

## SECTION 15453 - PLUMBING PUMPS

## PART 1 - GENERAL

## 1.1 DESCRIPTION OF WORK:

- A. Pumps furnished as part of factory-fabricated equipment, are specified as part of equipment assembly in other Division-15 sections.
- B. Refer to other Division 15 sections for insulation of pump housings; vibration control of plumbing pumps; not work of this section.
- C. 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.
- D. 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.

## 1.2 QUALITY ASSURANCE:

- A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of plumbing 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 plumbing pumps in accordance with HI "Hydraulic Institute Standards".
  - 2. UL Compliance: Design, manufacture, and install plumbing 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.
  - 4. SSPMA Compliance: Test and rate sump and sewage pumps in accordance with Sump and Sewage Pump Manufacturers Association (SSPMA) and provide certified rating seal.
- 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. Shop Drawings: Submit manufacturer's assembly-type shop drawings indicating dimensions, weight loadings, required clearances, and methods of assembly of components.
  - C. Wiring Diagrams: Submit manufacturer's electrical requirements for power supply wiring to plumbing 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.
  - 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 plumbing pumps and components carefully to prevent damage, breaking, denting and scoring. Do not install damaged plumbing pumps or components; replace with new.
  - B. Store plumbing 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 plumbing 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:
  - 1. In-Line Recirculation Pumps:
    - a. Armstrong Pumps, Inc.
    - b. Bell & Gossett ITT; Fluid Handling Div.
    - c. Dunham-Bush, Inc.
    - d. Grundfos Pumps Corp.
    - e. Taco, Inc.
    - f. Peerless Pumps
  - 2. Water Pressure Booster Systems:
    - a. Armstrong Pumps, Inc.
    - b. PSF; Div. Messco Inc.
    - c. Peerless Pumps
    - d. Amtrol
  - 3. Pedestal Type Sump Pumps:
    - a. Armstrong Pumps, Inc.
    - b. Ingersoll-Rand Co.
    - c. Peerless Pump.
    - d. Weil Pump Co.
    - e. Weinman Pump LFE Corp.; Fluids Control Div.

4. Pedestal Type Sewage Pumps
5. Submersible Sump Pumps:
  - a. Hydromatic Pumps
  - b. Goulds Pumps, Inc.
  - c. Kenco Pump Div., American Crucible Products Co.
  - d. Peabody Barnes.
  - e. Weil Pump Co.
  - f. Weinman Pump LFE Corp.; Fluids Control Div.
  - g. Zoeller Co.
  - h. Peerless Pumps
6. Submersible Sewage Pumps

## 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.

## 2.3 IN-LINE RECIRCULATION PUMPS:

- A. General: Provide in-line recirculation 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: Bronze or stainless steel construction.
- D. Shaft: Steel, ground and polished, integral thrust collar.
- E. Bearings: Two horizontal sleeve bearings designed to circulate oil.
- F. Seal: Mechanical, with carbon brass seal face rotating against ceramic seat.
- G. Motor: Non-overloading at any point on pump curve, open, drip-proof, sleeve bearings, quiet operating, rubber mounted construction, built-in thermal overload protection.
- H. Coupling: Self-aligning, flexible coupling.

## 2.4 WATER PRESSURE BOOSTER SYSTEM:

- A. General: Provide factory-fabricated and tested water pressure booster system consisting of diaphragm type water tank, centrifugal pumps, power and control panels, instrumentation, and operating controls. Provide size as indicated, capacities as scheduled.
- B. Pumps: Provide 2 constant speed, single stage, end-suction design, cast-iron, bronze fitted centrifugal pumps with mechanical shaft seals. Mount pumps on vibration isolators. Provide temperature probe and electric purge valve immediately upstream of each PRV. Provide drip-proof motors.
- C. Water Tank: Provide factory-precharged diaphragm type water tank with replaceable flexible membrane. Construct in accordance with ASME Code and provide ASME stamp for 125 psi minimum.

