SECTION 232223 - STEAM CONDENSATE PUMPS

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

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 steam condensate pumps.
			2. 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. Include certified performance curves and rated capacities, operating characteristics, furnished specialties, and accessories for each type of product indicated. Indicate pump's operating point on curves. Include receiver capacity and material.
				5. Shop Drawings: For each pump.

Show pump layout and connections.

Include setting drawings with templates for installing foundation and anchor bolts and other anchorages.

Include diagrams for power, signal, and control wiring.

* + - 1. CLOSEOUT SUBMITTALS
				1. Operation and Maintenance Data: For pumps to include in emergency, operation, and maintenance manuals.
1. PRODUCTS

See Editing Instruction No. 1 in the Evaluations for cautions about named manufacturers and products.

* + - 1. SINGLE-STAGE, CENTRIFUGAL PUMPS WITH FLOOR-MOUNTED RECEIVER

Retain this article for small simplex or duplex pumps with 12,000-sq. ft. EDR (845-kW) maximum capacity and up to 20-psig (140-kPa) discharge pressure.

* + - * 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Armstrong Fluid Handling.

ITT Corporation.

Roth Pump Company.

Skidmore Pump.

Spirax Sarco Limited.

Sterling.

Approved equivalent.

* + - * 1. Description: Factory-fabricated, packaged, electric-driven pumps; with receiver, pumps, controls, and accessories suitable for operation with steam condensate.

Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

ASME Compliance: Fabricate and label steam condensate receivers to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.

* + - * 1. Configuration: [**Simplex] [Duplex**] floor-mounted pump with receiver and float switches; rated to pump 200 deg F steam condensate.
				2. Receiver:

Floor mounted.

[**Close-grained cast iron] [Welded steel**].

Externally adjustable float switches.

Flanges for pump mounting.

Water-level gage and dial thermometer.

Pressure gage at pump discharge.

Bronze fitting isolation valve between pump and receiver.

Lifting eyebolts.

Inlet vent and an overflow.

Cast-iron inlet strainer with vertical self-cleaning bronze screen and large dirt pocket.

* + - * 1. Pumps:

Centrifugal, close coupled, vertical design.

Permanently aligned.

Bronze fitted.

Replaceable bronze case ring.

Mechanical seals rated at 250 deg F.

Mounted on receiver flange.

* + - * 1. Motor:

Default motor characteristics are specified in Section 230513 "Common Motor Requirements for HVAC Equipment."

Comply with NEMA designation, temperature rating, service factor, and efficiency requirements for motors specified in Section 230513 "Common Motor Requirements for HVAC Equipment."

Verify enclosure types with manufacturer of specified equipment. Delete "Enclosure" subparagraph below if included in schedule on Drawings or in "Capacities and Characteristics" paragraph.

Enclosure: [**Open, dripproof] [Totally enclosed, fan cooled] [Totally enclosed, air over] [Open, externally ventilated] [Totally enclosed, nonventilated] [Severe duty] [Explosion proof] [Dust-ignition-proof machine**].

Retain "Enclosure Materials," "Motor Bearings," "Unusual Service Conditions," "Efficiency," "NEMA Design," and "Service Factor" subparagraphs below if options are available from pump manufacturers and are different from default requirements specified in Section 230513 "Common Motor Requirements for HVAC Equipment." Consider each subparagraph and retain only those that vary from default requirements.

Enclosure Materials: [**Cast iron] [Cast aluminum] [Rolled steel**].

Permanently lubricated ball bearings are available up through 5 hp. Larger motors have grease-lubricated ball bearings.

Motor Bearings: [**Permanently lubricated] [Grease-lubricated**] ball bearings.

Unusual Service Conditions:

Ambient Temperature: <**Insert deg C**>.

Altitude: <**Insert feet**> above sea level.

High humidity.

<**Insert conditions**>.

Efficiency: Premium efficient.

NEMA Design: <**Insert designation**>.

Service Factor: <**Insert value**>.

* + - * 1. Control Panel:

Factory wired between pumps and float switches, for single external electrical connection.

Provide fused, control-power transformer if voltage exceeds 230 V ac.

NEMA 250, [**Type 1] [Type 3] [Type 12] <Insert type**> enclosure with hinged door and grounding lug, mounted on pump.

Motor controller for each pump.

Retain first two subparagraphs below for duplex units.

