DIVISION 23

SECTION 23 53 13

BOILER FEEDWATER PUMPS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Related Sections:

1. Section 01 51 23 - Temporary Heating
2. Section 23 05 00 – Common Work Results For HVAC
3. Section 23 05 13 - Common Motor Requirements For HVAC Equipment
4. Section 23 05 23 - General Duty Valves For HVAC Piping
5. Section 23 05 29 - Hangers and Supports for HVAC Piping and Equipment
6. Section 23 05 53 - Identification for HVAC Piping and Equipment
7. Section 23 05 93 - Testing, Adjusting and Balancing for HVAC
8. Section 23 07 00 - HVAC Insulation
9. Section 23 09 13 - Instrumentation and Control for HVAC
10. Section 23 09 14 - Natural Gas and CO Gas Leak Detection Equipment
11. Section 23 09 23 - Control Dampers
12. Section 23 09 24 - Steam Flow Meters
13. Section 23 22 13 - Steam and Condensate Heating Piping
14. Section 23 25 19 - Water Treatment for Steam System Feedwater
15. Section 23 31 13 - Metal Ducts
16. Section 23 33 00 - Air Duct Accessories
17. Section 23 34 16 - Boiler Room Combustion Air Makeup And Ventilation System
18. Section 23 51 00 - Chimney Liner
19. Section 23 51 16 - Prefabricated Breechings and Accessories
20. Section 23 51 23 - Gas Vents
21. Section 23 52 39 - Firetube Boilers
22. Section 23 53 12 - Vacuum Condensate Pumps
23. Section 23 53 13 - Boiler Feedwater Pumps

1.02 SUMMARY

A. This Section includes requirement for provision of feedwater pumps and receiver sets.

1.03 DEFINITIONS

A. NPSH: Net-positive suction head.

1.04 SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacity, temperature and NPSH required, pump performance curves with selection points clearly indicated, and furnished specialties and accessories.

B. Shop Drawings: Include plans, elevations, sections, details, dimensions, weights, loadings, required clearances, method of field assembly, and attachments to other work.

1. Wiring Diagrams: Power, signal, and control wiring.
2. Detailed description of equipment anchorage devices on which certification is based and their installation requirements.

C. Operation and Maintenance Data: For feed water equipment to include in emergency, operation, and maintenance manuals.

1.05 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. ASME Compliance: ASME B31.1, "Power Piping," for systems more than 15 psig (104 kPa), ASME B31.9, "Building Services Piping," for systems equal to or less than 15 psig (104 kPa). Safety valves and pressure vessels shall bear the appropriate ASME label.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Preparation for Shipping: Clean flanges and exposed-metal surfaces and treat with anticorrosion compound after assembly and testing. Protect flanges, pipe openings, and nozzles with wooden flange covers or with screwed-in plugs

B. Store units in dry location.

C. Retain protective flange covers and machined-surface protective coatings during storage.

D. Protect bearings and couplings against damage from sand, grit, and other foreign matter.

E. Comply with manufacturer's written rigging instructions.

1.07 COORDINATION

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

PART 2 - PRODUCTS

2.01 FEEDWATER PUMPS AND RECEIVER SET

A. Basis-of-Design Product Manufacturer: Subject to compliance with requirements, provide feedwater pumps and condensate receiver sets as manufactured by BFS Industries Corporation or a comparable product by one of the following, or approved equal:

1. Aurora Pump; Pentair Pump Group.
2. Domestic Pump; a unit of ITT Fluid Technology.
3. MEPCO (Marshall Engineered Products Co.).
4. Skidmore.
5. Federal Pump Corp.

B. Furnish and install a prefabricated packaged boiler feedwater pumps and condensate receiver set as shown on drawings and specified herein. Boiler feedwater set shall include two main and one standby feed water pumps, associated suction and discharge piping, integral control panel and the receiver tank mounted on an integral steel floor stand with common 12-inches high concrete housekeeping pad. Suction and discharge piping shall be as shown on the drawings. Capacities of condensate receiver tank and pumps shall be as scheduled on the Contract Drawings. Provide one (1) BFS Ind. Model B2.56112BX-5B, or approved equal, Triplex Feedwater System with:

1. Provide three (3) pumps (1 is standby) to serve four (4) 300 BoHP low pressure steam boilers operating at 8 psig. Each pump shall be sized for the entire boiler plant with a discharge pressure at 40 psig. Refer to Subparagraph C., “Feedwater Pumps Control Sequence of Operation”, below, for pumps’ control sequence of operation.

2. Storage Tank: Size #12BX, 2,400 gallon, non-code welded steel receiver. Tank shall be 72” diameter by 120” straight length x 1/4" thick with dished heads. Tank complete with:
   a. (1) 2-inches dia. solenoid valve & float switch for cold water make-up.
   b. (1) 2.5 inches dia. make-up valve with 3-valve bypass with Y-strainer.
   c. (1) air gap funnel fitting for make-up water.
   d. (2) McDonnell Miller Model #63, or approved equal, level switches for high & low level alarm / pump cut-off switch.
   e. (1) water glass gauge with cocks.
   f. (1) thermometer, 50-300°F.
   g. (1) chemical injection quill with ½” process connection, stainless steel.
   h. The receiver tank shall contain all necessary openings, water level sight glasses with shutoff valves and 18-inches dia. flanged manhole with hinge in end of tank. The receiver shall be insulated with 3" thick R12.5 fiberglass blanket insulation and jacket. Jacket shall be fitted PVC with Velcro seams.
   i. Provide a scale pocket under receiver tank, equipped with gate valve and piped to spill over local floor drain.

