



FEATURES AND BENEFITS

Unique features and benefits of the Flo-Tite TriPro Series 3 Piece, High Performance, Fire Safe Ball Valve



Introduction

The Tri-Pro valve is an innovative, proven valve design constructed from series of superior valve components and technologies specifically engineered to eliminate concerns that engineers have had about using 3 piece ball valves.

This superior quality, rugged and universal purpose design is a valve for all fluids and ideal for saturated or superheated steam, slurries, semisolids and corrosive services in diverse industrial, chemical, power, gas, paper and OEM applications.

Flo-Tite has eliminated the major reasons why many valve users do not use 3 piece valves. Their typical concerns are: additional leak paths, problems with NPT bolts, nuts, washers and poor body seal containment.



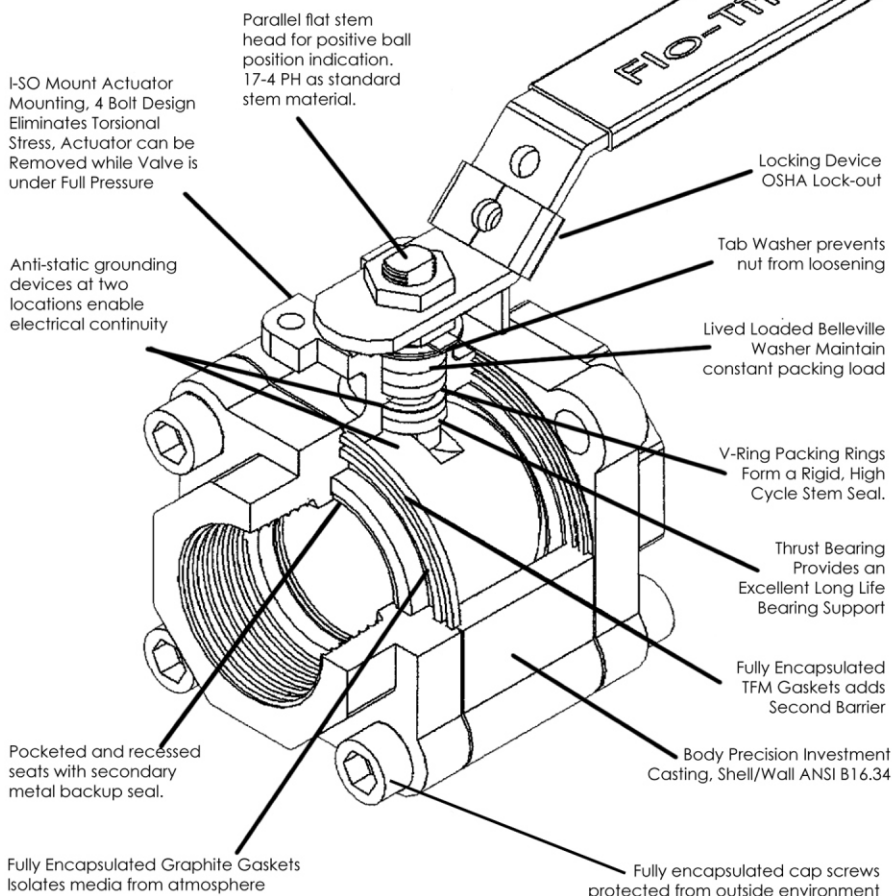
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To review Flo-Tite's design specifications and standards of compliance and technical specifications:

Design Specifications and Standards of Compliance

Technical Specifications



All Tri Pro valves are designed to meet ASME/ANSI B16.34 class 600&900 specifications and can be certified as such upon request at order submittal. The valve design is in compliance with BS 5351, BS 5159

Threaded End Connections meet ASME/ANSI B1.20.NPT, BSPTISO R/7,BS21

Socket Weld End Connections meet ASME/ANSI B16.11. Butt Weld End Connections meet MSS SP72. ANSI B16.25, B16.5 Figure 2 detail recommended sch. 40 up to 1000 PSI, sch. 80 up to 2200 PSI.

