SECTION 213413 - PRESSURE-MAINTENANCE PUMPS

Revise this Section by deleting and inserting text to meet Project-specific requirements.

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

Vertical, multistage, pressure-maintenance pumps.

Regenerative-turbine, pressure-maintenance pumps.

Submersible, pressure-maintenance pumps.

Vertical-turbine, pressure-maintenance pumps.

* + - 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 instruction 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: catalog sheets, specifications, and installation instruction. indicating UL or FM approved for each product.

Include rated capacities, operating characteristics, certified performance test curves, electrical characteristics, and furnished specialties and accessories.

* + - * 1. Shop Drawings: For pumps, accessories, and specialties. As per NFPA 20 “Standard for the Installation of Stationary Pumps for Fire Protection”

Include plans, elevations, sections, and 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.

Include diagrams for power, signal, and control wiring.

Retain "Field quality-control reports" Paragraph below if Contractor is responsible for field quality-control testing and inspecting.

* + - * 1. Field quality-control reports.
			1. CLOSEOUT SUBMITTALS
				1. Operation and Maintenance Data: For pumps to include in operation and maintenance manuals.
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. VERTICAL, MULTISTAGE, PRESSURE-MAINTENANCE PUMPS

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=12241) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Grundfos Pumps Corporation](http://www.specagent.com/Lookup?uid=123457130872).

[PACO Pumps; Grundfos Pumps Corporation, USA](http://www.specagent.com/Lookup?uid=123457130873).

[Taco Comfort Solutions](http://www.specagent.com/Lookup?uid=123457130874).

Approved equivalent.

* + - * 1. Description: Factory-assembled and -tested, multistage, barrel-type vertical pump as defined in ANSI/HI 2.1-2.2 “Rotodynamic Vertical Pumps of Radial, Mixed and Axial Flow Types for Nomenclature and Definitions” and ANSI/HI 2.3 “Rotodynamic Vertical Pumps of Radial, Mixed, and Axial Flow Types for Design and Application”; designed for surface installation with pump and motor direct coupled and mounted vertically.
				2. Pump Construction:

Barrel: Stainless steel.

Suction and Discharge Chamber: Cast iron with flanged inlet and outlet.

Pump Head/Motor Mount: Cast iron.

Impellers: Stainless steel, balanced, and keyed to shaft.

Pump Shaft: Stainless steel.

Seal: Mechanical type with carbon rotating face and silicon-carbide stationary seat.

Wear Rings: Teflon.

Intermediate Chamber Bearings: Aluminum-oxide ceramic or bronze.

Chamber-Base Bearing: Tungsten carbide.

O-Rings: [**EPDM**] [**NBR**] [**Viton**].

* + - * 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. Motor: Single speed with permanently lubricated ball bearings and rigidly mounted to pump head. Comply with requirements in Section 210513 "Common Motor Requirements for Fire Suppression Equipment."
				3. Power Cord: Factory-connected to motor for field connection to controller and at least [**10 feet**] <**Insert dimension**> long.
				4. Nameplate: Permanently attached to pump and indicating capacity and characteristics.

If Project has more than one type or configuration of multistage, pressure-maintenance pump, delete "Capacities and Characteristics" Paragraph below and schedule pressure-maintenance pumps on Drawings.

* + - * 1. Capacities and Characteristics:

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

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

Working Pressure: [**175 psig minimum**] [**230 psig**] [**300 psig**] <**Insert value**>.

Inlet and Outlet Size: [**NPS 1-1/4**] <**Insert size**>.

Discharge and Suction Flanges: [**Class 250**] <**Insert class**>.

Suction Head Available at Pump: <**Insert feet**>.

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

Motor Speed: <**Insert rpm**>.

Electrical Characteristics:

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

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

Hertz: [**60**] <**Insert value**>.

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

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

Maximum Overcurrent Protection: <**Insert amperage**>.

Pump-Start, Pressure-Switch Setting: <**Insert psig**>.

Pump-Stop, Pressure-Switch Setting: <**Insert psig**>.

* + - 1. REGENERATIVE-TURBINE, PRESSURE-MAINTENANCE PUMPS

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=12242) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Aquarius Fluid Products, Inc](http://www.specagent.com/Lookup?uid=123457130877).

[Crane Pumps & Systems](http://www.specagent.com/Lookup?uid=123457130878).

[PACO Pumps; Grundfos Pumps Corporation, USA](http://www.specagent.com/Lookup?uid=123457130880).

Approved equivalent.

* + - * 1. Description: Factory-assembled and -tested, close-coupled, single-stage, regenerative-turbine centrifugal pump as defined in ANSI/HI 1.1-1.2 “Rotodynamic Centrifugal Pumps for Nomenclature and Definitions” and HI 1.3 “Rotodynamic Centrifugal Pumps for Design and Application”; with pump and motor mounted horizontally.
				2. Pump Construction:

Casing: Radially split, cast iron, with threaded inlet and outlet.

Impeller: Bronze, balanced, and keyed to shaft.

