLENOID VALVES

- A. Manufacturers:
  - 1. Flow Controls Division of Emerson Electric.
  - 2. Parker Hannifin/Refrigeration and Air Conditioning.
  - 3. Sporlan Valve Company.
- B. Valve: AHRI 760 I-P, pilot operated, copper, brass or steel body and internal parts, synthetic seat, stainless steel stem and plunger assembly (permitting manual operation in case of coil failure), integral strainer, with flared, solder, or threaded ends; for maximum working pressure of 500 psi (3450 kPa).
- C. Coil Assembly: UL 429, UL listed, replaceable with molded electromagnetic coil, moisture and fungus proof, with surge protector and color coded lead wires, integral junction box with pilot light.

## 2.08 EXPANSION VALVES

- A. Manufacturers:
  - 1. Flow Controls Division of Emerson Electric.
  - 2. Parker Hannifin/Refrigeration and Air Conditioning.
  - 3. Sporlan Valve Company.
- B. Angle or Straight Through Type: AHRI 750; design suitable for refrigerant, brass body, internal or external equalizer, bleed hole, adjustable superheat setting, replaceable inlet strainer, with non-replaceable capillary tube and remote sensing bulb and remote bulb well.
- C. Selection: Evaluate refrigerant pressure drop through system to determine available pressure drop across valve. Select valve for maximum load at design operating pressure and minimum 10 degrees F (6 degrees C) superheat. Select to avoid being undersized at full load and excessively oversized at part load.



## 2.09 FLEXIBLE CONNECTORS

- A. Manufacturers:
  - 1. Circuit Hydraulics, Ltd.
  - 2. Flexicraft Industries.
  - 3. Penflex.
- B. Corrugated stainless steel hose with single layer of stainless steel exterior braiding, minimum 9 inches (230 mm) long with copper tube ends; for maximum working pressure of 500 psi (3450 kPa).

## PART 3 EXECUTION

### 3.01 PREPARATION

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Remove scale and dirt on inside and outside before assembly.
- C. Prepare piping connections to equipment with flanges or unions.

### 3.02 INSTALLATION

- A. Install refrigeration specialties in accordance with manufacturer's instructions.
- B. Route piping in orderly manner, with plumbing parallel to building structure, and maintain gradient.
- C. Install piping to conserve building space and avoid interference with use of space.
- D. Group piping whenever practical at common elevations and locations. Slope piping one percent in direction of oil return.
- E. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- F. Pipe Hangers and Supports:
  - 1. Install in accordance with ASME B31.5.
  - 2. Support horizontal piping as scheduled.
  - 3. Install hangers to provide minimum 1/2 inch (13 mm) space between finished covering and adjacent work.
  - 4. Place hangers within 12 inches (300 mm) of each horizontal elbow.
  - 5. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
  - 6. Provide copper plated hangers and supports for copper piping.
- G. Arrange piping to return oil to compressor. Provide traps and loops in piping, and provide double risers as required. Slope horizontal piping 0.40 percent in direction of flow.
- H. Provide clearance for installation of insulation and access to valves and fittings.
- I. Insulate piping.
- J. Follow ASHRAE Std 15 procedures for charging and purging of systems and for disposal of refrigerant.

- K. Locate expansion valve sensing bulb immediately downstream of evaporator on suction line.
- L. Provide external equalizer piping on expansion valves with refrigerant distributor connected to evaporator.
- M. Install flexible connectors at right angles to axial movement of compressor, parallel to crankshaft.
- N. Fully charge completed system with refrigerant after testing.

### **3.03 FIELD QUALITY CONTROL**

- A. Test refrigeration system in accordance with ASME B31.5.
- B. Pressure test system with dry nitrogen to 200 psi (1380 kPa). Perform final tests at 27 inches (92 kPa) vacuum and 200 psi (1380 kPa) using halide torch. Test to no leakage.

### **3.04 SCHEDULES**

- A. Hanger Spacing for Copper Tubing.
  1. 1/2 inch (13 mm), 5/8 inch (16 mm), and 7/8 inch (22 mm) OD: Maximum span, 5 feet (1500 mm); minimum rod size, 1/4 inch (6.3 mm).
  2. 1-1/8 inch (29 mm) OD: Maximum span, 6 feet (1800 mm); minimum rod size, 1/4 inch (6.3 mm).
  3. 1-3/8 inch (35 mm) OD: Maximum span, 7 feet (2100 mm); minimum rod size, 3/8 inch (9.5 mm).
  4. 1-5/8 inch (41 mm) OD: Maximum span, 8 feet (2400 mm); minimum rod size, 3/8 inch (9.5 mm).
  5. 2-1/8 inch (54 mm) OD: Maximum span, 8 feet (2400 mm); minimum rod size, 3/8 inch (9.5 mm).
  6. 2-5/8 inch (67 mm) OD: Maximum span, 9 feet (2700 mm); minimum rod size, 3/8 inch (9.5 mm).

**END OF SECTION**

**SECTION 23 31 00  
HVAC DUCTS AND CASINGS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Metal ductwork.
- B. Duct cleaning.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 84 00 - Firestopping.
- B. Section 23 05 93 - Testing, Adjusting, and Balancing for HVAC.
- C. Section 23 07 13 - Duct Insulation: External insulation.
- D. Section 23 33 00 - Air Duct Accessories.
- E. Section 23 36 00 - Air Terminal Units.
- F. Section 23 37 00 - Air Outlets and Inlets.

**1.03 REFERENCE STANDARDS**

- A. ASHRAE (FUND) - ASHRAE Handbook - Fundamentals; 2013.
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.
- E. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2015.
- F. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate duct fittings, particulars such as gages, sizes, welds, and configuration prior to start of work for air systems.
- C. Project Record Documents: Record actual locations of ducts and duct fittings. Record changes in fitting location and type. Show additional fittings used.

**1.05 REGULATORY REQUIREMENTS**

- A. Construct ductwork to NFPA 90A standards.

## 1.06 FIELD CONDITIONS

- A. Do not install duct sealants when temperatures are less than those recommended by sealant manufacturers.
- B. Maintain temperatures within acceptable range during and after installation of duct sealants.

## PART 2 PRODUCTS

### 2.01 MATERIALS

- A. Galvanized Steel for Ducts: Hot-dipped galvanized steel sheet, ASTM A653/A653M FS Type B, with G90/Z275 coating.
- B. Joint Sealers and Sealants: Non-hardening, water resistant, mildew and mold resistant.
  1. Type: Heavy mastic or liquid used alone or with tape, suitable for joint configuration and compatible with substrates, and recommended by manufacturer for pressure class of ducts.
  2. VOC Content: Not more than 250 g/L, excluding water.
  3. Surface Burning Characteristics: Flame spread index of zero and smoke developed index of zero, when tested in accordance with ASTM E84.
- C. Hanger Rod: ASTM A36/A36M; steel, galvanized; threaded both ends, threaded one end, or continuously threaded.
- D. Hanger Cable & Fastener:
  1. Cable: Galvanized high tensile steel cable to EN12385. Standard lengths from 5 ft - 30 ft.

	<u>No. 1</u>	<u>No. 2</u>	No. 3 (Standard)	No. 3 (Trapeze)	<u>No. 4</u>	<u>No. 5</u>
Cable Dia. (in.)	1/16	5/64	1/8	1/8	3/16	1/4
Strand configuration	7x7	7x7	7x7	1x19	7x19	7x19
Min. breaking load (lbs)	125	500	1,000	600	2,475	3,575
Max. safe working load (lbs)	25	100	200	200	495	715
Tensile strength (lbs/sq. in.)	256,700	256,700	256,700	256,700	256,700	256,700

2. Fastener:
  - a. Housing: Type ZA2 Zinc.
  - b. Wedge: Sintered steel hardened to minimum 56 Rockwell C.
  - c. Spring: Stainless steel, Type 302.
  - d. End Cap: No. 1-4 = UV stabilized homopolymer polypropylene; No. 5 = Type ZA2 zinc.
  - e. Screws: No. 5 only = Stainless steel, Type 304
3. Load Rating: All products 5:1 safety factor.
4. Size                      Maximum Safe Working Load

No. 1	25 lbs
No. 2	100 lbs
No. 3	200 lbs
No. 4	495 lbs
No. 5	715 lbs

5. Manufacturers:

- a. Gripple Inc.: Air Flow Company, Inc., Tom Class - 630-400-3344.
- b. Substitutions: See Section 01 60 00 - Product Requirements.

- E. Ducts: Galvanized steel, unless otherwise indicated.
- F. Low Pressure Supply (System with Cooling Coils): 2 inch w.g. (500 Pa) pressure class, galvanized steel.
- G. Medium and High Pressure Supply: 4 inch w.g. (1000 Pa) pressure class, galvanized steel.
- H. Return and Relief: 1 inch w.g. (250 Pa) pressure class, galvanized steel.
- I. General Exhaust: 1 inch w.g. (250 Pa) pressure class, galvanized steel.
- J. Ductmate or WDCI duct connection systems are acceptable. Ductwork constructed using these systems shall refer to manufacturer's recommendations for sheet metal gage intermediate and joint reinforcement.
- K. Outside Air Intake: 1/2 inch w.g. (125 Pa) pressure class, galvanized steel.
- L. Interior gaskets for flanged connections shall be Ductmate 440 butyl rubber.

## 2.02 DUCTWORK FABRICATION

- A. Fabricate and support in accordance with SMACNA (DCS) and as indicated.
- B. Transfer Air and Sound Boots: 1/2 inch w.g. (125 Pa) pressure class, lined galvanized steel.
- C. No variation of duct configuration or size permitted except by written permission. Size round duct installed in place of rectangular ducts in accordance with ASHRAE Handbook - Fundamentals.
- D. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.
- E. Construct T's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows must be used, provide air foil turning vanes of perforated metal with glass fiber insulation.
- F. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
- G. Where ducts are connected to exterior wall louvers and duct outlet is smaller than louver frame, provide blank-out panels sealing louver area around duct. Use same material as duct, painted black on exterior side; seal to louver frame and duct.

## 2.03 MANUFACTURED DUCTWORK AND FITTINGS

- A. Flexible Ducts: Multiple layers of aluminum laminate supported by helically wound spring steel wire.

1. Insulation: Fiberglass insulation with aluminized vapor barrier film.
  2. Pressure Rating: 10 inches WG (2.50 kPa) positive and 1.0 inches WG (250 Pa) negative.
  3. Maximum Velocity: 4000 fpm (20.3 m/sec).
  4. Temperature Range: Minus 20 degrees F to 210 degrees F (Minus 28 degrees C to 99 degrees C).
- B. Transverse Duct Connection System: SMACNA "E" rated rigidly class connection, interlocking angle and duct edge connection system with sealant, gasket, cleats, and corner clips in accordance with SMACNA (DCS).

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Install, support, and seal ducts in accordance with SMACNA (DCS).
- B. Install in accordance with manufacturer's instructions.
- C. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.
- D. Flexible Ducts: Connect to metal ducts with adhesive.
- E. Duct sizes indicated are inside clear dimensions. For lined ducts, maintain sizes inside lining.
- F. Duct sizes indicated shall be of sizes indicated. However, necessary changes in shape offsets or crossovers to clear piping, lighting, building construction obstructions, etc. shall be made without additional cost.
- G. Provide openings in ductwork where required to accommodate thermometers and controllers. Provide pilot tube openings where required for testing of systems, complete with metal can with spring device or screw to ensure against air leakage. Where openings are provided in insulated ductwork, install insulation material inside a metal ring.
- H. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
- I. Use double nuts and lock washers on threaded rod supports.
- J. Connect terminal units to supply ducts with 1 foot maximum length of flexible duct. Do not use flexible duct to change direction.
- K. Connect diffusers or light troffer boots to low pressure ducts directly or with 5 feet (1.5 m) maximum length of flexible duct held in place with strap or clamp.
- L. At exterior wall louvers, seal duct to louver frame and install blank-out panels.

### **3.02 CLEANING**

- A. Clean duct system and force air at high velocity through duct to remove accumulated dust. To obtain sufficient air, clean half the system at a time. Protect equipment that could be harmed by excessive dirt with temporary filters, or bypass during cleaning.

**END OF SECTION**

**SECTION 23 33 00  
AIR DUCT ACCESSORIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Air turning devices/extractors.
- B. Backdraft dampers - metal.
- C. Backdraft dampers - fabric.
- D. Combination fire and smoke dampers.
- E. Duct access doors.
- F. Duct test holes.
- G. Fire dampers.
- H. Flexible duct connections and forming brace.
- I. Smoke dampers.
- J. Volume control dampers.
- K. Indoor air quality equipment.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 84 00 - Firestopping.
- B. Section 23 31 00 - HVAC Ducts and Casings.
- C. Section 23 36 00 - Air Terminal Units: Pressure regulating damper assemblies.

**1.03 REFERENCE STANDARDS**

- A. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2015.
- B. NFPA 92 - Standard for Smoke Control Systems; 2015.
- C. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005.
- D. UL 33 - Safety Heat Responsive Links for Fire-Protection Service; Current Edition, Including All Revisions.
- E. UL 555 - Standard for Fire Dampers; Current Edition, Including All Revisions.

**1.04 DELIVERY, STORAGE, AND HANDLING**

- A. Protect dampers from damage to operating linkages and blades.

## **PART 2 PRODUCTS**

### **2.01 AIR TURNING DEVICES/EXTRACTORS**

- A. Multi-blade device with blades aligned in short dimension; steel construction; with individually adjustable blades, mounting straps.

### **2.02 BACKDRAFT DAMPERS - METAL**

- A. Manufacturers:
  - 1. Ruskin Company.
  - 2. Greenheck.
  - 3. Vent Products.
- B. Gravity Backdraft Dampers, Size 18 by 18 inches (450 by 450 mm) or Smaller, Furnished with Air Moving Equipment: Air moving equipment manufacturer's standard construction.

### **2.03 BACKDRAFT DAMPERS - FABRIC**

- A. Fabric Backdraft Dampers: Factory-fabricated.
  - 1. Blades: Neoprene coated fabric material.
  - 2. Birdscreen: 1/2 inch (12 mm) nominal mesh of galvanized steel or aluminum.
  - 3. Maximum Velocity: 1000 fpm (5 m/sec) face velocity.

### **2.04 COMBINATION FIRE AND SMOKE DAMPERS**

#### **2.05 DUCT ACCESS DOORS**

- A. Manufacturers:
  - 1. Acudor Products Inc.
  - 2. Ruskin Company.
  - 3. Vent Products.
- B. Fabrication: Rigid and close-fitting of galvanized steel with sealing gaskets and quick fastening locking devices. For insulated ducts, install minimum 1 inch (25 mm) thick insulation with sheet metal cover.
  - 1. Larger Sizes: Provide an additional hinge.
- C. Access doors with sheet metal screw fasteners are not acceptable.

#### **2.06 DUCT TEST HOLES**

- A. Temporary Test Holes: Cut or drill in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.
- B. Permanent Test Holes: Factory fabricated, air tight flanged fittings with screw cap. Provide extended neck fittings to clear insulation.

#### **2.07 FIRE DAMPERS**

- A. Manufacturers:
  - 1. Ruskin Company.
  - 2. Greenheck.



### 3. Air Balance.

- B. Fabricate in accordance with NFPA 90A and UL 555, and as indicated.
- C. Horizontal Dampers: Galvanized steel, 22 gage, 0.0299 inch (0.76 mm) frame, stainless steel closure spring, and lightweight, heat retardant non-asbestos fabric blanket.
- D. Multiple Blade Dampers: 16 gage, 0.0598 inch (1.52 mm) galvanized steel frame and blades, oil-impregnated bronze or stainless steel sleeve bearings and plated steel axles, 1/8 by 1/2 inch (3.2 by 12.7 mm) plated steel concealed linkage, stainless steel closure spring, blade stops, and lock.
- E. Fusible Links: UL 33, separate at 160 degrees F (71 degrees C) with adjustable link straps for combination fire/balancing dampers.
- F. Rating: Dampers shall be marked with 1-1/2 or 3-hour fire protection rating as required for damper location.

## 2.08 FLEXIBLE DUCT CONNECTIONS

- A. Fabricate in accordance with SMACNA (DCS) and as indicated.
- B. Flexible Duct Connections: Fabric crimped into metal edging strip.
  - 1. Fabric: UL listed fire-retardant neoprene coated woven glass fiber fabric to NFPA 90A, minimum density 30 oz per sq yd (1.0 kg/sq m).

## 2.09 FLEXIBLE DUCTS FORMING BRACE

- A. Manufacturers:
  - 1. Titus; Model FlexRight.
  - 2. Substitutions: See Section 01 60 00 - Product Requirements.
- B. UL Listed. Radius forming brace to hold flexible duct into a 90 degree elbow. Fits flexible duct sizes and diffuser inlets from 4 inches to 16 inches in diameter. Manufactured from copolymer polypropylene.

## 2.10 SMOKE DAMPERS

- A. Dampers shall meet the requirements of NFPA 90A, NFPA 92A and NFPA 92B. Dampers shall be classified as Leakage Class 1 Smoke Dampers in accordance with the latest version of UL555S.
- B. Dampers and their actuators shall have a UL 555S elevated temperature rating of 250 degrees F. Electric actuator shall be installed by damper manufacturer at time of damper fabrication.
- C. Dampers shall be fabricated of extruded aluminum with airfoil blades and silicone rubber blade edge seals.

## 2.11 VOLUME CONTROL DAMPERS

- A. Manufacturers:
  - 1. Ruskin Company.
  - 2. Greenheck.
  - 3. Air Balance.

- B. Fabricate in accordance with SMACNA (DCS) and as indicated.
- C. Single Blade Dampers: Fabricate for duct sizes up to 6 by 30 inch (150 by 760 mm).
  - 1. Fabricate for duct sizes up to 6 by 30 inch (150 by 760 mm).
  - 2. Blade: 24 gage, 0.0239 inch (0.61 mm), minimum.
- D. Multi-Blade Damper: Fabricate of opposed blade pattern with maximum blade sizes 8 by 72 inch (200 by 1825 mm). Assemble center and edge crimped blades in prime coated or galvanized channel frame with suitable hardware.
  - 1. Blade: 18 gage, 0.0478 inch (1.21 mm), minimum.
- E. End Bearings: Except in round ducts 12 inches (300 mm) and smaller, provide end bearings. On multiple blade dampers, provide oil-impregnated nylon, thermoplastic elastomer, or sintered bronze bearings.
- F. Quadrants:
  - 1. Provide locking, indicating quadrant regulators on single and multi-blade dampers.
  - 2. On insulated ducts mount quadrant regulators on stand-off mounting brackets, bases, or adapters.

## **2.12 INDOOR AIR QUALITY EQUIPMENT**

- A. Manufacturers:
  - 1. Plasma Air; Model 7400.
  - 2. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Needle point type ionizer producing an equal amount of positive and negative ions. Airflow capacity 4,200 - 6,000 CFM with a pressure drop less than 001 IN WG. Housing shall be 18 gauge powder coated steel. Electrical input 24 AC with internal fuse. UL listed.

## **2.13 MISCELLANEOUS PRODUCTS**

- A. Internal Strut End Plugs: Combination end-mounting and sealing plugs for metal conduit used as internal reinforcement struts for metal ducts; plug crimped inside conduit with outside gasketed washer seal.
- B. Duct Opening Closure Film: Mold-resistant, self-adhesive film to keep debris out of ducts during construction.
  - 1. Thickness: 2 mils (0.6 mm).
  - 2. High tack water based adhesive.
  - 3. UV stable light blue color.
  - 4. Elongation Before Break: 325 percent, minimum.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA (DCS). Refer to Section 23 31 00 for duct construction and pressure class.
- B. Provide backdraft dampers on exhaust fans or exhaust ducts nearest to outside and where indicated.

- C. Provide duct test holes where indicated and required for testing and balancing purposes.
- D. Provide fire dampers, combination fire and smoke dampers, and smoke dampers at locations indicated, where ducts and outlets pass through fire rated components, and where required by Authorities Having Jurisdiction. Install with required perimeter mounting angles, sleeves, breakaway duct connections, corrosion resistant springs, bearings, bushings and hinges.
- E. Install smoke dampers and combination smoke and fire dampers in accordance with NFPA 92.
- F. Demonstrate re-setting of fire dampers to Owner's representative.
- G. At fans and motorized equipment associated with ducts, provide flexible duct connections immediately adjacent to the equipment.
- H. At equipment supported by vibration isolators, provide flexible duct connections immediately adjacent to the equipment.
- I. Provide balancing dampers at points on supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing. Install minimum 2 duct widths from duct take-off.
- J. Provide balancing dampers on duct take-off to diffusers, grilles, and registers, regardless of whether dampers are specified as part of the diffuser, grille, or register assembly.

**END OF SECTION**

**SECTION 23 34 16  
CENTRIFUGAL HVAC FANS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Inline centrifugal fans.

**1.02 RELATED REQUIREMENTS**

- A. Section 23 33 00 - Air Duct Accessories: Backdraft dampers.

**1.03 REFERENCE STANDARDS**

- A. AMCA 99 - Standards Handbook; 2010.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on centrifugal fans and accessories including fan curves with specified operating point clearly plotted, power, RPM, sound power levels for both fan inlet and outlet at rated capacity, and electrical characteristics and connection requirements.
- C. Maintenance Data: Include instructions for lubrication, motor and drive replacement, spare parts list, and wiring diagrams.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Protect motors, shafts, and bearings from weather and construction dust.

**1.07 FIELD CONDITIONS**

- A. Permanent fans may not be used for ventilation during construction.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Loren Cook Company; SQND-EC.
- B. Greenheck.
- C. Carnes

**2.02 SQUARE INLINE FAN**

- A. Fan shall be UL Listed, bolted construction with side access doors sealed with closed cell neoprene gasketing. Wheel shall be centrifugal backward inclined, 100% aluminum and balanced in accordance with AMCA Standard 204-05. Motor shall be electronically commutated rated with continuous duty.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install fans with resilient mountings and flexible electrical leads.
- C. Install flexible connections between fan inlet and discharge ductwork; refer to Section 23 33 00. Ensure metal bands of connectors are parallel with minimum one inch (25 mm) flex between ductwork and fan while running.
- D. Provide backdraft dampers on discharge of exhaust fans and as indicated; refer to Section 23 33 00.

