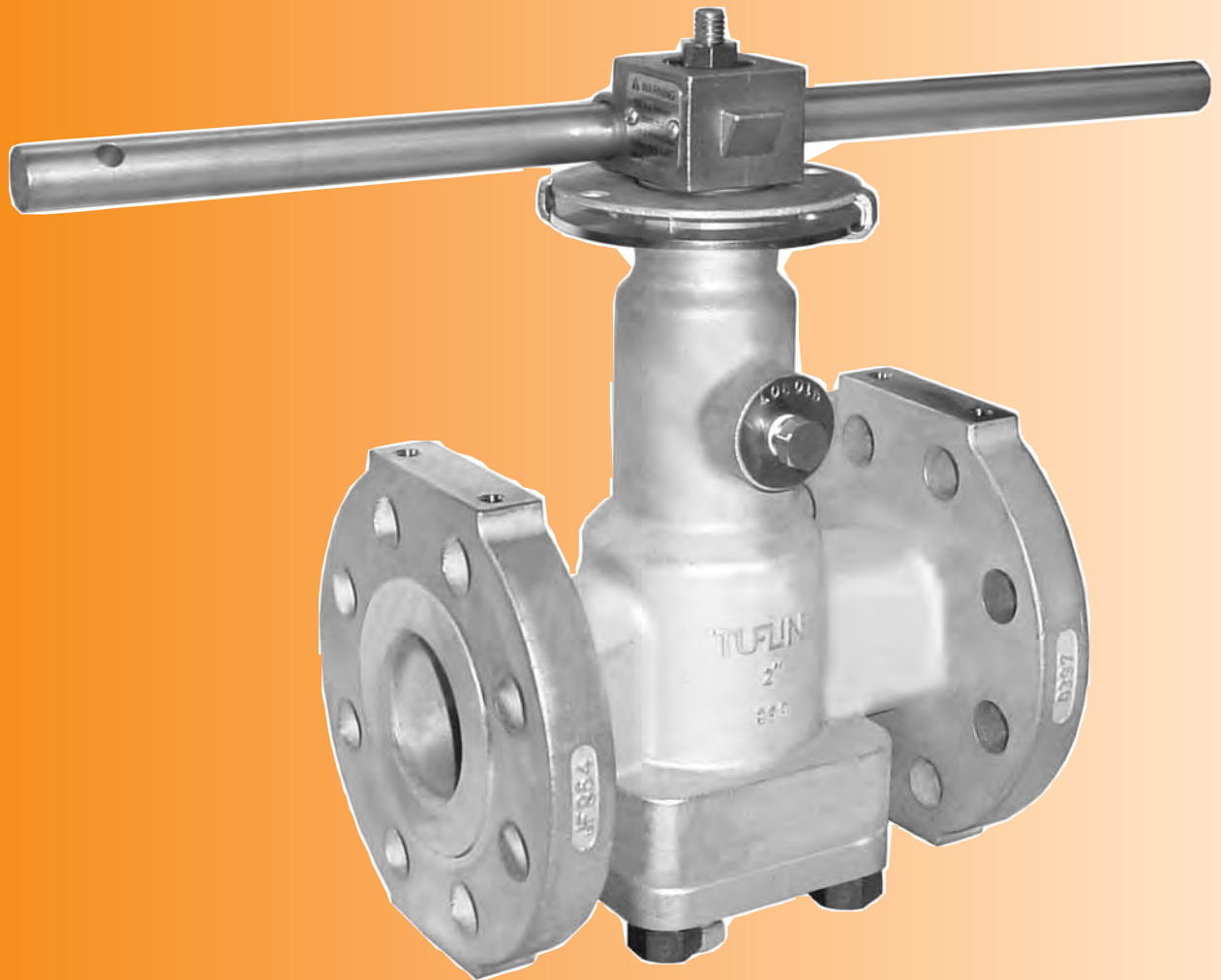


Tuflin[®] Severe Service Valves



XOMOX
Process Valves & Actuators

Tufline® Severe Service Valves

You are assured of superior sealing in hazardous applications, even with extreme thermal cycling conditions.

More Tufline valves which have been specifically designed for hazardous applications and fugitive emissions control have been in service longer than those of any other manufacturer.

Breathe easier.

Xomox offers the broadest line of valves for handling hazardous media and controlling fugitive emissions.

With this breadth of selection, Tufline can provide optimum and economical valving to meet your specific requirements.

More importantly, Tufline valving is designed to pay off with long-term, reliable, low-maintenance service life.



Built through processor partnerships.

The Tufline Severe Service valve was developed by working in close cooperation with major processors of hazardous materials. Continuing cooperation has led to further improvements.



Designed, not adapted.

This unique valve was designed from the ground up specifically for the most demanding applications.

While it employs numerous aspects of the best available technology, its distinctive design puts it in a class by itself.

Patented and proven.

This patented valve has proven itself with years of reliable performance in the most carefully monitored

Put Tufline Valves to the test

For valves in demanding processing applications, real value is . . . performance over time.

processing applications in the world



Emissions control leadership.

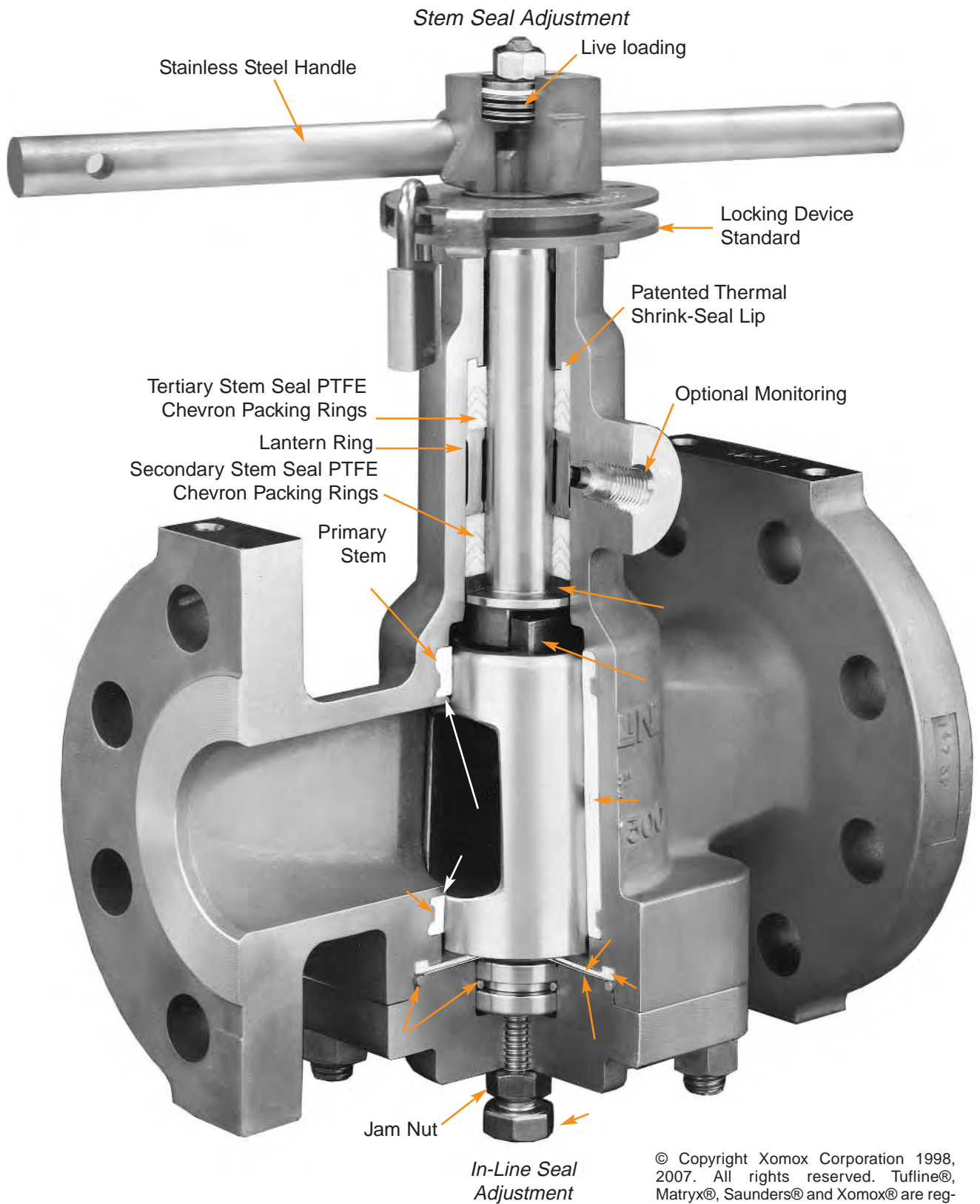
Xomox strongly champions testing procedures that will precisely evaluate



