SECTION 221329 - SANITARY SEWERAGE PUMPS

Verify that Section titles referenced in this Section are correct for this Project's Specifications; Section titles may have changed.

1. GENERAL
	* + 1. RELATED DOCUMENTS

Retain or delete this article in all Sections of Project Manual.

* + - * 1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
			1. SUMMARY
				1. Section Includes:

Terminology and descriptions for pumps used in this Section are from HI 1.1-1.2 and HI 3.1-3.5.

Submersible effluent pumps.

Submersible sewage pumps.

Wet-pit-volute sewage pumps.

Sewage-pump, reverse-flow assemblies.

Sewage-pump basins and basin covers.

Progressing-cavity sewage pumps.

Packaged, submersible sewage-pump units.

Packaged wastewater-pump units.

* + - * 1. Related Requirements:

Retain subparagraphs below to cross-reference requirements Contractor might expect to find in this Section but are specified in other Sections.

Section 221343 "Facility Packaged Sewage Pumping Stations" for applications in site-construction sewage pumping.

Section 221429 "Sump Pumps" for applications in storm-drainage systems.

* + - 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).
				4. Product Data: For each type of product indicated. [Include construction details, material descriptions, dimensions of individual components and profiles.] [Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.]
				5. Shop Drawings:

Include plans, elevations, sections, and [**mounting**] [**attachment**] details.

Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

Vibration Isolation Base Details: Detail fabrication including anchorages and attachments to structure and to supported equipment. Include adjustable motor bases, rails, and frames for equipment mounting.

Include diagrams for power, signal, and control wiring.

* + - 1. CLOSEOUT SUBMITTALS
				1. Operation and Maintenance Data: For pumps and controls, to include in operation and maintenance manuals.
			2. DELIVERY, STORAGE, AND HANDLING
				1. Retain shipping flange protective covers and protective coatings during storage.
				2. Protect bearings and couplings against damage.
				3. Comply with manufacturer's written instructions for handling.
			3. COORDINATION
				1. Coordinate sizes and locations of concrete bases with actual equipment provided.
1. PRODUCTS

Manufacturers and products listed in SpecAgent and MasterWorks Paragraph Builder are neither recommended nor endorsed by the AIA or Deltek. Before inserting names, verify that manufacturers and products listed there comply with requirements retained or revised in descriptions and are both available and suitable for the intended applications.

* + - 1. PERFORMANCE REQUIREMENTS
				1. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70 “Standard for Electrical Safety in the Workplace”, by a qualified testing agency, and marked for intended location and application.
				2. UL Compliance: Comply with UL 778 “Standard for Safety Motor-Operated Water Pumps” for motor-operated water pumps.
			2. SUBMERSIBLE EFFLUENT PUMPS

Retain "Sewage-Pump Basins and Basin Covers" Article if retaining this article.

Insert drawing designation. Use these designations on Drawings to identify each product.

If Project has more than one type or configuration of effluent or sewage pump, coordinate first paragraph below with schedule on Drawings. See sample schedule in the Evaluations.

* + - * 1. Submersible, Fixed-Position, Single-Seal Effluent Pumps <**Insert drawing designation**>:

[Manufacturers:](http://www.specagent.com/Lookup?ulid=2221) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Barnes; a Crane Pumps & Systems brand](http://www.specagent.com/Lookup?uid=123457132335).

[Bell & Gossett; a Xylem brand](http://www.specagent.com/Lookup?uid=123457132337).

[Little Giant; a brand of Franklin Electric Co., Inc](http://www.specagent.com/Lookup?uid=123457132330).

ProFlo; a Ferguson Enterprises, Inc. brand.

[Stancor, Inc](http://www.specagent.com/Lookup?uid=123457132327).

Or equal.

Description: Factory-assembled and -tested effluent-pump unit.

Pump Type: Submersible, end-suction, single-stage, close-coupled, overhung-impeller, centrifugal effluent pump as defined in HI 1.1-1.2 and HI 1.3.

Pump Casing: Cast iron, with open inlet, legs that elevate pump to permit flow into impeller, and vertical discharge for piping connection.

Impeller: Statically and dynamically balanced, [ASTM A48, Class No. 25 A cast iron] [ASTM A532, abrasion-resistant cast iron] [ASTM B584, cast bronze] [and] [stainless steel], closed or semiopen design for clear wastewater, and keyed and secured to shaft.

Pump and Motor Shaft: Stainless steel[ or steel], with factory-sealed, grease-lubricated ball bearings.

Seal: Mechanical.

Motor: Hermetically sealed, capacitor-start type; with built-in overload protection; lifting eye or lug; and three-conductor, waterproof power cable of length required and with grounding plug and cable-sealing assembly for connection at pump.

Verify that pump selected has motor feature in "Motor Housing Fluid" subparagraph below, if either option is required, or delete.

Motor Housing Fluid: [**Air**] [**Oil**].

Retain one of two "Controls" subparagraphs below. Controls in first subparagraph are rod-and-float type.

Controls:

Enclosure: NEMA 250 “Enclosures for Electrical Equipment”, [**Type 1**] [**Type 4X**] <**Insert type**>.

Switch Type: Pedestal-mounted float switch with float rods and rod buttons.

Retain "Automatic Alternator" subparagraph below for duplex pump units. Revise if unit includes three or more pumps.

Automatic Alternator: Start pumps on successive cycles and start multiple pumps if one cannot handle load.

Float Guides: Pipe or other restraint for floats and rods in basins of depth greater than 60 inches.

High-Water Alarm: Cover-mounted, compression-probe alarm, with electric bell; 120 V ac, with transformer and contacts for remote alarm bell.

Controls in first subparagraph below are float- and pressure-switch types.

Controls:

Enclosure: NEMA 250 “Enclosures for Electrical Equipment”, [**Type 1**] [**Type 4X**] <**Insert type**>; [**pedestal**] [**wall**] mounted.

Switch Type: [**Mechanical-float**] [**Mercury-float**] [**Pressure**] <**Insert type**> type, in NEMA 250 “Enclosures for Electrical Equipment”, Type 6 enclosures with mounting rod and electric cables.

Retain "Automatic Alternator" subparagraph below for duplex pump units. Revise if unit includes three or more pumps.

Automatic Alternator: Start pumps on successive cycles and start multiple pumps if one cannot handle load.

High-Water Alarm: Rod-mounted, NEMA 250 “Enclosures for Electrical Equipment”, Type 6 enclosure with [**mechanical-float, mercury-float, or pressure**] <**Insert type**> switch matching control and electric bell; 120 V ac, with transformer and contacts for remote alarm bell.

Control-Interface Features:

Two subparagraphs below are optional control features.

Remote Alarm Contacts: For remote alarm interface.

Building Automation System Interface: Auxiliary contacts in pump controls for interface to building automation system and capable of providing the following:

On-off status of pump.

Alarm status.

If Project has more than one type or configuration of effluent or sewage pump, coordinate first paragraph below with schedule on Drawings. See sample schedule in the Evaluations.

* + - * 1. Submersible, Fixed-Position, Double-Seal Effluent Pumps <**Insert drawing designation**>:

[Manufacturers:](http://www.specagent.com/Lookup?ulid=2223) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[ABS; Cardo Flow Solutions](http://www.specagent.com/Lookup?uid=123457132339).

[Pentair Aurora; Pentair Pump Group](http://www.specagent.com/Lookup?uid=123457132349).

[Zoeller Company](http://www.specagent.com/Lookup?uid=123457132348).

Or equal.

Description: Factory-assembled and -tested effluent-pump unit.

Pump Type: Submersible, end-suction, single-stage, close-coupled, overhung-impeller, centrifugal effluent pump as defined in HI 1.1-1.2 and HI 1.3.

Pump Casing: Cast iron, with open inlet, legs that elevate pump to permit flow into impeller, and vertical discharge for piping connection.

Impeller: Statically and dynamically balanced, [ASTM A48/, Class No. 25 A cast iron] [ASTM A532, abrasion-resistant cast iron] [ASTM B584, cast bronze] [and] [stainless steel], closed or semiopen design for clear wastewater, and keyed and secured to shaft.

Pump and Motor Shaft: Stainless steel[ or steel], with factory-sealed, grease-lubricated ball bearings.

Seals: Mechanical.

Verify that pump selected has feature in "Moisture-Sensing Probe" subparagraph below, if required, or delete.

Moisture-Sensing Probe: Internal moisture sensor and moisture alarm.

Motor: Hermetically sealed, capacitor-start type; with built-in overload protection; lifting eye or lug; and three-conductor, waterproof power cable of length required and with grounding plug and cable-sealing assembly for connection at pump.

Verify that pump selected has motor feature in "Motor Housing Fluid" subparagraph below, if either option is required, or delete.

Motor Housing Fluid: [**Air**] [**Oil**].

Retain one of two "Controls" subparagraphs below. Controls in first subparagraph are rod-and-float type.

Controls:

Enclosure: NEMA 250, [**Type 1**] [**Type 4X**] <**Insert type**>.

Switch Type: Pedestal-mounted float switch with float rods and rod buttons.

