# SECTION 400570 GLOBE PATTERN CONTROL VALVES (AWWA C530)

## PART 1 - GENERAL

### A. Description

This section includes materials and installation of a globe pattern diaphragm-actuated control valve acting as a flow control valve.

### B. Related Work Specified Elsewhere

1. Painting and Coating: 099000.
2. Fusion-Bonded Epoxy Linings and Coatings: 099761.
3. Pressure Testing of Piping: 400515.
4. Manual, Check, and Process Valves: 400520.

### C. Submittals

1. Submit shop drawings in accordance with the General Conditions and Section 013300.
2. Submit dimensional drawings for each size and type of valve provided.
3. Provide listing of materials of construction, with ASTM reference and grade. Show valve lining and paint primer coating with coating manufacturer and coating system number or designation.
4. Submit electrical drawings, showing wire and terminal connections, for valves that are electrically controlled and for associated electronic sensors and equipment.
5. Submit manufacturer's recommended maximum operating pressure and maximum recommended flow.

### D. Manufacturers' Services

Provide equipment manufacturers' services at the jobsite for the minimum labor days listed below, travel time excluded:

One labor day to check the installation and advise during start-up, testing, and adjustment of the valves and instruct the Owner's personnel in the operation and maintenance of the valves.

PART 2 - MATERIALS

A. Manufacturers

1. Diaphragm-actuated control valves shall be manufactured by Cla-Val Company, Newport Beach, California; Bermad, Anaheim, California; Watts Automatic Control Valve, Houston, Texas; or equal.

B. Valve Design--Diaphragm Actuated

1. Valves shall be hydraulically actuated diaphragm type complying with AWWA C530 except as modified herein. The body shall contain a removable seat insert. A resilient rubber disc shall form a drip-tight seal with the valve seat when pressure is applied above the diaphragm. The diaphragm assembly shall form a sealed chamber in the upper portion of the valve, separating operating pressure from line pressure.

2. All major components of the pilot control system shall be manufactured by the same company that manufactures the main valve. The main valve diaphragm shall either be vulcanized at the stem hole to ensure against wicking of the product within the diaphragm or the diaphragm shall utilize an FDA-approved nonwicking material and an elastomeric insert seal at the stem hole. The diaphragm shall not be used as a seating surface.

3. Provide guides at both ends of the stem or provide a center-guided stem. For design utilizing guides at both ends of the stem, provide a bearing in the valve cover and an integral bearing in the valve seat. Provide valve position indicator. Repairs and modifications other than the replacement of the main valve body shall be possible without removing the main valve from the line.

C. Materials of Construction--Diaphragm-Actuated Valves

1. Materials of construction for Class 125 and Class 250 valves larger than 1 inch in size shall be as follows:

| Item | Material |
|---|---|
| Main valve body and cover | Ductile iron, ASTM A536, Grade 65-45-12 |
| Main valve trim, seat, disc guide, and cover bearings | Type 303 stainless steel, ASTM A276, A 351, or A 743 |
| Diaphragm washer and disc retainer | Type 303 stainless steel |
| Pilot control system | Bronze per paragraph 3 below with Type 303 stainless steel trim |
| Piping and tubing | Copper (ASTM B75 and B88) |

| Item | Material |
|---|---|
| Stem sleeves | Delrin |
| Elastomers | Buna-N |
| Cover screws, caps, and nuts and bolts | Type 316 stainless steel |

2. Bronze in contact with water shall have the following chemical characteristics:

| Constituent | Content |
|---|---|
| Zinc | 7% maximum |
| Aluminum | 2% maximum |
| Lead | 8% maximum |
| Copper + Nickel + Silicon | 83% minimum |

D. Valve End Connections

1. Flanges for ductile-iron valves shall be ductile iron, same grade as the valve. Class 150 flanges shall comply with ASME B16.42, Class 150. Flanges shall be flat face.

2. Threaded ends shall comply with ASME B1.20.1.

3. Do not provide raised-face mating flanges on the connecting piping.

E. Limit Switches

Limit switches shall be double pole, double throw in a NEMA 4 enclosure. Voltage shall be 120 volts, 60 hertz, a-c.

F. Valves

1. Type 1315--Electrically Controlled Flow Control Valves, Class 150:

a. The electronic flow control valve shall consist of a piston or diaphragm valve with a dual solenoid pilot system and a positioning transmitter for signal feedback. Control shall be by an electronic control system that continuously compares system conditions to the programmed set point, electronic control system shall be Cla-Val 131VC or equal.

b. Equip the control valve with a dual solenoid pilot system. The solenoids shall respond to valve control commands from the electronic valve controller and, using system pressure, move the stem to the desired position. The dual solenoid pilot system shall function as follows:

(1) The solenoid used to close the main valve shall be a normally closed solenoid. When the solenoid is energized, the main valve shall close.

