

## PART 1 – GENERAL

### 1.1 RELATED DOCUMENTS

- A. Drawings and Divisions 00 and 01, apply to this Section.
- B. Related Sections include the following:
  - 1. Division 23.
  - 2. Division 22.
  - 3. Division 26.

### 1.2 SUMMARY

- A. This Section includes pumps for the building plumbing systems.

### 1.3 SUBMITTALS

- A. Product Data: Include certified performance curves and rated capacities of selected models; shipping, installed, and operating weights; furnished specialties; and accessories for each type and size of pump specified. Indicate pumps' operating point on curves.
- B. Maintenance Data: For each pump specified to include in maintenance manuals specified in Division 01.

### 1.4 CODES AND STANDARDS

- A. Codes and Standards shall be the current version adopted by the Authority Having Jurisdiction.

### 1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain same type of pumps through one source from a single manufacturer.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.

### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Retain shipping flange protective covers and protective coatings during storage.
- B. Protect bearings and couplings against damage.

## PART 2 – PRODUCTS

### 2.1 PUMPS, GENERAL

- A. Description: Factory-assembled and -tested, single-stage, centrifugal pump units; complying with UL 778; suitable for potable-water service; with all-bronze or stainless steel construction and components in contact with water made of corrosion-resistant materials.

- B. Motors: Provide with built-in thermal-overload protection appropriate for motor size and duty.
- C. End Connections for NPS 2 and Smaller: Threaded. Pumps available only with flanged ends may be furnished with threaded companion flanges.
- D. End Connections for NPS 2-1/2 and Larger: Flanged.
- E. Finish: Manufacturer's standard paint applied to factory-assembled and -tested units before shipping.
- F. Manufacturer's Preparation for Shipping: Clean flanges and exposed machined metal surfaces and treat with anticorrosion compound after assembly and testing. Protect flanges, pipe openings, and nozzles.

## 2.2 SUMP PUMPS, GENERAL

- A. Description: Factory-assembled and -tested, single-stage, centrifugal, end-suction sump pump units complying with UL 778. Include motor, operating controls, and construction for permanent installation.
- B. Discharge Pipe End Connections NPS 2 and Smaller: Threaded. Pumps available only with flanged-end discharge pipe may be furnished with threaded companion flanges.
- C. Discharge Pipe End Connections NPS 2-1/2 and Larger: Flanged.
- D. Motors: Single speed, with grease-lubricated ball bearings, and non-overloading through full range of pump performance curves.
- E. Finish: Manufacturer's standard paint applied to factory-assembled and -tested units before shipping.
- F. Manufacturer's Preparation for Shipping: Clean flanges and exposed machined metal surfaces and treat with anticorrosion compound after assembling and testing. Protect flanges, pipe openings, and nozzles with wooden flange covers or with screwed-in plugs.

## 2.3 WET-PIT-MOUNTED, VERTICAL SUMP PUMPS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Wet-Pit-Mounted, Vertical Sump Pumps:
    - a. Armstrong Pumps, Inc.
    - b. Aurora Pump.
    - c. Chicago Pump Co.
    - d. PACO Pumps, Inc.
    - e. Peerless Pump Co.
    - f. Weil Pump Co.
    - g. Or Approved Equal.
- B. Description: Vertical, separately coupled, suspended sump pump complying with HI 1.1-1.5 for wet-pit-volute sump pumps.

1. Pump Arrangement: [Simplex][Duplex].
2. Casing: Cast iron, with cast-iron inlet strainer.
3. Impeller: [ASTM A 48, Class No. 25 A or higher cast iron; statically and dynamically balanced, open or semi-open nonclog design, overhung, single suction, keyed to shaft, and secured by locking cap screw][ASTM B 584, cast bronze; statically and dynamically balanced, open or semi-open nonclog design, overhung, single suction, keyed to shaft, and secured by locking cap screw][ASTM A 532/A 532M, abrasion-resistant cast iron; statically and dynamically balanced, open or semi-open nonclog design, overhung, single suction, keyed to shaft, and secured by locking cap screw].
4. Pump Shaft and Sleeve Bearings: Stainless-steel shaft with bronze sleeve bearings. Include oil-lubricated, intermediate sleeve bearings at 48-inch maximum intervals if basin depth is greater than 48 inches, and grease-lubricated, ball-type thrust bearings.
5. Pump and Motor Shaft Coupling: Flexible, capable of absorbing torsional vibration and shaft misalignment.
6. Pump Discharge Piping: Manufacturer's standard galvanized-steel or bronze pipe.
7. Basin Cover: Cast iron or steel and suitable for supporting pumps, motors, and controls. Refer to "Sump Pump Basins" Article for other requirements.
8. Cover Shaft Seal: Stuffing box, with graphite-impregnated braided-yarn rings and bronze packing gland.
9. Motor: Mounted vertically on cast-iron pedestal.
  - a. Thermal Overload Protection: Built into pump motors or starters, as appropriate, according to size.
10. Controls: NEMA 250, Type 1, pedestal-mounted float switch; with float, float rod, and rod buttons.
11. Controls: NEMA 250, Type 1, pedestal-mounted float switch; with floats, float rods, and rod buttons. Include automatic alternator to alternate operation of pump units on successive cycles and to operate both units if one pump cannot handle load.
12. Float-Guide Pipe: Guide pipe or other restraint for floats and rods in basins of depth greater than 60 inches.
13. High-Water Alarm: Cover-mounted, compression-probe alarm, with electric bell; 120-V ac, with transformer and contacts for remote alarm bell, unless battery operation is indicated.

