



brands you trust.



XOMOX[®], PACIFIC VALVES[®] and WTA[®]

Hydrofluoric Alkylation Valves



Crane ChemPharma & Energy

www.cranecpe.com



Hydrofluoric Alkylation Valves

XOMOX® Tufline®, Pacific Valves®, WTA®

XOMOX® Tufline® Sleeved Plug Valves (SPV)

XOMOX® Tufline® SPV HF valves have a long and successful history in HF refineries around the world. Tight and secure in-line sealing, cavity freeness and self-cleaning characteristics have enabled successful performance throughout the years.

The **NEW XOMOX® Tufline® HF4D** meets the highest emission standards in the industry for HF applications: API 641 Group B & E certified under 100 ppm and ISO 15848-1 BH CO3 392°F/200°C SSA 0.

XOMOX® Tufline® Tertiary Top Seal SPV for HF applications are listed in UOP & ConocoPhillips Petroleum Company's HF Alkylation Process Design Specification Manual. This Top Seal design meets EPA Method 21.



NEW XOMOX® Tufline® HF4D



XOMOX® Tufline® Tertiary Top Seal SPV



Pacific Valves®

Pacific Valves® manufacturer of Gate, Globe and Check valves has over 50 years history in Hydrofluoric (HF) industry – Manufacturing API 600, 602, and 623 for these demanding applications.

WTA®

WTA® Bellows Sealed Globe Valves provide superior fugitive emission protection for Hydrofluoric Acid (HF) applications including Alkylation. WTA® HF Bellows Sealed Globe Valves meet and exceed API 598, TA-Luft, and ISO 15848-1 requirements. Every valve is tested to zero leakage.



ISO 15848 Standard Introduction



International Organization for Standardization

INTERNATIONALISO
STANDARD 15848-1

ISO 15848-1 is an International standard for fugitive emissions issued by the ISO Organization. It contains both dynamic life cycles and thermal cycles and is considered one of the most demanding fugitive emission standards for soft seated valves. This standard contains different levels of acceptance based on the number of thermal and mechanical cycles, temperature, and number of adjustments. The objective of ISO 15848-1 is to enable classification of performance in different designs and constructions of valves to reduce fugitive emissions.

Example Description Tables

ISO 15848 – 1 BH CO3 392°F – SSA 0 (200°C)

Part Composition		Number of Adjustments	
Part 1: Design • System of classification and procedures of qualification for the tests of the valve type	Part 2: Industrial (Production) • Acceptance tests in production of the valves • Non-destructive	0 / 1 / 2 / 3	

Temperature Classes				
(T-196°C)	(T-40°C)	(T RT)	(T200°C)	(T400°C)
-320°F	-40°F	Room temperature, °F	392°F	752°F
-196°C	-40°C	Room temperature, °C	200°C	400°C

Class	Measured Leak Rate ^a mg s ⁻¹ m ⁻¹	Remarks
A ^b	≤ 10 ⁻⁶	Typically achieved with bellow seals or and equivalent stem (shaft) sealing system for quarter turn valves
B	≤ 10 ⁻⁴	Typically achieved with PTFE based packings or elastomeric seals
C	≤ 10 ⁻²	Typically achieved with flexible graphite based packings

Classification	Minimum number of mechanical cycles
CO1	500 cycles, with two thermal cycles (except for RT)
CO2	1,500 cycles, with three thermal cycles
CO3	2,500 cycles, with four thermal cycles

Test Fluid	Class
H - Helium	AH, BH, CH
M - Methane	BM, CM

^a Expressed in mg s⁻¹ m⁻¹ measured with total leakage method
^b Class A can be measured only with helium using the vacuum method
 When the test fluid is **helium**, classes are identified as **AH, BH** and **CH**.
 When the test fluid is **methane**, classes are identified as **BM** and **CM**.

Manufacturing valves will be subjected to the ISO 15848-2 test as described in the norm. This is a non-destructive test that intends to address the performance of the valves (Please refer to ISO 15848 norm).

API 641 Standard Introduction



AMERICAN PETROLEUM INSTITUTE

API 641 standard specifies the requirements and acceptance criteria for fugitive emission type testing of quarter-turn valves, issued by API Organization. Type testing requirements contained are based on elements of EPA Method 21.

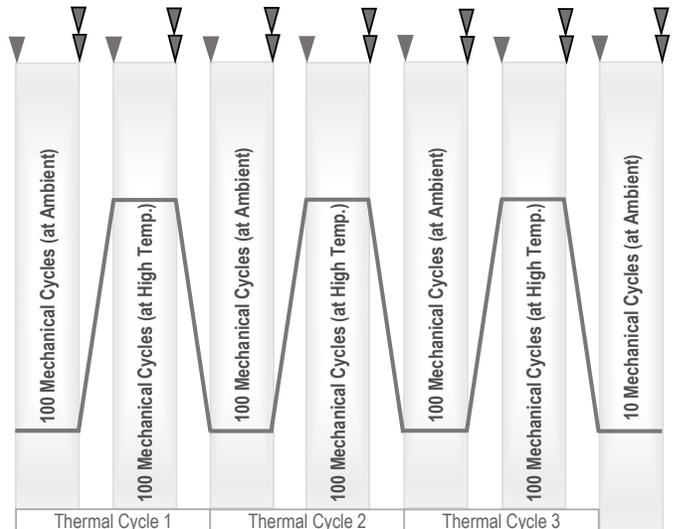
API 641 Group B & E

Class A	Valve pressure rating at 260° C (500° F) is ≥ 41.1 barg (600psig)	Valve Temperature Rating $\geq 260^{\circ}\text{C}(500^{\circ}\text{F})$
Class B	Valve pressure rating at 260° C (500° F) is < 41.1 barg (600 psig) and ≥ 6.89 barg (100 psig)	
Class C	Valve with a temperature rating $\geq 260^{\circ}\text{C}(500^{\circ}\text{F})$ and does not comply with the requirements of Group A or Group B	
NOTE Valves with a pressure rating less than 6.89 barg (100 psig) at ambient temperature are outside the scope of this standard		

Class D	Valve pressure rating at its maximum-rated temperature is ≥ 41.1 barg (600 psig)	Valve Temperature Rating $< 260^{\circ}\text{C}(500^{\circ}\text{F})$
Class E	Valve pressure rating at its maximum-rated temperature is < 41.1 barg (600 psig) and ≥ 6.89 barg (100 psig)	
Class F	Valve with temperature rating $< 260^{\circ}\text{C}(500^{\circ}\text{F})$ and does not comply with the requirements of Group D or Group E	
NOTE Valves with a pressure rating less than 6.89 barg (100 psig) at ambient temperature are outside the scope of this standard		

API 641 will always consider cycles:

- Valves shall be subjected to a total of 610 mechanical cycles and 3 thermal cycles
- Mechanical and thermal cycling shall begin with the valve at ambient level.
- Test has been performed by using Methane as the test medium.



- Indicates test temperatures
- ▼ Indicates static emission measurements
- ▼ Indicates both static and dynamic emission measurements

XOMOX® Tufline® HF4D Low E Sleeved Plug Valves (SPV)

The first Sleeved Plug Valve for HF applications capable of passing four (4) thermal cycles with ZERO packing adjustments.

Key Features & Benefits

- 1 Innovative stem seal design permits best in class FUGITIVE EMISSIONS CONTROL (ISO 15848-1 BH CO3 392°F or 200°C SSA 0).
- 2 Live-loaded design optimizes sealing performance (self-adjusted) and extended service life with ZERO PACKING ADJUSTMENTS through thermal cycling.
- 3 MAINTENANCE and CAVITY FREE: No costly lubrication, no sticking, and no contamination of process media.
- 4 ADDITIONAL 4D STEM PACKING ensures manual adjustment capabilities on the 4th sealing barrier to atmosphere.

XOMOX® HF4D LIVE-LOADED STEM CARTRIDGE SEAL

The new XOMOX® HF4D Soft Seated Sleeved Plug Valve incorporates a Live-loaded Stem Cartridge which enables to meet the most stringent emissions standards in the industry.

Options:

- Options for different packing materials to suit different temperatures and applications (392°F/200°C or 500°F/260°C); PTFE & graphite packing.
- All current XOMOX® sleeve material options are available – PTFE, Tufline-475, XeniTh.
- Full port configuration available.
- Firetest according to API 607 7th edition.
- HF4D is certified to API 641 Group B and E and ISO 15848-1 BH CO3 392°F/200°C SSA 0.



XOMOX® Tuflin® HF4D

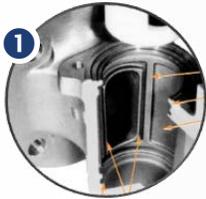
Low E SPV Features and Benefits

HF4D Sleeved Plug Valves are the first valves capable to pass all four thermal cycles without any packing adjustments, while meeting the ISO 15848-1 standard at the BH CO3 392°F/200°C SSA 0. The XOMOX® HF4D Sleeved Plug Valves contain the same live loaded stem cartridge as the XP3 design, while also adding bolting for manual adjustment. This additional set of packing allows for a manual override of the seal to atmosphere which can be achieved with the adjustable 4D stem seal of the cover.

The HF4D design incorporates the same features and benefits of the standard XOMOX® Sleeve Plug Valve by being maintenance and cavity-free. These valves require no costly lubrication and prevent accumulation or contamination of process media, reducing maintenance costs and the cost of ownership over time.

1 Primary Seal to Atmosphere

The HF4D utilizes the same proven sleeve & body design XOMOX® is known for. 360° port lips and high pressure ribs inside the valve body ensure tight in-line seal & primary seal to atmosphere. Plug remains adjustable if necessary.



3 Tertiary Seal to Atmosphere

NEW Patent pending Live-Loaded Stem Cartridge delivers World Class Low Emissions performance in a quarter-turn soft-seated plug valve.



2 Secondary Seal to Atmosphere

NEW Improved design enabled by the same wedge ring & plastic diaphragm in place on our existing product. Ensuring another layer of protection to stem seal and body cover joint.

4 4D Stem Seal

NEW Manual override for atmospheric sealing. 4D Stem Seal is to answer some customer requirements in the industry.

XOMOX® Tuflin® HF4D Low E SPV Features and Benefits



5 Patented live-loaded stem cartridge design

Optimizes sealing integrity to atmosphere and extended service life. 4D stem packing design for manual override capabilities

HF4D maintains all design features of current XOMOX® Tuflin® SPV

- Re-inforced body cover joint gasket for emissions-proof valves.
- 360° port lips on body prevent cold flow and deformation of the sleeve, eliminating the chances that the sleeve will rotate during thermal cycling.
- End connection options available – flanged, threaded or socket weld end.
- All sleeve materials are available.

MEETING BEST IN CLASS FUGITIVE EMISSION STANDARDS

ISO 15848-1 BH CO3 200°C/392°F

- Tightness class BH (<0-4 mg/(s x m))
- Endurance class CO3
- Temperature class RT to 200°C/392°F
- Adjustments: SSA0 (zero packing adjustments)



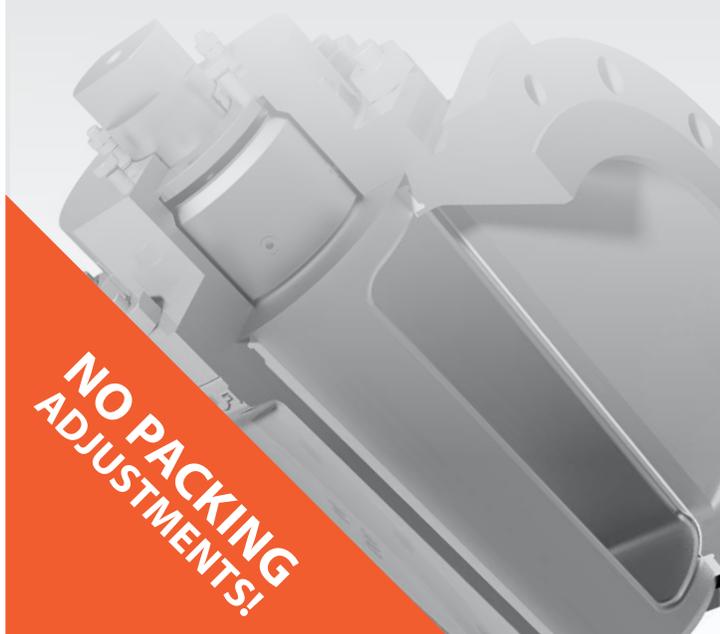
International Organization for Standardization

Option:

API 641 Group B and E (200°C/392°F) (260°C/ 500°F)



AMERICAN PETROLEUM INSTITUTE



XOMOX® Tuflin® HF4D

Low E SPV for every HF Application

XOMOX® HF4D valves can be ordered with different options, such as end connections, depending on your application requirements.

