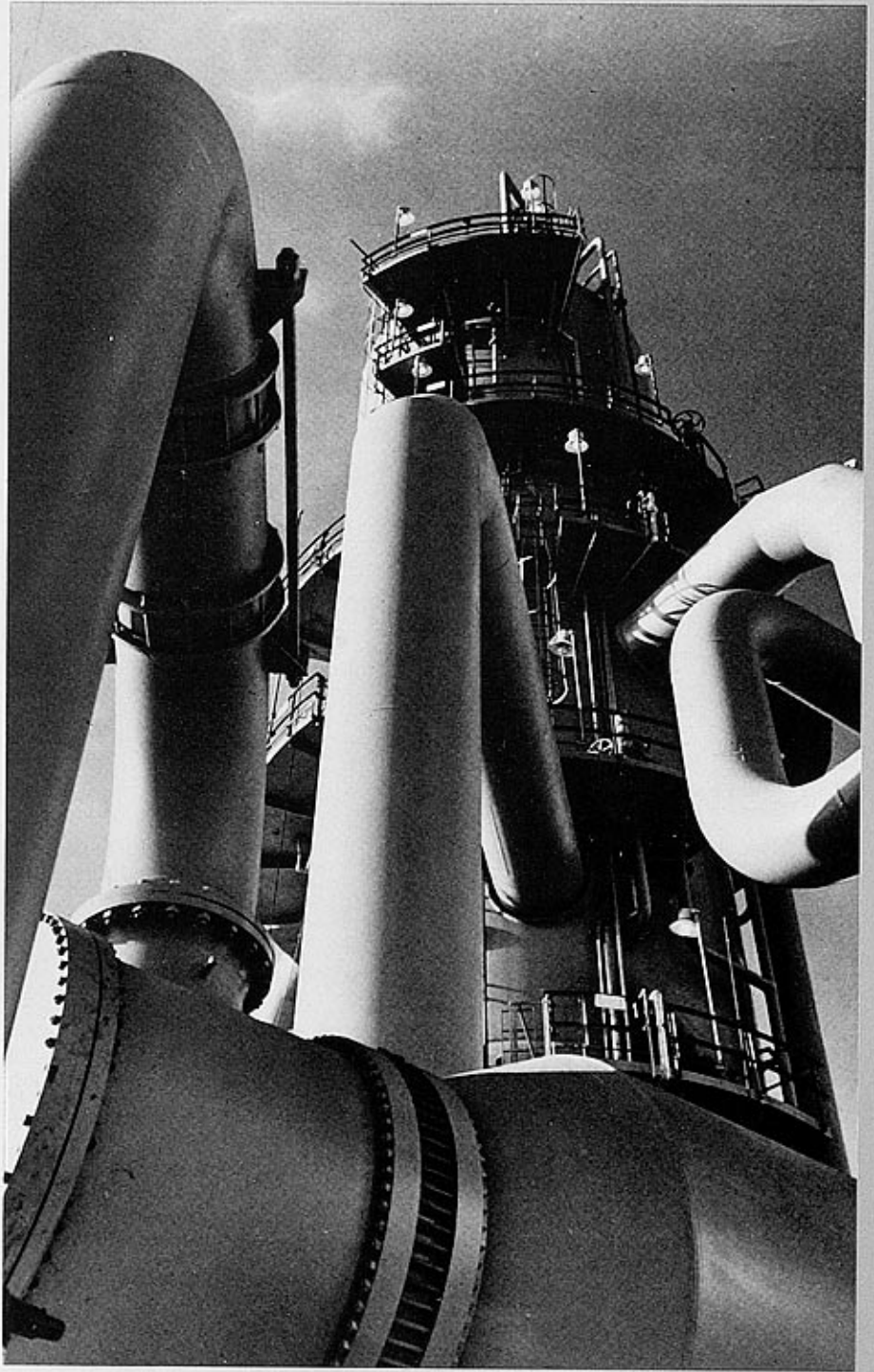


# Tufline<sup>®</sup> HF Valves



**XOMOX<sup>®</sup>**  
Tufline Valves & Matryx Actuators

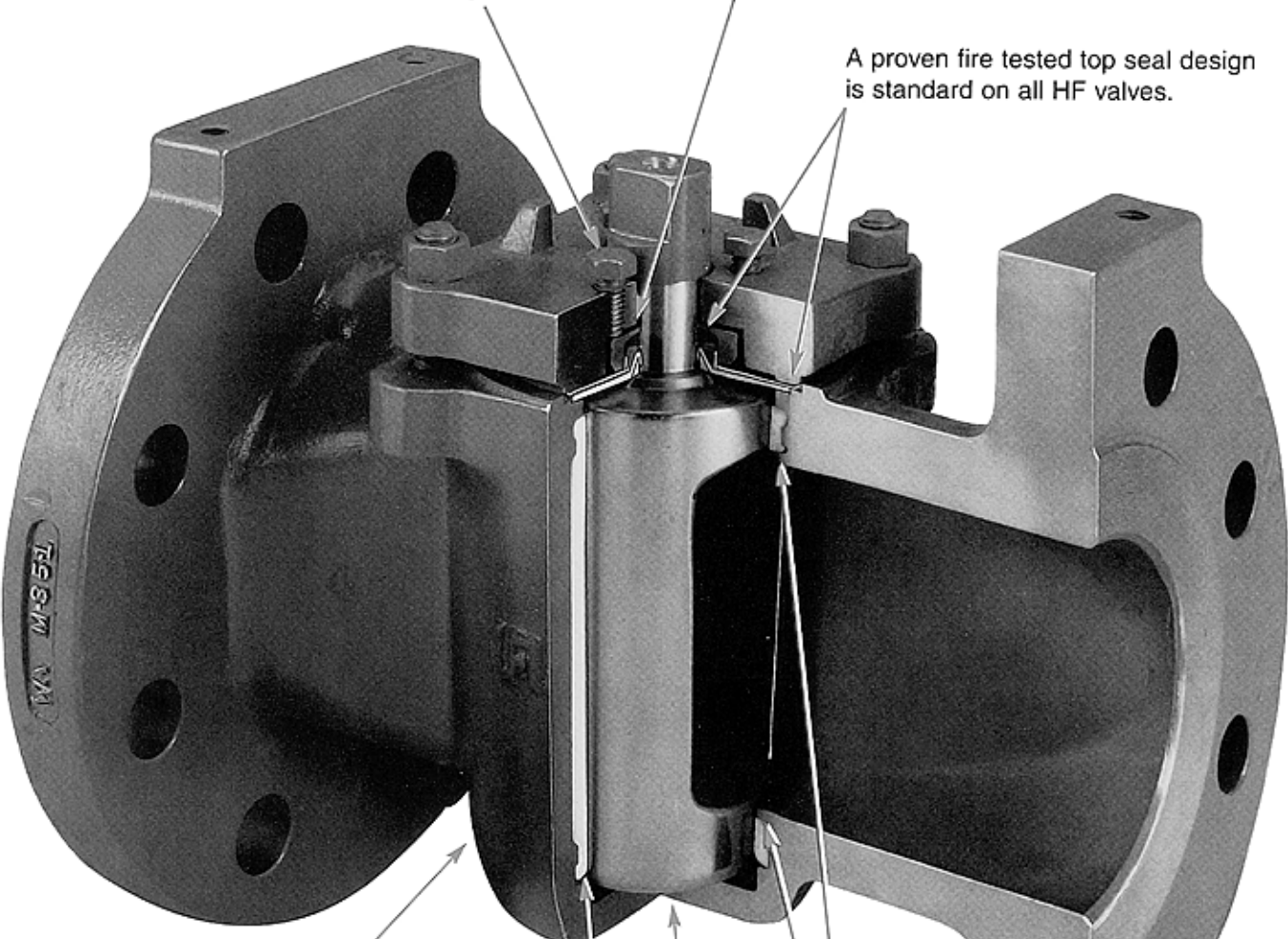
# Tufline® HF valves have been proven through years of service in hydrofluoric acid applications.

Hydrofluoric acid is important in dozens of industrial applications. Yet, it can be a difficult and hazardous fluid to handle. Tufline HF valves have proven themselves with years of service in thousands of installations.

Easily accessible adjustment bolts assure tight internal and external sealing.

The unique design of the multiple seals provides superior protection against external stem leakage, assures long service life, and reduces maintenance requirements.

A proven fire tested top seal design is standard on all HF valves.



Valves are available in a variety of corrosion resistant materials for every HF application.

The lightweight design makes installation easier and more economical. The compact configuration requires less space in your processing system and permits more design flexibility.

The PTFE sleeve fully surrounds the plug. This assures a continuous primary seal that needs no lubrication. Line leakage through a Tufline valve in the closed position is virtually impossible. This is an important safety consideration.

The 360° port defining lips, originally developed by Xomox, prevent sleeve cold flow, protect against sleeve erosion, and retard media infiltration behind the sleeve.

A vent hole in the bottom of the plug allows hydrofluoric acid to vent back into the waterway. This eliminates the possibility of trapping the acid below the plug.

## Approved for the most demanding HF requirements



The Phillips Petroleum HF Alkylation Process Specifications provide the standards for valves being installed in most new alkylation systems, worldwide. Tufline valves manufactured for the Phillips HF process are listed by Phillips Petroleum for use in their licensed systems. You can specify Tufline HF valves that meet these special Phillips Petroleum design and material requirements and testing criteria for your application. (See pages 4 and 5 for detailed Phillips Petroleum HF alkylation valve specifications.)