## 2.4 SUBMERSIBLE SUMP PUMPS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  1. Submersible Sump Pumps:
    - a. Chicago Pump Co.
    - b. Grundfos Pumps Corp.
    - c. Little Giant Pump Co.
    - d. PACO Pumps, Inc.
    - e. Weil Pump Co.
    - f. Zoeller.
    - g. Or Approved Equal.
- B. Description: Submersible, direct-connected sump pump complying with HI 1.1-1.5 for submersible sump pumps.
  1. Pump Arrangement: [Simplex][Duplex].

2. Casing: Cast iron with cast-iron inlet strainer, legs that elevate pump to permit flow into impeller, and discharge companion flange suitable for plain-end pipe connection arranged for vertical discharge.
3. Impeller: [ASTM A 48, Class No. 25 A or higher cast iron; statically and dynamically balanced, open or semi-open nonclog design, overhung, single suction, keyed to shaft, and secured by locking cap screw][ASTM B 584, cast bronze; statically and dynamically balanced, open or semi-open nonclog design, overhung, single suction, keyed to shaft, and secured by locking cap screw][ASTM A 532/A 532M, abrasion-resistant cast iron; statically and dynamically balanced, open or semi-open nonclog design, overhung, single suction, keyed to shaft, and secured by locking cap screw].
4. Construction: Stainless steel with stainless-steel or other corrosion-resistant impeller, stainless-steel inlet strainer, legs that elevate pump to permit flow into impeller, and discharge companion flange suitable for plain-end pipe connection arranged for vertical discharge.
5. Pump and Motor Shaft: Stainless steel, with factory-sealed, grease-lubricated ball bearings.
6. Seals: Double mechanical seals.
7. Motor: Hermetically sealed, capacitor-start type, with built-in overload protection; and three-conductor waterproof power cable of length required, with grounding plug and cable-sealing assembly for connection at pump.
8. Moisture-Sensing Probe: Internal moisture sensor, moisture alarm, and waterproof cable of length required, with cable-sealing assembly for connection at pump.
9. Pump Discharge Piping: Factory or field fabricated, ASTM A 53, Schedule 40, galvanized-steel pipe, bronze pipe, or copper tube.
10. Basin Cover: Cast iron or steel and suitable for supporting controls. Refer to "Sump Pump Basins" Article for other requirements.
11. Controls: NEMA 250, Type 1 enclosure, pedestal mounted, unless wall mounting is indicated; with two micropressure switches in NEMA 250, Type 6 enclosures; mounting rod; and electric cables.
12. Controls: NEMA 250, Type 1 enclosure, pedestal mounted, unless wall mounting is indicated; with three micropressure switches in NEMA 250, Type 6 enclosures; mounting rod; and electric cables. Include automatic alternator to alternate operation of pump units on successive cycles and to operate both units if one pump cannot handle load.
13. Controls: NEMA 250, Type 1 enclosure, pedestal mounted, unless wall mounting is indicated; with two mercury-float switches in NEMA 250, Type 6 enclosures; mounting rod; and electric cables.
14. Controls: NEMA 250, Type 1 enclosure, pedestal mounted, unless wall mounting is indicated; with three mercury-float switches in NEMA 250, Type 6 enclosures; mounting rod; and electric cables. Include automatic alternator to alternate operation of pump units on successive cycles and to operate both units if one pump cannot handle load.
15. Controls: NEMA 250, Type 1 enclosure, pedestal-mounted float switch; with float, float rod, and rod buttons.
16. Controls: NEMA 250, Type 1 enclosure, pedestal-mounted float switch; with floats, float rods, and rod buttons. Include automatic alternator to alternate operation of pump units on successive cycles and to operate both units if one pump cannot handle load.
17. Float-Guide Pipe: Guide pipe or other restraint for floats and rods in basins of depth greater than 60 inches.
18. High-Water Alarm: [Cover-mounted, compression-probe alarm, with electric bell; 120-V ac, with transformer and contacts for remote alarm bell, unless battery operation is indicated][Rod-mounted, NEMA 250, Type 6 enclosure with micropressure-switch alarm matching control and electric bell; 120-V ac, with transformer and contacts for remote alarm bell, unless battery operation is indicated][Rod-mounted, NEMA 250, Type 6 enclosure with mercury-float-switch alarm matching control and electric bell;

120-V ac, with transformer and contacts for remote alarm bell, unless battery operation is indicated].

