

SECTION 23 00 05 - BASIC MECHANICAL REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The General Provisions of the Contract, including General and Supplementary Conditions and Division 1 - Specification Sections and Contract Documents apply to work in this section. Consult them for further instructions and be governed by the requirements there under.

1.2 SUMMARY OF WORK

- A. Description of Systems
 - 1. The work of Division 23 includes but is not limited to Heating, Ventilating and Air Conditioning Systems.
- B. Work Included
 - 1. Furnish all labor and materials and perform all operations necessary for the installation of complete and operating mechanical systems subject to the conditions of the contract. The work also includes the completion of such mechanical and electrical details not mentioned or shown which are necessary for the successful operation of all systems; this includes the furnishing of all materials for filling systems to make them operable, including water, refrigerant, oil and grease. Prove satisfactory operation of all equipment and controls to the Consulting Mechanical Engineer on request.
- C. Work Not Included (Specified Elsewhere)
 - 1. Certain labor and materials may be furnished and/or installed under other divisions of these specifications. Coordinate with other trades and arrange the work to make the parts fit together. The following items are to be accomplished under other divisions of these specifications.
 - 2. Fixed concrete bases for mechanical equipment: Division 3. Anchor bolts, setting diagrams, base sizes and other required information furnished under Division 15.
 - 3. Concrete for inertia bases for mechanical equipment: Division 3. Steel forms provided under Division 15.
 - 4. Concrete surrounding buried ductwork: Division 3. Tie downs for buried ductwork under Division 15.
 - 5. Masonry wall opening lintels: Division 4.
 - 6. Wall openings and Chases: Under applicable sections according to information furnished under Division 23.
 - 7. Access Panels: Furnished and located by Division 23 installer as specified in Division 8 for installation by appropriate trades.
 - 8. Painting (except mechanical identification systems): Division 9.
 - 9. Roof Curbs
 - a. Curbs for all equipment located on the roof shall be furnished under Division 6 except for any prefab curbs specified herein. Roof flashings to be specified under Division 7. All counter flashing shall be furnished and installed by this Contractor of the same material as specified in Division 7.
- D. Equipment Furnished by Owner
 - 1. General: Also see Division 1.
 - 2. Rough-in service pipes to locations as required by architectural and mechanical drawings and equipment shop drawings. Provide service valves on all pipes except waste and vent pipes, plug

or cap these. Final connections to equipment will be made by MC. (This Contractor will provide all necessary equipment or items required for final connections to equipment).

E. Examination of Premises

1. Visit the premises before submitting bid as no extras will be allowed for lack of knowledge of existing conditions.

F. Inspection

1. Inspect work proceeding or interfacing with work of Division 23 Sections and report any known or observed defects that affect the work to the General Contractor. Do not proceed with work until defects are corrected.

G. Definitions

1. "Provide" means Contractor is responsible for the furnishing and installation of.
2. "Exposed" means visible from the floor of a room or area.
3. "Concealed" means in such spaces as pipe chases, pipe trenches, above plaster ceilings, in walls and buried where pipe is inaccessible when building is completed.
4. "Conditioned" space, means any space which is within the exterior insulation boundary or layer and is heated by the mechanical system or by an adjacent space. Mechanical rooms and ceiling plenums are classified as "conditioned" spaces.
5. "Mechanical Room" means any space or area which contains equipment providing heating, cooling, ventilation, plumbing distribution, or mechanical/plumbing system utility generation and distribution capabilities. These spaces are defined as "Mechanical Rooms" even if they are called by another name (i.e. boiler room, chiller room, machine room, etc.).

1.3 COORDINATION

A. General

1. Coordinate and order the progress of mechanical work to conform to the Owner's schedule and the progress of the work of the other trades. Complete the entire installation as soon as the condition of the building will permit.

B. Utility Interruptions

1. Coordinate mechanical utility interruptions with the Owner and the Utility Company. Plan work so that duration of the interruption is kept to a minimum.