HF4D is offered in Monel which is particularly designed for HF application requirements.

Standard Materials of Construction

Part	Material	Additional Material Notes
4D Packing Adjustment Studs / Nuts	ASTM B164 Monel 400 / ASTM B164 Monel 405	
Plug Adjusting Bolts	ASTM B164 Monel 400	
Cover	ASTM A216, Grade WCB w/ S16 supplemental requirements	Radiography per ASTM E446 & ASTM E186. Impact Tested at -29°C
Cover Bolts / Studs & Nuts	ASTM A193, Grade B7M / ASTM A194, Grade 2HM	100% Indentation Hardness Tested
Weatherseals	EPDM	
Live Loaded Device	AISI 6150 (1.8159) with Geomet 321 Coating	
Fire Tested Cartridges	ASTM A494, Grade M-35-1 / (2.4360.10 & N04400)	
Metal Diaphragm	(Monel) Alloy 400	
Stem Seal Ring	Braided Graphite	
Formed Diaphragm	Virgin PTFE	
Wedge Ring	Virgin PTFE	
Body-Cover Joint Gasket	Graphite/PTFE Blend with (Monel) Alloy 400 Trim Band	
Plug	ASTM A494, Grade M-35-1	Liquid Penetrant Examination per ASTM A165
Sleeve	Virgin PTFE & PTFE-X (a.k.a. TFM)	
Body	ASTM A494, Grade M-35-1	Radiography per ASTM E446 and ASTM E186
Paint	HF Acid Detection Paint	
Tag	304 Stainless Steel	
Plastic Cable Tie	Plastic	
Mounting Kit	Painted Carbon Steel	
Stem Drive Compensators / Adaptors	Carbon Steel	
Hub / Wrench	ASTM A216, Grade WCB / Painted C.R.S.	



XOMOX® SPV HF4D –
Valve components view

Reference of Available Configurations

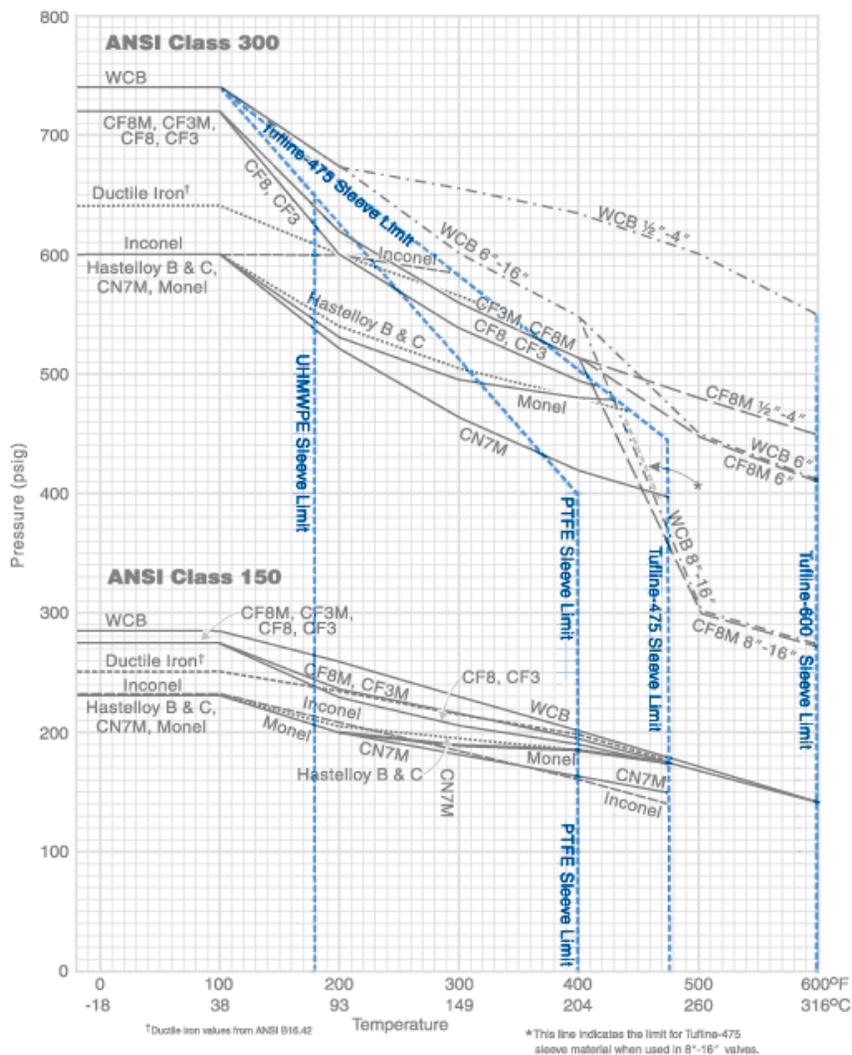
Size (in.)	ASME Class	Figure Number	Flanged End	Threaded End
1/2 to 12	300	0367HF4D	x	
1/2 to 1	300	0366HF4D-SE		x

XOMOX® Tuflin® HF4D Low E SPV Properties and Characteristics

HF4D Break Torque - Class 300 [in*lbs]

Size	PTFE/PTFEX		%R-PTFE Sleeve		PTFEXC/XeniTh Sleeve		UHMWPE/PFA Sleeve	
	Std	Built Dry	Std	Built Dry	Std	Built Dry	Std	Built Dry
½" & ¾"	163	244	204	305	214	326	326	478
1"	458	692	580	865	621	936	916	1384
1 ½"	916	1384	1150	1730	1242	1863	1842	2758
2"	1262	1893	1578	2372	1710	2565	2534	3797
3"	1384	2066	1730	2585	1863	2799	2758	4143
4"	2758	4143	3450	5181	3725	5588	5517	8285
6"	5751	8621	7186	10779	7766	11644	11502	17252
8"	8967	13456	11217	16815	12112	18168	17944	26912
10"	16560	24845	20703	31054	22352	33538	33120	49681
12"	24153	36225	30189	45284	32601	48907	48296	72450

If any additional information is required, please contact your sales representative or customer service.



XOMOX® Tuflin® HF4D Low E SPV Dimensional Data

Bare Stem Operated

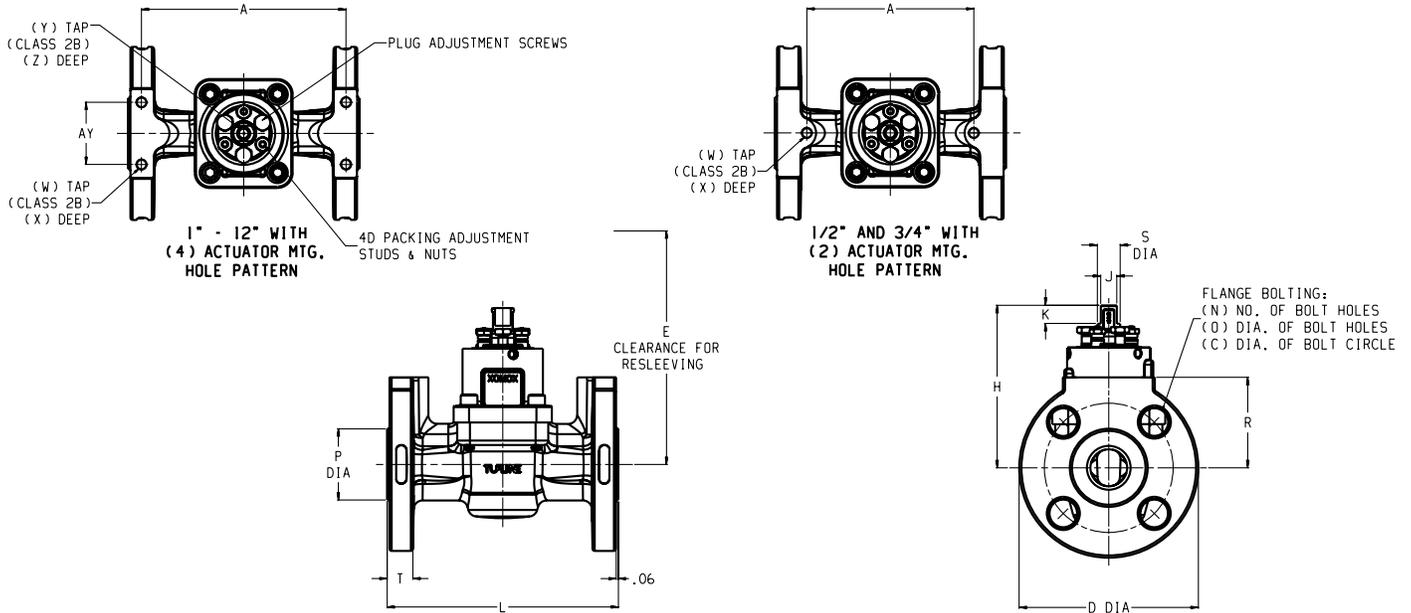


Figure 0367HF4D Class 300

SIZE	L	D	T	R	N	O	C	W
1/2"	5.50	3.75	.56	1.88	4	.63	2.63	6.6
3/4"	6.00	4.63	.63	2.31	4	.75	3.25	9.9
1"	6.50	4.88	.69	2.44	4	.75	3.50	12
1-1/2"	7.50	6.13	.81	3.06	4	.88	4.50	22
2"	8.50	6.50	.88	3.25	8	.75	5.00	29
3"	11.13	8.25	1.13	4.13	8	.88	6.63	40
4"	12.00	10.00	1.25	5.13	8	.88	7.88	84
6"	15.88	12.50	1.44	6.25	12	.88	10.63	170
8"	16.50	15.00	1.63	7.50	12	1.00	13.00	275
10"	18.00	17.50	1.88	8.75	16	1.13	15.25	407
12"	19.75	20.50	2.00	10.25	16	1.25	17.75	556

(4) ACT. MTG. HOLE PATT.			
A	AY	W	X
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5.570	1.750	5/16 - 18	.38
6.625	1.150	5/16 - 18	.47
7.563	2.250	5/16 - 18	.47
9.938	3.500	3/8 - 16	.56
10.688	4.000	7/16 - 14	.63
14.000	4.000	7/16 - 14	.63
14.625	6.000	1/2 - 13	.63
15.688	6.000	1/2 - 13	.63
17.375	6.000	1/2 - 13	.63

(2) ACT. MTG. HOLE PATT.		
A	W	X
4.375	5/16 - 18	.47
3.750	5/16 - 18	.47
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Figure 0367HF4D Class 300

SIZE	H	S	J	K	P	E	Y	Z
1/2"	4.591	.537	.437	.500	1.38	8.68	1/4 - 20	.91
3/4"	4.591	.537	.437	.500	1.69	8.68	1/4 - 20	.91
1"	4.433	.620	.437	.500	2.00	8.93	1/4 - 20	.91
1-1/2"	5.456	.848	.563	.530	2.88	10.43	5/16 - 18	.91
2"	6.067	1.102	.755	.748	3.63	11.63	5/16 - 18	.91
3"	6.598	1.102	.755	.748	3.63	11.63	5/16 - 18	.91
4"	8.054	1.260	.880	1.000	6.19	24.83	5/16 - 18	.91
6"	9.590	2.008	1.398	1.000	10.63	30.47	5/16 - 18	.91
8"	11.795	2.008	1.398	1.000	10.63	30.47	5/16 - 18	.91
10"	13.291	2.500	1.673	1.000	12.75	31.47	1/2 - 13	.91
12"	14.315	2.992	1.968	1.000	15.00	37.53	1/2 - 13	.91

All dimensions in inches. Weight of valve in pounds. All weights are estimated.

