SECTION 235300 - HEATING BOILER FEEDWATER EQUIPMENT

This Section specifies boiler feedwater pumps, feedwater equipment, deaerators, and packaged deaerators.

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

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

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

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

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

Deaerators.

Low-pressure boiler feed units.

High-pressure boiler feed units.

Receivers.

* + - * 1. Related Requirements:

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

Section 230513 - Common Motor Requirements for HVAC Equipment: Requirements for motors.

Section 230548 - Vibration and Seismic Controls for HVAC: Vibration isolators.

Section 232213 - Steam and Condensate Heating Piping: Requirements for connection to pumps.

Section 235213 - Electric Boilers: Boilers serving steam or hot water systems.

Section 235223 - Cast-Iron Boilers: Boilers serving steam or hot water systems.

Section 235233.13 - Finned Water-Tube Boilers: Boilers serving hot water systems.

Section 235233.14 - Flexible Water-Tube Boilers: Boilers serving steam or hot water systems.

Section 235233.16 - Steel Water-Tube Boilers: Boilers serving steam or hot water systems.

Section 235239 - Fire-Tube Boilers: Boilers serving steam or hot water systems.

Section 260583 - Wiring Connections: Requirements for electrical connections to pumps.

* + - 1. REFERENCE STANDARDS

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

* + - * 1. American Society of Mechanical Engineers:

ASME Boiler and Pressure Vessel Code, Section VIII, Division 1 - Rules for Construction of Pressure Vessels.

* + - * 1. National Electrical Manufacturers Association:

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

* + - 1. PREINSTALLATION MEETINGS
         1. Section 013000 - Administrative Requirements: Requirements for preinstallation meeting.
         2. Convene minimum [**one week**] [**<\_\_\_\_\_\_\_\_> weeks**] prior to commencing Work of this Section.
      2. SUBMITTALS

Only request submittals needed to verify compliance with Project requirements.

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

Submit manufacturer model number, dimensions, service sizes, and finishes.

Submit electrical characteristics and connection requirements.

Pumps:

Submit certified pump curves showing performance characteristics with pump and system operating point plotted.

Submit net positive suction head (NPSH) curve if applicable.

* + - * 1. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

Include separate Paragraphs for additional certifications.

* + - * 1. Manufacturer Instructions:

Submit detailed instructions on installation requirements, including storage and handling procedures.

Submit application, selection, and hookup configuration with pipe and accessory elevations.

Submit hanging and support requirements and recommendations.

* + - * 1. Source Quality-Control Submittals: Indicate results of [**shop**] [**factory**] tests and inspections.
        2. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.
        3. Qualifications Statements:

Coordinate following Subparagraphs with requirements specified in QUALIFICATIONS Article.

Submit qualifications for manufacturer and installer.

Submit manufacturer's approval of installer.

* + - * 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).
      1. MAINTENANCE MATERIAL SUBMITTALS
         1. Section 017716 – Contract Closeout000 - Execution and Closeout Requirements: Requirements for maintenance materials.
         2. Extra Stock Materials:

Furnish [**one set**] [**<\_\_\_\_\_\_\_\_> sets**] of mechanical seals for [**each pump**] [**<\_\_\_\_\_\_\_\_> pumps**].

* + - 1. QUALITY ASSURANCE

Include this Article to specify compliance with overall reference standards affecting products and installation included in this Section.

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

* + - * 1. Perform Work according to <**\_\_\_\_\_\_\_\_**> standards.

Include following Paragraph only when cost of acquiring specified standards is justified.

* + - * 1. Maintain <**\_\_\_\_\_\_\_\_**> [**copy**] [**copies**] of each standard affecting Work of this Section on Site.
      1. QUALIFICATIONS

Coordinate following Paragraphs with requirements specified in SUBMITTALS Article.

* + - * 1. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum [**three**] <**\_\_\_\_\_\_\_\_**> years' [**documented**] experience.
        2. Installer: Company specializing in performing Work of this Section with minimum [**three**] <**\_\_\_\_\_\_\_\_**> years' [**documented**] experience [**and approved by manufacturer**].
      1. DELIVERY, STORAGE, AND HANDLING
         1. Section 016500 – Materials and Equipment000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
         2. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
         3. Store materials according to manufacturer instructions.
         4. Protection:

Protect units from entry of foreign materials by using temporary caps and covers.

Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.

Provide additional protection according to manufacturer instructions.

* + - 1. EXISTING CONDITIONS
         1. Field Measurements:

Verify field measurements prior to fabrication.

Indicate field measurements on Shop Drawings.

* + - 1. WARRANTY

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

* + - * 1. Section 017716 – Contract Closeout000 - Execution and Closeout Requirements: Requirements for warranties.
        2. Furnish [**five**] <**\_\_\_\_\_\_\_\_**>-year manufacturer's warranty for pumps and package units.

1. PRODUCTS
   * + 1. DEAERATORS

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=12409) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Ambassador Heat Transfer Company](http://www.specagent.com/Lookup?uid=123457138942).

[Bryan Boilers; Bryan Steam LLC](http://www.specagent.com/Lookup?uid=123457138944).

[Cleaver-Brooks](http://www.specagent.com/Lookup?uid=123457138945).

[Cochrane, Inc](http://www.specagent.com/Lookup?uid=123457138946).

[Ecodyne Limited](http://www.specagent.com/Lookup?uid=123457138949).

[Industrial Steam](http://www.specagent.com/Lookup?uid=123457138951).

[Kansas City Deaerator Company](http://www.specagent.com/Lookup?uid=123457138953).

[Lockwood Products](http://www.specagent.com/Lookup?uid=123457138954).

[Nationwide Boiler Incorporated](http://www.specagent.com/Lookup?uid=123457138955).

[Precision Boilers](http://www.specagent.com/Lookup?uid=123457138961).

[PVI; A WATTS Brand](http://www.specagent.com/Lookup?uid=123457138956).

[Sellers Engineering Co](http://www.specagent.com/Lookup?uid=123457138957).

[Skidmore Pump](http://www.specagent.com/Lookup?uid=123457138958).

[Sterling Deaerator Co](http://www.specagent.com/Lookup?uid=123457138959).

[U.S. Deaerator Co](http://www.specagent.com/Lookup?uid=123457138960).

[York-Shipley Global; Division of Power Mechanical, Inc](http://www.specagent.com/Lookup?uid=123457138941).

Approved equivalent.

* + - * 1. [Manufacturers](http://www.specagent.com/LookUp/?ulid=8313&mf=04&src=wd):

Substitutions: **[As specified in Section 016000 - Product Requirements] [Not permitted**].

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

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

Furnish materials according to <**\_\_\_\_\_\_\_\_**> standards.

Insert descriptive specifications below to identify Project requirements and to eliminate conflicts with products specified above. Include configuration, size, material composition, and other properties needed to describe product.

* + - * 1. Description: Storage tank, surge tank, boiler feed pumps, transfer pumps, float switches, control panel, and accessories.
        2. Storage Tank:

Configuration: Horizontal.

Material:

Welded steel.

Comply with ASME Section VIII “Rules for Construction of Pressure Vessels” and furnish stamp.

Working Pressure: [**50**] [**125**] psig ([**350**] [**860**] kPa).

Access Size: 11 by 15 inches (275 by 375 mm).

Base:

Configuration: Elevated.

Material: Fabricated steel.

Accessories:

Inlet Water Regulating Valve:

Size: <**\_\_\_\_\_\_\_\_**> inch (<**\_\_\_\_\_\_\_\_**> mm).

Furnish external float control assembly.

Steam pressure-reducing valve.

Water Level Gage: Glass.

Manual and automatic vent valves.

Pressure relief valve.

Thermometer.

System pressure gage.

Pressure gage on each pump discharge.

Adjustable inlet spray valve.

Overflow drain.

Manual drain valve.

Bronze isolation valves [**and strainers**] between boiler feed pumps and tanks.

Double-pole HIGH LEVEL and LOW LEVEL alarm float switches.

* + - * 1. Surge Tank:

Configuration: Horizontal.

Material:

Welded steel.

Comply with ASME Section VIII “Rules for Construction of Pressure Vessels” , and furnish stamp.

Working Pressure: [**50**] [**125**] psig ([**350**] [**860**] kPa).