## 2.5 COMPACT, SUBMERSIBLE SUMP PUMPS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Compact, Submersible Sump Pumps:
    - a. Grundfos Pumps Corp.
    - b. Little Giant Pump Co.
    - c. Weil Pump Co.
    - d. Zoeller.
    - e. Or Approved Equal.
- B. Description: Simplex, submersible, direct-connected sump pump.
1. Casing: Cast iron or stainless steel with metal inlet strainer. Include discharge companion flange suitable for plain-end pipe connection arranged for vertical discharge.
  2. Impeller: Cast iron, bronze, brass, or stainless steel.
  3. Casing: Cast iron with inlet strainer and discharge companion flange suitable for plain-end pipe connection arranged for vertical discharge.
  4. Impeller: Cast iron, bronze, brass or stainless steel.
  5. Construction: Stainless steel with stainless-steel or other corrosion-resistant impeller, stainless-steel inlet strainer, legs that elevate pump to permit flow into impeller, and discharge companion flange suitable for plain-end pipe connection arranged for vertical discharge.
  6. Pump and Motor Shaft: Steel, with factory-sealed, grease-lubricated ball bearings.
  7. Seal: Mechanical type.
  8. Motor: Hermetically sealed, capacitor-start type; with built-in overload protection; and three-conductor waterproof power cable of length required, with grounding plug and cable-sealing assembly for connection at pump.
  9. Pump Discharge Piping: Factory or field fabricated, ASTM A 53, Schedule 40, galvanized-steel pipe or copper tube.
  10. Cover: With holes and gaskets.
  11. Controls: NEMA 250, Type 6, 120-V ac, micropressure or mercury-float switches, mounted on discharge piping.

## 2.6 SUMP PUMP BASINS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Plastic, Sump Pump Basins:
    - a. AK Industries, Inc.
    - b. Armstrong Pumps, Inc.
    - c. Ashland Plastics, Inc.
    - d. Barnes Pumps, Inc.
    - e. Federal Pump Corp.
    - f. Fiberbasin, Inc.
    - g. Goulds Pumps, Inc.

- h. Peerless Pump Co.
  - i. Weil Pump Co.
  - j. Or Approved Equal.
- B. Description: Factory fabricated with sump, pipe connections, and separate cover.
- C. Basin Sump: Fabricate watertight, with sidewall openings for pipe connections.
  - 1. Material: [Fiberglass][Polyethylene][Steel, with bitumastic coating][Cast iron][Fiberglass, polyethylene, steel with bitumastic coating, or cast iron].
  - 2. Reinforcement: Mounting plates for pumps, fittings, and accessories.
  - 3. Anchor Flange: Same material as or compatible with basin sump, cast in or attached to sump, in location and of size required to anchor basin in concrete slab.
- D. Basin Cover: Fabricate with openings with gaskets, seals, and bushings, for access, pumps, pump shafts, control rods, discharge piping, vent connections, and power cables.
  - 1. Material: [Fiberglass][Polyethylene][Steel, with bitumastic coating][Cast iron][Steel, with bitumastic coating or cast iron][Fiberglass, polyethylene, steel with bitumastic coating, or cast iron].
  - 2. Reinforcement: Steel or cast-iron reinforcement capable of supporting foot traffic for basins installed in foot-traffic areas.

## 2.7 SUMP PUMP PITS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Packaged, Drainage Pump Units:
    - a. Alyan Pump Co.
    - b. Federal Pump Corp.
    - c. Liberty Pumps.
    - d. Little Giant Pump Co.
    - e. Milton Roy Co.; Hartell Div.
    - f. Myers: F.E. Myers Co.
    - g. Sta-Rite Industries, Inc.
    - h. Zoeller Pump Co.
    - i. Or Approved Equal.
- B. Description: Cast-in-place concrete with steel curb frames and covers. Refer to Division 03 Section "Cast-in Place Concrete."
- C. Curb Frames: Galvanized steel or steel with bitumastic coating of dimension to fit cover.
  - 1. Pattern: [Angle-cross-section shape with flat top surface][Z-cross-section shape with raised outer rim of height matching cover for recessed mounting that will have installed cover flush with top of floor slab].
- D. Pit Cover: Fabricate with openings with gaskets, seals, and bushings, for access, pumps, pump shafts, control rods, discharge piping, vent connections, and power cables.