XOMOX® Tuflite® HF4D Low E SPV Dimensional Data

Wrench Operated

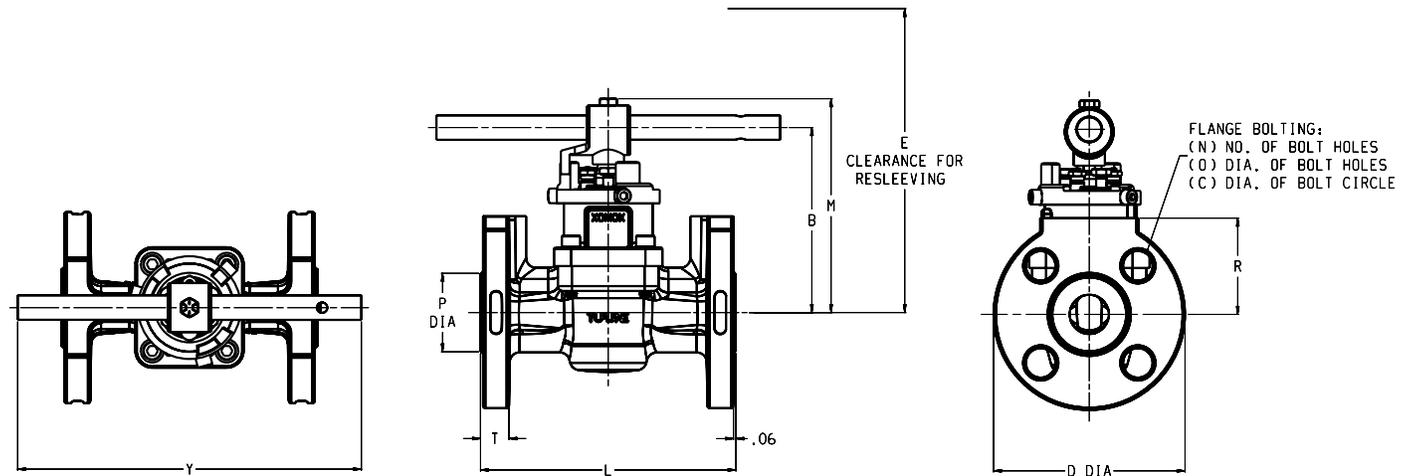


Figure 0367XP3 Class 300

SIZE	L	D	T	P	R	N	O	C	E	M	B	Y	W
1/2"	5.50	3.75	.56	1.38	1.88	4	.63	2.63	8.68	5.61	4.89	8.75	8.6
3/4"	6.00	4.63	.63	1.69	2.31	4	.75	3.25	8.68	5.61	4.89	8.75	12
1"	6.50	4.88	.69	2.00	2.44	4	.75	3.50	8.93	5.45	4.73	8.75	14
1-1/2"	7.50	6.13	.81	2.88	3.06	4	.88	4.50	10.43	6.62	5.79	12.50	25
2"	8.50	6.50	.88	3.63	3.25	8	.88	5.00	11.63	7.44	6.61	18.00	32
3"	11.13	8.25	1.13	5.00	4.13	8	.88	6.63	12.63	7.96	7.13	24.00	44
4"	12.00	10.00	1.25	6.19	5.13	8	.88	7.88	24.83	9.76	8.68	30.00	92

All dimensions in inches. Weight of valve in pounds. All weights are estimated.

XOMOX® Tuflin® HF4D Low E SPV Dimensional Data

Gear Operated

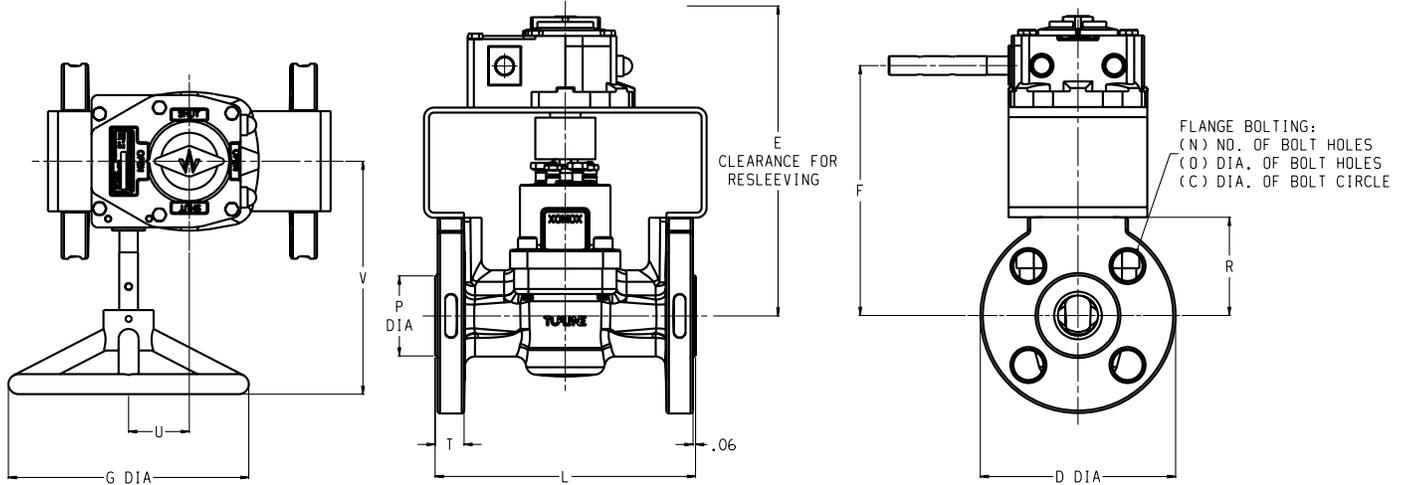


Figure 0367XP3 Class 300

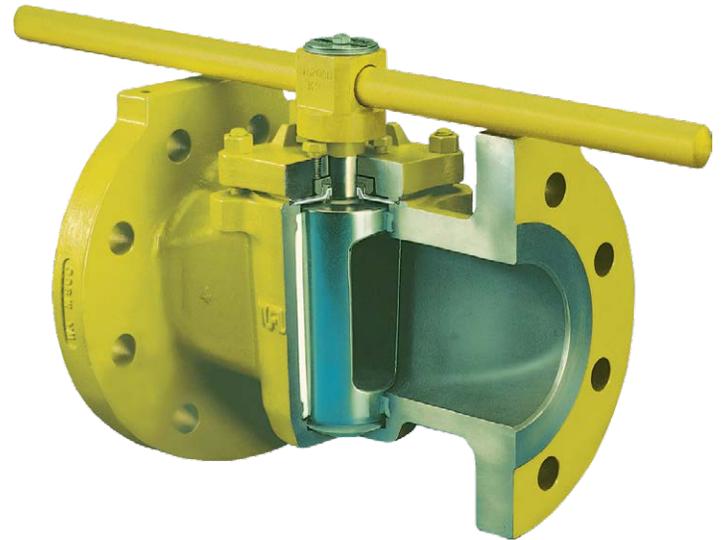
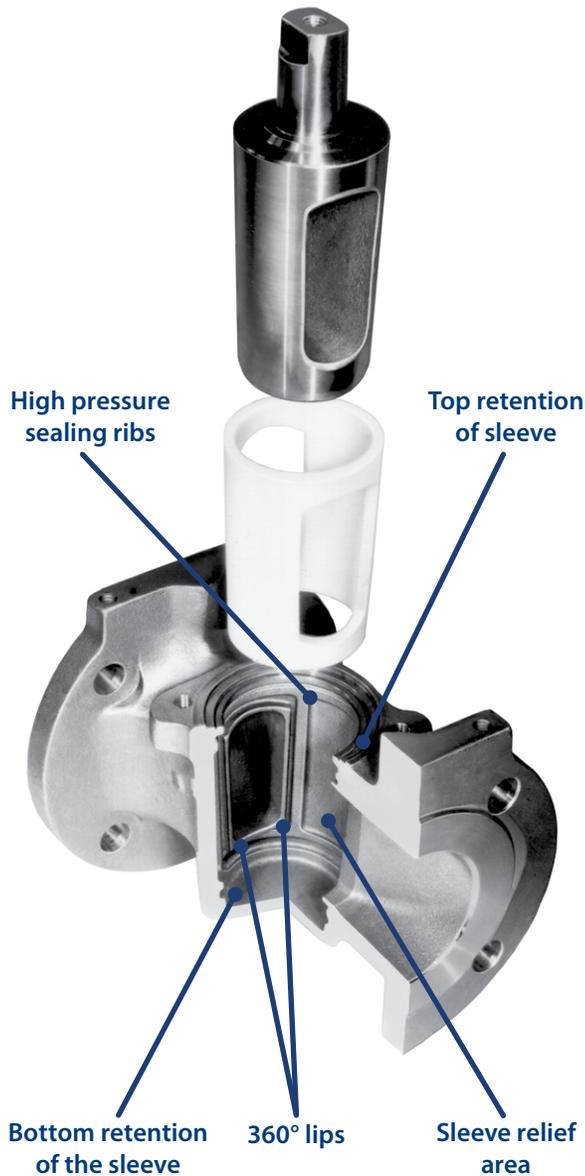
SIZE	L	D	T	P	R	N	O	C	E	F	G	U	V	W
3"	11.13	8.25	1.13	5.00	4.13	8	.88	6.63	12.63	10.38	12.00	2.05	7.77	64
4"	12.00	10.00	1.25	6.19	5.13	8	.88	7.88	24.83	11.57	12.00	2.05	7.77	110
6"	15.88	12.50	1.44	8.50	6.25	12	.88	10.63	27.25	13.78	18.00	2.53	10.30	218
8"	16.50	15.00	1.63	10.63	7.50	12	1.00	13.00	30.47	16.03	18.00	3.53	10.96	349
10"	18.00	17.50	1.88	12.75	8.75	16	1.13	15.25	31.47	17.78	24.00	4.84	14.26	515
12"	19.75	20.50	2.00	15.00	10.25	16	1.25	17.75	37.53	18.78	30.00	4.84	15.76	674

All dimensions in inches. Weight of valve in pounds. All weights are estimated.

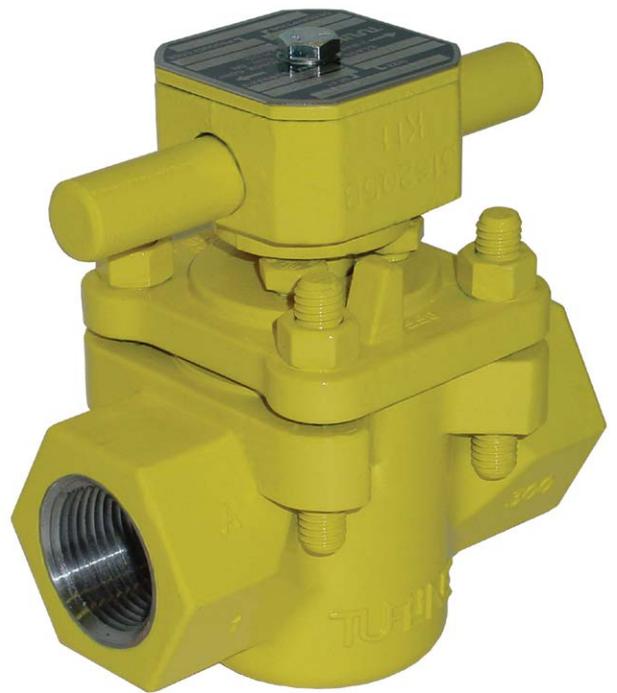
XOMOX® Tuflin® SPV Tertiary Top Seal Design Features & Benefits

Features & Benefits

- ❶ Superior, longer lasting in-line sealing
- ❷ Secure sealing with no cold-flow, deformation, or rotation of the sleeve due to iron fluoride buildup
- ❸ No cavities, reduced risk of contamination



HF Flanged End Sleeved Plug Valve



HF Screwed End Sleeved Plug Valve

XOMOX® Tuflin® SPV Tertiary Top Seal Applications & Full Port Options

Two-Way Full Port Sleeved Plug Valves

Approved for the most demanding HF requirements

The UOP & ConocoPhillips Petroleum HF Alkylation Process Specifications provide the standards for valves being installed in most new alkylation systems, worldwide. Tuflin valves manufactured for the UOP & ConocoPhillips HF processes are listed by UOP & ConocoPhillips Petroleum for use in their licensed systems. You can specify Tuflin HF valves that meet these special UOP & ConocoPhillips Petroleum design and material requirements and testing criteria for your application.

Tuflin valves for other HF applications and processes

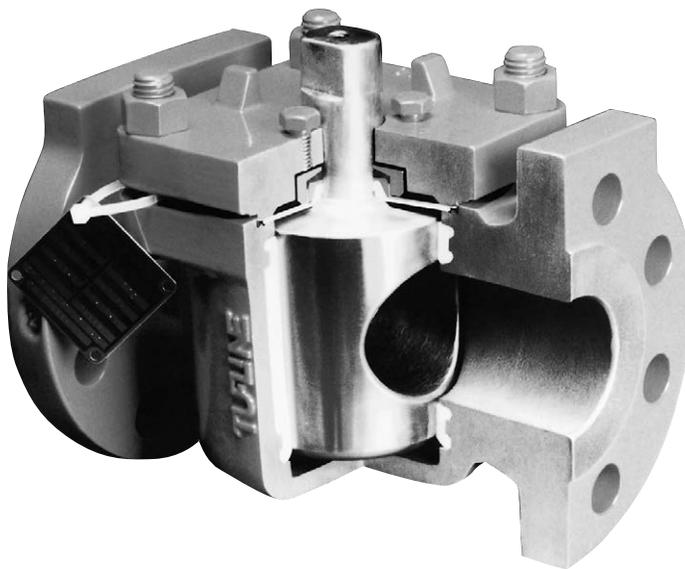
Tuflin HF valves are available to meet a variety of alternate design specifications. You can also choose from a number of optional features. These valves are designed to meet the requirements for commercial HF Alkylation processes and hydrofluoric acid applications.