Access Size: 11 by 15 inches (275 by 375 mm).

Base:

Configuration: Elevated.

Material: Fabricated steel.

Accessories:

Inlet Water Regulating Valve:

Size: <**\_\_\_\_\_\_\_\_**> inch (<**\_\_\_\_\_\_\_\_**> mm).

Type: Float actuated.

Water Level Gage: Glass.

Pressure relief valve.

Thermometer.

System pressure gage.

Pressure gage on each pump discharge.

Inlet diffuser.

Overflow drain.

Manual drain valve.

Bronze isolation valves [**and strainers**] between transfer pumps and tank.

Double-pole LOW LEVEL alarm float switch.

* + - * 1. Pumps:

Description: Furnish pumps to operate at specified system fluid temperatures without vapor binding and cavitation, to operate in non-overloading condition in parallel or individual operation, and to operate within 25 percent of midpoint of published maximum efficiency curve.

Boiler Feed Pumps:

Type: [**One**] [**Two**] stage.

Configuration: [**Vertical**] [**Horizontal**].

Materials: Bronze fitted, with stainless-steel shaft and bronze impeller.

[**Case Ring: Bronze; renewable.**]

Shaft Seal: Mechanical.

Drive: Close coupled to 3,500-rpm motor.

Transfer Pumps:

Configuration: [**Vertical**] [**Horizontal**].

Materials: Bronze fitted, with stainless-steel shaft and enclosed bronze impeller.

Case Ring: Bronze; renewable.

Shaft Seal: Mechanical.

Drive: Close coupled to motor.

* + - * 1. Performance and Design Criteria:

Deaerator Tank and Surge Tank:

Capacity:

Minimum: <**\_\_\_\_\_\_\_\_**> gal (<**\_\_\_\_\_\_\_\_**> L).

Maximum: <**\_\_\_\_\_\_\_\_**> gal (<**\_\_\_\_\_\_\_\_**> L).

Size: <**\_\_\_\_\_\_\_\_**>-inch (<**\_\_\_\_\_\_\_\_**>-mm) diameter by <**\_\_\_\_\_\_\_\_**> inches ((<**\_\_\_\_\_\_\_\_**> mm))long.

Boiler Feed Pumps:

Number: [**One**] [**Two**] [**Three**].

Flow Rate Capacity of Each: <**\_\_\_\_\_\_\_\_**> gpm (<**\_\_\_\_\_\_\_\_**>L/s).

Head: <**\_\_\_\_\_\_\_\_**> psig (<**\_\_\_\_\_\_\_\_**> kPa).

Transfer Pumps:

Number: [**One**] [**Two**] [**Three**].

Flow Rate Capacity of Each: <**\_\_\_\_\_\_\_\_**> gpm (<**\_\_\_\_\_\_\_\_**> L/s).

Head: <**\_\_\_\_\_\_\_\_**> psig (<**\_\_\_\_\_\_\_\_**> kPa).

Makeup Water Supply Pressure: <**\_\_\_\_\_\_\_\_**> psig (<**\_\_\_\_\_\_\_\_**> kPa).

* + - 1. LOW-PRESSURE BOILER FEED UNITS

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=6128) Subject to compliance with requirements, provide products by one of the following:

[Domestic Pump](http://www.specagent.com/Lookup?uid=123457138933).

[Lockwood Products](http://www.specagent.com/Lookup?uid=123457138936).

[MEPCO, LLC](http://www.specagent.com/Lookup?uid=123457138939).

Approved equivalent.

* + - * 1. [Manufacturers](http://www.specagent.com/LookUp/?ulid=8314&mf=04&src=wd):

Substitutions: **[As specified in Section 016000 - Product Requirements] [Not permitted**].

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

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

Furnish materials according to <**\_\_\_\_\_\_\_\_**> standards.

Insert descriptive specifications below to identify Project requirements and to eliminate conflicts with products specified above. Include configuration, size, material composition, and other properties needed to describe product.

* + - * 1. Description: Receiver, inlet strainer, pumps, water makeup assembly, electric control components, and accessories.
        2. Condensate Receiver:

Material: Cast iron.

