
Bray
TRI LOK® SERIES
ANSI Class 150, 300, 600 & 900
(PN 10 to 140)
Wafer/Lug/Flanged Bodies
3" - 60" (80mm-1500mm)
Tri Lok®
THE ULTIMATE
CRITICAL SERVICE
TRIPLE OFFSET VALVE

TRIPLE OFFSET QUARTER TURN VALVES

HIGH PRESSURE ZERO LEAKAGE METAL TO METAL SEALING

3"- 60" (80mm-1500mm)

Bray Controls is proud to introduce the ***Tri Lok***® Series Triple Offset Valve – the latest evolution in high performance quarter turn valve technology. Bray's ***Tri Lok*** is the only triple offset built with 21st Century innovation.

The ***Tri Lok*** Series offers customers the benefit of Bray's innovation. Design improvements include:

- Unique Hub & Bearing system provides maximum stem support while preventing media ingress.
- Unique Splined disc/stem connection facilitates self-alignment of the disc seal with the seat, and eliminates the requirements of external pins, keyways and other types of fasteners.
- Seat/Seal system features field replaceable body seats and disc seals.

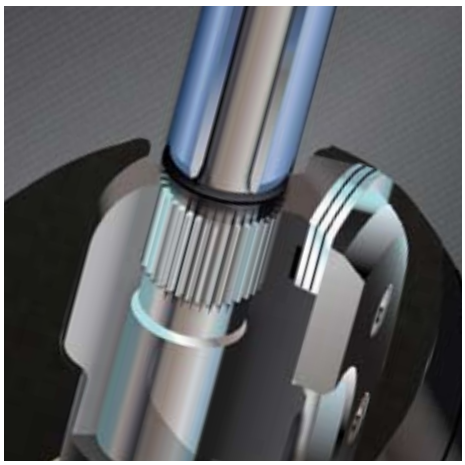
Bray's comprehensive knowledge and commitment to innovation has produced the *Tri Lok*®, the ultimate critical service triple offset valve.

Contained in this brochure is an overview of the *TriLok*'s primary features. For complete technical data please contact the Bray factory or authorized distributor.

BODY HUBS & BEARING SYSTEM

Bray's unique bearing system features **Inboard Body Hubs** that protrude into the valve flow way, allowing the bearings to extend fully to the disc. This configuration produces the least amount of unsupported stem length possible. Stem deflection and strain during operation under high pressure drops are greatly reduced – substantially enhancing performance and increasing the valve's service life. The top and bottom **Stem Bearings**, offered in NiResist D2 as standard, securely support the stem. By incorporating advanced metallurgy in the bearing design, Bray has eliminated stem galling under heavy loads.

The Body Hubs also raise the stem entry point into the body above the area where the media particles normally settle and over time potentially penetrate between stem and bearing. This profile minimizes bearing failure and extends the valve cycle life.



SPLINED DISC/STEM CONNECTION

Bray's *Tri Lok* is the only valve in its class with a splined disc/stem connection. The *Tri Lok* connection allows axial movement of the disc independently of the stem. Therefore, the disc seal and body seat remain in position, unaffected by temperature fluctuations and pressure effects on the bottom of the stem. This design prevents the typical misalignment problems of rigidly attached discs and stems. The splined connection offers maximum strength. Close tolerance engagement between the disc and stem eliminates hysteresis.

Tri Lok's internal disc to stem connection eliminates exposure of stem retention components, such as pins or taper pins, to the line media. It is common for such exposed connections to result in leak paths, erosion, corrosion and vibration failures. Additionally, these external connections often require difficult machining for disassembly. Disassembly of Bray's connection is performed by just pulling the stem out of the disc.