valve emissions control performance, over time, in realistic applications.

Problem solvers. Talk with a Xomox Sales Engineer about any aspect of your fluid handling system. You will get process-improving answers.

Your Xomox Sales Engineer has



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Patented external sealing system.

An exceptionally tight and continuous external seal is a must when processing hazardous media in rigorous thermal cycling conditions.

The unique, integral extended bonnet enhances sealing.

In extreme frigid or thermal cycling conditions PTFE packing will shrink. Packing shrinkage is minimized in this valve because the packing is located up in the bonnet, away from the media flow path.

PTFE chevron packing rings

Lantern ring

PTFE chevron packing rings

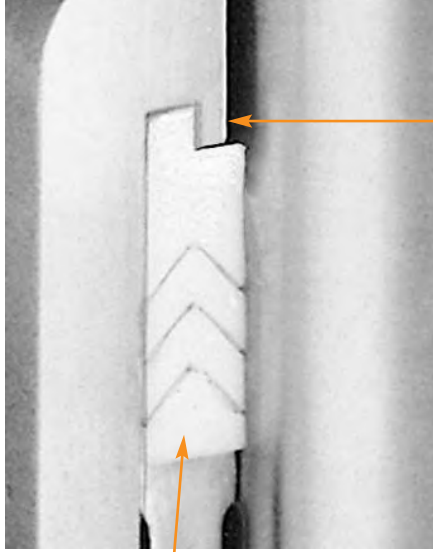
Secondary and tertiary stem sealing.

Double packing sets of PTFE chevron rings are separated by a lantern ring.

The packing is placed away from the flow media to minimize the effects of thermal cycling.

Easy to insulate.

The extended bonnet allows several inches of insulation to be placed around all valve sizes while packing adjustment remains fully accessible.

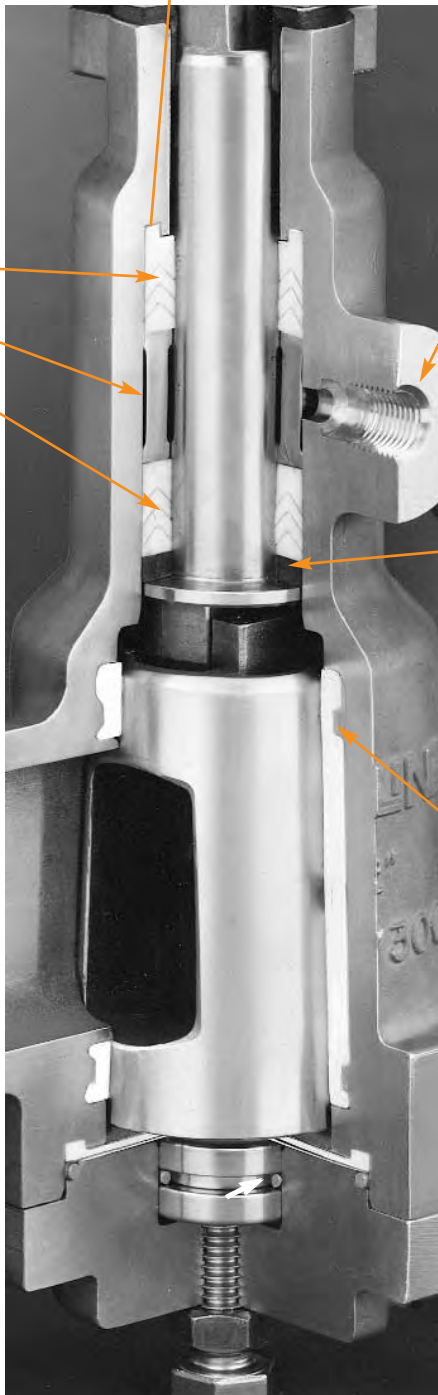


A patented shrink-seal lip helps stop fugitive emissions.

Temperature changes cause unequal expansion and contraction of valve components and sealing elements. With thermal cycling, packing shrinkage often leads to leakage along the stem.

With the patented Tufline design, radial shrinkage of the packing actually tightens the seal. An overhanging lip is machined into the interior bore of the body.

Radial shrinkage of the packing causes the packing to tighten inward against the lip, preventing leakage to the atmosphere.



Monitoring/Injection port.

As an option, the packing chamber is available with a port for monitoring packing integrity or for grease injection.

Graphite-filled PTFE ring.

A graphite-filled PTFE ring prevents extrusion of the PTFE packing. It acts as a bearing between the packing and the stem base as well as between the stem and bonnet wall.

Primary stem sealing.

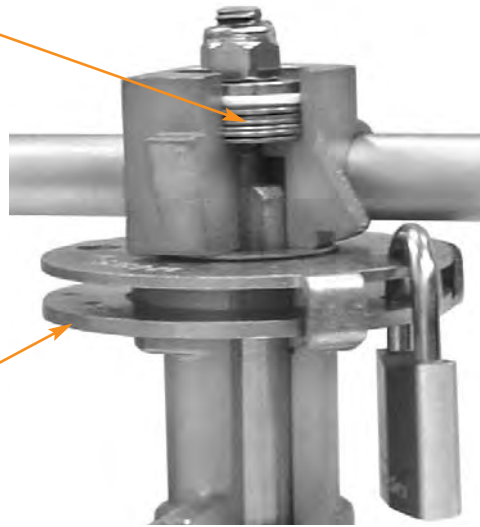
The first seal against stem leakage is accomplished by the PTFE sleeve, where it encircles the top of the plug. This means that the two stem packing sets are actually secondary and tertiary external seals.

Live loading for continuous sealing.

The set of spring washers, located in the valve hub, provide a constant, uniform load on the packing.

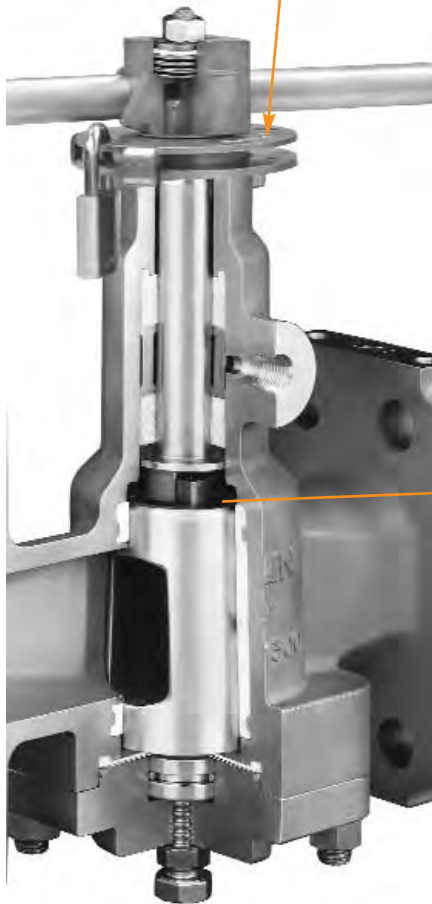
Live loading compensates for expansion and contraction of the PTFE packing that is caused by temperature fluctuations.