Full port design advantages

With the full-area round port there is no diminished or constricted flow. Ideal wherever low pressure-drop and high-flow efficiency are important such as rapid evac systems. This is a true pipe bore full port. The CV values on average is 3-4 times that of a full area type design plug.

Self cleaning

Metal lips completely surround the valve ports. With each rotation of the valve, any scale which may have collected on the plug seal surface is broken up and wiped away.



UOP
Approved!



XOMOX® Tuflin® SPV Tertiary Top Seal for Petroleum Alkylation Processes

Tuflin HF Valves are listed in UOP & ConocoPhillips Petroleum Company's HF Alkylation Process Design Specification Manual and meet UOP specifications.

Tuflin valves ordered for the UOP & ConocoPhillips Petroleum HF Alkylation process are manufactured in strict accordance with the approved assembly and testing procedures; with no deviation from material and design specifications.

Finish requirements

All finished valve assemblies, excluding actuator fasteners and actuator mounting hardware, are painted with one coat of HF acid detection paint.

Testing requirements

All valve body castings are subjected to 100% radiography of all critical areas of each casting. Each valve body is shell tested with Helium at 400 psig. Completed valve assemblies are hydrostatically shell tested with kerosene at 1 ½ times their rated working pressure, and seat tested at 80 psig air.

Ordering procedures

UOP & ConocoPhillips Valves must be ordered by drawing number. There can be no deviations from specifications and no other options are available. The following table references conventional sizes and figure numbers with the UOP & ConocoPhillips listed drawing numbers.

ASME Class 300

Size (in.)	Figure No.	Phillips Listed Drawing No.	UOP Approved Drawing No.
½	0366HF	FP0694-E	FP1238-E
¾	0366HF	FP0695-E	FP1238-E
1	0366HF	FP0696-E	FP1238-E
1½	0366HF	FP0697-E	FP1238-E
2	0367HF	FP0703-E	FP1243
3	0367HF	FP0704-E	FP1243
4	0367HF	FP0705-E	FP1243
4	0367EG-HF	FP0706-E	FP1244
6	0367EG-HF	FP0707-E	FP1244
8	0367EG-HF	FP0708-E	FP1244-E
10	0367EG-HF	FP0709-E	FP1244-E
12	0367EG-HF	FP0710-E	FP1244-E
14x12x14	0367EG-HF	FP1956-E	FP3709*
14x16x14	0367EG-HF	FP0711-E	FP1244-E
16x16x16	0367EG-HF	FP0712-E	FP1244-E
18x16x18	0367EG-HF	FP0713-E	FP1244-E
20x24x20	0367EG-HF	FP2110-E	FP3708*

ASME Class 600 DR

Size (in.)	Figure No.	Phillips Listed Drawing No.	UOP Approved Drawing No.
2	0667DR-HF	FP1091-E	FP3705*
3	0667DR-HF	FP1092-E	FP3706*
4	0667DR-HF	FP1093-E	FP3707*

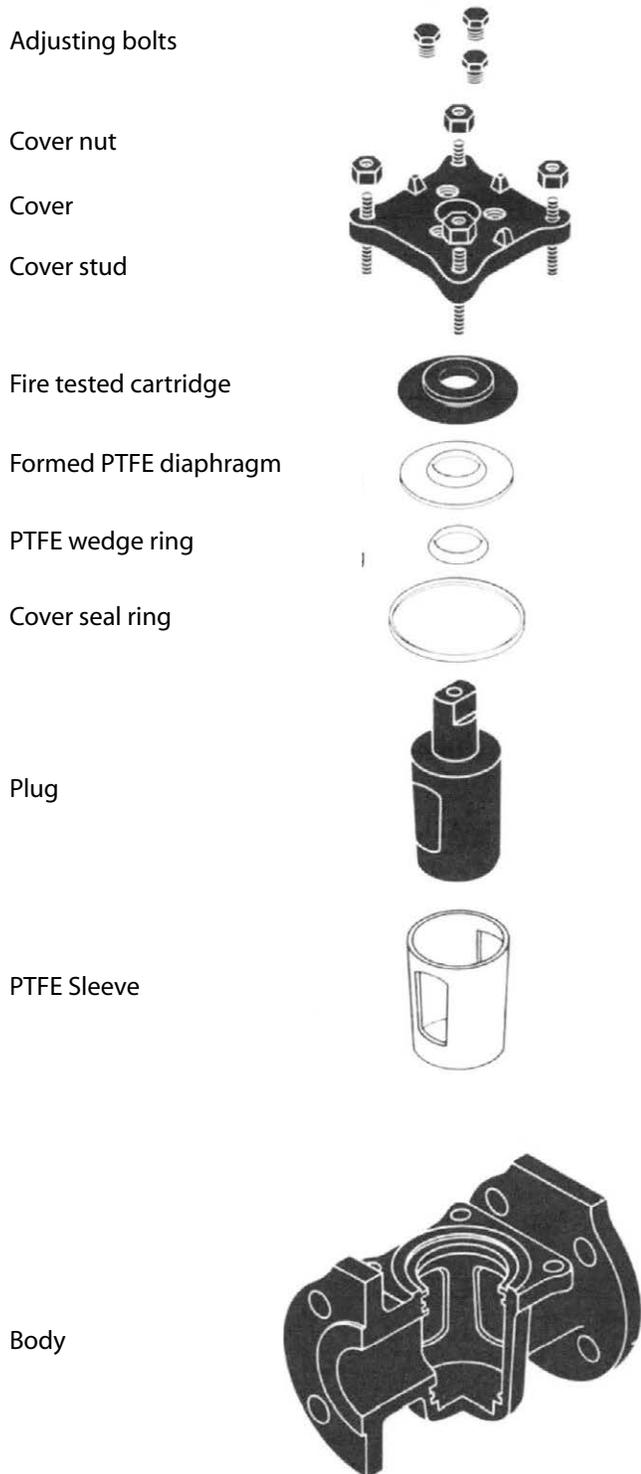
ASME Class 300 Full Port

Size (in.)	Figure No.	Phillips Listed Drawing No.	UOP Approved Drawing No.
1	20367HF	FP1703	FP1912
1½	20367HF	FP1704	FP1912
2	20367HF	FP1705	FP1912
3	20367HF	FP1707	FP1913
4	20367HF	FP1708	FP1913
6	20367HF	FP1709	FP1913
8	20367HF	FP1710	FP1913
10	20367HF	FP1711	FP1913
12	20367HF	FP1712	FP1914

*At time of printing, drawing submitted for review but not currently approved or listed by UOP.

XOMOX® Tuflin® SPV Tertiary Top Seal for Every HF Application

Valve Components



For other HF acid processing applications. Tuflin offers choices of body materials and design options. Tuflin HF valves can be ordered in the same sizes, end connections, and pressure classes that are available in standard Tuflin plug valves.

Monel® or carbon steel bodies are available. (All carbon steel bodies are sprayed with fluorocarbon behind the sleeve to protect against the build-up of iron fluoride scale.)

UOP & ConocoPhillips HF Valves Materials of Construction

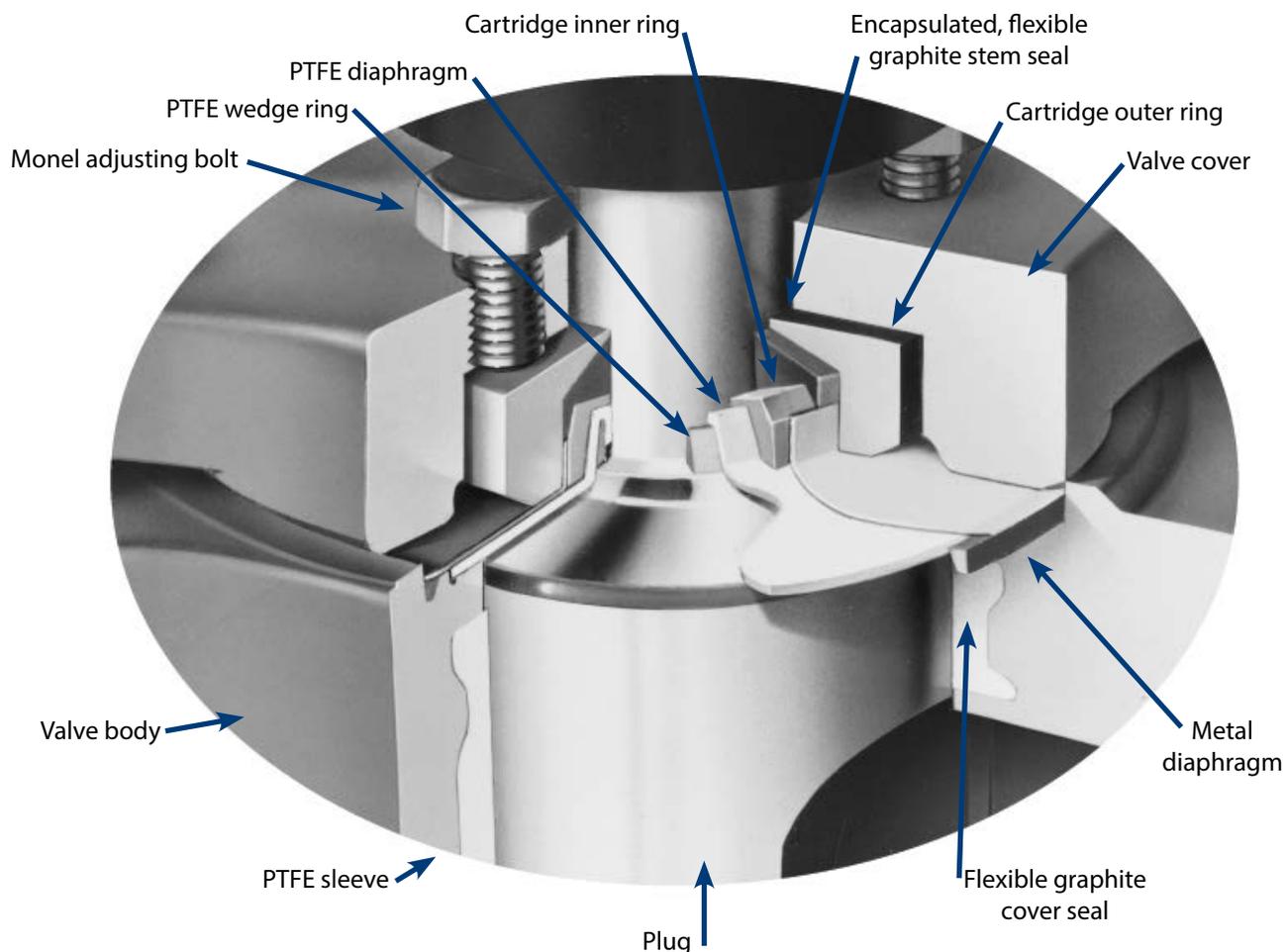
Part	Material
Adjusting Bolts	ASTM B164. Monel
Cover	ASTM A216, Grade WCB Carbon Steel
Cover Nut	ASTM A194, Grade 2HM Carbon Steel
Cover Stud	ASTM A193. Grade B7M Carbon Steel
Fire Tested Cartridges	ASTM B127, Monel
Stem Seal Ring	Flexible Graphite
Formed Diaphragm	Virgin PTFE
Wedge Ring	Virgin PTFE
Cover Seal Ring	Flexible Graphite
Plug	ASTM A494, Grade M-35-1
Sleeve	Virgin PTFE
Body	ASTM A494, Grade M-35-1
Paint	HF Acid Detection Paint
Tag	304 Stainless Steel
Plastic Cable Tie	Plastic

During the assembly process the plug is coated with HF lubricant.