SEAT/SEAL SYSTEM

Tri Lok's frictionless, non-interference metal-to-metal seal delivers zero leakage with the least amount of torque. The metal-to-metal contact is inherently **Firesafe**. The standard **Body Seat** material is 321 Stainless Steel, with other materials and/or Stellite overlay available. The standard **Disc Seal** is a laminated 321 Stainless Steel /Graphite ring, secured in position by a full-faced retainer bolted to the disc. The elasticity of the laminated ring ensures uniform peripheral sealing with the seat, achieving full shutoff regardless of flow direction. Bray offers a solid metal disc seal for high temperature and severe applications. The system ensures bi-directional zero leakage throughout the full pressure/temperature range.

Tri Lok Series valves feature independent field replacement of both the body seat and the disc seal. Two drilled and tapped holes in the body seat ease removal. Seat and seal materials can be changed, if application requirements change, without replacing the entire valve. Maintenance time and costs are substantially reduced, and the service life of the valve is extended.

TriLok®

- **Wafer, Lug & Flanged Bodies are offered for all piping systems**
- **Matched Disc & Body Materials provide equal rates of thermal expansion**

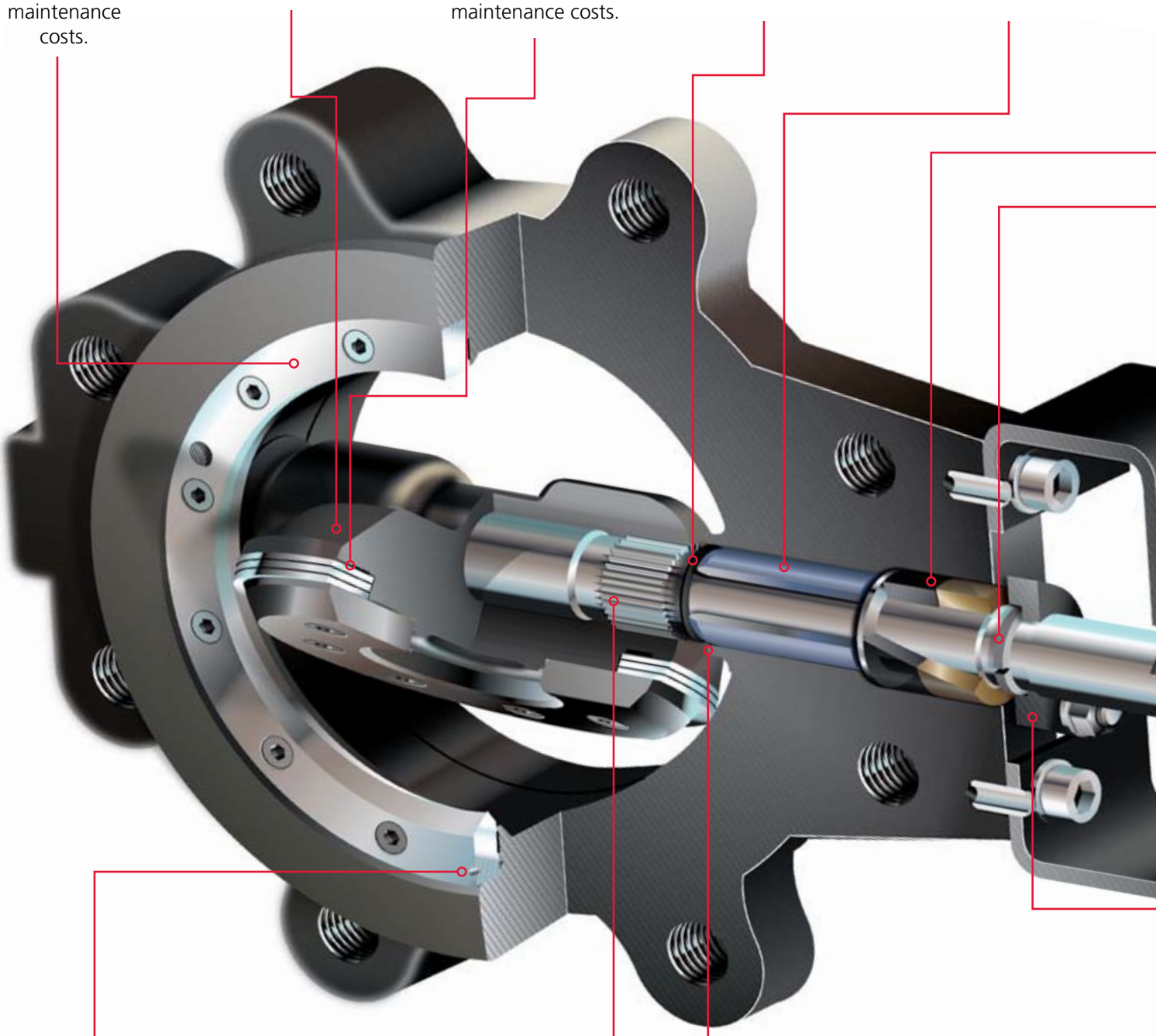
Replaceable Body Seat reduces field maintenance costs.