Locking Device Standard



Separate, accessible, easy sealing adjustment.

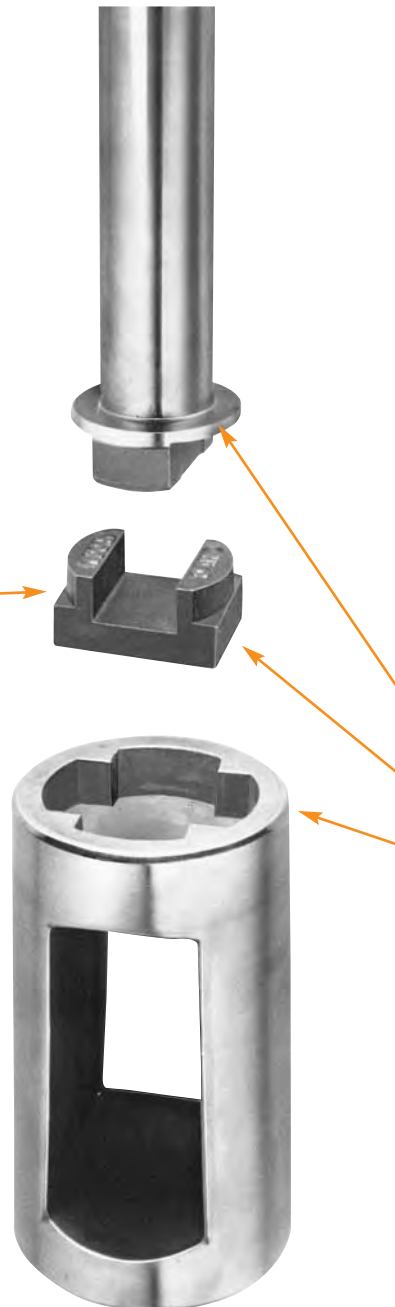
Individual adjustment of the in-line seal and the stem seal assure maximum control, flexibility, and longer service life.



An independent plug and stem eliminate side loading on the packing.

In valves with a one-piece plug and stem, differential pressure against the plug of a valve can cause the stem to lose concentricity within the packing. This causes uneven stem pressure against the packing and leak paths can develop.

In this valve, the stem is independent of the plug. A compensator, located between the stem and plug, keeps any differential pressure on the plug from affecting the stem's concentricity.



Stem

Compensator

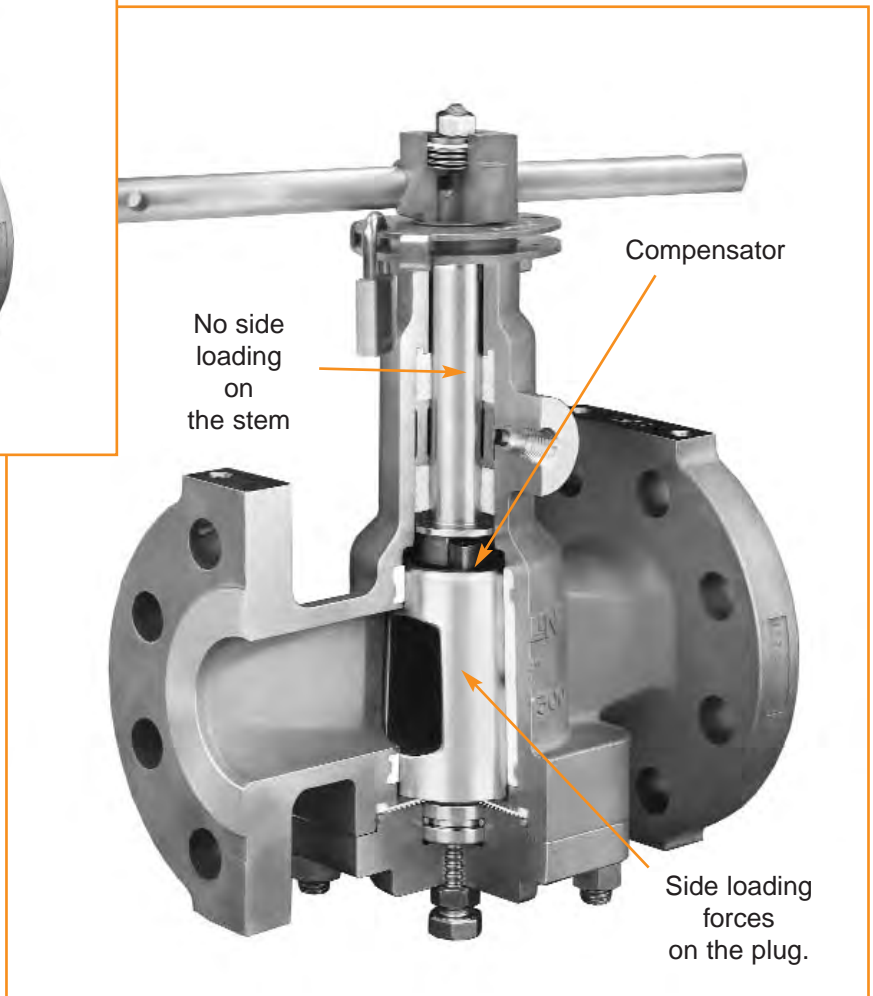
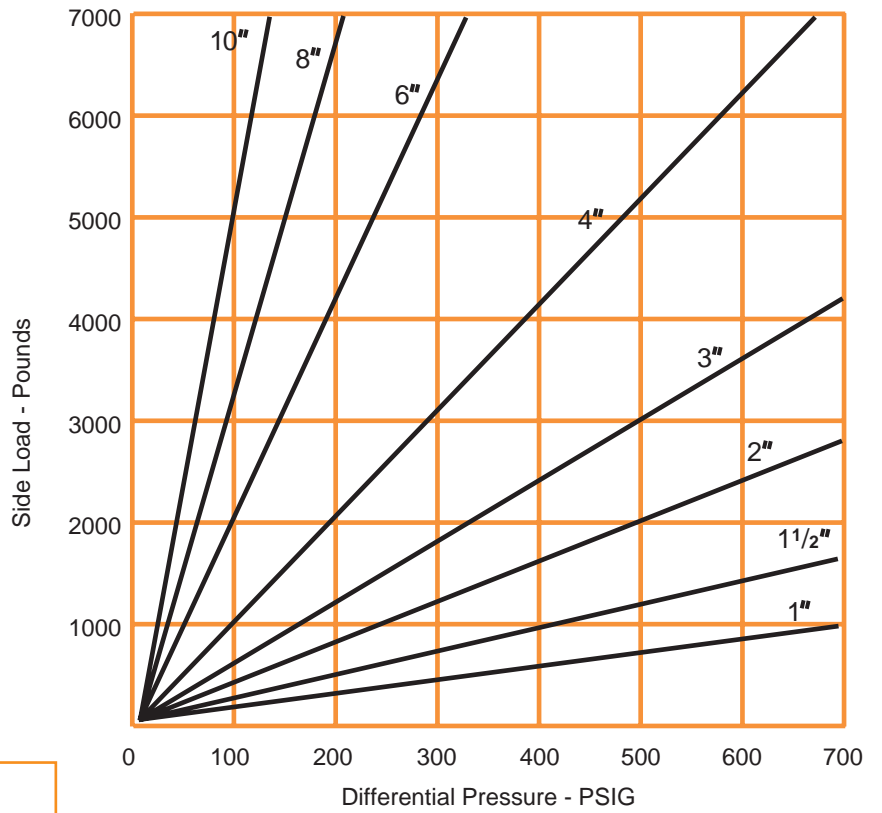
Plug

There is no side loading of the stem against the packing so leakage to the atmosphere is less likely to occur.