Pump Shaft: Stainless steel[**or steel**] with deflector.

Shaft Sleeve: Bronze.

Seal: Mechanical type with spring-loaded rotating head.

* + - * 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. Motor: Single speed with permanently lubricated ball bearings. Comply with requirements in Section 210513 "Common Motor Requirements for Fire Suppression Equipment."

Power Cord: Factory-connected to motor for field connection to controller and at least [**10 feet**] <**Insert dimension**> long.

* + - * 1. Nameplate: Permanently attached to pump and indicating capacity and characteristics.

If Project has more than one type or configuration of regenerative-turbine, pressure-maintenance pump, delete "Capacities and Characteristics" Paragraph below and schedule pressure-maintenance pumps on Drawings.

* + - * 1. Capacities and Characteristics:

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

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

Working Pressure: [**175 psig**] [**300 psig**] <**Insert value**>.

Inlet Size: Threaded; <**Insert NPS**>.

Outlet Size: Threaded; <**Insert NPS**>.

Suction Head Available at Pump: <**Insert feet**>.

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

Motor Speed: <**Insert rpm**>.

Electrical Characteristics:

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

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

Hertz: [**60**] <**Insert value**>.

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

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

Maximum Overcurrent Protection: <**Insert amperage**>.

Pump-Start, Pressure-Switch Setting: <**Insert psig**>.

Pump-Stop, Pressure-Switch Setting: <**Insert psig**>.

* + - 1. SUBMERSIBLE, PRESSURE-MAINTENANCE PUMPS

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=12243) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Aquarius Fluid Products, Inc](http://www.specagent.com/Lookup?uid=123457130884).

[Aurora Pump; Pentair Ltd](http://www.specagent.com/Lookup?uid=123457130885).

[Weir Floway](http://www.specagent.com/Lookup?uid=123457130887).

Approved equivalent.

* + - * 1. Description: Factory-assembled and -tested, vertical, multistage, submersible pump as defined in HI 2.1-2.2 “Rotodynamic Vertical Pumps of Radial, Mixed and Axial Flow Types for Nomenclature and Definitions” and HI 2.3 “Rotodynamic Vertical Pumps of Radial, Mixed, and Axial Flow Types for Design and Application”; with pump motor mounted below pump.
				2. Pump Construction:

Pump Head or Elbow: Cast iron, for surface discharge, with flanged or threaded connections.

Pump Shaft: Stainless steel.

Shaft Seal: Ceramic/carbon mechanical type.

Bearings: Bronze water lubricated.

Bowl Section: Multiple [**cast-iron**] [**stainless steel**] bowls with closed-type bronze or stainless-steel impellers.

Column Pipe: ASTM A53 “Standard Specification for Pipe, Steel, Black and Hot-Dipper, Zinc-Coated, Welded and Seamless”, Schedule 40, galvanized-steel pipe with threaded ends and cast-iron or steel fittings, in sections 10 feet or less, with strainer of cast or fabricated bronze or stainless steel between pump and bowl section.

* + - * 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. Motor: Single speed with permanently lubricated ball bearings and capable of continuous operation under water. Comply with requirements in Section 210513 "Common Motor Requirements for Fire Suppression Equipment."

Power Cord: Capable of continuous underwater operation, factory-connected to motor for field connection to controller, and at least [**10 feet**] <**Insert dimension**> long.

* + - * 1. Base: Cast iron or steel with hole for electrical cable.
				2. Nameplate: Permanently attached to pump and indicating capacity and characteristics.

If Project has more than one type or configuration of submersible, pressure-maintenance pump, delete "Capacities and Characteristics" Paragraph below and schedule pressure-maintenance pumps on Drawings.

* + - * 1. Capacities and Characteristics:

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

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

Working Pressure: <**Insert psig**>.

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

Pump Column Length: <**Insert feet**>.

Outlet Size: <**Insert NPS**>.

Flange: [**Class 125**] <**Insert class**>.

Suction Head Available at Pump: <**Insert feet**>.

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

Motor Speed: <**Insert rpm**>.

Electrical Characteristics:

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

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

Hertz: [**60**] <**Insert value**>.

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

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

Maximum Overcurrent Protection: <**Insert amperage**>.

Pump-Start, Pressure-Switch Setting: <**Insert psig**>.

Pump-Stop, Pressure-Switch Setting: <**Insert psig**>.

* + - 1. VERTICAL-TURBINE, PRESSURE-MAINTENANCE PUMPS

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=12244) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Aquarius Fluid Products, Inc](http://www.specagent.com/Lookup?uid=123457130890).

[Sulzer Pumps Inc](http://www.specagent.com/Lookup?uid=123457130897).

[Weir Floway](http://www.specagent.com/Lookup?uid=123457130898).

Approved equivalent.

* + - * 1. Description: Factory-assembled and -tested, vertical, multistage, open-line-shaft turbine pump as defined in HI 2.1-2.2 “Rotodynamic Vertical Pumps of Radial, Mixed and Axial Flow Types for Nomenclature and Definitions” and HI 2.3 “Rotodynamic Vertical Pumps of Radial, Mixed, and Axial Flow Types for Design and Application”; with pump motor mounted above pump head.
				2. Pump Construction:

Pump Head: Cast iron, for surface discharge, with flange except connections may be threaded in sizes in which flanges are not available.