Optimized Disc Profile provides maximum strength and maximum flow capacity.

Replaceable Disc Seal reduces field maintenance costs.

Bearing Seals eliminate media solids ingress.

Stem Bearings support the stem and eliminate galling.



Alignment Marks on body, body seat, disc, disc seal and disc seal retainer provide error free assembly.

Splined Disc to Stem Connection assists Seat/Seal alignment, and eliminates hysteresis and external pins/taper pins.

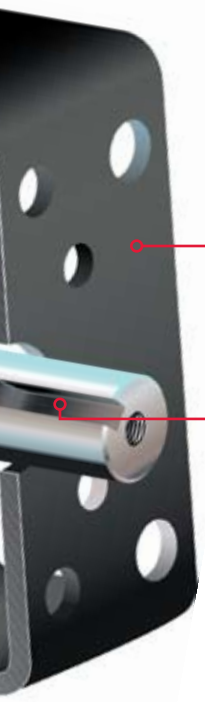
Inboard Body Hub & Bearing System minimizes stem bending and strain, prevents process debris ingress and maintains Body Seat / Disc Seal alignment.

Lug Valve shown in the recommended horizontal installation position.

- **Bi-Directional Seal ensures zero leakage throughout the full pressure/temperature range of the valve.**

Stem Seal System
eliminates fugitive emissions.

Stem Blow Out Prevention Ring
prevents stem ejection in the unlikely event of internal failure.



Universal Mounting
Actuator Mounting Plate and Stem Connection conform to ISO 5211.

Disc Position Indication
stem end provides fool-proof verification of disc location.

Stem Packing Gland
allows easy access should field adjustment ever be needed.

Triple Offset Geometry

allows for metal-to-metal sealing without interference and provides a long service life.

TRIPLE OFFSET DESIGN

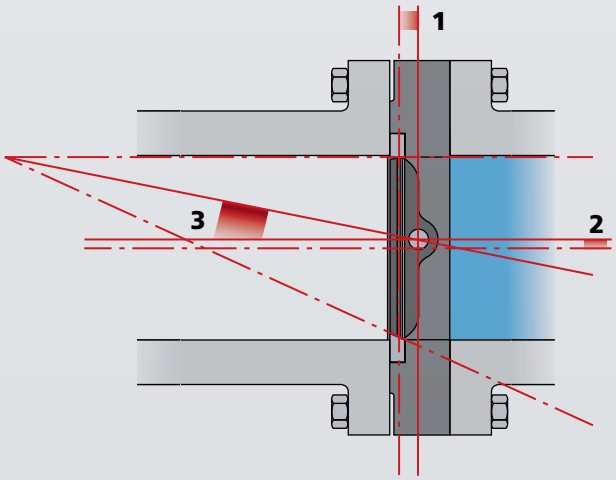
Below is a description and illustration of the traditional triple offset design.

