

VALVES, FIRE HYDRANTS, AND APPURTENANCES**PART 1 - GENERAL****1.01 SECTION INCLUDES**

- A. Butterfly Valves
- B. Gate Valves
- C. Tapping Valve Assemblies
- D. Fire Hydrant Assemblies
- E. Flushing Devices (Blowoffs)
- F. Valve Boxes

1.02 DESCRIPTION OF WORK

Install valves, fire hydrants, and appurtenances for water mains.

1.03 SUBMITTALS

Comply with Division 1 - General Provisions and Covenants.

1.04 SUBSTITUTIONS

Comply with Division 1 - General Provisions and Covenants.

1.05 DELIVERY, STORAGE, AND HANDLING

Comply with Division 1 - General Provisions and Covenants, as well as the following:

Remove valves, fire hydrants, and appurtenances contaminated with mud and surface water from the site. Do not use in construction unless thoroughly cleaned, inspected, and approved by the owner.

1.06 SCHEDULING AND CONFLICTS

Comply with Division 1 - General Provisions and Covenants.

1.07 SPECIAL REQUIREMENTS

None.

1.08 MEASUREMENT AND PAYMENT**A. Valve (Butterfly or Gate):**

1. **Measurement:** Each type and size of valve will be counted.
2. **Payment:** Payment will be at the unit price for each type and size of valve.
3. **Includes:** Unit price includes, but is not limited to, all components attached to the valve or required for its complete installation, including underground or above ground operator, square valve operating nut, valve box and cover, valve box extension, and valve stem extension.

1.08 MEASUREMENT AND PAYMENT (Continued)**B. Tapping Valve Assembly:**

1. **Measurement:** Each size of tapping valve assembly will be counted.
2. **Payment:** Payment will be at the unit price for each tapping valve assembly.
3. **Includes:** Unit price includes, but is not limited to, tapping sleeve, tapping valve, the tap, valve box and cover, valve box extension, and valve stem extension.

C. Fire Hydrant Assembly:

1. **Measurement:** Each fire hydrant assembly will be counted.
2. **Payment:** Payment will be at the unit price for each fire hydrant assembly.
3. **Includes:** Unit price includes, but is not limited to, the fire hydrant, barrel extensions sufficient to achieve proper bury depth of anchoring pipe and height of fire hydrant above finished grade, and components to connect the fire hydrant to the water main, including anchoring pipe, fittings, thrust blocks, pea gravel or porous backfill material, and fire hydrant gate valve and appurtenances, except tapping valve assembly if used.

D. Alternate Fire Hydrant Assembly:

1. **Measurement:** Each alternate fire hydrant assembly will be counted.
2. **Payment:** Payment will be at the unit price for each alternate fire hydrant assembly.
3. **Includes:** Unit price includes, but is not limited to, the fire hydrant, barrel extensions sufficient to achieve proper bury depth of anchoring pipe and height of fire hydrant above finished grade, and components to connect the fire hydrant to the water main, including anchoring pipes, 90 degree bend; fittings, thrust blocks, pea gravel or porous backfill material, and fire hydrant gate valve and appurtenances, except tapping valve assembly if used.

E. Flushing Device (Blowoff):

1. **Measurement:** Each size of flushing device will be counted.
2. **Payment:** Payment will be at the unit price for each flushing device

F. Valve Box Adjustment, Minor: Measurement and payment for minor adjustment of an existing valve box by raising or lowering the adjustable valve box is incidental.**G. Valve Box Extension:**

1. **Measurement:** Each existing valve box adjusted to finished grade by adding a valve box extension will be counted.
2. **Payment:** Payment will be at the unit price for each valve box extension.

1.08 MEASUREMENT AND PAYMENT (Continued)**H. Valve Box Replacement:**

1. **Measurement:** Each existing valve box replaced with a new valve box will be counted.
2. **Payment:** Payment will be at the unit price for each valve box replacement.
3. **Includes:** The unit price for each valve box replacement includes, but is not limited to, removal of existing valve box; excavation; furnishing and installing new valve box; backfill; compaction; and all other necessary appurtenances.

I. Fire Hydrant Adjustment:

1. **Measurement:** Each existing fire hydrant adjusted to finished grade by addition of an extension barrel section and stem will be counted.
2. **Payment:** Payment will be at the unit price for each adjustment of an existing fire hydrant.
3. **Includes:** The unit price for each adjustment of an existing fire hydrant includes, but is not limited to, removal and reinstallation of the existing fire hydrant; furnishing and installing the extension barrel section and stem; and all other necessary appurtenances.