Electrical pump alternator to operate pumps in lead-lag sequence and allow both pumps to operate on receiver high level.

Manual lead-lag control to override electrical pump alternator and manually select the lead pump.

Momentary-contact "TEST" push button on cover for each pump.

Numbered terminal strip.

Disconnect switch.

If Project has more than one type or configuration of small floor-mounted pump with receiver and float switches, delete "Capacities and Characteristics" paragraph below and schedule pumps on Drawings.

* + - * 1. Capacities and Characteristics:

Unit Total Capacity: <**Insert sq. ft. EDR**>.

Capacity, Each Pump:

Flow: <**Insert gpm**>.

Discharge Head: <**Insert psig**>.

Discharge Size: <**Insert NP**S>.

Speed: <**Insert rpm**>.

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

Receiver:

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

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

Height to Inlet: <**Insert inches**>.

Electrical Characteristics:

Volts: [**120] [230] [240] <Insert value**>.

Phase: Single.

Hertz: 60.

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

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

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

* + - 1. REGENERATIVE TURBINE PUMPS WITH FLOOR-MOUNTED RECEIVER

Retain this article for small duplex turbine pumps with 12,000-sq. ft. EDR (845-kW) maximum capacity and up to 20-psig (140-kPa) discharge pressure.

* + - * 1. Manufacturers: Subject to compliance with requirements, provide products by the following:

Roth Pump Company.

Pentair

Burks Pump, a Crane Co. Company

Approved equivalent.

* + - * 1. Description: Factory-fabricated, packaged, electric-driven pumps; with receiver, pumps, controls, and accessories suitable for operation with steam condensate.

Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

ASME Compliance: Fabricate and label steam condensate receivers to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.

* + - * 1. Configuration: Duplex floor-mounted regenerative turbine pump with receiver and float switches; rated to pump 210 deg F steam condensate.
				2. Receiver:

Stainless-steel and plastic receivers are available from some manufacturers.

Floor mounted.

[**Close-grained cast iron] [Welded steel**].

Externally adjustable float switches.

Flanges for pump mounting.

Water-level gage and dial thermometer.

Pressure gage at pump discharge.

Bronze fitting isolation valve between pump and receiver.

Lifting eyebolts.

Inlet vent and an overflow.

Cast-iron inlet strainer with vertical self-cleaning bronze screen and large dirt pocket.

* + - * 1. Pumps:

Regenerative turbine, close coupled.

Permanently aligned.

Bronze fitted.

Mechanical seals rated at 250 deg F.

Independent pump control circuit for each pump.

Mounted on base or receiver flange.

Rated to operate with a minimum of 2 feet of NPSH.

* + - * 1. Motor:

Default motor characteristics are specified in Section 230513 "Common Motor Requirements for HVAC Equipment."

Comply with NEMA designation, temperature rating, service factor, and efficiency requirements for motors specified in Section 230513 "Common Motor Requirements for HVAC Equipment."

Verify enclosure types with manufacturer of specified equipment. Delete "Enclosure" subparagraph below if included in schedule on Drawings or in "Capacities and Characteristics" paragraph.

Enclosure: [**Open, dripproof] [Totally enclosed, fan cooled] [Totally enclosed, air over] [Open, externally ventilated] [Totally enclosed, nonventilated] [Severe duty] [Explosion proof] [Dust-ignition-proof machine**].

Retain "Enclosure Materials," "Motor Bearings," "Unusual Service Conditions," "Efficiency," "NEMA Design," and "Service Factor" subparagraphs below if options are available from pump manufacturers and are different from default requirements specified in Section 230513 "Common Motor Requirements for HVAC Equipment." Consider each subparagraph and retain only those that vary from default requirements.

Enclosure Materials: [**Cast iron] [Cast aluminum] [Rolled steel**].

Permanently lubricated ball bearings are available up through 5 hp. Larger motors have grease-lubricated ball bearings.

Motor Bearings: [**Permanently lubricated] [Grease-lubricated**] ball bearings.

Unusual Service Conditions:

Ambient Temperature: <**Insert deg C**>.

Altitude: <**Insert feet**> above sea level.

High humidity.

<**Insert conditions**>.

Efficiency: Premium efficient.

NEMA Design: <**Insert designation**>.

Service Factor: <**Insert value**>.

* + - * 1. Control Cabinet:

Factory mounted on unit with drip lip and piano-hinged door.