**END OF SECTION**

**SECTION 23 36 00  
AIR TERMINAL UNITS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Single-duct terminal units.
  - 1. Single-duct, variable-volume units.

**1.02 RELATED REQUIREMENTS**

- A. Section 23 09 23 - Direct-Digital Control System for HVAC.
- B. Section 23 21 13 - Hydronic Piping: Connections to heating coils.
- C. Section 23 31 00 - HVAC Ducts and Casings.

**1.03 REFERENCE STANDARDS**

- A. AHRI 410 - Standard for Forced-Circulation Air-Cooling and Air-Heating Coils; 2001 (R2011).
- B. AHRI 880 (I-P) - Performance Rating of Air Terminals; 2011 with Addendum 1.
- C. ASTM A492 - Standard Specification for Stainless Steel Rope Wire; 1995 (Reapproved 2013).
- D. ASTM A603 - Standard Specification for Zinc-Coated Steel Structural Wire Rope; 1998 (Reapproved 2014).
- E. ASTM C1071 - Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material); 2012.
- F. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2015.
- G. SMACNA (SRM) - Seismic Restraint Manual Guidelines for Mechanical Systems; Sheet Metal and Air Conditioning Contractors' National Association; 2008.
- H. UL 181 - Standard for Factory-Made Air Ducts and Air Connectors; current edition, including all revisions.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data indicating configuration, general assembly, and materials used in fabrication. Include catalog performance ratings that indicate air flow, static pressure, and NC designation. Include electrical characteristics and connection requirements.
- C. Shop Drawings: Indicate configuration, general assembly, and materials used in fabrication, and electrical characteristics and connection requirements.
  - 1. Include schedules listing discharge and radiated sound power level for each of second through sixth octave bands at inlet static pressures of 1 to 4 inch wg (250 to 1000 Pa).
- D. Project Record Documents: Record actual locations of units and controls components and locations of access doors required for access of valving.

- E. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, maintenance and repair data, and parts lists. Include directions for resetting constant-volume regulators.

## 1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

## PART 2 PRODUCTS

### 2.01 SINGLE-DUCT, VARIABLE-VOLUME UNITS

#### A. Manufacturers:

1. Titus.
2. Price.
3. Tuttle & Bailey.

#### B. General:

1. Factory-assembled, AHRI 880 rated and bearing the AHRI seal, air volume control terminal with damper assembly, flow sensor, externally mounted volume controller, duct collars, and all required features.
2. Control box bearing identification, including but not necessarily limited to nominal cfm, maximum and minimum factory-set airflow limits, coil type and coil (right or left hand) connection, where applicable.

#### C. Unit Casing:

1. Minimum 22 gage, 0.0299 inch (0.76 mm) galvanized steel.
2. Air Inlet Collar: Provide round, suitable for standard flexible duct sizes.
3. Unit Discharge: Rectangular, with slip-and-drive connections.
4. Acceptable Liners:
  - a. 1/2 inch (13 mm) thick, coated, fibrous-glass complying with ASTM C1071.
    - 1) Secure with adhesive.
    - 2) Coat edges exposed to airstream with NFPA 90A approved sealant.
    - 3) Cover liner with non-porous foil.
  - b. Liner not to contain pentabrominated diphenyl ether (CAS #32534-81-9) or octabrominated diphenyl ether.

#### D. Damper Assembly:

1. Heavy-gage, galvanized steel or extruded aluminum construction with solid steel, nickel-plated shaft pivoting on HDPE, self-lubricating bearings.
2. Provide integral position indicator or alternative method for indicating damper position over full range of 90 degrees.
3. Incorporate low leak damper blades for tight airflow shutoff.

#### E. Hot Water Heating Coil:

1. Coil Casing: Minimum 22 gage, 0.0299 inch (0.76 mm) galvanized steel, factory-installed on terminal discharge with rectangular outlet, duct connection type.
2. Coil Fins: Aluminum or aluminum plated fins, mechanically-bonded to seamless copper tubes.

3. Coil leak tested to minimum 350 psig (2413 kPa).
4. Base performance data on tests run in accordance with AHRI 410 and units to bear AHRI 410 label.

F. Controls:

1. DDC (Direct-Digital Controls):
  - a. Include a factory-installed, unit-mounted, direct-digital controller.
  - b. Bi-directional Damper Actuator: 24 volt, powered closed, spring return open.
  - c. See Section 23 09 23.
2. Airflow Sensor: Differential pressure airflow device measuring total, static, and wake pressures.
  - a. Signal accuracy: Plus/minus five percent throughout terminal operating range.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that conditions are suitable for installation.

### **3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install the inlets of air terminal units and air flow sensors a minimum of four duct diameters from elbows, transitions, and duct takeoffs.
- C. Provide ceiling access doors or locate units above easily removable ceiling components.
- D. Support units individually from structure with wire rope complying with ASTM A492 and ASTM A603 in accordance with SMACNA (SRM).
- E. Do not support from ductwork.
- F. Connect to ductwork in accordance with Section 23 31 00.

### **3.03 ADJUSTING**

- A. Reset volume with damper operator attached to assembly allowing flow range modulation from 100 percent of design flow to zero percent full flow. Set units with heating coils for minimum scheduled percent full flow.

### **3.04 CLEANING**

- A. Vacuum clean coils and inside of units.

**END OF SECTION**



**SECTION 23 37 00  
AIR OUTLETS AND INLETS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Diffusers.
- B. Registers/grilles.

**1.02 REFERENCE STANDARDS**

- A. ASHRAE Std 70 - Method of Testing the Performance of Air Outlets and Inlets; 2006 (R2011).

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.

**1.04 QUALITY ASSURANCE**

- A. Test and rate air outlet and inlet performance in accordance with ASHRAE Std 70.
- B. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

**1.05 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Price Industries.
- B. Titus.
- C. Tuttle & Bailey.
- D. Nailor.

**2.02 SQUARE CEILING DIFFUSERS**

- A. Type: Provide square, stamped, multi-core diffuser to discharge air in four way pattern.
- B. Connections: As scheduled on drawings.
- C. Frame: Provide inverted T-bar type.
- D. Fabrication: Steel with baked enamel finish.
- E. Color: white.

F. Accessories: Provide radial opposed blade volume control damper; removable core with damper adjustable from diffuser face.

G. Titus Model TMS.

### **2.03 CEILING SLOT DIFFUSERS**

A. Type: Continuous 2-inch wide slot, 1 slots wide, with energy harvesting auto-changeover.

B. Fabrication: Steel with factory baked enamel finish.

C. Slot: Energy harvesting from solar and ambient room light. Solar cell mounted on face of diffuser with internal capacitor for storage. Internal temperature sensor to monitor supply air temperature and automatically adjust air flow pattern. Internal P.C. board with smart logic and dip switch adjustment to change temperature bands.

D. Color: To be selected by Architect/Engineer from manufacturer's standard range.

E. Plenum: Integral, galvanized steel, external insulation.

F. Titus Model EOSI.

### **2.04 CEILING SLOT DIFFUSERS**

A. Type: Continuous 1 inch (25 mm) wide slot, two slots wide, with adjustable vanes for left, right, or vertical discharge.

B. Fabrication: Aluminum extrusions with factory baked enamel finish.

C. Color: To be selected by Architect from manufacturer's standard range.

D. Frame: 1 inch (25 mm) margin with support clips for T bar mounting and gasket, mitered end border.

E. Plenum: Integral, galvanized steel, insulated.

F. Titus Model TBDI-80.

### **2.05 PERFORATED FACE CEILING RETURN REGISTERS/GRILLES**

A. Type: Perforated face.

B. Frame: Inverted T-bar type.

C. Fabrication: Steel with steel frame and baked enamel white finish.

D. Color: As selected by Architect with manufacturer's standard range.

E. Titus Model PAR.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

A. Install in accordance with manufacturer's instructions.

- B. Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry, and lighting arrangement.
- C. Install diffusers to ductwork with air tight connection.
- D. Provide balancing dampers on duct take-off to diffusers, and grilles and registers, despite whether dampers are specified as part of the diffuser, or grille and register assembly.

**END OF SECTION**

**SECTION 23 62 13**  
**PACKAGED AIR-COOLED REFRIGERANT COMPRESSOR AND CONDENSER UNITS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Condensing unit package.
- B. Charge of refrigerant and oil.
- C. Controls and control connections.
- D. Refrigerant piping connections.
- E. Motor starters.
- F. Electrical power connections.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-in-Place Concrete: Concrete bases.
- B. Section 23 23 00 - Refrigerant Piping.
- C. Section 23 73 13 - Modular Central-Station Air-Handling Units.

**1.03 REFERENCE STANDARDS**

- A. AHRI 210/240 - Standard for Performance Rating of Unitary Air-Conditioning and Air-Source Heat Pump Equipment; 2008.
- B. ASHRAE Std 15 - Safety Standard for Refrigeration Systems; 2013.
- C. ASHRAE Std 23.1 - Methods of Testing for Rating Positive Displacement Refrigerant Compressors and Condensing Units; 2010.
- D. ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings; 2013, Including All Amendments and Errata.
- E. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide rated capacities, weights specialties and accessories, electrical nameplate data, and wiring diagrams. Include equipment served by condensing units in submittal, or submit at same time, to ensure capacities are complementary.
- C. Operation and Maintenance Data: Include start-up instructions, maintenance instructions, parts lists, controls, and accessories.
- D. Warranty: Submit manufacturer's warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.

## **1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Comply with manufacturer's installation instructions for rigging, unloading, and transporting units.

## **1.06 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Provide a five year warranty to include coverage for refrigerant compressors.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Trane, a brand of Ingersoll Rand; TTA300J3.
- B. Daikin Applied.
- C. Aeon.
- D. Carrier.

### **2.02 MANUFACTURED UNITS**

- A. Units: Self-contained, packaged, factory assembled and pre-wired units suitable for outdoor use consisting of cabinet, compressors, condensing coil and fans, integral sub-cooling coil, VAV supply air controls, coil frost protection, liquid receiver, and screens.
- B. Construction and Ratings: In accordance with AHRI 210/240. Test in accordance with ASHRAE Std 23.1.
- C. Performance Ratings: Energy Efficiency Rating (EER) and Coefficient of Performance (COP) not less than prescribed by ASHRAE Std 90.1.
- D. Unit shall utilize R410A refrigerant. Refrigerants R-22 and R-407C are unacceptable.

### **2.03 CASING**

- A. House components in welded steel frame with galvanized steel panels with weather resistant, baked enamel finish.
- B. Mount starters, disconnects, and controls in weatherproof panel provided with full opening access doors. Provide mechanical interlock to disconnect power when door is opened.
- C. Provide removable access doors or panels with quick fasteners and piano hinges.

### **2.04 CONDENSER COILS**

- A. Coils: Aluminum fins mechanically bonded to seamless copper tubing. Provide sub-cooling circuits. Air test under water to 425 psig (2900 kPa), and vacuum dehydrate. Seal with holding charge of nitrogen.
- B. Coil Guard: Expanded metal with lint screens.

## 2.05 FANS AND MOTORS

- A. Vertical discharge direct driven propeller type condenser fans with fan guard on discharge. Equip with roller or ball bearings with grease fittings extended to outside of casing.
- B. Weatherproof motors suitable for outdoor use, single phase permanent split capacitor or 3 phase, with permanent lubricated ball bearings and built in current and thermal overload protection.

## 2.06 COMPRESSORS

- A. Compressor: Hermetic scroll type.
- B. Mounting: Statically and dynamically balance rotating parts and mount on spring vibration isolators.
- C. Lubrication System: Centrifugal oil pump with oil charging valve, oil level sight glass, and magnetic plug or strainer.
- D. Motor: Constant speed 1800 rpm suction gas cooled with electronic sensor and winding over temperature protection, designed for across-the-line starting. Furnish with starter.
- E. Capacity Reduction Equipment: Suction valve unloaders, with lifting mechanism operated by electrically actuated solenoid valve, with unloaded compressor start; controlled from suction pressure.
- F. Sump Oil Heater: Evaporates refrigerant returning to sump during shut down. Energize heater continuously when compressor is not operating.

## 2.07 REFRIGERANT CIRCUIT

- A. Provide each unit with one refrigerant circuit, factory supplied and piped. Refer to Section 23 23 00.
- B. For each refrigerant circuit, provide:
  - 1. Filter dryer replaceable core type.
  - 2. Liquid line sight glass and moisture indicator.
  - 3. Thermal expansion valve for maximum operating pressure.
  - 4. Suction and liquid line service valves and gage ports.
  - 5. Charging valve.
  - 6. Compressor discharge service valve.

## 2.08 CONTROLS

- A. On unit, mount weatherproof steel control panel, NEMA 250, containing power and control wiring, factory wired with single point power connection.
- B. For each compressor, provide across-the-line starter, non-recycling compressor overload, starter relay, and control power transformer or terminal for controls power. Provide manual reset current overload protection. For each condenser fan, provide across-the-line starter with starter relay.
- C. Provide safety controls arranged so any one will shut down machine:
  - 1. High discharge pressure switch (manual reset) for each compressor.
  - 2. Low suction pressure switch (automatic reset) for each compressor.

3. Oil Pressure switch (manual reset).
- D. Provide the following operating controls:
  1. One minute off timer prevents compressor from short cycling.
  2. Lead-lag switch to alternate compressor operation.
- E. Provide controls to permit operation down to 0 degrees F (minus 18 degrees C) ambient temperature.
  1. Head pressure switch to cycle fan motors in response to refrigerant condensing pressure.
  2. Solid state control to vary speed of one condenser fan motor in response to refrigerant condensing pressure.
  3. Electronic control consisting of mixing damper assembly, controlled to maintain constant refrigerant condensing pressure.
- F. Gages: Prepped for suction and discharge refrigerant pressures and oil pressure for each compressor.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Install in accordance with manufacturer's installation instructions.
- B. Complete structural, mechanical, and electrical connections in accordance with manufacturer's installation instructions.
- C. Provide for connection to electrical service.
- D. Install units on concrete base as indicated. Refer to Section 03 30 00.
- E. Provide connection to refrigeration piping system and evaporators. Refer to Section 23 23 00. Comply with ASHRAE Std 15.

### **3.02 SYSTEM STARTUP**

- A. Supply initial charge of refrigerant and oil for each refrigeration system. Replace losses of oil or refrigerant prior to end of correction period.
- B. Charge system with refrigerant and test entire system for leaks after completion of installation. Repair leaks, put system into operation, and test equipment performance.
- C. Provide cooling season start-up, and winter season shut-down for first year of operation.

**END OF SECTION**

**SECTION 23 73 13**  
**MODULAR CENTRAL-STATION AIR-HANDLING UNITS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Casing construction.
- B. Fan section.
- C. Coil section.
- D. Filter and air cleaner section.
- E. Damper section.
- F. Energy recovery ventilators.

**1.02 RELATED REQUIREMENTS**

- A. Section 23 05 93 - Testing, Adjusting, and Balancing for HVAC.
- B. Section 23 07 19 - HVAC Piping Insulation.
- C. Section 23 33 00 - Air Duct Accessories: Flexible duct connections.

**1.03 REFERENCE STANDARDS**

- A. ABMA STD 9 - Load Ratings and Fatigue Life for Ball Bearings; 2015.
- B. AHRI 410 - Standard for Forced-Circulation Air-Cooling and Air-Heating Coils; 2001 (R2011).
- C. AMCA (DIR) - (Directory of) Products Licensed Under AMCA International Certified Ratings Program; <http://www.amca.org/certified/search/company.aspx>.
- D. AMCA 99 - Standards Handbook; 2010.
- E. AMCA 210 - Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating; 2007.
- F. AMCA 300 - Reverberant Room Method for Sound Testing of Fans; 2014.
- G. AMCA 301 - Methods for Calculating Fan Sound Ratings from Laboratory Test Data; 2014.
- H. AMCA 500-D - Laboratory Methods of Testing Dampers for Rating; 2012.
- I. ASHRAE Std 52.2 - Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size; 2012, with 2015 amendments.
- J. ASHRAE Std 62.1 - Laboratory Method of Testing to Determine the Sound Power in a Duct; 2013.
- K. ASHRAE Std 90.1 - Energy Standard for Buildings Except Low-Rise Residential Buildings; 2013, Including All Addenda.
- L. ASTM B177/B177M - Standard Guide for Engineering Chromium Electroplating; 2011.



- M. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- N. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2015.
- O. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005.
- P. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.

#### **1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data:
  - 1. Published Literature: Indicate dimensions, weights, capacities, ratings, gages and finishes of materials, and electrical characteristics and connection requirements.
  - 2. Filters: Data for filter media, filter performance data, filter assembly, and filter frames.
  - 3. Fans: Performance and fan curves with specified operating point clearly plotted, power, RPM.
  - 4. Sound Power Level Data: Fan outlet and casing radiation at rated capacity.
  - 5. Electrical Requirements: Power supply wiring including wiring diagrams for interlock and control wiring, clearly indicating factory-installed and field-installed wiring.
- C. Shop Drawings: Indicate assembly, unit dimensions, weight loading, required clearances, construction details, field connection details, and electrical characteristics and connection requirements.
- D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 01 60 00 - Product Requirements, for additional provisions.
  - 2. Extra Fan Belts: One set for each unit.
  - 3. Extra Filters: One set for each unit.

#### **1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

#### **1.06 REGULATORY REQUIREMENTS**

- A. Products Requiring Electrical Connection: Listed and classified by UL (DIR) as suitable for the purpose specified and indicated.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Accept products on site in factory-fabricated protective containers, with factory-installed shipping skids and lifting lugs. Inspect for damage.
- B. Store in clean dry place and protect from weather and construction traffic. Handle carefully to avoid damage to components, enclosures, and finish.
- C. Do not operate units until ductwork is clean, filters are in place, bearings lubricated, and fan has been test run under observation.

## **PART 2 PRODUCTS**

### **2.01 PACKAGED AIR HANDLING UNITS**

#### **A. MANUFACTURERS**

1. Trane Inc; Climate Changer.
2. Daikin Applied.
3. Aeon.
4. Carrier.

### **2.02 CASING CONSTRUCTION**

#### **A. Full Perimeter Base Rail:**

1. Construct of galvanized steel.
2. Provide base rail of sufficient height to raise unit for external trapping of condensate drain pans.

#### **B. Casing:**

1. Construct of one piece, insulated, double wall panels.
2. Provide mid-span, no through metal, internal thermal break.
3. Construct outer panels of galvanized steel and inner panels of galvanized steel.
4. Casing Air Pressure Performance Requirements:
  - a. Able to withstand up to 8 inches w.g. (2 kPa) positive or negative static pressure.
  - b. Not to exceed 0.0042 inches per inch (0.0042 mm/mm) deflection at 1.5 times design static pressure up to a maximum of plus 8 inches w.g. (2 kPa) in positive pressure sections and minus 8 inches w.g. (2 kPa) in negative pressure sections.

#### **C. Access Doors:**

1. Construction, thermal and air pressure performance same as casing.
2. Provide surface mounted handles on hinged, swing doors.

#### **D. Unit Flooring:** Construct with sufficient strength to support expected people and equipment loads associated with maintenance activities.

#### **E. Casing Leakage:** Seal joints and provide airtight access doors so that air leakage does not exceed one percent of design flow at the specified casing pressure.

#### **F. Insulation:**

1. Injected foam construction, 2 inches thick with R-value of 12.
2. Provide minimum thermal thickness of 12 R (2.29 RSI) throughout.
3. Completely fill panel cavities in each direction to prevent voids and settling.
4. Comply with NFPA 90A.

#### **G. Drain Pan Construction:**

1. Provide cooling coil sections with an insulated, double wall, stainless steel drain pan complying with ASHRAE 62.1 for indoor air quality and sufficiently sized to collect condensate.
2. Slope in two planes to promote positive drainage and eliminate stagnate water conditions.
3. Locate outlet of sufficient diameter at lowest point of pan to prevent overflow at normal operating conditions.
4. Provide threaded drain connections constructed of drain pan material, extended sufficient distance beyond the base to accommodate field installed, condensate drain trapping.

5. Bottom Inlet Units: Provide steel or aluminum walking grate on structural supports.

H. Finish:

1. Indoor Units:

- a. Provide exterior, galvanized steel panels with painted surface complying with ASTM B177/B177M.
- b. Color: Manufacturer's standard color.

## 2.03 FAN SECTION

A. Type: Forward curved, double width, double inlet, centrifugal plug type fan, conforming to AMCA 99..

1. Performance Ratings: Determined in accordance with AMCA 210 and labeled with AMCA Certified Rating Seal.
2. Sound Ratings: AMCA 301; tested to AMCA 300 and label with AMCA Certified Sound Rating Seal.

B. Bearings: Self-aligning, grease lubricated, with lubrication fittings extended to exterior of casing with plastic tube and grease fitting rigidly attached to casing.

C. Mounting:

1. Locate fan and motor internally on welded steel base coated with corrosion resistant paint.
2. Provide access to motor, drive, and bearings through removable casing panels or hinged access doors.
3. Mount base on vibration isolators.

D. External Motor Junction Box: Factory mount NEMA 4 external junction box and connect to extended motor leads from internally mounted motors.

E. Fan Accessories:

F. Drives:

1. Conform to AMCA 99.
2. Bearings: Heavy duty pillow block type, ball bearings, with ABMA STD 9, L-10 life at 50,000 hours.
3. Shafts: Solid, hot rolled steel, ground and polished, with key-way, and protectively coated with lubricating oil.
4. V-Belt Drive: Cast iron or steel sheaves, dynamically balanced, bored to fit shafts, and keyed. Variable and adjustable pitch sheaves for motors 15 hp and under selected so required rpm is obtained with sheaves set at mid-position; fixed sheave for 20 hp and over, matched belts, and drive rated as recommended by manufacturer or minimum 1.5 times nameplate rating of the motor.
5. Belt Guard: Fabricate to SMACNA (DCS); 0.106 inch (2.6 mm) thick, 3/4 inch (20 mm) diamond mesh wire screen welded to steel angle frame or equivalent, prime coated. Secure to fan or fan supports without short circuiting vibration isolation, with provision for adjustment of belt tension, lubrication, and use of tachometer with guard in place.

