SECTION 221429.16 - SUBMERSIBLE SUMP PUMPS

This Section includes submersible and non-submersible sump pumps used to lift and transport wastewater from plant sumps.

Manufacturers found in SpecAgent for this Section were identified as representative and not as an endorsement for meeting requirements of this Specification.

This Section includes performance, proprietary, and descriptive specifications. Edit to avoid conflicting requirements.

This Section may include the term "Architect/Engineer." "Architect" is used in AIA contract documents; "Engineer" is used in EJCDC contract documents. Retain appropriate term.

See Drawing Coordination Checklist and Evaluations for information needed to coordinate this Specification Section with Drawings.

1. GENERAL
   * + 1. SUMMARY
          1. Section Includes:

Non-submersible sump pumps, controls, and accessories.

Submersible sump pumps, controls, and accessories.

* + - * 1. Related Requirements:

List other Sections directly related to or affecting Work of this Section. Include Sections specifying information expected to be found in this Section as well as Sections required to describe complete system or assembly requirements.

Section 400551 - Common Requirements for Process Valves: Product and installation requirements for valves provided under this Section.

Section 460553 - Identification for Water and Wastewater Equipment: Product and installation requirements for identification of equipment provided under this Section.

* + - 1. DEFINITIONS

Limit list of definitions to terms unique to this Section and not provided elsewhere.

* + - * 1. Alternator: A device that changes the starting order of pumps in a multiple-pump system.
        2. Lag Pump: The second pump to be energized in a multiple-pump system.
        3. Lead Pump: The first pump to be energized in a multiple-pump system.
      1. COORDINATION
         1. Section 013000 - Administrative Requirements: Requirements for coordination.
         2. Coordinate Work of this Section with [**plant operations**] [**Director’s Representative's operations**] <**\_\_\_\_\_\_\_\_**>.
      2. REFERENCE STANDARDS

List reference standards included within text of this Section, with designations, numbers, and complete document titles.

* + - * 1. National Electrical Manufacturers Association:

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

* + - 1. SUBMITTALS
         1. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
         2. Manufacturer's installation instructions shall be provided along with product data.
         3. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).

Only request submittals needed to verify compliance with Project requirements.

* + - * 1. Section 013300 - Submittal Procedures: Requirements for submittals.
        2. Product Data:

Submit pump type and capacity.

Submit certified pump curves showing pump performance characteristics with pump and system operating point plotted, including NPSH curve when applicable.

Submit electrical characteristics and connection requirements.

* + - * 1. Manufacturer's Certificate: Certify that [**products**] <**\_\_\_\_\_\_\_\_**> meet or exceed [**specified requirements**] <**\_\_\_\_\_\_\_\_**>.

Include separate paragraphs for additional certifications.

* + - * 1. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.
        2. Manufacturer Reports: Certify that pumps have been installed according to manufacturer's instructions.
        3. Qualifications Statement:

Coordinate following subparagraph with requirements specified in QUALIFICATIONS Article.

Submit qualifications for manufacturer.

* + - 1. QUALIFICATIONS

Coordinate following paragraph with requirements specified in SUBMITTALS Article.

* + - * 1. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum [**three**] <**\_\_\_\_\_\_\_\_**> years' [**documented**] experience.
      1. WARRANTY

This Article extends warranty period beyond one year. Extended warranties may increase construction costs and Owner enforcement responsibilities. Specify warranties with caution.

* + - * 1. Furnish [**five**] <**\_\_\_\_\_\_\_\_**>-year manufacturer's warranty for sump pumps.

1. PRODUCTS
   * + 1. NON-SUBMERSIBLE SUMP PUMPS
          1. [Manufacturers](http://www.specagent.com/LookUp/?ulid=11970&mf=04&src=wd): Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

Little Giant Pump Co. Subsid., Tecumseh Products Co.

Paco Pumps, Inc.

Weil Pump Co.

Zoeller Co.

Or equal.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

In following Paragraph insert "State of \_\_\_\_\_\_\_\_ Department of Transportation," "Municipality of \_\_\_\_\_\_\_\_ Department of Public Works," or other agency as appropriate.

* + - * 1. Furnish materials according to <**\_\_\_\_\_\_\_\_**> standards.