Retain "Automatic Alternator" subparagraph below for duplex pump units. Revise if unit includes three or more pumps.

Automatic Alternator: Start pumps on successive cycles and start multiple pumps if one cannot handle load.

Float Guides: Pipe or other restraint for floats and rods in basins of depth greater than 60 inches.

High-Water Alarm: Cover-mounted, compression-probe alarm, with electric bell; 120 V ac, with transformer and contacts for remote alarm bell.

Controls in first subparagraph below are float- and pressure-switch types.

Controls:

Enclosure: NEMA 250 “Enclosures for Electrical Equipment”, [**Type 1**] [**Type 4X**] <**Insert type**>; [**pedestal**] [**wall**] mounted.

Switch Type: [**Mechanical-float**] [**Mercury-float**] [**Pressure**] <**Insert type**> type, in NEMA 250 “Enclosures for Electrical Equipment”, Type 6 enclosures with mounting rod and electric cables.

Retain "Automatic Alternator" subparagraph below for duplex pump units. Revise if unit includes three or more pumps.

Automatic Alternator: Start pumps on successive cycles and start multiple pumps if one cannot handle load.

High-Water Alarm: Rod-mounted, NEMA 250 “Enclosures for Electrical Equipment”, Type 6 enclosure with [**mechanical-float, mercury-float, or pressure**] <**Insert type**> switch matching control and electric bell; 120 V ac, with transformer and contacts for remote alarm bell.

Control-Interface Features:

Two subparagraphs below are optional control features.

Remote Alarm Contacts: For remote alarm interface.

Building Automation System Interface: Auxiliary contacts in pump controls for interface to building automation system and capable of providing the following:

On-off status of pump.

Alarm status.

If Project has more than one type or configuration of effluent or sewage pump, coordinate first paragraph below with schedule on Drawings. See sample schedule in the Evaluations.

* + - * 1. Submersible, Quick-Disconnect, Single-Seal Effluent Pumps <**Insert drawing designation**>:

[Manufacturers:](http://www.specagent.com/Lookup?ulid=2224) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Pentair Aurora; Pentair Pump Group](http://www.specagent.com/Lookup?uid=123457132353).

[Stancor, Inc](http://www.specagent.com/Lookup?uid=123457132350).

[Zoeller Company](http://www.specagent.com/Lookup?uid=123457132352).

Or equal.

Description: Factory-assembled and -tested effluent-pump unit with guide-rail supports.

Pump Type: Submersible, end-suction, single-stage, close-coupled, overhung-impeller, centrifugal effluent pump as defined in HI 1.1-1.2 and HI 1.3.

Pump Casing: Cast iron, with open inlet, and discharge fittings for connection to guide-rail support.

Impeller: Statically and dynamically balanced, [**ASTM A48, Class No. 25 A cast iron**] [**ASTM A532, abrasion-resistant cast iron**] [**ASTM B584, cast bronze**] [**and**] [**stainless steel**], closed or semiopen design for clear wastewater, and keyed and secured to shaft.

Pump and Motor Shaft: Stainless steel[**or steel**], with factory-sealed, grease-lubricated ball bearings.

Seal: Mechanical.

Motor: Hermetically sealed, capacitor-start type; with built-in overload protection; lifting eye or lug; and three-conductor, waterproof power cable of length required and with grounding plug and cable-sealing assembly for connection at pump.

Verify that pump selected has motor feature in "Motor Housing Fluid" subparagraph below, if either option is required, or delete.

Motor Housing Fluid: [**Air**] [**Oil**].

Retain one of two "Controls" subparagraphs below. Controls in first subparagraph are rod-and-float type.

Controls:

Enclosure: NEMA 250 “Enclosures for Electrical Equipment”, [**Type 1**] [**Type 4X**] <**Insert type**>.

Switch Type: Pedestal-mounted float switch with float rods and rod buttons.

Retain "Automatic Alternator" subparagraph below for duplex pump units. Revise if unit includes three or more pumps.

Automatic Alternator: Start pumps on successive cycles and start multiple pumps if one cannot handle load.

Float Guides: Pipe or other restraint for floats and rods in basins of depth greater than 60 inches.

High-Water Alarm: Cover-mounted, compression-probe alarm, with electric bell; 120 V ac, with transformer and contacts for remote alarm bell.

Controls in first subparagraph below are float- and pressure-switch types.

Controls:

Enclosure: NEMA 250 “Enclosures for Electrical Equipment”, [**Type 1**] [**Type 4X**] <**Insert type**>; [**pedestal**] [**wall**] mounted.

Switch Type: [**Mechanical-float**] [**Mercury-float**] [**Pressure**] <**Insert type**> type, in NEMA 250 “Enclosures for Electrical Equipment”, Type 6 enclosures with mounting rod and electric cables.

Retain "Automatic Alternator" subparagraph below for duplex pump units. Revise if unit includes three or more pumps.

Automatic Alternator: Start pumps on successive cycles and start multiple pumps if one cannot handle load.

High-Water Alarm: Rod-mounted, NEMA 250 “Enclosures for Electrical Equipment”, Type 6 enclosure with [**mechanical-float, mercury-float, or pressure**] <**Insert type**> switch matching control and electric bell; 120 V ac, with transformer and contacts for remote alarm bell.

Control-Interface Features:

First two subparagraphs below are optional control features.

Remote Alarm Contacts: For remote alarm interface.

Building Automation System Interface: Auxiliary contacts in pump controls for interface to building automation system and capable of providing the following:

On-off status of pump.

Alarm status.

Guide-Rail Supports:

Standard: SWPA's "Submersible Sewage Pumping Systems (SWPA) Handbook."

Guide Rails: Vertical pipes or structural members, made of galvanized steel or other corrosion-resistant metal, attached to baseplate and basin sidewall or cover.

Baseplate: Corrosion-resistant metal plate, attached to basin floor, supporting guide rails and stationary elbow.

Pump Yoke: Motor- or casing-mounted yokes or other attachments for aligning pump during connection of flanges.

Movable Elbow: Pump discharge-elbow fitting with flange, seal, and positioning device.

Stationary Elbow: Fixed discharge-elbow fitting with flange that mates to movable-elbow flange and support attached to baseplate.

Lifting Cable: Stainless steel; attached to pump and cover at manhole.

If Project has more than one type or configuration of effluent or sewage pump, coordinate first paragraph below with schedule on Drawings. See sample schedule in the Evaluations.

* + - * 1. Submersible, Quick-Disconnect, Double-Seal Effluent Pumps <**Insert drawing designation**>:

[Manufacturers:](http://www.specagent.com/Lookup?ulid=2225) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[ABS; Cardo Flow Solutions](http://www.specagent.com/Lookup?uid=123457132354).

[Pentair Aurora; Pentair Pump Group](http://www.specagent.com/Lookup?uid=123457132364).

[Stancor, Inc](http://www.specagent.com/Lookup?uid=123457132359).

[Zoeller Company](http://www.specagent.com/Lookup?uid=123457132362).

Or equal.

Description: Factory-assembled and -tested effluent-pump unit with guide-rail supports.

Pump Type: Submersible, end-suction, single-stage, close-coupled, overhung-impeller, centrifugal effluent pump as defined in HI 1.1-1.2 and HI 1.3.

Pump Casing: Cast iron, with open inlet, and discharge fittings for connection to guide-rail support.

Impeller: Statically and dynamically balanced, [**ASTM A48, Class No. 25 A cast iron**] [**ASTM A532, abrasion-resistant cast iron**] [**ASTM B584, cast bronze**] [**and**] [**stainless steel**], closed or semiopen design for clear wastewater, and keyed and secured to shaft.

Pump and Motor Shaft: Stainless steel[**or steel**], with factory-sealed, grease-lubricated ball bearings.

Seals: Mechanical.

Verify that pump selected has feature in "Moisture-Sensing Probe" subparagraph below, if required, or delete.

Moisture-Sensing Probe: Internal moisture sensor and moisture alarm.

Motor: Hermetically sealed, capacitor-start type; with built-in overload protection; lifting eye or lug; and three-conductor, waterproof power cable of length required and with grounding plug and cable-sealing assembly for connection at pump.

Verify that pump selected has motor feature in "Motor Housing Fluid" subparagraph below, if required, or delete.

Motor Housing Fluid: [**Air**] [**Oil**].

Retain one of two "Controls" subparagraphs below. Controls in first subparagraph are rod-and-float type.

Controls:

Enclosure: NEMA 250 “Enclosures for Electrical Equipment”, [**Type 1**] [**Type 4X**] <**Insert type**>.

Switch Type: Pedestal-mounted float switch with float rods and rod buttons.

Retain "Automatic Alternator" subparagraph below for duplex pump units. Revise if unit includes three or more pumps.

Automatic Alternator: Start pumps on successive cycles and start multiple pumps if one cannot handle load.

Float Guides: Pipe or other restraint for floats and rods in basins of depth greater than 60 inches.

High-Water Alarm: Cover-mounted, compression-probe alarm, with electric bell; 120 V ac, with transformer and contacts for remote alarm bell.