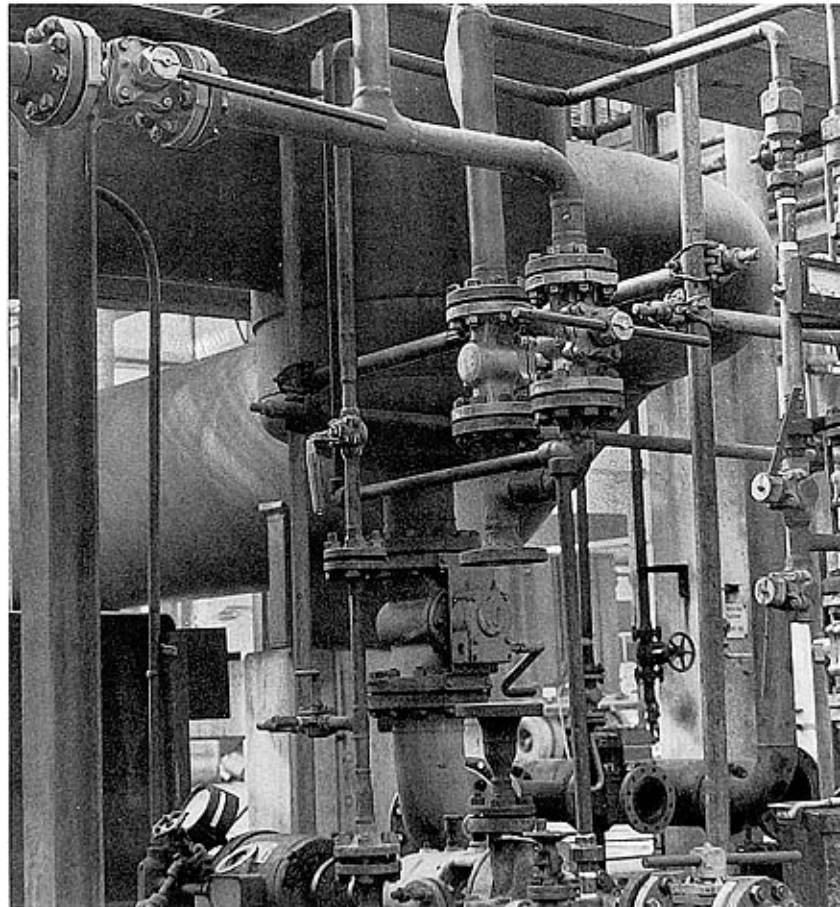
## Tufline valves for other HF applications and processes

Tufline HF valves are also available to meet a variety of alternate design specifications, including UOP. You can also choose from a number of optional features. These valves are designed to meet the requirements for other HF alkylation processes and any hydrofluoric acid applications. (See pages 6 and 7 for detailed specifications.)



## Page / Contents

- 4 Tufline valves for the Phillips HF alkylation process
- 6 Tufline valves for other HF applications
- 8 General engineering information
- 9 Sizes and dimensions
- 11 Full port HF valves



*With proper procedures and quality equipment like Tufline valves, hydrofluoric acid can be handled safely in a wide variety of applications.*

## Tufline Valves for Petroleum Alkylation Processes

Tufline HF Valves are listed in Phillips Petroleum Company's HF Alkylation Process Design Specification Manual and meet UOP specifications.

Tufline valves ordered for the Phillips Petroleum HF alkylation process will be manufactured in strict accordance with the approved assembly and testing procedures, and with no deviation from material and design specifications.

### Materials of construction

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
Thrust Collar	ASTM B127, Monel
Metal Diaphragm	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 or M-30-C* Monel
Paint	HF acid detection paint
Tag	304 Stainless Steel
Plastic Cable Tie	Plastic

\*M-30-C monel may be used only for 1/2 to 1 1/2 inch 0366 valve bodies. All other size valve bodies are of M-35-1 monel.



### Finish requirements.

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

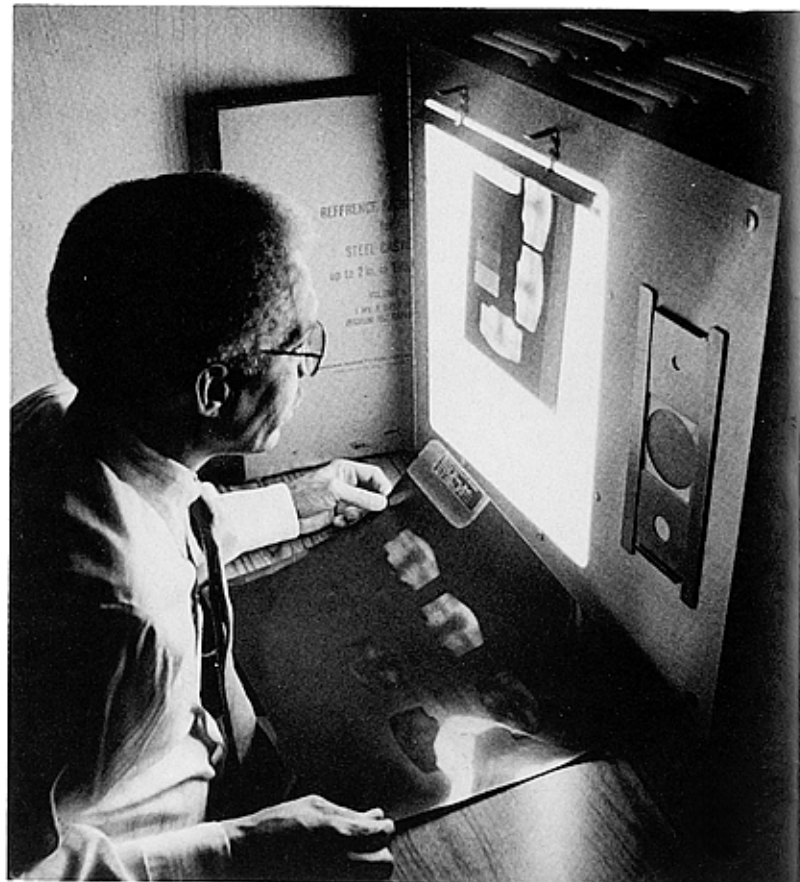
### Testing requirements.