Insert descriptive specifications below to identify Project requirements and to eliminate conflicts with products specified above.

* + - * 1. Description:

Type: Vertical, centrifugal.

Configuration: Direct-connected[**, simplex**] [**, duplex**].

* + - * 1. Performance and Design Criteria:

Design Flow Rate: <**\_\_\_\_\_\_\_\_**> gpm.

Design Total Dynamic Head: <**\_\_\_\_\_\_\_\_**> feet.

* + - * 1. Casing: Cast-iron volute with radial clearance around impeller [**and slide-away couplings**].

Strainers are not used in sumps; therefore, pump should have open impeller. Choice between cast-iron or bronze impeller is generally a function of pump size and service. Consider using cast-iron impeller if pump is continuously submerged (refer to next Article).

* + - * 1. Impeller:

Material: [**Cast iron**] [**Bronze**].

Type: [**Open, non-clog**] [**Closed**].

Attachment: Keyed to shaft.

* + - * 1. Shaft Material: [**Stainless**] [**Corrosion-resistant alloy**] steel.
        2. Support: Cast-iron pedestal on steel floor plate.
        3. Bearings:

[**Forced grease-**] [**Oil-**] lubricated bronze sleeve.

Grease-lubricated ball thrust at floor plate.

* + - * 1. Drive: Flexible coupling to electric motor.
        2. Operation:

Electrical Characteristics:

<**\_\_\_\_\_\_\_\_**> hp <**\_\_\_\_\_\_\_\_**> [**RLA**].

Voltage: <**\_\_\_\_\_\_\_\_**> V, [**single**] [**three**] phase, 60 Hz.

Maximum [**Fuse Size**] [**Circuit Breaker Size**] [**Overcurrent Protection**]: <**\_\_\_\_\_\_\_\_**> A.

Minimum Circuit Ampacity: <**\_\_\_\_\_\_\_\_**>.

Minimum Power Factor: <**\_\_\_\_\_\_\_\_**> percent at rated load.

Control Panel:

NEMA 250 [**Type 1**] [**Type 4**] <**\_\_\_\_\_\_\_\_**>.

Single point power connection and grounding lug.

Delete following subparagraph if controls are not required.

Controls:

If both of following subparagraphs are required for different pumps, indicate in pump schedule.

Listed controls are those most commonly applied to this type of pump. If required, controls for submersible pumps (as specified in next Article) may be used in this type of installation.

Simplex:

Description: Float switch with float rod, stops, and corrosion-resistant float.

Furnish separate pressure switch-activated HIGH LEVEL alarm with transformer, alarm bell, and standpipe.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

Duplex:

Description: Float-operated mechanical alternator with float rod, stops, and corrosion-resistant float to alternate operation of pumps.

Lag pump energized upon rising liquid level or lead pump failure.

Furnish separate pressure switch-activated HIGH LEVEL alarm with transformer, alarm bell, and standpipe.

[**Furnish extra set of wired terminals for remote alarm circuit**] [**and emergency float switch with float rod, stops, and corrosion-resistant float to operate both pumps upon failure of alternator**].

Disconnect Switch: Factory mounted [**in control panel**] [**on equipment**].

* + - 1. SUBMERSIBLE SUMP PUMPS
         1. [Manufacturers](http://www.specagent.com/LookUp/?ulid=11972&mf=04&src=wd): Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

Goulds Pumps, Inc.

Paco Pumps, Inc.

Weil Pump Co.

Zoeller Co.

Or equal.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

In following Paragraph insert "State of \_\_\_\_\_\_\_\_ Department of Transportation," "Municipality of \_\_\_\_\_\_\_\_ Department of Public Works," or other agency as appropriate.

* + - * 1. Furnish materials according to <**\_\_\_\_\_\_\_\_**> standards.

Insert descriptive specifications below to identify Project requirements and to eliminate conflicts with products specified above.

* + - * 1. Description: Completely submersible, vertical, centrifugal.
        2. Performance and Design Criteria:

Design Flow Rate: <**\_\_\_\_\_\_\_\_**> gpm.

Design Total Dynamic Head: <**\_\_\_\_\_\_\_\_**> feet.