Combination magnetic starter with fused disconnects and cover interlock,

Auto-off hand selector switch.

Numbered terminal strip.

* + - * 1. Control Panel:

Factory wired between pumps and float switches, for single external electrical connection.

Provide fused, control-power transformer if voltage exceeds 230 V ac.

NEMA 250, [**Type 1] [Type 3] [Type 12] <Insert type**> enclosure with hinged door and grounding lug, mounted on pump.

Motor controller for each pump.

Electrical pump alternator to operate pumps in lead-lag sequence and allow both pumps to operate on receiver high level.

Manual lead-lag control to override electrical pump alternator and manually select the lead pump.

Momentary-contact "TEST" push button on cover for each pump.

Numbered terminal strip.

Disconnect switch.

If Project has more than one type or configuration of small floor-mounted regenerative turbine pump, delete "Capacities and Characteristics" paragraph below and schedule pumps on Drawings.

* + - * 1. Capacities and Characteristics:

Unit Total Capacity: <**Insert sq. ft. EDR**>.

Capacity, Each Pump:

Flow: <**Insert gpm**>.

Discharge Head: <**Insert psig**>.

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

Speed: <**Insert rpm**>.

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

Receiver:

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

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

Height to Inlet: <**Insert inches**>.

Electrical Characteristics:

Power supply to this pump includes controls.

Volts: [**120] [230] [240] <Insert value**>.

Phase: Single.

Hertz: 60.

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

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

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

* + - 1. TWO-STAGE, CENTRIFUGAL PUMPS WITH FLOOR-MOUNTED RECEIVER

Retain this article for large duplex floor-mounted pumps with approximately 150,000-sq. ft. EDR (10 545-kW) maximum capacity and up to 75-psig (520-kPa) discharge pressure.

* + - * 1. Manufacturers: Subject to compliance with requirements, provide products by the following:

Skidmore Pump.

Zoeller Pump Company

Pentair

Approved equivalent.

* + - * 1. Description: Factory-fabricated, packaged, electric-driven pumps; with receiver, pumps, controls, and accessories suitable for operation with steam condensate.

Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

ASME Compliance: Fabricate and label steam condensate receivers to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.

* + - * 1. Configuration: Duplex floor-mounted pumps with receiver and float switches; rated to pump minimum 210 deg F steam condensate with a minimum of 2 feet of NPSH.
				2. Receiver:

Floor mounted.

[**Close-grained cast iron] [Welded steel**].

Externally adjustable float switches.

Flanges for pump mounting.

Water-level gage and dial thermometer.

Pressure gage at pump discharge.

Bronze gate valves between receiver and pump discharge.

Lifting eyebolts.

Inlet vent and an overflow.

Cast-iron inlet strainer with self-cleaning bronze screen, dirt pocket, and cleanout plug on receiver inlet.

* + - * 1. Pumps:

Centrifugal, two stage, close coupled.

Vertical design, permanently aligned, and bronze fitted.

Axial-flow first-stage bronze impeller.

Enclosed second-stage bronze impeller with replaceable bronze case rings.

Stainless-steel shafts.

Mechanical seals rated at 250 deg F.

Rated to operate with a minimum of 2 feet of NPSH.

Mounted on receiver flanges.

* + - * 1. Motor:

Default motor characteristics are specified in Section 230513 "Common Motor Requirements for HVAC Equipment."

Comply with NEMA designation, temperature rating, service factor, and efficiency requirements for motors specified in Section 230513 "Common Motor Requirements for HVAC Equipment."

Verify enclosure types with manufacturer of specified equipment. Delete "Enclosure" subparagraph below if included in schedule on Drawings or in "Capacities and Characteristics" paragraph.

Enclosure: [**Open, dripproof] [Totally enclosed, fan cooled] [Totally enclosed, air over] [Open, externally ventilated] [Totally enclosed, nonventilated] [Severe duty] [Explosion proof] [Dust-ignition-proof machine**].

Retain "Enclosure Materials," "Motor Bearings," "Unusual Service Conditions," "Efficiency," "NEMA Design," and "Service Factor" subparagraphs below if options are available from pump manufacturers and are different from default requirements specified in Section 230513 "Common Motor Requirements for HVAC Equipment." Consider each subparagraph and retain only those that vary from default requirements.

Enclosure Materials: [**Cast iron] [Cast aluminum] [Rolled steel**].