Controls in first subparagraph below are float- and pressure-switch types.

Controls:

Enclosure: NEMA 250 “Enclosures for Electrical Equipment”, [**Type 1**] [**Type 4X**] <**Insert type**>; [**pedestal**] [**wall**] mounted.

Switch Type: [**Mechanical-float**] [**Mercury-float**] [**Pressure**] <**Insert type**> type, in NEMA 250 “Enclosures for Electrical Equipment”, Type 6 enclosures with mounting rod and electric cables.

Retain "Automatic Alternator" subparagraph below for duplex pump units. Revise if unit includes three or more pumps.

Automatic Alternator: Start pumps on successive cycles and start multiple pumps if one cannot handle load.

High-Water Alarm: Rod-mounted, NEMA 250 “Enclosures for Electrical Equipment”, Type 6 enclosure with [**mechanical-float, mercury-float, or pressure**] <**Insert type**> switch matching control and electric bell; 120 V ac, with transformer and contacts for remote alarm bell.

Control-Interface Features:

First two subparagraphs below are optional control features.

Remote Alarm Contacts: For remote alarm interface.

Building Automation System Interface: Auxiliary contacts in pump controls for interface to building automation system and capable of providing the following:

On-off status of pump.

Alarm status.

Guide-Rail Supports:

Standard: SWPA's "Submersible Sewage Pumping Systems (SWPA) Handbook."

Guide Rails: Vertical pipes or structural members, made of galvanized steel or other corrosion-resistant metal, attached to baseplate and basin sidewall or cover.

Baseplate: Corrosion-resistant metal plate, attached to basin floor, supporting guide rails and stationary elbow.

Pump Yoke: Motor- or casing-mounted yokes or other attachments for aligning pump during connection of flanges.

Movable Elbow: Pump discharge-elbow fitting with flange, seal, and positioning device.

Stationary Elbow: Fixed discharge-elbow fitting with flange that mates to movable-elbow flange and support attached to baseplate.

Lifting Cable: Stainless steel; attached to pump and cover at manhole.

If Project has more than one type or configuration of effluent or sewage pump, delete "Capacities and Characteristics" paragraph below and schedule effluent and sewage pumps on Drawings. See sample schedule in the Evaluations.

* + - * 1. Capacities and Characteristics:

Unit Capacity: <**Insert value**> gpm.

Number of Pumps: [**One**] [**Two**] <**Insert value**>.

Each Pump:

Capacity: <**Insert value**> gpm.

Solids Handling Capability: [Not applicable] [**2 inches** minimum] [**2-1/2 inches** minimum] [**3 inches** minimum] <Insert **inches** minimum>.

Total Dynamic Head: <**Insert value**>feet.

Speed: <**Insert rpm**>.

Discharge Pipe Size: <**Insert value**> NPS.

Motor Horsepower: <**Insert value**> hp.

Electrical Characteristics:

Volts: [**120**] [**240**] [**277**] [**480**] <**Insert value**> V ac.

Phases: [**Single**] [**Three**].

Hertz: 60.

Unit Electrical Characteristics:

Full-Load Amperes: <**Insert value**> A.

Minimum Circuit Ampacity: <**Insert value**> A.

Maximum Overcurrent Protection: <**Insert value**> A.

* + - 1. SUBMERSIBLE SEWAGE PUMPS

Insert drawing designation. Use these designations on Drawings to identify each product.

Retain "Sewage-Pump Basins and Basin Covers" Article if retaining this article.

If Project has more than one type or configuration of sewage pump, coordinate first paragraph below with schedule on Drawings. See sample schedule in the Evaluations.

* + - * 1. Submersible, Fixed-Position, Single-Seal Sewage Pumps <**Insert drawing designation**>:

[Manufacturers:](http://www.specagent.com/Lookup?ulid=2226) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Bell & Gossett; a Xylem brand](http://www.specagent.com/Lookup?uid=123457132280).

[Little Giant; a brand of Franklin Electric Co., Inc](http://www.specagent.com/Lookup?uid=123457132272).

ProFlo; a Ferguson Enterprises, Inc. brand.

[Zoeller Company](http://www.specagent.com/Lookup?uid=123457132278).

Or equal.

Description: Factory-assembled and -tested sewage-pump unit.

Pump Type: Submersible, end-suction, single-stage, close-coupled, overhung-impeller, centrifugal sewage pump as defined in HI 1.1-1.2 and HI 1.3.

Pump Casing: Cast iron, with open inlet, legs that elevate pump to permit flow into impeller, and vertical discharge for piping connection.

Impeller: Statically and dynamically balanced, [**ASTM A48, Class No. 25 A cast iron**] [**ASTM A532, abrasion-resistant cast iron**] [**ASTM B584, cast bronze**] [**and**] [**stainless steel**], nonclog, open, or semiopen design for solids handling, and keyed and secured to shaft.

Pump and Motor Shaft: Stainless steel[**or steel**], with factory-sealed, grease-lubricated ball bearings.

Seal: Mechanical.

Motor: Hermetically sealed, capacitor-start type; with built-in overload protection; lifting eye or lug; and three-conductor, waterproof power cable of length required and with grounding plug and cable-sealing assembly for connection at pump.

Verify that pump selected has motor feature in "Motor Housing Fluid" subparagraph below, if either option is required, or delete.

Motor Housing Fluid: [**Air**] [**Oil**].

Retain one of two "Controls" subparagraphs below. Controls in first subparagraph are rod-and-float type.

Controls:

Enclosure: NEMA 250 “Enclosures for Electrical Equipment”, [**Type 1**] [**Type 4X**] <**Insert type**>.

Switch Type: Pedestal-mounted float switch with float rods and rod buttons.

Retain "Automatic Alternator" subparagraph below for duplex pump units. Revise if unit includes three or more pumps.

Automatic Alternator: Start pumps on successive cycles and start multiple pumps if one cannot handle load.

Float Guides: Pipe or other restraint for floats and rods in basins of depth greater than 60 inches.

High-Water Alarm: Cover-mounted, compression-probe alarm, with electric bell; 120 V ac, with transformer and contacts for remote alarm bell.

Controls in first subparagraph below are float- and pressure-switch types.

Controls:

Enclosure: NEMA 250 “Enclosures for Electrical Equipment”, [**Type 1**] [**Type 4X**] <**Insert type**>; [**pedestal**] [**wall**] mounted.

Switch Type: [**Mechanical-float**] [**Mercury-float**] [**Pressure**] <**Insert type**> type, in NEMA 250 “Enclosures for Electrical Equipment”, Type 6 enclosures with mounting rod and electric cables.

Retain "Automatic Alternator" subparagraph below for duplex pump units. Revise if unit includes three or more pumps.

Automatic Alternator: Start pumps on successive cycles and start multiple pumps if one cannot handle load.

High-Water Alarm: Rod-mounted, NEMA 250 “Enclosures for Electrical Equipment”, Type 6 enclosure with [**mechanical-float, mercury-float, or pressure**] <**Insert type**> switch matching control and electric bell; 120 V ac, with transformer and contacts for remote alarm bell.

Control-Interface Features:

Two subparagraphs below are optional control features.

Remote Alarm Contacts: For remote alarm interface.

Building Automation System Interface: Auxiliary contacts in pump controls for interface to building automation system and capable of providing the following:

On-off status of pump.

Alarm status.

If Project has more than one type or configuration of sewage pump, coordinate first paragraph below with schedule on Drawings. See sample schedule in the Evaluations.

* + - * 1. Submersible, Fixed-Position, Double-Seal Sewage Pumps <**Insert drawing designation**>:

[Manufacturers:](http://www.specagent.com/Lookup?ulid=2227) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Bell & Gossett; a Xylem brand](http://www.specagent.com/Lookup?uid=123457132381).

[Pentair Aurora; Pentair Pump Group](http://www.specagent.com/Lookup?uid=123457132385).

[Zoeller Company](http://www.specagent.com/Lookup?uid=123457132379).

Or equal.

Description: Factory-assembled and -tested sewage-pump unit.

Pump Type: Submersible, end-suction, single-stage, close-coupled, overhung-impeller, centrifugal sewage pump as defined in HI 1.1-1.2 and HI 1.3.

Pump Casing: Cast iron, with open inlet, legs that elevate pump to permit flow into impeller, and vertical discharge for piping connection.

Impeller: Statically and dynamically balanced, [**ASTM A48, Class No. 25 A cast iron**] [**ASTM A532, abrasion-resistant cast iron**] [**ASTM B584, cast bronze**] [**and**] [**stainless steel**], nonclog, open, or semiopen design for solids handling, and keyed and secured to shaft.

Pump and Motor Shaft: Stainless steel[**or steel**], with factory-sealed, grease-lubricated ball bearings.

Seals: Mechanical.

Verify that pump selected has feature in "Moisture-Sensing Probe" subparagraph below, if required, or delete.

Moisture-Sensing Probe: Internal moisture sensor and moisture alarm.

Motor: Hermetically sealed, capacitor-start type; with built-in overload protection; lifting eye or lug; and three-conductor, waterproof power cable of length required and with grounding plug and cable-sealing assembly for connection at pump.