C. Cutting and Patching

1. See Division 1.

D. Drawings and Specifications

1. Mechanical drawings are diagrammatic and because of the small scale, it is not possible to indicate every required offset, fitting, etc. Drawings are not to be scaled for dimensions. Take all dimensions from Architectural drawings, certified equipment drawings and from the structure itself before fabricating any work. Verify all space requirements, coordinating with other trades, and install the systems in the space provided without extra charges to the Owner.
2. Examine Drawings and Specifications for other parts of the work, and if any discrepancies occur between the plans for the work of this Division and the plans for the work of others, report such discrepancies to the General Contractor and obtain written instructions for any changes necessary.
3. All documents are complimentary. What is required by one document is binding as if by all.

E. Ceiling Cavity

1. Confer, cooperate, and coordinate work with other trades. Coordinate ceiling cavity space carefully with all trades. In event of conflict, install mechanical and electrical systems within cavity space in following order of priority.
 - a. Plumbing waste and vent piping
 - b. Roof drain piping

- c. Hydronic piping
- d. Ductwork
- e. Electrical conduit and lighting
- f. Domestic hot and cold water piping
- g. Fire sprinkler piping.

1.4 REFERENCE STANDARDS

- A. For products or workmanship specified by association, trade, or Federal Standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. The date of the standards that is in effect at the bid date, or date of Owner/Contractor Agreement when there are no bids, except when a specific date is specified or when the standard is part of an applicable code which includes an edition date.
- C. When required by individual Specification section, obtain copy of standard. Maintain copy at job site during work until Substantial Completion.
- D. Schedule of Referenced Organizations. See Division 1.

1.5 SUBMITTALS

- A. Submit samples, shop drawings and product data as required by various sections of Division 23 in accordance with Division 1. Make submittals to Architect. Do not make submittals directly to Engineer.

1.6 SUBMITTALS AND SHOP DRAWINGS

- A. Conform to requirements of Division 1 and following paragraphs.
- B. Submittals shall include catalog cut-sheets, manufacturer's data sheets, written descriptions, and specification sheets detailing the associated product, item, and assembly.
- C. Shop drawings shall include details, installation drawings, assembly drawings, fabrication drawings, diagrams, and other information which show adaptation or installation of Contractor-furnished products or materials for overall project.
- D. Prior to ordering equipment or beginning installation work, assemble, prepare, and furnish submittals and shop drawings required for project. Furnish submittals and shop drawings as required by individual sections of specifications.
- E. Contractor shall thoroughly check subcontractors' or vendors' submittals and shop drawings and, after approving them, submit them for review. Submittals and shop drawings that do not bear Contractor's review stamp will be returned Not Reviewed.
- F. The purpose of submittals and shop drawings is to ensure that Contractor understands design requirements and demonstrates understanding by indicating and detailing intended materials, methods, and installation practices. Submittals and shop drawings are not a method of requesting substitutions or deviation from Specifications. If discrepancies between submittals, shop drawings, and Contract Documents are discovered either prior to or after submittals and shop drawings are reviewed, requirements of Contract Documents shall take precedence. Submittals and shop drawings which are submitted, but which are not required by Contract Documents, will be returned Not Reviewed.
- G. Review of submittals and shop drawings and action recommended as result of review is courtesy extended to Contractor by Owner's representative. This review is intended to minimize delivery to job site and installation of materials and equipment that do not meet intent of Construction Documents. Submission of material for review does not alter Contractor's obligation to follow intent of Construction Documents, nor Contractor's responsibility to comply therewith.
- H. Submittals and shop drawings shall identify specific equipment with numbers or letters identical to those listed or scheduled on the Drawings or Specifications.

- I. Each set of submittals and shop drawings submitted or re-submitted shall bear a unique Contractor's submittal number. Submit minimum of copies as required by Division 1. After review, submittals and shop drawings will be returned together with Submittal Review Sheet which indicates comments on submittals and shop drawings and with specific actions such as: No Exception Taken; Make Corrections Noted, Re-submittal Not Required; Make Corrections Noted, Re-submittal required; Rejected; Not Reviewed. Continue to re-submit submittals and shop drawings until No Exception Taken or Make Corrections Noted, Re-submittal Not Required action is indicated.