Permanently lubricated ball bearings are available up through 5 hp. Larger motors have grease-lubricated ball bearings.

Motor Bearings: [**Permanently lubricated] [Grease-lubricated**] ball bearings.

Unusual Service Conditions:

Ambient Temperature: <**Insert deg C**>.

Altitude: <**Insert feet**> above sea level.

High humidity.

<**Insert conditions**>.

Efficiency: Premium efficient.

NEMA Design: <**Insert designation**>.

Service Factor: <**Insert value**>.

* + - * 1. Control Panel:

Factory wired between pumps and float switches, for single external electrical connection.

Provide fused, control-power transformer if voltage exceeds 230 V ac.

NEMA 250, [**Type 1] [Type 3] [Type 12] <Insert type**> enclosure with hinged door and grounding lug, mounted on pump.

Motor controller for each pump.

Electrical pump alternator to operate pumps in lead-lag sequence and allow both pumps to operate on receiver high level.

Manual lead-lag control to override electrical pump alternator and manually select the lead pump.

Momentary-contact "TEST" push button on cover for each pump.

Numbered terminal strip.

Disconnect switch.

If Project has more than one type or configuration of large duplex floor-mounted pump, delete "Capacities and Characteristics" paragraph below and schedule pumps on Drawings.

* + - * 1. Capacities and Characteristics:

Unit Total Capacity: <**Insert sq. ft. EDR**>.

Capacity, Each Pump:

Flow: <**Insert gpm**>.

Discharge Head: <**Insert psig**>.

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

Speed: <**Insert rpm**>.

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

Receiver:

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

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

Height to Inlet: <**Insert inches**>.

Electrical Characteristics:

Volts: [**120] [208] [230] [240] [480] <Insert value**>.

Phase: [**Single] [Three**].

Hertz: 60.

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

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

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

* + - 1. SINGLE-STAGE, CENTRIFUGAL PUMPS WITH ELEVATED RECEIVER

Retain this article for large pumps with elevated receiver and with approximately 150,000-sq. ft. EDR (10 545-kW) maximum capacity and up to 75-psig (520-kPa) discharge pressure.

* + - * 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

ITT Corporation.

Skidmore Pump.

Spirax Sarco Limited.

Approved equivalent.

* + - * 1. Description: Factory-fabricated, packaged, electric-driven pumps; with receiver, pumps, controls, and accessories suitable for operation with steam condensate.

Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

ASME Compliance: Fabricate and label steam condensate receivers to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.

* + - * 1. Configuration: [**Simplex] [Duplex**] floor-mounted pump with elevated receiver, float switches, and connecting piping; rated to pump 212 deg F steam condensate.
				2. Receiver:

Mounted on fabricated-steel supports.

[**Close-grained cast iron] [Welded steel**].

Externally adjustable float switches.

Water-level gage and dial thermometer.

Pressure gage at pump discharge.

Bronze isolation valves between receiver and pumps.

Lifting eyebolts.

Inlet cascade baffle and convex heads.

Cast-iron inlet strainer with self-cleaning bronze screen, dirt pocket, and cleanout plug on receiver inlet.

* + - * 1. Pumps:

Centrifugal, close coupled.

Permanently aligned.

Bronze fitted with enclosed bronze impellers.

Replaceable bronze case rings.

Stainless-steel shafts.

Mechanical seals rated at 250 deg F.

Mounted on base below receiver.

Rated to operate with a minimum of 2 feet of NPSH.

* + - * 1. Motor:

Default motor characteristics are specified in Section 230513 "Common Motor Requirements for HVAC Equipment."

Comply with NEMA designation, temperature rating, service factor, and efficiency requirements for motors specified in Section 230513 "Common Motor Requirements for HVAC Equipment."

Verify enclosure types with manufacturer of specified equipment. Delete "Enclosure" subparagraph below if included in schedule on Drawings or in "Capacities and Characteristics" paragraph.

Enclosure: [**Open, dripproof] [Totally enclosed, fan cooled] [Totally enclosed, air over] [Open, externally ventilated] [Totally enclosed, nonventilated] [Severe duty] [Explosion proof] [Dust-ignition-proof machine**].

Retain "Enclosure Materials," "Motor Bearings," "Unusual Service Conditions," "Efficiency," "NEMA Design," and "Service Factor" subparagraphs below if options are available from pump manufacturers and are different from default requirements specified in Section 230513 "Common Motor Requirements for HVAC Equipment." Consider each subparagraph and retain only those that vary from default requirements.

