Bray®

YOUR GLOBAL FLOW CONTROL PARTNER™

The Tri Lok Advantage

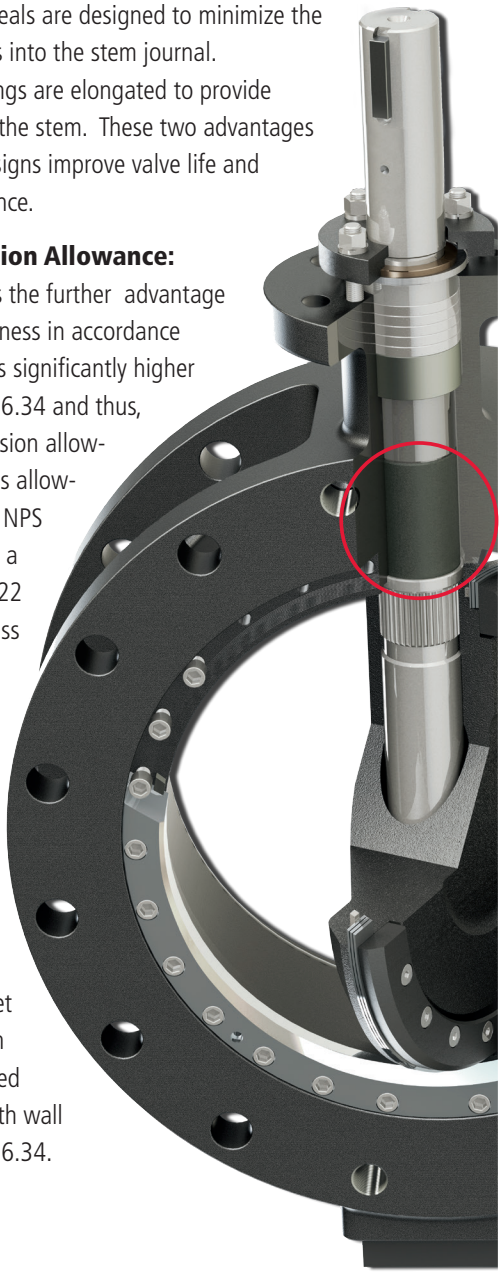
Triple offset butterfly valves are used in place of gate valves and ball valves in critical isolation applications. Bray's Tri Lok Valve incorporates design features that most other triple offset valves do not have that improve performance in abrasive, erosive and corrosive environments, and substantially extend the overall service life of the valve and the value to the customer.

Replaceable Seat: The Tri Lok design has both a seat and a seal ring that are independently field replaceable. The valve may be re-trimmed or repaired on site without having to be returned to the manufacturer or specialized repair center. If operating conditions change, the seats and seals can be replaced. If the valve is damaged from weld slag, debris due to upset of a catalyst bed, or other unanticipated occurrence, the seat or seal can be replaced with minimal delay in startup and minimal downtime. No special tools are needed. For most other triple offset valves with an integral seat, a small amount of wear or damage can result in the valve having to be removed and sent to a repair facility or manufacturing plant for additional seat material to be added, followed by re-machining the integral seat and its hardened surface. This results in significant delays and costs, even lost production.

Splined Stem: Tri Lok's internal disc-to-stem connection eliminates external retention components, such as taper pins, keys or locating bolts, which are subject to corrosion or vibration failure. External connections may require machining or grinding for removal, but the Tri Lok disc and stem is easily removed by sliding the splined stem from the disc. The Tri Lok connection allows axial movement of the disc independent of the stem. Therefore, the seal ring and seat remain in position, unaffected by temperature fluctuations and pressure effects on the stem. The splined connection offers maximum strength and is perfectly aligned. Close tolerance engagement between the disc and stem minimizes hysteresis.

Bearings: Bearing seals are designed to minimize the ingress of particulates into the stem journal. In addition, the bearings are elongated to provide maximum support of the stem. These two advantages over conventional designs improve valve life and operational performance.