The first offset is the stem set away from the disc edge (**1**). This allows for a continuous sealing surface uninterrupted by the stem.

The second is the stem centerline offset to one side of the valve centerline (**2**).This produces a cam-like rotary motion of the disc that pulls the disc edge from the seat upon opening. As the disc reaches the closed position, this cam-like offset converts the rotary motion to a linear motion that pushes the disc into the seat. The disc edge does not contact the seat throughout the full range of travel.

The third offset consists of conical seal and seat edges with both cones tilted away from the axis of revolution (**3**). The offset tilting of the cones facilitates rotary disengagement of the disc from the seat. This cone-in-cone geometry removes the entire disc edge from the seat immediately upon opening rotation of the disc and engages contact only at closing. All interference between disc and seal is eliminated.

Contact Bray to learn what the power of triple offset valves can deliver to you. Insist on *Tri Lok*!



Temperature Range:
-425°F to +1,200°F
-254°C to +650°C

Pressure Ratings:
ANSI Class 150, 300, 600 & 900
to full ASME B16.34
(PN 10 to 140)

FEATURES

ALIGNMENT MARKS As standard, alignment marks in the body, body seat, disc, disc seal ring and disc seal retainer ensure proper assembly of these parts.

DISC Using proprietary software, the disc profile has been optimized to provide the highest strength.

STEM Standard stem materials are 17-4 PH, 416 Stainless Steel and Nitronic 50. Other materials are available. The high-strength, one piece stem features a **Blow-out Proof Prevention Ring** located above the packing box and outside the pressure boundary. All stem ends conform to ISO 5211 and provide clear indication of disc position in accordance with API 609.

WAFER/LUG/DOUBLE FLANGED BODIES The one-piece bodies offer bi-directional sealing as standard to full ANSI Class 150, 300, 600 and 900 (PN 10 to 140) pressure ratings. The neck allows for easy access to the stem for packing adjustments and actuator mounting.

STEM SEAL & PACKING SYSTEM

The high temperature graphite stem seal provides constant compression for a positive seal around the stem preventing fugitive emissions and providing firesafe protection. A Stainless Steel Thrust Washer holds the stem seal in position. The stem packing system is easily adjustable without removing the mounting plate or actuator. A slight 1/4 turn of the hex head nuts is usually all that is needed should field adjustment ever be required.

PRESSURE/TEMPERATURE RATINGS

The Bray *Tri Lok* Series is fully rated to ASME B16.34, thus eliminating the need for seal material compatibility, temperature or pressure limit verifications.

MATERIALS OF CONSTRUCTION

Valve bodies and discs are available in WCB Carbon Steel and CF8M Stainless Steel as standard. Duplex Stainless Steel, Monel, Hastelloy® and other materials are available. The disc is normally the same material as the body to allow full pressure/temperature rating and maintain uniform thermal expansion at elevated temperatures. Stem, Seat/Seal and all trim materials are selected to best meet the required mechanical properties while providing any needed corrosion resistance. For further specifics consult the *Tri Lok* Series trim materials listing.

Standard materials of the body seat and disc seal are 321 stainless steel. *Tri Lok*'s sealing geometry eliminates any possibility of galling between these materials since the entire disc seal immediately disengages from the seat upon opening rotation of the disc.

APPLICATIONS

Tri Lok Series valves are well suited for operation in vacuum to high pressure and cryogenic to high temperature applications. The standard resilient metal-to-metal seal system is inherently firesafe, and is suitable for steam, slurries and other difficult media. Applications requiring a zero leakage seal can now be accomplished with one valve, the Bray *Tri Lok*.

When compared to gate, globe, or ball valves of the same size and class, Bray quarter turn valves provide space, weight and installation reductions – resulting in lower construction and maintenance costs.