Verify that pump selected has motor feature in "Motor Housing Fluid" subparagraph below, if either option is required, or delete.

Motor Housing Fluid: [**Air**] [**Oil**].

Retain one of two "Controls" subparagraphs below. Controls in first subparagraph are rod-and-float type.

Controls:

Enclosure: NEMA 250 “Enclosures for Electrical Equipment”, [**Type 1**] [**Type 4X**] <**Insert type**>.

Switch Type: Pedestal-mounted float switch with float rods and rod buttons.

Retain "Automatic Alternator" subparagraph below for duplex pump units. Revise if unit includes three or more pumps.

Automatic Alternator: Start pumps on successive cycles and start multiple pumps if one cannot handle load.

Float Guides: Pipe or other restraint for floats and rods in basins of depth greater than 60 inches.

High-Water Alarm: Cover-mounted, compression-probe alarm, with electric bell; 120 V ac, with transformer and contacts for remote alarm bell.

Controls in first subparagraph below are float- and pressure-switch types.

Controls:

Enclosure: NEMA 250 “Enclosures for Electrical Equipment”, [**Type 1**] [**Type 4X**] <**Insert type**>; [**pedestal**] [**wall**] mounted.

Switch Type: [**Mechanical-float**] [**Mercury-float**] [**Pressure**] <**Insert type**> type, in NEMA 250 “Enclosures for Electrical Equipment”, Type 6 enclosures with mounting rod and electric cables.

Retain "Automatic Alternator" subparagraph below for duplex pump units. Revise if unit includes three or more pumps.

Automatic Alternator: Start pumps on successive cycles and start multiple pumps if one cannot handle load.

High-Water Alarm: Rod-mounted, NEMA 250 “Enclosures for Electrical Equipment”, Type 6 enclosure with [**mechanical-float, mercury-float, or pressure**] <**Insert type**> switch matching control and electric bell; 120 V ac, with transformer and contacts for remote alarm bell.

Control-Interface Features:

Two subparagraphs below are optional control features.

Remote Alarm Contacts: For remote alarm interface.

Building Automation System Interface: Auxiliary contacts in pump controls for interface to building automation system and capable of providing the following:

On-off status of pump.

Alarm status.

If Project has more than one type or configuration of sewage pump, coordinate first paragraph below with schedule on Drawings. See sample schedule in the Evaluations.

* + - * 1. Submersible, Quick-Disconnect, Single-Seal Sewage Pumps <**Insert drawing designation**>:

[Manufacturers:](http://www.specagent.com/Lookup?ulid=2229) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[PACO Pumps; Grundfos Pumps Corporation, USA](http://www.specagent.com/Lookup?uid=123457132396).

[Pentair Aurora; Pentair Pump Group](http://www.specagent.com/Lookup?uid=123457132394).

[Zoeller Company](http://www.specagent.com/Lookup?uid=123457132392).

Or equal.

Description: Factory-assembled and -tested sewage-pump unit with guide-rail supports.

Pump Type: Submersible, end-suction, single-stage, close-coupled, overhung-impeller, centrifugal sewage pump as defined in HI 1.1-1.2 and HI 1.3.

Pump Casing: Cast iron, with open inlet, and discharge fittings for connection to guide-rail support.

Impeller: Statically and dynamically balanced, [**ASTM A48, Class No. 25 A cast iron**] [**ASTM A532, abrasion-resistant cast iron**] [**ASTM B584, cast bronze**] [**and**] [**stainless steel**], nonclog, open, or semiopen design for solids handling, and keyed and secured to shaft.

Pump and Motor Shaft: Stainless steel[**or steel**], with factory-sealed, grease-lubricated ball bearings.

Seal: Mechanical.

Motor: Hermetically sealed, capacitor-start type; with built-in overload protection; lifting eye or lug; and three-conductor, waterproof power cable of length required and with grounding plug and cable-sealing assembly for connection at pump.

Verify that pump selected has motor feature in "Motor Housing Fluid" subparagraph below, if either option is required, or delete.

Motor Housing Fluid: [**Air**] [**Oil**].

Retain one of two "Controls" subparagraphs below. Controls in first subparagraph are rod-and-float type.

Controls:

Enclosure: NEMA 250 “Enclosures for Electrical Equipment”, [**Type 1**] [**Type 4X**] <**Insert type**>.

Switch Type: Pedestal-mounted float switch with float rods and rod buttons.

Retain "Automatic Alternator" subparagraph below for duplex pump units. Revise if unit includes three or more pumps.

Automatic Alternator: Start pumps on successive cycles and start multiple pumps if one cannot handle load.

Float Guides: Pipe or other restraint for floats and rods in basins of depth greater than 60 inches.

High-Water Alarm: Cover-mounted, compression-probe alarm, with electric bell; 120 V ac, with transformer and contacts for remote alarm bell.

Controls in first subparagraph below are float- and pressure-switch types.

Controls:

Enclosure: NEMA 250 “Enclosures for Electrical Equipment”, [**Type 1**] [**Type 4X**] <**Insert type**>; [**pedestal**] [**wall**] mounted.

Switch Type: [**Mechanical-float**] [**Mercury-float**] [**Pressure**] <**Insert type**> type, in NEMA 250 “Enclosures for Electrical Equipment”, Type 6 enclosures with mounting rod and electric cables.

Retain "Automatic Alternator" subparagraph below for duplex pump units. Revise if unit includes three or more pumps.

Automatic Alternator: Start pumps on successive cycles and start multiple pumps if one cannot handle load.

High-Water Alarm: Rod-mounted, NEMA 250 “Enclosures for Electrical Equipment”, Type 6 enclosure with [**mechanical-float, mercury-float, or pressure**] <**Insert type**> switch matching control and electric bell; 120 V ac, with transformer and contacts for remote alarm bell.

Control-Interface Features:

First two subparagraphs below are optional control features.

Remote Alarm Contacts: For remote alarm interface.

Building Automation System Interface: Auxiliary contacts in pump controls for interface to building automation system and capable of providing the following:

On-off status of pump.

Alarm status.

Guide-Rail Supports:

Standard: SWPA's "Submersible Sewage Pumping Systems (SWPA) Handbook."

Guide Rails: Vertical pipes or structural members, made of galvanized steel or other corrosion-resistant metal, attached to baseplate and basin sidewall or cover.

Baseplate: Corrosion-resistant metal plate, attached to basin floor, supporting guide rails and stationary elbow.

Pump Yoke: Motor- or casing-mounted yokes or other attachments for aligning pump during connection of flanges.

Movable Elbow: Pump discharge-elbow fitting with flange, seal, and positioning device.

Stationary Elbow: Fixed discharge-elbow fitting with flange that mates to movable-elbow flange and support attached to baseplate.

Lifting Cable: Stainless steel; attached to pump and cover at manhole.

If Project has more than one type or configuration of sewage pump, coordinate first paragraph below with schedule on Drawings. See sample schedule in the Evaluations.

* + - * 1. Submersible, Quick-Disconnect, Double-Seal Sewage Pumps <**Insert drawing designation**>:

[Manufacturers:](http://www.specagent.com/Lookup?ulid=2231) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Bell & Gossett; a Xylem brand](http://www.specagent.com/Lookup?uid=123457132307).

[Pentair Aurora; Pentair Pump Group](http://www.specagent.com/Lookup?uid=123457132304).

[Weil Pump; a Wilo Company](http://www.specagent.com/Lookup?uid=123457132293).

[Zoeller Company](http://www.specagent.com/Lookup?uid=123457132302).

Or equal.

Description: Factory-assembled and -tested sewage-pump unit with guide-rail supports.

Pump type: Submersible, end-suction, single-stage, close-coupled, overhung-impeller, centrifugal sewage pump as defined in HI 1.1-1.2 and HI 1.3.

Pump Casing: Cast iron, with open inlet, and discharge fittings for connection to guide-rail support.

Impeller: Statically and dynamically balanced, [ASTM A48, Class No. 25 A cast iron] [ASTM A532, abrasion-resistant cast iron] [ASTM B584, cast bronze] [and] [stainless steel], nonclog, open, or semiopen design for solids handling, and keyed and secured to shaft.

Pump and Motor Shaft: Stainless steel[ or steel], with factory-sealed, grease-lubricated ball bearings.

Seals: Mechanical.

Verify that pump selected has feature in "Moisture-Sensing Probe" subparagraph below, if required, or delete.

Moisture-Sensing Probe: Internal moisture sensor and moisture alarm.

Motor: Hermetically sealed, capacitor-start type; with built-in overload protection; lifting eye or lug; and three-conductor, waterproof power cable of length required and with grounding plug and cable-sealing assembly for connection at pump.

Verify that pump selected has motor feature in "Motor Housing Fluid" subparagraph below, if either option is required, or delete.

Motor Housing Fluid: [**Air**] [**Oil**].

Retain one of two "Controls" subparagraphs below. Controls in first subparagraph are rod-and-float type.