## 2.04 COIL SECTION

- A. Casing: Provide access to both sides of coils. Enclose coils with headers and return bends exposed outside casing. Slide coils into casing through removable end panel with blank off sheets and sealing collars at connection penetrations.
  - 1. Drain Pans: Downstream of coil and down spouts for cooling coil banks more than one coil high.
  - 2. Air Coils:
    - a. Certify capacities, pressure drops, and selection procedures in accordance with AHRI 410.
  - 3. Fabrication:
    - a. Tubes: 5/8 inch (16 mm) OD seamless copper expanded into fins, brazed joints.
    - b. Fins: Aluminum.
    - c. Casing: Die formed channel frame of galvanized steel.
  - 4. Water Heating Coils:
    - a. Headers: Cast iron, seamless copper tube, or prime coated steel pipe with brazed joints.
    - b. Configuration: Drainable, with threaded plugs for drain and vent; serpentine type with return bends on smaller sizes and return headers on larger sizes.
  - 5. Refrigerant Coils:
    - a. Refrigerant: Use only refrigerants that have ozone depletion potential (ODP) of zero and global warming potential (GWP) of less than 50.
    - b. Headers: Seamless copper tubes with silver brazed joints.
    - c. Liquid Distributors: Brass or copper venturi distributor with seamless copper distributor tubes.
    - d. Configuration: Down feed with bottom suction.

## 2.05 FILTER AND AIR CLEANER SECTION

- A. General: Provide filter sections with filter racks, minimum of one access door for filter removal, and filter block-offs to prevent air bypass.
- B. Pleated Media Filters:
  - 1. Media: 2 inch (50 mm), 100 percent synthetic fibers, continuously laminated to a grid with water repellent adhesive, and capable of operating up to a maximum of 625 fpm (3.17 m/s) without loss of efficiency and holding capacity.
  - 2. Frame: Side access with rigid frames.
  - 3. Minimum Efficiency Reporting Value: 8 MERV when tested in accordance with ASHRAE 52.2.
- C. Differential Pressure Gage:
  - 1. Provide factory installed dial type differential pressure gage, flush mounted with casing outer wall, and fully piped to both sides of each filter to indicate status.
  - 2. Maintain plus/minus 5 percent accuracy within operating limits of 20 degrees F (minus 6.7 degrees C) to 120 degrees F (48.9 degrees C).

## 2.06 DAMPER SECTION

- A. Mixing Section: Provide a functional section to support the damper assembly for modulating the volume of outdoor and return air.
- B. Damper Blades:

1. Double-skin airfoil design with metal, compressible jamb seals and extruded-vinyl blade-edge seals on each blade.
2. Self-lubricating stainless steel or synthetic sleeve bearings.
3. Comply with ASHRAE 90.1 for rated maximum leakage rate.
4. Provide leakage testing and pressure ratings in compliance with AMCA 500-D test methods.
5. Arrange in parallel or opposed-blade configuration.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Bolt sections together with gaskets.
- C. Install flexible duct connections between fan inlet and discharge ductwork and air handling unit sections. Ensure that metal bands of connectors are parallel with minimum one inch (25 mm) flex between ductwork and fan while running.
- D. Provide sheaves required for final air balance.
- E. Make connections to coils with unions or flanges.
- F. Hydronic Coils:
  1. Hydronic Coils: Connect water supply to leaving air side of coil (counterflow arrangement).
  2. Provide shut-off valve on supply line and lockshield balancing valve with memory stop on return line.
  3. Locate water supply at bottom of supply header and return water connection at top.
  4. Provide manual air vents at high points complete with stop valve.
  5. Ensure water coils are drainable and provide drain connection at low points.
- G. Refrigerant Coils: Provide sight glass in liquid line within 12 inches (300 mm) of coil.
- H. Insulate Coil Headers Located Outside Air Flow as Specified for Piping: Refer to Section 23 07 19.
- I. Cooling Coils:
  1. Pipe drain and overflow to nearest floor drain.

### **3.02 SYSTEM STARTUP**

- A. Prepare and start equipment and systems in accordance with manufacturers' instructions and recommendations.
- B. Adjust for proper operation within manufacturer's published tolerances.

**END OF SECTION**

**SECTION 26 05 00**  
**BASIC ELECTRICAL REQUIREMENTS**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

**1.02 SECTION INCLUDES**

- A. Basic Electrical Requirements and materials specifically applicable to Division 26 Sections, in addition to Division 1 - General Requirements. Section includes:
  1. Electrical Identification.
  2. Minor Demolition.
  3. Conductors and Devices.
  4. Raceways and Boxes.
  5. Supporting Devices.

**1.03 REGULATORY REQUIREMENTS**

- A. Conform to NFPA 70 - National Electrical Code, latest edition with amendments as adopted by the Village of Oak Brook, IL.
- B. Install electrical Work in accordance with the NECA Standard of Installation.

**1.04 DELIVERY, STORAGE AND HANDLING**

- A. Store and protect all materials as specified under the provisions of Section 01 60 00 and as specified herein.
- B. Deliver products to the project properly identified with names, model numbers, types, grades, compliance labels, and other information needed for identification.
- C. Ship products to the job site in their original packaging. Receive and store products in a suitable manner to prevent damage or deterioration. Keep equipment upright at all times.
- D. Investigate the spaces through which equipment must pass to reach its final destination. Coordinate with the manufacturer to arrange delivery at the proper stage of construction and to provide shipping splits where necessary.

**1.05 PROJECT/SITE CONDITIONS**

- A. Install work in locations shown on Drawings, unless prevented by Project conditions. Drawings have omitted certain branch circuitry in areas for ease of reading. All branch circuitry is to be provided by Contractor.
- B. Prepare drawings showing proposed rearrangement of Work to meet Project conditions, including changes to Work specified in other Sections. Obtain permission from Architect/Engineer before proceeding as specified under modification procedures.

## **1.06 QUALITY ASSURANCE**

- A. Provide Work as required for a complete and operational electrical installation.
- B. All products shall be designed, manufactured, and tested in accordance with industry standards. Standards, organizations, and their abbreviations as used hereafter, include the following:
  - 1. American National Standards Institute, Inc (ANSI).
  - 2. American Society for Testing and Materials (ASTM).
  - 3. National Electrical Manufacturers Association (NEMA).
  - 4. Underwriters Laboratories, Inc. (UL).
- C. Install all Work in accordance with the NECA Standard of Installation.

## **1.07 SUBMITTALS**

- A. Submit all requested items in Division 26 Sections under provisions of Section 01 30 00.

## **1.08 SUBSTITUTIONS**

- A. Substitutions will be considered only as allowed within the provisions of Section 01 60 00.

## **1.09 PROJECT RECORD DOCUMENTS**

- A. Cooperate and assist in the preparation of project record documents under the provisions of Section 01 78 00.

## **1.10 PROJECT MANAGEMENT AND COORDINATION**

- A. Proper project management and coordination is critical for a successful project. Manage and coordinate the Work with all other trades in accordance with Section 01 30 00 requirements. Reliance on the Drawings and Specifications only for exact project requirements is insufficient for proper coordination.

## **PART 2 PRODUCTS**

### **2.01 WIRING METHODS**

- A. All locations: Building wire in raceway.
- B. Use no wire smaller than 12 AWG for power and lighting circuits, and no smaller than 14 AWG for control wiring.
  - 1. Use 10 AWG conductor for 20 ampere, 120 volt branch circuit home runs longer than 100 feet. Use minimum #10 AWG conductor wire in all the following locations:
    - a. All programmable panel branch circuits (larger where indicated).
    - b. All emergency lighting and exit branch circuits.

### **2.02 WIRE AND CABLE**

- A. Manufacturers:
  - 1. Okonite.
  - 2. Southwire.
  - 3. Collyer.
- B. Building Wire:

1. Feeders and Branch Circuits Larger Than 6 AWG: Copper, stranded conductor, 600 volt insulation.
  2. Feeders and Branch Circuits 6 AWG and Smaller: Copper conductor, 600 volt insulation. 6 and 8 AWG, stranded conductor; smaller than 8 AWG, stranded conductor (solid for device terminations).
  3. Control Circuits: Copper, stranded conductor, 600 volt insulation.
  4. Use 10 AWG conductors for 20 ampere, 120 volt branch circuits longer than 75 feet (25 m).
  5. Use 10 AWG conductors for 20 ampere, 277 volt branch circuits longer than 200 feet (60 m).
  6. Use conductor not smaller than 12 AWG for power and lighting circuits.
  7. Use conductor not smaller than 16 AWG for control circuits.
- C. Locations:
1. Concealed Dry Interior Locations: Use only building wire with Type THHN insulation in raceway.
  2. Exposed Dry Interior Locations: Use only building wire with Type THHN insulation in raceway.
  3. Above Accessible Ceilings: Use only building wire with Type THHN insulation in raceway.
  4. Wet or Damp Interior Locations: Use only building wire with Type THWN insulation in raceway.
  5. Exterior Locations: Use only building wire with Type XHHW insulation in raceway.
  6. Underground Installations: Use only building wire with Type XHHW insulation in raceway.

### **2.03 WIRING DEVICES AND WALL PLATES**

- A. Single Pole Switch: Specification grade.
1. Hubbell Model 1121.
  2. P & S Model 521.
  3. Leviton Model 1121.
  4. Color: Ivory.
- B. Three-way Switch: Specification grade.
1. Hubbell Model 1123.
  2. P & S Model 523.
  3. Leviton Model 1123.
  4. Color: Ivory.
- C. Single-pole Fluorescent Dimmer Switch: Specification grade.
1. Lutron Nova Series or equal.
  2. Description: Linear slide fluorescent dimmer, compatible with ballast and number of lamps.
  3. Voltage: 277 volt.
  4. Power Rating: Match load shown on drawings.
- D. Duplex Convenience Receptacle: Nema 5-20R, duplex, specification grade.
1. Hubbell.
  2. Bryant.
  3. Leviton.
  4. Color: Ivory.
- E. GFCI Receptacle: Nema 5-20R, duplex, GFCI, specification grade.
1. Hubbell Model GF-5362.
  2. Slater Model SIR-20-F.



3. Eagle Model 647.
4. Color: Ivory.

F. Decorative Cover Plate:

1. Hubbell.
2. Bryant.
3. Leviton.
4. Description: Ivory, metal.

## 2.04 RACEWAY REQUIREMENTS

A. Use only specified raceway in the following locations:

1. Branch Circuits and Feeders:
  - a. Concealed Dry Interior Locations: Electrical metallic tubing.
  - b. Exposed Dry Interior Finished Locations: Electrical metallic tubing.
  - c. Exposed Dry Interior Unfinished Locations: Electrical metallic tubing.
  - d. All other locations: Galvanized Rigid Metallic Conduit.

B. Size raceways for conductor type installed.

1. Minimum Size Conduit Homerun to Panelboard: 3/4-inch.

## 2.05 METALLIC CONDUIT AND FITTINGS

A. Conduit:

1. Rigid Steel Conduit: ANSI C80.1.
2. Electrical metallic tubing: ANSI C80.3.
3. Flexible Conduit: UL 1, zinc-coated steel.
  - a. Liquidtight Flexible Conduit: UL360. Fittings shall be specifically approved for use with this raceway.

B. Conduit Fittings:

1. Metal Fittings and Conduit Bodies: NEMA FB 1.
  - a. EMT fittings: Use set-screw indentor-type fittings.

## 2.06 CONDUIT HANGERS

A. Manufacturers:

1. Minerrallac Electric Company.
2. Substitutions: Or Approved Equal.

B. Description:

1. Standard conduit hanger, zinc-plated steel with bolts.
2. Threaded rod and hardware: Plated finish, size and length as required for loading and conditions.

## 2.07 BEAM CLAMPS

A. Manufacturers:

1. Appleton.
2. Midwest.
3. Raco.

B. Description: Malleable beam clamp, zinc plated steel.

## **2.08 ELECTRICAL BOXES**

A. Manufacturers:

1. Raco.
2. Steel City.
3. Appleton.
4. Substitutions: Or Approved Equal.

B. Sheet Metal Outlet Boxes: ANSI/NEMA OS 1, galvanized steel, suitable for installation in masonry:

C. Equipment Support Boxes: Rated for weight of equipment supported; include 2 inch male fixture studs where required.

D. Wet Location Outlet Boxes: Cast aluminum: Cast alloy, deep type, gasket cover, threaded hubs.

## **2.09 ELECTRICAL CEILING BOXES.**

A. Manufacturers:

1. Panduit.
2. Leviton.
3. Walker.

B. Description: Two gang, separated power/data surface metallic box. Combination duplex receptacle with two port data faceplate, compatible with data jacks. Ivory.

## **2.10 PENETRATION SEALANTS**

A. Fire-rated assemblies: Provide firestopping of all penetrations made by Work under this Contract in accordance with provisions of Section 07 84 00 requirements.

B. Thermal and Moisture Protection: Provide thermal and moisture protection made by Work under this Contract of all exterior wall, floor and roof penetrations in accordance with Division 7 requirements.

## **2.11 TWO CELL SURFACE METALLIC RACEWAY**

A. Manufacturer:

1. Wiremold G-4000 Series or equal.

B. Description: UL-5, 4-3/4 inches wide by 1-3/4 inches height, two channel galvanized steel, combination power/data.

C. Finish: Painted, ANSI 61 Gray.

D. Accessories: Transition fittings, divider plates, device mounting straps, couplings, combination power/data cover plates, end plates and all other accessories necessary for a complete system in locations indicated on Drawings.

## **2.12 TWO CELL LOW PROFILE SURFACE METALLIC RACEWAY**

A. Manufacturer:

1. Wiremold 2400 Series or equal.
- B. Description: UL-5, 2 inches wide by 1 inch height, two channel galvanized steel, combination power/data.
- C. Finish: Painted, ANSI 61 Color Selected by architect.
- D. Accessories: Transition fittings, divider plates, device mounting straps, couplings, combination power/data cover plates, end plates and all other accessories necessary for a complete system in locations indicated on Drawings.

### **2.13 TWO CELL SURFACE NON-METALLIC RACEWAY**

- A. Manufacturer:
  1. Wiremold 5400 Series or equal.
- B. Description: UL-5A, 5-1/4 inches wide by 1-3/4 inches height, two channel with individual (twin snap) compartment covers, combination power/data.
- C. Finish: White.
- D. Accessories: Transition fittings, divider plates, device mounting straps, couplings, combination power/data cover plates, end plates and all other accessories necessary for a complete system in locations indicated on Drawings.

### **2.14 WIREWAY**

- A. Manufacturers:
  1. Hoffman.
  2. Cooper Industries.
  3. Approved Equal.
- B. Description:
  1. NEMA Type 1 Lay-In Galvanized Wireway, UL 870. Flat cover design. Size as shown on drawings.
  2. Provide hinged covers where noted on drawings.
  3. Provide all elbows, tee's, covers and fittings as required
- C. Finish:
  1. To be selected by Architect/Engineer.

### **2.15 MOTION SENSORS**

- A. Manufacturers:
  1. Leviton
  2. Hubbell
  3. Approved Equal
- B. Combination Wall Switch/Occupancy Sensor
  1. Dual technology (passive infrared and ultrasonic), 277V sensor with 180degree field-of-view and maximum coverage of 2400 square feet.
  2. Manual push button for ON/OFF light switching.
  3. Time delay settings: 30 seconds, 10, 20 or 30 minutes.

4. Adjustable Integral blinders.
5. Sensor shall continuously monitor space to identify usage patterns. Unit shall automatically adjust time delay and sensitivity settings for optimal performance and energy efficiency.

C. Ceiling Mounted.

1. Dual technology (passive infrared and ultrasonic), 24VDC sensor with unobtrusive appearance and 360 degrees of coverage.
  - a. Provide type/quantity of motion sensors to meet square foot coverage requirements.
2. Provide power pack for 24VDC controls and switching of 120/277V circuits. Minimum quantity of sensors per power pack: 2.
3. Sensor shall continuously monitor space to identify usage patterns. Unit shall automatically adjust time delay and sensitivity settings for optimal performance and energy efficiency.
4. Time delay settings: Auto, fixed (5,10,15,20 or 30 minutes).
5. Sensitivity settings: Auto, reduced sensitivity (passive infrared) variable (ultrasonic).
6. (1) N/O and (1) N/C output.

## 2.16 NAMEPLATES AND LABELS

- A. Nameplates: Engraved three-layer laminated plastic, black letters on white background.
- B. Locations:
1. Each electrical distribution and control equipment enclosure.
- C. Letter Size:
1. Use 1/8 inch letters for identifying individual equipment and loads.
  2. Use 1/4 inch letters for identifying grouped equipment and loads.
- D. Labels: Embossed adhesive tape, with 3/16 inch white letters on a black background. Use only for identification of individual wall switches and receptacles and control device stations.

## 2.17 WIRE AND CABLE MARKERS

- A. Manufacturers:
1. Brady Model PCPS.
  2. Panduit Model PCM.
  3. T & B Model WM.
- B. Description: Cloth type wire markers.
- C. Locations: Each conductor at panelboard gutters, pull boxes, and each load connection.
- D. Legend:
1. Power and Lighting Circuits: Branch circuit or feeder number indicated on drawings.

## 2.18 CONDUIT MARKERS

- A. Location: Furnish markers for each conduit longer than 6 feet.
- B. Spacing: 20 feet on center.
- C. Color:
1. 480 Volt System: Orange
  2. 208 Volt System: Black

3. Fire Alarm System: Red.

**PART 3 EXECUTION**

**3.01 EXAMINATION AND PREPARATION**

- A. Demolition Drawings are based on casual field observation and are intended to identify the limits of the construction site. Remove all electrical systems in their entirety in proper sequence with the Work.
- B. Disconnect electrical systems in walls, floors, and ceilings for removal.
- C. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.
- D. Existing Electrical Service and Emergency Electrical Service: Disable system only to make switchovers and connections. Obtain permission from Owner and Architect at least 24 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area.
- E. Existing Fire Alarm System: Maintain existing system in service. Disable system only to make switchovers and connections. Notify Owner, Architect/Engineer and local fire service at least 24 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area.
- F. Beginning of demolition means installer accepts existing conditions.
- G. Verify that supporting surfaces are ready to receive work.
- H. Electrical boxes are shown on Drawings, in approximate locations, unless dimensioned.
  - 1. Obtain verification from Architect/Engineer for locations of outlets throughout prior to rough-in.
- I. Degrease and clean surfaces to receive wire markers.
- J. Verify that interior of building is physically protected from weather.
- K. Verify that mechanical work which is likely to injure conductors has been completed.
- L. Completely and thoroughly swab raceway system before installing conductors.

**3.02 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK**

- A. Remove all existing electrical installations to accommodate new construction.
- B. Remove abandoned wiring to source of supply.
- C. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.
- D. Relocate existing fire alarm devices affected by wall, ceiling and floor demolition.
- E. Repair adjacent construction and finishes damaged during demolition and extension work.
- F. Properly dispose of all ballast to approved ballast recycler. Do not land fill ballasts.

### 3.03 APPLICATION

- A. Install nameplate and label parallel to equipment lines.
- B. Secure nameplate to equipment front using screws.
- C. Secure nameplates to inside surface of door on panelboard that is recessed in finished locations.
- D. Identify underground conduits using underground warning tape. Install one tape per trench at 3 inches below finished grade.
- E. Neatly train and secure wiring inside boxes, equipment, and panelboards.
- F. Use wire pulling lubricant for pulling 4 AWG and larger wires.
- G. Route wire and cable as required to meet project conditions.
  - 1. Wire and cable routing indicated is approximate unless dimensioned.
  - 2. Where wire and cable destination is indicated and routing is not shown, determine exact routing and lengths required.
- H. Pull all conductors into raceway at same time.
- I. Protect exposed cable from damage.
- J. Neatly train and lace wiring inside boxes, equipment and panelboards.
- K. Support cables above accessible ceilings to keep them from resting on ceiling tiles.
- L. Make splices, taps, and terminations to carry full ampacity of conductors without perceptible temperature rise.
- M. Use split bolt connectors for copper conductor splices and taps, 6 AWG and larger. Tape uninsulated conductors and connector with electrical tape to 150 percent of insulation rating of conductor.
- N. Provide anchors, fasteners, and supports in accordance with NECA "Standard of Installation".
- O. Do not fasten supports to pipes, ducts, mechanical equipment, and conduit.
- P. Do not use powder-actuated anchors.
- Q. Do not drill or cut structural members.
- R. Fabricate supports from structural steel or steel channel. Rigidly weld members or use hexagon head bolts to present neat appearance with adequate strength and rigidity. Use spring lock washers under all nuts.
- S. Install surface-mounted cabinets and panelboards with minimum of four anchors.
- T. In wet and damp locations use steel channel supports to stand cabinets and panelboards one inch off wall.
- U. Use sheet metal channel to bridge studs above and below cabinets and panelboards recessed in hollow partitions.
- V. Terminate spare conductors with electrical tape.

- W. Do not share neutral conductor on load side of dimmers.
- X. Install wiring devices in accordance with manufacturer's instructions.
  - 1. Install wall switches at height shown on drawings, OFF position down.
  - 2. Install convenience receptacles at height shown on drawings grounding pole on bottom.
  - 3. Install specific purpose receptacles at heights shown on Drawings.
- Y. Install wall plates flush and level.
  - 1. Install decorative plates on switch, receptacle, and blank outlets in finished areas.
  - 2. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface-mounted outlets.