Quick reference of available configurations

Size (in.)	ASME Class	Figure Number	Screwed End	Flanged End
½ to 2	150	066HF	X	
½ to 2	300	0366HF	X	
½ to 4	150	067HF		X
½ to 4	300	0367HF		X
4 to 24	150	067EG-HF		X
4 to 20	300	0367EG-HF		X
½ to 16	600DR	0667/DR-HF		X

XOMOX® Tuflin® SPV Tertiary Top Seal Isolate HF Processes



Control fugitive emissions

This top seal package provides exceptional control of fugitive emissions. It meets or exceeds the most stringent current regulatory requirements EPA Method 21.

Triple sealed for extra protection

Under normal conditions, there are three active seals between the flow media and the atmosphere. Primary sealing is provided by the interaction of the plug, sleeve, and body. Secondary sealing is provided by the PTFE and metal diaphragms. Tertiary sealing is provided at the stem by the encapsulated, flexible graphite stem seal and at the body/cover joint by the graphite cover seal ring.

This Simple system assures stem sealing

This simple, compact, design harnesses complex dynamic forces to assure effective sealing to atmosphere. The metallic cartridge totally encapsulates the flexible graphite tertiary dynamic stem seal. At its outer edge, the metal diaphragm overlaps the graphite static seal ring to reinforce the tertiary seal at the body-to-cover joint. The PTFE wedge ring concentrates the sealing force of the PTFE diaphragm radially against the valve stem for more reliable prevention of external leakage at this secondary seal.

API-607 Standards

The Tuflin Tertiary Top Seal Sleeved Plug valve exceeds API-607 - Third Edition Section 4.2 - Specifications for External Leakage. It is available in a broader range of sizes than the standard fire tested model.

XOMOX® Tuflin® Sleeved Plug Valves

Tuflin-475 & XeniTh for Higher Temperatures

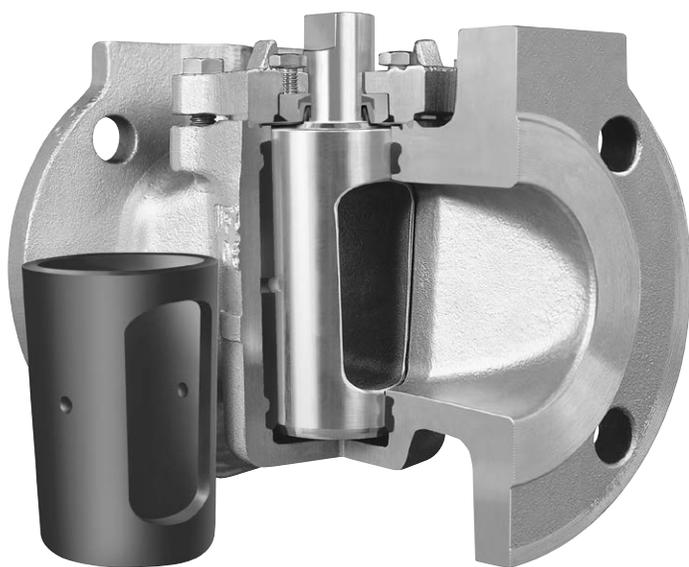
Tuflin-475 and XeniTh High Temperature Sleeved Plug Valves provide a higher performance alternative to traditional PTFE sleeves.

Tuflin-475 High Temperature Sleeved Plug Valve greatly extends the pressure/temperature range of sleeved plug valves. It even exceeds the operating range of glass-filled PTFE. This greater pressure/temperature operating range is the result of improved thermo-mechanical properties, improved cold-flow properties and improved toughness.

The XeniTh High Temperature Sleeved Plug Valve offers bi-directional flow, simple actuation, and lightweight and compact design in a variety of 2-way and multi-port configurations. This versatility expands the range of possibilities when designing a new processing system or improving an existing system.

Features & Benefits

- ❶ A greater range of operating pressures and temperatures enables use of the more reliable and preferred sleeved plug valve in more applications
 - Tuflin-475 up to 475°F
 - XeniTh up to 600°F
- ❷ Reduced cold-flow at elevated temperatures
- ❸ Greater stability helps reduce down-time
- ❹ A smoother surface means better sealing
- ❺ Lower porosity and greater density assure sleeve integrity
- ❻ Enhanced strength and resistance to abrasion and wear



XeniTh Sleeved Plug Valve

Difficulties with other alternative sleeve materials

There are other resins which also work well at elevated temperatures, but they sacrifice sealing capability.

Alternative sleeve materials also dramatically increase torque.

They do not offer the exceptional sealing characteristics and low torque ratings of Tuflin-475.

Pacific Valves® Overview

Pacific Valves®, The Leading Source for Hydrofluoric (HF) Gates, Globes and Checks



Features & Benefits

- ❶ **API 624 certified Gate and Globe valves to ensure low fugitive emissions performance**
- ❷ **One stop solution for HF Acid gates, globes, checks and sleeved plug valves**
- ❸ **High Integrity Shutoff (HIS) design for tighter shutoff while remaining fire-safe**
- ❹ **Originally approved by all the major hydrofluoric acid licensors in all sizes and pressure ranges**

Experience

Pacific Valves® has been manufacturing valves for this very difficult service for over 50 years. Pacific Valves® manufactures API 600, 602, and 623 for the Hydrofluoric (HF) industry. Our valves are superior in “Total Cost of Ownership” and wall thickness to keep the HF process in the valve for safety considerations.

Monel® parts assembled into a hydrofluoric acid valve are acid-tested to assure that it is Monel®. Another important aspect in the manufacture of these valves is the clearances at the critical metal interfaces (wedge/body guides, stem/back seat bushing, etc.). Hydrofluoric acid will react with carbon steel and Monel® producing a fluoride buildup on the metal surfaces which can render the valve in operable. These clearances, developed over years of manufacturing experience, testing and research, must be precisely controlled to allow for this buildup.

Our experience has enabled us to consistently produce valves that give the best performance for this stringent service.

Pacific Valves® does not use commodity hydrocarbon valves and trim for HF service, thus our internal tolerances are designed for this unique process.

Monel® is a registered trademark of Special Metals Corporation.

Every Valve is Tested

Pacific Valves® conducts a total of 7 tests on our valves before releasing for shipment. Testing specifications are available upon request. Pacific Valves® tested Gate and Globe valves by a third party authorized API facility and passed the new API 624 fugitive emissions specification on rising stem API 600, API 602 and API 623 products using API 622 packing. Pacific Gate and Globe valves tested to the new API 624 fugitive emissions specification by an API authorized third party lab.

Pacific Valves® shell tests all API 600 and API 602 valves:

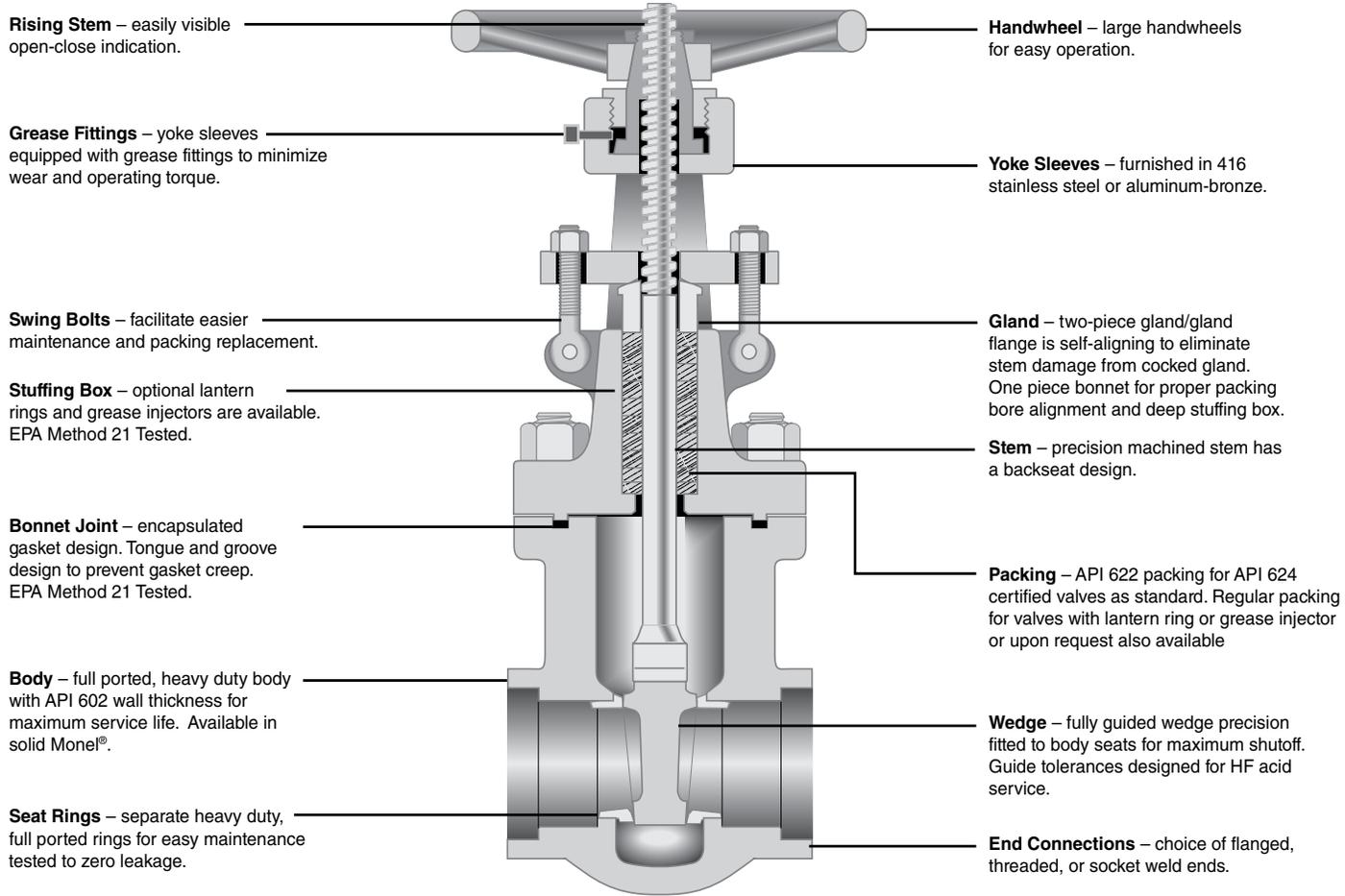
- ASME 150; 450 PSI
- ASME 300; 500 PSI for ten minutes

Through our HF experience Pacific Valves® has found that Helium tests are the most effective testing criteria to determine casting defects. Thus we monitor percent defect on this test as our primary quality process on defects per testing lot. Our goal is to be at 98% defect-free rate.

Pacific Valves® tests our hydrofluoric acid valves at extended time periods to further assure the quality of the valve performance. In addition, we test our HF Acid valves with Helium at 300 PSI to insure the casting integrity.

Pacific Valves® has the best reparability and “Mean Time Between Repair” of all approved HF suppliers. Pacific Valves® still has valves in HF process performing after 40 years. The reparability of our valves are double that of our competition due to robust casting design. Thus, our customer receives the best Total Cost of Ownership.

Pacific Valves® API 602 Compact Gate Valve Features

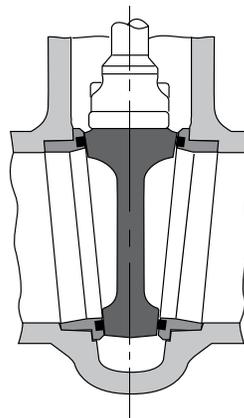


Options

Grease Injector & Lantern Ring

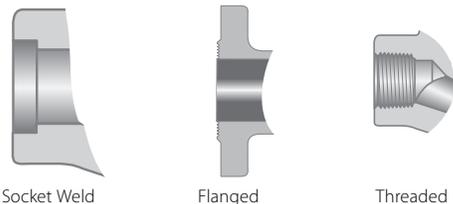


Soft Seated "T" Trim Seat Ring



All gate valves are available with optional PTFE seat rings. The molded PTFE ring is bonded into a seat ring groove in the face for maximum service life. This design is excellent for lower temperature service where tight shutoff is required.

End Connections



Pacific Valves® API 600 Bolted Bonnet Gate Valve Features

Rising Stem – easily visible open-close indication.

Grease Fittings – yoke sleeves equipped with fittings to minimize wear and operating torque.

Swing Bolts – facilitate easier maintenance and packing replacement.