J. Fire Hydrant Assembly Removal:

1. **Measurement:** Each fire hydrant assembly removed will be counted.
2. **Payment:** Payment will be made at the unit price for each fire hydrant assembly removed.
3. **Includes:** The unit price includes, but is not limited to, excavation, removal of the fire hydrant, hydrant valve, thrust block, delivery of the fire hydrant assembly to the Contracting Authority (if specified), capping of the pipe, backfill, compaction, and surface restoration to match the surrounding area.

K. Valve Removal:

1. **Measurement:** Each size of valve removed will be counted
2. **Payment:** Payment will be made at the unit price for each size of valve removed.
3. **Includes:** The unit price includes, but is not limited to, excavation, removal of each valve, replacing the removed valve with pipe and connections if required or capping the former valve connection, delivery of the valve to the Contracting Authority (if specified), backfill, compaction, and surface restoration to match the surrounding area.

L. Valve Box Removal:

1. **Measurement:** Each valve box removed will be counted
2. **Payment:** Payment will be made at the unit price for valve box removed.
3. **Includes:** The unit price includes, but is not limited to, excavation, removal of each valve box, delivery of the valve box to the Contracting Authority (if specified), backfill, compaction, and surface restoration to match the surrounding area.

PART 2 - PRODUCTS**2.01 VALVES****A. General:**

1. **Valve Body:** Manufacturer's name and pressure rating cast on valve body.
2. **Direction of Opening:** The opening direction is counterclockwise as viewed from the top, unless otherwise specified in the contract documents or as directed by the Jurisdiction.
3. **Joints:**
 - a. For buried installations, use mechanical joints per AWWA C111. Comply with [Section 5010](#) for joint nuts and bolts.
 - b. For installation within structures, flanged with dimensions and drillings according to AWWA C110 or ANSI B16.1 class 125.

B. Gate Valves:

1. **Standards:** Comply with AWWA C509 (gray iron or ductile iron) or AWWA C515 (ductile iron) and NSF 61.
2. **Stem Seals:** Double O-rings permanently lubricated between seals. Lubricant certified for use in potable water.
3. **External Bolts and Hex Nuts:** Stainless steel according to ASTM A 240, Type 304.

C. Butterfly Valves:

1. **Standards:** Comply with AWWA C504 class 150B (gray iron or ductile iron) and NSF 61.
2. **Stem:** Stainless steel according to ASTM A 240, Type 304, turned, ground, and polished.
3. **For Seat on Body Valves:**
 - a. **Disc:** Ductile iron or gray iron with plasma applied nickel-chromium edge or stainless steel edge according to ASTM A 240, Type 316, and mechanically fixed stainless steel pins.
 - b. **Seat:** Synthetic rubber compound mechanically retained to the body.
4. **For Seat on Disc Valves:**
 - a. **Disc:** Ductile iron according to ASTM A 536 with synthetic rubber compound seat mechanically retained to the disc.
 - b. **Seat:** Continuous Type 316 stainless steel seat.
5. **External Bolts and Hex Nuts:** Stainless steel according to ASTM A 240, Type 304.

D. Tapping Valve Assemblies:

1. **Tapping Valve:** Gate valve complying with AWWA C509 or AWWA C515.
2. **Sleeve:**
 - a. Minimum 14 gauge.
 - b. Stainless steel according to ASTM A 240, Type 304.
 - c. Working pressure 150 psi.
 - d. Must fully surround pipe.
 - e. Flanged with dimensions and drillings according to AWWA C110 or ANSI B16.1 class 125.

2.01 VALVES (Continued)

3. **Minimum Sleeve Length:** Comply with the following table.

Table 5020.01: Minimum Sleeve Length

Outlet Flange Size	Minimum Sleeve Length
4"	15"
6"	15"
8"	20"
10"	25"
12"	25"
Over 12"	As approved by the Engineer

4. **Gasket:**
- To completely surround pipe.
 - Minimum thickness 0.125 inch.
 - Use nitrile rubber.
5. **Outlet Flange:**
- Stainless steel complying with ASTM A 240, Type 304.
 - ANSI B16.1, 125 pound pattern.
6. **Hex Nuts and Bolts:** Stainless steel complying with ASTM A 240, Type 304.
7. **Tapping Valve Assemblies:** Use only where specified in the contract documents.