All valve body castings are subjected to 100% radiography of all critical areas of each casting. Each valve body is hydrostatic shell tested at 1 1/2 times its rated working pressure. Completed valve assemblies are tested at 80 psig air for seat integrity.

### Ordering procedures.

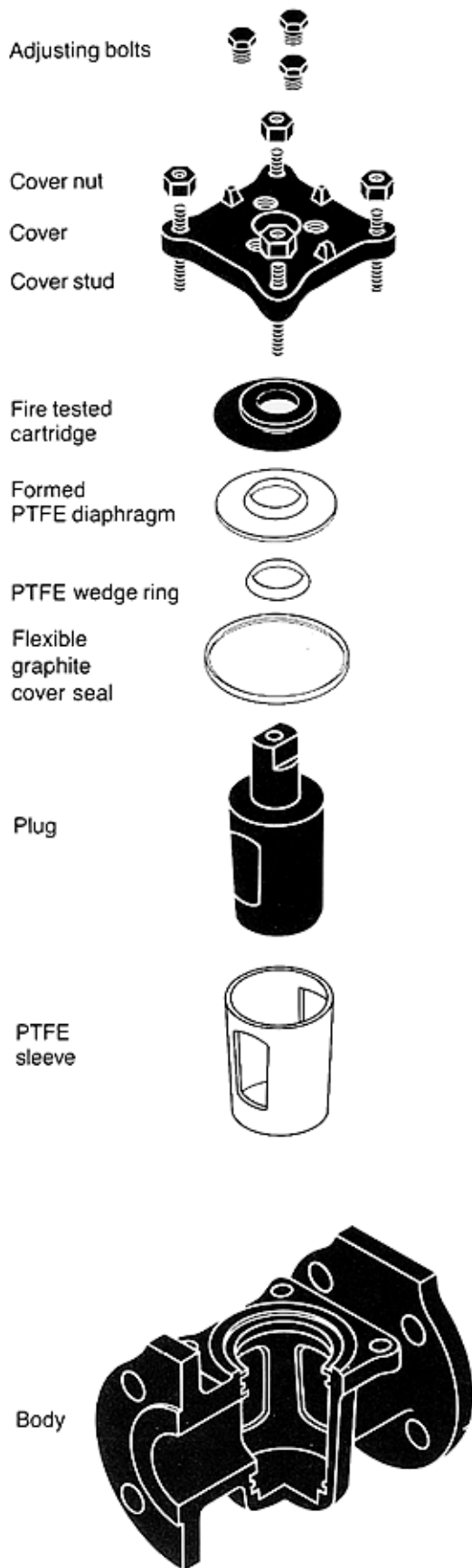
Valves must be ordered by drawing number. There can be no deviations from specifications and no other options are available. The following table references conventional sizes and figure numbers with the Phillips listed drawing numbers.

Below: X-rays of valve bodies are inspected to assure casting integrity.





## Valve components



## ANSI Class 300

Size (in.)	Figure No.	Phillips Listed Drawing No.	UOP Approved Drawing No.
1/2	0366HF	FP0694-E	FP1238-E
3/4	0366HF	FP0695-E	FP1238-E
1	0366HF	FP0696-E	FP1238-E
1 1/2	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*

## ANSI Class 600 DR

2	0667DR-HF	FP1091-E	FP3705*
3	0667DR-HF	FP1092-E	FP3706*
4	0667DR-HF	FP1093-E	FP3707*

## ANSI Class 300 - Full Port

Size (in.)	Figure No.	Phillips Listed Drawing No.	UOP Approved Drawing No.
1	20367HF	FP1703	FP1912
1 1/2	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

How to order: Specify Drawing Number.

**How to order**  
Specify drawing number and actuation.

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

## Tufline valves for every hydrofluoric acid application

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



## Materials of construction

Adjusting Bolts	ASTM B164, Monel
Cover	ASTM A216, Grade WCB carbon steel
Cover Bolts	ASTM A193, Grade B7M carbon steel
Thrust Collar	ASTM B127, Monel
Metal Diaphragm	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-30-C Monel
Sleeve	Virgin PTFE
Body	ASTM A216, Grade WCB carbon steel or ASTM A494 Grade M-30-C Monel
Paint	Sherwin Williams No. F65-G39 Industrial Kemlustral light green

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

## Quick reference of available configurations

Size Inches	ANSI Class	Figure Number	Screwed End	Flanged End
1/2 to 2	150	066HF	X	
1/2 to 2	300	0366HF	X	
1/2 to 4	150	067HF		X
1/2 to 4	300	0367HF		X
4 to 24	150	067EG-HF		X
4 to 20	300	0367EG-HF		X
1/2 to 16	600DR	0667/DR-HF		X

All configurations listed above are available with monel or carbon steel bodies

Some of the applications in which Tufline HF valves have proven themselves are listed below:

HF alkylation	Casting cleaning
Acid regeneration	Organic fluorinating
Glass production	Inorganic fluorinating
Aluminum production	Fluorine production
Metallurgical pickling	Aluminum fluoride production
Filter paper purification	Uranium refining
Electropolishing of metals	Rocket propellant preparation
Stone and brick cleaning	Isomerization
Oil well acidizing	Condensation
Fermentation control	Dehydration
Ore dissolving	Polymerization

### How to order:

Specify: Size . . . . Figure Number . . . . Body & Plug Material . . . . Actuation . . . . Accessories

