SECTION 232123 - HYDRONIC PUMPS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. In-line circulators.
2. In-line pumps.
3. Close-coupled, end-suction pumps.
4. Pump accessories.

1.2 SUBMITTALS

A. Product Data: Include pump dimensions, weights, certified performance curves and rated capacities; furnished specialties; final impeller dimensions; and accessories for each pump indicated. Indicate pump's operating point on curves.

B. Operation and maintenance data.

1.3 QUALITY ASSURANCE

A. UL Compliance: Fabricate and label pumps to comply with UL 778, "Motor-Operated Water Pumps," for construction requirements.

B. Regulatory Requirements: Fabricate and test steam condensate pumps to comply with HI 1.1-1.5, "Centrifugal Pumps for Nomenclature, Definitions, Application and Operation," and HI 1.6, "Centrifugal Pump Tests."

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 GENERAL PUMP REQUIREMENTS

A. Pump Units: Factory assembled and tested.
B. Motors: Include built-in, thermal-overload protection on single phase motors and grease-lubricated ball bearings on all motors. Select each motor to be nonoverloading over full range of pump performance curve. See Division 15 Section "Common Motor Requirements for HVAC Equipment" for general motor requirements.

2.3 IN-LINE CIRCULATORS

A. Horizontal, in-line, centrifugal, single-stage, radially split case design; rated for 125-psig minimum working pressure and a continuous water temperature of 225 degrees F.

1. Manufacturers:
   a. Amtrol, Inc.
   b. Armstrong Pumps, Inc.
   c. Bell & Gossett ITT; Div. of ITT Fluid Technology Corp.
   d. Burks Pumps, Inc.; Div. of Crane Pumps & Systems, Inc.
   e. Grundfos Pumps Corp.
   f. MEPCO (Marshall Engineering Products Co.).
   g. Taco; Fabricated Products Div.

2. Casing: Bronze, with threaded companion flanges or unions for piping connections, and threaded gage tappings at inlet and outlet connections.
4. Shaft and Sleeve: Steel shaft with oil-lubricated copper sleeve.
5. Seals: Mechanical type, carbon-steel rotating ring, stainless-steel spring, ceramic seat, and flexible bellows and gasket.
7. Motor Bearings: Oil-lubricated, sleeve type, or permanently lubricated ball bearings.
8. Coupling: Flexible, capable of absorbing torsional vibration and shaft misalignment.

2.4 COMPACT IN-LINE CIRCULATORS

A. Cartridge type, horizontal, in-line, compact, seal-less, centrifugal, and single stage. Include pump and motor assembled on a common shaft in cartridge-type, hermetically sealed unit, without stuffing boxes or mechanical seals. Include isolation of motor section from motor-stator windings by corrosion-resistant, nonmagnetic, alloy liner. Include design rated for 125-psig minimum working pressure and a continuous water temperature of 225 degrees F.

1. Manufacturers:
   a. Amtrol, Inc.
   b. Armstrong Pumps, Inc.
   c. Bell & Gossett ITT; Div. of ITT Fluid Technology Corp.
   d. Grundfos Pumps Corp.
   e. PACO Pumps.
   f. Taco; Fabricated Products Div.

2. Casing: Lead-free cast bronze, with stainless-steel liner, static O-ring seal to separate motor section from motor stator, and flanged piping connections.
3. Impeller: Overhung, single suction, closed or open, nonmetallic.

2.5 IN-LINE PUMPS

A. Centrifugal, flexible-coupled or close-coupled, single-stage, radially split case design suitable for horizontal or vertical-mounting as indicated on Drawings. Pump shall be bronze-fitted design with mechanical seals rated for 175-psig minimum working pressure and a continuous water temperature of 225 degrees F.

1. Manufacturers:
   b. Amtrol, Inc.
   c. Armstrong Pumps, Inc.
   d. Bell & Gossett ITT; Div. of ITT Fluid Technology Corp.
   e. Burks Pumps, Inc.; Div. of Crane Pumps & Systems, Inc.
   f. Goulds Pumps, Inc.
   g. Grundfos Pumps Corp.
   h. MEPCO (Marshall Engineering Products Co.).
   i. PACO Pumps.
   j. Peerless Pump Co.
   k. Taco; Fabricated Products Div.

2. Casing: Cast iron, with threaded companion flanges for piping connections NPS 2 inches and smaller, and Class 125 flanges NPS 2-1/2 inches and larger, drain plug at low point of volute, and threaded gage tappings at inlet and outlet connections.

3. Impeller: ASTM B 584, cast bronze, statically and dynamically balanced, closed, overhung, single suction, and keyed to shaft.

4. Shaft and Sleeve: Ground and polished stainless-steel shaft with bronze sleeve.

5. Seals: Mechanical, with carbon-steel rotating ring, stainless-steel spring, ceramic seat, and flexible bellows and gasket.

6. Motor: Directly mounted to pump casing. Vertical pumps shall have lifting and supporting lugs in top of motor enclosure.

2.6 CLOSE-COUPLLED, END-SUCTION PUMPS

A. Centrifugal, close-coupled, end-suction, single-stage, bronze-fitted, back-pull-out, radially split case design; rated for 175-psig minimum working pressure and a continuous water temperature of 225 degrees F.