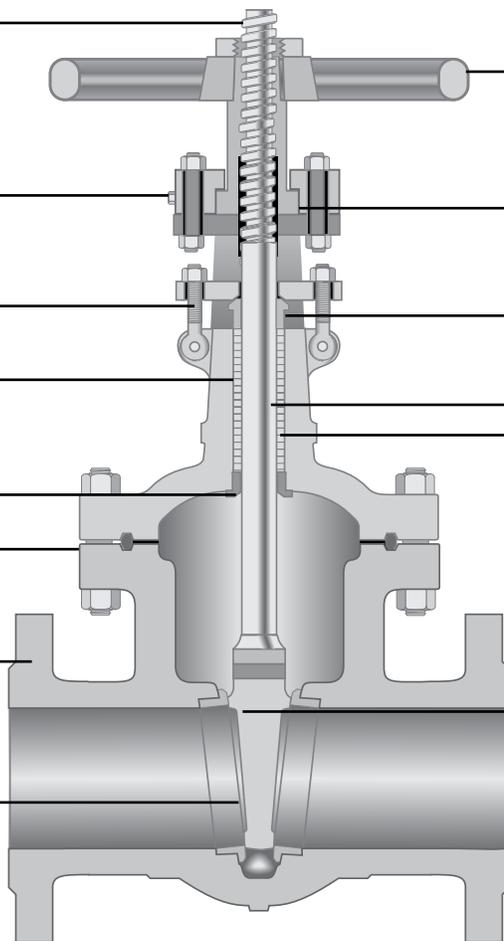
Stuffing Box – optional lantern rings and grease injectors are available. Tested per API 622 and EPA Method 21 Fugitive Emissions.

Backseat – machined bonnet stem bushing provides back-up stem seal.

Bonnet Joint – joint design varies with ASME class rating.

Body – full ported, heavy duty body with API 600 wall thickness for maximum service life. Best life cycle in HF history. Castings 25-30% heavier than competition. Provided with bosses for optional by-passes or drains.

Seat Rings – separate heavy duty, full ported rings for easy maintenance. Wide-face seat rings for sealing adjustability. Double seal welded to eliminate leakage behind seats and low life cycle of inlays. Non-cast seat rings for weldability to reduce stress cracking and handle high wedge loading for extended life cycle.



Handwheel – large handwheels for easy operation. Also available with gearing, motor actuators or cylinder actuators for more difficult services.

Yoke Sleeves – furnished in ductile Ni-resist or aluminum-bronze to reduce operating torque.

Gland – two-piece gland/gland flange is self-aligning to eliminate stem damage from cocked gland.

Stem – all Pacific wedge gate valves are provided with upset forged T-head stems. By forging the T-head, the stem at the stem-wedge connection is strengthened. This design also allows the wedge to self-align, eliminating the possibility of a bent stem jamming the wedge.

Packing – API 622 packing for API 624 certified valves as standard. Regular packing for valves with lantern ring or grease injector or upon request also available

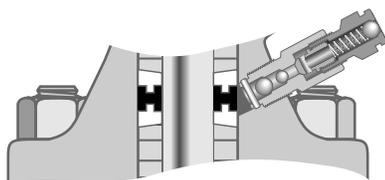
Wedge – heavy pattern, fully guided wedge precision fitted to body seats for maximum shutoff. True fire-safe High Integrity Shutoff design available, See page 11. Wedge fitted to seat for zero leakage on high and low pressure testing.

End Connections – flanged end options are raised face smooth finish or ring type joint.

Options

Grease Injector and Lantern Ring

Per UOP Specifications.



High Integrity Shutoff Wedge

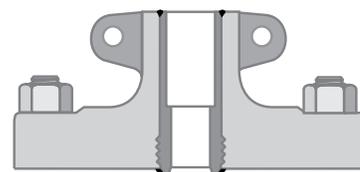
This wedge has two sealing elements:

- PTFE Primary
- Metal-to-Metal back up

This design provides a zero leakage barrier for both upstream and downstream. This technology offers excellent long term isolation capabilities with true fire-safe functionality. A detailed description can be found on page 11.

Monel® Sleeved Stuffing Box

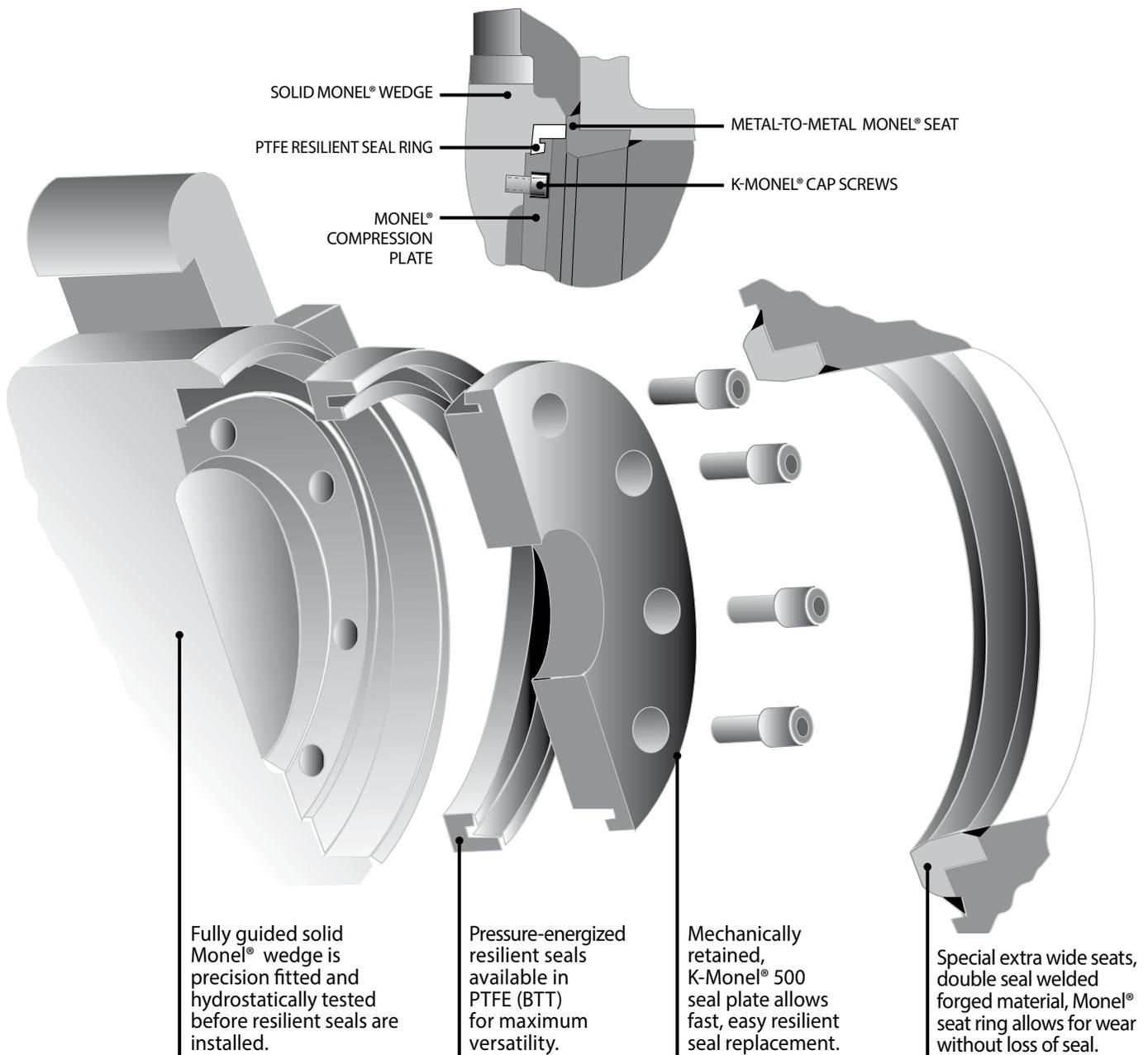
All Monel® stuff box provides superior stem sealing and eliminates iron fluoride buildup.



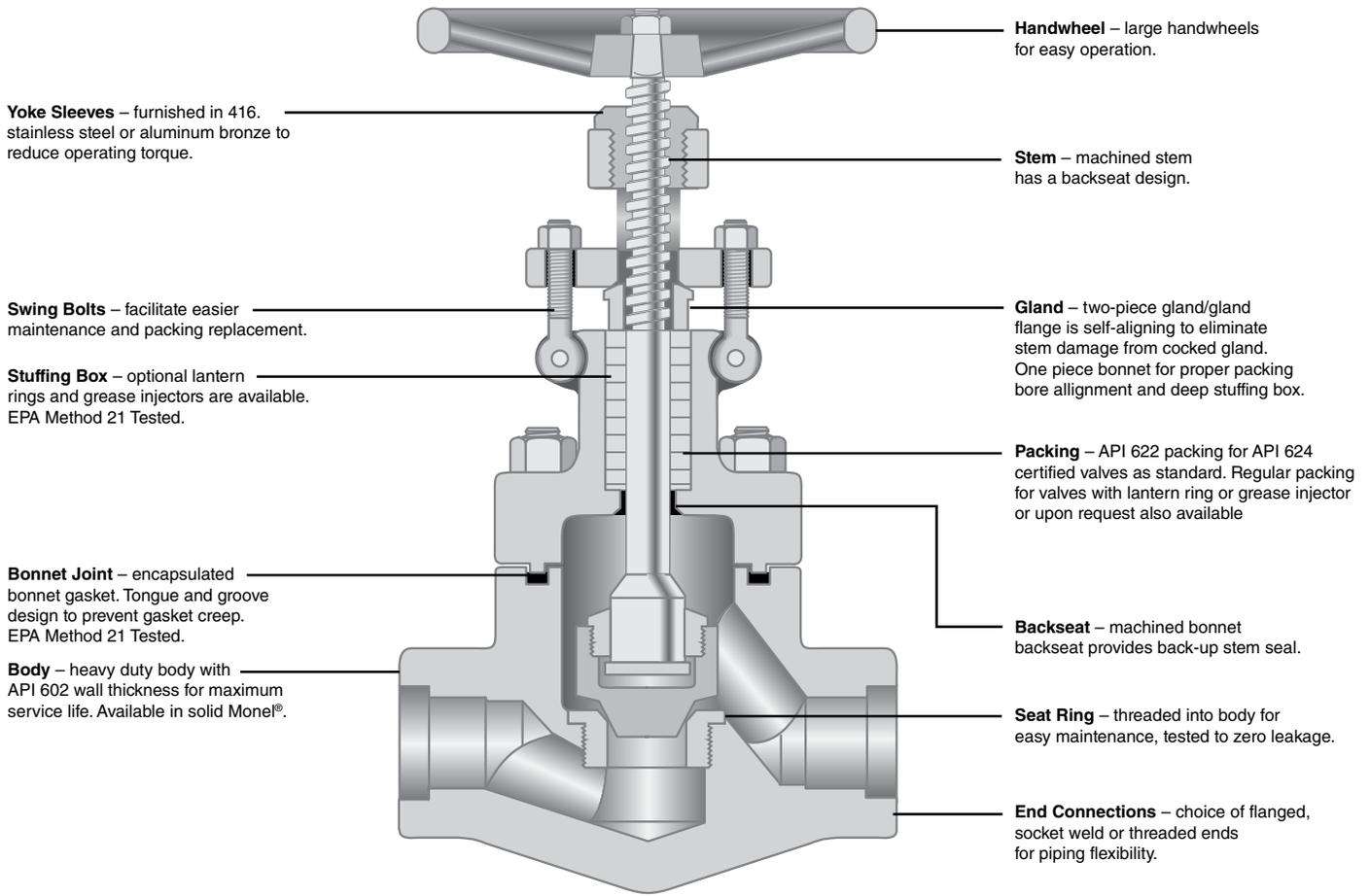
Pacific Valves® High Integrity Shutoff (HIS) Design

For services that require bubble tight shutoff, specify Pacific Valves® High Integrity Shutoff gate valves. These fire-safe valves provide a bubble tight barrier on both upstream and downstream seats and eliminate possible product contamination or loss of fluids due to valve leakage. This design has been tested to 18,000 cycles and still tested to bubble tight shutoff. The Teflon resilient seat compresses into the seat ring and seals, even though the seat ring is exposed to process and iron Fluoride impingement, to provide bubble tight sealing.

The HIS construction retains the proven reliability and low maintenance of Pacific Valves® standard API-600 gate valve. A resilient seal is locked into the wedge by a retainer plate. Special seat rings are installed to provide a wide seating surface for both the elastomer and metal wedge seating surfaces; wedge is fitted to metal seat rings for zero leakage. Teflon seat and retainer is assembled then tested for bubble zero leakage. This results in dual tight sealing for total isolation for HF processes. A full range of trim and shell materials, end connections, piping and actuator options are available for corrosive services and temperatures up to 450°F.

