

SECTION 230100 - GENERAL HVAC REQUIREMENTS**PART 1 - GENERAL****1.1 DEFINITIONS**

- A. Provide – To furnish and install, complete, fully coordinated, and ready of operation.
- B. Contractor – mechanical subcontractor, or contractor engaged to perform work specified under Division 23.

1.2 SCOPE OF WORK:

- A. The provisions of this Section apply to all Division 23 work.
- B. Include provisions of General Conditions as part of this section.
- C. Provide all labor, materials, equipment, and services necessary for the completion of all Mechanical work shown, specified or implied, complete, and ready for operation.

1.3 GENERAL REQUIREMENTS

- A. Coordinate HVAC work with all other trades; provide approved submittals to appropriate trades to coordinate installation of requirements the actual equipment to be installed.
- B. Protect mechanical equipment from damage during construction, when installation is complete clean equipment and touch up paint.
- C. Install all equipment to provide normal service access to all components, install in accordance with manufacturer's instruction. If manufacturer's instructions conflict with contract documents obtain engineer of records decision before proceeding.
- D. All work shall conform to the contract documents and all codes, standards and requirements listed below in the Regulatory Requirements section.
- E. Cooperate with all other crafts/trades. Perform work in a timely manner. Do not interfere with the work of other trades.
- F. Contractor shall provide shop drawings verifying clearances routings and tie-ins on piping and ductwork prior to fabrication and installation of new work.
- G. If systems interfere or conflict the Architect shall decide which equipment to relocate regardless of which was installed first.
- H. The contractor shall be responsible for fire stopping wall penetrations at fire rated walls where ductwork, control conduit, wiring, or piping are installed. Fire stopping shall be performed immediately after the work is installed. Do not leave penetrations unprotected overnight.

1.4 DRAWINGS AND SPECIFICATIONS

- A. HVAC drawings and specifications are intended to be worked together as a set by the contractor, drawings are not standalone.
- B. HVAC drawings are diagrammatic and subject to requirements of the architectural drawings and conditions existing in the field. Mechanical drawings indicate generally the location of components and are not intended to show all fittings or all details of the work. Mechanical drawings are intended to show size, capacity, approximate location, direction, and general

relationship of the work, but not exact detail or arrangement.

- C. Coordinate dimensions with all project drawings and field conditions. Do not scale HVAC drawings for locations of system components. Coordinate location of air devices, pipe, ductwork, lighting, ceiling grids, sprinkler piping, sprinkler heads, equipment and equipment pads and supports with architectural, structural, and electrical drawings as well as conditions existing in the field and layout work to fit in ceiling grids, lighting, and other parts.
- D. Make no changes that alter the intent or scope of the work without written instructions from the architect. In case of doubt, submit a formal request for information (RFI) to the architect and obtain the architect's response before proceeding with work. Where doubt arises as to the meaning of the HVAC drawings and specifications, obtain the Architect's written interpretation before proceeding. Failure to follow this instruction shall make the contractor liable for damage to other work, and responsible for removing and repairing defective or mis-located work in proper manner.
- E. Make minor adjustments in the field as required to provide optimum results and to facilitate ease of service, efficient operation, and best appearance. Minor adjustments are those that do not alter design intent, scope of the work or operation of HVAC systems.

1.5 REFERENCES

- A. AGA: American Gas Association.
- B. ANSI: American National Standards Institute, Inc.
- C. AMCA: Air Movement & Control Association.
- D. ARI: American Refrigeration Institute.
- E. ASHRAE: American Society of Heating, Refrigeration and Air Conditioning Engineers.
- F. ASME: American Society for Mechanical Engineers.
- G. ASSE: American Society of Sanitary Engineers.
- H. ASTM: American Society of Testing and Materials.
- I. AWWA: American Water Works Association.
- J. CISPI: Cast Iron Soil Pipe Institute.
- K. FM: Factory Mutual.
- L. NAIMA: North American Insulation Manufacturers Association.
- M. NEMA: National Electrical Manufacturer's Association.
- N. NFPA: National Fire Protection Association.
- O. NSF: National Sanitation Foundation.
- P. MSS: Manufacturer's Standardization Society of the Valve and Fitting Industry.
- Q. PDI: Plumbing and Drainage Institute.
- R. SMACNA: Sheet Metal and Air Conditioning Contractor's National Association.
- S. UL: Underwriters Laboratories, Inc.