3" Fig. 067HF WCB/MO with Matryx® MX200 Pneumatic Actuator Matryx Limit Switch

# Valve components

Adjusting bolts



Cover



Fire tested cartridge



Formed PTFE diaphragm



PTFE wedge ring



Flexible graphite cover seal



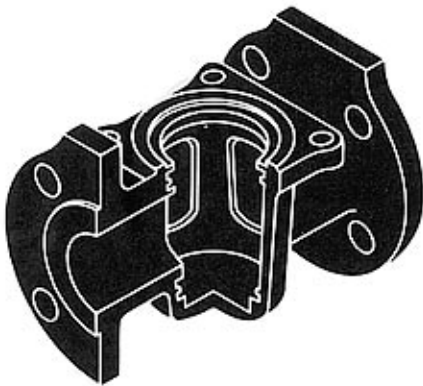
Plug



PTFE sleeve



Body



**ANSI Class 150, 300  
Sizes 1/2" to 2"**

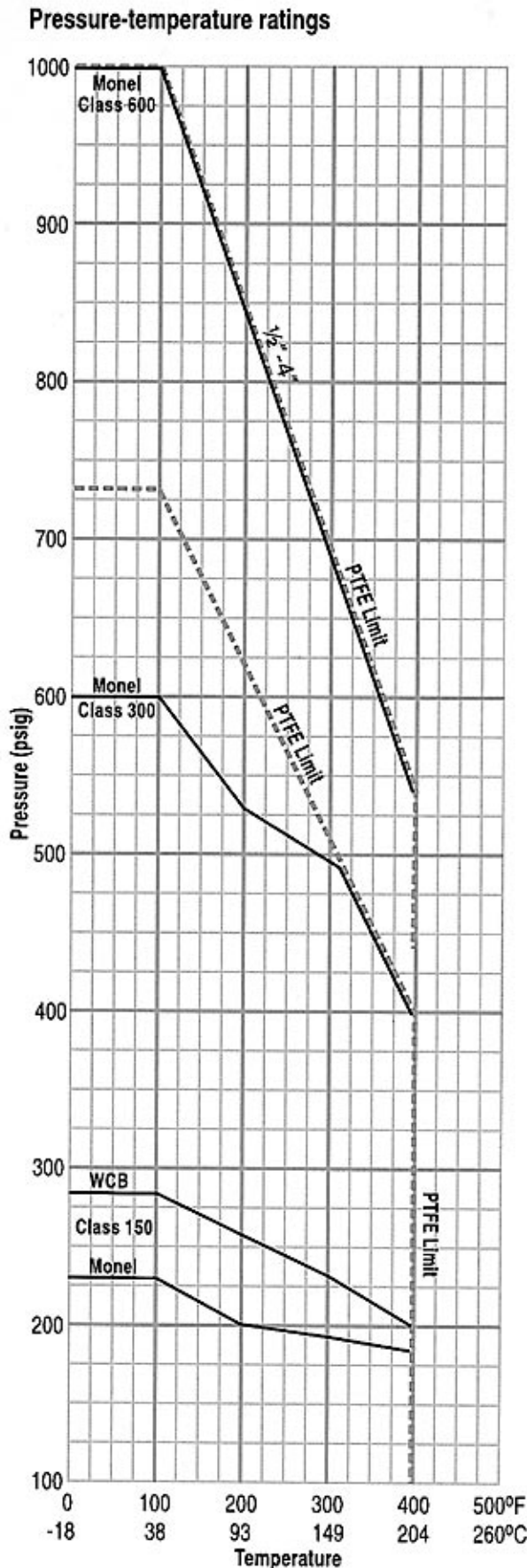


**ANSI Class 150, 300, 600DR  
Sizes 1/2" to 24"**

# General engineering information and dimensional drawings

## Cv factors for valve sizing.

Size	Cv
1/2	9
3/4	9
1	43
1 1/2	89
2	172
3	294
4	548
6	1075
8	1591
10	2159
12	3200
14x12x14	3200
14x16x14	5280
16	5600
18	5900
20	11,000



For pressure-temperature limitations for Fig. 0667DR valves in sizes 6 through 14 inches, consult factory.

## 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, the end user must assume final responsibility for proper evaluation, application and performance of all products. The contents of this document are presented for information purposes only. Every effort has been made to ensure accuracy. This information is not intended to be construed as warranties or guarantees, expressed or implied, nor imply use applicability, for products or services described herein. We reserve the right to modify or improve the designs and specifications of such products at any time without notice. As the manufacturer, Xomox sells its products and services pursuant to its standard terms and conditions of sale, including its limited warranty, copies of which are available upon request. Xomox limits its liability specifically to the replacement or repair of defective items, or to a refund for same. Xomox does not accept liability for any incidental or consequential damages.



# Flanged ends, Class 150 - 067/067EG

## With Wrench

Size	L	h	H	D	b	g	f	Q	Wts.
1/2	4.25		4.00	3.50	.38	1.38	.06	6.38	3 3/4
3/4	4.63		4.00	3.88	.41	1.68	.06	6.38	4 1/4
1	5.00	3.81	2.88	4.25	.44	2.00	.06	8.75	8 1/2
1 1/2	6.50	4.56	3.63	5.00	.56	2.88	.06	12.50	15
2	7.00	5.13	4.00	6.00	.63	3.63	.06	18.00	24
2 1/2*	8.00	5.69	4.63	7.50	.75	4.13	.06	24.00	34 1/2
3	8.00	5.69	4.63	7.50	.75	5.00	.06	24.00	34 1/2
4	9.00	7.06	5.75	9.00	.94	6.19	.06	30.00	62

\*2 1/2" valves are machined from 3" castings, but flanges are machined to 2 1/2" dimensions.

