FLO TITE valves & controls ®

3pc High Performance Fire Safe Valves

Tri-Pro Series

Models / Full

HPF50 - (316SS)
HPF40 - (WCB)
Size: 1/4” - 4”
Pressure Rating:
3000 psi 1/4” - 3/4”
2250 psi 1” - 4”

Models / Reduced

HPS50 - (316SS)
HPS40 - (WCB)
Size: 1/2” - 4”
Pressure Rating:
3000 psi 1/2” - 1”
2250 psi 1-1/4” - 4”

1” HPF52 (SW)

3” HPF51 (NPT)

Design Features / Options

- Fire Safe Certified to API 607 4th Edition
- I-SO 5211 Actuator Mounting Pad
- Secondary Media Containment
- Anti-Static Grounding Device
- Weld in-Place, SW / BW / Flanged
- Protected Seat Design
- Two Fully Contained Body Seals
- Cap Screw Body Assembly
- Cryogenic Service (Available)
- V-Port Control (Available)
- Metal Seats (Available)

Tri Pro’s Advantage

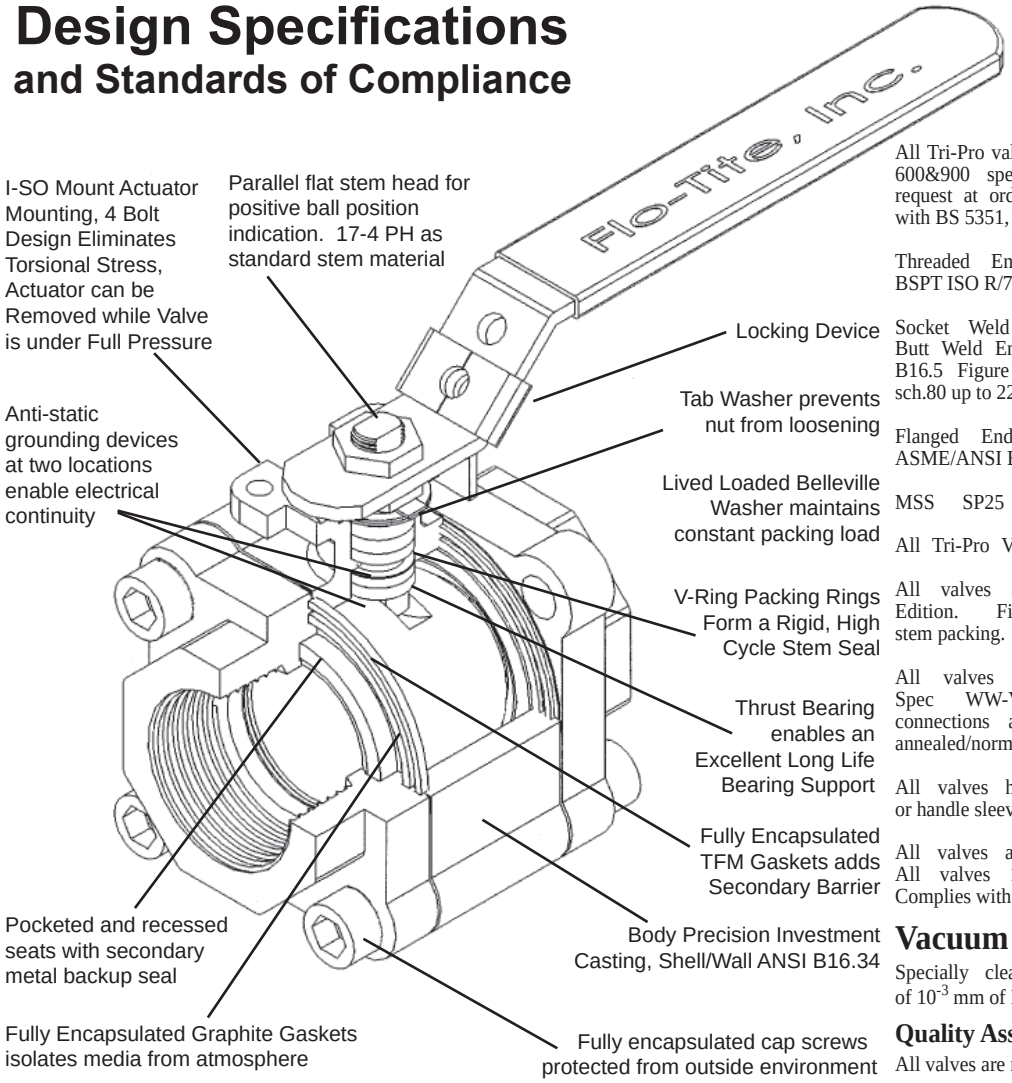
- Ability to handle extreme pressure and temperature shock
- Ability to withstand higher pressure drop
- Ability to handle slurries and resist abrasion and wear
- Bubbletight sealing to 550°F
- Bubbletight sealing to 2250 psi / 3000 psi
- Ability to handle thermal fluid and super heated steam
- Superior Stem Seal Design