1.6 REGULATORY REQUIREMENTS

- A. Comply with the current edition, unless otherwise noted, of the following codes and standards.
 - 1. 2021 Arkansas State Codes –Building, Plumbing, Fire Protection, Fuel Gas, and Mechanical Codes.
 - 2. ADA - American's with Disabilities Act

3. ASHRAE 15 - Safety Code for Mechanical Refrigeration
4. ASHRAE 62 - Ventilation for Acceptable Indoor Air Quality
5. ASME - Boiler and Pressure Code
6. NFPA 13 - Installation of Sprinkler Systems
7. NFPA 70 – 2020 National Electrical Code with Amendments.
8. NFPA 90A - Installation of Air Conditioning and Ventilating Systems
9. NFPA 101 - Life Safety Code
10. SMACNA HVAC Duct Construction Standards Metal and Flexible -Current Edition.
11. SMACNA HVAC Air Duct Leakage Test Manual -Current Edition
12. SMACNA Guidelines for Roof Mounted Outdoor Air Conditioner Installation -Current Edition
13. SMACNA Fire Smoke and radiation Damper Installation Guide for HVAC -Current Edition

B. Permits, Licenses, Inspections and Fees.

1. Contractor shall give required notices, file drawings, obtain and pay for permits, deposits, and fees necessary for the installation of the Division 23 HVAC work.
2. Contractor shall obtain and pay for inspections required by laws, ordinances, rules, regulations, or public authority having jurisdiction.
3. Contractor shall obtain and pay for certificates of such inspections and file such certificates with the Owner.

1.7 QUALIFICATION OF THE CONTRACTOR AND SUBCONTRACTORS

- A. The mechanical contractor shall have been in business as a licensed HVAC contractor for a minimum of 3 years prior to the date of opening bids and shall have been pre-qualified as a bidder by the owner.
- B. He shall have a satisfactory experience record with air conditioning installations of character and scope comparable with this project, within the last 3 years prior to the date of opening bids.
- C. He shall have had an established service department capable of providing service inspection or full maintenance contracts.
- D. If the HVAC contractor with the Engineer's approval, uses a sub-contractor to provide another discipline that the contractor does not normally furnish, that sub-subcontractor shall meet the same qualifications.

1.8 PRODUCT REQUIREMENTS

- A. Provide new standard, first-grade materials throughout.
- B. Multiple items of similar equipment shall be the product of the same manufacturer.
- C. Substitutions:
 1. Comply with the provisions of Division 1 for product requirements, substitutions and alternates, and the following.
 2. When several manufacturers are named in the specifications, the corresponding products and models made by the specified manufacturers will be accepted and Contractor may base his bid on any one of those products. However, if the Contractor's bid is based on products other than the scheduled or specified basis of design, it shall be understood that there will be no extra cost involved whatsoever, and the effect on other trades has been included in

the Contractor's proposal. Coordination with other trades for substituted equipment or use of products other than the named basis of design shall be the responsibility of the Contractor furnishing the equipment.

3. The basis of design manufacturer's equipment has been used to determine space requirements. Should another approved manufacturer's equipment be used in preparing proposals, Contractor shall be responsible for determining that said equipment will fit space allocated. Submission of shop drawings or product data on such equipment shall be considered as indicating that the Contractor has reviewed the space requirements and the submitted equipment will fit the space allocated with due consideration given to access required for maintenance and code purposes.
4. Each bidder may submit to the Architect a list of any substitutes which he proposes to use in lieu of the equipment or material named in the specifications with a request for the approval of proposed substitutes. To be considered, such requests must be delivered to the office of the Architect not later than 10 days prior to the bid due date. The submittal shall include the following:
 - a. Specific equipment or material proposed for substitution giving manufacturer, catalog, and model number.
 - b. All performance and dimensional data necessary for comparison of the proposed substitute with the equipment or material specified.
 - c. A statement setting forth any changes in other materials, equipment, or other Work that incorporation of the substitute may require.
5. The burden of proof of the merit of the proposed substitute is upon the proposer. The Architect's decision of approval or disapproval of a proposed substitution is final.
6. All bidders will be advised by addenda of proposed substitutes which are found to be acceptable. Do not rely upon approvals made in any other manner.

1.9 SUBMITTALS

- A. Submit under provisions of Division 1 and Division 23 sections for submittals and submittal procedures.
- B. Submittals shall include product information for all equipment and components specified or shown on the plans, and contractor shop drawings that provide details, dimensions and coordination of the work with all other disciplines.
- C. For each type of product, equipment, material, and services specified in Division 23 specification sections provide product data that is clearly marked indicating compliance with the HVAC drawing and specifications. Submittals shall be provided with specified shop drawings. Provide to the architect or prime consultant, a complete submittal fully marked to identify exactly what shall be provided including the following minimal information:
 1. All submittals shall be provided in electronic pdf format and shall be organized in accordance with the HVAC specification numbering system.
 2. All submittals shall be completely marked with manufacturer's names, model number, dimensions, weights, performance ratings, efficiencies, features, and accessories to be provided.
 3. Capacities, dimensions, weights, etc. shall be in the terms specified in the inch-pound system.