(2) The solenoid used to open the main valve shall be a normally closed solenoid. When the solenoid is energized, the main valve shall open.

c. Solenoids shall operate with 120-volt a-c. Solenoid arrangement shall be Cla-Val 131 electronic control system, or equal. The valve shall also be equipped with limit switches to provide electrical indication of open and closed position, rated for 120-volt a-c, 5 amperes. Provide ball valves to bypass the two solenoid valves in order to facilitate manual control of main valve. Provide isolation valves for each pilot system.

d. The solid-state valve position transmitter shall operate by a potentiometer connected to the stem of the main valve. Transmitter shall operate with120-volt a-c supply. Provide NEMA 4 enclosure containing the position transmitter electronics to communicate valve position to the electronic flow controller via a 4- to 20-mA signal, Cla-Val Model X117C or equal.

e. The valve and position transmitter when connected to the electronic flow controller, flowmeter, and corresponding flow signal transmitter shall provide a complete flow control loop (see instrumentation drawings.)

f. Valve shall be Cla-Val Hytrol 100, Ross Model 42WR, Watts 113-40, or equal.

G. Bolts and Nuts for Flanged Valves

1. Bolts and nuts for flanged valves shall be as specified for the piping to which the valves are connected.

2. Provide washers for each nut. Washers shall be of the same material as the nuts.

H. Gaskets for Flanges

Gaskets for flanged end valves shall be as specified for the piping to which the valve is connected.

I. Spare Parts

1. Provide the following spare parts for each valve:

| Quantity | Description |
|---|---|
| 1 | Diaphragm, disc, and spacer washer set (for diaphragm-actuated valves). |
| 1 | Strainer. |
| 2 | Isolation valves for each valve pilot system. |
| 1 | Solenoid control valve for each solenoid-controlled valve. |
| 1 | Limit switch for each valve having a limit switch assembly. |
| 1 | Throttling valve for opening/closing speed control. |
| 1 | Rebuild kit. |

2. Pack spare parts in a wooden box and label with parts description and vendor name, address, and telephone number.

PART 3 - EXECUTION

A. Shipment and Storage

1. Ship and deliver valves in accordance with AWWA C530, Section 6 and as follows.

2. Provide flanged openings with metal closures at least 3/16-inch thick, with elastomer gaskets and at least four full-diameter bolts. Install closures at the place of valve manufacture prior to shipping. For studded openings, use all the nuts needed for the intended service to secure closures.

3. Provide threaded openings with steel caps or solid-shank steel plugs. Do not use nonmetallic (such as plastic) plugs or caps. Install caps or plugs at the place of valve manufacture prior to shipping.

4. Inspect valves on receipt for damage in shipment and conformance with quantity and description on the shipping notice and order. Unload valves carefully to the ground without dropping. Use forklifts or slings under skids. Do not lift valves with slings or chain around valve bonnet, pilot housing, or through waterway. Lift valves with eyebolts or rods through flange holes or chain hooks at ends of valve parts.

5. Protect the valve and pilot system from weather and the accumulation of dirt, rocks, and debris. Also, see the manufacturer's specific storage instructions.

6. Make sure flange faces, joint sealing surfaces, body seats, and disc seats are clean. Check the bolting attaching the bonnet or pilot housing to the valve for loosening in transit and handling. If loose, tighten firmly.

7. If the valves and associated actuators are stored or installed outside or in areas subject to temperatures below 40°F or are exposed to the weather prior to permanent installation, provide the manufacturer's recommended procedures for extended storage. Inspect electrical contacts before start-up.

B. Lining and Coating

1. Coat exteriors of valves in accordance with Section 099000, System No. 10. Apply the specified prime, intermediate, and finish coats at the place of manufacture. Finish coat shall match the color of the adjacent piping.

2. Line interiors of valves per Section 099000, System No. 7 or with 12 mils of fusion-bonded epoxy per Section 099761.

3. Do not coat seating areas and bronze or stainless steel pieces.

C. Valve Service Conditions

1. Valve service conditions shall be as shown below:

| | |
|---|---|
| Maximum flow | 5,800 gpm |
| Minimum flow | 400 gpm |
| Maximum upstream pressure | 150 psi |
| Minimum upstream pressure | 60 psi |
| Minimum downstream pressure | 60 psi |

D. Valve Installation

1. Remove covers over flanged openings and plugs from threaded openings, after valves have been lifted off the truck and placed at the point to which it will be connected to the adjacent piping.

2. Bolt holes of flanged valves shall straddle the horizontal and vertical centerlines of the pipe run to which the valves are attached. Clean flanges by wire brushing before installing flanged valves. Clean flange bolts and nuts by wire brushing, lubricate threads as specified in the piping specifications, and tighten nuts uniformly and progressively. If flanges leak under pressure testing, loosen or remove the nuts and bolts, reseat or replace the gasket, reinstall or retighten the bolts and nuts, and retest the joints. Joints shall be watertight.

3. Clean threaded joints by wire brushing or swabbing. Apply Teflon® joint compound or Teflon® tape to pipe threads before installing threaded valves. Joints shall be watertight.

4. Handle valves carefully when positioning, avoiding contact or impact with other equipment or vault or building walls.

5. Clean valve interiors and adjacent piping of foreign material prior to making up valve to pipe joint connection. Prepare pipe ends and install valves in accordance with the pipe manufacturer's instructions for the joint used. Do not deflect pipe-valve joint. Do not use a valve as a jack to pull pipe into alignment. The installation procedure shall not result in bending of the valve/pipe connection with pipe loading.

6. Prior to assembly, coat threaded portions of stainless steel bolts and nuts with lubricant.

E. Valve Pressure Testing

Test valves at the same time that the connecting pipelines are pressure tested. See Section 400515 for pressure testing requirements. Protect or isolate any parts of valves, operators, or control and instrumentation systems whose pressure rating is less than the test pressure.

END OF SECTION