

SLOW CLOSING AIR VALVE FOR LARGE WELL PUMP APPLICATIONS

Houston typically uses 4" conventional slow closing combination air valves/air release valves on the water wells that provide most of the water used by Houston. This design was selected to attempt to deal with the **surge** and **water hammer** commonly associated with this type pumping operation. This type of valve is **maintenance intensive** due to leakage, premature closure due to surge, corrosion and water hammer. Man hours in labor and safety liability are also a concern due to the **large size** and **weight** of the multi- component conventional slow closing combination air valve. Mr. James Walker, Department Manager chose 2 well sites for installation of the 4" D-070, # 1 Braeswood pump station and # 2, The IH Airport pump station.



The D-070 Dynamic Combination Air Release valve 4" was chosen for this application. This valve weighs less than 50 lbs. compared to the conventional valve weighing in excess of 250#. The D-070 is epoxy coated on the interior and exterior to prevent corrosion. All of the hardware including internal and external fasteners and the name tag are stainless steel. The D-070 Combination Dynamic Air Valve is a unique valve operating **without a float**, utilizing the *rolling diaphragm* principle. This unique structure allows the dynamic valves to discharge air from the water system in a **controlled and gradual manner, preventing slam and local up-surges**. When vacuum occurs, the valve's fast reaction will draw in large volumes of air into the water system, impeding down-surges and, consequently, all pressure surges in the line. The valves are normally closed when the line is not operating, thus preventing the infiltration of foreign particles.

and insects into the water system. allows the large volume of air moving ahead of the water to be vented from 3 psi to 250 psi until completely vented. When the pump starts the well column begins to rapidly discharge large volumes of air that need to be removed. The system begins to fill with water, air becomes compressed in the well discharge and flows into the air valves, raising their sealing assemblies to their open position. Air is then released through an automatic kinetic nozzle. When the water reaches the air valve, it fills the kinetic chamber, where some of it outflows through the kinetic nozzle, and some of it enters into the seal operating chamber, causing it to close.



Pressure develops in the operating chamber, bringing about a controlled lowering of the sealing assembly, until the kinetic nozzle is completely closed. At this stage, the automatic small orifice air release valve continues to work, releasing air through its nozzle.

With a reduction in pressure in the line during drainage or shutoff, the force is reduced on the kinetic sealing assembly and it rises and opens the kinetic nozzle, drawing in air from the atmosphere into the system. The D-070 is made so that one person can install and maintain with common hand tools. Mr. Walker's comments about the A.R.I. D-070 Dynamic Slow Closing Air Valve? "We're very pleased with this new valve. It will solve a lot of expensive problems for us in Operations and Maintenance."