

## **Orifice Testing of RO Systems**

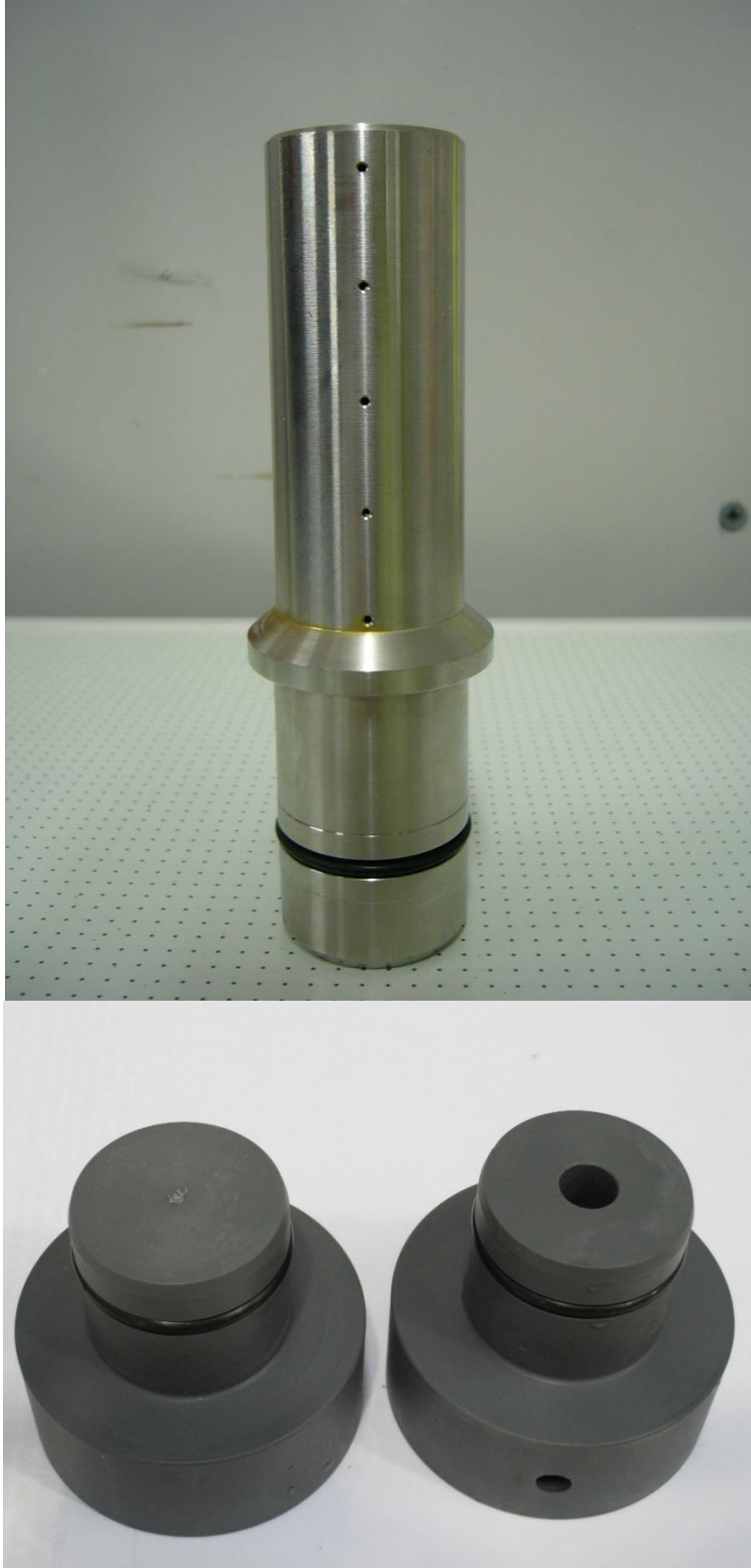
This bulletin provides general information on the purpose and use of orifice plugs in reverse osmosis systems.

### **Background**

Orifice plugs are used in RO systems to check the functionality of the process control system (valves, meters, gauges, transmitters, etc.) before the RO membranes are loaded. This allows the RO system provider to be able to be sure that all of the RO equipment is operating correctly without endangering the RO elements. It also allows RO system provider to check the pump curves, pretreatment, and post treatment chemical addition systems, and to see if there are problems with the feed water supply while at design flows. There are usually two different plugs that are used, solid plugs that are used to plug the permeate port where the permeate is not collected (usually the upstream end of the pressure vessel), and drilled plugs that are used where the permeate is collected (usually the downstream end of the pressure vessel). The drilled hole is sized so that when running the RO system at designed feed pressure, it will allow the correct amount of permeate flow to simulate operation as if using actual RO elements. The plugs can be made from either PVC or stainless depending upon the operating pressure, and many times these are available from the vessel supplier.

Many times, hypochlorite (usually 50 – 100 ppm) is added to the feed water during orifice testing to help remove any residual organics from PVC glues, piping, FRP tanks, etc. The chlorine also disinfects the system. When orifice testing is completed, the chlorinated water is drained from the system and loading of the elements can begin. All standard thin-film composite RO elements are preserved with a 1% sodium bisulfite solution so the chance of any damage to the RO elements by any trace amounts of chlorine left in the system is negligible.

See TSBs 105, 118, and 122 for more information on Hydranautics' recommended element loading practices and operational parameters.



Examples of Orifice Plugs

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