Furnish water level gage, dial thermometer, bronze isolation valves [**and strainer**] between pumps and receiver, and lifter eyebolts.

* + - * 1. Inlet Strainer:

Material: Cast iron.

Screen:

Type: Vertical, self-cleaning, and removable.

Material: Bronze.

Furnish dirt pocket.

Mounting: On receiver.

* + - * 1. Water Makeup Assembly:

Description: Level control switch and solenoid valve mounted on receiver.

Valve:

Packless, piston pilot-operated type, with cushioned closing and epoxy resin-molded waterproof coil.

Capacity: Equivalent to one boiler feed pump.

Furnish strainer and manual bypass.

* + - * 1. Pumps:

Configuration: [**Vertical**] [**Horizontal**].

Materials: Bronze fitted, with stainless-steel shaft and enclosed bronze impeller.

Case Ring: Bronze; renewable.

Shaft Seal: Mechanical.

Drive: Close coupled to motor.

* + - * 1. Performance and Design Criteria:

Receiver Capacity: <**\_\_\_\_\_\_\_\_**> gal (<**\_\_\_\_\_\_\_\_**> L).

Pumps:

Number: [**One**] [**Two**] [**Three**].

Flow Rate Capacity of Each: <**\_\_\_\_\_\_\_\_**> gpm (<**\_\_\_\_\_\_\_\_**> L/s).

Head: <**\_\_\_\_\_\_\_\_**> psig (<**\_\_\_\_\_\_\_\_**> kPa).

* + - 1. HIGH-PRESSURE BOILER FEED UNITS
         1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=6128) Subject to compliance with requirements, provide products by one of the following:

[Domestic Pump](http://www.specagent.com/Lookup?uid=123457138933).

[Lockwood Products](http://www.specagent.com/Lookup?uid=123457138936).

[MEPCO, LLC](http://www.specagent.com/Lookup?uid=123457138939).

Approved equivalent.

* + - * 1. [Manufacturers](http://www.specagent.com/LookUp/?ulid=8315&mf=04&src=wd):

Substitutions: [**As specified in Section 016000 - Product Requirements] [Not permitted**].

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

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

Furnish materials according to <**\_\_\_\_\_\_\_\_**> standards.

Insert descriptive specifications below to identify Project requirements and to eliminate conflicts with products specified above. Include configuration, size, material composition, and other properties needed to describe product.

* + - * 1. Description: Receiver, inlet strainer, pumps, water makeup assembly, electric controls, control cabinet, and accessories.
        2. Condensate Receiver:

Configuration: Horizontal.

Material: Welded steel.

Furnish cradles, inlet cascade baffle, and dished heads.

* + - * 1. Inlet Strainer:

Material: Cast iron.

Screen:

Type: Vertical, self-cleaning, and removable.

Material: Bronze.

Furnish dirt pocket.

Mounting: On receiver.

* + - * 1. Water Makeup Assembly:

Description: Level control switch and solenoid valve mounted on receiver.

Valve:

Packless, piston pilot-operated type, with cushioned closing and epoxy resin-molded waterproof coil.

Capacity: Equivalent to one boiler feed pump.

Furnish strainer and manual bypass.

Accessories:

Water level gage.

Dial thermometer.

LOW WATER cutoff switch.

Pressure gages on pump discharge.

Bronze isolation valves [**and strainer**] between pumps and receiver.

Two-stage pumps are most common type and are suitable for pressures up to approximately 300 psig (2 070 kPa). Some single-stage pumps are suitable to approximately 80 psig (550 kPa). If required operating pressure exceeds approximately 300 psig (2 070 kPa), consider using turbine pumps.

* + - * 1. Pumps:

Type: [**One**] [**Two**] stage.

Configuration: [**Vertical**] [**Horizontal**].

Materials: Bronze fitted, with stainless-steel shaft and bronze impeller.

[**Case Ring: Bronze; renewable.**]

Shaft Seal: Mechanical.

Drive: Close coupled to 3,500-rpm motor.

* + - * 1. Performance and Design Criteria:

Receiver:

Capacity: <**\_\_\_\_\_\_\_\_**> gal (<**\_\_\_\_\_\_\_\_**> L).