Flanged End Connections meet ASME/ANSI Class 600, ASME/ANSI B16.10 and B16.5

MSS SP25 compliance for standard marking system All Tri-Pro Valves meet NACE MR0175 for sour gas service.

All valves are Fire Safe and certified to API 607 4th Edition. Fire Safe Designed Valves must have Graphite Stem packing.

Federal Spec WW-V-35C Type II valve body and end connections are high quality investment cast and solution annealed/ normalized.

All valves are hydrostatically shell tested to 1.5 x rating. All valves 100% air tested under water at 80-100 psi. Complies with API-598, BS6755Pt.2.

Vacuum Service Suitable to 20 Micron

Specially cleaned and lubricated valves can handle services of 10-3 mm. of Hg (1 micron).

Quality Assurance

All valves are manufactured to ISO 9001 quality standards

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Flo-Tite's Van Guard stem sealing system, designed to minimize fugitive emissions. Increases safety and provides an immediate ball valve solution to the newer EPA performance requirements, for valves meeting with a leak rate of less than 500ppm.

Flo-Tite's Van Guard seal, state of the art stem sealing system. Incorporating a triple set of valve stem seals. This unique system eliminates the possibility of valve stem leaks in most all media applications.

STAGE I - FRONT LINE

Stage I provides a front line defense against leakage. The blow-out proof stem shoulder has a 45 degree bell shaped slope. The bell shaped design offers more sealing surface, effectively blocking all leak paths during rotation. The wedging action of the portion of the stem is far superior to the common small flat stem shoulder design.

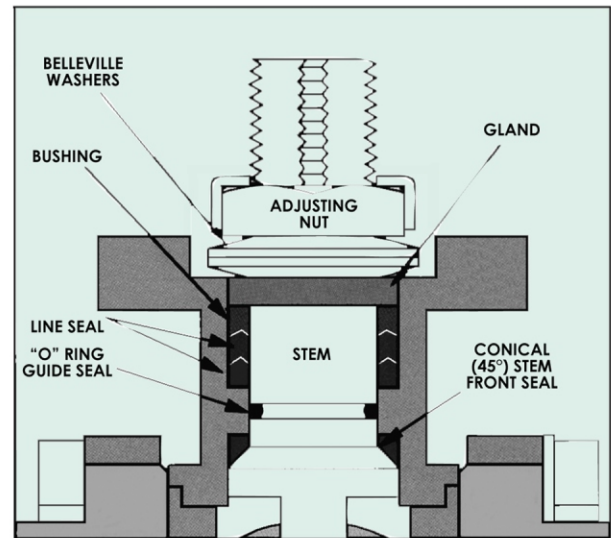
STAGE II - GUIDE-SEAL

The O-ring originated early in valve design and has been a proven performer in high cycle applications. Its basic function reduces the potential of machining imperfections and provide a low torque flexible seal. This center guide also helps to maintain a perfect stem alignment, by eliminating side loading stress which can cause stem leaks. Standard O-Ring is Viton, optional materials are available, consult factory.

STAGE III - LIVE-SEAL

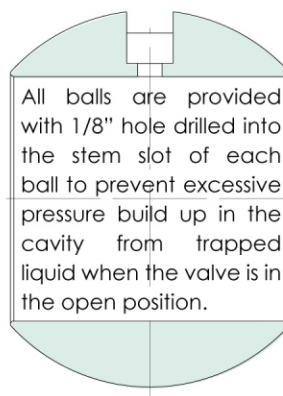
Live-Seal is considered the intellectual component and the workhorse of Flo-Tite's Van Guard stem sealing system. Working in unison with stages I and II, stage III calls upon the use of V-Ring packing sets which expands side ways as it is compressed and pressurized blocking all air pockets. The Van-Guard stem system is energized by belleville washers which continueously adjusts packing compression to compensate for wear, pressure or temperature fluctuations.