Overcoming powerful side loading forces that create leak paths.

This chart illustrates the typical side loading forces created on a one-piece plug and stem. This force can compress and deform the stem packing, causing leak paths to develop.

The Tufline Severe Service valve overcomes this problem



Redundant sealing assures integrity of the bottom cover seal.

Where the sleeve encircles the plug, the primary bottom seal is established.

The PFA diaphragm provides a secondary seal.

The machined counter-bore of the valve body provides a wide, serrated surface for extended sealing contact with the diaphragm.

The compression of the diaphragm between the body and the bottom cover is precisely controlled.

The edge of the diaphragm and the valve body have interlocking thermal shrink-seal lips. Temperature changes cause unequal expansion and contraction of the body and the diaphragm.

Because of the interlocking lips in the Tufline Severe Service valve, differential shrinkage of the body and diaphragm actually tighten the seal.

A metal diaphragm supports the PFA diaphragm and provides the contact for the plug adjustment button.

Two PFA encapsulated silicone O-rings are tertiary sealing elements. They are located at the cover-to-body joint and in a groove in the plug adjustment button.

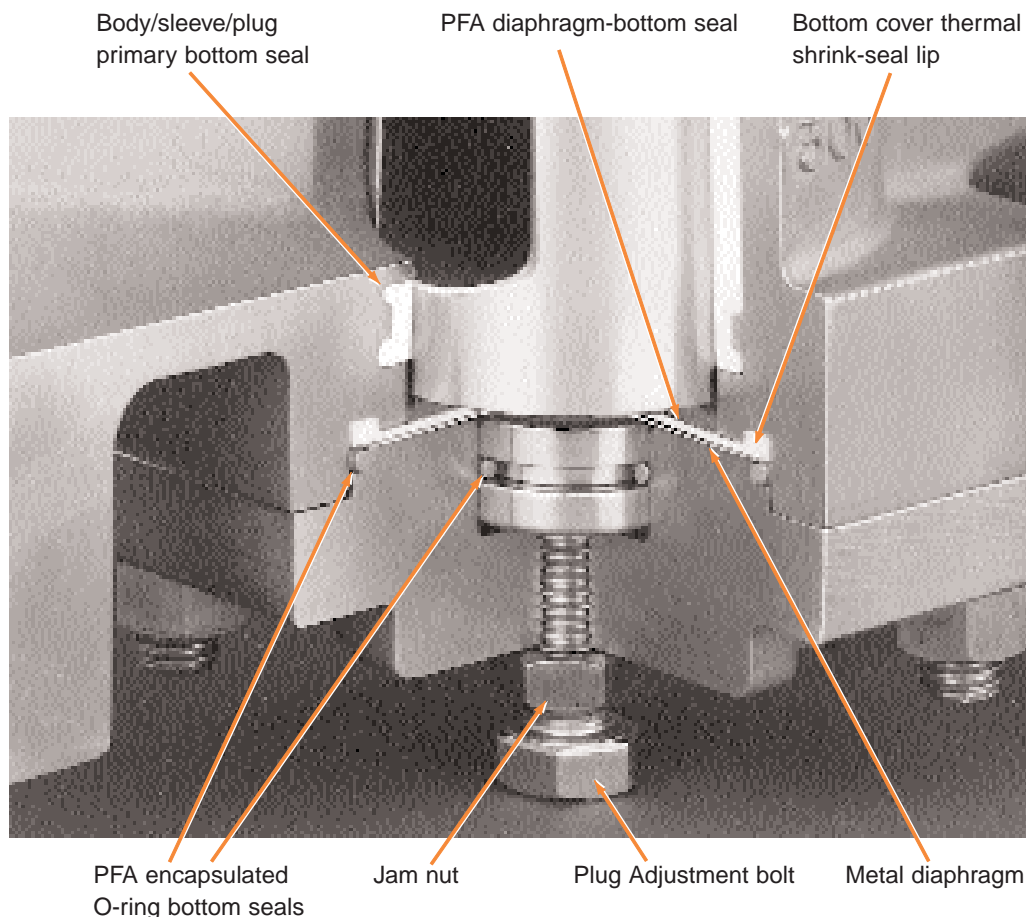
Metal to metal contact between the cover and body helps assure tightness of cover bolts under thermal cycling.

Easily adjusted in-line sealing.

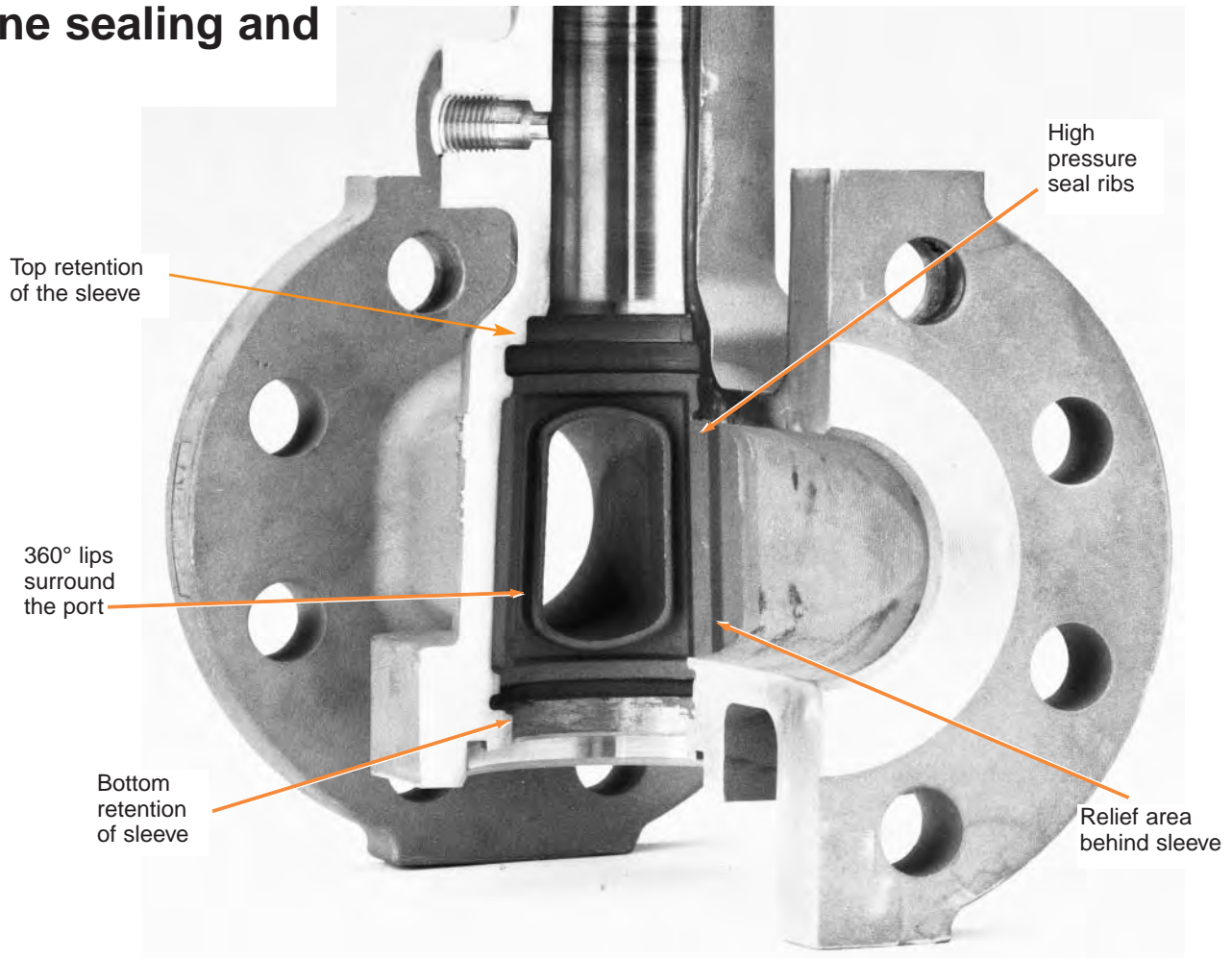
To adjust the in-line seal, loosen the jam nut on the valve bottom and turn the adjusting bolt clockwise. This action puts upward pressure on the tapered plug.