Controls:

Enclosure: NEMA 250 “Enclosures for Electrical Equipment”, [**Type 1**] [**Type 4X**] <**Insert type**>.

Switch Type: Pedestal-mounted float switch with float rods and rod buttons.

Retain "Automatic Alternator" subparagraph below for duplex pump units. Revise if unit includes three or more pumps.

Automatic Alternator: Start pumps on successive cycles and start multiple pumps if one cannot handle load.

Float Guides: Pipe or other restraint for floats and rods in basins of depth greater than 60 inches.

High-Water Alarm: Cover-mounted, compression-probe alarm, with electric bell; 120 V ac, with transformer and contacts for remote alarm bell.

Controls in first subparagraph below are float- and pressure-switch types.

Controls:

Enclosure: NEMA 250 “Enclosures for Electrical Equipment”, [**Type 1**] [**Type 4X**] <**Insert type**>; [**pedestal**] [**wall**] mounted.

Switch Type: [**Mechanical-float**] [**Mercury-float**] [**Pressure**] <**Insert type**> type, in NEMA 250 “Enclosures for Electrical Equipment”, Type 6 enclosures with mounting rod and electric cables.

Retain "Automatic Alternator" subparagraph below for duplex pump units. Revise if unit includes three or more pumps.

Automatic Alternator: Start pumps on successive cycles and start multiple pumps if one cannot handle load.

High-Water Alarm: Rod-mounted, NEMA 250 “Enclosures for Electrical Equipment”, Type 6 enclosure with [**mechanical-float, mercury-float, or pressure**] <**Insert type**> switch matching control and electric bell; 120 V ac, with transformer and contacts for remote alarm bell.

Control-Interface Features:

First two subparagraphs below are optional control features.

Remote Alarm Contacts: For remote alarm interface.

Building Automation System Interface: Auxiliary contacts in pump controls for interface to building automation system and capable of providing the following:

On-off status of pump.

Alarm status.

Guide-Rail Supports:

Standard: SWPA's "Submersible Sewage Pumping Systems (SWPA) Handbook."

Guide Rails: Vertical pipes or structural members, made of galvanized steel or other corrosion-resistant metal, attached to baseplate and basin sidewall or cover.

Baseplate: Corrosion-resistant metal plate, attached to basin floor, supporting guide rails and stationary elbow.

Pump Yoke: Motor- or casing-mounted yokes or other attachments for aligning pump during connection of flanges.

Movable Elbow: Pump discharge-elbow fitting with flange, seal, and positioning device.

Stationary Elbow: Fixed discharge-elbow fitting with flange that mates to movable-elbow flange and support attached to baseplate.

Lifting Cable: Stainless steel; attached to pump and cover at manhole.

If Project has more than one type or configuration of sewage pump, coordinate first paragraph below with schedule on Drawings. See sample schedule in the Evaluations.

* + - * 1. Submersible, Quick-Disconnect, Grinder Sewage Pumps <**Insert drawing designation**>:

[Manufacturers:](http://www.specagent.com/Lookup?ulid=2233) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Barnes; a Crane Pumps & Systems brand](http://www.specagent.com/Lookup?uid=123457132409).

[Pentair Aurora; Pentair Pump Group](http://www.specagent.com/Lookup?uid=123457132410).

[Zoeller Company](http://www.specagent.com/Lookup?uid=123457132408).

Or equal.

Description: Factory-assembled and -tested, grinder sewage-pump unit with guide-rail supports.

Pump Type: Submersible, end-suction, single-stage, close-coupled, overhung-impeller, centrifugal sewage pump as defined in HI 1.1-1.2 and HI 1.3.

Pump Casing: Cast iron, with open inlet, and discharge fittings for connection to guide-rail supports.

Impeller: Bronze or stainless steel; statically and dynamically balanced, with stainless-steel cutter, grinder, or slicer assembly; capable of handling solids; and keyed and secured to shaft.

Pump and Motor Shaft: Stainless steel[**or steel**], with factory-sealed, grease-lubricated ball bearings.

Seal: Mechanical.

Motor: Hermetically sealed, capacitor-start type; with built-in overload protection; lifting eye or lug; and three-conductor, waterproof power cable of length required and with grounding plug and cable-sealing assembly for connection at pump.

Verify that pump selected has motor feature in "Motor Housing Fluid" subparagraph below, if either option is required, or delete.

Motor Housing Fluid: [**Air**] [**Oil**].

Retain one of two "Controls" subparagraphs below. Controls in first subparagraph are rod-and-float type.

Controls:

Enclosure: NEMA 250 “Enclosures for Electrical Equipment”, [**Type 1**] [**Type 4X**] <**Insert type**>.

Switch Type: Pedestal-mounted float switch with float rods and rod buttons.

Retain "Automatic Alternator" subparagraph below for duplex pump units. Revise if unit includes three or more pumps.

Automatic Alternator: Start pumps on successive cycles and start multiple pumps if one cannot handle load.

Float Guides: Pipe or other restraint for floats and rods in basins of depth greater than 60 inches.

High-Water Alarm: Cover-mounted, compression-probe alarm, with electric bell; 120 V ac, with transformer and contacts for remote alarm bell.

Controls in first subparagraph below are float- and pressure-switch types.

Controls:

Enclosure: NEMA 250 “Enclosures for Electrical Equipment”, [**Type 1**] [**Type 4X**] <**Insert type**>; [**pedestal**] [**wall**] mounted.

Switch Type: [**Mechanical-float**] [**Mercury-float**] [**Pressure**] <**Insert type**> type, in NEMA 250 “Enclosures for Electrical Equipment”, Type 6 enclosures with mounting rod and electric cables.

Retain "Automatic Alternator" subparagraph below for duplex pump units. Revise if unit includes three or more pumps.

Automatic Alternator: Start pumps on successive cycles and start multiple pumps if one cannot handle load.

High-Water Alarm: Rod-mounted, NEMA 250 “Enclosures for Electrical Equipment”, Type 6 enclosure with [**mechanical-float, mercury-float, or pressure**] <**Insert type**> switch matching control and electric bell; 120 V ac, with transformer and contacts for remote alarm bell.

Control-Interface Features:

First two subparagraphs below are optional control features.

Remote Alarm Contacts: For remote alarm interface.

Building Automation System Interface: Auxiliary contacts in pump controls for interface to building automation system and capable of providing the following:

On-off status of pump.

Alarm status.

Guide-Rail Supports:

Standard: SWPA's "Submersible Sewage Pumping Systems (SWPA) Handbook."

Guide Rails: Vertical pipes or structural members, made of galvanized steel or other corrosion-resistant metal, attached to baseplate and basin sidewall or cover.

Baseplate: Corrosion-resistant metal plate, attached to basin floor, supporting guide rails and stationary elbow.

Pump Yoke: Motor- or casing-mounted yokes or other attachments for aligning pump during connection of flanges.

Movable Elbow: Pump discharge-elbow fitting with flange, seal, and positioning device.

Stationary Elbow: Fixed discharge-elbow fitting with flange that mates to movable-elbow flange and support attached to baseplate.

Lifting Cable: Stainless steel; attached to pump and cover at manhole.

If Project has more than one type or configuration of sewage pump, coordinate first paragraph below with schedule on Drawings. See sample schedule in the Evaluations.

* + - * 1. Submersible, Quick-Disconnect, Progressing-Cavity, Grinder Sewage Pumps <**Insert drawing designation**>:

[Manufacturers:](http://www.specagent.com/Lookup?ulid=2234) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Barnes; a Crane Pumps & Systems brand](http://www.specagent.com/Lookup?uid=123457132412).

[Pentair Aurora; Pentair Pump Group](http://www.specagent.com/Lookup?uid=123457132413).

Or equal.

Description: Factory-assembled and -tested, progressing-cavity, grinder sewage-pump unit with guide-rail supports

Pump Type: Submersible, progressing-cavity, single-screw rotary, grinder sewage pump as defined in HI 3.1-3.5.

Pump Body: [Cast iron] <Insert material>.

Pump Bearings: Radial and thrust types.

Pump Shaft: Steel.

Rotor: Stainless steel.

Stator: [Buna-N] [or] [natural rubber] <Insert material>.

Seal: Packing gland and mechanical types.

Motor: Hermetically sealed, capacitor-start type; with built-in overload protection; lifting eye or lug; and three-conductor, waterproof power cable of length required and with grounding plug and cable-sealing assembly for connection at pump.

Retain one of two "Controls" subparagraphs below. Controls in first subparagraph are rod-and-float type.

Controls:

Enclosure: NEMA 250 “Enclosures for Electrical Equipment”, [**Type 1**] [**Type 4X**] <**Insert type**>.

Switch Type: Pedestal-mounted float switch with float rods and rod buttons.

Retain "Automatic Alternator" subparagraph below for duplex pump units. Revise if unit includes three or more pumps.

Automatic Alternator: Start pumps on successive cycles and start multiple pumps if one cannot handle load.

Float Guides: Pipe or other restraint for floats and rods in basins of depth greater than 60 inches.

High-Water Alarm: Cover-mounted, compression-probe alarm, with electric bell; 120 V ac, with transformer and contacts for remote alarm bell.