Whether your service involves volatile organic compounds, volatile hazardous chemicals, or air pollutants. Flo-Tite's ball valves are by design dependable, long lasting and fully maintainable. Flo-Tite has various valve solutions and designs that provides end users freedom of choice for the toughest requirements imposed by the industry and by international standards.



The Ball Design provides added standard safety features:

Ball Design Added Safety Feature



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In addition, the Tri-Pro valve is offered as a 2,250 psi standard. Many of the 3 piece valves on the market start out as 1000 pound WOG rated valve, and some will jump up to a 1,500 pound WOG. **The Tri-Pro is a full 2,250 psi pound psi WOG valve!**

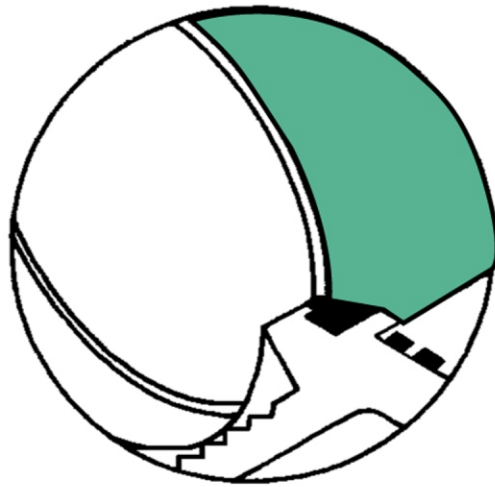
Full port and reduced port options: (show drawings of both full and reduced port)

With the reduced port valve Flo-Tite is able to “up rate” the valve to 3,000 psi as standard for sizes through 1 inch. Full port has the standard 2,250 psi rating.

The pressure rating can be upgraded with Flo-Tites special 50-50 seat material, which is a combination of PTFE (S-TEK) and granular stainless steel. This seat material capability provides increased strength and temperature capacity that allows for the increased pressure rating on the full port valve up to 3,000 psi.

Since this special material combination provides a harder seating arrangement that increases the overall torque of the valve it may be a consideration for automation. This typically is not a concern for manual valve applications.

Other important seat and seal features of the Tri-Pro series: Flow path protection



Sealing in end caps



**Seats & dual seals are
fitted into valve end caps**

To summarize the additional features and benefits of the Tri-Pro series:

- 1) **Valve Castings:** All valve castings are investment cast. Bodies are either stainless steel type 316 CF8M with weld ends being 316L CF3M or WCB A216 carbon steel. Ball and stem will be with 316SS ball and stem on the stainless bodied valves; 304 SS or 316 SS on the carbon steel bodies. All assembly hardware is 304SS including the valve handle. Stainless valve castings are solution annealed/normalized for the highest quality and for added strength. All wetted flow paths have a fully machined I.D.
- 2) **Three piece valve:** The “mix and match” threaded, socket weld, and butt weld end connections between the same valves. Are easy to do with the Tri-Pro Series flanged ends.
- 3) **Valve Ball:** Valve balls are precision machined and mirror finished for bubble-tight shut-off with low operating torque. As an added safety feature, a hole in the stem slot of each ball equalizes pressure between the body cavity and the line media flow when the valve is in the open position.

Optional:

- A) Vented ball, positive release to upstream side assured in bypassing the upstream seat through a drilled hole in the ball. Unidirectional shut off only.
 - B) Open-Port – A Special Modified Ball
 - C) Escaping ball – A Specially Machined Ball to Reduce Wear and Valve Torque
- 4) **Cap Screws:** Standard on all Tri-Pro Series valves. Rather than a through bolt design to connect the ends to the body section, cap screws. These come in from the outside ends and THREAD directly into the body. This makes an amazingly tight connection and maintains a tremendous integrity to the overall valve. There is no way that an end connection can get “cocked” during reassembly (common for through bolt designs). This also means that Tri-Pro valves perform well in applications with significant temperature

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Swings, shorter bolts, and cap screw design handles expansion and contraction issues much better than longer bolts due to temperature deviations (from expansion and contraction of metals).