The upward thrust of the plug concentrates compression of the sleeve between the plug and body ribs.

The plug acts as a wedge, pressing the sleeve against the body, assuring a uniformly tight seal.



In-line sealing and



Body, plug, and sleeve work together for a tight in-line seal.

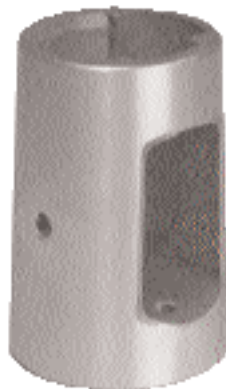
The PTFE sleeve completely surrounds the plug. The sleeve provides a fully circumferential, port-to-port sealing surface.

Self lubrication.

The PTFE sleeve has a low coefficient of friction, allowing it to act like a lubricant.

Enhanced shutoff reliability.

Even after being left open or closed without maintenance for extended periods of time, this self-lubricating design provides assurance that the valve will virtually never “stick”. This operating reliability can be vital in emergency shutoff situations.



360° lips clean and protect

These lips surround the valve ports and are an integral part of the precision body casting. These port defining lips improve valve performance and extend service life by:

- Breaking up and removing adhering, scaly deposits from the outer surface of the plug as it rotates.
- Protecting the sleeve from erosion.
- Preventing cold flow deformation and blowout.
- Eliminating sleeve rotation.

Ribs enhance in-line sealing.

For improved sealing, compression of the sleeve is concentrated between the raised rib areas and the plug. Relief areas are cast into the body between the ribs to allow for expansion of the sleeve.

Methods of operation.

Quarter-turn Tufline Severe Service valves are easy to actuate and automate. Valve sizes 1/2 through 3 inch are supplied as wrench operated with locking devices. Enclosed gear actuators are optional on these sizes.

On sizes 4 inch and larger, gear operators with locking devices are standard. A variety of on/off actuating systems are available in pneumatic, hydraulic, or electric models. Actuators are easily and securely mounted on the flanges.



Matryx vane double acting actuators.



Matryx Rack & Pinion actuators



Matryx limit switch module.

Technical data.

Typical applications.

- Chlorine
- Hydrochloric acid
- Hydrofluoric acid
- Phosgene

For other applications, consult factory.

Chlorine service.

Tufline Severe Service valves designated for chlorine service will be supplied with vented plugs. These valves are thoroughly cleaned and dried per internal Xomox chlorine cleaning standards, and are sealed and packaged in plastic containers. The valves will meet requirements of the Chlorine Institute.

Vacuum service.

Tufline Severe Service valves are suitable for vacuum service to as low as .01 microns in absolute pressure. However, special cleaning is required to achieve this rating.

End connections.

ANSI Class 150, Class 300 and Class 600 raised face flanges.

Optional features.

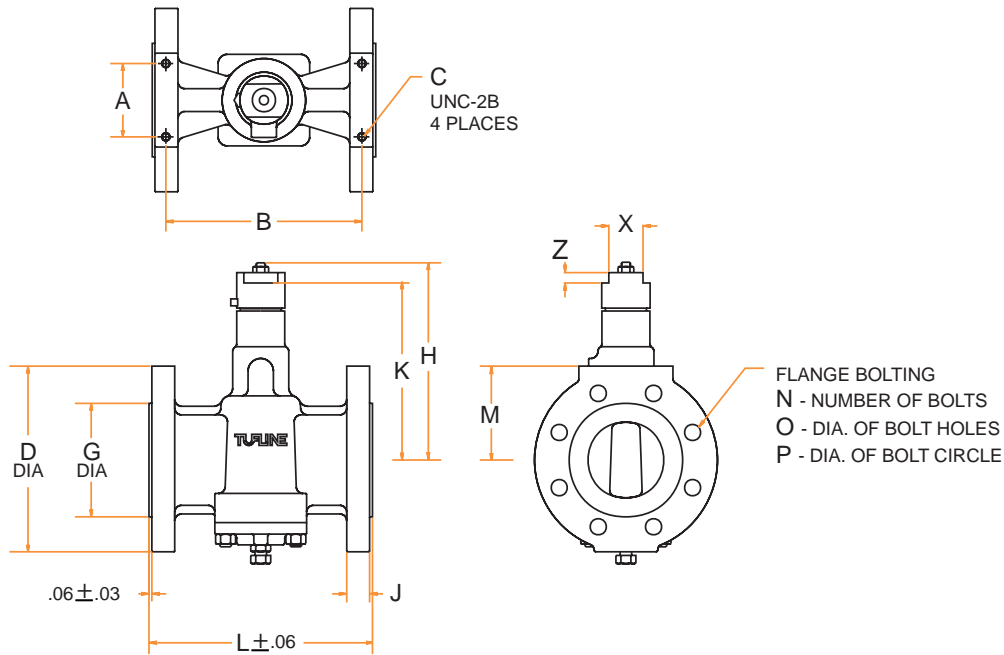
Grease injection connection in packing area. Leak detection port above packing area. Lantern ring purge connection.

Custom designs and modifications.

The products in this catalog may be obtained in other sizes and materials from the Xomox Special Products Group, which offers design, engineering and manufacturing services for custom products and modifications.

Severe Service Sleeved Plug Valve Dimensions

Dimensions are in inches.
Weights (Wt.) are in pounds
and are approximate.



Class 150 . . . Figure **097**

Size	L	D	G	H	K	J	M	X	Z	N	O	P	A	B	C	Wt.
1/2	4.63	3.88	1.38	4.91	3.50	.41	1.94	1.874	0.56	4	.63	2.38	1.750	4.063	1/4 - 20 x .63	14
3/4	4.63	3.88	1.69	4.91	3.50	.41	1.94	1.874	0.56	4	.63	2.75	1.750	4.063	1/4 - 20 x .63	14
1	5.00	4.25	2.00	8.09	6.50	.44	2.13	1.874	0.56	4	.63	3.13	1.750	4.438	5/16 - 18 x .63	18
1 1/2	6.50	5.00	2.88	8.43	6.84	.56	2.50	1.874	0.56	4	.63	3.88	1.750	5.750	5/16 - 18 x .63	25
2	7.00	6.50	3.62	8.81	7.22	.88	3.25	1.874	0.56	4	.75	4.75	2.250	6.312	5/16 - 18 x .63	36
3	8.00	7.50	5.00	9.47	7.88	.75	3.75	1.874	0.56	4	.75	6.00	3.500	7.125	3/8 - 16 x .63	75
4	9.00	9.00	6.19	11.00	9.66	.94	4.50	1.864	0.56	8	.75	7.50	4.000	8.000	7/16 - 14 x .63	82
6	10.50	11.00	8.50	12.12	10.71	1.00	5.50	1.864	0.56	8	.91	9.50	4.000	9.44	7/16 - 14 x .63	105
8	11.50	13.50	10.63	13.58	12.06	1.12	6.75	1.990	0.56	8*	.88	11.75	5.500	10.188	1/2 - 13 x .63	185
10	13.00	16.00	12.75	14.80	13.30	1.25	8.00	1.990	0.56	12†	1.00	14.25	5.500	11.562	1/2 - 13 x .63	285
12	14.00	19.00	15	17.44	15.33	1.25	9.50	2.504	1.25	12†	1.00	17.00	6.00	12.530	1/2 - 13 x 1.00	425

* 2 top and 2 bottom holes in each flange are tapped for 3/4 - 10 UNC threads.