2.02 FIRE HYDRANT ASSEMBLY

- A. **Material:** Comply with AWWA C502.
- B. **Manufacturers:** As allowed by the Jurisdiction or as specified in the contract documents.
- C. **Features:**
- Breakaway Items:** Stem coupling and flange.
 - Inlet Nominal Size:** 6 inch diameter.
 - Inlet Connection Type:** Mechanical joint.
 - Hose Nozzles:** Two, each 2 1/2 inches in diameter.
 - Direction of Opening:** Counterclockwise, unless otherwise specified.
 - Items to be Specified:** The following items will be specified by the Jurisdiction or in the contract documents.
 - Operating nut.
 - Pumper nozzle.
 - Nozzle threads.
 - Main valve nominal opening size.
- D. **Painting:**
- Shop coating according to AWWA C502.
 - Above grade exterior coating type and color will be selected by the Engineer.
- E. **External Bolts and Hex Nuts:** Stainless steel according to ASTM A 193, Grade B 8.
- F. **Gate Valve:** Comply with Section 5020, 2.01.
- G. **Pipe and Fittings:** Comply with [Section 5010](#).

2.03 APPURTENANCES

- A. Flushing Device (Blowoff):** As specified in the contract documents.
- B. Valve Box:**
1. **Applicability:** For all buried valves.
 2. **Manufacturer:** As allowed by the Jurisdiction or specified in the contract documents.
 3. **Type:**
 - a. In paved areas, use a slide type.
 - b. In all other areas, use a screw extension type.
 4. **Material:** Gray iron.
 5. **Cover:** Gray iron, labeled "WATER"
 6. **Wall Thickness:** 3/16 inch, minimum.
 7. **Inside Diameter:** 5 inches, minimum.
 8. **Length:** Adequate to bring top to finished grade, including valve box extensions, if necessary.
 9. **Factory Finish:** Asphalt coating.
 10. **Valve Box Centering Ring:** Include in installation.
- C. Valve Stem Extension:** For all buried valves, provide as necessary to raise 2 inch operating nut to within 3 feet of the finished grade. Stem diameter according to valve manufacturer's recommendations, but not less than 1 inch.

PART 3 - EXECUTION**3.01 GENERAL**

- A. Install according to the contract documents.
- B. Apply polyethylene wrap to all iron pipe, valves, fire hydrants, and fittings.
- C. Set tops of valve boxes to finished grade, unless otherwise directed by the Engineer.
- D. Check the working order of all valves by opening and closing through entire range. Before opening the valves, check with the Jurisdiction on operating requirements.
- E. Test and disinfect all valves, fire hydrants, and appurtenances as components of the completed water main according to [Section 5030](#).

3.02 FLUSHING DEVICE (BLOWOFF)

Install and construct as specified in the contract documents.

3.03 FIRE HYDRANT

- A. Install according to [Figure 5020.201](#). Ensure a 3 foot clear space around the circumference of the fire hydrant. Place anchor tee and hydrant in the locations specified in the contract documents.
- B. If the fire hydrant valve is positioned adjacent to the water main, attach it to an anchor tee.
- C. If the fire hydrant valve is positioned away from the water main, restrain all joints between the valve and water main.
- D. Fire Hydrant Depth Setting:
 - 1. Use adjacent finished grade to determine setting depth.
 - 2. Set bottom of breakaway flange between 2 and 5 inches above finished grade.
 - 3. If finished grade is not to be completed during the current project, consult with the Engineer for proper setting depth.
- E. Coordinate installation with tracer wire installation.
- F. Orient fire hydrant nozzles parallel with or at right angles to the curb, with the pumper nozzle facing the curb. Set hydrants having two hose nozzles 90 degrees apart with each nozzle facing the curb at an angle of 45 degrees or as directed by the Engineer.

3.04 ADJUSTMENT OF EXISTING VALVE BOX OR FIRE HYDRANT

- A. Minor Valve Box Adjustment:** For existing adjustable boxes that have sufficient adjustment range to bring to finished grade, raise or lower valve box to finished grade.
- B. Valve Box Extension:** For existing valve boxes that cannot be adjusted to finished grade, install valve box extensions as required.
- C. Valve Box Replacement:** For existing valve boxes that cannot be adjusted to finished grade, remove and replace the valve box.

3.04 ADJUSTMENT OF EXISTING VALVE BOX OR FIRE HYDRANT (Continued)

D. Fire Hydrant Adjustment:

1. Add extension barrel sections and stems as necessary to set existing fire hydrant at finished grade.
2. Paint exterior of new barrel section to match existing fire hydrant unless otherwise specified.

END OF SECTION