

# PLUNGER VALVE SPECIFICATION

## PLUNGER VALVE

The Plunger Valve by J&S Valve, Inc. (JSV) - Plunger shall be two-part body design and shall feature interior geometry that provides water flow that is guided around the streamlined internal body structure. The valve has a geometrically optimized design, a continuous annular cross-sectional reduction from inlet to throttle cross section, and continuous rise of flow velocity to the exit without producing cavitation.

The JSV Plunger Valve assembly consist of a flanged short conical inlet section having an internal cone to divert the water flow into the annular chamber of the body section.

The JSV Plunger Valve shall have an oval body section with an inner annular chamber within the body shell. Designed with a customized control cylinder that is part of the internal slider-crank mechanism and is driven by and outside worm gear.

The JSV Plunger Valve design shall feature a specially customized designed control cylinder with slotted cage to pass 3/4-inch diameter debris and to minimize cavitation. Slots shall be fully closed when the valve is placed in the closed position. The profile sealing ring in the plunger shall also be seated against the downstream stainless steel seat block in the body when closed.

The JSV Plunger Valve designs the plunger to move in an axially flow direction to reduce or enlarge the annular flow cross section between the outer annular chamber and the inner chamber of the plunger so the water flows through the slots in the customized control cylinder or around the plunger in a degressive manner. The gap where the water flow is fully closed when the valve is in the closed position.

The JSV Plunger Valve is designed, when open during operations, features plunger assembly movement in the upstream side direction to release water between the plunger and the body or through the slotted control cylinder.

The JSV Plunger Valve design features advanced and retract axial strokes of plunger, guided in the internal body by an internal slider-crank mechanism which minimizes the friction forces on the plunger and guide areas. The internal slider-crank mechanism is driven by an external worm gear. The crank shall have a 78 to 90 degree angle of rotation.

The JSV Plunger Valve guides the plunger with bronze ring or guide rails with bronze welded overlay applied directly on the body. Provided sufficient guide rails or bronze rings for improved range of response frequency of the plunger, to reduce the possibility of operational vibration.

The JSV Plunger Valve on the outside of the plunger seats against an O-ring seal with anti-twist protection and impenetrable to dirt at its upstream end which will be against medium pressure from both the upstream and downstream sides and shall have a profile sealing ring which will seat against a stainless steel seat and the downstream valve body end. The valve shall have a non-wetted and double or-ring sealed actuation shaft to ensure corrosion free operation over the life of the valve. If required, top and bottom cleanout access covers are to be provided.

The design of the annular throat cross section in any position of the plunger shall ensure linear regulation of flow.

The profile sealing ring at the downstream side of the valve body or at the downstream side of the plunger shall be exchangeable without the need to dismantle the valve from the pipeline

The design of the internal components and downstream portions of the valve body exposed to high velocity, or erosive flows with stainless steel block or stainless steel liner.

The outside of the plunger shall seat against an elastomeric seal ring at the upstream end which will be against pressure from both upstream and downstream sides. The plunger shall seat against the downstream valve body end. The downstream elastomeric seal ring shall either be in the body of the plunger valve insert or be mechanically retained in the downstream flange of the valve body by a stainless steel seat ring. The seal shall allow the valve to be drip and bubble tight in both flow directions for the long term. The valve operating shaft shall have seal rings to maintain a drip tight seal regardless of modulation cycles or inactivity. The seal rings will prevent corrosion of the shaft body bore which shall remain dry by design.

## VALVE ACTUATOR

Motion of the plunger shall be controlled by Manual or Electric Motor Actuators.

The JSV Plunger Valve shall be actuated with no more than five times the normal operating force required at minimum inlet head conditions. The movement of the plunger shall be controlled by means of an AWWA quarter turn worm gear unit with externally adjustable mechanical stops to limit valve travel in both the open and closed positions. The valve stroke shall equal 78 to 90 degrees plus or minus 2 degrees, whereby the mechanical stops of the worm gear shall be engaged before the full extension or retraction of the plunger. In no instance shall the full output torque of the actuator be allowed to be transmitted to the valve at its end of travel, either open or closed without engaging the travel stops of the worm gear first. The AWWA worm gear unit shall be operated by a handwheel or electric actuator.