REFINED BY DESIGN, DIFFERENT BY INTENT

Tri-Pro! One Valve for Most All Applications

Printing Date 2014/06

Design Specifications
and Standards of Compliance



Technical Specification

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

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

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

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

MSS SP25 compliance for standard marking system

All Tri-Pro Valves meet NACE MR0175 for sour gas service.

All valves are Fire Safe & certified to API 607 4th Edition. Fire Safe Designed Valves must have graphite stem packing.

All valves are in compliance with API 608. Federal Spec WW-V-35C Type II valve body and end connections are high quality investment cast and solution annealed/normalized.

All valves have CE marking on either metal name plate or handle sleeve.

All valves are hydrostatically shell tested to 1.5 x rating All valves 100% air tested under water at 80-100 psi. Complies with API-598, BS 6755 Pt.2.

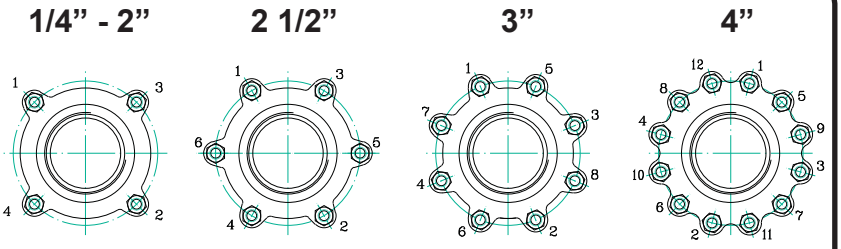
Vacuum Service Suitable to 20 Micron

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

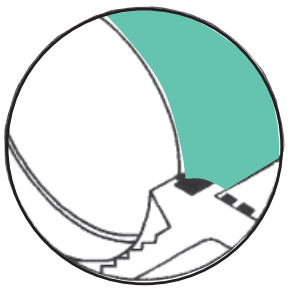
Quality Assurance

All valves are manufactured to ISO 9001 quality standards.

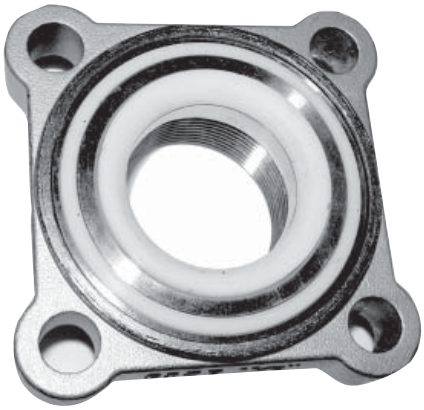
Valve Size	Bolt Size	Bolt Torque in-lb
1/4" - 3/4"	M8	250
1" - 1 1/4"	M10	450
1 1/2"	M12	850
2"	M14	1400
2 1/2"	M16	2100
3"	5/8"	1800
4"	3/4"	2500



Seat Code	Seat Material
F	Super-Tek (TFM)
Y	Super-Tek III (carbon graphite filled TFM
S	S-Tek 50% Stainless filled PTFE
U	UHMWPE
P	PEEK
M	Metal
C	Cavity Filler



Detail of protected seat and encapsulated body seal design. Isolates and protects both seats and seals from flow path. Helps prevent cold flow



