

SECTION 23 21 23

HYDRONIC PUMPS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Base mounted end suction pumps.
2. Double suction pumps

B. Related Sections:

1. Division 23 - Vibration and Seismic Controls for HVAC Piping and Equipment: Product requirements for vibrations isolators installed with pumps.
2. Division 23 - Hydronic Piping: Execution requirements for connection to pumps specified by this section.
3. Division 23 - Hydronic Piping Specialties: Product and execution requirements for piping specialties installed in hydronic systems adjacent to pumps.
4. Division 26 - Equipment Wiring Connections: Execution requirements for electrical connections to pumps specified by this section.

1.02 REFERENCES

A. National Electrical Manufacturers Association:

1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

B. Underwriters Laboratories Inc.:

1. UL 778 - Motor Operated Water Pumps.

1.03 PERFORMANCE REQUIREMENTS

- ###### A.
- Provide pumps to operate at system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, and operate within 25 percent of midpoint of published maximum efficiency curve.

1.04 SUBMITTALS

A. Division 01 - Submittal Procedures.

- ###### B.
- Product Data: Submit certified pump curves showing performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable. Include electrical characteristics and connection requirements. Submit also, manufacturer model number, dimensions, service sizes, and finishes.

- ###### C.
- Manufacturer's Installation Instructions: Submit application, selection, and hookup configuration with pipe and accessory elevations. Submit hanging and support requirements and recommendations.

- ###### D.
- Manufacturer's Certificate: Certify products meet or exceed specified requirements.

- E. Shop drawings: Show pump layout and connections. Include setting drawings with templates for installing foundation and anchor bolts and other anchorages.
 - 1. Wiring diagrams: Detail wiring for power, signal and control systems and differentiate between manufacturers installed and field installed wiring.
- 1.05 CLOSEOUT SUBMITTALS
 - A. Division 01 - Execution and Closeout Requirements.
 - B. Operation and Maintenance Data: Submit installation instructions, servicing requirements, assembly views, lubrication instructions, and replacement parts list.
 - C. Maintain one copy of each document on site.
- 1.06 QUALIFICATIONS
 - A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience and with service facilities within 100 miles of Project.
 - B. Installer: Company specializing in performing Work of this section with minimum three years documented experience approved by manufacturer.
- 1.07 PRE-INSTALLATION MEETINGS
 - A. Division 01 - Administrative Requirements.
 - B. Convene minimum one week prior to commencing work of this section.
- 1.08 DELIVERY, STORAGE AND HANDLING
 - A. Division 01 - Product Requirements: Product storage and handling requirements.
 - B. Protect systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.
- 1.09 FIELD MEASUREMENTS
 - A. Verify field measurements prior to fabrication.
- 1.10 WARRANTY
 - A. Division 01 - Execution and Closeout Requirements.
 - B. Furnish five year manufacturer warranty for pumps.
- 1.11 EXTRA MATERIALS
 - A. Division 01 - Execution and Closeout Requirements.
 - B. Furnish one set of mechanical seals for each pump pumps.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following or equal:

1. Flexible-Coupled, End-Suction Pumps:
 - a) Bell & Gossett
 - b) Paco Pumps
 - c) Peerless Pump Co
 - d) Weinman Pumps
 - e) Armstrong
2. Flexible-Coupled, Double-Suction Pumps:
 - a) Bell & Gossett
 - b) Paco Pumps
 - c) Peerless Pump Co
 - d) Weinman Pumps
 - e) Armstrong

2.02 FLEXIBLE-COUPLED, END-SUCTION PUMPS

- A. Description: Base-mounted, centrifugal, 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 deg F.
1. Casing: Cast iron, with flanged piping connections, drain plug at low point of volute, threaded gage tapings at inlet and outlet connections, and integral feet or other means on volute to support weight of casing and attached piping. Casing shall allow removal and replacement of impeller without disconnecting piping.
 2. Impeller: ASTM B 584, cast bronze, statically and dynamically balanced, closed overhung, single suction, keyed to shaft, and secured by locking cap screw.
 3. Wear Rings: Replaceable, bronze casing ring.
 4. Shaft and Sleeve: Steel shaft with bronze sleeve.
 5. Seals: Mechanical, Silicon Carbide seat, carbon washer, Viton elastomer, stainless steel spring and parts.
 6. Pump shaft bearings: Grease-lubricated ball bearings in cast-iron housing.
 7. Coupling: Flexible-spacer type, capable of absorbing torsional vibration and shaft misalignment; with flange and sleeve section that can be disassembled and removed without removing pump or motor.
 8. Coupling Guard: Steel, removable, and attached to mounting frame.
 9. Mounting Frame: Welded-steel frame and cross members, factory fabricated from ASTM A 36/A 36M channels and angles. Fabricate for mounting pump casing, coupling guard, and motor. Field-drill motor-mounting holes for field-installed motors.
 10. Motor: Secured to mounting frame, with adjustable alignment.

