SECTION 230010

BASIC MECHANICAL REQUIREMENTS

PART 1 GENERAL

1.1 STIPULATIONS

A. The specifications sections “General Conditions of the Construction Contract”, “Special Conditions”, and “Division 1 - General Requirements” form a part of this Section by this reference thereto, and shall have the same force and effect as if printed herewith in full.

1.2 RELATED DOCUMENTS

A. The word drawings is inclusive of all drawings contained in the contract documents. Work pertaining to Division 23 may be contained in any drawing, any specification section, the General or the Supplementary Conditions. The presentation of requirements in separate specification sections, specification divisions, or individual drawing groupings (M, P, E, S, C, or A) is not intended to scope the work into separate subcontracts nor limit the work in any fashion. The contract documents work as a whole and the Contractor is required to provide all work (materials, equipment, and labor) as required to fully accomplish and make operational and complete all mechanical and plumbing work as reasonably inferable by any portion of the contract documents (drawings and specifications of all section). In case of conflict in quantities of work indicated between any drawing or specification the contractor is to provide the greatest number and/or amount of work, including providing all supporting infrastructure reasonably inferable.

1.3 SUMMARY

A. This Section specifies the basic requirements for mechanical installations and includes requirements common to more than one section of Division 23. It expands and supplements the requirements specified in sections of Division 1.

1. Submittals
2. Record documents
3. Maintenance manuals
4. Rough-ins
5. Mechanical installations
6. Cutting and patching
7. Warranties
8. Factory Start-up and Training
9. Cutting and Patching

B. Related Sections: The following sections contain requirements that relate to this section:

1. Division 23 Section "Common Motor Requirements for HVAC Equipment", for factory-installed motors, controllers, accessories, and connections.
2. Division 23 Section "Basic Mechanical Materials and Methods", for materials and methods common to the remainder of Division 23, plus general related specifications including:
3. Division 23 Section “Commissioning”, for the commissioning process of all mechanical equipment.

1.4 SUBMITTALS

A. General: Follow the procedures specified in Division 1 Section "Submittals."

B. Submittal Register: Provide a submittal register for all Division 23 and 26 work, including but not limited to: product data, shop drawings, certified data, and quality assurance reports. The submittal register shall be submitted with the first Division 23 and 26 submittal package sent to for engineer review.

C. Equipment and material submittals shall be grouped together to allow review of groups of items whenever possible. All equipment and preconstruction submittals, with the exception of coordination drawings and controls, shall be submitted in no more than four groups. Submittals may be issued electronically (except for the Operation and Maintenance Manuals); however, a minimum of one hard copy shall be issued directly to the Engineer for the Engineer's record. Hard copy submittals shall be enclosed in hard back covers (preferably 3 ring binders) identifying the project and name and phone number of the individual responsible for the submittal. First page of each submittal section shall have a blank area to receive the Architects/Engineer shop drawing stamp in addition to the area for the General Contractor’s approval stamp.

D. The contractor is responsible for complying with all contract requirements. Checking of submittals by the architect or engineer is only for general conformance with the design concept of the project and general compliance with the information given in the contract documents. Any action indicated by the architect or engineer is subject to the requirements of the contract documents. Should the architect or engineer miss catching an error or feature in the submittal that does not comply with the contract requirements the Contractor remains responsible for meeting the requirements of the contract. The contractor is responsible for: dimensions which shall be confirmed and correlated at the job site; confirming and correlating all quantities; fabrication processes and techniques of construction; coordination of work between all trades; and the satisfactory performance of his work.

E. Submittals marked “No Exception Taken” indicate that the architect or engineer has found no obvious deviations from the contract requirements and that the contractor may continue the procurement process subject to compliance with the contract requirements.

F. Submittals marked “Make Corrections Noted” indicate that the architect or engineer has made corrective notations on the submittal in response to contract deviations that he has found and that the contractor may continue the procurement process subject to compliance with the notations and the contract requirements.

G. Submittals marked “Revise and Resubmit” indicate that the architect or engineer has found significant deviations from the contract requirements and that the contractor must correct the submittal in accordance with the architect or engineer’s notations and resubmit the submittal for review; however, the likelihood is that the submittal can be corrected to come into compliance with the contract requirements.