Enclosure Materials: [**Cast iron] [Cast aluminum] [Rolled steel**].

Permanently lubricated ball bearings are available up through 5 hp. Larger motors have grease-lubricated ball bearings.

Motor Bearings: [**Permanently lubricated] [Grease-lubricated**] ball bearings.

Unusual Service Conditions:

Ambient Temperature: <**Insert deg C**>.

Altitude: <**Insert feet**> above sea level.

High humidity.

<**Insert conditions**>.

Efficiency: Premium efficient.

NEMA Design: <Insert designation>.

Service Factor: <**Insert value**>.

Retain "Pipe," "Fittings NPS 2 (DN 50) and Smaller," and "Fittings NPS 2-1/2 (DN 65) and Larger" paragraphs below for duplex pumps or for simplex pumps with receiver.

* + - * 1. Pipe: ASTM A53, Type S, Grade B or ASTM A106; Schedule 80; seamless steel.
				2. Fittings NPS 2 and Smaller: ASME B16.1, Class 125 cast iron, threaded.
				3. Fittings NPS 2-1/2 and Larger: ASTM A234, steel, for welded connections.
				4. Control Panel:

Factory wired between pumps and float switches, for single external electrical connection.

Provide fused, control-power transformer if voltage exceeds 230 V ac.

NEMA 250, [**Type 1] [Type 3] [Type 12**] <**Insert type**> enclosure with hinged door and grounding lug, mounted on pump.

Motor controller for each pump.

Retain first two subparagraphs below for duplex units.

Electrical pump alternator to operate pumps in lead-lag sequence and allow both pumps to operate on receiver high level.

Manual lead-lag control to override electrical pump alternator and manually select the lead pump.

Momentary-contact "TEST" push button on cover for each pump.

Numbered terminal strip.

Disconnect switch.

If Project has more than one type or configuration of large floor-mounted pump with elevated receiver, delete "Capacities and Characteristics" paragraph below and schedule pumps on Drawings.

* + - * 1. Capacities and Characteristics:

Unit Total Capacity: <**Insert sq. ft. EDR**>.

Capacity, Each Pump:

Flow: <**Insert gpm**.>

Discharge Head: <**Insert psig**>.

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

Speed: <**Insert rpm**>.

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

Receiver:

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

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

Height to Inlet: <**Insert inches**>.

Electrical Characteristics:

Volts: [**120] [208] [230] [240] [480] <Insert value**>.

Phase: [**Single] [Three**].

Hertz: 60.

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

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

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

* + - 1. VERTICAL, WET-PIT-MOUNTED DUPLEX PUMPS

Coordinate basin dimensions, inlet size, and location on Drawings.

* + - * 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

ITT Corporation.

Roth Pump Company.

Skidmore Pump.

Approved equivalent.

* + - * 1. Description: Factory-fabricated, packaged, electric-driven pumps; with controls and accessories suitable for operation with steam condensate.

Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

* + - * 1. Configuration: Duplex pump with basin and float switches; rated to pump 200 deg F steam condensate.
				2. Basin: Cast iron, with hub-type inlets.

Cast-iron inlet strainer with vertical self-cleaning bronze screen and large dirt pocket.

Discharge pressure gages.

Retain "Anchor Flange" subparagraph below where required to anchor basin to concrete slab if there is a ground-water problem.

Anchor Flange: Cast iron, attached to basin, in location and of size required to anchor basin to concrete slab.

* + - * 1. Basin Cover: Cast-iron or steel cover for each pump with gasketed openings for access to pumps, pump shafts, control rods, discharge piping, and vent connections.
				2. Pumps:

Vertical, wet-pit mounted, flexible coupled, and suspended.

Cast-iron casing with open inlet.

Stainless-steel shaft with oil-lubricated, bronze, intermediate sleeve bearings; 48-inch maximum intervals where basin depth is more than 48 inches; and grease-lubricated, ball-type, thrust bearings.

Shaft Couplings: Flexible, capable of absorbing vibration.

Impeller: Bronze

Mechanical seals rated at 250 deg F, with carbon rotating ring bearing on a ceramic seat held by a stainless-steel spring and enclosed by a flexible bellows and gasket.

* + - * 1. Motors:

Vertically mounted on cast-iron pedestal.

Default motor characteristics are specified in Section 230513 "Common Motor Requirements for HVAC Equipment."

