

SECTION 15520

HEATING BOILER FEEDWATER EQUIPMENT

**PART 1 –GENERAL**

1.1 SUMMARY

A. Section includes boiler feedwater pumps, de-aerators, accessories, controls and tanks.

1.2 REFERENCES

A. ASME (American Society of Mechanical Engineers) - Boiler and Pressure Vessel Codes, SEC VIII-D - Rules for Construction of Pressure Vessels.

B. NEMA 250 (National Electrical Manufacturers Association) - Enclosures for Electrical Equipment (1000 Volt Maximum).

1.3 PERFORMANCE REQUIREMENTS

A. Ensure pumps operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, and operate within 25 percent of midpoint of published maximum efficiency curve.

1.4 SUBMITTALS

A. Section 01330 - Submittal Procedures: Submittals procedures.

B. Product Data: Submit certified pump curves showing performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable. Include electrical characteristics and connection requirements. Submit also, manufacturer model number, dimensions, service sizes, and finishes.

C. Manufacturer's Installation Instructions: Submit application, selection, and hookup configuration with pipe and accessory elevations. Submit hanging and support requirements and recommendations.

D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.5 CLOSEOUT SUBMITTALS

A. Section 01770 - Execution Requirements: Closeout procedures.

B. Operation and Maintenance Data: Submit installation instructions, servicing requirements, assembly views, lubrication instructions, and replacement parts list.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with applicable codes and laws as well as the Stanford Facilities Design Guidelines and all Stanford University Contract documents.
- B. Maintain one copy of each document on site.

1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience

1.8 PRE-INSTALLATION MEETING

- A. Section 01330 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing Work of this section.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Accept units on site in factory packing. Inspect for damage.
- B. Protect units from entry of foreign materials by using temporary caps and covers.

1.10 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

1.11 WARRANTY

- A. Section 01770 - Execution Requirements: Product warranties and product bonds.
- B. Provide five year manufacturer warranty for pumps and package units.

1.12 EXTRA MATERIALS

- A. Section 01770 - Execution Requirements: Spare parts and maintenance products.

**PART 2 –PRODUCTS**

2.1 DEAERATORS

- A. Deaerator System: Consists of storage tank, surge tank, boiler feed pumps, transfer pumps, float switches, control panel and accessories.

B. Deaerator Storage Tank:

1. Horizontal welded steel, ASME SEC 8-D stamped construction
2. Working Pressure: 125 psig.
3. Manhole: 11 x 15 inch.
4. Base: Elevated, fabricated steel.

C. Storage Tank Accessories:

1.  $\frac{3}{4}$  inch inlet water regulating valve with external float control assembly.
2. Steam pressure-reducing valve.
3. Water level gage glass.
4. Manual and automatic vent valves.
5. Pressure relief valve.
6. Thermometer.
7. Pressure gage.
8. Adjustable inlet spray valve.
9. Overflow drain.
10. Manual drain valve.
11. Pressure gages on each pump discharge.
12. Bronze isolation valves and strainers between boiler feed pumps and tanks.
13. Double pole high and low level alarm float switches.

D. Surge Tank:

1. Horizontal welded steel, ASME SEC VIII-D stamped construction.
2. Working Pressure: 125 psig.
3. Manhole: 11 x 15 inch.
4. Base: Elevated, fabricated steel.

E. Surge Tank Accessories:

1.  $\frac{3}{4}$  inch float actuated inlet water regulating valve.
2. Water level gage, glass.
3. Pressure relief valve.
4. Thermometer
5. Pressure gage.
6. Inlet diffuser.
7. Overflow drain.
8. Manual drain valve.
9. Pressure gages on each pump discharge.
10. Bronze isolation valves and strainers between transfer pumps and tank.
11. Double pole low level alarm float switch.

F. Boiler Feed Pumps:

1. Pumps: Two stage, vertical or horizontal per design, bronze fitted with stainless steel shaft, bronze impeller, renewable bronze case ring, mechanical shaft seal, close coupled to 3500 rpm motor.