3. Tank Stand: 66” high structural steel tank support stand, with pumps mounted beneath receiver tank.

4. Feedwater Pumps: (3) Mepco Corp., or approved equal, model #B2.561, 1-stage, bronze fitted, horizontal centrifugal pumps equipped with high temperature mechanical seals. Each pump shall have a capacity of 103 gpm @ 100-feet Total Discharge Head. Pumps shall be mounted on formed steel unit base and each close coupled to 5 HP, 208 volt, 60 hertz, 3-phase, 3500 rpm vertical, TEFC motor. Provide bed plate drain piping for feedwater pumps.

5. Pump Suction Piping: 3.0-inches dia. sch. 40 pump suction piping from common header with all necessary fittings and:

   a. (3) gate valves; 125# NPT, Powell Corp., or approved equal.
   b. (3) expansion couplings; Dresser Corp., or approved equal.
   c. (3) Y-type strainers; 125# NPT, Mueller Corp., or approved equal.

6. Pump Discharge Piping: 2-inches dia. sch. 40 pump discharge piping to 3-inches dia. header, with all necessary fittings and:

   a. (3) gate valves; 125# NPT, Powell Corp., or approved equal.
   b. (3) spring loaded check valves; 125# NPT, Powell Corp. or approved equal.
   c. (3) 4-1/2-inch dia. pressure gauges with cocks.
   d. (1) pressure switch, 5-100 psig with 2.5 psig fixed dead band, Mercoid DS Corp., or approved equal, (snap-type, Mercury-free).

7. Pump Recirculation Piping: individually piped with all necessary fittings, complete with:

   a. (3) gate valves; 125#, Powell Corp., or approved equal.
   b. (3) check valves; 125#, Powell Corp., or approved equal.
   c. (3) orifices, sized for 9 gpm min flow, 3/4-inches SST NPT.

8. Integral Control Panel: BFS Industries Model #T-18-208, or approved equal, in a NEMA #4 enclosure, complete with:

   a. (3) Magnetic across-the-line starters, each having: 3-phase protection, Lead-Off-Lag switches, disconnect switch with door interlock and external operator, fuse block with fuses, and running light
   b. (1) Control circuit transformer
   c. (1) Low water pump cut off circuit.
   d. (1) High/low level alarm system complete with high level light, low level light, common horn, and silencing switch.
   e. (1) Lead-lag system to start standby pump in the event of header pressure loss.
   f. (4) Dry auxiliary inputs from boilers; call for water.
   g. The entire control panel system, including all internal wiring, shall be Under-writers' Laboratories approved and labeled as specified under the classification of "Industrial Control Panels".

9. The feedwater system shall be completely packaged. Control panel shall be integrally mounted on stand and factory wired to motors.

C. Feedwater Pumps Control Sequence of Operation:

1. Up to two (2) pumps operating and one (1) pump stand-by.
2. One of the three pumps shall be selected manually to operate continuously at all times, selected as “Lead.”
3. One of the other two pumps which is selected for “Lag” shall be automatically cycled on as a backup if the pressure in the feedwater line falls below the low-pressure switch set point of 25 psig, (adj.). The differential pressure on the low-pressure switch shall be set to minimize frequent hunting of the backup pump.
4. The third pump shall be used for manual starting as a "standby" pump.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Before feedwater unit installation, examine roughing-in for concrete equipment bases, anchor-bolt sizes and locations, and piping and electrical connections to verify actual locations, sizes, and other conditions affecting feedwater unit performance, maintenance, and operations.

1. Final feed water unit locations indicated on Drawings are approximate. Determine exact locations before roughing-in for piping and electrical connections.
2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Install feedwater unit level on concrete base. Concrete base is specified in Division 23 Section "Common Work Results for HVAC," and concrete materials and installation requirements are specified in Division 03.

B. Vibration Isolation: Elastomeric isolator pads or mounts with a minimum static deflection of 0.25 inch (6.35 mm).

C. Install unit to permit access for maintenance.

D. Support piping independent of pumps.

E. Install base-mounted pumps on concrete bases with grouted base frames.

F. Install parts and accessories shipped loose.

3.03 CONNECTIONS

A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to machine to allow service and maintenance.

C. Connect makeup water piping with reduced-pressure backflow preventers.

D. Install overflow drain piping to nearest floor drain.

E. Install vents and terminate with elbow turned down.

3.04 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test and adjust components, assemblies, and equipment installations, including connections. Report results in writing.

B. Perform tests and inspections and prepare test reports.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and assist in testing.

C. Tests and Inspections:

1. Inspect field-assembled components, equipment installation, and piping and electrical connections for compliance with manufacturer's written instructions.
2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
3. Check bearing lubrication.
4. Verify proper motor rotation.
5. Start up service.
6. Report results in writing.

D. Remove and replace malfunctioning units and retest as specified above.

3.05 ADJUSTING

A. Adjust boiler water-level controls to properly stage unit.

B. Set field-adjustable, makeup and cooling-water controls.

3.06 CLEANING

A. Clean equipment internally; remove coatings applied for protection during shipping and storage, foreign material, and oily residue according to manufacturer's written instructions.

B. Clean strainers.

3.07 DEMONSTRATION

A. Engage a factory-authorized service representative to train NYCHA's maintenance personnel to adjust, operate, and maintain feedwater units.

END OF SECTION