† 2 top and 2 bottom holes in each flange are tapped for 7/8 - 9 UNC threads.

ASTM designations

Monel	ASTM A494 M-30C
Hastelloy C	ASTM A494 CW6M
Alloy 20	ASTM A351 CN7M
Carbon Steel	ASTM A352 LCB
316SS	ASTM A351 CF8M

Cv factors for

Size	1/2	3/4	1	1 1/2	2	3
Cv	9	9	43	89	172	294

Size	4	6	8	10	12
Cv	548	1075	1591	2159	3200

Class 300 . . . Figure **0397**

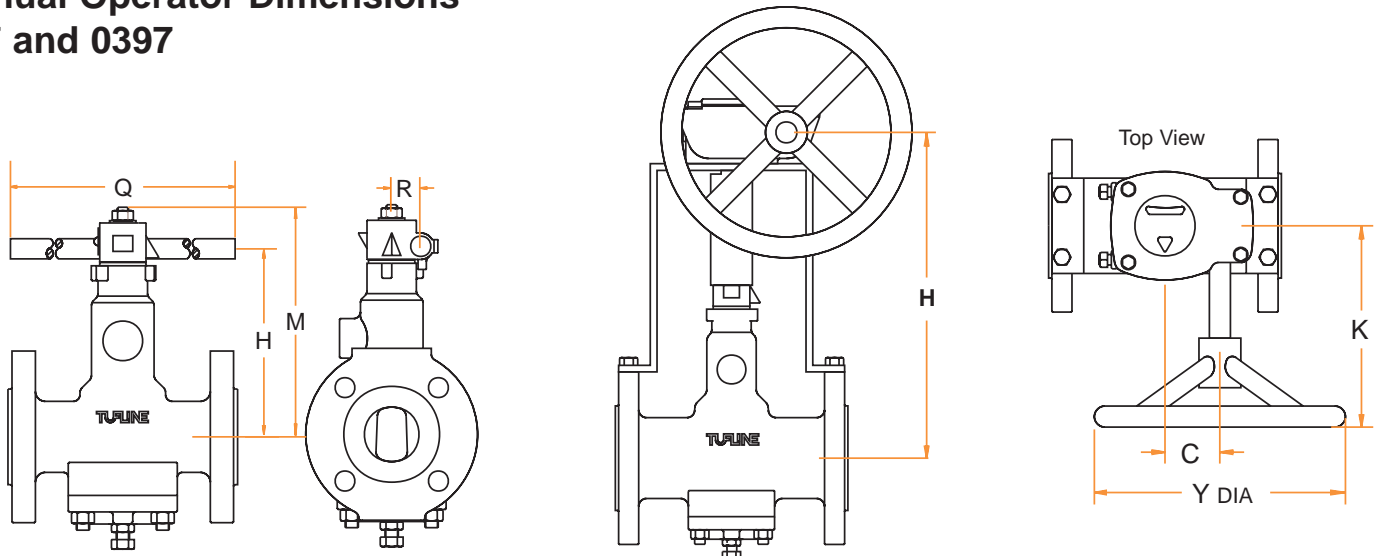
Size	L	D	G	H	K	J	M	X	Z	N	O	P	A	B	C	Wt.
1/2	6.00	4.63	1.38	4.91	3.50	.63	2.31	1.874	.56	4	.62	2.62	1.750	5.312	1/4 - 20 x .63	17
3/4	6.00	4.63	1.69	4.91	3.50	.63	2.31	1.874	.56	4	.75	3.25	1.750	5.312	1/4 - 20 x .63	17
1	6.50	4.88	2.00	8.09	6.50	.69	2.44	1.874	.56	4	.75	3.50	1.750	5.750	5/16 - 18 x .63	22
1 1/2	7.50	6.12	2.88	8.43	6.84	.81	3.06	1.874	.56	4	.88	4.50	1.750	6.625	5/16 - 18 x .63	31
2	8.50	6.50	3.62	8.81	7.22	.88	3.25	1.874	.56	8	.75	5.00	2.250	7.562	5/16 - 18 x .63	44
3	11.13	8.25	5.00	9.47	7.88	1.12	4.12	1.874	.56	8	.88	6.62	3.500	9.937	3/8 - 16 x .63	87
4	12.00	10.00	6.19	11.00	9.66	1.25	5.13	1.864	.56	8	.88	7.88	4.000	10.688	7/16 - 14 x .63	97
6	15.88	12.50	8.50	12.12	10.71	1.44	6.25	1.864	.56	12	.88	10.62	4.000	14.000	7/16 - 14 x .63	175
8	16.50	15.00	10.63	13.25	12.06	1.63	7.50	1.990	.56	12*	1.00	13.00	5.500	14.630	1/2 - 13 x .63	275
10	18.00	17.50	12.75	14.50	13.31	1.88	8.75	1.990	.56	16†	1.13	15.25	5.500	15.690	1/2 - 13 x .63	420
12	19.75	20.50	15	17.44	15.33	2.00	10.38	2.504	1.25	16**	1.25	17.75	6.000	17.380	5/8 - 11 x 1.00	605

* 2 top and 2 bottom holes in each flange are tapped for 7/8 - 9 UNC threads.

† 2 top and 2 bottom holes in each flange are tapped for 1 - 8 UNC threads.