4. Call attention to and clearly identify deviations from specified equipment and components regarding operation and physical dimensions, capacities, and performance.
 5. Performance curves for equipment such as fans and pumps shall be included and shall be clearly marked with operating points, and efficiency.
- D. The contractor shall obtain reviewed submittals from the Engineer that have been returned and marked as follows:
1. APPROVED – Contractor approved to order equipment and proceed with the work.
 2. APPROVED AS NOTED – Contractor approved to order equipment and proceed with the work after making corrections noted by the engineer and coordinating corrections with all disciplines. Corrected submittal shall be re-submitted for record purposes to the General Contractor, and A/E team.
 3. REVISE AND RESUBMIT – Contractor to correct submittal and resubmit to the A/E team for approval. Re-submittal shall be clearly marked as such.
- E. Final equipment or material orders shall not be placed until submittals have been returned marked either “APPROVED” OR “APPROVED AS NOTED” without exception.
- F. Shop Drawings shall be provided for all areas of the building and include the following:
1. Before starting any work submit and obtain approved shop drawings from the Engineer of Record.
 2. No work shall begin and not equipment shall be ordered until shop drawings have been marked by the engineer of record as “APPROVED” or “APPROVED AS NOTED”. Failure to submit shop drawings will make the Contractor responsible for changes required to facilitate installation of mechanical work and other affected disciplines.
 3. Shop drawings shall fully detail all mechanical work to be performed. Shop drawings shall be submitted in electronic pdf format and shall comply with the following:
 4. All shop drawings shall be drawn to 1/4" = 1'-0" scale. 1/8" – 1'-0" scale may be used when approved by the engineer of record.
 5. Ductwork shop drawing shall include the following at a minimum:
 - a. Bottom of duct elevations.
 - b. Dimensions from columns lines.
 - c. Duct sizes (including insulation)
 - d. Insulation thickness.
 - e. Sheet metal gauges.
 - f. Ductwork pressure classes.
 - g. Ductwork seal class.
 - h. Locations of turning vanes, manual dampers, remote damper operators, control dampers and control devices.
 - i. Ductwork construction details.
 - j. Ductwork support details and support locations.

1.10 PROJECT/SITE CONDITIONS

- A. Visiting Site: Visit site before and during construction to become familiar with installed work that may affect HVAC work. No additional allowance will be granted because of lack of knowledge of such conditions.
- B. Cause as little interference or interruption of existing services as possible. Schedule work which will cause interference or interruption in advance with Owner, authorities having jurisdiction, and all affected trades.

1.11 PROJECT CLOSE-OUTS

- A. Submit project close out documents after the final inspection and all punch list items are complete.
- B. Record Drawings shall include ductwork, piping and control system record drawings shall be provided and shall include the following:
 - 1. Record drawings shall be an accurate record of corrections, variations, and deviations, including those required by change orders to the contract documents.
 - 2. Record changes daily on a set of plans kept at the job site.
 - 3. Submit record drawing marked as noted above to Architect for review prior to request for final payment.
 - 4. Marked record drawings will be returned to Contractor for use in preparing final record drawings.
 - 5. Final Record Drawings: Provide one complete set of prints, and one electronic copy in AutoCAD or Revit format indicating the actual completed installation of the work.
- C. Prior to the issuance of a certificate for final payment, submit to Architect and obtain his approval of the following:
 - 1. Record drawings – As noted above.
 - 2. Air balance report (Electronic PDF).
 - 3. Equipment Submittal Data (Electronic PDF).
 - 4. Equipment operating and maintenance manuals (Electronic PDF and 2 hard copies).
 - 5. Equipment warranty dates and guarantees (Electronic PDF and 2 hard copies).
 - 6. List of Owner's Personnel who have received operating and maintenance instructions.
 - 7. Letter certifying and signed by Owner or his representative that the Owner or his representative has received the extra materials specified for each system.

1.12 TEMPORARY USE OF HEATING AND AIR CONDITIONING SYSTEMS DURING CONSTRUCTION

- A. Use of newly installed mechanical equipment to provide heating, air conditioning, and ventilation during construction will be permitted subject to compliance with the following provisions:
 - 1. The HVAC/Control contractor shall provide written procedures detailing parties responsible for operating the equipment and the manner in which the equipment will be operated and controlled during temporary use.
 - 2. Equipment specified to have factory supervised start-up shall have had such start-up and factory start-up reports shall have been submitted and certified by the contractor to contain no deficiencies.

3. All safeties, and interlocks shall be installed and functionally tested.
4. All smoke detectors and fire alarm system interlocks shall have been installed and functionally tested.
5. Automatic temperature control systems for preheat coils shall function properly and all safety controls shall function to prevent coil freeze-up damage.
6. Specified air filters shall be installed. Filters shall be changed when deemed dirty by the architect until acceptance of the systems by the owner. Clean filters shall be provided prior to test, adjust and balance of the HVAC systems.
7. All return air and outside air openings shall have temporary filter media installed over inlet side of opening and secured airtight there to.
8. Prior to final inspection, the equipment or parts used which show wear and tear beyond normal, shall be replaced with identical replacements, at no additional cost to the Owner.
9. Warranty dates shall start at Date of Substantial Completion of the entire project, operation of the equipment on a temporary basis during construction does not constitute substantial completion or beneficial use by the owner.
10. The contractor shall maintain all equipment during temporary use, including routine maintenance, and repairs of any component failures.

B. This paragraph shall not reduce the requirements of the mechanical specification sections.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION 230100