## With enclosed gear w/handwheel

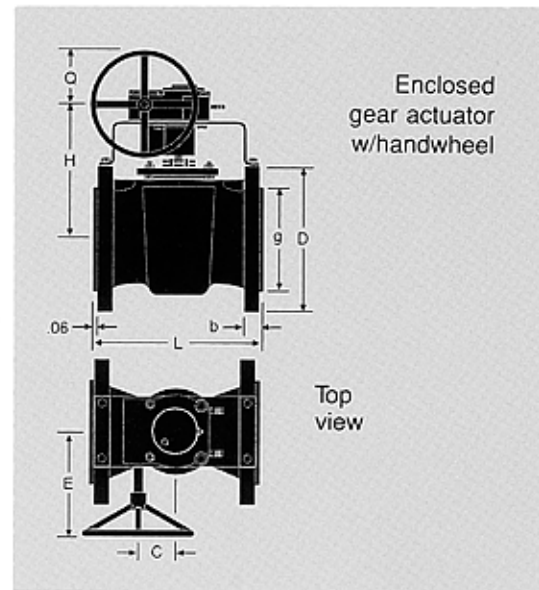
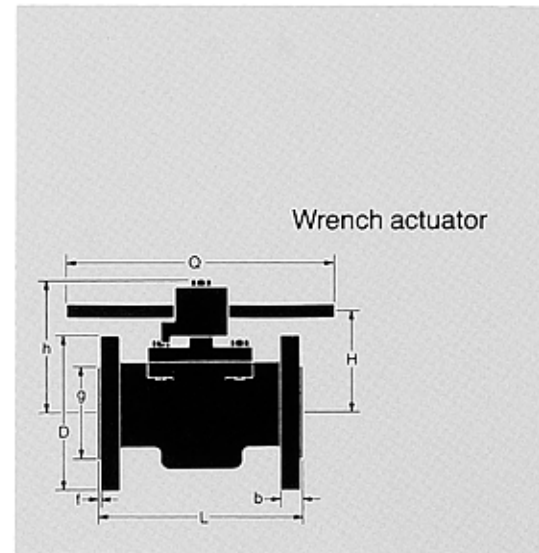
Size	L	b	D	g	H	Q	C	E	Wts.
4	9.00	.94	9.00	6.19	8.75	6.00	2.06	8.00	100
6	10.50	1.00	11.00	8.50	11.50	9.00	2.62	10.38	150
8	11.50	1.13	13.50	10.63	13.50	9.00	2.62	10.38	231
10	13.00	1.19	16.00	12.75	15.25	12.00	3.53	12.31	304
12	14.00	1.25	19.00	15.00	16.25	15.00	4.88	15.88	445

Valve Size	1/2	3/4	1	1 1/2	2	2 1/2	3
Diameter of bolt circle	2.38	2.75	3.13	3.88	4.75	5.50	6.00
Diameter of bolt holes	.63	.63	.63	.63	.75	.75	.75
Number of bolt holes	4	4	4	4	4	4	4

Valve Size	4	4EG	6	8	10	12
Diameter of bolt circle	7.50	7.50	9.50	11.75	14.25	17.00
Diameter of bolt holes	.75	.75	.88	.88	1.00	1.00
Number of bolt holes	8	8	8	*8	**12	**12

\*2 top holes in flanges are tapped for 3/4" - 10 UNC threads.

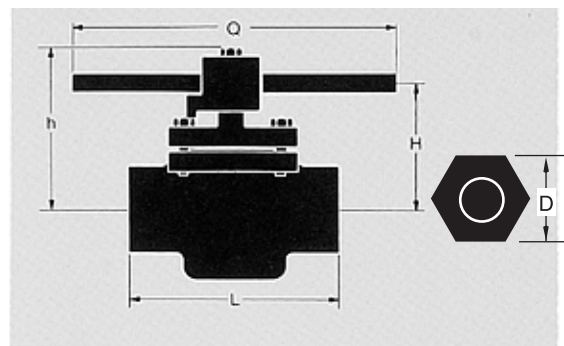
\*\*2 top holes in flanges are tapped for 7/8" - 9 UNC threads.



# Screwed ends, Class 150/300 - 066/0366

## With wrench

Size	L	h	H	D	Q	Wts.
1/2	3.25	---	4.00	3.10	6.38	11 1/2
3/4	3.25	---	4.00	3.10	6.38	11 1/2
1	4.63	3.81	2.88	1.90	8.75	6
1 1/2	5.50	4.56	3.63	2.50	12.50	12
2	6.50	5.13	4.00	3.10	18.00	19



## Flanged ends, Class 300 - 0367 / 0367EG

### With Wrench

Size	L	h	H	D	b	g	f	Q	Wts.
1/2	5.50	-	4.00	3.75	.56	1.38	.06	6.38	7
3/4	6.00	-	4.00	4.63	.63	1.69	.06	6.38	10
1	6.50	3.81	2.88	4.88	.69	2.00	.06	8.75	13
1 1/2	7.50	4.56	3.63	6.13	.81	2.88	.06	12.50	23
2	8.50	5.13	4.00	6.50	.88	3.63	.06	18.00	32
2 1/2*	11.13	5.69	4.63	8.25	1.13	4.13	.06	24.00	42
3	11.13	5.69	4.63	8.25	1.13	5.00	.06	24.00	42
4	12.00	7.06	5.75	10.00	1.25	6.19	.06	30.00	88

\* 2 1/2" valves are machined from 3" castings, but flanges are machined to 2 1/2" dimensions.