Controls in first subparagraph below are float- and pressure-switch types.

Controls:

Enclosure: NEMA 250 “Enclosures for Electrical Equipment”, [**Type 1**] [**Type 4X**] <**Insert type**>; [**pedestal**] [**wall**] mounted.

Switch Type: [**Mechanical-float**] [**Mercury-float**] [**Pressure**] <**Insert type**> type, in NEMA 250 “Enclosures for Electrical Equipment”, Type 6 enclosures with mounting rod and electric cables.

Retain "Automatic Alternator" subparagraph below for duplex pump units. Revise if unit includes three or more pumps.

Automatic Alternator: Start pumps on successive cycles and start multiple pumps if one cannot handle load.

High-Water Alarm: Rod-mounted, NEMA 250 “Enclosures for Electrical Equipment”, Type 6 enclosure with [**mechanical-float, mercury-float, or pressure**] <**Insert type**> switch matching control and electric bell; 120 V ac, with transformer and contacts for remote alarm bell.

Control-Interface Features:

First two subparagraphs below are optional control features.

Remote Alarm Contacts: For remote alarm interface.

Building Automation System Interface: Auxiliary contacts in pump controls for interface to building automation system and capable of providing the following:

On-off status of pump.

Alarm status.

Guide-Rail Supports:

Standard: SWPA's "Submersible Sewage Pumping Systems (SWPA) Handbook."

Guide Rails: Vertical pipes or structural members, made of galvanized steel or other corrosion-resistant metal, attached to baseplate and basin sidewall or cover.

Baseplate: Corrosion-resistant metal plate, attached to basin floor, supporting guide rails and stationary elbow.

Pump Yoke: Motor- or casing-mounted yokes or other attachments for aligning pump during connection of flanges.

Movable Elbow: Pump discharge-elbow fitting with flange, seal, and positioning device.

Stationary Elbow: Fixed discharge-elbow fitting with flange that mates to movable-elbow flange and support attached to baseplate.

Lifting Cable: Stainless steel; attached to pump and cover at manhole.

If Project has more than one type or configuration of sewage pump, delete "Capacities and Characteristics" paragraph below and schedule sewage pumps on Drawings. See sample schedule in the Evaluations.

* + - * 1. Capacities and Characteristics:

Unit Capacity: <**Insert value**> gpm.

Number of Pumps: [**One**] [**Two**] <**Insert value**>.

Each Pump:

Capacity: <**Insert value**> gpm.

Solids Handling Capability: [Not applicable] [**2 inches** minimum] [**2-1/2 inches** minimum] [**3 inches** minimum] <Insert **inches** minimum>.

Total Dynamic Head: <**Insert value**> feet.

Speed: <**Insert rpm**>.

Discharge Pipe Size: <**Insert value**> NPS.

Motor Horsepower: <**Insert value**> hp.

Electrical Characteristics:

Volts: [**120**] [**240**] [**277**] [**480**] <**Insert value**> V ac.

Phases: [**Single**] [**Three**].

Hertz: 60.

Unit Electrical Characteristics:

Full-Load Amperes: <**Insert value**> A.

Minimum Circuit Ampacity: <**Insert value**> A.

Maximum Overcurrent Protection: <**Insert value**> A.

* + - 1. WET-PIT-VOLUTE SEWAGE PUMPS <**Insert drawing designation**>

Retain "Sewage-Pump Basins and Basin Covers" Article if retaining this article.

If Project has more than one type or configuration of effluent or sewage pump, coordinate first paragraph below with schedule on Drawings. See sample schedule in the Evaluations.

* + - * 1. Description: Factory-assembled and -tested sewage-pump unit.

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=2235) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Armstrong Fluid Technology](http://www.specagent.com/Lookup?uid=123457132313).

[Pentair Aurora; Pentair Pump Group](http://www.specagent.com/Lookup?uid=123457132323).

[Tramco Pump Company](http://www.specagent.com/Lookup?uid=123457132318).

[Weil Pump; a Wilo Company](http://www.specagent.com/Lookup?uid=123457132320).

Or equal.

* + - * 1. Pump Type: Wet-pit-volute, single-stage, separately coupled, overhung-impeller, centrifugal sewage pump as defined in HI 1.1-1.2 and HI 1.3.
				2. Pump Casing: Cast iron, with open inlet and threaded or flanged connection for discharge piping.
				3. Pump Shaft: [Stainless steel] [and] [steel].
				4. Impeller: Statically and dynamically balanced, [**ASTM A48, Class No. 25 A cast iron**] [**ASTM A532, abrasion-resistant cast iron**] [**and**] [**ASTM B584, cast bronze**], nonclog, open, or semiopen design for solids handling, and keyed and secured to shaft.
				5. Sleeve Bearings: Bronze. Include oil-lubricated, intermediate sleeve bearings at 48-inch- maximum intervals if basin depth is more than 48 inches, and grease-lubricated, ball-type thrust bearings.
				6. Pump and Motor Shaft Coupling: Flexible, capable of absorbing torsional vibration and shaft misalignment.
				7. Pump Discharge Piping: Factory or field fabricated, [galvanized, ASTM A53, Schedule 40, steel pipe with ASME B16.1, Class 125, cast-iron flanges and flanged fittings or ASME B16.4, Class 125, gray-iron threaded fittings] <Insert pipe material>.

Retain subparagraph below if retaining "Sewage-Pump, Reverse-Flow Assemblies" Article and applies to wet-pit-volute sewage pumps.

Revise piping configuration to accommodate reverse-flow assembly.

* + - * 1. Support Plate: Cast iron or coated steel; strong enough to support pumps, motors, and controls. See "Sewage-Pump Basins and Basin Covers" Article for requirements.
				2. Shaft Seal: Stuffing box, with graphite-impregnated braided-yarn rings and bronze packing gland.
				3. Motor: Single speed; grease-lubricated ball bearings and mounted on vertical, cast-iron pedestal.

Retain one of two "Controls" paragraphs below. Controls in first paragraph are rod-and-float type.

* + - * 1. Controls:

Enclosure: NEMA 250 “Enclosures for Electrical Equipment”, [**Type 1**] [**Type 4X**] <**Insert type**>.

Switch Type: Pedestal-mounted float switch with float rods and rod buttons.

Retain "Automatic Alternator" subparagraph below for duplex pump units. Revise if unit includes three or more pumps.

Automatic Alternator: Start pumps on successive cycles and start multiple pumps if one cannot handle load.

Float Guides: Pipe or other restraint for floats and rods in basins of depth greater than 60 inches.

High-Water Alarm: Cover-mounted, compression-probe alarm, with electric bell; 120 V ac, with transformer and contacts for remote alarm bell.

Controls in first paragraph below are float- and pressure-switch types.

* + - * 1. Controls:

Enclosure: NEMA 250 “Enclosures for Electrical Equipment”, [**Type 1**] [**Type 4X**] <**Insert type**>; [**pedestal**] [**wall**] mounted.

Switch Type: [**Mechanical-float**] [**Mercury-float**] [**Pressure**] <**Insert type**> type, in NEMA 250 “Enclosures for Electrical Equipment”, Type 6 enclosures with mounting rod and electric cables.

Retain "Automatic Alternator" subparagraph below for duplex pump units. Revise if unit includes three or more pumps.

Automatic Alternator: Start pumps on successive cycles and start multiple pumps if one cannot handle load.

High-Water Alarm: Rod-mounted, NEMA 250 “Enclosures for Electrical Equipment”, Type 6 enclosure with [**mechanical-float, mercury-float, or pressure**] <**Insert type**> switch matching control and electric bell; 120 V ac, with transformer and contacts for remote alarm bell.

* + - * 1. Control-Interface Features:

Two subparagraphs below are optional control features.

Remote Alarm Contacts: For remote alarm interface.

Building Automation System Interface: Auxiliary contacts in pump controls for interface to building automation system and capable of providing the following:

On-off status of pump.

Alarm status.

If Project has more than one effluent or sewage pump, delete "Capacities and Characteristics" paragraph below and schedule effluent and sewage pumps on Drawings. See sample schedule in the Evaluations.

* + - * 1. Capacities and Characteristics:

Unit Capacity: <**Insert value**> gpm.

Number of Pumps: [**One**] [**Two**] <**Insert value**>.

Each Pump:

Capacity: <**Insert value**> gpm.

Solids Handling Capability: [**2 inches**] [**2-1/2 inches**] [**3 inches**] <Insert **inches**> minimum.

Total Dynamic Head: <**Insert value**> feet.

Speed: <**Insert rpm**>.

Discharge Pipe Size: <**Insert value**> NPS.

Motor Horsepower: <**Insert value**> hp.

Electrical Characteristics:

Volts: [**120**] [**240**] [**277**] [**480**] <**Insert value**> V ac.

Phases: [**Single**] [**Three**].

Hertz: 60.

Unit Electrical Characteristics:

Full-Load Amperes: <**Insert value**> A.

Minimum Circuit Ampacity: <**Insert value**> A.

Maximum Overcurrent Protection: <**Insert value**> A.