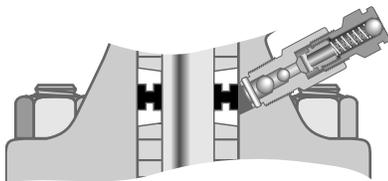


Pacific Valves® API 602 Compact Globe Valve Features

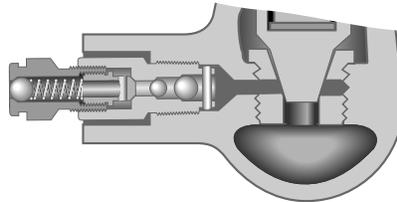


Options

Grease Injector and Lantern Ring

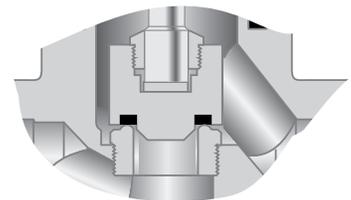


Grease Injector in Seat

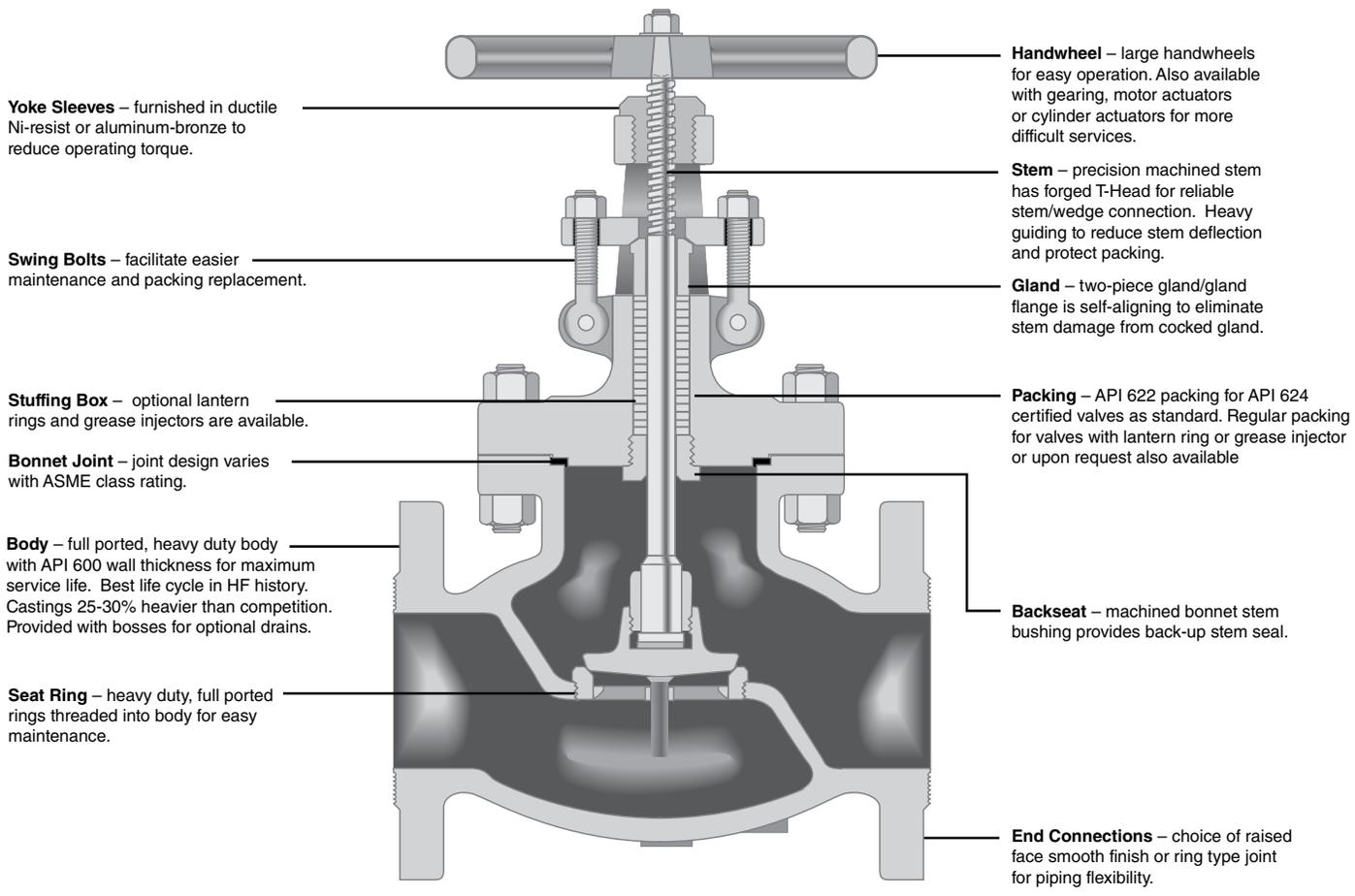


Soft Seated "T" Trim

All valves are available with optional soft seated PTFE trim. The molded PTFE ring is bonded into a groove in the disc face for maximum service life. This design is excellent for lower temperature service where tight shutoff is required.

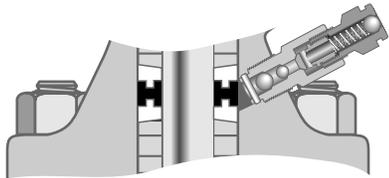


Pacific Valves® API 600 Bolted Bonnet Globe Valve Features

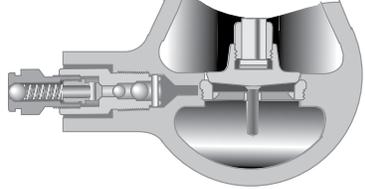


Options

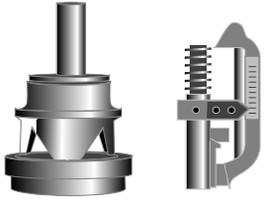
Grease Injector & Lantern Ring



Grease Injector in Seat

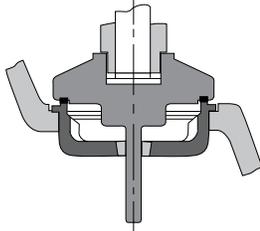


V-Port Trim



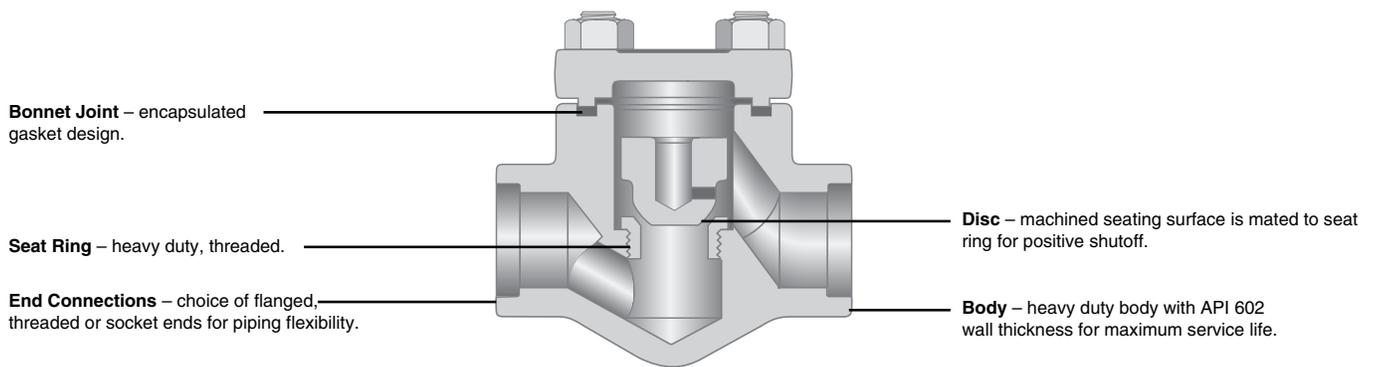
Soft Seated "T" Trim

All valves are available with optional soft seated PTFE trim. The molded PTFE ring is bonded into groove in the disc face for maximum service life. This design is excellent for lower temperature service where tight shutoff is required.

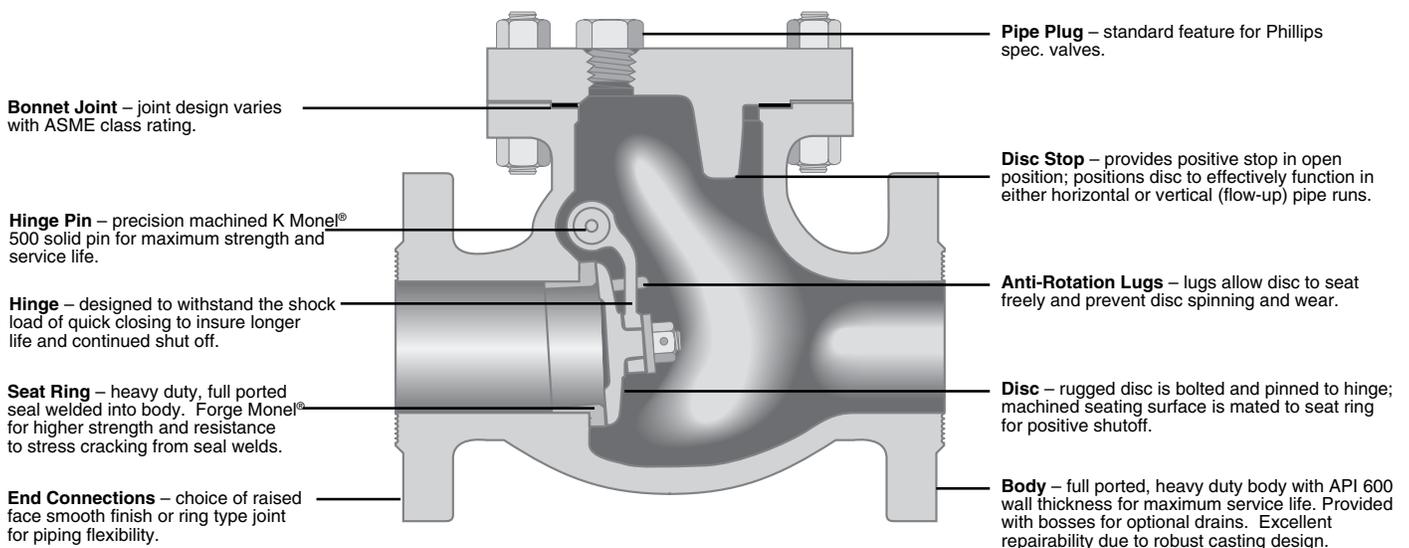


Pacific Valves® API 602 and 600 Check Valve Features

API 602



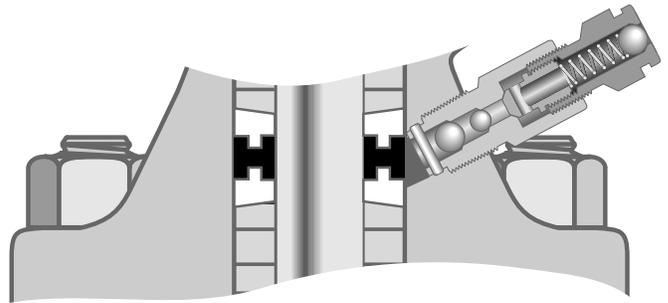
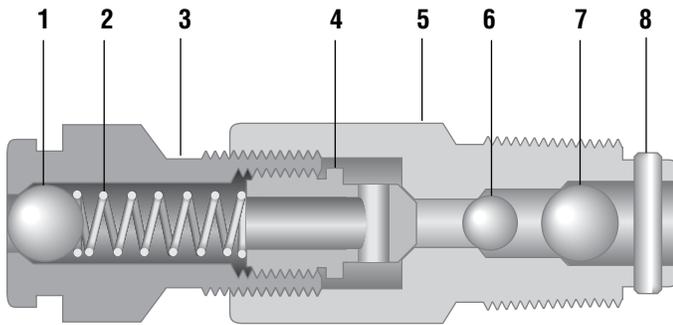
API 600



Pacific Valves® Grease Injectors

Double Ball Grease Injector

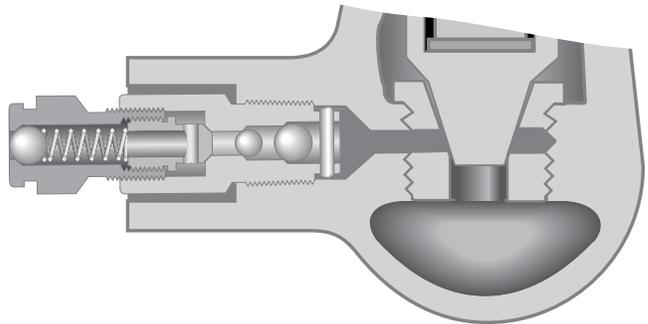
Pacific Valves® unique injector has a double ball check protection against leakage and a positive shut-off internal valve. The injector button head must be unscrewed one half turn to open the internal valve before injecting grease. While unscrewing the injector button head, a second wrench must be used to assure that the injector body is not loosened from the main valve. After grease injection the head is then retightened to maintain positive shut-off.