Pump Head Seal: Stuffing box and stuffing.

Retain first two subparagraphs below for static water levels of 50 feet or less and for water-lubricated bearings.

Line Shaft: Stainless steel or steel, with corrosion-resistant shaft sleeves.

Line Shaft Bearings: Rubber sleeve, water lubricated.

Retain first two subparagraphs below for static water levels between 50 and 200 feet and for oil-lubricated bearings.

Line Shaft: Steel.

Line Shaft Bearings: Corrosion resistant, oil lubricated.

Impeller Shaft: Monel metal or stainless steel.

Bowl Section: Multiple cast-iron bowls with closed-type bronze or stainless-steel impellers.

Column Pipe: ASTM A53 “Standard Specification for Pipe, Steel, Black and Hot-Dipper, Zinc-Coated, Welded and Seamless”, Schedule 40, galvanized-steel pipe with threaded ends and cast-iron or steel fittings, in sections 10 feet or less, with strainer of cast or fabricated bronze or stainless steel at bottom.

* + - * 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. Motor: Single speed with permanently lubricated ball bearings. Comply with requirements in Section 210513 "Common Motor Requirements for Fire Suppression Equipment."

Power Cord: Factory-connected to motor for field connection to controller and at least [**10 feet**] <**Insert dimension**> long.

* + - * 1. Base: Cast iron or steel with hole for electrical cable.
				2. Nameplate: Permanently attached to pump and indicating capacity and characteristics.

If Project has more than one type or configuration of vertical-turbine, pressure-maintenance pump, delete "Capacities and Characteristics" Paragraph below and schedule pressure-maintenance pumps on Drawings.

* + - * 1. Capacities and Characteristics:

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

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

Working Pressure: <**Insert psig**>.

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

Pump Column Length: <**Insert feet**>.

Outlet Size: <**Insert NPS**>.

Flange: [**Class 125**] <**Insert class**>.

Suction Head Available at Pump: <**Insert feet**>.

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

Motor Speed: <**Insert rpm**>.

Electrical Characteristics:

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

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

Hertz: [**60**] <**Insert value**>.

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

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

Maximum Overcurrent Protection: <**Insert amperage**>.

Pump-Start, Pressure-Switch Setting: <**Insert psig**>.

Pump-Stop, Pressure-Switch Setting: <**Insert psig**>.

* + - 1. MOTORS

Default motor characteristics are specified in Section 210513 "Common Motor Requirements for Fire Suppression Equipment."

* + - * 1. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Section 210513 "Common Motor Requirements for Fire Suppression 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. EXECUTION
	* + 1. EQUIPMENT INSTALLATION
				1. NFPA Standard: Comply with NFPA 20 “Standard for the Installation of Stationary Pumps for Fire Protection” for installation of pressure-maintenance pumps.
				2. Equipment Mounting:

Install [**multistage**] [**and**] [**regenerative-turbine**], pressure-maintenance pumps according to HI 1.4 “Rotodynamic Centrifugal Pumps for Manuals Describing Installation, Operation, and Maintenance”.

Install [**submersible**] [**and**] [**vertical-turbine**], pressure-maintenance pumps according to HI 2.4 “Rotodynamic (Vertical) Pumps for Manuals Describing Installation, Operation, and Maintenance”.

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

Install base-mounted pumps on cast-in-place concrete equipment base(s).

Retain one of first two subparagraphs below. Retain first subparagraph for projects in seismic areas; retain second subparagraph 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 210548 "Vibration and Seismic Controls for Fire-Suppression Piping and Equipment."

For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.

Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

Install anchor bolts to elevations required for proper attachment to supported equipment.

Attach pumps to equipment base using anchor bolts.

Shim pumps as needed to make them level.

Comply with requirements for piping specified in [Section 211313 “Wet Pipe Sprinkler Systems.]

Install isolation valves in both inlet and outlet pipes near the pump. Comply with requirements for valves specified in [Section 210523 "General Duty Valves for Water-Based Fire Suppression Piping” for ball, butterfly, check, gate, post-indicators, and trim & drain valves."]

Install listed fire-protection shutoff valves with tamper switches supervising valves in open position.

* + - 1. FIELD QUALITY CONTROL

Retain "Manufacturer's Field Service" Paragraph below to require a factory-authorized service representative to perform tests and inspections.

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

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

* + - * 1. Perform the following tests and inspections [**with the assistance of a Company Field Advisor per OGS Spec Section 014216**]:

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.

Pressure-maintenance pumps will be considered defective if they do not pass tests and inspections.

* + - * 1. Prepare test and inspection reports.
			1. ADJUSTING
				1. Lubricate pumps as recommended by manufacturer.
				2. Set field-adjustable pressure-switch ranges as indicated.

END OF SECTION 213413