* + - 1. SEWAGE-PUMP, REVERSE-FLOW ASSEMBLIES <**Insert drawing designation**>

Insert drawing designation. Use these designations on Drawings to identify each product.

Retain this article for duplex, submersible sewage pumps, except the grinder type, and for wet-pit-volute sewage pumps. If required, verify that basin diameter is adequate.

* + - * 1. Description: Factory-fabricated, sewage pump reverse-flow assembly for factory or field assembly and installation in sewage pump basin.

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=2237) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Chicago Pump Company; Grundfos Pumps Corporation](http://www.specagent.com/Lookup?uid=123457132418).

[Weil Pump; a Wilo Company](http://www.specagent.com/Lookup?uid=123457132416).

Or equal.

* + - * 1. Components: Include the following corrosion-resistant-metal components:

Inlet Fitting: One combination inlet-overflow strainer fitting.

Valves: Two shutoff valves and two check valves.

Strainers: Two strainer housings with reverse-flow, self-flushing strainers.

Pipe and Fittings: Size and configuration required to connect to sewage pumps and piping.

* + - 1. SEWAGE-PUMP BASINS AND BASIN COVERS

Retain this article if retaining any or all of "Submersible Effluent Pumps," "Submersible Sewage Pumps," and "Wet-Pit-Volute Sewage Pumps" articles.

Sewage pump basins are typically round with space for simplex or multiplex pumps. A reverse-flow assembly often will require a larger basin.

* + - * 1. Basins: Factory-fabricated, watertight, cylindrical, basin sump with top flange and sidewall openings for pipe connections.

If Project has more than one type or configuration of sewage-pump basin, delete "Material" subparagraph below and schedule sewage-pump basin material on Drawings. See sample schedule in the Evaluations.

Material: [Cast iron] [Fiberglass] [Polyethylene] <Insert material>.

Reinforcement: Mounting plates for pumps, fittings[**, guide-rail supports if used,**] and accessories.

Retain "Anchor Flange" subparagraph below if required to anchor basin to concrete slab in case of ground-water problems.

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.

Sewage-pump basin covers are typically round with openings for simplex or multiplex pumps.

* + - * 1. Basin Covers: Fabricate metal cover with openings having gaskets, seals, and bushings; for access to pumps, pump shafts, control rods, discharge piping, vent connections, and power cables.

Reinforcement: Steel or cast iron, capable of supporting foot traffic for basins installed in foot-traffic areas.

If Project has more than one type or configuration of sewage pump basin, delete "Capacities and Characteristics" paragraph below and schedule sewage pump basins on Drawings. See sample schedule in the Evaluations.

* + - * 1. Capacities and Characteristics:

Capacity: <**Insert value**> gal..

Diameter: <**Insert value**> inches.

Depth: <**Insert value**> inches.

Inlet No. 1:

Drainage Pipe Size: <**Insert value**> NPS.

Bottom of Sump to Centerline: <**Insert value**> inches.

Type: [**Flanged**] [**Hubbed**] [**Threaded**] outside.

Inlet No. 2:

Drainage Pipe Size: <**Insert value**> NPS.

Bottom of Sump to Centerline: <**Insert value**> inches.

Type: [**Flanged**] [**Hubbed**] [**Threaded**] outside.

Inlet No. 3:

Drainage Pipe Size: <**Insert value**> NPS.

Bottom of Sump to Centerline: <**Insert value**> inches.

Type: [**Flanged**] [**Hubbed**] [**Threaded**] outside.

Sidewall Outlet:

Discharge Pipe Size: <**Insert value**> NPS.

Bottom of Sump to Centerline: <**Insert value**> inches.

Type: [Hubbed inside] [Hubbed outside] <Insert type>.

Cover Material: [Cast iron] [Steel with bituminous coating] [Cast iron or steel with bituminous coating] <Insert material>.

Cover Diameter: <**Insert value**> inches, but not less than outside diameter of basin top flange.

Manhole Required in Cover: [**Yes**] [**No**].

Vent Size: <**Insert value**> NPS.

* + - 1. PROGRESSING-CAVITY SEWAGE PUMPS
				1. Description: Factory-assembled and -tested, progressing-cavity, single-screw rotary pump as defined in HI 3.1-3.5.
				2. [Manufacturers:](http://www.specagent.com/Lookup?ulid=2239) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Roper Pump Co](http://www.specagent.com/Lookup?uid=123457132420).

Or equal.

* + - * 1. Pump Body: [**Cast iron**] <**Insert material**> with feet for base or floor installation.
				2. Pump Bearings: Radial and thrust types.
				3. Pump Shaft: Steel.
				4. Rotor: [Chrome-plated steel] <Insert material>.
				5. Stator: [Buna-N] [or] [natural rubber] <Insert material>.
				6. Seals: Packing gland and mechanical types.
				7. Coupling: Flexible.
				8. Motor: Single speed; grease-lubricated ball bearings.

If Project has more than one effluent or sewage pump, delete "Capacities and Characteristics" paragraph below and schedule effluent and sewage pumps on Drawings. See sample schedule in the Evaluations.

* + - * 1. Capacities and Characteristics:

Capacity: <**Insert value**>gal..

Solids Handling Capability: [Not applicable] [**2 inches** minimum] [**2-1/2 inches** minimum] [**3 inches** minimum] <Insert **inches** minimum>.

Total Dynamic Head: <**Insert value**> feet.

Speed: <**Insert rpm**>.

Discharge Pipe Size: <**Insert value**> NPS.

Motor Horsepower: <**Insert value**> hp.

Electrical Characteristics:

Volts: [**120**] [**240**] [**277**] [**480**] <**Insert value**> V ac.

Phases: [**Single**] [**Three**].

Hertz: 60.

Unit Electrical Characteristics:

Full-Load Amperes: <**Insert value**> A.

Minimum Circuit Ampacity: <**Insert value**> A.

Maximum Overcurrent Protection: <**Insert value**> A.

* + - 1. PACKAGED, SUBMERSIBLE SEWAGE-PUMP UNITS

Units in this article are complete with pumps, basin, piping, and controls. Units have limited applications and capacities. Most manufacturers offer only simplex units, but duplex units are available. Using these units as the only means of discharging sewage is not recommended.

* + - * 1. Packaged, Submersible, Grinder, Sewage-Pump Units: <**Insert drawing designation**>

Description: Factory-assembled and -tested, automatic-operation, basin-mounted, grinder sewage-pump unit.

[Manufacturers:](http://www.specagent.com/Lookup?ulid=2240) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Barnes; a Crane Pumps & Systems brand](http://www.specagent.com/Lookup?uid=123457132428).

[Pentair Aurora; Pentair Pump Group](http://www.specagent.com/Lookup?uid=123457132427).

[Zoeller Company](http://www.specagent.com/Lookup?uid=123457132426).

Or equal.

Pump Type: Submersible, end-suction, single-stage, close-coupled, overhung-impeller centrifugal pump as defined in HI 1.1-1.2 and HI 1.3.

Pump Casing: Cast iron.

Impeller: Stainless-steel grinder[**, cutter, or slicer**] type with shredding ring.

Motor: Hermetically sealed, capacitor-start type; with built-in overload protection; and three-conductor, waterproof power cable of length required and with grounding plug and cable-sealing assembly for connection at pump.

Retain one of two "Controls" subparagraphs below. Retain first for simplex pump unit; second, for duplex pump unit.

Controls: Manufacturer's standard panel for one pump.

Controls: Automatic, with mechanical- or mercury-float switches and alternator.

Pump Discharge Piping: Factory or field fabricated, [galvanized, ASTM A53, Schedule 40, steel pipe with ASME B16.4, Class 125, gray-iron threaded fittings] <Insert pipe material>.

Basin: Watertight[**plastic**] and of size required for pumps, with inlet pipe connection and gastight cover with pump discharge and vent connections.

* + - * 1. Packaged, Submersible, Nonclog, Sewage-Pump Units <**Insert drawing designation**>:

Description: Factory-assembled and -tested, automatic-operation, basin-mounted, sewage-pump unit.

[Manufacturers:](http://www.specagent.com/Lookup?ulid=2241) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Barnes; a Crane Pumps & Systems brand](http://www.specagent.com/Lookup?uid=123457132437).

[Bell & Gossett; a Xylem brand](http://www.specagent.com/Lookup?uid=123457132438).

[Pentair Aurora; Pentair Pump Group](http://www.specagent.com/Lookup?uid=123457132441).

[Zoeller Company](http://www.specagent.com/Lookup?uid=123457132436).

Or equal.

Pump Type: Submersible, end-suction, single-stage, close-coupled, overhung-impeller centrifugal pump as defined in HI 1.1-1.2 and HI 1.3.

Pump Casing: Cast iron.

Impeller: Brass or cast iron; statically and dynamically balanced, non-clog design, and capable of handling 2-inch- diameter solids.

Motor: Hermetically sealed, capacitor-start type; with built-in overload protection; lifting eye or lug; and three-conductor, waterproof power cable of length required and with grounding plug and cable-sealing assembly for connection at pump.

