



# INSTA-VALVE PLUS 250 **INSERTION VALVES**

14"–16" Insertion Valve Specifications — Revised February 2024



## 14"–16" Insta-Valve Plus 250 | Insertion Valve Specification | 2

The Insta-Valve Plus 250 (IVP 250) from Hydra-Stop is an insertable gate valve designed to be installed onto a working, pressurized pipe to provide a control point in a piping system the same day. Like the Insta-Valve 250 product line offered by Hydra-Stop, the Insta-Valve Plus 250 installs in three basic steps: 1. Mount the valve body onto the host pipe; 2. Hot tap the host pipe; 3. Insert the valve cartridge into the valve body. This procedure can contain the pipe pressure throughout the entire process by using a temporary knife gate valve that installs onto the flange of the valve body.

### General Specifications:

- 14-inch: For use on ductile iron (DI), cast iron (CI), polyvinyl chloride (PVC ), or asbestos cement (AC) pipe with an inside diameter of 13.3 –14.50 inches. 16 inch: For use on on ductile iron (DI), cast iron (CI), polyvinyl chloride (PVC ), or asbestos cement (AC) pipe with an inside diameter of 15.3 –16.50 inches. Due to the wide variety of pipes, the O.D. ranges are for estimation purposes only. When ordering valves please specify I.D. and wall thickness. Please consult Hydra-Stop for proper shell cutter, valve cartridge, and valve body combinations.
- Allows for bi-directional flow.
- Installation results in an unobstructed waterway.
- Non-rising stem available in the open left and open right directions.
- AIS-compliant version available. AIS version meets requirements specified in the "Build America, Buy America Act" and "American Iron and Steel" requirements.
- Insta-Valve Plus 250 weights:

14" IVP 250	16" IVP 250
Valve Cartridge = 185 lbs.	Valve Cartridge = 245 lbs.
Valve Body = 415 lbs.	Valve Body = 620 lbs.
Total = 600 lbs.	Total = 865 lbs.

**NOTE:** Contact Hydra-Stop for custom applications.

### Performance Specifications:

- Maximum Working Pressure: 250 psid
- Maximum Test Pressure: 375 psid
- Operating Temperature: 33–125 degrees F
- Number of Turns to Close: 14-inch = 44–48; 16-inch = 50–54
  - The number of turns is dependent on the amount of gate seal rubber compression and expansion required to seal on the inside diameter of the host pipe; pipes with larger inside diameters will be on the high end of the range.
- Operating Torque for Closing: 150–350 ft-lbs. typical
  - The operating torque to close is dependent on the amount of gate seal rubber compression and expansion required to seal on the inside diameter of the host pipe; pipes with larger inside diameters will be on the high end of the range.
- Operating Torque for Opening: 100 – 850 ft-lbs Typical

The operating torque to open is dependent on the pressure differential across the closed gate at the start of opening, where a full 250 psid pressure differential will require the most torque to bring the gate off its seat. As the gate opens and pressure is relieved, the torque will reduce significantly.

**Components:**

**Valve Body:** The valve body houses the internal components of the valve and clamps onto the host pipe. The valve body is made of three subcomponents; the valve clamp, branch, and flange welded together. Each of these subcomponents is described in detail below.

**Valve Body Clamp:** The valve body clamp is the bottom portion of the valve body that secures the valve to the host pipe. The clamp is made of a top and bottom section that are shaped to fit onto the host pipe. Along the sides of the two sections are lug bars that receive the threaded studs or bolts and provide the surfaces that support the nuts that are tightened onto the threaded studs or bolts, which results in the top and bottom sections of the clamp being pulled toward one another and squeeze the host pipe. This mounting process creates the foundation for the valve. The valve body clamp is made of 304 stainless steel with a passivated finish.

The following components are included in the valve body clamp assembly:

- **Gasket** — Made of BUNA-N and SBR, the gasket is glued into a circular groove on the inside, top portion of the clamp, which creates a seal between the valve body and the host pipe to contain pressure after the pipe is tapped. The two rubber seals that extend from the gasket to the inside diameter of the valve body branch form a seal with the gate when that valve is closed and between the host pipe and clamp.
- **Hardware** — The hardware used to mount the clamp onto the pipe includes bolts (20), washers (20), and nuts (20). All hardware is made of 304 stainless steel.

**Valve Body Branch:** The valve body branch is the cylindrical portion of the valve body that extends from the clamp. The valve body branch, in addition to the valve body flange, contains the valve cartridge. The valve body branch is made of 304 stainless steel with a passivated finish.

**Valve Body Flange:** The valve body flange provides a bolt pattern on the top of the valve used to install the temporary knife gate valve during installation and fasten the top flange for final assembly. The valve body flange also provides the means of securing the valve cartridge — making a pressurized installation possible — through eight ports along the outside diameter of the flange that receive the pins that hold the valve cartridge. The valve body flange is made from carbon steel and painted for rust protection.

The following components are included in the valve body flange assembly:

- **Pins** — Eight pins thread into the ports on the outside diameter of the valve body flange. They are threaded deeper into the flange during the valve insertion process to enter slots in the valve cartridge's completion plug. The pins are made of high-strength 1144 steel to hold the valve cartridge against the upward thrust from the pressurized pipe and are zinc plated for corrosion resistance. Each pin exhibits a BUNA-N O-ring to minimize water discharge from the port during the valve insertion process.
- **Plugs** — Each pin is backed up by a plug that threads into the start of each port. The plugs ensure each port is sealed during pressure testing of the valve body and provide backup seals for the valve cartridge. The plugs are made of stainless steel and coated to prevent galling.
- **O-ring** — The face of the valve body flange contains an O-ring groove that includes a BUNA-N O-ring which forms a seal between the valve body flange and the top flange. This seal provides backup for the valve cartridge seals.