### With enclosed gear w/handwheel

Size	L	b	D	g	H	Q	C	E	Wts.
4	12.00	1.25	10.00	6.19	8.75	6.00	2.06	8.00	136
6	15.88	1.44	12.50	8.50	11.50	9.00	2.62	10.38	220
8	18.50	1.63	15.00	10.63	13.50	9.00	2.62	10.38	323
10	18.00	1.88	17.50	12.75	15.25	12.00	3.53	12.31	467
12	19.75	2.00	20.50	15.00	16.25	15.00	4.88	15.88	625
14x12x14	30.00	2.12	23.00	16.25	16.25	15.00	4.88	15.88	900
14x16x14	30.00	2.12	23.00	16.25	21.66	15.00	5.38	16.90	925
16	33.00	2.25	25.50	18.50	21.66	12.00	5.12	17.66	1005
18	36.00	2.38	28.00	21.00	21.66	12.00	5.12	17.66	1200
20	39.00	2.50	32.00	23.00	32.92	15.75	16.97	24.00	2500

Valve Size:	1/2	3/4	1	1 1/2	2	2 1/2	3	4
Dia. of bolt circle	2.63	3.25	3.50	4.50	5.00	5.88	6.63	7.88
Dia. of bolt holes	.63	.75	.75	.88	.75	.88	.88	.88
Number of holes	4	4	4	4	8	8	8	8

Valve Size:	6	8	10	12	14	16	18	20
Dia. of bolt circle	10.63	13.00	15.25	17.75	20.25	22.50	24.75	27.00
Dia. of bolt holes	.88	1.00	1.13	1.25	1.25**	1.38	1.38	1.38
Number of holes	12	12	16	16	20	20	24	24

\*\* On 14" valves, the two top holes in the flange are tapped 1-8UNC-2B threads.

## Flanged ends, Class 600 / 0667DR

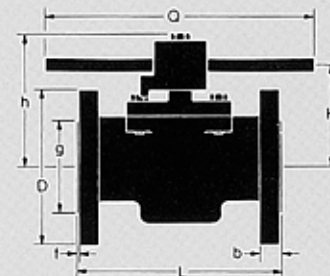
### With wrench

Size	L	h	H	D	b	g	f	Q	Wts.
2	11.50	5.13	4.00	6.50	1.00	3.63	.25	18.00	38
3	14.00	5.69	4.63	8.25	1.25	5.00	.25	24.00	62
4	17.00	9.00	7.62	10.75	1.50	6.19	.25	30.00	115

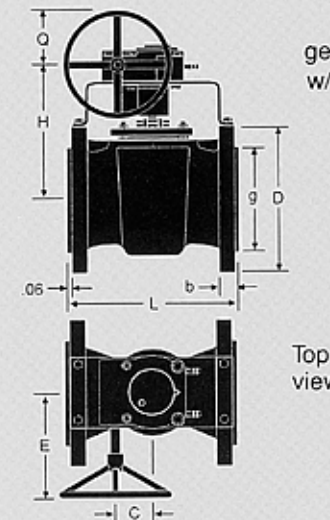
For dimensional data concerning ANSI Class 600DR valves in sizes 1/2" through 1 1/2" and 6" through 16", consult factory.

Valve Size:	2	3	4
Dia. of bolt circle	5.00	6.63	8.50
Dia. of bolt holes	.75	.88	1.00
Number of holes	8	8	8

