SECTION 23 21 23

HYDRONIC PUMPS

1.0 GENERAL

1. DESCRIPTION
   1. All work specified in this Section is governed by the Common Work Results for HVAC Section 23 05 00.
   2. This Section 23 21 23 and the accompanying drawings cover the provisions of all labor, equipment, appliances, and materials and performing all operations in connection with the construction and installation of the centrifugal pumps as specified herein and as shown. These pumps include, but are not limited to, the following:
      1. In-line Pumps
      2. End-suction Pumps
2. BASIS OF DESIGN
   1. The basis of design is as scheduled. Any proposed substitutions shall be proven equal in all respects to the equipment specified as the basis of design. Any modifications to piping, electrical work, controls, building structure, etc., that result from any substitution shall be coordinated with all trades. This coordination shall occur before delivery of equipment and any modifications shall be performed without incurring additions to the Contract.
3. ACCEPTABLE MANUFACTURERS
   1. Acceptable substitute manufacturers are Bell & Gossett, Aurora, Armstrong, Taco, Grundfos, Goulds, and Peerless, provided that their pumps, performance, appearance and physical characteristics are equal in all respects to the basis of design for this specific project.

2.0 PRODUCTS

1. GENERAL
   1. Pump motors shall be premium efficiency.
   2. Pumps scheduled of variable speed operation shall have inverter duty-rated motors, including appropriate insulation class, and shall be provided and installed with microfiber shaft grounding rings and ground strap connected to the building ground. In addition, motors 100 HP or over shall have insulated bearings.
   3. \*\*The Pump PLEV efficiency based on AHRI Standard 550/590 “IPLV” load profile, 30% fixed head or calculated minimum control head, shall not be less than that of the pump specified. A detailed pump efficiency report at each load point based on that load profile shall be submitted with the pump. A, B, C and D is the pump efficiency at 100%, 75%, 50% and 25% of flow rate.
   4. An OSHA 1910.219 and ANSI B15.1, Section 8, compliant coupler guard securely fastened to the base shall shield the coupler and all exposed rotating parts.
2. IN-LINE PUMPS
   1. Furnish and install pumps with capacities as shown. Pumps shall be in-line type, close-coupled, for installation in vertical or horizontal position, and capable of being serviced without disturbing piping connections.
   2. Pump casing shall be of Class 30 cast iron except pumps used in potable water systems, which shall be bronze. The impeller shall be of cast bronze, enclosed type, dynamically balanced and keyed to the shaft.
   3. Impeller diameter shall not exceed 85% of the casing cut-water diameter. Impeller diameter shall not be the minimum size available for the pump body.
   4. The liquid cavity shall be sealed off at the motor shaft by an internally-flushed mechanical seal with ceramic seal seat and carbon seal ring, suitable for continuous operation at 225°F. A bronze shaft sleeve shall completely cover the wetted area under the seal.
   5. Pumps shall be rated for a minimum of 175 psi working pressure. The pump case shall have gauge tappings at the suction and discharge nozzles and shall include vent and drain ports.
   6. Motor shall have heavy-duty grease lubricated ball bearings, selected for the maximum load for which the pump is designed.
   7. Each pump shall be factory tested. It shall then be thoroughly cleaned and painted with at least one coat of high-grade machinery enamel prior to shipment.
   8. Pump motors shall be selected for non-overloading operation.
3. END-SUCTION PUMPS
   1. End-suction pumps shall be base-mounted, single-stage, flexible-coupled centrifugal pumps. Pumps shall be suitable for base-mounted installations, and shall be capable of being serviced without disturbing piping connections; back pull-out design.
   2. Pump casing shall be of cast iron. The impeller shall be of stainless steel, enclosed type, dynamically balanced and keyed to the shaft.
   3. Impeller diameter shall not exceed 85% of the casing cut-water diameter. Impeller diameter shall not be the minimum size available for the pump body. Bearings shall be grease lubricated, complete with grease fittings designed for a minimum life of 40,000 hours.
   4. The critical speed of each pump shall be at least 115% of the scheduled RPM.
   5. The pumps shall be free of cavitation at all flow rates from 25% to 150% of design flow under the suction conditions indicated.
   6. The liquid cavity shall be sealed off at the motor shaft by an internally-flushed mechanical seal with ceramic seal seat and carbon seal ring, suitable for continuous operation at 225°F. A replaceable stainless steel shaft sleeve shall completely cover the wetted area under the seal.
   7. Pumps shall be rated for a minimum of 175 psi working pressure. The pump case shall have gauge tappings at the suction and discharge nozzles and shall include vent and drain ports.
   8. Base shall be constructed of welded structural steel suitable for grouting to a concrete pad.
   9. All chilled water pumps shall be provided with a drip pan under the pump casing. Drip pan shall have a threaded connection for field piping to the nearest floor drain.
   10. Each pump shall be hydrostatically and run tested at the factory. It shall then be thoroughly cleaned and painted with at least one coat of high-grade machinery enamel prior to shipment.
   11. Pump motors shall be selected for non-overloading operation.

3.0 EXECUTION

1. INSTALLATION
   1. The pumps and accessories shall be installed in strict accordance with the manufacturer's recommendations and the Contract Documents.
   2. All base-mounted pumps shall be grouted level, grouted between the pump base and pad, and secured to inertia base, as applicable, with anchor bolts. Grout shall be non-shrink type.

END OF SECTION