Cornerstone® VALVE
SEVERE SERVICE ENGINEERING

Experience In Severe Service Applications

There are applications in processing of heavy crude oils that require valves to operate at 950F and 3250 psig. Valve bore sizes, however, are generally 4" or smaller. Both trunnion-mounted and floating ball designs have been used.

Although there are many applications in similar temperature ranges in hydrocarbon processing, most operate at lower pressures. Cornerstone has experience in handling hot gas in sizes through 16" in the 800 to 900 F temperature range. They are Class 900 valves.

Each type of valve faces a particular design challenge. In the floating ball design, high torques can damage either the stem-to-ball connection or the ball seat interface. Trunnion mounting the ball reduces the torque by a factor of at least 50% -however the valve must then become an upstream sealing design.

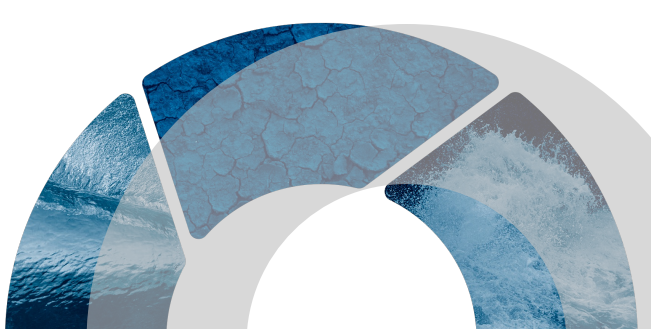
This means that there are two potential leak paths. They are the ball/seat interface (same challenge on a floating ball) and the seal between the seat spool and body. The ball/seat spool is a function of metallurgy and sphere accuracy.

The seat spool to body seal is the challenge. This area must provide positive sealing in both the radial and axial directions. In addition, it must respond to rapid temperature changes.

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We have developed a live loaded high temperature seal design that seals effectively. It is currently used on our small power valves. (Incidentally we have about a hundred of these installed over the last four years and have had zero leaks to date.)

Earlier versions of this design developed operated in sizes up to 12" 900 and 10"-2500. We have a valve in Natref Refinery, installed in 1993, that operates at 800F and pressures to 5000 psig.

We will send you a detailed design of this seal but it is proprietary with our company and it will be with the understanding that this design will not be exposed to another competitor or their representative.

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