2.03 FLEXIBLE-COUPLED, DOUBLE-SUCTION PUMPS

- A. Description: Base-mounted, centrifugal, flexible-coupled, double-suction, single-stage, bronze-fitted, axially split case design; rated for 175-psig minimum working pressure and a continuous water temperature of 225 deg F, with mechanical seals and impeller mounted between bearings.
1. Casing: Cast iron; with ASME B16.1, Class 125 flanged pipe connections. Include threaded gage tapings at inlet and outlet connections, vent valve at high point of volute, and threaded drain plug at low point of volute.
 - a. Casing shall allow removal and replacement of impeller without disconnecting piping.
 2. Impeller: ASTM B 584, cast bronze, statically and dynamically balanced, closed, double suction, and keyed to shaft.
 3. Wear Rings: Replaceable, bronze casing ring.
 4. Shaft and Sleeve: Stainless-steel shaft with stainless steel or bronze sleeve.
 5. Pump Shaft Bearings: Grease-lubricated ball bearings contained in cast-iron housing.
 6. Seals: Mechanical, Silicon Carbide seat, carbon washer, Viton elastomer, stainless steel spring and parts.
 7. Coupling: Flexible-spacer type, capable of absorbing torsional vibration and shaft misalignment; with flange and sleeve section that can be disassembled and removed without removing pump or motor.
 8. Coupling Guard: Steel, removable, and attached to mounting frame.
 9. Mounting Frame: Welded-steel frame and cross members, factory fabricated from ASTM A 36/A 36M channels and angles. Fabricate for mounting pump casing, coupling guard, and motor. Field-drill motor-mounting holes for field-installed motors.
 10. Motor: Secured to mounting frame, with adjustable alignment.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Provide pumps to operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, and operate within 25 percent of midpoint of published maximum efficiency curve.
- B. Install long radius reducing elbows or reducers between pump and piping. Support piping adjacent to pump so no weight is carried on pump casings. For base mounted pumps, install supports under elbows on pump suction and discharge line.
- C. Install pumps on vibration isolators. Refer to Division 23.
- D. Install flexible connectors at or near pumps where piping configuration does not absorb vibration. Refer to Division 23.
- E. Provide line sized shut-off valve and strainer or pump suction fitting on pump suction, and line sized non slam check valve, balancing valve, and shut-off valve or combination pump discharge valve] on pump discharge. Refer to Division 23.
- F. Decrease from line size with long radius reducing elbows or reducers. Support piping adjacent to pump so no weight is carried on pump casings. Provide supports under elbows on pump suction and discharge line.
- G. Provide air cock and drain connection on horizontal pump casings.
- H. Provide drains for bases and seals.

- I. Check, align, and certify alignment of base mounted pumps prior to start-up.
- J. Install base mounted pumps on concrete housekeeping base, with anchor bolts, set and level, and grout in place. Refer to Division 03.
- K. Lubricate pumps before start-up.

3.02 FIELD QUALITY CONTROL

- A. Division 01 - Quality Requirements and Execution and Closeout Requirements.
- B. Inspect for alignment of base mounted pumps.

3.03 COMMISSIONING

- A. Verify that pumps are installed and connected according to the Contract Documents.
- B. Verify that electrical wiring installation complies with manufacturer's written instructions and the Contract Documents.
- C. Perform the following preventive maintenance operations and checks before starting:
 - 1. Lubricate bearings.
 - 2. Remove grease-lubricated bearing covers, flush bearings with kerosene, and clean thoroughly. Fill with new lubricant according to manufacturer's written instructions.
 - 3. Disconnect coupling and check motor for proper rotation that matches direction marked on pump casing.
 - 4. Verify that pumps are free to rotate by hand and that pumps for handling hot liquids are free to rotate with pumps hot and cold. Do not operate pumps if they are bound or drag, until cause of trouble is determined and corrected.
 - 5. Check suction piping connections for tightness to avoid drawing air into pumps.
 - 6. Clean strainers.
 - 7. Verify that pump controls are correct for required application.
- D. Starting procedure for pumps with shutoff power not exceeding safe motor power is as follows:
 - 1. Prime pumps by opening suction valves and closing drains, and prepare pumps for operation.
 - 2. Open discharge valves, pumps should not be operated against dead shutoff.
 - 3. Start motors.
 - 4. Open discharge valves slowly.
 - 5. Check general mechanical operation of pumps and motors.
- E. Refer to Division 23 "Testing, Adjusting, and Balancing" for detailed requirements for testing, adjusting, and balancing hydronic systems and Division 1 "Commissioning".

3.04 DEMONSTRATION

- A. Engage a factory-authorized service representative to train County's maintenance personnel to adjust, operate, and maintain hydronic pumps as specified below:
 - 1. Train County's maintenance personnel on procedures and schedules for starting and stopping, troubleshooting, servicing, and maintaining pumps.
 - 2. Review data in maintenance manuals. Refer to Division 1 "Operation and Maintenance Data."
 - 3. Schedule training with County's Representative.

END OF SECTION