**END OF SECTION**

**SECTION 26 51 00  
LIGHTING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Interior luminaires.
- B. Emergency lighting units.
- C. Exit signs.
- D. Ballasts and drivers.
- E. Luminaire accessories.

**1.02 REFERENCE STANDARDS**

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; National Electrical Contractors Association; 2010.
- B. NEMA LE 4 - Recessed Luminaires, Ceiling Compatibility; National Electrical Manufacturers Association; 2012.
- C. UL 1598 - Luminaires; Current Edition, Including All Revisions.
- D. UL 8750 - Light Emitting Diode (LED) Equipment for Use in Lighting Products; Current Edition, Including All Revisions.
- E. IESNA LM-63 - ANSI Approved Standard File Format for Electronic Transfer of Photometric Data and Related Information; Illuminating Engineering Society; 2002 (Reaffirmed 2008).
- F. NECA/IESNA 500 - Standard for Installing Indoor Commercial Lighting Systems; National Electrical Contractors Association; 2006.
- G. NECA/IESNA 502 - Standard for Installing Industrial Lighting Systems; National Electrical Contractors Association; 2006.
- H. UL 924 - Emergency Lighting and Power Equipment; Current Edition, Including All Revisions.
- I. UL 1598 - Luminaires; Current Edition, Including All Revisions.

**1.03 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate the installation of luminaires with mounting surfaces installed under other sections or by others. Coordinate the work with placement of supports, anchors, etc. required for mounting. Coordinate compatibility of luminaires and associated trims with mounting surfaces at installed locations.
  - 2. Coordinate placement of poles and associated foundations with utilities, curbs, sidewalks, trees, walls, fences, striping, etc. installed under other sections or by others. Coordinate elevation to obtain specified foundation height.



3. Coordinate the placement of luminaires with structural members, ductwork, piping, equipment, diffusers, fire suppression system components, and other potential conflicts installed under other sections or by others.
4. Coordinate the placement of exit signs with furniture, equipment, signage or other potential obstructions to visibility installed under other sections or by others.
5. Notify Architect of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.

#### **1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings:
  1. Provide photometric calculations where luminaires are proposed for substitution upon request.
  2. Indicate construction, installation and mounting details for products.
  3. Wiring Diagrams: Submit wiring diagrams for all exit sign, night light, self-contained back-up battery lighting, battery ballasts and associated circuit breakers, programmable circuit breakers and/or emergency circuit breakers.
- C. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, installed accessories, and ceiling compatibility; include model number nomenclature clearly marked with all proposed features.
  1. LED Luminaires:
    - a. Include estimated useful life, calculated based on IES LM-80 test data.
    - b. Include IES LM-79 test report upon request.
  2. Lamps: Include rated life, color temperature, color rendering index (CRI), and initial and mean lumen output.
  3. Wiring diagrams: Provide wiring diagrams for dimmable ballasts and dimmable switches.
- D. Certificates for Dimming Ballasts: Manufacturer's documentation of compatibility with dimming controls to be installed.
- E. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- F. Operation and Maintenance Data: Instructions for each product including information on replacement parts.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  1. See Section 01 60 00 - Product Requirements, for additional provisions.
- H. Project Record Documents: Record actual connections and locations of luminaires and any associated remote components.

#### **1.05 QUALITY ASSURANCE**

- A. Conform to requirements of NFPA 70.

- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

## **1.06 DELIVERY, STORAGE, AND PROTECTION**

- A. Receive, handle, and store products according to NECA/IESNA 500 (commercial lighting), NECA/IESNA 502 (industrial lighting), and manufacturer's written instructions.
- B. Keep products in original manufacturer's packaging and protect from damage until ready for installation.

## **1.07 FIELD CONDITIONS**

- A. Maintain field conditions within manufacturer's required service conditions during and after installation.

## **1.08 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

## **PART 2 PRODUCTS**

### **2.01 LUMINAIRE TYPES**

- A. Furnish products as specified below.
- B. Substitutions: See Section 01 60 00 - Product Requirements, except where individual luminaire types are designated with substitutions not permitted.
- C. Type A: Recessed Lensed LED Troffer.
  - 1. Products:
    - a. METALUX - 22GR-LD4-43-A19/156-UNV-L840-CD1-U.
    - b. Substitutions: See Section 01 60 00 - Product Requirements.
  - 2. Housing: Steel, painted white.
  - 3. Nominal Size: 2 by 2 feet.
  - 4. Air Function: Static (no air function).
  - 5. Ceiling Trim: NEMA type G (grid).
  - 6. Lamp(s): One-LED.
    - a. Correlated Color Temperature: 4,000 K.
  - 7. Door: Steel, flush, white.
  - 8. Shielding: Pattern 19 acrylic lens, 0.156 inch nominal thickness.
  - 9. Voltage: Universal 120-277 V.
  - 10. Driver(s): One 0-10V Dimming Driver.
  - 11. Mounting: Lay-in, grid ceiling.
- D. Type B: LED Strip Light.
  - 1. Products:
    - a. Metalux - 4BCLED-LD4-44HL-F-UNV-L840-CD1-U.
    - b. Substitutions: See Section 01 60 00 - Product Requirements.
  - 2. Housing: Steel, painted white.
  - 3. Nominal Length: 4 feet.

4. Lamp(s): One-4 foot LED Strip.
    - a. Correlated Color Temperature: 4,000 K.
  5. Voltage: Universal 120-277 V.
  6. Driver(s): One 0-10V Dimming Driver.
  7. Mounting: Surface, Wall at 8 feet AFF.
- E. Type C1/C2: Recessed LED Downlight.
1. Products:
    - a. C1 - Halo - ML5609840 592SC.
    - b. C2 - Halo - ML5609840 692SC.
    - c. Substitutions: See Section 01 60 00 - Product Requirements.
  2. Housing: Galvanized steel.
    - a. Product: C1 - Halo H550ICAT.
    - b. Product: C2 - Halo H750ICAT.
    - c. Substitutions: See Section 01 60 00 - Product Requirements.
  3. Nominal Aperture Size: Round, 5 inches/6 inches.
  4. Lamp(s): One-LED.
    - a. Correlated Color Temperature: 4,000 K.
  5. Reflector Finish: Specular, clear.
  6. Trim: White baffle and trim.
  7. Lens: None.
  8. Voltage: Universal 120-277 V.
  9. Driver: 0-10V Dimming Driver.
  10. Mounting: Recessed.

## 2.02 LUMINAIRES

- A. Provide products that comply with requirements of NFPA 70.
- B. Provide products that are listed and labeled as complying with UL 1598, where applicable.
- C. Provide products listed, classified, and labeled as suitable for the purpose intended.
- D. Provide products complying with Federal Energy Management Program (FEMP) requirements.
- E. Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.
- F. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, supports, trims, accessories, etc. as necessary for a complete operating system.
- G. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.
- H. Recessed Luminaires:
  1. Ceiling Compatibility: Comply with NEMA LE 4.
  2. Luminaires Recessed in Insulated Ceilings: Listed and labeled as IC-rated, suitable for direct contact with insulation and combustible materials.

- 3. Luminaires Recessed in Sloped Ceilings: Provide suitable sloped ceiling adapters.
- I. Fluorescent Luminaires:
  - 1. Provide ballast disconnecting means complying with NFPA 70 where required.
- J. LED Luminaire Components: UL 8750 recognized or listed as applicable.
- K. Track Lighting Systems: Provide track compatible with specified track heads, with all connectors, power feed fittings, dead ends, hangers and canopies as necessary to complete installation.
- L. Luminaires Mounted in Continuous Rows: Provide quantity of units required for length indicated, with all accessories required for joining and aligning.

### **2.03 EMERGENCY LIGHTING UNITS**

- A. Description: Emergency lighting units complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924.
- B. Operation: Upon interruption of normal power source or brownout condition exceeding 20 percent voltage drop from nominal, solid-state control automatically switches connected lamps to integral battery power for minimum of 90 minutes of rated emergency illumination, and automatically recharges battery upon restoration of normal power source.
- C. Battery:
  - 1. Sealed maintenance-free lead calcium unless otherwise indicated.
  - 2. Size battery to supply all connected lamps, including emergency remote heads where indicated.
- D. Diagnostics: Provide power status indicator light and accessible integral test switch to manually activate emergency operation.
- E. Provide low-voltage disconnect to prevent battery damage from deep discharge.
- F. Accessories:
  - 1. Provide compatible accessory mounting brackets where indicated or required to complete installation.
  - 2. Provide compatible accessory high impact polycarbonate vandal shields where indicated.
  - 3. Provide compatible accessory wire guards where indicated.
  - 4. Where indicated, provide emergency remote heads that are compatible with the emergency lighting unit they are connected to and suitable for the installed location.

### **2.04 EXIT SIGNS**

- A. All Exit Signs: Internally illuminated with LEDs unless otherwise indicated; complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924.
  - 1. Number of Faces: Single or double as indicated or as required for the installed location.
  - 2. Directional Arrows: As indicated or as required for the installed location.
- B. Self-Powered Exit Signs:
  - 1. Operation: Upon interruption of normal power source or brownout condition exceeding 20 percent voltage drop from nominal, solid-state control automatically switches connected lamps

to integral battery power for minimum of 90 minutes of rated emergency illumination, and automatically recharges battery upon restoration of normal power source.

2. Battery: Sealed maintenance-free nickel cadmium unless otherwise indicated.
3. Diagnostics: Provide power status indicator light and accessible integral test switch to manually activate emergency operation.
4. Provide low-voltage disconnect to prevent battery damage from deep discharge.

## 2.05 BALLASTS AND DRIVERS

### A. Manufacturers:

1. General Electric Company/GE Lighting: [www.gelighting.com](http://www.gelighting.com).
2. Osram Sylvania: [www.sylvania.com](http://www.sylvania.com).
3. Philips Lighting Electronics/Advance: [www.advance.philips.com](http://www.advance.philips.com).
4. Universal; [www.unvlt.com](http://www.unvlt.com)
5. Substitutions: See Section 01 60 00 - Product Requirements.
6. Manufacturer Limitations: Where possible, for each type of luminaire provide ballasts produced by a single manufacturer.
7. Where a specific manufacturer or model is indicated elsewhere in the luminaire schedule or on the drawings, substitutions are not permitted unless explicitly indicated.

### B. All Ballasts:

1. Provide ballasts containing no polychlorinated biphenyls (PCBs).
2. Minimum Efficiency/Efficacy: Provide ballasts complying with all current applicable federal and state ballast efficiency/efficacy standards.

### C. Fluorescent Ballasts:

1. All Fluorescent Ballasts: Unless otherwise indicated, provide high frequency electronic ballasts complying with ANSI C82.11 and listed and labeled as complying with UL 935.
  - a. Ballast shall be programmed rapid start type.
  - b. Input Voltage: Suitable for operation at voltage of connected source, with variation tolerance of plus or minus 10 percent.
  - c. Total Harmonic Distortion: Not greater than 10 percent.
  - d. Power Factor: Not less than 0.95.
  - e. Ballast Factor: Normal ballast factor between 0.85 and 1.15, unless otherwise indicated.
  - f. Thermal Protection: Listed and labeled as UL Class P, with automatic reset for integral thermal protectors.
  - g. Sound Rating: Class A, suitable for average ambient noise level of 20 to 24 decibels.
  - h. Lamp Compatibility: Specifically designed for use with the specified lamp, with no visible flicker.
  - i. Lamp Operating Frequency: Greater than 20 kHz, except as specified below.
  - j. Lamp Current Crest Factor: Not greater than 1.7.
  - k. Provide automatic restart capability to restart replaced lamp(s) without requiring resetting of power.
  - l. Provide end of lamp life automatic shut down circuitry for T5 and smaller diameter lamp ballasts.
  - m. Surge Tolerance: Capable of withstanding characteristic surges according to IEEE C62.41.2, location category A.

- n. Electromagnetic Interference/Radio Frequency Interference (EMI/RFI) Limits: Comply with FCC requirements of CFR, Title 47, Part 18, for Class A, non-consumer application.
  - o. Ballast Marking: Include wiring diagrams with lamp connections.
  - p. Minimum starting temperature: 50 degrees F.
  - q. Certify ballast design and construction by Certified Ballast Manufacturers, Inc.
2. Dimming Fluorescent Ballasts:
- a. Dimming Range: Continuous dimming from 100 percent to five percent relative light output unless dimming capability to lower level is indicated, without flicker and with even tracking across multiple lamps.
  - b. Control Compatibility: Fully compatible with the dimming controls to be installed.
  - c. Lamp Starting Method: Programmed start unless otherwise indicated.
  - d. Dimmed Lamp Starting: Capable of starting lamp(s) at any dimmed preset without transitioning first to full light output.
  - e. Coordinate dimming ballasts with dimmer switches.

## **2.06 FLUORESCENT EMERGENCY POWER SUPPLY UNITS**

- A. Description: Self-contained fluorescent emergency power supply units suitable for use with indicated luminaires, complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924.
- B. Compatibility:
  - 1. Ballasts: Compatible with electronic, standard magnetic, energy saving, and dimming AC ballasts, including those with end of lamp life shutdown circuits.
  - 2. Lamps: Compatible with low-mercury lamps.
- C. Operation: Upon interruption of normal power source, solid-state control automatically switches connected lamp(s) to the fluorescent emergency power supply for minimum of 90 minutes of rated emergency illumination, and automatically recharges battery upon restoration of normal power source.
- D. Emergency Illumination Output:
  - 1. Luminaires with F32T8 Lamps: Operate one lamp(s) at a minimum of 600 lumens unless otherwise indicated with indicated illumination evenly divided between the lamps.
- E. Diagnostics: Provide accessible and visible multi-chromatic combination test switch/indicator light to display charge, test, and diagnostic status and to manually activate emergency operation.
- F. Fluorescent Dimming Control Units: Linear slide type, rated wattage and voltage as required.

## **2.07 LAMPS**

- A. Manufacturers:
  - 1. General Electric Company/GE Lighting: [www.gelighting.com](http://www.gelighting.com).
  - 2. Osram Sylvania: [www.sylvania.com](http://www.sylvania.com).
  - 3. Philips Lighting Company: [www.lighting.philips.com](http://www.lighting.philips.com).
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.
  - 5. Manufacturer Limitations: Where possible, provide lamps produced by a single manufacturer.
- B. Lamps - General Requirements:

1. Unless explicitly excluded, provide new, compatible, operable lamps in each luminaire.
  2. Verify compatibility of specified lamps with luminaires to be installed. Where lamps are not specified, provide lamps per luminaire manufacturer's recommendations.
  3. Minimum Efficiency: Provide lamps complying with all current applicable federal and state lamp efficiency standards.
  4. Color Temperature Consistency: Unless otherwise indicated, for each type of lamp furnish products which are consistent in perceived color temperature. Replace lamps that are determined by the Architect to be inconsistent in perceived color temperature.
- C. Compact Fluorescent Lamps: Wattage and bulb type as indicated, with base type as required for luminaire.
- D. Linear Fluorescent Lamps: Wattage and bulb type as indicated, with base type as required for luminaire.
1. Low Mercury Content: Provide lamps that pass the EPA Toxicity Characteristic Leaching Procedure (TCLP) test for characteristic hazardous waste.
  2. T8 Linear Fluorescent Lamps:
    - a. Correlated Color Temperature (CCT): 4,100 K unless otherwise indicated.
      - 1) Fluorescent lamps in medical treatment areas: 5,000 K or 6,000 K.
    - b. Color Rendering Index (CRI): Not less than 80.
      - 1) Fluorescent lamps in medical treatment areas: minimum CRI of 85.
    - c. Average Rated Life: Not less than 20,000 hours for an operating cycle of three hours per start.
    - d. CBM certified with average input wattage of 49 watts as tested per ANSI C82.2.

## **2.08 POLES**

- A. Manufacturers:
- B. All Poles:
1. Provide poles and associated support components suitable for the luminaire(s) and associated supports and accessories to be installed.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field measurements are as shown on the drawings.
- B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate conductors in accordance with NFPA 70.
- C. Verify that suitable support frames are installed where required.
- D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to luminaires.
- E. Verify that conditions are satisfactory for installation prior to starting work.
- F. Examine substrate and supporting grids for luminaires.
- G. Examine each fixture to determine suitability for lamps specified.

### 3.02 PREPARATION

- A. Provide extension rings to bring outlet boxes flush with finished surface.
- B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

### 3.03 INSTALLATION

- A. Install products according to manufacturer's instructions.
- B. Install luminaires securely, in a neat and workmanlike manner, as specified in NECA 1 (general workmanship), NECA 500 (commercial lighting), and NECA 502 (industrial lighting).
- C. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.
- D. Locate recessed ceiling luminaires as indicated on reflected ceiling plan.
- E. Install wall mounted luminaires, emergency units and exit signs at height as indicated on Drawings and directed in the field by Architect. Obtain final approval from Architect prior to commencement of this portion of work.
- F. Install accessories furnished with each luminaire.
- G. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire.
- H. Suspended Ceiling Mounted Luminaires:
  - 1. Do not use ceiling tiles to bear weight of luminaires.
  - 2. Support luminaires larger than 2 foot by 4 foot size independent of ceiling framing.
  - 3. Secure lay-in luminaires to ceiling support channels using listed safety clips at four corners.
  - 4. See appropriate Division 9 section where suspended grid ceiling is specified for additional requirements.
- I. Recessed Luminaires:
  - 1. Install trims tight to mounting surface with no visible light leakage.
  - 2. Install recessed luminaires to permit removal from below.
  - 3. Install recessed luminaires using accessories and firestopping materials to meet regulatory requirements for fire rating.
  - 4. Install clips to secure recessed grid-supported luminaires in place.
- J. Suspended Luminaires:
  - 1. Install using the suspension method indicated, with support lengths and accessories as required for specified mounting height.
  - 2. Unless otherwise indicated, support pendants from swivel hangers.
- K. Install accessories furnished with each luminaire.
- L. Bond products and metal accessories to branch circuit equipment grounding conductor.
- M. Air Handling Luminaires: Interface with air handling accessories furnished and installed under Section 23 36 00.



- N. Fluorescent Luminaires Controlled by Dual-Level Switching: Connect such that each switch controls the same corresponding lamps in each luminaire.
- O. Emergency Lighting Units:
  - 1. Unless otherwise indicated, connect unit to unswitched power from same circuit feeding normal lighting in same room or area. Bypass local switches, contactors, or other lighting controls.
- P. Exit Signs:
  - 1. Unless otherwise indicated, connect unit to unswitched power from same circuit feeding normal lighting in same room or area. Bypass local switches, contactors, or other lighting controls.
- Q. Fluorescent Emergency Power Supply Units:
  - 1. Unless otherwise indicated, connect unit to unswitched power from same circuit feeding normal ballast(s) in luminaire. Bypass local switches, contactors, or other lighting controls.
- R. Install lamps in each luminaire.
- S. Lamp Burn-In: Operate lamps at full output for prescribed period per manufacturer's recommendations prior to use with any dimming controls. Replace lamps that fail prematurely due to improper lamp burn-in.

### **3.04 FIELD QUALITY CONTROL**

- A. See Section 01 40 00 - Quality Requirements, for additional requirements.
- B. Inspect each product for damage and defects.
- C. Operate each luminaire after installation and connection to verify proper operation.
- D. Test self-powered exit signs, emergency lighting units, and fluorescent emergency power supply units to verify proper operation upon loss of normal power supply.
- E. Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy ballasts as determined by Architect.
- F. Energy Code Commissioning: The electrical contractor shall program, test, calibrate and confirm the proper operation and placement of all lighting controls in accordance with the International Energy Code, 2012 Edition Paragraph C408.3 "Lighting system functional testing".

### **3.05 ADJUSTING**

- A. Aim and position adjustable luminaires to achieve desired illumination as indicated or as directed by Architect. Secure locking fittings in place.
- B. Aim and position adjustable emergency lighting unit lamps to achieve optimum illumination of egress path as required or as directed by Architect or authority having jurisdiction.
- C. Exit Signs with Field-Selectable Directional Arrows: Set as indicated or as required to properly designate egress path as directed by Architect or authority having jurisdiction.
- D. Relamp luminaires which have failed lamps at completion of work.

### **3.06 CLEANING**

- A. Clean surfaces according to NECA 500 (commercial lighting), NECA 502 (industrial lighting), and manufacturer's instructions to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.

### **3.07 CLOSEOUT ACTIVITIES**

- A. See Section 01 78 00 - Closeout Submittals, for closeout submittals.
- B. Demonstration: Demonstrate proper operation of luminaires to Architect, and correct deficiencies or make adjustments as directed.
- C. Just prior to Substantial Completion, replace all lamps that have failed.
- D. Project record documents: Accurately record location of each luminaire.

### **3.08 PROTECTION**

- A. Protect installed luminaires from subsequent construction operations.

**END OF SECTION**

**SECTION 28 31 00  
FIRE DETECTION AND ALARM**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Transmitters for communication with supervising station (reuse existing).
- B. Replacement and removal of existing fire alarm system components, wiring, and conduit indicated.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 84 00 - Firestopping: Materials and methods for work to be performed by this installer.
- B. Section 23 33 00 - Air Duct Accessories: Smoke dampers monitored and controlled by fire alarm system.

**1.03 REFERENCE STANDARDS**

- A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.
- B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- C. Provide all materials and labor in conformance with the following codes and standards:
  - 1. Village of Oak Brook - Code of Ordinances.
  - 2. ANSI/NFPA 70 - National Electrical Code 2005 Edition as adopted and Amended by the Village of Oak Brook, IL.
  - 3. IBC International Building Code, 2003 Edition, with local amendments.
  - 4. IECC International Energy Conservation Code, 2006 Edition with local amendments.
  - 5. International Fire Code, First Edition, 2003, with local amendments.
  - 6. NFPA 72 - National Fire Alarm Code ; 2003.
  - 7. Code for Safety to Life from Fire in Buildings and Structures (Life Safety Code, NFPA 101, 2003 edition).
  - 8. Automatic Fire Detectors, 2005 Edition (NFPA 72E).
  - 9. ADA-AG - American with Disabilities Act - Accessibility Guidelines.
  - 10. Illinois Accessibility Code, 1997 Edition (Illinois Administrative Code, Title 71, Chapter I, Subchapter b, Part 400).
  - 11. Underwriter's Laboratory.
  - 12. IEEE C62.41 - IEEE Recommended Practice on Surge Voltages in Low-Voltage Power Circuits; 1991 (R1995).