** 2 top and 2 bottom holes in each flange are tapped for 1 1/8 - 8 UNC threads.

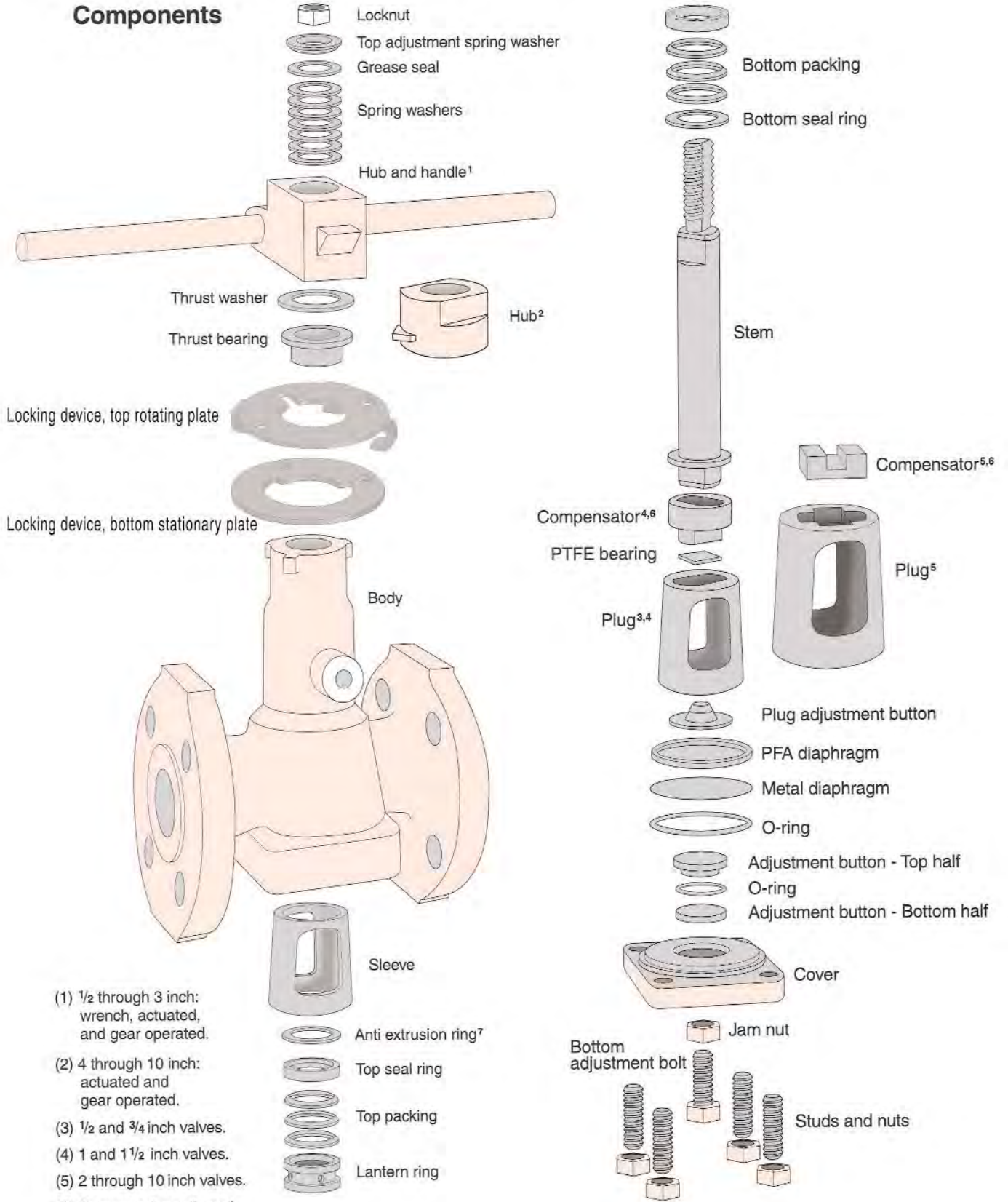
**Manual Operator Dimensions
097 and 0397**



Size	H	M	Q	R
1/2	3.50	4.91	11.25	.75
3/4	3.50	4.91	11.25	.75
1	6.50	8.09	12.50	1.16
1 1/2	6.84	8.43	12.50	1.16
2	7.22	8.81	18.00	1.28
3	7.88	9.47	24.00	1.28

Size	H	K	C	Y
1	11.76	9.63	2.62	12.00
1 1/2	12.11	9.63	2.62	12.00
2	12.52	9.63	2.62	12.00
3	13.18	9.63	2.62	12.00
4	14.57	11.13	3.50	18.00
6	15.88	13.43	3.50	24.00
8	17.37	13.43	3.50	30.00
10	18.62	14.25	5.38	30.00
12	24.00	18.58	5.50	24.00

Components



- (1) 1/2 through 3 inch: wrench, actuated, and gear operated.
- (2) 4 through 10 inch: actuated and gear operated.
- (3) 1/2 and 3/4 inch valves.
- (4) 1 and 1 1/2 inch valves.
- (5) 2 through 10 inch valves.
- (6) Compensator not used on 1/2 and 3/4 inch valves
- (7) 2 inch and above

Materials of construction

Valve Part	WCB/316/ 316/WCB	HC/HC/HC (Chlorine)	MO/MO/HC (Chlorine)	LCB/MO/HC (Chlorine)	A20/HC/HC	316/MO/HC	316/316/316
Body*	WCB	Hastelloy C	Monel	LCB	Alloy 20	316SS	316SS
Plug	316SS	Hastelloy C	Monel	Monel	Hastelloy C	Monel	316SS
Stem	316SS	Hastelloy C	Hastelloy C	Hastelloy C	Hastelloy C	Hastelloy C	316SS
Cover	WCB	Hastelloy C	Monel	LCB	Alloy 20	316SS	316SS
Cover bolting †	B7**	B7**	B7**	B7**	B7**	B7** or B8	B8
Lantern ring	Hastelloy C	Hastelloy C	Hastelloy C	Hastelloy C	Hastelloy C	Hastelloy C	Hastelloy C
Metal diaphragm	Hastelloy C	Hastelloy C	Hastelloy C	Hastelloy C	Hastelloy C	Hastelloy C	Hastelloy C
Bottom adjustment button	304SS	Hastelloy C	Monel	Carbon Steel	Alloy 20	304SS	304SS
Bottom adjustment bolt	304SS	Monel	Monel	Monel	304SS	304SS	304SS
Jam nut	304SS	Monel	Monel	Monel	304SS	304SS	304SS

* Optional connection for grease injection - lantern ring port will be furnished as 1/4-inch NPT female with solid pipe plug of similar material to valve body with PTFE tape thread sealant.

** PTFE coated.

† Other material combinations and cover bolting materials are available upon request.

Locknut	Hastelloy C or 316 stainless steel
Top adjustment spring washer	Stainless steel
Grease seal	PTFE
Spring washers	Inconel
Hub	CD4MCu
Thrust bearing	35% graphite PTFE
Sleeve	PTFE
Top seal ring	PTFE
Packing rings	PTFE
Bottom seal ring	35% graphite PTFE
Compensator	Hastelloy C
Compensator bearing	PTFE
Plug adjustment button	PTFE
Diaphragm	PFA
Locking Device	Stainless Steel

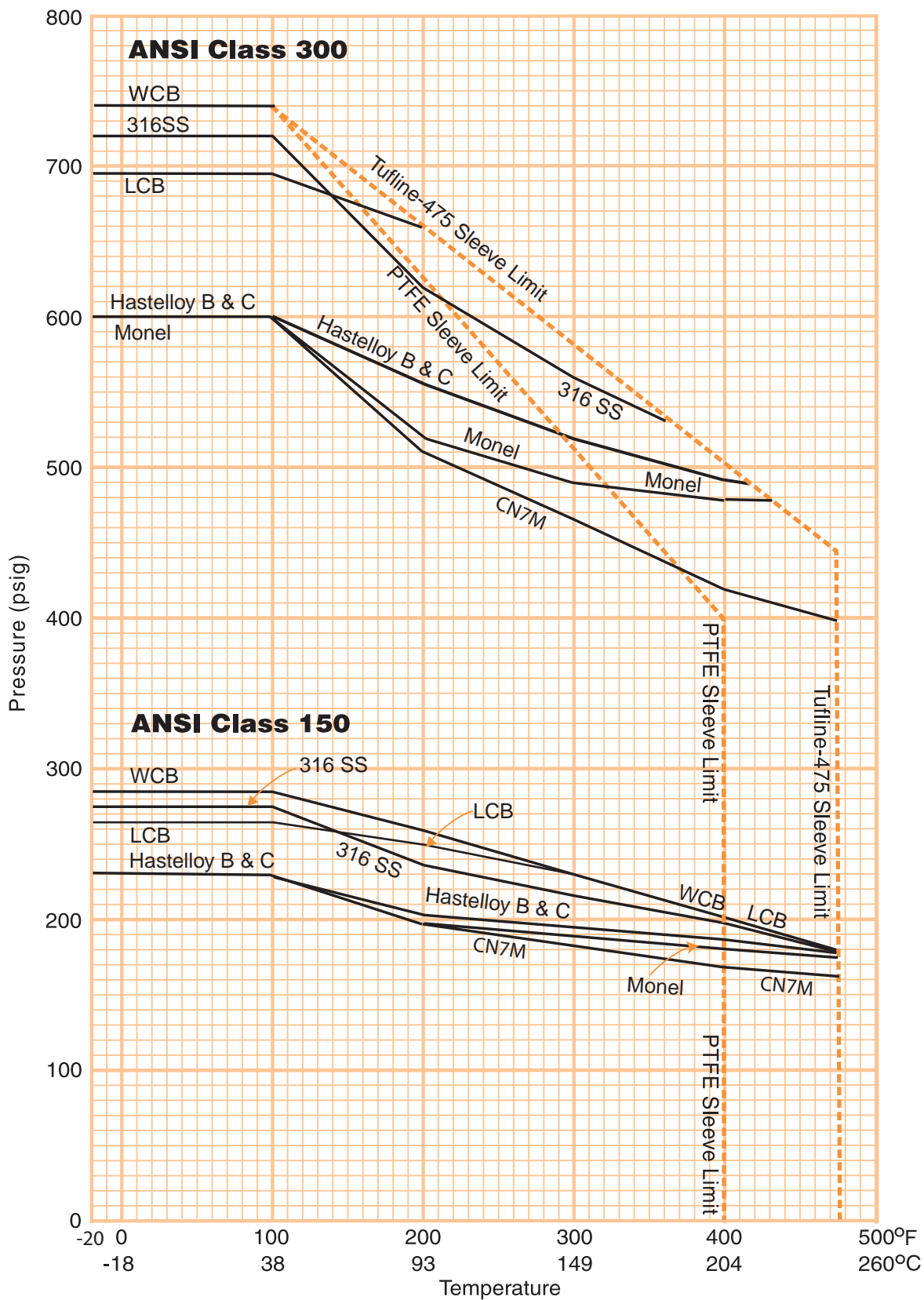
Operating Torques* Severe Service valves with PTFE sleeves