Comply with NEMA designation, temperature rating, service factor, and efficiency requirements for motors specified in Section 230513 "Common Motor Requirements for HVAC Equipment."

Verify enclosure types with manufacturer of specified equipment. Delete "Enclosure" subparagraph below if included in schedule on Drawings or in "Capacities and Characteristics" paragraph.

Enclosure: [**Open, dripproof] [Totally enclosed, fan cooled] [Totally enclosed, air over] [Open, externally ventilated] [Totally enclosed, nonventilated] [Severe duty] [Explosion proof] [Dust-ignition-proof machine**].

Retain "Enclosure Materials," "Motor Bearings," "Unusual Service Conditions," "Efficiency," "NEMA Design," and "Service Factor" subparagraphs below if options are available from pump manufacturers and are different from default requirements specified in Section 230513 "Common Motor Requirements for HVAC Equipment." Consider each subparagraph and retain only those that vary from default requirements.

Enclosure Materials: [**Cast iron] [Cast aluminum] [Rolled steel**].

Permanently lubricated ball bearings are available up through 5 hp. Larger motors have grease-lubricated ball bearings.

Motor Bearings: [**Permanently lubricated] [Grease-lubricated**] ball bearings.

Unusual Service Conditions:

Ambient Temperature: <**Insert deg C**>.

Altitude: <**Insert feet**> above sea level.

High humidity.

<**Insert conditions**>.

Efficiency: Premium efficient.

NEMA Design: <**Insert designation**>.

Service Factor: <**Insert value**>.

* + - * 1. Pump Discharge Piping: Manufacturer's standard steel or bronze pipe unless otherwise indicated.
				2. Control Panel:

Factory wired between pumps and float switches, for single external electrical connection.

Provide fused, control-power transformer if voltage exceeds 230 V ac.

NEMA 250, [**Type 1] [Type 3] [Type 12] <Insert type**> enclosure with hinged door and grounding lug, mounted on pump.

Motor controller for each pump.

Electrical pump alternator to operate pumps in lead-lag sequence and allow both pumps to operate on receiver high level.

Manual lead-lag control to override electrical pump alternator and manually select the lead pump.

Momentary-contact "TEST" push button on cover for each pump.

Numbered terminal strip.

Disconnect switch.

If Project has more than one type or configuration of wet-pit-mounted duplex pump, delete "Capacities and Characteristics" paragraph below and schedule pumps on Drawings.

* + - * 1. Capacities and Characteristics:

Unit Total Capacity: <**Insert sq. ft. EDR**>.

Capacity, Each Pump:

Flow: <**Insert gpm**>.

Discharge Head: <**Insert psig**>.

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

Speed: <**Insert rpm**>.

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

Underground Basin:

Diameter: <**Insert inches**>.

Depth: <**Insert inches**>.

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

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

Electrical Characteristics:

Volts: [**120] [208] [230] [480] <Insert value**>.

Phase: [**Single] [Three**].

Hertz: 60.

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

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

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

* + - 1. PRESSURE-POWERED PUMPS

Steam, compressed air, or other operating medium under pressure is required for these pumps.

* + - * 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Armstrong Fluid Handling.

Bestobell Steam Traps.

Kadant, Inc.

Nicholson Steam Trap; a Division of Circor International, Inc.

Spence Engineering Company, Inc.

Spirax Sarco Limited.

Approved equivalent.

* + - * 1. Description: Factory-fabricated, pressure-powered pumps with mechanical controls, valves, piping connections, and accessories suitable for pumping steam condensate using [**steam] [compressed air**].

Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

ASME Compliance: Fabricate and label steam condensate receivers to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.

* + - * 1. Configuration: [**Simplex] [Duplex**] pump with float-operated valve control.

Pump Body: [**Cast iron] [Welded steel**], ASME rated to 125 psig.

Piping Connections: Threaded; for steam condensate, operating medium, vent, and indicated accessories.

Level Gage: Glass site gage with shutoff cocks.

Valves: Manufacturer's standard check valves on inlet and outlet.

Internal Parts: Stainless-steel float, springs, and actuating mechanism.

Valve Seals: Replaceable from exterior.

Retain "Receiver" paragraph below for pumps with receiver.

* + - * 1. Receiver:

Factory mounted on steel supports.

[**Cast iron] [Welded steel] [Cast 316 stainless steel**].