- 5) **Extensive Seat Selections Available:** The Tri-Pro series valve is available with a wide range of special seating materials. –RTFE, 50-50, UHMWPE, PEEK, to name a few.
- 6) **TFM Seating:** Standard seating material for the Tri-Pro series. This is seen as an upgrade over standard Teflon which is offered by other valve manufacture. TFM is also considered an upgrade over TFE and RTFE is most applications.
- 7) **Deep Pocketed Seating:** The Tri-Pro valve offers an amazing seat design that provides an overall greater mass of seating surface as well as deep pocketing that helps maintain the mechanical integrity of the seat. This design also provides a greater overall strength as compared to standard ball valve seating. In addition, *the deep pocketing and recessed seating design* offers a greater amount of protection for the seating on all three sides. This seat design provides a pocket and a metal shoulder seat support that protects the seat as flow media passes by. This is excellent for higher pressure applications and higher flow velocities.
- 8) **Seat Loading:** All end loaded. Seats, body seals, all load into the Tri-Pro end cap. This further allows for ease of maintenance and repair.
- 9) **Socket Weld Ends:** Weld in place. No disassembly required. This offers a huge savings for customers who wish to install weld end valves. The valve has longer end caps, and comes standard with heat dissipating rings. This makes installation much easier, and typically saves the customer a significant amount of time and money. This hold true if installed by the plants own maintenance and especially true if they have to pay an outside contractor to install. Labor savings alone could be over \$100.00 for atypical 2 inch valve. NOTE: Extra long ends are also available as an option. This may prove to be the better choice for some applications.

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10) **Mounting Pad:** All Tri-Pro valves have integrally cast mounting pads for ease of mounting actuation and handles. I-SO Mount Type Automation Pad is standard.

11) **Body Seals: DUAL BODY SEALS:** In-board and outboard body seals. The internal seal is TFM and is the first line of defense in ensuring the integrity of the sealing in body from leakage. The out board seal is made of spiral wound graph oil, which is a secondary seal that also provides a very tight and stable seating of the body and end connections.

12) **Stem Seals:** The Tri-Pro unique design stem seal incorporates a triple sealed live loaded stem with self-adjusting Belleville washers. This seal automatically adjusts for thermal contraction and expansion and also self-compensates due to stem seal wear. O-ring in the stem bearing area helps maintain stem alignment and reduced packing side loading and wear. The compression of low friction TFM V-ring seals also eliminates stem leakage by avoiding straight line leakage paths. As an added safety feature, all Hi Tech stem assemblies are provided standard with anti-static grounding springs.

13) **Steam Service:** This valve is rated to a full 250 PSI steam service (this is with our 50-50 seating). Our standard valve is rated to 150 PSI steam. (150 PSI Steam = 366.7 degrees F). Higher temp coverage may also be available with special seating.

14) **Need Control? Tri-Pro Is The Way To Go:** This valve can be provided with many characterized ball offerings. The Tri-Pro valve can become a quarter turn control valve to provide control valve technology and flow rates and performance all from a quarter turn ball valve. Special custom seat designs in addition to those mentioned above are also available.

15) **Metal Seated Options:** The Tri-Pro valve offers yet another option of full metal seated capabilities. Need the valve for 600 degree? 1,000 degree

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applications? The Tri-Pro valve can be modified as a full metal seated valve for high temperature applications. Seats and balls are specially designed and specially matched for the most demanding services.

16) **Cold Service:** Liquid oxygen? Nitrogen? Other cryogen applications? The Tri-Pro Cryogenic Option is yet another modification that we can provide to the Tri-Pro series. This valve can be modified into our Flo-Tite Cryogenic Valve.

17) **Fire-Safe Valves:** The standard Tri-Pro valve is a fire-safe valve. This valve is certified to API fire-safe standards as it comes directly off the shelf. No special ordering options, no plant or field modifications. Standard is Fire-Safe.

18) **Stems:** Constructed of high strength 17-4 stainless is provided as standard. Anti-static stem grounding is standard on all the Tri-Pro valves. The 17-4 PH stems provide good corrosion resistance and high torsional strength for the Tri-Pro valve.

