SECTION 33 11 24

AWSS HP DI GATE VALVES

PART 1 GENERAL

1.1 DESCRIPTION

A. These Specifications specify the requirements for furnishing, testing, delivering and installing 3-inch to 20-inch high-pressure flanged ductile iron valves of various configurations for the City and County of San Francisco's (CCSF) Auxiliary Water Supply System (AWSS) where as shown on the Plans.

B. Valves specified herein shall be flanged, ductile iron body, single or double disc, bronze mounted, non-rising stem, suitable for vertical installation in underground service. Valves shall have an operating nut. Valves of 12-inch and larger shall have bypass valves as specified hereinafter.

C. Except as hereinafter specified or required to meet material, pressure and testing requirements, valves shall conform to the current AWWA Standard C500-86.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Section 33 11 23 Auxiliary Water Supply System (AWSS) Work

1.3 REFERENCES

See below requirements.

1.4 SUBMITTALS

A. The Contractor shall provide three copies of all test data for the valves, certified by the Manufacturer as to accuracy.

B. The Contractor shall provide from the valve Manufacturer five prints and one reproducible of valve drawings and gear operator drawings. Drawings shall show outside dimensions, cross-sections, material standards, weights, and complete parts list with parts numbers for ordering replacement parts, and complete maintenance instructions. They submittal drawings shall become the property of the City.

C. The Contractor shall submit three copies of the Manufacturer's certification of compliance.

1.5 QUALITY COTROL

A. Experience:

The Manufacturer of the valves shall have at least five (5) years experience in the manufacturer of ductile iron gate valves and of valves similar in type, size and pressure rating to these specifications.

B. Manufacturer's certification of compliance:

The Contractor shall furnish an affidavit certifying the following:

1. All materials of the component parts of the valves are as specified or are approved substitutions. Specifically list any substitutions which were approved by the City Representative.

2. All materials supplied have met the required tests for strength and composition according to their respective standards.

3. All valves have successfully passed the specified performance and hydrostatic tests.

C. Negotiations of minor differences:

The City reserves the right to negotiate minor differences in manufacture of the valves to be furnished. Any such revision shall not be valid unless in writing.

D. Quality and workmanship:

Castings shall be true to patterns, sound, smooth and free from all flaws, defects or imperfections of any kind which, in the judgment of the City Representative, may render them unfit for their intended use. All projections resulting from gates or risers shall be cut off and ground smooth with the surface of the casting.

No plugging, filling or welding of defects in castings will be allowed.

E. Guarantee:

All valves and appurtenant components furnished under these specifications shall be guaranteed by the Contractor against defects in design, materials or workmanship for a period of three (3) years from the date of delivery or two (2) year from the date the valve is put into service, whichever occurs sooner. If, during the guarantee period, any gate valve or appurtenant component furnished under this specification is found to fail, malfunction, or leak at gate seals or stem (after adjustment of the stem seal) because of inferior quality, faulty workmanship or improper handling during delivery, the Contractor shall immediately replace the valve or component to the satisfaction of the City Representative. Replacement shall be at the expense of the Contractor and shall include all labor and parts, as well as shipping, loading and unloading costs to or from the Manufacturer's facility. All such repaired or replaced work shall carry the same guarantee as the original work.

The City may test or inspect valves after delivery, either at the storage lot or installed in the field, at no costs to the Contractor. Should more than three (3) valves be found not in compliance with specifications in a similar manner, the City may reject the entire shipment as unacceptable. For a shipment or partial shipment so rejected, subsequent testing and inspection at the Contractor's request to prove conformance with specified requirements shall be at the Contractor's expense.

1.6 TESTING AND INSPECTION

The Manufacturer shall test the valves with bypass valves installed. Copies of all test data shall be certified by the Manufacturer and shall be submitted to the City Representative.

A. Hydrostatic Tests:

Separate seat and shell hydrostatic tests shall be performed on every valve furnished by the Contractor.

1. The shell test shall be performed with gate unseated. Hydrostatic test pressure shall be two times the design service pressure or 900 psig, whichever is greater. Pressure shall be maintained for 5 minutes, during which no leakage, sweating of water or other defects shall be shown.

