



DIVISION 15- MECHANICAL

Section 15540 - HVAC Pumps and Specialties

1.00 PART 1 -GENERAL

1.01 DESCRIPTION OF WORK:

- A. Provide pumps and required system trim for heating, chilled water, and dual temperature water systems including all related appurtenances for a complete and operating systems.

1.02 SECTION INCLUDES:

- A. 3-Piece Inline Pump – Permanently Lubricated

1.03 RELATED DOCUMENTS:

- A. Drawings and general provisions of the Contract, including General and supplementary Conditions and Division 1 Specification Sections, apply to these Sections.
 - o Section *** - Alignment of Rotating Equipment
 - o Section *** - Cast-in-Place Concrete
 - o Section *** - Mechanical General Requirements
 - o Section *** - Supports, Anchors, and Sleeves
 - o Section *** - Motors and Starters
 - o Section *** - Drives
 - o Section *** - Mechanical Identification
 - o Section *** - Vibration Isolation
 - o Section *** - Piping Insulation
 - o Section *** - Equipment Installation
 - o Section *** - Hydronic Piping and Specialties
 - o Section *** - Testing, Adjusting, and Balancing
 - o Section *** - Meters and Gauges
 - o Section *** - Electrical

1.04 QUALITY ASSURANCE:

- A. All equipment or components of this specification section shall meet or exceed the requirements and quality of the items herein specified, or as denoted on the drawings.
- B. Ensure pump operation at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, and operate to ANSI/HI 9.6.3.1 standard for Preferred Operating Region (POR) unless otherwise approved by the engineer. The pump NPSH shall conform to the ANSI/HI 9.6.1-1997 standards for Centrifugal and Vertical Pumps for NPSH Margin.
- C. Ensure pump pressure ratings are at least equal to system's maximum operating pressure at point where installed, but not less than specified.
- D. Equipment manufacturer shall be a company specializing in manufacture, assembly, and field performance of provided equipment with a minimum 20 years of experience.
- E. Equipment provider shall be responsible for providing certified equipment start-up and, when noted, an in the field certified training session. New pump start-up shall be for the purpose of determining pump alignment, lubrication, voltage, and amperage readings. All proper electrical connections, pump's balance, discharge and suction gauge readings, and adjustment of head, if required. A copy of the start-up report shall be made and sent to both the contractor and to the Engineer.

1.05 PRODUCT HANDLING:

- A. Protection: Use all means necessary to protect equipment before, during, and after installation.
- B. Replacement and Repair: All scratched, dented, and otherwise damaged units shall be repaired or replaced as directed by the Architect Engineer.

1.06 REGULATORY REQUIREMENTS:

- A. Conform to Health/Life Safety Code for Public Schools
- B. Conform to International Mechanical Code
- C. Conform to BOCA National Building Code
- D. Conform to BOCA National Fire Protection Code
- E. Conform to State of Illinois Plumbing Code
- F. Conform to National Electric Code NFPA 70
- G. Conform to Illinois Accessibility Code
- H. Conform to applicable ANSI/HI standards
- I. Products: Listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

1.07 SUBMITTAL:

- A. Submit each item in this article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Submit manufacturer's installation instructions under provisions of General Conditions and Division 1.

- C. Product Data including certified performance curves and rated capacities of selected models, weights (shipping, installed, and operating), furnished specialties, and accessories. Indicate pump's operating point on curves.
- D. Complete Package information Product Data including:
 - o System summary sheet (where applicable)
 - o Sequence of Operation
 - o Shop drawing indicating dimensions, required clearances and location and size of each field connection
 - o Power and control wiring diagram
 - o System profile analysis including pump curves, system curve, and variable speed pump curves (where applicable)
 - o Pump data sheets - Rated capacities of selected models and indication of pump's operating point on curves.
 - o Submittals on furnished specialties and accessories
 - o Submittals must be specific to this project. Generic submittals will not be accepted

- E. Hanging and support requirements should follow the recommendations in the manufacturer's installation instructions.

1.08 OPERATION AND MAINTENANCE DATA:

- A. Submit Operation and Maintenance information under provisions of Division 15 "Mechanical General Requirements" and the provisions of the General Conditions and Division 1.
- B. Operation and Maintenance Data: Include installation instructions, assembly views, lubrication instructions, and replacement parts lists.
- C. Under provisions of commissioning documentation; testing of pumps, as well as training of owner's operation and maintenance personnel may be required in cooperation with the commissioning consultant.