1.7 RECORD DOCUMENTS

- A. Keep in custody during entire period of construction, a current set of documents indicating changes that have been made to the Contract Documents. Changes to be noted on the documents shall include but shall not be limited to piping or ductwork location more than 2'-0" from where shown on Drawings, changes in pipe and duct size, location of valves and cleanouts. Mark valve tag numbers on Drawings. Incorporate Addenda, accepted Alternates, Change Orders, and other Document revisions which occurred after the award of the General Contract or the start of construction activities into the Record Documents. Notations and changes shall be done in a neat and legible manner in accordance with Architect's instructions. Changes shall be noted in red, deletions in green, and notes in blue.
- B. Upon completion of work, submit the complete set of Record Documents to the Architect. The Contract Documents set the standard for content and methods of presentation for the changes shown.
- C. The Contract shall not be considered completed until these Record Documents have been reviewed and accepted by the Architect.

1.8 DELIVERY, STORAGE, HANDLING

- A. Provide delivery and safe storage of materials and equipment. Make provisions for introduction into building of equipment too large to pass through finished openings. Provide for hoisting of equipment.

1.9 PROTECTION OF EQUIPMENT

- A. Protect materials and equipment from physical damage, construction dirt, and the elements from time of shipment to time installation is accepted by Owner.
- B. Protect mechanical work against theft, injury, or damage from all causes.

1.10 GUARANTEE

- A. Guarantee materials, workmanship, and operation of equipment installed for period of one year from date of acceptance of entire Work. Repair or replace any part of work which shows defect during that time.
- B. Be responsible for damage to property of Owner or to work of other contractors during construction and guarantee period.
- C. Furnish equipment warranties to Owner.

PART 2 - PRODUCTS – Not Used

PART 3 - EXECUTION

3.1 MECHANICAL EQUIPMENT WIRING AND CONNECTIONS

- A. Voltage characteristics shall be as in Electrical Division of Specifications and on Electrical Drawings.

3.2 DEMOLITION

BASIC MECHANICAL REQUIREMENTS

- A. During demolition, carefully remove existing equipment, piping, ductwork, and related items as required for Work. Tag items, protect from damage, and store as directed by Owner. Deliver list of items stored to Owner. At completion of work or when directed by Architect, remove from job site stored items not reused or wanted by Owner.
- B. Hazardous material may exist at job site. If hazardous material is discovered, stop work in that area, notify Architect. Owner will remove hazardous material. Do not resume work in that area until notified to do so by Owner.
- C. Dispose of or recycle refrigerant and refrigeration equipment in accordance with State and Federal regulations. Capture and recycle to be performed by District. Contractor shall coordinate with the District and notify District a minimum 1 week prior to demolition.

3.3 CUTTING AND PATCHING

- A. Locate all holes and chases required for work during progress of construction; provide properly sized metal sleeves or wood boxes for sleeving. Before beginning sleeving or installation work, study Contract Drawings and check piping, ductwork, equipment locations for interference with other trades. If conflicts are discovered, submit recommended solution for approval prior to installation. Do all cutting, repairing, structural reinforcing for installation of work per Architect's directions. Do not cut for any reason without Architect's approval.
- B. Sleeves and chases are prohibited in any structural member except where approved by Architect.
- C. Cut and patch all openings in existing walls, floors, and roof as required for ductwork and piping. Patching consists of completing work to match and blend in with adjoining existing work. Patches which are not properly blended shall be redone. Do patching work with craftsmen qualified and skilled in type of patching work required.

3.4 TEMPORARY FACILITIES

- A. Light, Heat, Power, Etc.: Provide temporary power supply or other facilities required for Work. Arrange with proper parties to bring facilities from services to required location on premises.
- B. Use of Existing Equipment for Temporary Heating or Cooling: Do not use new or existing building equipment without written permission from Owner. If building equipment is used for temporary heating or cooling, it shall be adequately maintained per manufacturer's instructions and protected with filters, strainers, controls, reliefs, etc. Guarantee period shall not start until equipment is accepted by Owner.