Retain one of two "Controls" subparagraphs below. Retain first for simplex pump unit; second, for duplex pump unit.

Control: Manufacturer's standard panel for one pump.

Controls: Automatic, with mechanical- or mercury-float switches and alternator.

Pump Discharge Piping: Factory or field fabricated, [galvanized, ASTM A53, Schedule 40, steel pipe with ASME B16.4, Class 125, gray-iron threaded fittings] <Insert pipe material>.

Basin: Watertight[**plastic**] and of size required for pumps, with inlet pipe connection and gastight cover with pump discharge and vent connections.

If Project has more than one type of configuration of packaged sewage- or wastewater-pump unit, delete "Capacities and Characteristics" paragraph below and schedule packaged sewage and wastewater pumps on Drawings. See sample schedule in the Evaluations.

* + - * 1. Capacities and Characteristics:

System Capacity: <**Insert value**>gal..

Number of Pumps: [**One**] [**Two**].

Each Pump:

Capacity: <**Insert value**>gal..

Total Dynamic Head: <**Insert value**> feet.

Speed: <**Insert rpm**>.

Discharge Pipe Size: <**Insert value**> NPS.

Motor Horsepower: <**Insert value**> hp.

Electrical Characteristics:

Volts: [**120**] [**240**] [**277**] [**480**] <**Insert value**> V ac.

Phases: [**Single**] [**Three**].

Hertz: 60.

Unit Electrical Characteristics:

Full-Load Amperes: <**Insert value**> A.

Minimum Circuit Ampacity: <**Insert value**> A.

Maximum Overcurrent Protection: <**Insert value**> A.

Alternator Control Required: [**Yes**] [**No**].

Basin:

Dimensions: <**Insert values**>.

Inlet Size: <**Insert value**> NPS.

Bottom to Inlet Centerline: <**Insert value**> inches.

Vent Size: <**Insert value**> NPS.

* + - 1. PACKAGED WASTEWATER-PUMP UNITS

Units in this article are complete with a pump, piping, and controls. Units have limited applications and capacities.

* + - * 1. Packaged, Wet-Pit-Volute, Wastewater-Pump Units:

Description: Factory-assembled and -tested, automatic-operation, basin-mounted, effluent-pump unit.

[Manufacturers:](http://www.specagent.com/Lookup?ulid=2242) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Hartell Pumps; Milton Roy](http://www.specagent.com/Lookup?uid=123457132444).

Or equal.

Pump Type: Wet-pit-volute, single-stage, separately coupled, overhung-impeller centrifugal pump as defined in HI 1.1-1.2 and HI 1.3.

Pump Body and Impeller: Corrosion-resistant materials.

Motor: With built-in overload protection and mounted vertically on basin cover.

Power Cord: Three-conductor, waterproof cable of length required, but not less than 72 inches and with grounding plug and cable-sealing assembly for connection at pump.

Control: Float switch.

Pump Discharge Piping: Factory or field fabricated, [galvanized, ASTM A53, Schedule 40, steel pipe with ASME B16.4, Class 125, gray-iron threaded fittings] <Insert pipe material>.

Basin: Watertight, aluminum, plastic, or coated steel with inlet pipe connection and gastight cover with vent and pump discharge connections.

* + - * 1. Packaged, Submersible Wastewater-Pump Units:

Description: Factory-assembled and -tested, automatic-operation, effluent-pump unit with basin.

[Manufacturers:](http://www.specagent.com/Lookup?ulid=2243) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Bell & Gossett; a Xylem brand](http://www.specagent.com/Lookup?uid=123457132452).

[Pentair Aurora; Pentair Pump Group](http://www.specagent.com/Lookup?uid=123457132454).

ProFlo; a Ferguson Enterprises, Inc. brand.

[Zoeller Company](http://www.specagent.com/Lookup?uid=123457132451).

Or equal.

Pump Type: Submersible, end-suction, single-stage, overhung-impeller, centrifugal pump as defined in HI 1.1-1.2 and HI 1.3.

Pump Body and Impeller: Corrosion-resistant materials.

Pump Seals: Mechanical.

Motor: Hermetically sealed, capacitor-start type, with built-in overload protection.

Power Cord: Three-conductor, waterproof cable of length required, but not less than 72 inches and with grounding plug and cable-sealing assembly for connection at pump.

Control: Float switch.

Pump Discharge Piping: Factory or field fabricated, [galvanized, ASTM A53, Schedule 40, steel pipe with ASME B16.4, Class 125, gray-iron threaded fittings] <Insert pipe material>.

Basin: Watertight plastic with inlet pipe connection and gastight cover with vent and pump discharge connections.

If Project has more than one packaged sewage- or wastewater-pump unit, delete "Capacities and Characteristics" subparagraph below and schedule packaged sewage and wastewater pumps on Drawings. See sample schedule in the Evaluations.

Capacities and Characteristics:

Pump Capacity: <**Insert value**> gpm.

Total Dynamic Head: <**Insert value**> feet.

Speed: <**Insert rpm**>.

Discharge Pipe Size: <**Insert value**> NPS.

Motor Horsepower: <**Insert value**> hp.

Electrical Characteristics:

Volts: [**120**] [**240**] <**Insert value**> V ac.

Phases: [**Single**] [**Three**].

Hertz: 60.

Unit Electrical Characteristics:

Full-Load Amperes: <**Insert value**> A.

Minimum Circuit Ampacity: <**Insert value**> A.

Maximum Overcurrent Protection: <**Insert value**> A.

Basin:

Capacity: [**2 gal.**] [**4 gal.**] <Insert value> minimum.

Inlet Connection: [**NPS 1-1/2**] <Insert pipe size> minimum.

Vent Connection: [**NPS 1-1/2**] <Insert pipe size> minimum.

* + - 1. MOTORS

Default motor characteristics are specified in Section 220513 "Common Motor Requirements for Plumbing Equipment."

* + - * 1. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Section 220513 "Common Motor Requirements for Plumbing Equipment."

Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.

* + - * 1. Motors for submersible pumps shall be hermetically sealed.
1. EXECUTION
	* + 1. EXAMINATION
				1. Examine roughing-in for plumbing piping to verify actual locations of sanitary drainage and vent piping connections before sewage pump installation.
			2. INSTALLATION
				1. Pump Installation Standards:

Comply with ANSI Standard/HI 1.4 for installation of centrifugal pumps.

Comply with ANSI Standards/HI 3.1-3.5 for installation of progressing-cavity sewage pumps.

* + - * 1. Equipment Mounting:

Retain first subparagraph below to require equipment to be installed on cast-in-place concrete equipment bases.

Install progressing-cavity sewage pumps on cast-in-place concrete equipment base(s). Comply with requirements for equipment bases and foundations specified in Section 033000 "Cast-in-Place Concrete."

Retain one of two subparagraphs below. Retain first for projects in seismic areas; retain second for projects not in seismic areas. Indicate vibration isolation and seismic-control device type and minimum deflection in supported equipment schedule on Drawings.

Comply with requirements for vibration isolation and seismic-control devices specified in Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment."

Comply with requirements for vibration isolation devices specified in Section 220548.13 "Vibration Controls for Plumbing Piping and Equipment."

Retain "Wiring Method" paragraph below for pumps with wall-mounted controls and coordinate with Drawings. Delete if wiring methods for system are indicated on Drawings.

* + - * 1. Wiring Method: Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
				2. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.
			1. CONNECTIONS

Coordinate pump installations and specialty arrangements with Drawings and with requirements specified in piping systems. If Drawings are explicit enough, these requirements may be reduced or omitted.

* + - * 1. Comply with requirements for piping specified in Section 221316 "Sanitary Waste and Vent Piping." Drawings indicate general arrangement of piping, fittings, and specialties.
				2. Where installing piping adjacent to equipment, allow space for service and maintenance.
			1. FIELD QUALITY CONTROL

Retain "Manufacturer's Field Service" paragraph below to require a Company Service Advisor to perform tests, inspections, and adjustments.

* + - * 1. Manufacturer's Field Service: Engage a Company Field Advisor per OGS Spec Section 014216 to test, inspect, and adjust components, assemblies, and equipment installations, including connections.

Retain "Perform the following test and inspections" paragraph below to require Contractor to perform tests and inspections.

* + - * 1. Perform the following tests and inspections:

Perform each visual and mechanical inspection.

Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.

Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.

Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

* + - * 1. Pumps and controls will be considered defective if they do not pass tests and inspections.
				2. Prepare test and inspection reports.
			1. STARTUP SERVICE
				1. [Engage a Company Field Advisor per OGS Spec Section 014216 to perform] [Perform] startup service.

Complete installation and startup checks according to manufacturer's written instructions.

<Insert startup steps if any>.

* + - 1. ADJUSTING
				1. Adjust pumps to function smoothly and lubricate as recommended by manufacturer.
				2. Adjust control set points.
			2. DEMONSTRATION
				1. [Engage a Company Field Advisor per OGS Spec Section 014216 to train] [Train] Facility’s maintenance personnel to adjust, operate, and maintain[ controls and] pumps.

END OF SECTION 221329