Threaded piping connections.

Water-level gage and dial thermometer.

Pressure gage at pump discharge.

Bronze fitting isolation valve between pump and receiver.

Lifting eyebolts.

Inlet vent and an overflow.

Cast-iron inlet strainer with vertical self-cleaning bronze screen and large dirt pocket.

Retain "Pipe" and "Fittings" paragraphs below for duplex pumps or for simplex pumps with receiver.

* + - * 1. Pipe: ASTM A53, Type S, Grade B or ASTM A106; Schedule 80; seamless steel.
				2. Fittings: ASME B16.1, Class 125 cast iron, threaded.

If Project has more than one type or configuration of pressure-powered steam condensate pump, delete "Capacities and Characteristics" paragraph below and schedule pumps on Drawings.

* + - * 1. Capacities and Characteristics:

Unit Total Capacity: <**Insert sq. ft. EDR**>.

Capacity, Each Pump:

Flow: <**Insert gpm**>.

Discharge Head: <**Insert psig**>.

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

Retain "Operating Steam Pressure" and "Steam Consumption Rate" subparagraphs below for steam-powered pumps.

Operating Steam Pressure: <**Insert psig**>.

Steam Consumption Rate: <**Insert lb/1000 lb**> of steam condensate.

Retain "Operating Compressed-Air Pressure" and "Compressed-Air Consumption Rate" subparagraphs below for compressed-air powered pumps.

Operating Compressed-Air Pressure: <**Insert psig**>.

Compressed-Air Consumption Rate: <**Insert cu. ft./1000 lb**> of steam condensate.

Receiver:

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

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

Height to Inlet: <**Insert inches**>.

1. EXECUTION
	* + 1. EXAMINATION
				1. Examine equipment foundations and anchor-bolt locations for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
				2. Examine roughing-in for piping systems to verify actual locations of piping connections before pump installation.
				3. Proceed with installation only after unsatisfactory conditions have been corrected.
			2. INSTALLATION

Delete first paragraph below for pressure-powered steam condensate pumps.

* + - * 1. Install pumps according to ANSI/HI Standards 1.1-1.2, 1.3, and 1.4.
				2. Install pumps to provide access for periodic maintenance including removing motors, impellers, couplings, and accessories.
				3. Support pumps and piping separately so piping is not supported by pumps.
				4. Install thermometers and pressure gages.
				5. Equipment Mounting:

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

Install 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 if vibration isolation is required. 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 230548 "Vibration and Seismic Controls for HVAC."

Comply with requirements for vibration isolation devices specified in Section 230548.13 "Vibration Controls for HVAC."

* + - 1. CONNECTIONS

Coordinate piping 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 232213 "Steam and Condensate Heating Piping" and Section 232216 "Steam and Condensate Heating Piping Specialties."
				2. Where installing piping adjacent to machine, allow space for service and maintenance.

Retain first paragraph for compressed-air powered pumps.

* + - * 1. Install compressed-air supply for pressure-powered pumps as required in Section 221513 "General-Service Compressed-Air Piping."

Coordinate first paragraph below with Section 230923 "Direct Digital Control (DDC) System for HVAC" for controls to provide sufficient back pressure during low-load operations.

* + - * 1. Install a globe and check valve and pressure gage before inlet of each pump and a gate and check valve at pump outlet.
				2. Pipe drain to nearest floor drain for overflow and drain piping connections.
				3. Install full-size vent piping to outdoors, terminating in 180-degree elbow at point above highest steam system connection or as indicated.
				4. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."
				5. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
			1. STARTUP SERVICE
				1. [**Engage a Company Field Advisor to perform] [Perform**] startup service.

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

Clean strainers.

Set steam condensate pump controls.

Set pump controls for automatic start, stop, and alarm operation.

Perform the following preventive maintenance operations and checks before starting:

Set float switches to operate at proper levels.

Set throttling valves on pump discharge for specified flow.

Check motors for proper rotation.

Test pump controls and demonstrate compliance with requirements.

Replace damaged or malfunctioning pump controls and equipment.

Verify that pump controls are correct for required application.

Start steam condensate pumps according to manufacturer's written startup instructions.

* + - 1. DEMONSTRATION
				1. [**Engage a Company Field Advisor to train] [Train**] Director’s Representative’s maintenance personnel to adjust, operate, and maintain steam condensate pumps.

END OF SECTION 232223