Class 300  
Wrench actuator

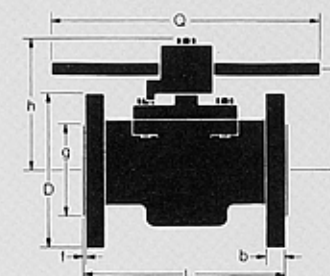


Enclosed  
gear actuator  
w/handwheel

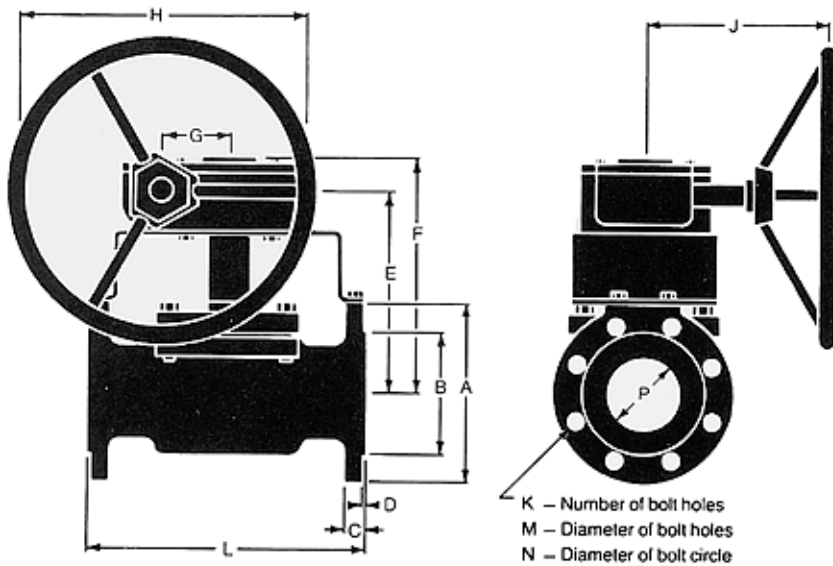
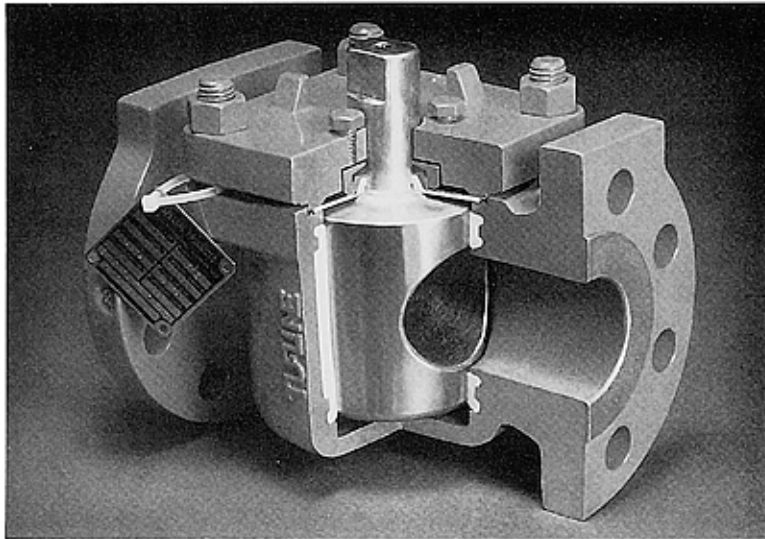


Top  
view

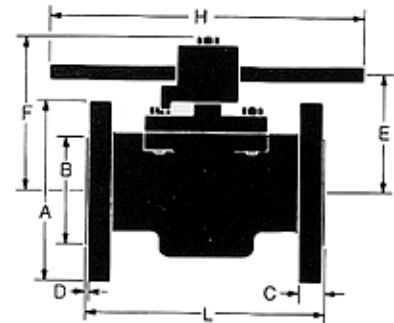
Class 600  
Wrench actuator



# Full Port HF Valves



1" to 2" are wrench operated.  
3" to 12" are gear operated.



Size	L	A	B	C	D	E	F	G	H	J	K	M	N	P	Wt.	Cv
1½	6.50	4.88	2.00	.69	.06	2.88	3.81		18.00	---	4	.75	3.50	1.04	28	100
1½	7.50	6.13	2.88	.81	.06	3.63	4.56	---	24.00	---	4	.88	4.50	1.56	35	270
2	8.50	6.50	3.63	.88	.06	4.94	6.00	---	30.00	---	8	.75	5.00	2.06	52	450
3	11.13	8.25	5.00	1.12	.06	9.87	11.45	2.62	18.00	10.19	8 <sup>1</sup>	.88	6.62	3.06	135	1130
4	12.00	10.00	6.19	1.25	.06	10.62	12.57	4.38	18.00	11.19	8 <sup>2</sup>	.88	7.88	4.03	205	2200
6	15.88	12.50	8.50	1.44	.06	12.75	14.88	5.38	30.00	14.94	12 <sup>3</sup>	.88	10.62	6.00	475	5350
8	19.75	15.00	10.63	1.62	.06	14.84	18.04	5.43	24.00	18.21	12 <sup>4</sup>	1.00	13.00	7.98	875	10400
10	22.38	17.50	12.75	1.88	.06	15.12	17.25	5.43	18.00	20.59	16 <sup>5</sup>	1.12	15.25	10.02	1600	15850
12	28.00	23.00	15.00	2.00	.06	21.81	29.35	9.33	18.00	22.90	16 <sup>6</sup>	1.25	17.75	11.78	2530	22000

1. 2 top and 2 bottom holes in flanges are tapped.  
2. 2 top holes in flanges are tapped.

3. 4 top holes in flanges are tapped.  
4. 4 top and 2 bottom holes in flanges are tapped.

5. 6 top and 2 bottom holes in flanges are tapped.  
6. 4 top and 4 bottom holes in flanges are tapped.

# Global Capabilities For Global Customers



## Worldwide capabilities.

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

- 18 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

## Global locator.

For a listing of Xomox Manufacturing Facilities, Service Centers, Regional Offices, and Authorized Distributors, visit our web site [www.xomox.com](http://www.xomox.com).

## Xomox literature.

All Xomox catalogs and technical data are available as PDF files at [www.xomox.com](http://www.xomox.com).

## Phone support.

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



a Crane Co. Company

## Corporate strength.

Xomox is a Crane Co. company. Through the Crane Co. association, Xomox offers even greater global capabilities and breadth of product lines.

## Xomox Corporation

World Headquarters  
4444 Cooper Road  
Cincinnati, Ohio 45242

**XOMOX**<sup>®</sup>  
Process Valves & Actuators