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Evidence of designer qualifications.
- C. Shop Drawings: Submit all information required for plan review and permitting by authorities having jurisdiction, including but not limited to floor plans, riser diagrams, and description of operation:
  - 1. Indicate existing wiring arrangements and locations of devices and wiring routing.

2. Copy (if any) of list of data required by authority having jurisdiction.
3. NFPA 72 "Record of Completion", filled out to the extent known at the time.
4. System zone boundaries and interfaces to fire safety systems.
5. Location of all components, circuits, and raceways; mark components with identifiers used in control unit programming.
6. Manufacturer's detailed data sheet for each component, including wiring diagrams, installation instructions, circuit length limitations, dimensions, ratings, layouts and complete catalog numbers.
  - a. Submit UL listings with cross-listing substantiation for each system component clearly marked.
7. Description of power supplies; if secondary power is by battery include calculations demonstrating adequate battery power.
8. Certification by either the manufacturer of the control unit or by the manufacturer of each other component that the components are compatible with the control unit.
9. Certification by the manufacturer of the control unit that the system design complies with the contract documents.
10. Certification by Contractor that the system design complies with the contract documents.
11. Do not show existing components to be removed.

D. Evidence of installer qualifications.

E. Inspection and Test Reports:

1. Submit inspection and test plan prior to closeout demonstration.
2. Submit documentation of satisfactory inspections and tests.
3. Submit NFPA 72 "Inspection and Test Form," filled out.

F. Project Record Documents: See Section 01 78 00 for additional requirements; have one set available during closeout demonstration:

1. "As installed" wiring and schematic diagrams, with final terminal identifications.
2. "As programmed" operating sequences, including control events by device, updated input/output chart, and voice messages by event.

G. Closeout Documents:

1. Certification by manufacturer that the system has been installed in compliance with his installation requirements, is complete, and is in satisfactory operating condition.
2. NFPA 72 "Record of Completion", filled out completely and signed by installer and authorized representative of authority having jurisdiction.
3. Final shop drawings approved and signed by the local authority having jurisdiction.
4. Submit written statement by installing contractor that the system has been installed and tested in accordance with approved plans, specifications and NFPA requirements.
5. Include actual field conditions including location of end-of-line resistors, cable outing, color coding, terminations, devices and equipment.

## 1.05 QUALITY ASSURANCE

- A. Installer: Qualified firm with minimum 5 years documented experience installing fire alarm systems of the specified type and providing contract maintenance service as a regular part of their business.

1. Authorized representative of control unit manufacturer; submit manufacturer's certification that installer is authorized; include name and title of manufacturer's representative making certification.
2. Installer Personnel: At least 2 years of experience installing fire alarm systems.
3. Supervisor: NICET level III or IV (3 or 4) certified fire alarm technician; furnish name and address.

B. Qualified personnel includes those persons that are:

1. Factory trained and certified; OR
2. NICET Level III or IV (3 or 4) Fire Alarm certified; OR
3. International Municipal Signal Association Fire Alarm certified; OR
4. Certified by state (Illinois Department of Professional Regulation); OR
5. Trained, qualified, and employed by an organization listed by a national testing laboratory.

## **1.06 WARRANTY**

A. Provide installer's warranty that the installation is free from defects and will remain so for 1 year after date of Substantial Completion.

## **1.07 EXISTING CONDITIONS**

A. The existing fire alarm system control panel is an EST iO500 Addressable System.

1. The existing control panel will be modified and expanded to feed new devices as shown on the floor plans.
2. Provide new equipment comparable with existing devices and system at site.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

A. Initiating Devices, and Notification Appliances:

1. Same manufacturer as control units.
2. Provide all initiating devices and notification appliances made by the same manufacturer.

B. Substitutions: Not permitted.

### **2.02 FIRE ALARM SYSTEM**

A. Fire Alarm System: Provide modifications and extensions to the existing automatic fire detection and alarm system:

1. Provide all components necessary, regardless of whether shown in the contract documents or not.
2. Protected Premises: Areas denoted on the drawings.
3. Comply with the following; where requirements conflict, order of precedence of requirements is as listed:
  - a. ADA Standards.
  - b. The requirements of the local authority having jurisdiction, which is Village of Oak Brook.
  - c. Applicable local codes.
  - d. The contract documents (drawings and specifications).

- e. NFPA 72; where the word "should" is used consider that provision mandatory; where conflicts between requirements require deviation from NFPA 72, identify deviations clearly on design documents.
  - 4. Evacuation Alarm: Single smoke zone; general evacuation of entire premises.
  - 5. Zoning: Point addressable system with initiating devices being individually zoned.
- B. Supervising Stations and Fire Department Connections:
- 1. Existing connections to remain.
- C. Circuits:
- 1. Initiating Device Circuits (IDC): Class B, Style A.
  - 2. Signaling Line Circuits (SLC) Within Single Building: Class B, Style 0.5.
  - 3. Notification Appliance Circuits (NAC): Class B, Style W.
  - 4. All cabling shall be plenum rated.
- D. Spare Capacity:
- 1. Initiating Device Circuits: Minimum 25 percent spare capacity.
  - 2. Notification Appliance Circuits: Minimum 25 percent spare capacity.
  - 3. Master Control Unit: Capable of handling all circuits utilized to capacity without requiring additional components other than plug-in control modules.
- E. Power Sources:
- 1. Primary: Dedicated branch circuits of the facility power distribution system.
  - 2. Secondary: Storage batteries.
  - 3. Capacity: Sufficient to operate entire system for period specified by NFPA 72.
  - 4. Each Computer System: Provide uninterruptible power supply (UPS).

## **2.03 EXISTING COMPONENTS**

- A. Existing Fire Alarm System: Remove existing components indicated and incorporate remaining components into new system, under warranty as if they were new; do not take existing portions of system out of service until new portions are fully operational, tested, and connected to existing system.
- B. Clearly label components that are "Not In Service."
- C. Remove unused existing components and materials from site and dispose of properly.

## **2.04 FIRE SAFETY SYSTEMS INTERFACES**

- A. HVAC:
  - 1. Duct Smoke Detectors: Close dampers indicated (if any); shut down air handlers indicated.

## **2.05 COMPONENTS**

- A. General:
  - 1. Provide flush mounted units where installed in finish areas; in unfinished areas, surface mounted unit are acceptable.
  - 2. Provide legible, permanent labels for each control device, using identification used in operation and maintenance data.

- B. Fire Alarm Power Supplies, Initiating Devices, and Notification Appliances: Analog, addressable type; listed by Underwriters Laboratories as suitable for the purpose intended.
- C. Initiating Devices:
  - 1. Duct Mounted Smoke Detector: Addressable/Analog photoelectric type, duct sampling tubes extending width of duct, in duct-mounted housing compatible with control panel and air stream velocities. Fan control shall not be hard wired through duct detector. Fan shutdown shall be completed by fan shutdown relay.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION AND PREPARATION**

- A. Field inspect existing fire alarm system installation to determine all required interface components necessary for fire alarm system replacement and relocation.
- B. Perform repair work on existing system to eliminate trouble conditions.

### **3.02 INSTALLATION**

- A. Install in accordance with applicable codes, NFPA 72, NFPA 70, and the contract documents.
- B. Install fire alarm system in accordance with manufacturer's instructions.
  - 1. Mount end-of-line device in separate box adjacent to sprinkler flow switch.
  - 2. Make conduit and wiring connections to fire suppression system at fire sprinkler riser and elevator tamper switches and duct smoke detectors.
  - 3. Install manual station with operating handle 4 feet above floor. Install horn strobe units 7.5 feet above floor.
- C. Conceal all wiring, conduit, boxes, and supports where installed in finished areas.
- D. Obtain Owner's approval of locations of devices, before installation.
- E. Install instruction cards and labels.

### **3.03 INSPECTION AND TESTING FOR COMPLETION**

- A. Perform field inspection and testing of fire alarm system in accordance with Section 01 78 00.
- B. Notify Owner 7 days prior to beginning completion inspections and tests.
- C. Notify authorities having jurisdiction and comply with their requirements for scheduling inspections and tests and for observation by their personnel.
- D. Provide the services of the installer's supervisor or person with equivalent qualifications to supervise inspection and testing, correction, and adjustments.
- E. Prepare for testing by ensuring that all work is complete and correct; perform preliminary tests as required.
- F. Provide all tools, software, and supplies required to accomplish inspection and testing.
- G. Perform inspection and testing in accordance with NFPA 72 and requirements of local authorities; document each inspection and test.

1. Include description of testing and results in test report.
  2. Perform 100 percent acceptance test to NFPA 72 standards on system.
- H. Correct defective work, adjust for proper operation, and retest until entire system complies with contract documents.

### **3.04 MANUFACTURER'S FIELD SERVICES**

- A. Include services of technician to supervise installation, adjustments, final connections, and system testing.

### **3.05 CLOSEOUT**

- A. Closeout Demonstration: Demonstrate proper operation of all functions to Owner.
1. Be prepared to conduct any of the required tests.
  2. Have at least one copy of operation and maintenance data, preliminary copy of project record drawings, input/output matrix, and operator instruction chart(s) available during demonstration.
  3. Have authorized technical representative of control unit manufacturer present during demonstration.
  4. Demonstration may be combined with inspection and testing required by authority having jurisdiction; notify authority having jurisdiction in time to schedule demonstration.
  5. Repeat demonstration until successful.
- B. Substantial Completion of the project cannot be achieved until inspection and testing is successful and:
1. Approved operating and maintenance data has been delivered.
  2. Spare parts, extra materials, and tools have been delivered.
  3. All aspects of operation have been demonstrated to Owner.
  4. Final acceptance of the fire alarm system has been given by authorities having jurisdiction.
- C. Perform post-occupancy instruction within 3 months after Substantial Completion.

### **3.06 MAINTENANCE**

- A. See Section 01 70 00 - Execution Requirements, for additional requirements relating to maintenance service.
- B. Provide a complete description of preventive maintenance, systematic examination, adjustment, cleaning, inspection, and testing, with a detailed schedule.
- C. Maintain a log at each fire alarm control unit, listing the date and time of each inspection and call-back visit, the condition of the system, nature of the trouble, correction performed, and parts replaced. Submit duplicate of each log entry to Owner's representative upon completion of site visit.
- D. Comply with Owner's requirements for access to facility and security.

**END OF SECTION**



## Appendix

- Oak Brook Park District Prevailing Wage Resolution and the July 2015 pay rates from the Illinois Department of Labor
- Park District Risk Management Association (PDRMA) Fact Sheet: “Fire Equipment Self Inspection Program, Frequency of Inspection and Maintenance Procedures, and Inspection Forms.” This document contains recommended procedures and forms for the testing of the Fire Suppression System. Contractor shall be responsible for the testing of the system after performing the work for the Project. Contractor shall provide test results to the Owner and Architect.
- Park District Risk Management Association (PDRMA) Fact Sheet: “Cutting Welding Procedures.” Contractor shall implement the safety measures as stated in this Fact Sheet when conducting “Hot Work.”

**RESOLUTION NO. 16-0620**

**A RESOLUTION OF THE OAK BROOK PARK DISTRICT  
REGARDING ILLINOIS PREVAILING WAGE ACT**

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WHEREAS, the State of Illinois has enacted “the Prevailing Wage Act,” as amended, 820 ILCS 130/0.01 through 130/12 (the “Act”); and

WHEREAS, the Act requires that the Board of Park Commissioners of the Oak Brook Park District (the “District”) investigate and ascertain for the District the prevailing rate of wages as defined in the Act, for laborers, mechanics, and other workers in the locality of the District employed in performing construction or demolition of public works for the Park District.

**NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF PARK COMMISSIONERS OF THE OAK BROOK PARK DISTRICT, AS FOLLOWS:**

Section 1. To the extent and as required by the Act, the general prevailing rate of wages in this locality for laborers, mechanics and other workers engaged in the construction and demolition of public works coming under the jurisdiction of the District is hereby ascertained to be the same as the prevailing rate of wages for construction and demolition work in DuPage County as determined by the Department of Labor of the State Of Illinois (the “Department”) as of July 1, 2015 (the latest Illinois Prevailing Wage Rates available on the Illinois Department of Labor website), a copy of those determinations being attached hereto and incorporated herein by reference. As required by said Act, any and all revisions of the prevailing rate of wages by the Department shall supersede the Department’s July 2015 determination and apply to any and all public works construction or demolition undertaken by the District. The definition of any terms appearing in this Resolution, which are also used in aforesaid Act, shall be the same as in the Act.

Section 2. Nothing herein contained is intended to apply nor shall be construed to apply said general prevailing rate of wages, as herein ascertained, to any work or employment performed on behalf of the District except public works construction or demolition of the District to the extent required by the Act.

Section 3. The Secretary of the District’s Board of Park Commissioners shall publicly post or keep available for inspection by any interested party in the main office of the District this determination of the prevailing rate of wages. A copy of this determination or of the current revised determination of prevailing rate of wages then in effect shall be attached to all contract specifications, and for works awarded to a contractor without a public bid, contract or project specification, shall be attached to the purchase order related to the work to be done or in a separate document.

Section 4. The Secretary of the District's Board of Park Commissioners shall mail a copy of this Resolution to any employer, and to any association of employers and to any person or association of employees who have filed or file their names and addresses, requesting copies of any determination stating the particular rates and the particular class of workers whose wages will be affected by such rates.

Section 5. The Secretary of the District's Board of Park Commissioners shall promptly file a certified copy of the Resolution with the Department of Labor of the State of Illinois.

Section 6. Within thirty (30) days after filing a certified copy of this Resolution with the Illinois Department of Labor, the Secretary of the District's Board of Park Commissioners shall cause to be published in a newspaper of general circulation within the area a notice that this determination is effective and constitutes the determination of the District.

**ADOPTED BY ROLL CALL VOTE THIS 20<sup>th</sup> day of June, 2016**

**AYES:** Truedson, Tan Carson and Knitter

**NAYS:** Trombetta

**ABSENT:** \_\_\_\_\_

**APPROVED:**

  
\_\_\_\_\_  
**President**

**ATTEST:**

  
**Secretary**

STATE OF ILLINOIS        )  
  ) SS  
COUNTY OF DU PAGE     )

**CERTIFICATION**

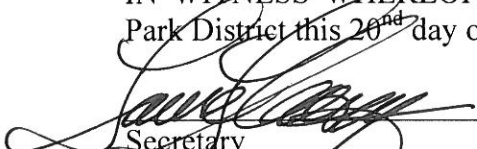
I, the undersigned, do hereby certify that I am the Secretary of Oak Brook Park District, DuPage County, Illinois, and as such official, I am keeper of the records, Resolutions, files and seal of said Park District, and I HEREBY CERTIFY that the foregoing instrument is a true and correct copy of Resolution **16-0620**

**A RESOLUTION OF THE OAK BROOK PARK DISTRICT  
REGARDING ILLINOIS PREVAILING WAGE ACT**

adopted at a duly called Regular Meeting of the Board of Park Commissioners of the Oak Brook Park District, held in Oak Brook, Illinois, in said Park District at 6:30 p.m. on the 20<sup>nd</sup> day of June, 2016.

I do further certify that the deliberations of the Board on the adoption of said resolution were conducted openly, that the vote on the adoption of said Resolution was taken openly, that said meeting was called and held at a specified time and place convenient to the public, that notice of said meeting was duly given to all of the news media requesting such notice, that said meeting was called and held in strict compliance with the provisions of the Open Meetings Act of the State of Illinois, as amended, and with the provisions of the Park District Code of the State of Illinois, as amended, and that the Board has complied with all of the provisions of said Act and said Code and with all of the procedural rules of the Board.

IN WITNESS WHEREOF, I hereunto affix my official signature and the seal of said Park District this 20<sup>nd</sup> day of June, 2016.

  
Secretary  
Oak Brook Park District

### Du Page County Prevailing Wage for July 2015

(See explanation of column headings at bottom of wages)

Trade Name	RG	TYP	C	Base	FRMAN	M-F>8	OSA	OSH	H/W	Pensn	Vac	Trng			
ASBESTOS ABT-GEN		ALL		39.400	39.950	1.5	1.5	2.0	13.98	10.72	0.000	0.500			
ASBESTOS ABT-MEC		BLD		36.340	38.840	1.5	1.5	2.0	11.47	10.96	0.000	0.720			
BOILERMAKER		BLD		47.070	51.300	2.0	2.0	2.0	6.970	18.13	0.000	0.400			
BRICK MASON		BLD		43.780	48.160	1.5	1.5	2.0	10.05	14.43	0.000	1.030			
CARPENTER		ALL		44.350	46.350	1.5	1.5	2.0	11.79	16.39	0.000	0.630			
CEMENT MASON		ALL		43.750	45.750	2.0	1.5	2.0	13.05	14.45	0.000	0.480			
CERAMIC TILE FNSHER		BLD		36.810	0.000	1.5	1.5	2.0	10.55	9.230	0.000	0.770			
COMMUNICATION TECH		BLD		32.650	34.750	1.5	1.5	2.0	9.550	15.16	1.250	0.610			
ELECTRIC PWR EQMT OP		ALL		37.890	51.480	1.5	1.5	2.0	5.000	11.75	0.000	0.380			
ELECTRIC PWR EQMT OP		HWY		39.220	53.290	1.5	1.5	2.0	5.000	12.17	0.000	0.390			
ELECTRIC PWR GRNDMAN		ALL		29.300	51.480	1.5	1.5	2.0	5.000	9.090	0.000	0.290			
ELECTRIC PWR GRNDMAN		HWY		30.330	53.290	1.5	1.5	2.0	5.000	9.400	0.000	0.300			
ELECTRIC PWR LINEMAN		ALL		45.360	51.480	1.5	1.5	2.0	5.000	14.06	0.000	0.450			
ELECTRIC PWR LINEMAN		HWY		46.950	53.290	1.5	1.5	2.0	5.000	14.56	0.000	0.470			
ELECTRIC PWR TRK DRV		ALL		30.340	51.480	1.5	1.5	2.0	5.000	9.400	0.000	0.300			
ELECTRIC PWR TRK DRV		HWY		31.400	53.290	1.5	1.5	2.0	5.000	9.730	0.000	0.310			
ELECTRICIAN		BLD		38.160	41.980	1.5	1.5	2.0	9.550	18.29	4.680	0.680			
ELEVATOR CONSTRUCTOR		BLD		50.800	57.150	2.0	2.0	2.0	13.57	14.21	4.060	0.600			
FENCE ERECTOR	NE	ALL		37.340	39.340	1.5	1.5	2.0	13.05	12.06	0.000	0.300			
FENCE ERECTOR	W	ALL		45.060	48.660	2.0	2.0	2.0	10.52	20.76	0.000	0.700			
GLAZIER		BLD		40.500	42.000	1.5	2.0	2.0	13.14	16.99	0.000	0.940			
HT/FROST INSULATOR		BLD		48.450	50.950	1.5	1.5	2.0	11.47	12.16	0.000	0.720			
IRON WORKER	E	ALL		44.200	46.200	2.0	2.0	2.0	13.65	21.14	0.000	0.350			
IRON WORKER	W	ALL		45.060	48.660	2.0	2.0	2.0	10.52	20.76	0.000	0.700			
LABORER		ALL		39.200	39.950	1.5	1.5	2.0	13.98	10.72	0.000	0.500			
LATHER		ALL		44.350	46.350	1.5	1.5	2.0	11.79	16.39	0.000	0.630			
MACHINIST		BLD		45.350	47.850	1.5	1.5	2.0	7.260	8.950	1.850	0.000			
MARBLE FINISHERS		ALL		32.400	34.320	1.5	1.5	2.0	10.05	13.75	0.000	0.620			
MARBLE MASON		BLD		43.030	47.330	1.5	1.5	2.0	10.05	14.10	0.000	0.780			
MATERIAL TESTER I		ALL		29.200	0.000	1.5	1.5	2.0	13.98	10.72	0.000	0.500			
MATERIALS TESTER II		ALL		34.200	0.000	1.5	1.5	2.0	13.98	10.72	0.000	0.500			
MILLWRIGHT		ALL		44.350	46.350	1.5	1.5	2.0	11.79	16.39	0.000	0.630			
OPERATING ENGINEER		BLD 1		48.100	52.100	2.0	2.0	2.0	17.55	12.65	1.900	1.250			
OPERATING ENGINEER		BLD 2		46.800	52.100	2.0	2.0	2.0	17.55	12.65	1.900	1.250			
OPERATING ENGINEER		BLD 3		44.250	52.100	2.0	2.0	2.0	17.55	12.65	1.900	1.250			
OPERATING ENGINEER		BLD 4		42.500	52.100	2.0	2.0	2.0	17.55	12.65	1.900	1.250			
OPERATING ENGINEER		BLD 5		51.850	52.100	2.0	2.0	2.0	17.55	12.65	1.900	1.250			
OPERATING ENGINEER		BLD 6		49.100	52.100	2.0	2.0	2.0	17.55	12.65	1.900	1.250			
OPERATING ENGINEER		BLD 7		51.100	52.100	2.0	2.0	2.0	17.55	12.65	1.900	1.250			
OPERATING ENGINEER		FLT		36.000	36.000	1.5	1.5	2.0	17.10	11.80	1.900	1.250			
OPERATING ENGINEER		HWY 1		46.300	50.300	1.5	1.5	2.0	17.55	12.65	1.900	1.250			
OPERATING ENGINEER		HWY 2		45.750	50.300	1.5	1.5	2.0	17.55	12.65	1.900	1.250			
OPERATING ENGINEER		HWY 3		43.700	50.300	1.5	1.5	2.0	17.55	12.65	1.900	1.250			
OPERATING ENGINEER		HWY 4		42.300	50.300	1.5	1.5	2.0	17.55	12.65	1.900	1.250			
OPERATING ENGINEER		HWY 5		41.100	50.300	1.5	1.5	2.0	17.55	12.65	1.900	1.250			
OPERATING ENGINEER		HWY 6		49.300	50.300	1.5	1.5	2.0	17.55	12.65	1.900	1.250			
OPERATING ENGINEER		HWY 7		47.300	50.300	1.5	1.5	2.0	17.55	12.65	1.900	1.250			
ORNAMNTL IRON WORKER E		ALL		45.000	47.500	2.0	2.0	2.0	13.55	17.94	0.000	0.650			
ORNAMNTL IRON WORKER W		ALL		45.060	48.660	2.0	2.0	2.0	10.52	20.76	0.000	0.700			
PAINTER		ALL		41.730	43.730	1.5	1.5	1.5	10.30	8.200	0.000	1.350			
PAINTER SIGNS		BLD		33.920	38.090	1.5	1.5	1.5	2.600	2.710	0.000	0.000			
PILEDRIVER		ALL		44.350	46.350	1.5	1.5	2.0	11.79	16.39	0.000	0.630			
PIPEFITTER		BLD		46.000	49.000	1.5	1.5	2.0	9.000	15.85	0.000	1.780			
PLASTERER		BLD		43.430	46.040	1.5	1.5	2.0	10.05	14.43	0.000	1.020			
PLUMBER		BLD		46.650	48.650	1.5	1.5	2.0	13.18	11.46	0.000	0.880			
ROOFER		BLD		41.000	44.000	1.5	1.5	2.0	8.280	10.54	0.000	0.530			
SHEETMETAL WORKER		BLD		44.720	46.720	1.5	1.5	2.0	10.65	13.31	0.000	0.820			
SPRINKLER FITTER		BLD		49.200	51.200	1.5	1.5	2.0	11.75	9.650	0.000	0.550			
STEEL ERECTOR	E	ALL		42.070	44.070	2.0	2.0	2.0	13.45	19.59	0.000	0.350			
STEEL ERECTOR	W	ALL		45.060	48.660	2.0	2.0	2.0	10.52	20.76	0.000	0.700			
STONE MASON		BLD		43.780	48.160	1.5	1.5	2.0	10.05	14.43	0.000	1.030			
SURVEY WORKER			->NOT IN EFFECT			ALL	37.000	37.750	1.5	1.5	2.0	12.97	9.930	0.000	0.500
TERRAZZO FINISHER		BLD		38.040	0.000	1.5	1.5	2.0	10.55	11.22	0.000	0.720			
TERRAZZO MASON		BLD		41.880	44.880	1.5	1.5	2.0	10.55	12.51	0.000	0.940			
TILE MASON		BLD		43.840	47.840	1.5	1.5	2.0	10.55	11.40	0.000	0.990			
TRAFFIC SAFETY WRKR		HWY		32.750	34.350	1.5	1.5	2.0	6.550	6.450	0.000	0.500			
TRUCK DRIVER		ALL 1		35.920	36.120	1.5	1.5	2.0	8.280	8.760	0.000	0.150			
TRUCK DRIVER		ALL 2		32.700	33.100	1.5	1.5	2.0	6.500	4.350	0.000	0.150			
TRUCK DRIVER		ALL 3		32.900	33.100	1.5	1.5	2.0	6.500	4.350	0.000	0.150			