2. Seat tests shall be performed separately on each side of the gate, with the gate seated and the bypass valve closed. Test pressure shall be maintained at 450 psig for 5 minutes minimum. If leakage is noted, the pressure shall be maintained for 12 minutes minimum. Leakage past the disc shall not exceed 1 ounce/hour/inch of nominal valve diameter.

B. Functional Tests:

Following the hydrostatic tests, each valve shall be fully opened and fully closed to verify smooth and satisfactory operation

1. The maximum torque required to open each valve from the closed position at an unbalanced pressure of 350 psig shall be measured and documented for each valve. Operating torque shall not exceed the limit specified hereinafter

2. The total number of turns required to open and to close each valve shall be counted and documented, and shall be as specified hereinafter.

1.7 DELIVERY, STORAGE AND HANDLING

All valves shall be mounted on non-returnable shipping pallets, with not more than 4000 pounds per pallet board. Each flange shall be protected and each valve opening closed with bolted-on plywood not less than 5/8-inch thick, or approved alternate closure. The Contractor shall provide shipping, unloading, and placement of the valves at the San Francisco Water Department Pipe Yard, San Francisco, CA, all at the Contractor's expense. Storage areas are expected to be outdoors. The Manufacturer shall state in writing if valves must be covered during storage.

PART 2 - PRODUCTS

2.1 SURFACE PREPARATION AND COATING WORK FOR HIGH-PRESSURE GATE VALVES

All sizes of gate valves to be installed as part of the AWSS facilities shall require the following surface preparation and coating work to be performed at the gate valve manufacturer's facility and/or at the contractor's facility. This includes gate valves obtained from the City, whether City-Furnished or purchased from the City. The contractor shall submit in a formal submittal referencing the valve's unique serial number, photographic documentation and written verification, that the following surface preparation and coating work has been performed for each gate valve a maximum of one (1) year from the date of valve installation:

The surface preparation for exterior surfaces shall be Near White Metal Abrasive Blast Cleaning per SSPC-SP12 / NACE 5 Surface Preparation and Cleaning of Steel and Other Hard Materials by High and Ultra-High Pressure Water Jetting Prior to Recoating. The coating material shall be Amerlock-2 as manufactured by Ameron International, or Carboguard-954HB as manufactured by Carboline Company, or an approved equal. The coating material shall be applied in minimum of two coats, at 7-8 mils per coat; the total dry film thickness shall be 14-16 mils. The prime coat shall be white. Topcoat for the valve actuator shall be red color. Topcoat for valve body shall be OSHA-blue, or as approved by the City Representative. Bronze materials shall not be coated. No coating shall be applied

over any bronze materials, stainless steel fasteners except for the wax tape and primer for the flanges, or any surfaces designed to move during the normal operation of the valve.

2.2 HIGH-PRESSURE GATE VALVES

At the CCSF's discretion, high-pressure ductile iron gate valves meeting the specifications may be obtained from the City's stock after submitting a request through the City Representative and furnishing either a check made out to the CCSF for the current gate valve replacement cost.

2.3 MATERIALS

A. Components shall be as specified below. ASTM and other standards shall be the most recent issue.

1. Cast ductile iron: ASTM A 536 or A 395.

   Tensile and yield stresses shall be 65,000 psi and 45,000 psi, respectively. Elongation may be 5% to 18% in 2-inch length, as determined appropriate by the valve Manufacturer for these service conditions.

2. Cast bronze trim (Not including stem): ASTM B62.

   All bronze in contact with water shall be "low zinc bronze" with maximum 7% zinc and 2% aluminum

3. Stainless Steel: ASTM A 276, AISI Type 304 or 316.

B. Components

1. Body, Bonnet, Disc and Stuffing Box shall be cast of ductile iron, as specified above. Manufacturer's standard stem seal in lieu of stuffing box will be considered.

2. Disc shall be either solid wedge or double disc with tapered or parallel seats, cast of ductile iron as described previously.

3. Valve stem shall be low zinc bronze, not more than 7% zinc and 2% aluminum. Bronze shall be not less than 60,000 psi tensile, 36,000 psi yield. Material to be recommended by the valve manufacturer with written approval by the City Representative.

4. Trim: Valves shall have resurfaceable disc seat rings and threaded, replaceable body seat rings. Disc ring, body ring, packing gland, disc bushing, backseat bushing, and other trim shall be bronze, ASTM B62.