1.09 DELIVERY, STORAGE, AND HANDLING:

- A. Deliver materials to the site in such a manner as to protect the materials from shipping and handling damage. Provide materials on factory provided shipping skids and lifting lugs if required for handling. Materials damaged by the elements should be packaged in such a manner that they could withstand short-term exposure to the elements during transportation.
- B. Store materials in clean, dry place and protect from weather and construction traffic. Handle carefully to avoid damage.

1.10 WARRANTY:

- A. Provide a minimum One (1) year warranty on materials and installation under provision of Section 15010.

1.11 EXTRA MATERIALS:

- A. Provide one (1) set of mechanical seals for each model type of primary pump scheduled.

2.00 PART 2- PRODUCTS

- A. The specifying engineer reserves the right to specify a primary supplier / lead spec manufacturer on all supplied schedule and specification documents. These primary suppliers have lead their respective industry in research and development and their products have had proven track records in the field. These primary suppliers, in the opinion of this engineering firm, produce a superior product to the alternately listed manufacturers. The contractor may choose to supply equivalent equipment as manufactured by the alternately specified manufacturer. This alternately specified equipment shall be supplied on a deduct alternate basis and based on the approval of the supplied alternate manufacturer's submittals.

The use of a primary supplier and deduct alternates protects the specifying engineer's design concept, but allows for a check-and-balance system to protect the post-commissioning owner.

2.04 3-PIECE INLINE PUMPS – PERMANENTLY LUBRICATED:

A. Manufacturer:

- 1. Contractor shall furnish and install new 3-piece inline permanently lubricated pumps for chilled water and hot water heating systems as indicated on the drawings. Pumps shall be Series e-60 as manufactured by **Bell & Gossett** under base bid. Equivalent units as manufactured by others may be submitted as deduct alternates. Pumps shall meet types, sizes, capacities, and characteristics as scheduled on the Equipment Schedule drawings.

B. 3-piece Inline Pumps – Permanently Lubricated:

- 1. The pumps shall be of a horizontal, permanently lubricated type, specifically designed for quiet operation. Suitable for 225° F operation at 175 PSIG working pressure. The pump shall be single stage, vertical split case design, in cast iron bronze fitted (or all bronze) construction. The pump internals shall be capable of being serviced without disturbing piping connections.
- 2. The pumps shall be composed of three separable components a motor, bearing assembly, and pump end (wet end). The motor shaft shall be connected to the pump shaft via a replaceable flexible coupler.
- 3. The pumps shall have a solid SAE1144 steel shaft supported by two sealed ball bearings. A non-ferrous shaft sleeve shall be employed to completely cover the wetted area under the seal.
- 4. Pump shall be equipped with an internally-flushed mechanical seal assembly. Seal assembly shall be the unitized type with stainless steel drive tabs, EPR bellows and seat gasket, stainless steel spring, and be of a carbon silicon-

carbide design with the carbon face rotating against a stationary silicon-carbide face.

5. Bearing assembly shaft shall connect to either a cast bronze impeller. Impeller shall be hydraulically and dynamically balanced, keyed to the shaft and secured by a locking capscrew or nut.
6. A flexible type coupling shall be employed between the pump and motor.
7. Pump should be designed to allow for true back pull-out access to the pump's working components for ease of maintenance.
8. Pump volute shall be of cast iron design for heating systems or cast bronze for domestic water systems. The connection style on cast iron and bronze pumps shall be flanged. Volute shall include gauge ports at nozzles, and vent and drain ports.
9. To ensure alignment the motor shall be mounted to the bearing assembly via a bolted motor bracket assembly, and a rubber motor mount shall be used to assist in aligning the motor shaft with the pump shaft.
10. Motors shall meet scheduled horsepower, speed, voltage, and enclosure design. Motors through 1 HP shall be resilient mounted, motors over 1.5 HP shall be rigid mounted. Motors shall have permanently lubricated ball bearings and must be completely maintenance free. Motors shall be non-overloading at any point on the pump curve and shall meet NEMA specifications.
11. Pump shall be of a maintainable design and for ease of maintenance should use machine fit parts and not press fit components.
12. Pump manufacturer shall be ISO-9001 certified and be of U.S. manufacturer.
13. Each pump shall be factory tested and name-plated before shipment and shall be provided with a (3) year warranty from date of installation.

C. Accessories:

1. EPT seals are applicable on systems with up to 250° F maximum water temperatures.

END OF SECTION 15540