**Gate:** The gate valve component travels down into and seals upon the host pipe to isolate pressure and stop flow. The gate is made from food-grade cast nylon, type 6, which has lightweight and low friction characteristics. The gate assembly contains a variety of components that enable the travel of the gate and allow the gate to seal onto the pipe.

The following components are included in the valve stem assembly:

- **Gate Seals** – The gate utilizes two gate seals, both made of EPDM rubber, to form a seal on the host pipe. The top gate seal wraps around the gate and forms a seal on the gate housing and the inside of the valve body. The bottom gate seal forms a seal primarily inside of the host pipe and inside of the valve body as well. Continued closing of the gate after the bottom seal makes contact with the host pipe results in compression and expansion of the gate seal that forms a complete seal on the inside diameter of the host pipe.
- **Paddle Shields (2)** — On each side of the bottom gate seal, or paddle, is a paddle shield that supports the rubber seal against severe flow conditions. The paddle shields are made of aluminum and are hard coat anodized.
- **Retention Plate** — The retention plate is made from high-strength 7075 aluminum and bolts into the top of the gate to retain the stem nut.
- **Gate Hardware** — A variety of hardware is contained within the gate to hold the retention plate, bottom gate seal, and paddle shields in place. All hardware is made of stainless steel.
- **Check Valve Assemblies (2)** — Two check valve assemblies are attached to the completion plug. These check valves allow pressure to equalize above and below the valve cartridge during insertion. The check valve assemblies consist of a 316 SS check valve, a 304 SS check valve nut, a 304 SS NPT plug, and (3) BUNA-N O-rings.

**Gate Housing:** The gate housing is the valve component that directs the gate travel into the host pipe. When the valve stem of the valve is rotated, the gate housing prevents the rotation of the gate, which results in gate travel in the direction of the valve stem. In addition to enabling gate travel, the gate housing is critical for valve sealing and installation as it makes up the bulk of the valve cartridge. The gate housing is made from food-grade cast nylon, type 6, which has lightweight and low friction characteristics.

The following components are included in the valve stem assembly:

- **Completion Plug** — Made of aluminum, the completion plug is secured to the top of the nylon gate housing to support the upward thrust on the valve cartridge caused by pressure within the host pipe. The completion plug stops upward thrust of the gate housing through the eight slots along the outside diameter which each receive a pin that is threaded through the valve body flange. The higher strength of the aluminum, in comparison to nylon, is critical to support the valve stem during the opening of the valve as the shaft collar of the valve stem rotates within the completion plug.
- **O-rings (2)** — The gate housing contains an O-ring at the top of the assembly that forms a seal inside of the valve body flange. The second O-ring, separated in two sections, forms a seal on the inside of the valve body branch as well as the gate seal. Both O-rings are made of EPDM.

**Valve Stem:** The valve stem is part of the valve cartridge assembly and allows valve operation or opening and closing through its rotation. The valve stem uses 2–3 stub Acme threads (2" major diameter, 3 threads per inch), which results in 1" of gate travel for every three rotations in one direction. The smaller threads, on the end opposite the Acme threads, are used to fasten the valve cartridge to the insertion tool during the installation process and to secure the 2" square operating nut with a nut after valve insertion is complete. The valve stem is made from 304 stainless steel, which is compliant with the AWWA C509-09 standard.

The following components are included in the valve stem assembly:

- **O-rings (2)** — Two BUNA-N O-rings fit into O-ring grooves above the Acme threads and create a redundant seal between the gate housing and valve stem.
- **Thrust Washers (2)** — Thrust washers are positioned above and below the shaft collar of the valve stem to reduce operating torque by providing a low friction surface the valve stem rotates against. Both thrust washers are made of acetal.
- **Operating Nut** — The 2" square operating nut is secured at the top of the valve stem through a stainless steel nut that threads on the end of the valve stem and down onto the operating nut. A steel lock washer with a galvanized finish is

placed under the nut to keep tension on the threads to prevent the nut from loosening. The operating nut provides a means for the valve operator to input torque to rotate the valve stem. As specified in AWWA C509-09, the operating nut is cast using ductile iron and painted for corrosion resistance — open left operating nuts are painted black and open right operating nuts are painted red.

**Stem Nut:** Made from 360 brass, the stem nut is contained within the gate and is threaded onto the valve stem through its internal 2–3 stub Acme threads (2" minor diameter, 3 threads per inch). Within the gate, the stem nut is prevented from rotating when the valve stem is turned. With the stem nut fixed inside of the gate and threaded onto the valve stem, rotating the valve stem results in gate travel.

**Top Flange:** The top flange fastens to the valve body flange to provide a cover for the valve and also serves as a stop for the valve step during the closing of the valve. The top flange is made from carbon steel, per AWWA C207, and is epoxy-coated black for rust protection.

The following components are included in the blind flange assembly:

- Nuts and Bolts (16 of each) – Sixteen nuts and bolts are used to fasten the top flange to the valve body flange. The nuts and bolts are each made from 316 stainless steel.
- X-Ring – Made of BUNA-N, an X-ring is contained within a groove in the inside diameter of the top flange and seals upon the valve stem to provide a backup to the valve cartridge seals.
- Lip Seal – Made of urethane and BUNA-N, a lip seal is pressed into the top of the top flange and seals upon the valve stem to keep debris outside of the valve.

APPROVED BY:

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