G. Transfer Pumps:

1. Pumps: Vertical or Horizontal per design, bronze fitted with stainless steel shaft, enclosed bronze impeller, renewable bronze case ring, mechanical shaft seal, close coupled to motor.

H. Control Cabinet:

1. NEMA 250 enclosure, UL listed, with piano hinged door, grounding lug terminal strip and fusible control circuit transformer.
2. Combination magnetic starters with overload relays, circuit breakers and cover interlock.
3. Electric alternator, 'Auto-Off' switch. a) Operate pumps on high level, alternating after each cycle. b) Operate second pump upon failure of first pump and alarm.
4. Selector 'lead-off-lag' switches.
5. Alarm lights, acknowledge button, test buttons, alarm horn.

I. Control Sequence:

1. Operate transfer pumps on high level alternating after each cycle. Operate second transfer pump upon failure of first pump and alarm.
2. Operate boiler feed pumps from boiler controls.

2.2 LOW PRESSURE BOILER FEED UNITS

A. Boiler Feed Units: Consisting of receiver, inlet strainer, pumps, water make-up assembly, electric control components and accessories.

B. Condensate Receiver: Cast iron, equipped with water level gage, dial thermometer, bronze isolation valves and strainer between pumps and receiver, and lifter eye bolts.

C. Inlet Strainer: Cast iron, with vertical self-cleaning easily removable bronze screen and large dirt pocket, mounted on receiver.

D. Water Make-up Assembly:

1. Consists of level control switch and solenoid valve mounted on receiver.
2. Valve:
  - a. Packless, piston pilot operated type with cushioned closing and epoxy resin molded waterproof coil.
  - b. Capacity: Equal to one boiler feed pump.
  - c. With strainer, and manual bypass.

E. Pumps:

1. Vertical or Horizontal per design, bronze fitted with stainless steel shaft, enclosed bronze impeller, renewable bronze case ring, mechanical shaft seal, close coupled to motor.

### 2.3 HIGH PRESSURE BOILER FEED UNITS

- A. Boiler Feed Units: Consist of receiver, inlet strainer, pumps, water make-up assembly, electric controls and NEMA 250 control cabinet, and accessories.
- B. Condensate Receiver: Horizontal welded steel construction with cradles, inlet cascade baffle and dished heads.
- C. Inlet Strainer: With self-cleaning bronze screen and large dirt pocket on receiver. Screen shall be vertically removable for cleaning.
- D. Water make-up Assembly:
  - 1. Consists of level control switch and solenoid valve mounted on receiver.
  - 2. Valve:
    - a. Packless, piston pilot operated type with cushioned closing and epoxy resin molded waterproof coil.
    - b. Capacity: Equal to one boiler feed pump.
    - c. With strainer, and manual bypass.
- E. Accessories:
  - 1. Water level gage
  - 2. Dial thermometer.
  - 3. Low water cut-off switch.
  - 4. Pressure gages on pump discharge.
  - 5. Bronze isolation valves and strainer between pumps and receiver.
- F. Pumps:
  - 1. Two stage, vertical or horizontal per design, bronze fitted with stainless steel shaft, bronze impeller, renewable bronze case ring, mechanical shaft seal, close coupled to 3500 rpm motor.

### 2.4 RECEIVERS

- A. Condensate Receiver: Horizontal welded steel, ASME SEC 8-D stamped construction for 125 psig working pressure with elevated, fabricated steel base and equipped with taps for mounting float switches, water level gage, thermometers, pump suction fittings, condensate inlet, and lifting eye bolts.

### 2.5 ELECTRICAL CHARACTERISTICS AND COMPONENTS

- A. Disconnect Switch: Factory mount in control panel

**PART 3 –EXECUTION**

3.1 EXAMINATION

- A. Section 01330 - Administrative Requirements: Coordination and project conditions.
- B. Verify power requirements.
- C. Verify boilers and water system are ready for installation.

3.2 FIELD QUALITY CONTROL

- A. Section 01770 - Execution Requirements: Testing, adjusting, and balancing.
- B. Inspect for alignment of base mounted pumps.

END OF SECTION