

## SECTION 15540 - HVAC PUMPS

## PART 1 GENERAL

## 1.1 DESCRIPTION OF WORK:

- A. Extent of HVAC pumps work required by this section is indicated on drawings and schedules, and by requirements of this section.
- B. Pumps furnished as part of factory-fabricated equipment, are specified as part of equipment assembly in other Division-15 sections.
- C. Refer to other Division 15 sections for other work; not work of this section.
- D. Refer to Division-16 sections for the following work; not work of this section.
  - 1. Power supply wiring from power source to power connection on pumps. Include starters, disconnects, and required electrical devices, except where specified as furnished, or factory-installed, by manufacturer.
  - 2. Interlock wiring between pumps; and between pumps and field-installed control devices.
    - a. Interlock wiring specified as factory-installed is work of this section.
- E. Provide the following electrical work as work of this section, complying with requirements of Division-16 sections:
  - 1. Control wiring between field-installed controls, indicating devices, and pump control panels.
    - a. Control wiring specified as work of Division-15 for Automatic Temperature Controls is work of that section.

## 1.2 QUALITY ASSURANCE:

- A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of general-use centrifugal pumps with characteristics, sizes and capacities required, whose products have been in satisfactory use in similar service for not less than 5 years.
- B. Codes and Standards:
  - 1. HI Compliance: Design, manufacture, and install HVAC pumps in accordance with HI "Hydraulic Institute Standards".
  - 2. UL Compliance: Design, manufacture, and install HVAC pumps in accordance with UL 778 "Motor Operated Water Pumps".
  - 3. UL and NEMA Compliance: Provide electric motors and components which are listed and labeled by Underwriters Laboratories and comply with NEMA standards.
- C. Certification, Pump Performance: Provide pumps whose performances, under specified operating conditions, are certified by manufacturer.

### 1.3 SUBMITTALS:

- A. Product Data: Submit manufacturer's pump specifications, installation and start-up instructions, and current accurate pump characteristic performance curves with selection points clearly indicated.
- B. Wiring Diagrams: Submit manufacturer's electrical requirements for power supply wiring to HVAC pumps. Submit manufacturer's ladder-type wiring diagrams for interlock and control wiring. Clearly differentiate between portions of wiring that are factory-installed and portions to be field-installed.
- C. Record Drawings: At project closeout, submit record drawings of installed systems products in accordance with requirements of Division 15.
- D. Maintenance Data: Submit maintenance data and parts lists for each type of pump, control, and accessory; including "trouble-shooting" maintenance guide. Include this data, product data, shop drawings, and wiring diagrams in maintenance manual; in accordance with requirements of Division 15.

### 1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING:

- A. Handle HVAC pumps and components carefully to prevent damage, breaking, denting and scoring. Do not install damaged HVAC pumps or components; replace with new.
- B. Store HVAC pumps and components in clean dry place. Protect from weather, dirt, fumes, water, construction debris, and physical damage.
- C. Comply with Manufacturer's rigging and installation instructions for unloading HVAC pumps, and moving them to final location.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS:

- A. Manufacturer: Subject to compliance with requirements, provide products by one of the following unless approved by Littleton Public Schools.:
  - 1. In-Line Booster Pumps:
    - a. Bell & Gossett ITT; Fluid Handling Div.
    - b. Taco
  - 2. In-Line Circulator Pumps:
    - a. Bell & Gossett ITT; Fluid Handling Div.
    - b. Taco
  - 3. Vertical In-Line Pumps:
    - a. Bell & Gossett ITT; Fluid Handling Div.
    - b. Taco
  - 4. Frame-Mounted End Suction Pumps:
    - a. Bell & Gossett ITT; Fluid Handling Div.

b. Taco

5. Close-Coupled End Suction Pumps:

- a. Bell & Gossett ITT; Fluid Handling Div.  
b. Taco

2.2 PUMPS:

- A. General: Provide factory-tested pumps, thoroughly cleaned, and painted with one coat of machinery enamel prior to shipment. Type, size, and capacity of each pump is listed in pump schedule. Provide pumps of same type by same manufacturer.
- B. Pump motor shall be sized so as not to be overloaded at any point along impeller curve for specified performance.
- C. All pump couplers shall be suitable for both constant speed and variable speed operation.

2.3 IN-LINE BOOSTER PUMPS:

- A. General: Provide in-line booster pumps where indicated, and of capacities as scheduled.
- B. Type: Horizontal, oil-lubricated, designed for 125 psi working pressure, 225 degrees F (107 degrees C) continuous water temperature, and specifically designed for quiet operation.
- C. Body: Cast iron, split vertical volute, rated for 175 psi, flanged suction and discharge.
- D. Impeller: Steel shaft with copper or stainless steel shaft sleeves.
- E. Shaft: Steel, ground and polished, integral thrust collar.
- F. Bearings: Two horizontal sleeve bearings designed to circulate oil.
- G. Seal: Mechanical, with carbon seal face rotating against ceramic seat.
- H. Motor: Pump motor shall be non-overloading at any point on pump curve and meet the requirements of Section 15040.
- I. Coupling: Self-aligning, flexible coupling.