Size: <**\_\_\_\_\_\_\_\_**>-inch (<**\_\_\_\_\_\_\_\_**>-mm) diameter by <**\_\_\_\_\_\_\_\_**> inches (<**\_\_\_\_\_\_\_\_**> mm) long.

Pumps:

Number: [**One**] [**Two**] [**Three**].

Flow Rate Capacity of Each: <**\_\_\_\_\_\_\_\_**> gal (<**\_\_\_\_\_\_\_\_**> L/s).

Head: <**\_\_\_\_\_\_\_\_**> psig (<**\_\_\_\_\_\_\_\_**> kPa).

Makeup Water Supply Pressure: <**\_\_\_\_\_\_\_\_**> psig (<**\_\_\_\_\_\_\_\_**> kPa).

* + - 1. RECEIVERS
         1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=9748) Subject to compliance with requirements, [provide products by the following] [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:

Midwest Tank Company

Steel-Pro Incorporated

Approved equivalent.

* + - * 1. [Manufacturers](http://www.specagent.com/LookUp/?ulid=8189&mf=04&src=wd):

Substitutions: **[As specified in Section 016000 - Product Requirements] [Not permitted**].

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

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

Furnish materials according to <**\_\_\_\_\_\_\_\_**> standards.

Insert descriptive specifications below to identify Project requirements and to eliminate conflicts with products specified above. Include configuration, size, material composition, and other properties needed to describe product.

* + - * 1. Condensate Receiver:

Material: Cast iron.

Configuration: Furnish taps for mounting float switches, water level gage, thermometers, pump suction fittings, condensate inlet, and lifting eyebolts.

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

* + - * 1. Condensate Receiver:

Material:

Welded steel.

Comply with ASME Section VIII “Rules for Construction of Pressure Vessels” and furnish stamp.

Working Pressure: 125 psig (860 kPa).

Base:

Configuration: Elevated.

Material: Fabricated steel.

Configuration:

Horizontal.

Furnish taps for mounting float switches, water level gage, thermometers, pump suction fittings, condensate inlet, and lifting eyebolts.

* + - 1. OPERATION
         1. Electrical Characteristics:

As specified in Section 260583 - Wiring Connections.

[**<\_\_\_\_\_\_\_\_> hp (<\_\_\_\_\_\_\_\_> W)**] [**<\_\_\_\_\_\_\_\_> RLA**].

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

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

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

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

Motors: As specified in Section 230513 - Common Motor Requirements for HVAC Equipment.

Control Panel:

Factory mounted.

NEMA 250 “Enclosures for Electrical Equipment (1000 Volts Maximum)” Type [**1**] [**4**] <**\_\_\_\_\_\_\_\_**>.

UL listed.

Door: Piano hinged.

Combination magnetic starters with overload relays, circuit breakers, and cover interlock.

Single-point power connection and grounding lug, and fusible control circuit transformer.

Controls:

Selector LEAD-OFF-LAG switches.

Electric alternator with AUTO-OFF switch.

Alarm lights, acknowledge button, test buttons, and alarm horn.

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

Operation Sequences:

Transfer Pumps:

Energize upon HIGH LEVEL

Alternate after each cycle.

Energize second transfer pump upon failure of first pump and alarm.

Boiler Feed Pumps: From boiler controls as specified in Section [**235213 - Electric Boilers**] [**235223 - Cast-Iron Boilers**] [**235233.13 - Finned Water-Tube Boilers**] [**235233.16 - Steel Water-Tube Boilers**] [**235233.14 - Flexible Water-Tube Boilers**] [**235239 - Fire-Tube Boilers**] [**235213 - Electric Boilers**].

* + - 1. SOURCE QUALITY CONTROL
         1. Provide shop inspection and testing of completed assembly.

Include one or both of following Paragraphs to require Owner's inspection or witnessing of test at factory.

* + - * 1. Director’s Representative Inspection:

Make completed boiler feedwater equipment available for inspection at manufacturer's factory prior to packaging for shipment.

Notify Director’s Representative at least [**seven**] <**\_\_\_\_\_\_\_\_**> days before inspection is allowed.

* + - * 1. Director’s Representative Witnessing:

Allow witnessing of factory inspections and tests at manufacturer's test facility.