* + - * 1. Casing:

Pump Body: [**Cast iron**] [**Bronze**].

Motor Chamber: Oil filled.

Strainers are not used in sumps; therefore, pump should have open impeller. Choice between cast-iron or bronze impeller is generally a function of pump size and service. Consider using cast-iron impeller if pump is continuously submerged (refer to next Article).

* + - * 1. Impeller:

Type: Open, non-clog.

Material: [**Cast iron**] [**Bronze**].

* + - * 1. Shaft Material: [**Stainless**] [**Corrosion-resistant alloy**] steel.
        2. Bearings: Ball type.
        3. Mounting: Slide-away coupling consisting of discharge elbow secured to sump floor, movable bracket, guide pipe system, lifting chain, and chain hooks.
        4. Operation:

Electrical Characteristics:

<**\_\_\_\_\_\_\_\_**> hp <**\_\_\_\_\_\_\_\_**> [**RLA**].

Voltage: <**\_\_\_\_\_\_\_\_**> V, [**single**] [**three**] phase, 60 Hz.

Maximum [**Fuse Size**] [**Circuit Breaker Size**] [**Overcurrent Protection**]: <**\_\_\_\_\_\_\_\_**> A.

Minimum Circuit Ampacity: <**\_\_\_\_\_\_\_\_**>.

Minimum Power Factor: <**\_\_\_\_\_\_\_\_**> percent at rated load.

Controls:

Following controls are generally appropriate only for single-phase motors up to 1 hp (740 W).

Type: Integral [**diaphragm**] [**mercury switch**].

Furnish separate level switch-activated HIGH LEVEL alarm with transformer, alarm bell, and standpipe.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

Controls:

Following controls are for pump motor installations larger than 1/2 hp (370 W) and are suitable for three-phase electrical service.

Control Panel:

NEMA 250 “Enclosures for Electrical Equipment” [**Type 1**] [**Type 4**] <**\_\_\_\_\_\_\_\_**>.

Furnish across-the-line electric motor starters with ambient-compensated, quick-trip overloads in each phase and with manual trip and reset buttons, circuit breaker, control transformer, electro-mechanical alternator, HAND-OFF-AUTO selector switches, pilot lights, HIGH LEVEL alarm pilot light, reset button, and alarm horn.

Single point power connection and grounding lug.

Liquid Level Switches:

Description: Steel shell encased in polyurethane foam with cast-iron weight for PUMP ON (each pump), PUMP OFF (common), and HIGH WATER ALARM.

Type: Mercury.

Disconnect Switch: Factory mounted [**in control panel**] [**on equipment**].

* + - 1. ACCESSORIES
         1. Cord and Plug:

Oil resistant.

Length: [**6**] <**\_\_\_\_\_\_\_\_**> feet.

[**Furnish three-prong connector for connection to electric wiring system.**]

[**Furnish grounding connector.**]

1. EXECUTION
   * + 1. INSTALLATION
          1. Provide line-sized [**gate**] [**ball**] valve, line-sized [**soft seated**] [**lever and weight**] check valve [**and balancing valve**] on pump discharge.
          2. Decrease from line size with long-radius reducing elbows or reducers.
          3. Support piping adjacent to pump independently of pump casings.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

In following paragraph insert "State of \_\_\_\_\_\_\_\_ Department of Transportation," "Municipality of \_\_\_\_\_\_\_\_ Department of Public Works," or other agency as appropriate.

* + - * 1. Installation Standards: Install Work according to <**\_\_\_\_\_\_\_\_**> standards.
      1. FIELD QUALITY CONTROL
         1. Check, align, and certify alignment of pumps prior to startup.
         2. Startup and Performance Testing:

Operate pump using clear water for continuous period of 10 minutes in presence of Director’s Representative.

Verify pump performance by performing time-drawdown test or time-fill test.

Check pump and motor for high temperature and excessive vibration.

Check for motor overload by taking ampere readings.

* + - * 1. Equipment Acceptance:

Adjust, repair, modify, or replace components failing to perform as specified and rerun tests.

* + - 1. DEMONSTRATION
         1. Demonstrate pump startup, shutdown, routine maintenance, and emergency repair procedures to Facility’s personnel.

END OF SECTION 221429.16