2.4 IN-LINE CIRCULATOR PUMPS:

- A. General: Provide bronze fitted in-line circulator pumps where indicated, and of capacities as scheduled.
- B. Type: Horizontal mount, vertical split case, oil-lubricated, designed for 175 psi working pressure, and 225 degrees F (107 degrees C) continuous water temperature.
- C. Body: Cast iron, with flanged suction and discharge and gauge tappings.
- D. Shaft: Hardened alloy steel.
- E. Bearings: Oil-lubricated bronze journal bearings.
- F. Seal: Mechanical, with carbon seal ring and ceramic seat.
- G. Motor: Pump motor shall be non-overloading at any point on pump curve and meet requirements of Section 15040.
- H. Coupling: Self-aligning, flexible coupling.
- I. Impeller: Brass or Bronze enclosed type, hydraulically and dynamically balanced, and keyed to shaft.

2.5 VERTICAL IN-LINE PUMPS:

- A. General: Provide bronze fitted vertical in-line pumps where indicated, and of capacities as scheduled.
- B. Type: Vertical mount, in-line, close-coupled, single stage, designed for 175 psi working pressure.
- C. Body: Cast iron, 125/250 psi ANSI flanges of equal size, tappings for gauge and drain fittings.
- D. Shaft: Steel with replaceable shaft sleeve.

- E. Seal: Mechanical seal with ceramic seal seat.
- F. Motor: Pump motor shall be non-overloading at any point on pump curve, open and meet requirements of Section 15040.
- G. Impeller: Bronze enclosed type, hydraulically and dynamically balanced, keyed to shaft and secured with locking screw. Assembly components shall be 304 stainless steel.

#### 2.6 FRAME-MOUNTED END SUCTION PUMPS:

- A. General: Provide frame-mounted bronze fitted end suction pumps where indicated, and of capacities and having characteristics as scheduled.
- B. Type: Horizontal mount, single stage, vertical split case, flexible coupling, base mounted, designed for 175 psi working pressure.
- C. Casing: Cast iron, 125 psi ANSI flanges, tappings for gauge and drain connections.
- D. Shaft: Steel with replaceable shaft sleeve.

Use sleeve bearings where quiet operation is essential.

- E. Bearings: Regreaseable ball sleeve bearings.

Condenser Water: Use ceramic type seal with rotating carbon - not tungsten carbide.

- F. Seal: Mechanical, with carbon seal ring and ceramic seat.
- G. Motor: Pump motor shall be non-overloading at any point on pump curve and meet requirements of Section 15040.
- H. Impeller: Bronze enclosed type, hydraulically and dynamically balanced, keyed to shaft and secured with locking screw. Assembly components shall be 304 stainless steel.
- I. Baseplate: Structural steel with welded cross members, and open grouting area.
- J. Coupling: Flexible, capable of absorbing torsional vibration, equipped with coupling guard.

#### 2.7 CLOSE-COUPLED END SUCTION PUMPS:

- A. General: Provide bronze fitted close-coupled end suction pumps where indicated, and of capacities and having characteristics as scheduled.
- B. Type: Horizontal mount, single stage, vertical split case, designed for 175 psi working pressure.
- C. Casing: Cast iron, 125 psi ANSI flanges, tappings for gauge and drain connections.

Use sleeve bearings where quiet operation is essential.

- D. Bearings: Regreaseable ball sleeve bearings.
- E. Shaft: Steel with replaceable shaft sleeve.

Condenser Water: Use ceramic-type seal with a rotating carbon - not tungsten carbide.

- F. Seal: Mechanical, with carbon seal ring and ceramic seat.
- G. Motor: Pump motor shall be non-overloading at any point on pump curve, open and meet requirements of Section 15040.
- H. Impeller: Bronze enclosed type, hydraulically and dynamically balanced, keyed to shaft and secured with locking screw. Assembly components shall be 304 stainless steel.

### PART 3 EXECUTION

#### 3.1 INSPECTION:

- A. Examine areas and conditions under which HVAC pumps are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

#### 3.2 INSTALLATION OF PUMPS:

- A. General: Install HVAC pumps where indicated, in accordance with manufacturer's published installation instructions, complying with recognized industry practices to ensure that HVAC pumps comply with requirements and serve intended purposes.
- B. Access: Provide access space around HVAC pumps for service as indicated, but in no case less than that recommended by manufacturer.
- C. Support: Install base-mounted pumps [with inertia base] on minimum of 4" high concrete base equal or greater than 3 times total weight of pump and motor, with anchor bolts poured in place. Set and level pump, grout pump base with non-shrink grout.
  - 1. Install in-line pumps, supported from piping system.
- D. Support: Refer to Division-15 section "Vibration Control" for support and mounting requirements of HVAC pumps.
  - 1. Electrical Wiring: Install electrical devices furnished by manufacturer but not specified to be factory-mounted. Furnish copy of manufacturer's wiring diagram submittal to Electrical Installer.
- E. Verify that electrical wiring installation is in accordance with manufacturer's submittal and installation requirements of Division-16 sections. Do not proceed with equipment start-up until wiring installation is acceptable to equipment installer.

Provide cyclone separator or filtering device ahead of condenser water pumps to filter out solids.

- F. Piping Connections: Refer to Division 15 Section 15055 piping section. Provide system return connection to inlet strainer with valved bypass to drain. Provide pump discharge connections with check valve, shutoff valve, and balancing valve for each pump.

3.3 ADJUSTING AND CLEANING:

- A. Alignment: Adjust shafts of all motors and pumps within recommended tolerances by manufacturer, and in presence of manufacturer's service representative.
- B. Start-Up: Lubricate pumps before start-up. Start-up in accordance with manufacturer's instructions.
- C. Refer to Division 15, section 15990, for pump system balancing; not work of this section.
- D. Cleaning: Clean factory-finished surfaces. Repair any marred or scratched surfaces with manufacturer's touch-up paint.

END OF SECTION 15540