Valve Size	Break Torque ft-lb	Seat Torque ft-lb	Run Torque ft-lb
1/2	19	11	10
3/4	19	11	10
1	55	34	28
1 1/2	110	69	55
2	151	89	76
3	165	96	83
4	330	199	165
6	388	413	344
8	1073	646	536
10	1980	1183	990
12	2888	1733	1444

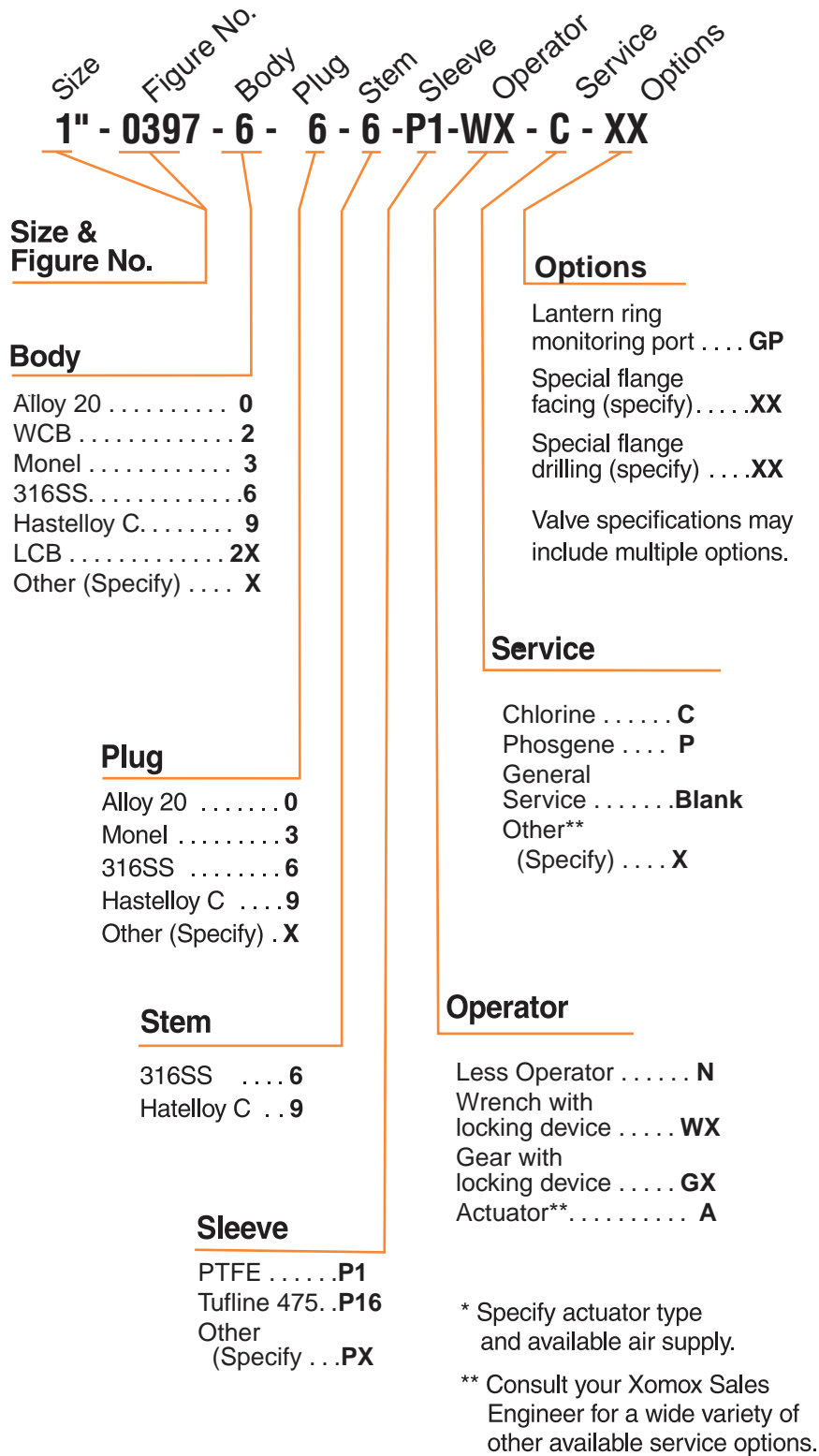
*Since most Tufline Severe Service valves are cleaned for chlorine service, torque values may be higher.

Pressure Temperature Ratings

Based on ANSI B16.34, 2004 Edition



How to order



Global Capabilities For Global Customers



Worldwide capabilities.

No matter where in the world you are, Xomox technical support and services are available from:

- 16 Manufacturing Facilities
- 18 Service Centers
- 50 Sales Offices
- More than 200 Xomox Authorized Distributors

Product selection.

Xomox offers the broadest line of process valves, actuators, accessories, and related services including:

- Tufline® Process Valves
- Saunders Diaphragm Valves
- Matryx® Rack & Pinion, Vane Actuators
- Xomox XRP™ Actuators

Product responsibility.

Xomox's concern for product performance extends to the product's period of service. We feel it is important for users to also be aware of their responsibilities. Our products are manufactured and used in numerous applications with a wide variety of service conditions. While general guidelines are often furnished, it obviously is not possible to provide complete and specific performance data for every conceivable service condition. Therefore,

Global locator.

For a listing of Xomox Manufacturing Facilities, Service Centers, Regional Offices, and Authorized Distributors, visit our web site www.xomox.com.

Xomox literature.

All Xomox catalogs and technical data are available as PDF files at www.xomox.com.

Phone support.

Call your nearest Xomox Sales Office or the Xomox World Headquarters:
Phone: 513-745-6000
Fax: 513-745-6093

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Cincinnati, Ohio 45242

XOMOX
Process Valves & Actuators

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