19) **Center Bodies And End Caps:** Need just a part of the valve? Have a valve welded in line? Just need the center section? Flo-Tite standardly offers center sections at significant dollar savings to our customers. Need an end? All are available with the Tri-Pro valve.

20) **Larger Size Ranges:** Tri-Pro valves are available in 2 ½ inch, 3 inch and 4 inch sizes.

21) **Flanged Ends:** Tri-Pro valves are available in a flanged end modification. The same great valve and center sections but with flanged ends. This valve meets ANSI take-out dimensions 150-300-600 pounds flanges.

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22) **Locking Handles:** Lever locking handles are standard. And can be locked in both open and closed positions.

23) **Seating:** Have a special application that requires special seating? The Tri-Pro Series Valve is available with many different seat and seal combinations, right off the shelf. Full body cavity fillers are also available. These are standard stock for Flo-Tite.

24) **Valve Identification:** Key information is cast into the Tri-Pro body. Metal tagging info follow MSS-SP-1998 tagging guidelines and specifications. Valve users worldwide can contract Flo-Tite quickly for installation or service requirements.

25) **Automation:** Flo-Tite offers full valve automation capabilities that are available off the shelf! This valve can also be field automated through any of our high quality automation distributors. The valve can also be easily automated in the field by knowledgeable automation personnel. ISO- 5211 bolting as well as our automation friendly top flange makes field automation quick and easy.

26) **Intermixable/ Interchangeable:** Do you have a full port valve, or even a standard port valve? Flo-Tite's Tri-Pro series parts mix and match within the same series.

27) **Media Containment:** The I-SO-Mounting pad also allows for the addition of Flo-Tite's media containment cap, this is a multi-purpose device that can be used as a safety device in high temperature, emission control, and as a maintenance tool. This I-SO Mounting also allows for adapting to our cryogenic stem extension.

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28) **Weld in Place with A Shorter End To End:** Standard threaded end valves (which have a shorter face to face) ends can be modified (bore out the threads). This valve can also be welded in line without taking the valve apart.

29) **Cavity Filler Available:** A cavity filler is where Teflon (or similar modified material) is used to fill the space that is typically “open” between the valve body and ball. This does not allow line media to build up around the ball and works to prevent the ball from seizing (locking up) due to media build up or from hardening of some materials due to temperature changes or chemical reactions.

True High Performance Ball Valve Technology

A superior quality, rugged, and universal purpose valve for all fluids ideal for saturated or superheated steam, slurries, semi-solids and corrosive services in endless industrial, chemical, power, gas, paper, and original equipment applications.

| | |
|--|---|
| Three Piece Design | offers a wide selection of pipe end connections. Swing-out center body allows easy access to internal valve components. |
| Fully Protected Body Seals | Prevents seal ruptures in high pressure or steam applications. |
| Live Loaded Blow-Out Proof Bottom Entry System | Self adjust with pressure and temperature fluctuations. Blow-out proof bottom entry stem, antistatic grounds help prevent accidents and injuries. |
| Secure Body Bolting | Cap screws – fully encapsulated secure end caps to tapped center body. Insuring ease of foolproof body |

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assembly every time. Also protects bolts from outside environments.

Integral Actuator Mounting Pad

Ideal for actuation, ISO-5211 bolting, actuators may be retrofitted without disturbing the pipeline. Allows for secondary containment unit to be added when necessary.

Captured Seats

Pocketed and recessed seats with secondary metal backup seal, meeting API607-4. Super-TEK TFM, 50/50, metal seats and more.

Weld-in-Place

Heat sink construction allows in-place welding, prevents damage to soft seat rings and eliminates the need to disassemble valve for welding. Assures safe and cost effective installation.

High Strength Stem

Parallel flat stem for positive ball position indication. High strength 17-4 PH stainless steel is provided as standard.

Lockable Safety Handle

Prevents valves from being opened or closed accidentally. Lock-out meets OSHA standards with locking device.