Grease Injector and Lantern Ring in Gate or Globe Stuffing box.

Parts List Carbon Steel

ITEM	DESCRIPTION	MATERIAL
1	Ball Check	302 S.S.
2	Spring	Music Wire
3	Head Housing	ASTM A108 GR 1018
4	Needle	ASTM A108 GR 1018
5	Valve Housing	ASTM A108 GR 1018
6	Ball Check	Monel®
7	Ball Check	Monel®
8	Pin	ASTM A108 GR 1018



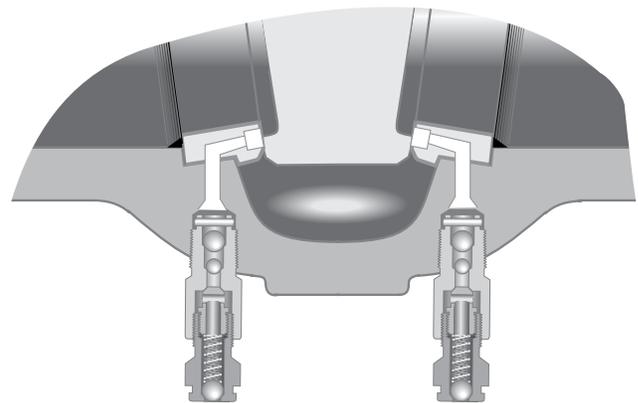
Grease Injector at Seat Ring and Disc of Globe Valve.

Parts List Monel®

ITEM	DESCRIPTION	MATERIAL
1	Ball Check	Monel®
2	Spring	Music Wire
3	Head Housing	Monel®
4	Needle	Monel®
5	Valve Housing	Monel®
6	Ball Check	Monel®
7	Ball Check	Monel®
8	Pin	Monel®

Dimensions

NPT PIPE SIZE	LENGTH
¼"	3 ¹ / ₁₆ "
⅜"	3 ¹ / ₁₆ "



Dual Grease Injector at Seat Ring and Wedge of Gate Valve.

WTA® Overview

Founded in 1978, WTA®, a Crane ChemPharma & Energy brand, designs and manufactures a comprehensive range of high-quality bellows sealed globe valves, strainers, check valves, relief valves, change-over valves and special valves to meet the stringent specifications required by the global chemical and petrochemical industries. Our highly-engineered bellows sealed globe valves are extensively specified and in service worldwide.

All standard products are available in:

- Carbon steel
- Stainless steel
- Alloys and other special materials
- NPS 1/2" to NPS 24"
- ASME 150 lbs to 2500 lbs
- T-type
- Y-type
- Corner type

Backed by a history of engineering excellence and manufactured from the highest-quality materials, bellows sealed globe valves from WTA® lead the industry in innovation and safety. With superior design and construction, WTA® valves incorporate the market's most advanced safety features to ensure leak-proof performance and long service life.

Founded on structural solutions that are backed by extensive field experience, WTA®'s advanced safety features have proven effective in numerous chemical applications. Crane's comprehensive product portfolio likewise includes a variety of other valve types that utilize the same trusted methods of design and fabrication.

The strength of the WTA® brand lies not only in our commitment to using the most reliable materials and manufacturing processes, but in our ability to provide customized solutions with existing special valve designs. While some applications require the fabrication of non-standard valves with novel materials, our custom designed valves can be supplied to fit the need.

Frequently used materials include heat-resistant carbon steel WCB and corrosion-resistant stainless steel CF8M. Low temperature applications are often supplied carbon steel LCB/LCC, Hastelloy®, Incoloy®, Inconel® and Monel®, while titanium and pure nickel also form part of the range. Steel and stainless steel valves are frequently equipped with bellows made of high-quality metals such as Hastelloy®. It is also possible to reinforce the plug/seat area with special materials.



HF Product Features & Benefits

- ❶ Superior safety sealing system with multiple walled bellows, gland packing, metal back seat, two-part rising stem, stellite coated, conical shaped piston and seat.
- ❷ Compliant with the demanding UOP Specifications for Bellows Sealed Globe Valves used for HF applications.
- ❸ The robust bellows design offers significant operating and maintenance cost savings.



Our highly-engineered bellows sealed valve has been designed for various applications with inflammable, explosive, volatile, toxic or aggressive characteristics including HF Alkylation and other HF applications whose emission into the atmosphere must be prevented.

WTA® HF Valves Features and Benefits

Product Description

Bellows sealed globe valves with protected bellows and safety gland packing designed for 10,000 cycles.

Typical Applications

Bellows Sealed Globe Valves provide the highest fugitive emission protection for Hydrofluoric Acid (HF) applications including Alkylation.

Materials

- Body made of ASTM A 216 WCB-S16 , Monel®, Hastelloy® C276
- Body seat hard-faced with Stellite® 21
- Disc in Hastelloy® C276 hard-faced with Stellite® 6
- Bellows and trim in Monel®, Hastelloy® C276
- Other materials are available upon request

Body Configurations

- T-type body design
- Globe valve face to face standard
- Gate/Plug valve face to face standard
- Body/bonnet wall thickness exceeds API 602 for additional corrosion resistance

Size Range

- NPS ½" - 12"
- Other sizes are available upon request

Pressure Ratings

- ASME class 300, 600, 800
- Other classes are available upon request

End Connections

Flange design in accordance with ASME B 16.5 and EN 1092-1. Other classes are available upon request.

Painting

Body/bonnet and end flanges painted with HF leakage detection paint.

Testing

In accordance with UOP and ConocoPhillips requirements including Shell and Helium leak test. WTA® HF Valves exceed API 598 requirements by testing every valve to zero leakage.*

Automation

Pneumatic actuated HF valves available with special bellows designed for up to 100,000 cycles.



* Zero leakage - in accordance with UOP specifications and API 598 standards

WTA® HF Valves Design Features

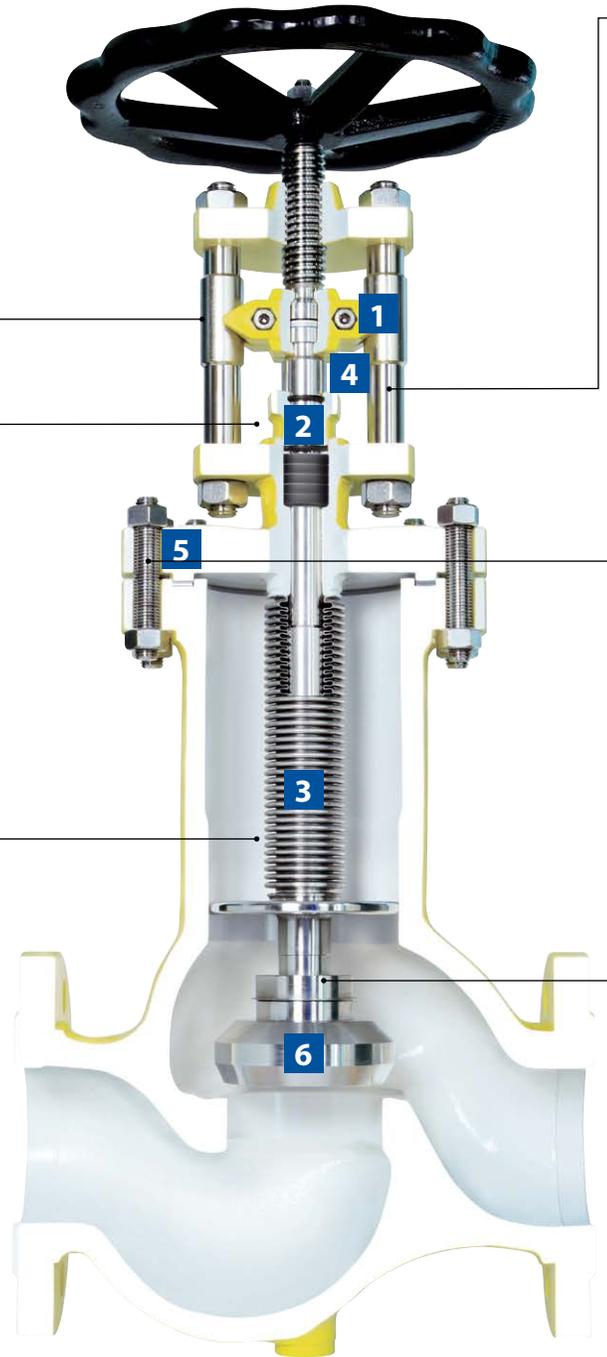
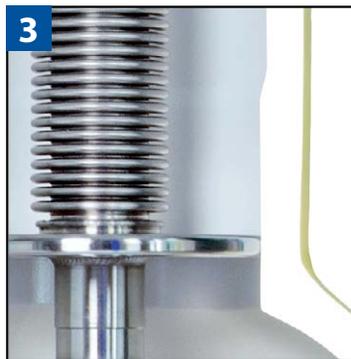
Bellows **anti-torque device** with integrated position indicator for open and closed positions



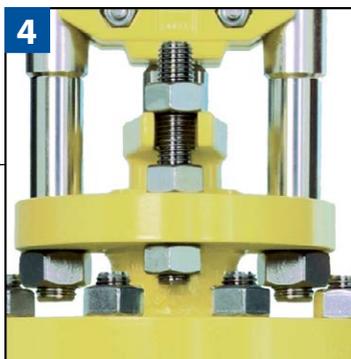
Safety **gland packing** made of graphite; gland follower with double wiper or O-ring seal made of FKM



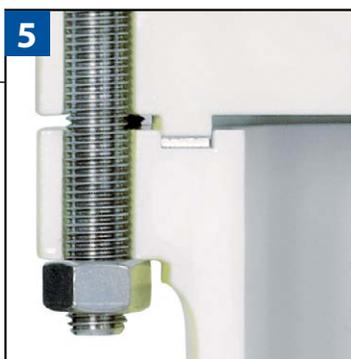
Protected **multiple wall bellows** made of Hastelloy® C276, designed for 10,000 cycles installed beyond main flow area



WTA® HF Valves Design Features



4 **Bridge and pillar design** separates yoke from bonnet; pillars are bolted and secured with nuts



5 Bonnet flange in **tongue and groove design**; stud bolts made of A 193 grade B7M with a nut in A 194 grade 2HM on each end; bonnet gasket with grooved Monel® and graphite coating



6 Exchangeable disc with conical shape; **sealing surface hard-faced** with Stellite® 6; **body seat hard-faced** with Stellite® 21

Design Advantages

The multi-wall, fully-flushed stainless steel **bellows** acts as the primary seal. This flushed system keeps the bellows clean and free from any particles settling into the fins of the bellows.

The full-sized **gland packing**, made of pure graphite, is designed as a secondary stem seal, providing an extra level of protection for the bellows in case of emergency or failure.

A third safety seal, the WTA® **metal backseat**, secures the bellows against overcompression, limits the stroke and eliminates any vibrations on the stem and plug. This feature allows continuous operation, even in case of a bellows and packing failure.

The WTA® **two-part rising stem** design separates the upper and lower stem from each other with an anti-torque device. The upper stem gets rotated through the handwheel operation while the lower stem is only stroked up and down. This prevents any torsion on the bellows.

WTA® uses two different materials to **hardface the seat** (Stellite® 21) **and the plug** (Stellite® 6). We always supply a plug harder than the seat to assure a tight, leakage-free closure and a re-polishing function of the seat during a long life time.

All parts of WTA®'s **rising handwheel** can be exchanged while the valve is in service and under pressure. Non-rising handwheel components cannot be exchanged if the bushing that guides and turns the stem has been compromised, in which case the complete insert/valve must be replaced.

The **tongue and groove sealing system** supports exceptional sealing while reducing the possibility for gasket wear over time. Tight sealing on the top flange bonnet is essential to fugitive emissions protection, while multiple features are required to prevent emissions around the packing material.

The **robust bellows design** offers significant operating and maintenance cost savings.

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 Fax: +49 8382 702 144

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FK®
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RESISTOFLEX®



Saunders®
 the science inside 

STOCKHAM®

UNI-CHEK®

WESTLOCK
 CONTROLS

w.ta.®

XOMOX®

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