SECTION 227100 -- HEAT PUMPS

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SECTION 227100 -- HEAT PUMPS

PART 1 GENERAL

1. SUMMARY
2. General
3. Read this Section in conjunction with other related Sections, Division 01 General Requirements, the Design Drawings and the Contract Conditions.
4. Performance Specified Work
5. Refer to the Contractor's Responsibilities in Division 01 General Requirements, Section 011000

Summary for specific requirements.

1. Supply, deliver, install and warrant the work in strict compliance with the materials and workmanship requirements of the Specification.
2. Where required to prepare Shop Drawings, these shall be limited to final detailing of components, systems indicated on the Design Drawings, necessary to demonstrate their safe installation.
3. Where products are offered by the Contractor for acceptance by the Engineer, provide full supporting documentation in respect of the complete system or installation.
4. Included Systems/ Products
5. Heat pumps.
   1. SUBMITTALS
6. General: Comply with the requirements of Division 01 General Requirements, Section 013300 Submittal Procedures and submit the following.
7. Post Contract Submittals
8. Shop Drawings.
9. Product Data on materials and components for use.
10. Supplementary Product Literature: Include a statement from the manufacturer for the design life of the system.
11. List of tests included.
12. Certified test data.
13. Outline technical specifications reflecting proposed materials and systems.
14. A list of proposed suppliers and Subcontractors intended to be used.
15. Method Statement.
16. Quality Plan.
17. Summary of deviations from the Specification.
    1. CLOSEOUT SUBMITTALS
18. General: Comply with the requirements of Division 01 General Requirements, Section 017800 Closeout Submittals and submit the following.
19. Warranties.
20. Operation and Maintenance (O&M) Manuals: Include component list with manufacturer's reference numbers, descriptions of materials and procedures for repairing and cleaning of finishes and cleaning frequency.
    1. QUALITY ASSURANCE
21. Acceptable Manufacturer
22. The manufacturer shall have at least 10 years of experience in the design and manufacture of heat pumps.
23. Standards: In addition to the requirements indicated on the Design Drawings, or specified in Division 01

General Requirements and Specification, the Work shall be in accordance with the following standards,

codes and relevant statutory requirements.

1. American Society for Testing and Materials, ASTM International Standards.
2. American Society of Mechanical Engineers, ASME Standards.
3. American National Standards Institute, ANSI Standards
4. International Electrotechnical Commission, IEC Standards.
5. National Electrical Manufacturers Association, NEMA Standards.
6. BSI Group, (BS) British Standards.
7. Underwriters' Laboratories, UL Standards.
8. Provide testing and inspections in accordance with Division 01 General Requirements, Section 014000

Quality Requirements.

1. Preconstruction Testing/ Reports
2. Submit reports of independent tests demonstrating that the products and systems comply with the specified performance requirements.
3. Where test results for a material or product are not available, undertake testing to show compliance with the Specification at an independent testing laboratory acceptable to the Engineer.
4. The provision of testing data or the carrying-out of tests does not relieve the Contractor of his responsibilities regarding the performance requirements, durability or service life requirements.

PART 2 PRODUCTS

1. SYSTEMS/ PRODUCTS

A. Heat Pumps

1. Description: Water to water type heat pumps comprising semi-hermetic screw compressors, shell and tube condenser, direct expansion evaporator, electronic expansion valve, electronic control and all necessary accessories, configured as indicated on the Design Drawings. The unit shall be factory tested and supplied with full charge of R134a refrigerant and must comply with what mentioned in BOQ.

1. DESIGN CRITERIA

A. General

1. The unit structure frame shall be made of polyester-painted galvanized steel. The self-supporting frame shall be built to guarantee maximum accessibility for servicing and maintenance operations.
2. The unit shall be provided with an independent refrigerant circuit for each compressor to assure continuous operation, minimum risk of gas leakages and easy maintenance.
3. The refrigerant circuit shall include the following components as a minimum:
4. Electronic expansion valve.
5. High- and low-pressure safety valve.
6. Compressor discharge and suction shut-off valve.
7. Drier filter with replaceable cartridge.
8. Refrigerant line sight glass with humidity indicator.
9. High pressure transducer.
10. Compressors

1. Semi-hermetic screw compressors shall be designed for low temperature application.

1. Plant Side Heat Exchanger
2. The plant side heat exchanger shall have a direct expansion evaporator where refrigerant flows inside the tubes and water on the shell side.
3. Internal copper tubes shall be mechanically fitted onto the plates and grooved internally to enhance the heat exchange between refrigerant and water.
4. Source Side Heat Exchanger
5. The source side heat exchanger shall have a shell and tube condenser, flooded type with water flowing inside and refrigerant flowing outside the pipes.
6. The copper tubes shall be internally and externally grooved to improve heat exchange.
7. Electrical and Control Panel

1. The panel shall be in accordance with EN 60204-1 and shall include the following components as a minimum:

1. Electronic controller.
2. Control circuit transformer.
3. General door lock isolator.
4. Power circuit with bar distribution system.
5. Fuses for compressors.
6. Compressors protection with internal thermal overload.
7. Terminals for cumulative alarm block.
8. Remote on/ off terminals.
9. Spring-type control circuit terminal board.
10. Phases sequence and minimum/maximum voltage control.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verification of Conditions

1. Examine areas for compliance with requirements for installation and conditions affecting performance of the Work. Identify conditions detrimental to a proper and timely completion. Proceed with installation only after unsatisfactory conditions have been corrected.

1. INSTALLATION

A. General

1. Install heat pump in accordance with the manufacturer's recommendations.
2. Coordinate electrical and control work.
3. Install interconnecting piping.
   1. SITE QUALITY CONTROL

A. General

1. Engage a factory-authorized service representative to inspect the equipment installation, including connections, and to assist in field testing. Prepare a test and inspection report.

* 1. DEMONSTRATION AND TRAINING

1. Demonstration
2. Demonstrate to the Engineer the features and functions of the system and subsystems including the labeling process.
3. Furnish the necessary trained personnel to perform the demonstration and instructions and arrange to have the manufacturer's representatives present to assist with the demonstrations.
4. Training
5. Instruct the Employer and designated representatives in the proper operation and maintenance of the system.
6. Conduct a training course for members of the operating and maintenance staff as designated by the Engineer.
7. The training course shall be given at the installation during normal working hours and shall start after the system is functionally complete but prior to final acceptance tests.

END OF SECTION