## 2.8 PACKAGED DRAINAGE PUMP UNITS

- A. Description: Packaged, automatic-operation, pedestal drainage pump; with aluminum or brass impeller, welded-steel or plastic basin, and float switch with 72-inch- minimum power cord and plug.
  - 1. Motor: Mounted vertically on sump with built-in overload protection.
- B. Description: Packaged, automatic-operation, submersible drainage pump; with cast-iron body and brass impeller, plastic basin, and motor-mounted float switch with 72-inch- minimum power cord and plug.
  - 1. Pump Seals: Mechanical type.
  - 2. Motor: Hermetically sealed, capacitor-start type, with built-in overload protection and three-conductor waterproof power cable of length required, with grounding plug and cable-sealing assembly for connection at pump.
- C. Description: Packaged, automatic-operation, submersible drainage pump; with plastic body, plastic impeller, plastic basin, and motor-mounted float switch with 72-inch- minimum power cord and plug.
  - 1. Pump Seals: Mechanical type.
  - 2. Motor: Hermetically sealed, capacitor-start type, with built-in overload protection and three-conductor waterproof power cable of length required, with grounding plug and cable-sealing assembly for connection at pump.
  - 3. Basin: Watertight with inlet pipe connection and gastight cover with vent and pump discharge connections. Plug vent opening if vent piping connection is not required.
  - 4. Controls: Automatic, with mercury-float switches and electrical power cables.
  - 5. Pump Discharge Piping: Manufacturer's standard steel pipe, copper tube, or plastic pipe.
  - 6. Valves: Factory- or field-installed check and shutoff valves on each pump discharge.

### PART 3 – EXECUTION

#### 3.1 EXAMINATION

- A. Examine roughing-in of plumbing piping systems to verify actual locations of connections before pump installation.

#### 3.2 SUMP PUMPS INSTALLATION

- A. Install pumps according to manufacturer's written instructions.
- B. Install pumps and arrange to provide access for maintenance, including removal of motors, impellers, couplings, and accessories.
- C. Support piping so weight of piping is not supported by pumps.
- D. Wet-Pit-Mounted, Vertical Sump Pumps: Suspend pumps from basin covers. Make direct connections to storm drainage piping.
- E. Submersible Sump Pumps: Set pumps on basin, pit, or sump floor. Make direct connections to storm drainage piping.

- F. Sump Pump Basins: Install basins and connect to storm drainage piping. Brace interior of basins according to manufacturer's written instructions to prevent distortion or collapse during concrete placement. Set basin cover and fasten to basin top flange. Install so top surface of cover is flush with finished floor.
- G. Sump Pump Pits: Construct concrete pits and connect to storm drainage piping. Set basin cover and fasten to top edge of concrete pit. Install so top surface of cover is flush with finished floor.
- H. Packaged Drainage Pump Units: Install and make direct connections to storm drainage piping.

### 3.3 SUMP PUMP CONNECTIONS

- A. Drawings indicate general arrangement of piping and specialties. The following are specific connection requirements.
  - 1. Install discharge pipe sizes equal to or greater than diameter of pump nozzles, and connect to storm drainage piping.
  - 2. Install swing check valve and gate or ball valve on each sump pump discharge. Include spring-loaded or weighted-lever check valves for piping NPS 2-1/2 and larger.
  - 3. Install swing check valve and gate or ball valve on each automatic, packaged pump discharge.

### 3.4 START-UP PROCEDURES

- A. Check suction piping connections for tightness.
- B. Clean strainers on suction piping.
- C. Controls: Set for automatic starting and stopping operation.
- D. Final Checks before Starting: Perform the following preventive maintenance operations:
  - 1. Lubricate oil-lubricated-type bearings.
  - 2. Verify that pump is free to rotate by hand and that pump for handling hot liquids is free to rotate with pump hot and cold. Do not operate pump if it is bound or drags, until cause of trouble is determined and corrected.
  - 3. Verify that pump controls are correct for required application.
- E. Starting procedure for pumps is as follows:
  - 1. Prime pump by opening suction valves and closing drains, and prepare pump for operation.
  - 2. Open circulating line valve if pump should not be operated against dead shutoff.
  - 3. Start motor.
  - 4. Open discharge valve slowly.
  - 5. Check general mechanical operation of pump and motor.
  - 6. Close circulating line valve once there is sufficient flow through pump to prevent overheating.

### 3.5 DEMONSTRATION



- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain pumps as specified below:
1. Train Owner's maintenance personnel on procedures and schedules for starting and stopping, troubleshooting, servicing, and maintaining pumps.
  2. Review data in maintenance manuals.
  3. Schedule [xx-hours][xx-days] of training with Owner with at least seven days' advance notice.

**END OF SECTION**