TRUCK DRIVER	ALL 4	33.100	33.100	1.5	1.5	2.0	6.500	4.350	0.000	0.150
TUCKPOINTER	BLD	42.620	43.620	1.5	1.5	2.0	10.05	13.34	0.000	0.670

Legend: RG (Region)  
 TYP (Trade Type - All,Highway,Building,Floating,Oil & Chip,Rivers)  
 C (Class)  
 Base (Base Wage Rate)  
 FRMAN (Foreman Rate)  
 M-F>8 (OT required for any hour greater than 8 worked each day, Mon through Fri.)  
 OSA (Overtime (OT) is required for every hour worked on Saturday)  
 OSH (Overtime is required for every hour worked on Sunday and Holidays)  
 H/W (Health & Welfare Insurance)  
 Pnsn (Pension)  
 Vac (Vacation)  
 Trng (Training)

**Explanations**

DUPAGE COUNTY

IRON WORKERS AND FENCE ERECTOR (WEST) - West of Route 53.

The following list is considered as those days for which holiday rates of wages for work performed apply: New Years Day, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day, Christmas Day and Veterans Day in some classifications/counties. Generally, any of these holidays which fall on a Sunday is celebrated on the following Monday. This then makes work performed on that Monday payable at the appropriate overtime rate for holiday pay. Common practice in a given local may alter certain days of celebration. If in doubt, please check with IDOL.

EXPLANATION OF CLASSES

ASBESTOS - GENERAL - removal of asbestos material/mold and hazardous materials from any place in a building, including mechanical systems where those mechanical systems are to be removed. This includes the removal of asbestos materials/mold and hazardous materials from ductwork or pipes in a building when the building is to be demolished at the time or at some close future date.

ASBESTOS - MECHANICAL - removal of asbestos material from mechanical systems, such as pipes, ducts, and boilers, where the mechanical systems are to remain.

TRAFFIC SAFETY - work associated with barricades, horses and drums used to reduce lane usage on highway work, the installation and removal of temporary lane markings, and the installation and removal of temporary road signs.

CERAMIC TILE FINISHER

The grouting, cleaning, and polishing of all classes of tile, whether for interior or exterior purposes, all burned, glazed or unglazed products; all composition materials, granite tiles, warning detectable tiles, cement tiles, epoxy composite materials, pavers, glass, mosaics, fiberglass, and all substitute materials, for tile made in tile-like units; all mixtures in tile like form of cement, metals, and other materials that are for and intended for use as a finished floor surface, stair treads, promenade roofs, walks, walls, ceilings, swimming pools, and all other places where tile is to form a finished interior or exterior. The mixing of all setting mortars including but not limited to thin-set mortars, epoxies, wall mud, and any other sand and cement mixtures or adhesives when used in the preparation, installation, repair, or maintenance of tile and/or similar materials. The handling and unloading of all sand, cement, lime, tile, fixtures, equipment, adhesives, or any other materials to be used in the preparation, installation, repair, or maintenance of tile and/or similar materials. Ceramic Tile Finishers shall fill all joints and voids regardless of method on all tile work, particularly and especially after installation of said tile work. Application of any and all protective coverings to all types of tile installations including, but not be limited to, all soap compounds, paper products, tapes, and all polyethylene coverings, plywood, masonite, cardboard, and any new type of products that may be used to protect tile installations, Blastrac equipment, and all floor scarifying equipment used in preparing floors to receive tile. The clean up and removal of all waste and materials. All demolition of existing tile floors and walls to be re-tiled.

COMMUNICATIONS TECHNICIAN

Low voltage installation, maintenance and removal of telecommunication facilities (voice, sound, data and video) including telephone and data inside wire, interconnect, terminal equipment, central offices, PABX, fiber optic cable and equipment, micro waves, V-SAT, bypass, CATV, WAN (wide area networks), LAN (local area networks), and ISDN (integrated system digital network), pulling of wire in raceways, but not the installation of raceways.

MARBLE FINISHER



Loading and unloading trucks, distribution of all materials (all stone, sand, etc.), stocking of floors with material, performing all rigging for heavy work, the handling of all material that may be needed for the installation of such materials, building of scaffolding, polishing if needed, patching, waxing of material if damaged, pointing up, caulking, grouting and cleaning of marble, holding water on diamond or Carborundum blade or saw for setters cutting, use of tub saw or any other saw needed for preparation of material, drilling of holes for wires that anchor material set by setters, mixing up of molding plaster for installation of material, mixing up thin set for the installation of material, mixing up of sand to cement for the installation of material and such other work as may be required in helping a Marble Setter in the handling of all material in the erection or installation of interior marble, slate, travertine, art marble, serpentine, alberene stone, blue stone, granite and other stones (meaning as to stone any foreign or domestic materials as are specified and used in building interiors and exteriors and customarily known as stone in the trade), carrara, sanionyx, vitrolite and similar opaque glass and the laying of all marble tile, terrazzo tile, slate tile and precast tile, steps, risers treads, base, or any other materials that may be used as substitutes for any of the aforementioned materials and which are used on interior and exterior which are installed in a similar manner.

MATERIAL TESTER I: Hand coring and drilling for testing of materials; field inspection of uncured concrete and asphalt.

MATERIAL TESTER II: Field inspection of welds, structural steel, fireproofing, masonry, soil, facade, reinforcing steel, formwork, cured concrete, and concrete and asphalt batch plants; adjusting proportions of bituminous mixtures.

#### OPERATING ENGINEER - BUILDING

Class 1. Asphalt Plant; Asphalt Spreader; Autograde; Backhoes with Caisson Attachment; Batch Plant; Benoto (requires Two Engineers); Boiler and Throttle Valve; Caisson Rigs; Central Redi-Mix Plant; Combination Back Hoe Front End-loader Machine; Compressor and Throttle Valve; Concrete Breaker (Truck Mounted); Concrete Conveyor; Concrete Conveyor (Truck Mounted); Concrete Paver Over 27E cu. ft; Concrete Paver 27E cu. ft. and Under; Concrete Placer; Concrete Placing Boom; Concrete Pump (Truck Mounted); Concrete Tower; Cranes, All; Cranes, Hammerhead; Cranes, (GCI and similar Type); Creter Crane; Spider Crane; Crusher, Stone, etc.; Derricks, All; Derricks, Traveling; Formless Curb and Gutter Machine; Grader, Elevating; Grouting Machines; Heavy Duty Self-Propelled Transporter or Prime Mover; Highlift Shovels or Front Endloader 2-1/4 yd. and over; Hoists, Elevators, outside type rack and pinion and similar machines; Hoists, One, Two and Three Drum; Hoists, Two Tugger One Floor; Hydraulic Backhoes; Hydraulic Boom Trucks; Hydro Vac (and similar equipment); Locomotives, All; Motor Patrol; Lubrication Technician; Manipulators; Pile Drivers and Skid Rig; Post Hole Digger; Pre-Stress Machine; Pump Cretes Dual Ram; Pump Cretes: Squeeze Cretes-Screw Type Pumps; Gypsum Bulker and Pump; Raised and Blind Hole Drill; Roto Mill Grinder; Scoops - Tractor Drawn; Slip-Form Paver; Straddle Buggies; Operation of Tie Back Machine; Tournapull; Tractor with Boom and Side Boom; Trenching Machines.

Class 2. Boilers; Broom, All Power Propelled; Bulldozers; Concrete Mixer (Two Bag and Over); Conveyor, Portable; Forklift Trucks; Highlift Shovels or Front Endloaders under 2-1/4 yd.; Hoists, Automatic; Hoists, Inside Elevators; Hoists, Sewer Dragging Machine; Hoists, Tugger Single Drum; Laser Screed; Rock Drill (Self-Propelled); Rock Drill (Truck Mounted); Rollers, All; Steam Generators; Tractors, All; Tractor Drawn Vibratory Roller; Winch Trucks with "A" Frame.

Class 3. Air Compressor; Combination Small Equipment Operator; Generators; Heaters, Mechanical; Hoists, Inside Elevators (remodeling or renovation work); Hydraulic Power Units (Pile Driving, Extracting, and Drilling); Pumps, over 3" (1 to 3 not to exceed a total of 300 ft.); Low Boys; Pumps, Well Points; Welding Machines (2 through 5); Winches, 4 Small Electric Drill Winches.

Class 4. Bobcats and/or other Skid Steer Loaders; Oilers; and Brick Forklift.

Class 5. Assistant Craft Foreman.

Class 6. Gradall.

Class 7. Mechanics; Welders.

#### OPERATING ENGINEERS - HIGHWAY CONSTRUCTION

Class 1. Asphalt Plant; Asphalt Heater and Planer Combination; Asphalt Heater Scarfire; Asphalt Spreader; Autograder/GOMACO or other similar type machines; ABG Paver; Backhoes with Caisson Attachment; Ballast Regulator; Belt Loader; Caisson Rigs; Car Dumper; Central Redi-Mix Plant; Combination Backhoe Front Endloader Machine, (1 cu. yd. Backhoe Bucket or over or with attachments); Concrete Breaker (Truck Mounted); Concrete Conveyor; Concrete Paver over 27E cu. ft.; Concrete

Placer; Concrete Tube Float; Cranes, all attachments; Cranes, Tower Cranes of all types: Creter Crane; Spider Crane; Crusher, Stone, etc.; Derricks, All; Derrick Boats; Derricks, Traveling; Dredges; Elevators, Outside type Rack & Pinion and Similar Machines; Formless Curb and Gutter Machine; Grader, Elevating; Grader, Motor Grader, Motor Patrol, Auto Patrol, Form Grader, Pull Grader, Subgrader; Guard Rail Post Driver Truck Mounted; Hoists, One, Two and Three Drum; Heavy Duty Self-Propelled Transporter or Prime Mover; Hydraulic Backhoes; Backhoes with shear attachments up to 40' of boom reach; Lubrication Technician; Manipulators; Mucking Machine; Pile Drivers and Skid Rig; Pre-Stress Machine; Pump Cretes Dual Ram; Rock Drill - Crawler or Skid Rig; Rock Drill - Truck Mounted; Rock/Track Tamper; Roto Mill Grinder; Slip-Form Paver; Snow Melters; Soil Test Drill Rig (Truck Mounted); Straddle Buggies; Hydraulic Telescoping Form (Tunnel); Operation of Tieback Machine; Tractor Drawn Belt Loader; Tractor Drawn Belt Loader (with attached pusher - two engineers); Tractor with Boom; Tractaire with Attachments; Traffic Barrier Transfer Machine; Trenching; Truck Mounted Concrete Pump with Boom; Raised or Blind Hole Drills (Tunnel Shaft); Underground Boring and/or Mining Machines 5 ft. in diameter and over tunnel, etc; Underground Boring and/or Mining Machines under 5 ft. in diameter; Wheel Excavator; Widener (APSCO).

Class 2. Batch Plant; Bituminous Mixer; Boiler and Throttle Valve; Bulldozers; Car Loader Trailing Conveyors; Combination Backhoe Front Endloader Machine (Less than 1 cu. yd. Backhoe Bucket or over or with attachments); Compressor and Throttle Valve; Compressor, Common Receiver (3); Concrete Breaker or Hydro Hammer; Concrete Grinding Machine; Concrete Mixer or Paver 7S Series to and including 27 cu. ft.; Concrete Spreader; Concrete Curing Machine, Burlap Machine, Belting Machine and Sealing Machine; Concrete Wheel Saw; Conveyor Muck Cars (Haglund or Similar Type); Drills, All; Finishing Machine - Concrete; Highlift Shovels or Front Endloader; Hoist - Sewer Dragging Machine; Hydraulic Boom Trucks (All Attachments); Hydro-Blaster; Hydro Excavating (excluding hose work); Laser Screed; All Locomotives, Dinky; Off-Road Hauling Units (including articulating) Non Self-Loading Ejection Dump; Pump Cretes: Squeeze Cretes - Screw Type Pumps, Gypsum Bulker and Pump; Roller, Asphalt; Rotary Snow Plows; Rototiller, Seaman, etc., self-propelled; Self-Propelled Compactor; Spreader - Chip - Stone, etc.; Scraper - Single/Twin Engine/Push and Pull; Scraper - Prime Mover in Tandem (Regardless of Size); Tractors pulling attachments, Sheeps Foot, Disc, Compactor, etc.; Tug Boats.

Class 3. Boilers; Brooms, All Power Propelled; Cement Supply Tender; Compressor, Common Receiver (2); Concrete Mixer (Two Bag and Over); Conveyor, Portable; Farm-Type Tractors Used for Mowing, Seeding, etc.; Forklift Trucks; Grouting Machine; Hoists, Automatic; Hoists, All Elevators; Hoists, Tugger Single Drum; Jeep Diggers; Low Boys; Pipe Jacking Machines; Post-Hole Digger; Power Saw, Concrete Power Driven; Pug Mills; Rollers, other than Asphalt; Seed and Straw Blower; Steam Generators; Stump Machine; Winch Trucks with "A" Frame; Work Boats; Tamper-Form-Motor Driven.

Class 4. Air Compressor; Combination - Small Equipment Operator; Directional Boring Machine; Generators; Heaters, Mechanical; Hydraulic Power Unit (Pile Driving, Extracting, or Drilling); Light Plants, All (1 through 5); Pumps, over 3" (1 to 3 not to exceed a total of 300 ft.); Pumps, Well Points; Vacuum Trucks (excluding hose work); Welding Machines (2 through 5); Winches, 4 Small Electric Drill Winches.

Class 5. SkidSteer Loader (all); Brick Forklifts; Oilers.

Class 6. Field Mechanics and Field Welders

Class 7. Dowell Machine with Air Compressor; Gradall and machines of like nature.

#### OPERATING ENGINEER - FLOATING

Diver. Diver Wet Tender, Diver Tender, ROV Pilot, ROV Tender

SURVEY WORKER - Operated survey equipment including data collectors, G.P.S. and robotic instruments, as well as conventional levels and transits.

#### TRUCK DRIVER - BUILDING, HEAVY AND HIGHWAY CONSTRUCTION

Class 1. Two or three Axle Trucks. A-frame Truck when used for transportation purposes; Air Compressors and Welding Machines, including those pulled by cars, pick-up trucks and tractors; Ambulances; Batch Gate Lockers; Batch Hopperman; Car and Truck Washers; Carry-alls; Fork Lifts and Hoisters; Helpers; Mechanics Helpers and Greasers; Oil Distributors 2-man operation; Pavement Breakers; Pole Trailer, up to 40 feet; Power Mower Tractors; Self-propelled Chip Spreader; Skipman; Slurry Trucks, 2-man operation; Slurry Truck Conveyor Operation, 2 or 3 man; Teamsters; Unskilled Dumpman; and Truck Drivers hauling warning lights, barricades, and portable toilets on the job site.

Class 2. Four axle trucks; Dump Crets and Adgetors under 7 yards; Dumpsters, Track Trucks, Euclids, Hug Bottom Dump Turnapulls or Turntrailers when pulling other than self-loading equipment or similar equipment under 16 cubic yards; Mixer Trucks under 7 yards; Ready-mix Plant Hopper Operator, and Winch Trucks, 2 Axles.



Class 3. Five axle trucks; Dump Crets and Adgetors 7 yards and over; Dumpsters, Track Trucks, Euclids, Hug Bottom Dump Turntrailers or turnapulls when pulling other than self-loading equipment or similar equipment over 16 cubic yards; Explosives and/or Fission Material Trucks; Mixer Trucks 7 yards or over; Mobile Cranes while in transit; Oil Distributors, 1-man operation; Pole Trailer, over 40 feet; Pole and Expandable Trailers hauling material over 50 feet long; Slurry trucks, 1-man operation; Winch trucks, 3 axles or more; Mechanic--Truck Welder and Truck Painter.

Class 4. Six axle trucks; Dual-purpose vehicles, such as mounted crane trucks with hoist and accessories; Foreman; Master Mechanic; Self-loading equipment like P.B. and trucks with scoops on the front.

#### TERRAZZO FINISHER

The handling of sand, cement, marble chips, and all other materials that may be used by the Mosaic Terrazzo Mechanic, and the mixing, grinding, grouting, cleaning and sealing of all Marble, Mosaic, and Terrazzo work, floors, base, stairs, and wainscoting by hand or machine, and in addition, assisting and aiding Marble, Masonic, and Terrazzo Mechanics.

#### Other Classifications of Work:

For definitions of classifications not otherwise set out, the Department generally has on file such definitions which are available. If a task to be performed is not subject to one of the classifications of pay set out, the Department will upon being contacted state which neighboring county has such a classification and provide such rate, such rate being deemed to exist by reference in this document. If no neighboring county rate applies to the task, the Department shall undertake a special determination, such special determination being then deemed to have existed under this determination. If a project requires these, or any classification not listed, please contact IDOL at 217-782-1710 for wage rates or clarifications.

#### LANDSCAPING

Landscaping work falls under the existing classifications for laborer, operating engineer and truck driver. The work performed by landscape plantsman and landscape laborer is covered by the existing classification of laborer. The work performed by landscape operators (regardless of equipment used or its size) is covered by the classifications of operating engineer. The work performed by landscape truck drivers (regardless of size of truck driven) is covered by the classifications of truck driver.

#### MATERIAL TESTER & MATERIAL TESTER/INSPECTOR I AND II

Notwithstanding the difference in the classification title, the classification entitled "Material Tester I" involves the same job duties as the classification entitled "Material Tester/Inspector I". Likewise, the classification entitled "Material Tester II" involves the same job duties as the classification entitled "Material Tester/Inspector II".