The *Tri Lok*® is Designed to Meet the following Standards / Specifications:

Valve Design & Pressure/Temperature Ratings: ASME B16.34
Fire Safe tested: ISO 10497:2004 (API 607, 5th Edition)
Fugitive Emission testing: EPA Method 21 and TA LUFT
Fugitive Emission requirements: TA LUFT
Stem Blow-Out Prevention: API 609
Stem Connection and Actuator Mounting Flange: ISO 5211
Face to Face Dimensions: MSS-SP-68 / API 609 Category B, ISO 5752, EN558-2
Seat testing: API 598, API 6D, ISO 5208
Flange Drilling: ASME B16.5, ASME B16.47, ISO 7005, DIN 2501
Flange Finishes: MSS-SP-6 / ASME B16.5
Valve Markings: MSS-SP-25 / ASME B16.34
Operation: MSS-SP-91
Disc Position Indication: API 609
Body Wall Thickness: ASME B16.34
Manufacturing Quality: ISO 9001

RECOMMENDED INSTALLATION GUIDELINES

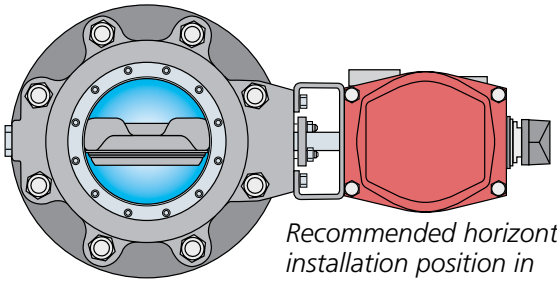
Bray *Tri Lok*® Series quarter turn valves can be easily installed in either horizontal or vertical piping systems. Since the *Tri Lok* is most often used in the most difficult applications, the service life can be improved by following these suggestions.

Where possible, install the *Tri Lok* with the stem horizontal with respect to the ground. If this installation is unavailable Bray recommends orienting the stem at angles with respect to the ground. This will prevent process debris from directly contacting the stem bearing area. In addition, on larger valve sizes the weight of the disc will be supported along the full length of the bearing journals. These positions will minimize operational wear.

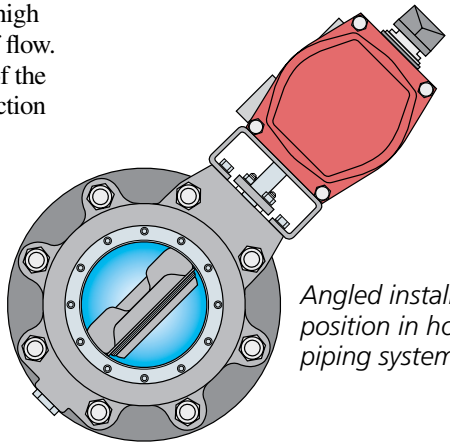
Although all Bray *Tri Lok*® Series valves are bidirectionally seal-tight, they are marked with an arrow indicating the preferred high pressure side, normally the direction of flow. On any intended application a review of the valve's direction with respect to its function when closed should be considered. The valve should be installed with the high-pressure side directed toward the stem when the valve is in the closed position.

Following these few simple guidelines will ensure the maximum performance and life cycle from the Bray *Tri Lok*.

Per request at time of order placement, Bray can mount the actuator or gear operator to best suit the intended application.



Recommended horizontal installation position in horizontal piping system.



Angled installation position in horizontal piping system.

Direct Mounting of Compact, High Torque Bray Pneumatic and Electric Actuators

Tri Lok® Series valves can be automated inexpensively with Bray's pneumatic and electric actuators. These actuators fully complement the *Tri Lok* and direct mount without the need for large brackets and adapters. Stem end connections and direct mount plates conform to ISO 5211. Bray has designed the most advanced, highest quality line of actuators and Brayline accessories available today.

*At left, a Series 92 Pneumatic Actuator is mounted to a 6" **Tri Lok** wafer valve. At right, a Series 70 Electric Actuator is shown mounted to a 6" **Tri Lok** lug valve.*

DISTRIBUTOR

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