

RANGER

VALVE AMERICA

TRIPLE OFFSET VALVES (TOV) - **ADVANCED TORQUE SEALING**

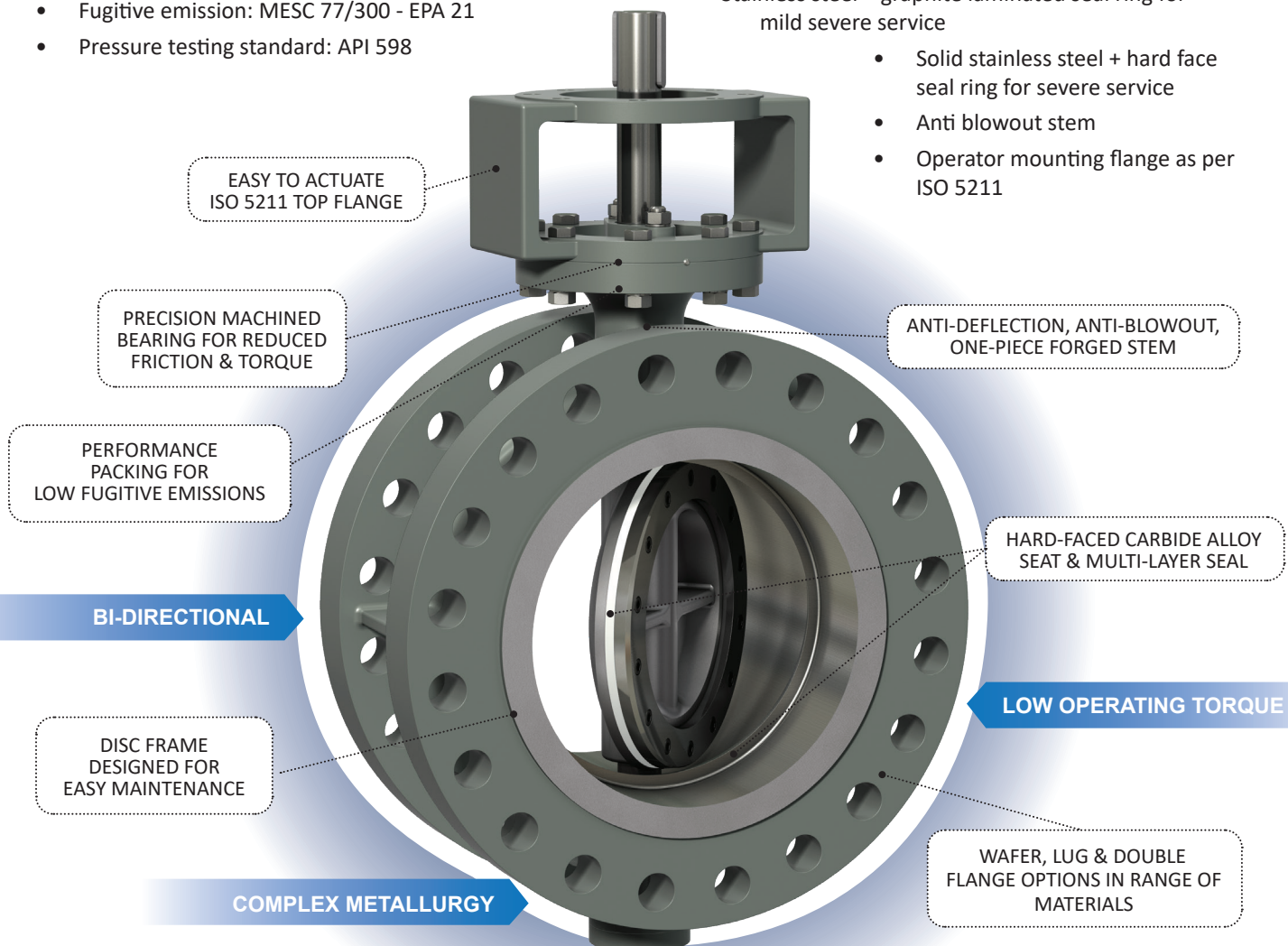
A Triple Offset Valve (TOV) is a torque seated valve design that requires torque to be applied to the shaft via a gear operator or actuator to maintain a seal. As such, it is important to minimize any torque that is lost to friction within the valve and therefore to maximize the torque transferred to the sealing faces. The Ranger™ design minimizes the friction in the valve drive train, and thus the operating torque required to achieve the seal, by using engineered preformed packing in the stem seal, tightly controlled stem surface finishing, and precision machined bearings. These important Ranger™ design details allow the maximum amount of the input torque to be transferred with minimal friction losses.

KEY FEATURES

- Design: API 609 Category B
- Size range: 2" to 48" / DN50 to DN1200
- Pressure range: Class 150 to 300
- Temperature range: -318 to +1200 °F / -196 to +650 °C
- Fire test: API 6FA, API 607
- Fugitive emission: MESC 77/300 - EPA 21
- Pressure testing standard: API 598

ADDITIONAL FEATURES

- Triple offset sealing geometry with bi-directional, zero leak sealing capability
- Low friction design for low operating torque
- Fire safe due to all metal construction and hard faced body seat
- Stainless steel + graphite laminated seal ring for mild severe service
- Solid stainless steel + hard face seal ring for severe service
- Anti blowout stem
- Operator mounting flange as per ISO 5211



KEY STANDARDS

- API 609
- API 607
- API 6FA
- API 598
- MESC SPE 77/300
- EPA 21
- Internal test specifications

2-48" | Class 150-300

QUALITY, ECONOMY & PERFORMANCE

Ranger Valve America Ltd.'s (Ranger™) triple offset butterfly valve has been designed to withstand the rigorous conditions that are associated within the refining, chemical, petrochemical, oil and gas processes. Utilizing the triple offset, elliptical sealing geometry concept, in conjunction with a laminated/solid floating seat ring and a robust construction, this valve is capable of achieving *bi-directional, zero leakage shutoff capabilities, low operating torques and practically zero sealing face wear, even after extensive cycling.*

TRIPLE OFFSET GEOMETRY

The triple offset geometry, see Figure A, has two offsets in the stem/disc alignment, created by offsetting the stem in two axis, see Offset 1/2. The third offset, which is the geometry of the sealing surface, is an offset, right angled conical shaped profile machined into the body and seat sealing components by using the same angled fixture to ensure that both sealing geometries are identical.

The optimal seat angle is between 15 to 20 degrees, which eliminates binding of the seal ring to the body seat during the open/close cycles, see Offset 3.

FIRST OFFSET

The centre of the stem is offset behind of the centre line of the seal ring/body seat interface, along the valve bore centre line. This offset offers a very basic “cam” motion which will ensure that the seal ring makes 100% contact with the body seat when closed. By having only a single offset, there will be 100% disc interference through 60 degrees of rotation at the beginning/end of each open/close cycle.

SECOND OFFSET

The centre of the stem is offset from the seal ring/valve bore centre line. With the stem now being offset in two planes, the disc will now function in a more perfect “cam” motion, with the opposite

sealing ring faces, perpendicular to the stem, enscribing different arc radii.

These two offsets ensure that the seal ring can move freely away from/into the body seat with minimal interference and that the correct body/seal ring interface contact area is always maintained. By having only a double offset, there will be 100% disc interference through 10 degrees of rotation at the beginning/end of each open/close cycle.

THIRD OFFSET

The body/seal ring cone axis is offset from the centre line of the stem so as to provide a conical sealing surface that allows the seal ring to rotate in and out of the body seat without any interference. By having a triple offset, there will be 0% disc interference through 90 degrees of rotation.