Notify Director’s Representative at least [**seven**] <**\_\_\_\_\_\_\_\_**> days before inspections and tests are scheduled.

Include following Paragraph if reliance on manufacturer's approved quality-control program is sufficient for Project requirements.

* + - * 1. Certificate of Compliance:

If manufacturer is approved by authorities having jurisdiction, submit certificate of compliance indicating Work performed at manufacturer's facility conforms to Contract Documents.

Specified shop tests are not required for Work performed by approved manufacturer.

1. EXECUTION
   * + 1. EXAMINATION
          1. Verify power requirements.
          2. Verify that boilers and water system are ready for installation.
       2. INSTALLATION
          1. According to manufacturer instructions.

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

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

* + - * 1. Installation Standards: Install Work according to <**\_\_\_\_\_\_\_\_**> standards.
      1. FIELD QUALITY CONTROL
         1. Inspect for proper alignment of base-mounted pumps.
         2. Manufacturer Services: Furnish services of manufacturer's representative experienced in installation of products furnished under this Section for not less than <**\_\_\_\_\_\_\_\_**> [**days**] [**hours**] on Site for installation, inspection, startup, field testing, and instructing Director’s Representative's personnel in operation and maintenance of equipment.
         3. Equipment Acceptance:

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

Make final adjustments to equipment under direction of manufacturer's representative.

* + - * 1. Furnish installation certificate from equipment manufacturer's representative attesting that equipment has been properly installed and is ready for startup and testing.
      1. DEMONSTRATION
         1. Section 017000 - Execution and Closeout Requirements: Requirements for demonstration and training.
         2. Demonstrate equipment startup, shutdown, routine maintenance, and emergency repair procedures to Director’s Representative's personnel.
      2. ATTACHMENTSSCHEDULES

When relying on separate schedules, tables, illustrations, or forms to specify product requirements, include list of each attachment. Include identical list of attachments in Project Manual table of contents.

Consider including schedule if more than one pump of each type is required. Coordinate equipment tags and abbreviations with project specific requirements.

Insert attachments following END OF SECTION. Consider following examples when developing Project schedule.

* + - * 1. Receivers Schedule:

Equipment Tag: <R-1>:

[**Manufacturer: <\_\_\_\_\_\_\_\_>.**]

[**Model: <\_\_\_\_\_\_\_\_>.**]

Location: <**\_\_\_\_\_\_\_\_**>.

Capacity: <**\_\_\_\_\_\_\_\_**>.

Diameter: <**\_\_\_\_\_\_\_\_**>.

Length: <**\_\_\_\_\_\_\_\_**>.

Equipment Tag: <R-2>:

[**Manufacturer: <\_\_\_\_\_\_\_\_>.**]

[**Model: <\_\_\_\_\_\_\_\_>.**]

Location: <**\_\_\_\_\_\_\_\_**>.

Capacity: <**\_\_\_\_\_\_\_\_**>.

Diameter: <**\_\_\_\_\_\_\_\_**>.

Length: <**\_\_\_\_\_\_\_\_**>.

* + - * 1. Feed Pumps Schedule:

Equipment Tag: <FP-1>:

[**Manufacturer: <\_\_\_\_\_\_\_\_>.**]

[**Model: <\_\_\_\_\_\_\_\_>.**]

Location: <**\_\_\_\_\_\_\_\_**>.

Service: <**\_\_\_\_\_\_\_\_**>.

Capacity: <**\_\_\_\_\_\_\_\_**>.

Head: <**\_\_\_\_\_\_\_\_**>.

Motor Size: <**\_\_\_\_\_\_\_\_**>.

Equipment Tag: <FP-2>:

[**Manufacturer: <\_\_\_\_\_\_\_\_>.**]

[**Model: <\_\_\_\_\_\_\_\_>.**]

Location: <**\_\_\_\_\_\_\_\_**>.

Service: <**\_\_\_\_\_\_\_\_**>.

Capacity: <**\_\_\_\_\_\_\_\_**>.

Head: <**\_\_\_\_\_\_\_\_**>.

Motor Size: <**\_\_\_\_\_\_\_\_**>.

END OF SECTION 235300