H. Submittals marked “Rejected” indicate that the architect or engineer has found deviations from the contract requirements of such magnitude that the submitted cannot be made compliant with the contract requirements and will not be accepted for further consideration; that the contractor must prepare a new submittal using a different manufacturer, product, model, or process, as applicable, and in accordance with the contract requirements.

I. Submittals marked “Submit Specified Item” indicate that the submittal is rejected and that only the item specified on the plans or in the specifications will be acceptable, and that the contractor must prepare a new submittal using the specified item.

1.5 RECORD DOCUMENTS

A. Prepare record documents in accordance with the requirements in Division 1 Section "Project Closeout". In addition to the requirements specified in Division 1, indicate the following installed conditions:

1. Ductwork mains and branches, size, and location, for both exterior and interior; locations of dampers and other control devices; filters, boxes, and terminal units requiring periodic maintenance or repair.
2. Mains and branches of piping systems, with valves and control devices located and numbered, concealed unions located, and with items requiring maintenance located (i.e., traps, strainers, expansion compensators, tanks, etc.) Valve location diagrams, complete with valve tag chart. Refer to Division 23 Section "Mechanical Identification." Indicate actual inverts and horizontal locations of underground piping.
3. Equipment locations (exposed and concealed), dimensioned from prominent building lines.
4. Approved substitutions, Contract Modifications, and actual equipment and materials installed.
5. Engage the services of a Land Surveyor or Professional Engineer registered in the state in which the project is located to record the locations and invert elevations of underground installations, including but not limited to: sanitary, storm, domestic water, fire water, HVAC piping, conduits and ductbanks.

1.6 MAINTENANCE MANUALS

A. Prepare maintenance manuals in accordance with Division 1 Section "Project Closeout". In addition to the requirements specified in Division 1, include the following information for equipment items:

1. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers of replacement parts.
2. Manufacturer's printed operating procedures to include start-up, break-in, and routine and normal operating instructions; regulation, control, stopping, shutdown, and emergency instructions; and summer and winter operating instructions.
3. Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair, and reassembly; aligning and adjusting instructions.
4. Servicing instructions and lubrication charts and schedules.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to the project properly identified with names, model numbers, types, grades, compliance labels, and other information needed for identification.

1.8 WARRANTIES

A. All Division 23 equipment shall be provided with a factory warranty for all parts and labor with 24 hour service. The warranty shall expire 24 months from the date of Substantial Completion, as defined by the date of the Substantial Completion Certificate. This is not necessarily a 24 month warranty period; rather, early start-up of the equipment prior to the substantial completion date should be expected and shall not affect the expiration date. The contractor shall coordinate this aspect with his suppliers as required.

B. Extended Warranties: Select pieces of equipment may be specified to have extended warranties which expire after the primary project warranty lists in the paragraph above. However, extended warranties shall also be coordinated with the date of substantial completion to expire in time periods relative to the substantial completion certificate.

1.9 MAINTENANCE CONTRACT:

A. The contractor shall provide a one year maintenance contract which shall include all labor and materials to perform all manufacturer recommended preventative maintenance, equipment cleaning, and repairs. The contractor shall provide a minimum of six inspections per year. The maintenance contract shall start upon the date of substantial completion as indicated on the substantial completion certificate.

1.10 CHANGES IN WORK:

A. When additional work is requested by the Owner or Engineer the Contractor shall provide a proposed change order to include a complete description of the additional work, a detailed breakdown of materials and labor removed by the change to be credited, and a detailed breakdown of materials and labor to be added. The value of credited work and additional work shall be priced on the same basis. Materials, labor, and any other cost shall be based upon the current version of the RS Means Mechanical Cost Data book, RS Means Plumbing Cost Data book, or RS Means Electrical Cost Data book. Actual supplier pricing for materials may be submitted so long as the pricing is competitive (within 5%) with competing local or internet based sources and a detailed breakdown is provided. Manufacturer material shipping and handling costs may apply; however, normal contractor overhead costs, including the cost of supervision, shop drawing production, ordering, and internal transit costs may not be charged separately and shall be included in the overhead costs. Unless defined in other locations of these contract documents, the maximum allowable combination of overhead and profit for the general contractor and all subcontractors (of all tiers) shall not exceed 25% of the sum of the material and labor costs.