- D. System Controls: Maintain system pressure with pilot- operated diaphragm type combination pressure regulating and non-slam check valve on each pump discharge line.
    - 1. Provide low system pressure switch located on discharge header to sense drop in system pressure, and to activate alarm and automatically start standby pump.
    - 2. Provide adjustable vane type flow switch to sequence lag pump.
  - E. Control Panel: Provide UL-listed, NEMA 1, hinged door, lockable control panel containing the following:
    - 1. For Each Pump:
      - a. Fused disconnect switch.
      - b. Motor starter with 3-leg overload protection.
      - c. Running light.
      - d. Multiple position motor control switch.
      - e. Discharge pressure gauge.
    - 2. For System:
      - a. 115-v control transformer.
      - b. Control power switch.
      - c. Indicating lights.
      - d. Relays.
      - e. Visual alarm system.
      - f. Suction pressure gauge.
  - F. Prefabrication: Factory-prefabricate booster system, mount all components on common structural stand. Provide interconnecting piping, isolation valves on suction and discharge of each pump, suction and discharge piping manifolds, shutoff cocks for gauges and pressure switches, and factory-wiring.
  - G. Factory-Test: Provide electrical and hydraulic test on assembled unit prior to shipment. Provide system operating flow test from 0 to 100 percent design flow rate at scheduled suction and discharge pressure conditions.
- 2.5 PEDESTAL TYPE SUMP PUMPS:
- A. General: Provide pedestal type sump pumps as indicated, of size and capacity as scheduled.
  - B. Pump: Centrifugal, enclosed impeller type sump pump, complete with cast iron inlet strainer, cast-iron base plate, suction plate and casing, and cast-iron or bronze impeller.
  - C. Shaft: Stainless steel of length to suit depth of basin, connected with flexible coupling to motor, and intermediate sleeve bearing for lengths over 4feet.
  - D. Motor: Open drip-proof, electrical characteristics as scheduled.
  - E. Basin: Fiberglass construction of indicated dimensions, with inlet connections of size and location as indicated. Maintain minimum of 3feet depth below lowest inlet invert.
  - F. Cover: Cast-iron or steel circular cover with manhole or handhole opening, depending on diameter. Provide openings for pump, control rod, and discharge piping.
  - G. Controls

1. Pump control shall be ball & rod mechanical float switch. Unit consists of copper ball, brass rod & stops. Float switch is mounted on a cast iron pedestal and bolted to sump cover plate.  
Duplex unit with mechanical alternating float switch complete with high level emergency start position turning on both pumps in case of high liquid level.
2. System shall include compression type high water alarm complete with alarm buzzer and additional contact for remote signaling. Alarm shall be housed in a NEMA 1 enclosure and mounted on sump cover plate.
3. Provide NEMA 1 Control Panel with the following standard features:
  - UL 508 or CSA approved,
  - Main disconnect,
  - Thermal & short circuit protection using internal circuit breakers,
  - Failure protection with automatic transfer to non-operating pump (duplex system),
  - Control transformer with fused primary (UL 508),
  - Power on and pump run indicating light,
  - Hand-off automatic selector switch.

#### 2.6 PEDESTAL TYPE SEWAGE PUMPS:

- A. General: Provide pedestal type sewage pumps as indicated, of size and capacity as scheduled, capable of passing solids sizes of 2-1/2inches & 3 inches.
- B. Pump: Centrifugal, non-clog open grinder type impeller type sewage pump, complete with cast iron inlet strainer, cast-iron base plate, suction plate and casing, and cast-iron or bronze impeller.
- C. Shaft: Stainless steel of length to suit depth of basin, connected with flexible coupling to motor upper ball bearings, and intermediate sleeve bearing for lengths over 4' and gas tight packing seal.
- D. Motor: Open drip-proof, electrical characteristics as scheduled.
- E. Basin: Fiberglass construction of indicated dimensions, with inlet connections of size and location as indicated. Maintain minimum of 3' depth below lowest inlet invert.
- F. Cover: Cast-iron or steel circular cover with manhole or handhole opening, depending on diameter. Provide openings for pump, control rod, and discharge piping.
- G. Controls
  1. Pump control shall be ball & rod mechanical float switch. Unit consists of copper ball, brass rod & stops. Float switch is mounted on a cast iron pedestal and bolted to sump cover plate.  
Duplex unit with mechanical alternating float switch complete with high level emergency start position turning on both pumps in case of high liquid level.
  2. System shall include compression type high water alarm complete with alarm buzzer and additional contact for remote signaling. Alarm shall be housed in a NEMA 1 enclosure and mounted on sump cover plate.
  3. Provide NEMA 1 Control Panel with the following standard features:

UL 508 or CSA approved,  
 Main disconnect,  
 Thermal & short circuit protection using internal circuit breakers,  
 Failure protection with automatic transfer to non-operating pump (duplex system),  
 Control transformer with fused primary (UL 508),  
 Power on and pump run indicating light,  
 Hand-off automatic selector switch.

#### 2.7 SUBMERSIBLE SUMP PUMPS:

- A. General: Provide submersible sump pumps as indicated, of size and capacity as scheduled.
- B. Pump: Cast-iron shell, bronze impeller, stainless steel shaft, factory-sealed grease lubricated ball bearings, ceramic mechanical seal, and perforated steel strainer.
- C. Motor: Hermetically sealed, capacitor-start, with built-in overload protection, electrical characteristics as scheduled. Provide 10 feet of 3-conductor PVC cord and molded grounding plug.
- D. Provide NEMA 1 remote panel with alternator, disconnect for each meter, starters, hand-off-auto selector switch, pilot lights, control transformer and high water alarm with contacts for remote signaling.

#### 2.8 SUBMERSIBLE SEWAGE PUMPS:

- A. General: Provide submersible sewage pumps as indicated, of size and capacity as scheduled.
- B. Pump: Cast-iron shell, bronze grinder type impeller multi-van-semi open capable of passing 3 inch solids, stainless steel shaft, factory-sealed grease lubricated ball bearings, ceramic mechanical seal.
- C. Motor: Hermetically sealed NEMA 6, capacitor-start, with built-in overload protection, electrical characteristics as scheduled. Provide 10' of 3-conductor PVC cord and molded grounding plug.
- D. Provide NEMA 1 remote panel with alternator, disconnect for each meter, starters, hand-off-auto selector switch, pilot lights, control transformer and high water alarm with contacts for remote signaling.

### PART 3 - EXECUTION

#### 3.1 INSPECTION:

- A. Examine areas and conditions under which plumbing 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 plumbing pumps where indicated, in accordance with manufacturer's published installation instructions, complying with recognized industry practices to ensure that plumbing pumps comply with requirements and serve intended purposes.

- B. Access: Provide access space around plumbing pumps for service as indicated, but in no case less than that recommended by manufacturer.
  - C. Support: Install base-mounted pumps on minimum of 4inch 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 under 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 plumbing pumps.
  - E. Basins: Install sump pump basins in indicated locations and connect to sewer lines. Brace interior of basin in accordance with manufacturer's instructions, to prevent distortion or collapse during concrete placement. Refer to Division 3 for concrete work; not work of this section. Set cover over basin, fasten to top flange of basin. Install so cover is flush with finished floor.
  - F. 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.
    - 1. 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.
  - G. Piping Connections: Refer to Division-15 plumbing piping sections. Provide piping, valves, accessories, gauges, supports, and flexible connections as indicated.
- 3.3 ADJUSTING AND CLEANING:
- A. Alignment: Check alignment, and where necessary, realign shafts of motors and pumps within recommended tolerances by manufacturer, and in presence of manufacturers' service representative.
  - B. Start-Up: Lubricate pumps before start-up. Start-up in accordance with manufacturer's instructions.
  - C. Cleaning: Clean factory-finished surfaces. Repair any marred or scratched surfaces with manufacturer's touch-up paint.

END OF SECTION 15453