1. Manufacturers:
   b. Amtrol, Inc.
   c. Armstrong Pumps, Inc.
   d. Bell & Gossett ITT; Div. of ITT Fluid Technology Corp.
   e. Burks Pumps, Inc.; Div. of Crane Pumps & Systems, Inc.
   f. Goulds Pumps, Inc.
   g. MEPCO (Marshall Engineering Products Co.).
2. Casing: Cast iron, with threaded or flanged piping connections, drain plug at low point of volute, and threaded gage tappings at inlet and outlet connections.

3. Impeller: ASTM B 584, cast bronze, statically and dynamically balanced, closed, overhung, single suction, keyed to shaft, and secured by locking cap screw.

4. Shaft: Stainless-steel shaft, or carbon steel shaft with copper alloy shaft sleeve, close coupled to motor shaft.

5. Seals: Mechanical, with carbon-steel rotating ring, stainless-steel spring, ceramic seat, and flexible bellows and gasket.

6. Motor: Directly mounted to pump casing and with supporting legs as integral part of motor enclosure.

2.7 BASE-MOUNTED, FLEXIBLE-COUPL ED, END-SUCTION PUMPS

A. Centrifugal, base-mounted, flexible-coupled, end-suction, single-stage, bronze-fitted, back-pull-out, radially split case design; rated for 175-psig minimum working pressure and a continuous water temperature of 225 degrees F.

1. Manufacturers:

   b. Amtrol, Inc.
   c. Armstrong Pumps, Inc.
   d. Bell & Gossett ITT; Div. of ITT Fluid Technology Corp.
   e. Burks Pumps, Inc.; Div. of Crane Pumps & Systems, Inc.
   f. Goulds Pumps, Inc.
   g. MEPCO (Marshall Engineering Products Co.).
   h. PACO Pumps.
   i. Peerless Pump Co.
   j. Taco; Fabricated Products Div.
   k. Weil Pump Company, Inc.

2. Casing: Cast iron, with threaded or flanged piping connections, drain plug at low point of volute, and threaded gage tappings at inlet and outlet connections.

3. Impeller: ASTM B 584, cast bronze, statically and dynamically balanced, closed, overhung, single suction, keyed to shaft, and secured by locking cap screw.

4. Shaft: Stainless-steel shaft, or carbon steel shaft with copper alloy shaft sleeve, close coupled to motor shaft.

5. Seals: Mechanical, with carbon-steel rotating ring, stainless-steel spring, ceramic seat, and flexible bellows and gasket.

6. Motor: Directly mounted to pump casing and with supporting legs as integral part of motor enclosure.

7. Base: Structural steel or fabricated steel channels with fully enclosed sides and ends with welded steel cross members. The base shall have a top opening for grouting.

2.8 PUMP SPECIALTY FITTINGS
A. Suction Diffuser: Angle pattern, 175-psig pressure rating, cast-iron body and end cap, pump-inlet fitting; with bronze startup and bronze or stainless-steel permanent strainers; bronze or stainless-steel straightening vanes; magnetic drain plug; and adjustable support foot.

B. Triple-Duty Valve: Angle or straight pattern, 175-psig pressure rating at 225 degrees F, cast-iron body, Class 125 flanged connections, with bronze-fitted shutoff, balancing, and silent check valve features.

2.9 AUTOMATIC CONDENSATE PUMP UNITS

A. Packaged units with corrosion-resistant pump, plastic tank with cover, and automatic controls. Include factory- or field-installed check valve and a 72-inch minimum, electrical power cord with plug.

1. Manufacturers:
   a. Beckett Corp.
   c. Little Giant Pump Co.
   d. Marsh Manufacturing, Inc.

PART 3 - EXECUTION

3.1 PUMP INSTALLATION

A. Install pumps to provide access for periodic maintenance, including removing motors, impellers, couplings, and accessories.

B. Support pumps and piping separately so piping is not supported by pumps.

C. Suspend in-line pumps using continuous-thread hanger rod and vibration-isolation hangers. Install seismic bracing as required by authorities having jurisdiction.

D. Completely fill base of base-mounted pumps with non-shrinking grout.

E. Automatic Condensate Pump Units: Install units for collecting condensate and extend to open drain.

3.2 CONNECTIONS

A. Install piping adjacent to machine to allow service and maintenance.

B. Connect piping to pumps. Install valves that are the same size as piping connected to pumps.

C. Install suction and discharge pipe sizes equal to or greater than diameter of pump nozzles.

D. Install check valve and throttling valve on discharge side of in-line circulators.

E. Install wye strainer and shutoff valve on suction side of in-line pumps.
1. Install blowdown piping with ball valve at each wye strainer or suction diffuser. Extend piping to nearest drain.

F. Install triple-duty valve, or non-slam check valve and throttling valve, on discharge side of in-line, close-coupled and base-mounted pumps, as applicable.

G. Install suction diffuser, or wye strainer, and shutoff valve on suction side of close-coupled and base-mounted pumps.

1. Install blowdown piping with ball valve at each wye strainer or suction diffuser. Extend piping to nearest drain.

H. Install flexible pump connectors on suction and discharge sides of close-coupled and base-mounted pumps between pump casing and valves.

I. Install a single pressure gages at each pump. Connect to pump suction and discharge with isolation valves. Install at integral pressure-gage tappings where provided.

J. Install check valve and ball valve on each condensate pump unit discharge.

K. Install electrical connections for power, controls, and devices. Electrical power and control wiring and connections are specified in Division 16.

L. Ground equipment according to Division 16.

3.3 FIELD QUALITY CONTROL

A. Alignment: Align flexible coupled pumps to within 0.003-inches.

END OF SECTION