3.5 INSPECTIONS

- A. Do not cover up or enclose work until inspected, tested, and approved. Any work enclosed or covered up before such approval shall be uncovered, tested, and approved.

3.6 ACCESS DOORS

- A. Furnish hinged steel access doors with concealed latch, whether shown or not, in walls and plaster or gypsum board ceilings for access to concealed valves, shock arresters, air vents, motors, fans, balancing valves, or other operating devices requiring adjustment or servicing.
- B. Access door shall be size of equipment to be removed or 24" by 24" if used for service only.
- C. Furnish doors to trades performing work in which they are to be installed. Group valves, devices, and other equipment, to permit use of minimum number of access doors.
- D. Doors shall be type compatible with finish in which they are to be installed.

3.7 SUPERVISION

- A. Supervise work to proceed in proper sequence without delay to other contractors. Keep supervisor on premises at all times to ensure that intent of Drawings and Specifications is being followed.

3.8 INSTALLATION

- A. Workmanship shall be first quality. Appearance of work shall be of equal importance to its mechanical operation. Lack of quality workmanship shall be reason for rejection of system in part or in whole.
- B. Install so that all valves and equipment can be easily accessed and serviced by adequate clearance, installation of access doors, unions in piping, or other methods.
- C. Complete installation shall function smoothly and noiselessly.
- D. Install equipment and materials per manufacturers' recommendations and local codes or regulations.
- E. Place or replace all equipment nameplates where they can be seen and read without difficulty.

3.9 LUBRICATIONS OF EQUIPMENT

- A. Lubricate equipment before operating and before turning over to Owner.

3.10 TESTING

- A. All tests specified herein and/or called for by authorities having jurisdiction shall be witnessed by Architect or Owner.
- B. Upon completion of the work, deliver certificates of inspection and final approval to Owner.

3.11 SYSTEM START-UP AND TESTING

- A. Start up and test all equipment per manufacturer's instructions. Operate system to establish proper operation and performance. Make necessary adjustments and corrections.
- B. Owner shall be present as start-up. Provide minimum 3-days notification to owner when start is to occur.
- C. Certify to Owner in writing that system has been operated and tested and is operating to design performance requirements.

3.12 COMPLETION

- A. Clean insulation covering, ducts, pipes, equipment, and accessories to receive prime coat of paint. Clean equipment received with prime coat to receive final coat.
- B. Replace air filters if units were operated during construction. Clean ducts, blowers, and coils if units were operated without filters during construction.
- C. Instruct Owner in operation and maintenance of mechanical systems. Minimum participants shall include mechanical contractor and controls contractor representatives.
- D. After tests and adjustments have been made and systems pronounced satisfactory for permanent operation, refinish damaged finish and leave everything in proper working order and appearance.
- E. On completion of work, remove tools, scaffolding, debris, etc., from grounds and leave premises clean.

3.13 PROJECT CLOSE-OUT

- A. Upon written notice from the Contractor certifying that the work is complete and ready for inspection, Engineer will prepare punchlist of items determined to be incomplete or otherwise not in compliance with intent of Contract Documents.
- B. When required, subsequent visit to review completion of punchlist work will be made after receipt of written statement from Contractor indicating punchlist work is complete. Include copies of intermediate observation reports and final punchlists with individual items initialed by Contractor to attest that individual work items are completed.
- C. Contractor shall pay Engineer's costs at the billing rates in effect at the time the services are performed for subsequent punch list visits required due to lack of completion of prior punch list.

3.14 OPERATION AND MAINTENANCE MANUALS

- A. Prior to completion of project, submit three (3) sets of maintenance manuals covering operation and maintenance of mechanical equipment with moving or movable parts, including plumbing systems. Instructions shall be in pamphlet or typewritten form in three ring binders. Instructions for each unit shall be indicated by separate tab.
- B. Include test and balance report.
- C. Include valve tag list.
- D. Include name, address, and telephone number of party to be contacted for 24-hour service for each item of equipment.
- E. Include starting, stopping, lubrication, preventative maintenance schedule, and adjustment information for each piece of equipment.
- F. Include guarantees and warranties of all equipment.

END OF SECTION 23 00 55