

### 1 Matched ball and seat sets

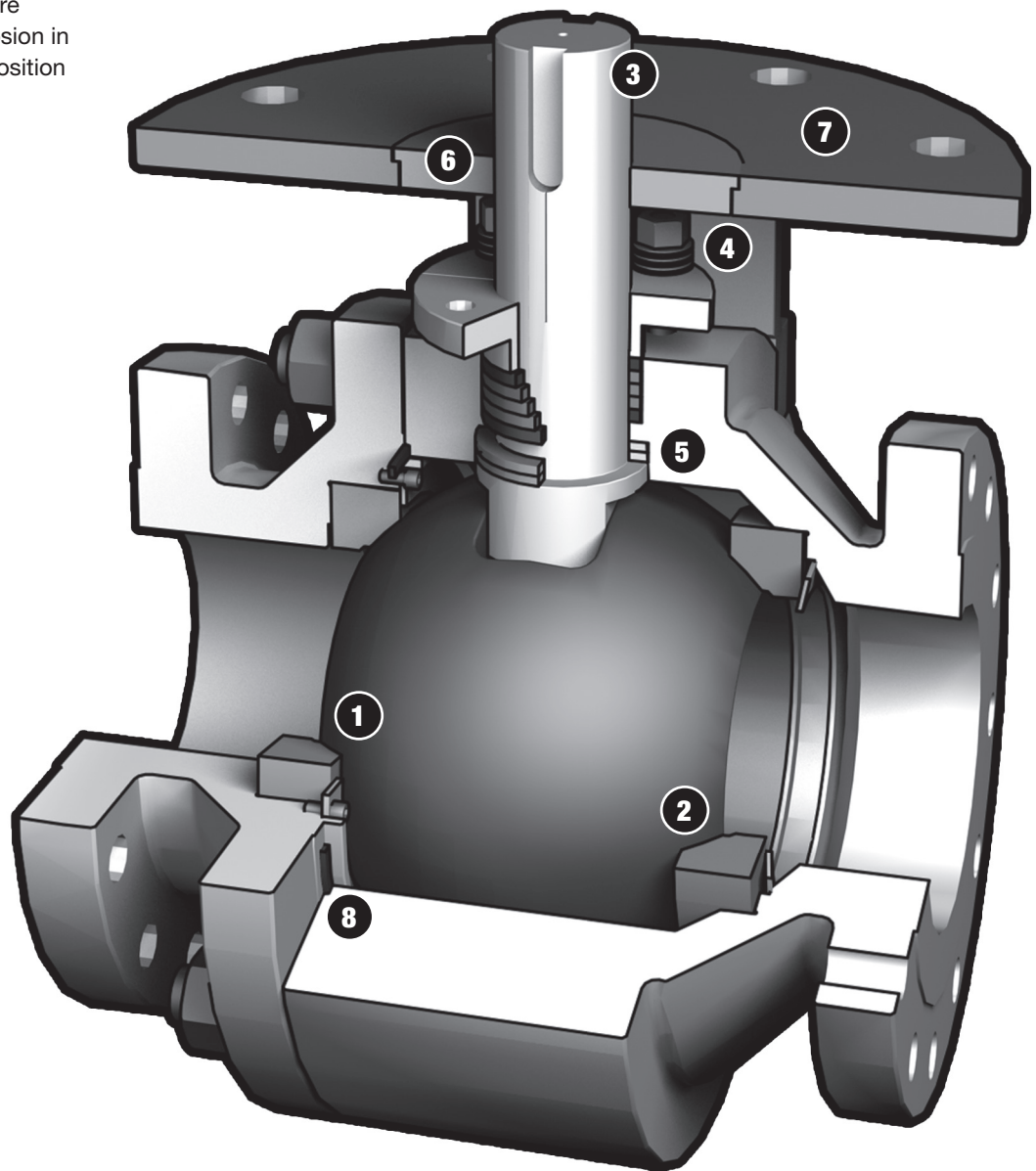
- Two-sided seat lapping delivers outstanding seal performance
- Each ball and seat set are “blued” to verify continual contact is achieved across entire seat face
- Oversized spheres allow slight over travel, which reduces wear and can accommodate misaligned actuator stops
- Seating surfaces are protected from erosion in the fully-opened position

### 2 Crucial metal seats

- Sharp leading edge design of seat ring “wipes” sealing surface each time valve is operated
- Proprietary MOGAS reverse seat geometry minimizes the effect of solid build-up on the sealing surface

### 3 Oversized stems

- MOGAS provides oversized stems to accommodate torque increases that can happen over time. Economical, under-designed stems can cause significant operational problems with frequent use and catalyst build-up.



### 4 Standard live-loaded packing

- Live loads of stem packing gland ensures constant packing energization, even after several thermal cycles
- Packing design meets EPA VOC emissions standards

### 5 Pressure-energized inner stem seal

- Two hard coated and lapped metal thrust bearings serve as both a pressure-energized inner stem seal and stem guide
- Bearings prevent migration of media into the packing box
- Lapped surfaces provide tight seal in combination with line pressure exerting additional vertical force
- Dual coated inner stem seals prevent galling between body, stem and the inner stem seals

### 6 Stem support bushing

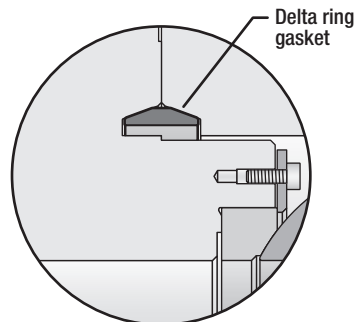
- Secondary stem bearing guide eliminates movement and packing deformation caused by side-loading of stem by the actuator
- The stem support bushing, in combination with the double inner stem seals, provides a dual guiding system which prevents lateral movement of the valve stem

### 7 Sturdy mounting bracket

- To properly support actuator weight, MOGAS heavy duty mounting brackets are first welded or bolted into place then machined for precise alignment
- Alignment surface is both square with and centered over the stem, promoting proper stem and stem bushing alignment

### 8 Body gaskets

- ASME 150 – 1500 class valves use an Inconel spiral-wound gasket with impregnated Grafoil®
- ASME 2500 class valves and above use a pressure energized Inconel metal gold-plated delta ring gasket (see drawing)



### Features Not Shown

#### Reliable coating

- Use of identical base materials ensures thermal growth properties are consistent for the ball and seat
- Coatings on ball and seats have compatible thermal growth rates to prevent bond failure
- Rounded ball bore edges eliminate risk of coating spalling
- Two types of coatings — spray and fused, which is metallurgically-bonded, and HVOF, which is mechanically-bonded

#### Rugged application-specific materials

- Heavy coking streams where EOR torque increases significantly over SOR torque require the selection of higher strength materials to prevent stem slot deformities

#### Withstands thermal shock

- Sufficient clearance is designed between seat back and seat pocket to ensure that valves remain fully operable (will not bind or seize), even when subjected to sudden swings in temperatures

#### Repairability

- Two easy to replace seats minimize the repair cost (welding, remachining, recoating) compared to the refurbishment of a complete integral seat end connection