5. Packing: Asbestos containing materials shall not be used.

6. Disc Guides: The AWWA C500 requirement for bronze disc guides on valves 16-inch and larger is not a requirement of this specification.

7. Gear Enclosure: Ductile iron, or cast iron of ASTM A 126 Grade B.

8. Bolts/Studs & Nuts: Fasteners shall be American standards, not metric. Fasteners for packing gland shall be bronze. Other exterior bolting such as for bonnet flange shall be Type 316 stainless steel.

2.4 DIMENSIONAL REQUIREMENTS

The table below lists major configuration requirements of the valves which are to be specified in detail hereinafter.

TABLE OF CONFIGURATIONS				
ITEM	PIPE DIAMETER	NO. OF TURNS	BYPASS VALVE	OPERATOR
LINE VALVES				
1	20-inch	267	4-inch	Gear with Operating Nut
2	16-inch	170	4-inch	Gear with Operating Nut
3	14-inch*	113	3-inch	Gear with Operating Nut
4	12-inch	70	3-inch	Gear with Operating Nut
5	10-inch	45	None	Operating Nut
6	8-inch	35	None	Operating Nut
BYPASS REQUIRED FOR LINE VALVES ABOVE				
7	4-inch	18	--	Operating Nut
8	3-inch	14	--	Operating Nut
Bypass valves shall conform to these specifications.				
* NOTE: The manufacturer may propose 16-inch valves in lieu of 14-inch if necessary. In such case, all configurations shall be that of a 16-inch valve.				

2.5 OPERATIONAL REQUIREMENTS

A. Pressure Rating: The valves shall be designed for a working pressure of not less than 450 psig (350 psig static plus an additional 100 psi allowance for water hammer shock pressure), and a hydrostatic test of not less than 750 psig.

B. Service: Fluid is cold water; normally clean. Valves are for a high pressure, emergency fire protection system. Emergency conditions may subject the valves to several days of sea water use, although it is expected that the valves would be flushed with clean water shortly after such use. Valves 12-inch and larger and their bypass valves will be installed in vaults. The 8-inch and 10-inch valves shall be designed for long-term burial in the ground.

C. Manufacturer's Standard Valve: Valves shall be modified from Manufacturer's standard Class 250, 300, or stronger valve. Modifications shall include, but are not limited to, material and thickness of body, bonnet, flanges and all other pressure parts as required to safely achieve test pressures herein specified. Modifications deemed advisable by the Manufacturer may be proposed. Valves shall be similar to Crane 3E, U.S. Pipe Series 7000, American-Darling 102, or an approved equal, as determined and approved by the City Representative.

D. Pipe Diameters: Diameters shown are nominal diameter of ductile iron pipe.

E. Flanges: Flange dimensions, drilling, and design pressure ratings shall conform to ANSI Standard B16.42 Class 300 Steel Flanges and/or Class 600 Steel flanges, flange class to be called out in the Drawings. Raised faces may be serrated but not grooved for 0-rings. Bolt holes shall be drilled and spot-faced on the back.

F. Operating Positions: All valves of this specification are to be designed for use with stems vertically upward.

G. Operating Nut: All valves, including those with motorized gear operators, shall have a 2-inch square operating nut facing upward.

H. Number of Turns: The valves shall open fully with counter-clockwise turns of the operating nut in the number specified in the preceding Table of Configurations, plus or minus 3 turns. In the open position, the disc shall not protrude into the water passageway (bore of the body seat ring).

No exception will be considered to the number of turns specified.

I. Torque: Torque required to open the valves shall not exceed 250 ft-lb at an unbalanced pressure of 350 psig.

J. Gear Operator: Valves of 12-inch and larger shall be furnished with fully enclosed gear operator

K. Identification: Each valve body or bonnet shall have cast on it the Manufacturer's name, size, working pressure rating, year of manufacture, and "DI" or Ductile." In addition, "SF - AWSS" shall be cast onto each body or bonnet in letters at least 1-inch high. Each valve shall also carry a unique identifying number which may be inscribed or cast into the body or bonnet, embossed on a stainless steel tag firmly secured to the bonnet flange, or other permanent method.

PART 3 - EXECUTION

A. Refer to Specification Section 33 11 23 – AWSS Work.

END OF SECTION