Additional Corrosion Allowance: The Tri Lok design has the further advantage of having a wall thickness in accordance with API 600, which is significantly higher than that of ASME B16.34 and thus, include a liberal corrosion allowance. For example, this allowance is 8 mm for a 6 NPS Class 150, 16 mm for a 12 NPS Class 150 or 22 mm for a 24 NPS Class 150. When Tri Lok valves are used in the place of API 600 gate valves, there is no sacrifice in body wall thickness or in corrosion allowance. This is not the case with most other triple offset butterfly valves, which are commonly designed and manufactured with wall thickness to ASME B16.34.



Tri Lok® Triple Offset Valves

SEALING COMPONENT COMPARISON

Comparison	TRI LOK		Competitor's Triple Offset Valve		Competitor's Triple Offset Valve	
	MATERIAL	HARDNESS	MATERIAL	HARDNESS	MATERIAL	HARDNESS
BODY SEAT	UNS S31600 NITRIDED	67 HRC	Stellite 21 Overlay	27-40 HRC**	ASTM A479 UNS S31600	<20HRC
SEAL RING	ASTM A240 UNS S31803	31 HRC	ASTM A240 UNS S31803	31 HRC	ASTM A240 UNS S31600	<20HRC
HARDNESS DIFFERENCE	36 HRC MINIMUM		9 HRC MAXIMUM 4 HRC MINIMUM		0 HRC HIGH POTENTIAL FOR GALLING	

**higher hardness values indicate a work hardened surface

Hard Seat (3 Points):

Point 1 (Extremely Hard Seat): Tri Lok valves are provided standard with a nitrided 316 stainless steel seat and a surface hardness of 67 HRC, which helps resist abrasion and erosion due to particulates such as sand, molecular sieve desiccant carryover, silica, ceramic particles and dust. The nitriding process used by Tri Lok is a unique specification, carefully controlled to assure uniform case thickness and hardness. This hardness is from 30 to 40 HRC HIGHER than a typical Stellite™ 21 seat and the case depth (or penetration) is integral to the seat material. It is not a coating or overlay which may be prone to cracking or separation from the substrate material. Nitrided 316 stainless steel seats have been cycle tested along with Stellite™ and other coatings and verified to provide superior wear performance.

Point 2 (Galling Eliminated): The hardness difference between the seat and seal is very important in a triple offset butterfly valve and often an overlooked factor in valve design and selection. While the technical advantage of the third offset in a triple offset valve is to reduce and almost completely eliminate friction, a difference in hardness is still required to avoid adhesive wear (galling) in both the seat and seal ring. Some triple offset valves have virtually no difference in hardness between the seat and seal ring (with both seat and seal often being 316 SS}, which results in a high probability for galling after the valve is installed and operated a few times under differential pressure. With Stellite™ 21 having a hardness anywhere from 27 to 37 HRC and a duplex SS seal ring having a hardness of approximately 31 HRC, the hardness difference is only 4 to 6 HRC. This small difference is also susceptible to galling. However, the Tri Lok design uses a 316 SS nitrided seat with, as previously noted, a surface hardness of 67 HRC nominal. This high hardness seat contacts a UNS S31803 seal ring with approximately 31 HRC. This difference in hardness of 36 HRC eliminates galling as a factor in performance.

Point 3 (Superior Performance Reliability): Stellite™ alloys are cobalt-based, and when weld deposited to steel, pick up iron through diffusion typically resulting in a decreased corrosion resistance. This corrosion resistance is often significantly less than 316 SS despite the high chromium content of Stellite™. Bray's proprietary nitriding process applied to 316 SS maintains a high corrosion resistance as an advantage over StelliteTM in most corrosive environments. Considering variability in overlay welds that sometimes result in hairline cracks in Stellite™, and concerns with separation at the Stellite™M-to-steel substrate interface, performance and reliability of Stellite™ in some corrosive environments is questionable.

Inherently Fire Safe: Although Tri Lok has undergone multiple successful fire-tests to API 607 by customer request, the metal-to-metal seat-to-seal design is inherently fire-safe – regardless of the direction of flow or high-pressure side. Unlike most gate valves and ball valves, the triple offset butterfly valve design does not trap fluids in the body cavity and thus further reduces hazards if called upon to operate and isolate following a fire

Bray® CONTROLS
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