**Cook County Prevailing Wage for July 2015**

(See explanation of column headings at bottom of wages)

Trade Name	RG	TYP	C	Base	FRMAN	M-F>8	OSA	OSH	H/W	Pensn	Vac	Trng	
ASBESTOS ABT-GEN	ALL			39.400	39.950	1.5	1.5	2.0	13.98	10.72	0.000	0.500	
ASBESTOS ABT-MEC	BLD			36.340	38.840	1.5	1.5	2.0	11.47	10.96	0.000	0.720	
BOILERMAKER	BLD			47.070	51.300	2.0	2.0	2.0	6.970	18.13	0.000	0.400	
BRICK MASON	BLD			43.780	48.160	1.5	1.5	2.0	10.05	14.43	0.000	1.030	
CARPENTER	ALL			44.350	46.350	1.5	1.5	2.0	11.79	16.39	0.000	0.630	
CEMENT MASON	ALL			43.750	45.750	2.0	1.5	2.0	13.05	14.45	0.000	0.480	
CERAMIC TILE FNSHER	BLD			36.810	0.000	1.5	1.5	2.0	10.55	9.230	0.000	0.770	
COMM. ELECT.	BLD			40.000	42.800	1.5	1.5	2.0	8.670	12.57	1.100	0.750	
ELECTRIC PWR EQMT OP	ALL			46.100	51.100	1.5	1.5	2.0	10.76	14.87	0.000	0.460	
ELECTRIC PWR GRNDMAN	ALL			37.050	52.500	1.5	2.0	2.0	8.630	12.28	0.000	0.370	
ELECTRIC PWR LINEMAN	ALL			47.500	52.500	1.5	2.0	1.5	11.06	15.75	0.000	0.480	
ELECTRICIAN	ALL			45.000	48.000	1.5	1.5	2.0	13.83	15.27	0.000	1.000	
ELEVATOR CONSTRUCTOR	BLD			50.800	57.150	2.0	2.0	2.0	13.57	14.21	4.060	0.600	
FENCE ERECTOR	ALL			37.340	39.340	1.5	1.5	2.0	13.05	12.06	0.000	0.300	
GLAZIER	BLD			40.500	42.000	1.5	2.0	2.0	13.14	16.99	0.000	0.940	
HT/FROST INSULATOR	BLD			48.450	50.950	1.5	1.5	2.0	11.47	12.16	0.000	0.720	
IRON WORKER	ALL			44.200	46.200	2.0	2.0	2.0	13.65	21.14	0.000	0.350	
LABORER	ALL			39.200	39.950	1.5	1.5	2.0	13.98	10.72	0.000	0.500	
LATHER	ALL			44.350	46.350	1.5	1.5	2.0	11.79	16.39	0.000	0.630	
MACHINIST	BLD			45.350	47.850	1.5	1.5	2.0	7.260	8.950	1.850	0.000	
MARBLE FINISHERS	ALL			32.400	34.320	1.5	1.5	2.0	10.05	13.75	0.000	0.620	
MARBLE MASON	BLD			43.030	47.330	1.5	1.5	2.0	10.05	14.10	0.000	0.780	
MATERIAL TESTER I	ALL			29.200	0.000	1.5	1.5	2.0	13.98	10.72	0.000	0.500	
MATERIALS TESTER II	ALL			34.200	0.000	1.5	1.5	2.0	13.98	10.72	0.000	0.500	
MILLWRIGHT	ALL			44.350	46.350	1.5	1.5	2.0	11.79	16.39	0.000	0.630	
OPERATING ENGINEER	BLD 1			48.100	52.100	2.0	2.0	2.0	17.55	12.65	1.900	1.250	
OPERATING ENGINEER	BLD 2			46.800	52.100	2.0	2.0	2.0	17.55	12.65	1.900	1.250	
OPERATING ENGINEER	BLD 3			44.250	52.100	2.0	2.0	2.0	17.55	12.65	1.900	1.250	
OPERATING ENGINEER	BLD 4			42.500	52.100	2.0	2.0	2.0	17.55	12.65	1.900	1.250	
OPERATING ENGINEER	BLD 5			51.850	52.100	2.0	2.0	2.0	17.55	12.65	1.900	1.250	
OPERATING ENGINEER	BLD 6			49.100	52.100	2.0	2.0	2.0	17.55	12.65	1.900	1.250	
OPERATING ENGINEER	BLD 7			51.100	52.100	2.0	2.0	2.0	17.55	12.65	1.900	1.250	
OPERATING ENGINEER	FLT 1			53.600	53.600	1.5	1.5	2.0	17.10	11.80	1.900	1.250	
OPERATING ENGINEER	FLT 2			52.100	53.600	1.5	1.5	2.0	17.10	11.05	1.900	1.250	
OPERATING ENGINEER	FLT 3			46.400	53.600	1.5	1.5	2.0	17.10	11.80	1.900	1.250	
OPERATING ENGINEER	FLT 4			38.550	53.600	1.5	1.5	2.0	17.10	11.80	1.900	1.250	
OPERATING ENGINEER	FLT 5			55.100	53.600	1.5	1.5	2.0	17.10	11.80	1.900	1.250	
OPERATING ENGINEER	FLT 6			35.000	35.000	1.5	1.5	2.0	16.60	11.05	1.900	1.250	
OPERATING ENGINEER	HWY 1			46.300	50.300	1.5	1.5	2.0	17.55	12.65	1.900	1.250	
OPERATING ENGINEER	HWY 2			45.750	50.300	1.5	1.5	2.0	17.55	12.65	1.900	1.250	
OPERATING ENGINEER	HWY 3			43.700	50.300	1.5	1.5	2.0	17.55	12.65	1.900	1.250	
OPERATING ENGINEER	HWY 4			42.300	50.300	1.5	1.5	2.0	17.55	12.65	1.900	1.250	
OPERATING ENGINEER	HWY 5			41.100	50.300	1.5	1.5	2.0	17.55	12.65	1.900	1.250	
OPERATING ENGINEER	HWY 6			49.300	50.300	1.5	1.5	2.0	17.55	12.65	1.900	1.250	
OPERATING ENGINEER	HWY 7			47.300	50.300	1.5	1.5	2.0	17.55	12.65	1.900	1.250	
ORNAMNTL IRON WORKER	ALL			45.000	47.500	2.0	2.0	2.0	13.55	17.94	0.000	0.650	
PAINTER	ALL			41.750	46.500	1.5	1.5	1.5	11.50	11.10	0.000	0.770	
PAINTER SIGNS	BLD			33.920	38.090	1.5	1.5	1.5	2.600	2.710	0.000	0.000	
PILEDRIIVER	ALL			44.350	46.350	1.5	1.5	2.0	11.79	16.39	0.000	0.630	
PIPEFITTER	BLD			46.000	49.000	1.5	1.5	2.0	9.000	15.85	0.000	1.780	
PLASTERER	BLD			43.430	46.040	1.5	1.5	2.0	13.05	14.43	0.000	1.020	
PLUMBER	BLD			46.650	48.650	1.5	1.5	2.0	13.18	11.46	0.000	0.880	
ROOFER	BLD			41.000	44.000	1.5	1.5	2.0	8.280	10.54	0.000	0.530	
SHEETMETAL WORKER	BLD			42.230	45.610	1.5	1.5	2.0	10.53	20.68	0.000	0.720	
SIGN HANGER	BLD			31.310	33.810	1.5	1.5	2.0	4.850	3.280	0.000	0.000	
SPRINKLER FITTER	BLD			49.200	51.200	1.5	1.5	2.0	11.75	9.650	0.000	0.550	
STEEL ERECTOR	ALL			42.070	44.070	2.0	2.0	2.0	13.45	19.59	0.000	0.350	
STONE MASON	BLD			43.780	48.160	1.5	1.5	2.0	10.05	14.43	0.000	1.030	
<del>SURVEY WORKER</del>	<del>---</del>	NOT IN	EFFECT	ALL	37.000	37.750	1.5	1.5	2.0	12.97	9.930	0.000	0.500
TERRAZZO FINISHER	BLD			38.040	0.000	1.5	1.5	2.0	10.55	11.22	0.000	0.720	
TERRAZZO MASON	BLD			41.880	44.880	1.5	1.5	2.0	10.55	12.51	0.000	0.940	
TILE MASON	BLD			43.840	47.840	1.5	1.5	2.0	10.55	11.40	0.000	0.990	
TRAFFIC SAFETY WRKR	HWY			32.750	34.350	1.5	1.5	2.0	6.550	6.450	0.000	0.500	
TRUCK DRIVER	E ALL 1			35.480	35.680	1.5	1.5	2.0	8.350	10.50	0.000	0.150	
TRUCK DRIVER	E ALL 2			34.100	34.500	1.5	1.5	2.0	8.150	8.500	0.000	0.150	
TRUCK DRIVER	E ALL 3			34.300	34.500	1.5	1.5	2.0	8.150	8.500	0.000	0.150	
TRUCK DRIVER	E ALL 4			34.500	34.500	1.5	1.5	2.0	8.150	8.500	0.000	0.150	
TRUCK DRIVER	W ALL 1			35.600	35.800	1.5	1.5	1.5	8.250	9.140	0.000	0.150	
TRUCK DRIVER	W ALL 2			32.700	33.100	1.5	1.5	2.0	6.500	4.350	0.000	0.000	

TRUCK DRIVER	W	ALL 3	32.900	33.100	1.5	1.5	2.0	6.500	4.350	0.000	0.000
TRUCK DRIVER	W	ALL 4	33.100	33.100	1.5	1.5	2.0	6.500	4.350	0.000	0.000
TUCKPOINTER		BLD	43.800	44.800	1.5	1.5	2.0	8.280	13.49	0.000	0.670

Legend: RG (Region)  
 TYP (Trade Type - All,Highway,Building,Floating,Oil & Chip,Rivers)  
 C (Class)  
 Base (Base Wage Rate)  
 FRMAN (Foreman Rate)  
 M-F>8 (OT required for any hour greater than 8 worked each day, Mon through Fri.)  
 OSA (Overtime (OT) is required for every hour worked on Saturday)  
 OSH (Overtime is required for every hour worked on Sunday and Holidays)  
 H/W (Health & Welfare Insurance)  
 Pensch (Pension)  
 Vac (Vacation)  
 Trng (Training)

**Explanations**

COOK COUNTY

The following list is considered as those days for which holiday rates of wages for work performed apply: New Years Day, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day, Christmas Day and Veterans Day in some classifications/counties. Generally, any of these holidays which fall on a Sunday is celebrated on the following Monday. This then makes work performed on that Monday payable at the appropriate overtime rate for holiday pay. Common practice in a given local may alter certain days of celebration. If in doubt, please check with IDOL.

TRUCK DRIVERS (WEST) - That part of the county West of Barrington Road.

EXPLANATION OF CLASSES

ASBESTOS - GENERAL - removal of asbestos material/mold and hazardous materials from any place in a building, including mechanical systems where those mechanical systems are to be removed. This includes the removal of asbestos materials/mold and hazardous materials from ductwork or pipes in a building when the building is to be demolished at the time or at some close future date.

ASBESTOS - MECHANICAL - removal of asbestos material from mechanical systems, such as pipes, ducts, and boilers, where the mechanical systems are to remain.

CERAMIC TILE FINISHER

The grouting, cleaning, and polishing of all classes of tile, whether for interior or exterior purposes, all burned, glazed or unglazed products; all composition materials, granite tiles, warning detectable tiles, cement tiles, epoxy composite materials, pavers, glass, mosaics, fiberglass, and all substitute materials, for tile made in tile-like units; all mixtures in tile like form of cement, metals, and other materials that are for and intended for use as a finished floor surface, stair treads, promenade roofs, walks, walls, ceilings, swimming pools, and all other places where tile is to form a finished interior or exterior. The mixing of all setting mortars including but not limited to thin-set mortars, epoxies, wall mud, and any other sand and cement mixtures or adhesives when used in the preparation, installation, repair, or maintenance of tile and/or similar materials. The handling and unloading of all sand, cement, lime, tile, fixtures, equipment, adhesives, or any other materials to be used in the preparation, installation, repair, or maintenance of tile and/or similar materials. Ceramic Tile Finishers shall fill all joints and voids regardless of method on all tile work, particularly and especially after installation of said tile work. Application of any and all protective coverings to all types of tile installations including, but not be limited to, all soap compounds, paper products, tapes, and all polyethylene coverings, plywood, masonite, cardboard, and any new type of products that may be used to protect tile installations, Blastrac equipment, and all floor scarifying equipment used in preparing floors to receive tile. The clean up and removal of all waste and materials. All demolition of existing tile floors and walls to be re-tiled.

COMMUNICATIONS ELECTRICIAN

Installation, operation, inspection, maintenance, repair and service of radio, television, recording, voice sound vision production and reproduction, telephone and telephone interconnect, facsimile, data apparatus, coaxial, fibre optic and wireless equipment, appliances and systems used for the transmission and reception of signals of any nature, business, domestic, commercial, education, entertainment, and residential purposes, including but not limited to, communication and telephone, electronic and sound equipment, fibre optic and data communication systems, and the performance of any task directly related to such installation or service whether at new or existing sites, such tasks to include the placing of wire and cable and electrical power conduit or other raceway work within the equipment room and pulling wire and/or cable through conduit and the

installation of any incidental conduit, such that the employees covered hereby can complete any job in full.

#### MARBLE FINISHER

Loading and unloading trucks, distribution of all materials (all stone, sand, etc.), stocking of floors with material, performing all rigging for heavy work, the handling of all material that may be needed for the installation of such materials, building of scaffolding, polishing if needed, patching, waxing of material if damaged, pointing up, caulking, grouting and cleaning of marble, holding water on diamond or Carborundum blade or saw for setters cutting, use of tub saw or any other saw needed for preparation of material, drilling of holes for wires that anchor material set by setters, mixing up of molding plaster for installation of material, mixing up thin set for the installation of material, mixing up of sand to cement for the installation of material and such other work as may be required in helping a Marble Setter in the handling of all material in the erection or installation of interior marble, slate, travertine, art marble, serpentine, alberene stone, blue stone, granite and other stones (meaning as to stone any foreign or domestic materials as are specified and used in building interiors and exteriors and customarily known as stone in the trade), carrara, sanionyx, vitrolite and similar opaque glass and the laying of all marble tile, terrazzo tile, slate tile and precast tile, steps, risers treads, base, or any other materials that may be used as substitutes for any of the aforementioned materials and which are used on interior and exterior which are installed in a similar manner.

MATERIAL TESTER I: Hand coring and drilling for testing of materials; field inspection of uncured concrete and asphalt.

MATERIAL TESTER II: Field inspection of welds, structural steel, fireproofing, masonry, soil, facade, reinforcing steel, formwork, cured concrete, and concrete and asphalt batch plants; adjusting proportions of bituminous mixtures.

#### OPERATING ENGINEER - BUILDING

Class 1. Asphalt Plant; Asphalt Spreader; Autograde; Backhoes with Caisson Attachment; Batch Plant; Benoto (requires Two Engineers); Boiler and Throttle Valve; Caisson Rigs; Central Redi-Mix Plant; Combination Back Hoe Front End-loader Machine; Compressor and Throttle Valve; Concrete Breaker (Truck Mounted); Concrete Conveyor; Concrete Conveyor (Truck Mounted); Concrete Paver Over 27E cu. ft; Concrete Paver 27E cu. ft. and Under; Concrete Placer; Concrete Placing Boom; Concrete Pump (Truck Mounted); Concrete Tower; Cranes, All; Cranes, Hammerhead; Cranes, (GCI and similar Type); Creter Crane; Spider Crane; Crusher, Stone, etc.; Derricks, All; Derricks, Traveling; Formless Curb and Gutter Machine; Grader, Elevating; Grouting Machines; Heavy Duty Self-Propelled Transporter or Prime Mover; Highlift Shovels or Front Endloader 2-1/4 yd. and over; Hoists, Elevators, outside type rack and pinion and similar machines; Hoists, One, Two and Three Drum; Hoists, Two Tugger One Floor; Hydraulic Backhoes; Hydraulic Boom Trucks; Hydro Vac (and similar equipment); Locomotives, All; Motor Patrol; Lubrication Technician; Manipulators; Pile Drivers and Skid Rig; Post Hole Digger; Pre-Stress Machine; Pump Cretes Dual Ram; Pump Cretes: Squeeze Cretes-Screw Type Pumps; Gypsum Bulker and Pump; Raised and Blind Hole Drill; Roto Mill Grinder; Scoops - Tractor Drawn; Slip-Form Paver; Straddle Buggies; Operation of Tie Back Machine; Tournapull; Tractor with Boom and Side Boom; Trenching Machines.

Class 2. Boilers; Broom, All Power Propelled; Bulldozers; Concrete Mixer (Two Bag and Over); Conveyor, Portable; Forklift Trucks; Highlift Shovels or Front Endloaders under 2-1/4 yd.; Hoists, Automatic; Hoists, Inside Elevators; Hoists, Sewer Dragging Machine; Hoists, Tugger Single Drum; Laser Screed; Rock Drill (Self-Propelled); Rock Drill (Truck Mounted); Rollers, All; Steam Generators; Tractors, All; Tractor Drawn Vibratory Roller; Winch Trucks with "A" Frame.

Class 3. Air Compressor; Combination Small Equipment Operator; Generators; Heaters, Mechanical; Hoists, Inside Elevators (remodeling or renovation work); Hydraulic Power Units (Pile Driving, Extracting, and Drilling); Pumps, over 3" (1 to 3 not to exceed a total of 300 ft.); Low Boys; Pumps, Well Points; Welding Machines (2 through 5); Winches, 4 Small Electric Drill Winches.

Class 4. Bobcats and/or other Skid Steer Loaders; Oilers; and Brick Forklift.

Class 5. Assistant Craft Foreman.

Class 6. Gradall.

Class 7. Mechanics; Welders.

#### OPERATING ENGINEERS - HIGHWAY CONSTRUCTION

Class 1. Asphalt Plant; Asphalt Heater and Planer Combination; Asphalt Heater Scarfire; Asphalt Spreader; Autograder/GOMACO or other similar

type machines; ABG Paver; Backhoes with Caisson Attachment; Ballast Regulator; Belt Loader; Caisson Rigs; Car Dumper; Central Redi-Mix Plant; Combination Backhoe Front Endloader Machine, (1 cu. yd. Backhoe Bucket or over or with attachments); Concrete Breaker (Truck Mounted); Concrete Conveyor; Concrete Paver over 27E cu. ft.; Concrete Placer; Concrete Tube Float; Cranes, all attachments; Cranes, Tower Cranes of all types; Creter Crane; Spider Crane; Crusher, Stone, etc.; Derricks, All; Derrick Boats; Derricks, Traveling; Dredges; Elevators, Outside type Rack & Pinion and Similar Machines; Formless Curb and Gutter Machine; Grader, Elevating; Grader, Motor Grader, Motor Patrol, Auto Patrol, Form Grader, Pull Grader, Subgrader; Guard Rail Post Driver Truck Mounted; Hoists, One, Two and Three Drum; Heavy Duty Self-Propelled Transporter or Prime Mover; Hydraulic Backhoes; Backhoes with shear attachments up to 40' of boom reach; Lubrication Technician; Manipulators; Mucking Machine; Pile Drivers and Skid Rig; Pre-Stress Machine; Pump Cretes Dual Ram; Rock Drill - Crawler or Skid Rig; Rock Drill - Truck Mounted; Rock/Track Tamper; Roto Mill Grinder; Slip-Form Paver; Snow Melters; Soil Test Drill Rig (Truck Mounted); Straddle Buggies; Hydraulic Telescoping Form (Tunnel); Operation of Tieback Machine; Tractor Drawn Belt Loader; Tractor Drawn Belt Loader (with attached pusher - two engineers); Tractor with Boom; Tractaire with Attachments; Traffic Barrier Transfer Machine; Trenching; Truck Mounted Concrete Pump with Boom; Raised or Blind Hole Drills (Tunnel Shaft); Underground Boring and/or Mining Machines 5 ft. in diameter and over tunnel, etc; Underground Boring and/or Mining Machines under 5 ft. in diameter; Wheel Excavator; Widener (AFSCO).

Class 2. Batch Plant; Bituminous Mixer; Boiler and Throttle Valve; Bulldozers; Car Loader Trailing Conveyors; Combination Backhoe Front Endloader Machine (Less than 1 cu. yd. Backhoe Bucket or over or with attachments); Compressor and Throttle Valve; Compressor, Common Receiver (3); Concrete Breaker or Hydro Hammer; Concrete Grinding Machine; Concrete Mixer or Paver 7S Series to and including 27 cu. ft.; Concrete Spreader; Concrete Curing Machine, Burlap Machine, Belting Machine and Sealing Machine; Concrete Wheel Saw; Conveyor Muck Cars (Haglund or Similar Type); Drills, All; Finishing Machine - Concrete; Highlift Shovels or Front Endloader; Hoist - Sewer Dragging Machine; Hydraulic Boom Trucks (All Attachments); Hydro-Blaster; Hydro Excavating (excluding hose work); Laser Screed; All Locomotives, Dinky; Off-Road Hauling Units (including articulating) Non Self-Loading Ejection Dump; Pump Cretes: Squeeze Cretes - Screw Type Pumps, Gypsum Bulker and Pump; Roller, Asphalt; Rotary Snow Plows; Rototiller, Seaman, etc., self-propelled; Self-Propelled Compactor; Spreader - Chip - Stone, etc.; Scraper - Single/Twin Engine/Push and Pull; Scraper - Prime Mover in Tandem (Regardless of Size); Tractors pulling attachments, Sheeps Foot, Disc, Compactor, etc.; Tug Boats.

Class 3. Boilers; Brooms, All Power Propelled; Cement Supply Tender; Compressor, Common Receiver (2); Concrete Mixer (Two Bag and Over); Conveyor, Portable; Farm-Type Tractors Used for Mowing, Seeding, etc.; Forklift Trucks; Grouting Machine; Hoists, Automatic; Hoists, All Elevators; Hoists, Tugger Single Drum; Jeep Diggers; Low Boys; Pipe Jacking Machines; Post-Hole Digger; Power Saw, Concrete Power Driven; Pug Mills; Rollers, other than Asphalt; Seed and Straw Blower; Steam Generators; Stump Machine; Winch Trucks with "A" Frame; Work Boats; Tamper-Form-Motor Driven.

Class 4. Air Compressor; Combination - Small Equipment Operator; Directional Boring Machine; Generators; Heaters, Mechanical; Hydraulic Power Unit (Pile Driving, Extracting, or Drilling); Light Plants, All (1 through 5); Pumps, over 3" (1 to 3 not to exceed a total of 300 ft.); Pumps, Well Points; Vacuum Trucks (excluding hose work); Welding Machines (2 through 5); Winches, 4 Small Electric Drill Winches.

Class 5. SkidSteer Loader (all); Brick Forklifts; Oilers.

Class 6. Field Mechanics and Field Welders

Class 7. Dowell Machine with Air Compressor; Gradall and machines of like nature.

#### OPERATING ENGINEER - FLOATING

Class 1. Craft Foreman; Master Mechanic; Diver/Wet Tender; Engineer; Engineer (Hydraulic Dredge).