1.11 USE OF THE TERM COORDINATE:

A. Whenever the term coordinate is used in any location of the drawings or specifications is shall be defined to mean to field confirm the actual item being provided and to modify, adjust, and provide all materials and work to make the item completely functional in the manner intended. This includes providing all work reasonably inferable.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 ROUGH-IN

A. Verify final locations for rough-ins with field measurements and with the requirements of the actual equipment to be connected.

B. Refer to equipment specifications in Divisions 2 through 26 for rough-in requirements.

3.2 MECHANICAL INSTALLATIONS

A. General: Sequence, coordinate, and integrate the various elements of mechanical systems, materials, and equipment. Comply with the following requirements:

1. Coordinate mechanical systems, equipment, and materials installation with other building components.
2. Verify all dimensions by field measurements.
3. Arrange for chases, slots, and openings in other building components during progress of construction, to allow for mechanical installations.
4. Coordinate the installation of required supporting devices and sleeves to be set in poured-in-place concrete and other structural components, as they are constructed.
5. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work. Give particular attention to large equipment requiring positioning prior to closing in the building.
6. Where mounting heights are not detailed or dimensioned, install systems, materials, and equipment to provide the maximum headroom possible.
7. Coordinate connection of mechanical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Provide required connection for each service.
8. Install systems, materials, and equipment to conform with approved submittal data, including coordination drawings, to greatest extent possible. Conform to arrangements indicated by the Contract Documents, recognizing that portions of the Work are shown only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer conflict to the Architect.
9. Install systems, materials, and equipment level and plumb, parallel and perpendicular to other building systems and components, where installed exposed in finished spaces.
10. Install mechanical equipment to facilitate servicing, maintenance, and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations. Extend grease fittings to an accessible location.
11. Install access panel or doors where units are concealed behind finished surfaces.
12. Install systems, materials, and equipment giving right-of-way priority to systems required to be installed at a specified slope.
13. Install mechanical systems, materials, and equipment and coordinate with all adjacent items so as to maintain the manufacturer’s recommended service clearance requirements. Indicate service clearance requirements on the coordination shop drawings. Advise the Engineer of any service clearance conflicts prior to installation. Remove, relocate, and revise conflicting items that have already been installed without additional cost to the Owner.

3.3 CUTTING AND PATCHING

A. General: Perform cutting and patching in accordance with Division 1 Section "CUTTING AND PATCHING". In addition to the requirements specified in Division 1, the following requirements apply:

1. Protection of Installed Work: During cutting and patching operations, protect adjacent installations.

B. Perform cutting, fitting, and patching of mechanical equipment and materials required to:

1. Uncover work to provide for installation of ill-timed or uncoordinated work. Uncoordinated work shall be deemed any work that does not fit within the allowable space.
2. Remove and replace defective work.
3. Remove and replace work not conforming to requirements of the Contract Documents.
4. Remove samples of installed work as specified for testing.
5. Install equipment and materials in existing structures.
6. Upon written instructions from the Architect, uncover and restore work to provide for Architect/Engineer observation of concealed work.
7. Perform demolition and connect to existing systems.
8. Cut, remove and legally dispose of selected mechanical equipment, components, and materials as indicated, including but not limited to removal of mechanical piping, heating units, plumbing fixtures and trim, insulation, tanks and other mechanical items made obsolete by the new work.

C. Protect the structure, furnishings, finishes, and adjacent materials not indicated or scheduled to be removed.

D. Provide core drilling and other cutting means and methods as necessary to relocate piping, conduit, and other mechanical-electrical features when required for uncoordinated work.

E. Provide and maintain temporary partitions or dust barriers adequate to prevent the spread of dust and dirt to adjacent areas.

F. Patch newly finished surfaces and building components using new materials specified for the original installation and experienced Installers. Installers' qualifications refer to the materials and methods required for the surface and building components being patched.

END OF SECTION 230010