Class 2. Crane/Backhoe Operator; Boat Operator with towing endorsement; Mechanic/Welder; Assistant Engineer (Hydraulic Dredge); Leverman (Hydraulic Dredge); Diver Tender.

Class 3. Deck Equipment Operator, Machineryman, Maintenance of Crane (over 50 ton capacity) or Backhoe (115,000 lbs. or more); Tug/Launch Operator; Loader/Dozer and like equipment on Barge, Breakwater Wall, Slip/Dock, or Scow, Deck Machinery, etc.

Class 4. Deck Equipment Operator, Machineryman/Fireman (4 Equipment Units or More); Off Road Trucks; Deck Hand, Tug Engineer, Crane Maintenance (50 Ton Capacity and Under) or Backhoe Weighing (115,000 pounds or less); Assistant Tug Operator.

Class 5. Friction or Lattice Boom Cranes.

Class 6. ROV Pilot, ROV Tender



SURVEY WORKER - Operated survey equipment including data collectors, G.P.S. and robotic instruments, as well as conventional levels and transits.

#### TERRAZZO FINISHER

The handling of sand, cement, marble chips, and all other materials that may be used by the Mosaic Terrazzo Mechanic, and the mixing, grinding, grouting, cleaning and sealing of all Marble, Mosaic, and Terrazzo work, floors, base, stairs, and wainscoting by hand or machine, and in addition, assisting and aiding Marble, Masonic, and Terrazzo Mechanics.

#### TRAFFIC SAFETY

Work associated with barricades, horses and drums used to reduce lane usage on highway work, the installation and removal of temporary lane markings, and the installation and removal of temporary road signs.

#### TRUCK DRIVER - BUILDING, HEAVY AND HIGHWAY CONSTRUCTION - EAST & WEST

Class 1. Two or three Axle Trucks. A-frame Truck when used for transportation purposes; Air Compressors and Welding Machines, including those pulled by cars, pick-up trucks and tractors; Ambulances; Batch Gate Lockers; Batch Hopperman; Car and Truck Washers; Carry-alls; Fork Lifts and Hoisters; Helpers; Mechanics Helpers and Greasers; Oil Distributors 2-man operation; Pavement Breakers; Pole Trailer, up to 40 feet; Power Mower Tractors; Self-propelled Chip Spreader; Skipman; Slurry Trucks, 2-man operation; Slurry Truck Conveyor Operation, 2 or 3 man; Teamsters; Unskilled Dumpman; and Truck Drivers hauling warning lights, barricades, and portable toilets on the job site.

Class 2. Four axle trucks; Dump Crets and Adgetors under 7 yards; Dumpsters, Tract Trucks, Euclids, Hug Bottom Dump Turnapulls or Turnatrailers when pulling other than self-loading equipment or similar equipment under 16 cubic yards; Mixer Trucks under 7 yards; Ready-mix Plant Hopper Operator, and Winch Trucks, 2 Axles.

Class 3. Five axle trucks; Dump Crets and Adgetors 7 yards and over; Dumpsters, Tract Trucks, Euclids, Hug Bottom Dump Turnatrailers or turnapulls when pulling other than self-loading equipment or similar equipment over 16 cubic yards; Explosives and/or Fission Material Trucks; Mixer Trucks 7 yards or over; Mobile Cranes while in transit; Oil Distributors, 1-man operation; Pole Trailer, over 40 feet; Pole and Expandable Trailers hauling material over 50 feet long; Slurry trucks, 1-man operation; Winch trucks, 3 axles or more; Mechanic--Truck Welder and Truck Painter.

Class 4. Six axle trucks; Dual-purpose vehicles, such as mounted crane trucks with hoist and accessories; Foreman; Master Mechanic; Self-loading equipment like P.B. and trucks with scoops on the front.

#### Other Classifications of Work:

For definitions of classifications not otherwise set out, the Department generally has on file such definitions which are available. If a task to be performed is not subject to one of the classifications of pay set out, the Department will upon being contacted state which neighboring county has such a classification and provide such rate, such rate being deemed to exist by reference in this document. If no neighboring county rate applies to the task, the Department shall undertake a special determination, such special determination being then deemed to have existed under this determination. If a project requires these, or any classification not listed, please contact IDOL at 217-782-1710 for wage rates or clarifications.

#### LANDSCAPING

Landscaping work falls under the existing classifications for laborer, operating engineer and truck driver. The work performed by landscape plantsman and landscape laborer is covered by the existing classification of laborer. The work performed by landscape operators (regardless of equipment used or its size) is covered by the classifications of operating engineer. The work performed by landscape truck drivers (regardless of size of truck driven) is covered by the classifications of truck driver.

#### MATERIAL TESTER & MATERIAL TESTER/INSPECTOR I AND II

Notwithstanding the difference in the classification title, the classification entitled "Material Tester I" involves the same job duties as the classification entitled "Material Tester/Inspector I". Likewise, the classification entitled "Material Tester II" involves the same job duties as the classification entitled "Material Tester/Inspector II".



# FACT SHEET

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## **TOPIC: Fire Equipment Self-Inspection Program**

### **STATEMENT**

Fire protection equipment requires both periodic maintenance for reliable operation and frequent inspections of such items as sprinkler control valves to verify they are in the open position. Fire protection systems are not an integral part of day to day operations and are often taken for granted. Each year, shut sprinkler control valves, plugged sprinkler piping and inoperative fire pumps result in millions of dollars in property losses, loss of business and jobs, and loss of life.

If automatic sprinkler systems, fire pumps, portable fire extinguishers, fire doors, etc. are installed in your facility, they should be inspected, tested and maintained in accordance with the applicable NFPA (National Fire Protection Association) standard (i.e. NFPA 25, "Inspection, Testing and Maintenance of Water Based Fire Protection Systems", covers details of inspecting and maintaining automatic sprinkler systems). NFPA 25 has been adopted by most state and local authorities as the standard for their local fire inspectors to use. The criteria presented herein has been taken from NFPA 25 and adapted to suit your individual needs. In all cases check with the authority having jurisdiction in your community to see that you are meeting their requirements.

An effective self-inspection, maintenance and testing program for fire protection equipment will require several essential elements. The guidelines listed will assist in your efforts to establish an effective self-inspection program.

### **DISCUSSION**

#### **Elements of an Effective Self-Inspection Program**

The responsibility for supervision of fire protection systems rests with management and designated personnel responsible for the equipment. Employees responsible for system supervision should be familiar with fire protection equipment and know how to operate equipment during an emergency.

If the services of a contractor are to be used to perform maintenance and testing, the contractor should furnish a written report. The report should include completed self-inspection forms. An employee should accompany the contractor during the testing to become familiar with the equipment in the event the equipment must be operated during an emergency. A contract with a sprinkler contractor should not reduce the frequency of recommended inspections or change the need for other recommended maintenance practices outlined in NFPA 25.

#### *Sprinkler Control Valves*

All fire protection system control valves larger than 1 1/2 inch or those controlling more than five sprinklers should be locked open using non-breakable locks. This includes electrically supervised valves. Locks and chains should be sturdy and resistant to breakage except by heavy bolt cutters. If valves are in a locked room,

with limited access, this will satisfy the control requirement.

### *Self-Inspection Forms*

Since the number, type and complexity of fire protection systems will vary depending on the size of your facility, customized self-inspection forms are needed for sprinkler control valves, portable fire extinguishers, fire pumps, dry pipe valves, etc. Such forms not only serve as a guide for conducting inspections but provide a method of proper recordkeeping. The inspector should carry the form and use it as a checklist. It should be filled in as rounds are made, not after the completion of an inspection. (See Sample Forms - Table 2, 3 and 4) Monthly sprinkler inspections can be added and customized as part of monthly building inspection form.

### *Frequency of Inspection*

The frequency of inspection of fire protection equipment depends on numerous factors. For example, dry pipe systems may need to be checked daily in the winter; but less frequent checks would be acceptable in the summer. Table 1 lists the recommended frequency for testing and maintenance of critical sprinkler system components. NFPA 25 also provides recommendations regarding the minimum recommended frequency for inspecting /testing fire protection equipment.

### *Record Keeping*

A copy of all inspection and testing records should be maintained on file for review by your PDRMA loss control representative and other regulatory agencies.



## **Frequency of Inspection & Maintenance Procedures for Fire Protection Equipment**

### **Daily**

#### **Dry Pipe Sprinkler Systems:**

During freezing weather, the area where **dry pipe valves** are located should be checked to assure adequate heat.

### **Weekly**

#### **All Sprinkler Systems Wet/Dry:**

Visually inspect all sealed and unlocked electrically supervised control valves to verify they are in the open position (the frequency of inspections for locked valves may be reduced to monthly).

### **Monthly**

#### **All Sprinkler Systems Wet/Dry:**

- Visually inspect sprinkler risers to make sure they are accessible, free and clear of storage.
  
- Inspect condition of sprinkler heads to make sure they have not been painted or otherwise impaired. The following areas should receive additional attention:
  - Sprinklers in storage areas should be checked to make sure they are not blocked by storage. Note: An 18-inch clear space must be maintained below sprinklers to assure an adequate discharge pattern.
  
  - Sprinklers in pool or pool mechanical rooms should be inspected for excessive corrosion resulting from exposure to caustic chemicals.
  
  - Gymnasium sprinklers should be inspected for damage from projectiles. In addition sprinklers should be fitted with guards. Missing or damaged guards should be replaced.
  
- Inspect fire department connections. Connections should be accessible and visible at all times. Caps or plugs should be in place and threads clean undamaged and lightly lubricated with graphite. If cap is missing make sure the connection is free of foreign objects before replacing cap.

#### **Sprinkler Control Valves:**

Locked control valves should be visually inspected to verify they are in the open position.

#### **Sprinkler Pressure Gauges:**

Inspect sprinkler riser water pressure gauges and record the normal pressure on the gauge or a tag attached to it. A loss of pressure of more than 10 percent should be investigated.

#### **Dry Pipe Sprinkler Systems:**

Inspect air pressure and water pressure gauges. Be sure that air and water pressures are within the normal range for that particular system. (Determine "normal" with sprinkler contractor at annual inspection)

### **Fire Pumps:**

Electric motor driven pumps should be operated for a period of at least 10 minutes once a month. This is commonly referred to as “churn testing”. If fire pumps are arranged for automatic run times using a programmable timer, someone should be located in the Pump Room to verify the pump operates properly.

During the churn test the fire pump suction and discharge pressures should be recorded, the circulation relief valve should be visually inspected to make sure it is flowing water, the fire pump packing should be inspected to make sure water is dripping, check for unusual noise or vibration and check packing boxes, bearings or pump for overheating. The results of the monthly pump test should be recorded on a self-inspection form See Table 4.

### **Portable Fire Extinguishers:**

Portable Fire Extinguishers should be inspected to make sure the extinguisher is properly hung on the wall and is accessible, has not been discharged and the pressure gauge indicates satisfactory.

## **Semi-Annually**

### **All Sprinkler Systems Wet/Dry:**

Before operating any automatic sprinkler system component place the fire alarm system into test mode and notify the alarm company and fire department. When testing is complete verify that the alarms were received by the monitoring station.

### **Wet Pipe Sprinkler Systems:**

Test water flow alarms by opening the inspector's test connection. This test simulates the flow of water from one sprinkler head and should activate the water motor alarm as well as any flow or pressure switch. An alarm should be received at the alarm panel within 90 seconds, if not the alarm should be investigated.

### **\*\*\*\*Dry Pipe Sprinkler Systems:**

To be performed by a qualified Sprinkler Contractor or trained personnel familiar with dry pipe valve operation – Please note this information is being provided so agency staff will have knowledge of test being conducted by the contractor. These are not specific instructions for conducting the process.

- Test the dry-pipe sprinkler's water flow alarm by opening the by-pass alarm test valve to simulate sprinkler water discharge.
- Test the dry pipe valve's low air pressure supervisory alarm.

### **Valve Tamper Alarms:**

All valve tamper alarms should be physically tested by partially closing the sprinkler control valves. A supervisory alarm should be received each time the alarm valve is closed.

### **Two Inch Main Drain Testing:**

Conduct a 2 in. drain test. Record static and residual pressure readings. If you have both a wet and a dry riser off of the same city feed line, run test only on wet riser, and record information. If you have only a dry pipe riser, you should only run the 2-in drain test as part of the annual testing as done by a sprinkler contractor. **Note:** Running the 2 in. drain test on dry pipe risers may accidentally trip the system and flood the lines with water requiring the system to be drained and the valve reset. Testing a dry pipe system should only be done by a sprinkler contractor.

A main drain test should be conducted any time a sprinkler control valve is closed and reopened to verify that the valve has fully opened.

## **Annually**

### **Sprinkler System Control Valves:**

Operate valves the full travel of their mechanisms to make sure they operate easily. Lubricate all OS&Y valve stems with graphite or graphite in light oil. Valves should be fully closed and reopened to test their operation and distribute lubricant to valve stems.

### **Dry Pipe Sprinkler Systems & Antifreeze Solutions:**

To be performed by a qualified Sprinkler Contractor – Please note this information is being provided so agency staff will have knowledge of test being conducted by the contractor. These are not specific instructions for conducting the process.

### **Dry Pipe Valve:**

Conduct dry pipe valve trip test on an annual basis. A throttled test should be conducted for two consecutive years followed by a full flow test every third year. The throttled test is conducted by turning the main control valve toward the closed position (leave the valve a few turns open) and tripping the system using the inspector's connection. Immediately following trip of the dry valve the main control valve should be closed to prevent water induction into the system.

A full trip test should be conducted every third year with the main control valve in the fully open position. The test should be terminated when clean water flows from the inspector's test connection. Open the alarm bypass valve.

### **Hydraulic Name Plate:**

Inspect sprinkler Risers to make sure the systems are labeled with a description of the area of the building the system covers. If system was hydraulically calculated, assure nameplate is legible and securely attached to riser.

### **Antifreeze Systems:**

The freezing point of solutions in antifreeze shall be tested annually by measuring the specific gravity with a hydrometer or refractometer and adjusting the solutions if necessary.

### **Fire Pump Tests:**

*Note: Only competent personnel, fully instructed with respect to details and operations of fire pumps, should attempt this test. It is suggested that a Sprinkler contractor perform this testing.*

Conduct the annual full flow test in accordance with NFPA 20, "Standard for the Installation of Stationary Pumps for Fire Protection". The test is accomplished by flowing water through the pump test header and comparing test results with the manufacturer's certified test curve. NFPA 20 requires the pump to be flow tested at 100% and 150% of its rated flow capacity. Underwriters listed play pipes should be used during test and attached directly to the pump header or hose nozzle.

### **Portable Fire Extinguishers:**

Annually all units should be inspected serviced and tagged with inspection date, by outside service contractor.

### **Other Fixed Extinguishing System:**

Any other fixed extinguishing system, with single source compressed gas cylinder based extinguishing agent, should be serviced and checked annually and be tagged with most recent inspection date. These systems may be found protecting high value computer equipment or cooking areas.

## **10 Years:**

### **Dry-Pendent Sprinklers:**

Replace dry-pendent sprinklers every ten years or have a representative sample (1%) sent to UL laboratories for testing to make sure they are functioning properly.

## **Miscellaneous:**

### **Sprinkler Impairment:**

Annually review with all affected personnel, the sprinkler impairment and notification policy. (Call PDRMA for Sprinkler Impairment Permit Kit.)

### **What is the reason for the Sprinkler Impairment System?**

The reality is that in fully sprinklered buildings that experienced a fire, 96.4% of the time the sprinkler system either controlled or extinguished the fire. In the other 3.6% of the cases one of the most reoccurring reasons why the sprinkler system did not control or extinguish the fire, was that the water supply **valves were closed!!**

When a sprinkler impairment occurs, the valves are closed to make repairs. It is at this time when the building is most vulnerable because the system is turned off. One of the purposes of the Impairment Program is to cause you to look at other methods of protection and exposure reduction during this time. You should explore additional building security patrols and facility monitoring until the system is restored. Also, you should consider suspending any high risk activities, such as cooking, smoking, or any hot work during the impairment.

The second part of the program, when used appropriately, is that PDRMA will follow up to assure that once the repair work is complete, the water supply **valves are reopened**. The Sprinkler Impairment Permit System Kit is available through PDRMA, and can help lead you through this process.

### **REMEMBER:**

When they occur, call in your impairments to:

**PDRMA at 630-769-0332  
or FAX 630-769-0449**

**Table 2**

## **AUTOMATIC SPRINKLER SYSTEMS - Monthly Inspection**

**SYSTEM** \_\_\_\_\_ **YEAR** \_\_\_\_\_

1. Date of inspection.
2. Inspector's name, initials or badge number.
3. If fire department connections are unobstructed and in good condition, note "OK" in block. If not, see that corrections are made and briefly described under "notes."
4. If valves are locked or the room otherwise secured, note "yes" in this block. If any are not locked, relock and note "relocked" in this block.
5. Verify that sprinkler risers, valves alarm, devices are not damaged and that they are accessible, free and clear of storage.
6. Assure there is proper number and type of sprinklers and a sprinkler wrench.
7. Check sprinklers for physical damage, obstructions, paint, etc.
8. Record pressure readings (psi). A loss of more than 10% should be investigated.
9. Check portable fire extinguishers to make sure that they are in the proper location and are in good condition.
- 10 Record any notes about the system which the inspector believes to be significant. Place a number in this block and number the corresponding note at the end of the inspection form.

1 DATE	2 INSPECTOR	3 FIRE DEPARTMENT CONNECTION	4 VALVES LOCKED (Yes/No)	5 RISER/VALVE ACCESSIBLE (Yes/No)	6 SPARE SPRINKLERS	7 CONDITION OF SPRINKLERS	8 WATE R PRES.	9 PORTABLE FIRE EXT.	10 NOTES

Notes:

**Table 3**

**AUTOMATIC SPRINKLER SYSTEMS –  
Semi-Annual/Annual Inspection and Tests**

**SYSTEM** \_\_\_\_\_ **YEAR** \_\_\_\_\_

<b>DATE</b>		
<b>INSPECTOR</b>		
<b>SEMI-ANNUAL</b>		
<b>WET PIPE SYSTEM FLOW ALARM</b> Test water flow alarms by opening the inspectors test valve. Once valve is opened record time till alarm sounds (must be received within 90 seconds).		
<b>CONTROL VALVE SUPERVISORY ALARM</b> Test supervisory alarm by partially closing and re-opening the valve.		
<b>*MAIN DRAIN TEST</b> Conduct a main drain test as follows:		
1. Record the static water supply pressure (psi) as indicated on the lower pressure gauge.		
2. Open the main drain and allow water flow to stabilize.		
3. Record the residual water supply pressure while water is flowing from the 2- inch main drain as indicated on the lower pressure gauge.		
4. Close the main drain (slowly).		
<b>ANNUAL</b>		
<b>*CONTROL VALVES</b> Operate valves the full length of travel and lubricate as necessary.		
<b>DRY PIPE VALVE</b> Partial or Trip Test Completed by Contractor		
<b>FIRE PUMP</b> Annual Full Flow Test Completed by Contractor		
<b>ANTIFREEZE SYSTEM</b> Contractor completed check of glycol solution		
<b>SPECIAL EXTINGUISHING SYSTEM</b> Contractor tested Kitchen or Computer Room Special Ext. System.		
<b>PORTABLE FIRE EXTINGUISHERS</b> Contractor serviced and tagged all Portable Fire Extinguishers		

\*Conduct two Inch main drain test after closing and re-opening valves to make sure valves re-open fully.

Notes:

**Table 4**

**Monthly Fire Pump Churn Test –**

**Pump** \_\_\_\_\_ **YEAR** \_\_\_\_\_

Inspector	Date	Suction Pressure (PSI)	Discharge Pressure (PSI)	Relief Valve Operating? (Yes/NO)	Packing Slow Drip? (Yes/No)	House-Keeping Adequate? (Yes/No)	Overall Condition Good? (Yes/No)

Notes:

**TOPIC:           Cutting/Welding Procedure Tips**

Cutting/welding projects can be extremely dangerous activities if the proper precautions are not taken. Agencies should ensure that staff is properly trained, the proper personal protective equipment is used and the work area is properly inspected prior to performing any cutting or welding projects. Attached is a pre-work checklist and procedures for fire watch/work area monitoring that should be considered prior to starting any project.

**Pre Work Checklist**

- Supervisor completes a hot work permit and a copy is retained.
- Any compressed gas cylinders to be moved in a vehicle must be firmly secured in an upright position, strapped or chained in place, and all safety caps securely screwed in place.
- Verify that sprinkler systems, fire extinguishers, or water hoses are in good working condition.
- Inspect all hot work equipment to make sure that it is in good working condition.
- The following personal protective equipment is made available and is used:
  - Face shield/proper eye lenses
  - Leather gloves
  - Leather gauntlets, long sleeve shirt, pants, etc.
- Evaluate these fire safety precautions within 35 feet of the work area:
  - Ensure the atmosphere does not contain explosive chemicals.
  - Remove any flammable liquids, paper or related items from the work area.
  - Use fire resistant tarps or metal shields over floors, walls, or other openings.
  - Sweep the floor of any debris.
  - Wet down combustible floors, walls and related areas when possible.

**Fire Watch/Work Area Monitoring**

- There should be at least one employee provided for an onsite fire watch for at least 60 minutes following the completion of the hot work.
- The fire watch should be provided with an appropriate fire extinguisher or water hose and communication device.
- The fire watch should look for signs of heat, smoke, etc. which may occur in the hot work area. Also, look for signs of fire above or below ceilings and on both sides of walls and floors.
- In the event a fire is noted, the employee should immediately sound the fire alarm and call the fire department. The fire watch can then attempt to extinguish the fire. Fires that occur in walls or between floors may be difficult to extinguish after they have been smoldering. For this reason, it is very important that the fire department be contacted so that they can conduct a professional assessment to determine if the fire is fully extinguished.
- The hot work area should be inspected approximately 4 hours after the job is completed to again ensure that no fire is present.