Seats & dual seals assemble into valve end caps

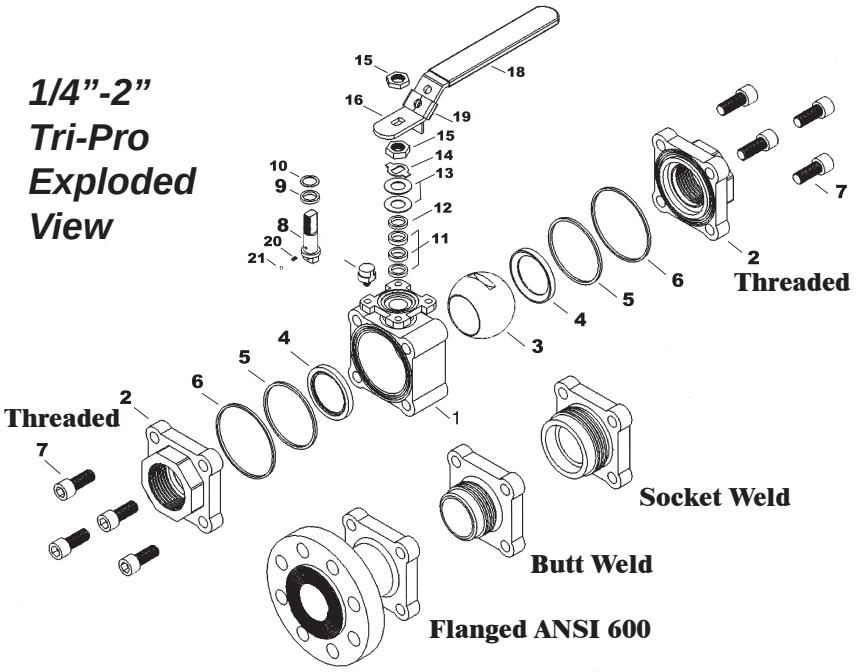
3-Way Diverter

BILL OF MATERIALS:

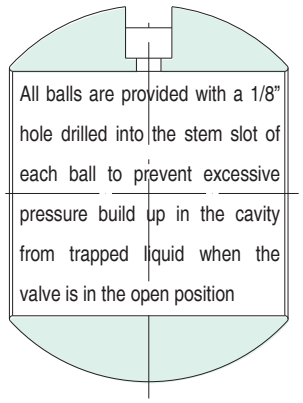
ITEM	NAME	STAINLESS STEEL	CARBON STEEL	QTY
1	BODY	ASTM A351 CF8M	ASTM A216 WCB	1
2	CAP *	ASTM A351 CF8M	ASTM A216 WCB	2
3	BALL	ASTM A351 CF8M	ASTM A351 CF8	1
4	SEAT #	TFM	TFM	2
5	GASKET #	TFM	TFM	2
6	GASKET #	Graphite	Graphite	2
7	BOLT	SS316	SS304	8
8	STEM	17-4PH	17-4PH	1
9	THRUST BEARING #	Carbon PTFE	Carbon PTFE	1
10	THRUST WASHER #	50%SS PTFE	50%SS PTFE	1
11	STEM PACKING #	Graphite	Graphite	1
12	PACKING FOLLOWER	SS304	SS304	1
13	BELLEVILLE WASHER	SS304	SS304	2
14	LOCK WASHER	SS304	SS304	1
15	STEM NUT	SS304	SS304	2
16	HANDLE	SS304	SS304	1
17	STOPPER	SS304	SS304	1
18	PLASTIC COVER	Plastic	Plastic	1
19	LOCKING DEVICE	SS304	SS304	1
20	ANTI-STATIC SPRING	SS301	SS301	2
21	ANTI-STATIC BALL	SS316	SS316	2

Parts included in the repair kits
* All SS welded ends 316L

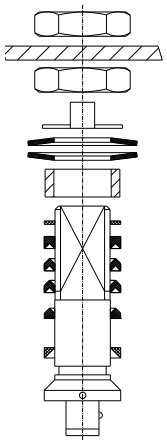
1/4”-2” Tri-Pro Exploded View



Ball Design Added Safety Feature

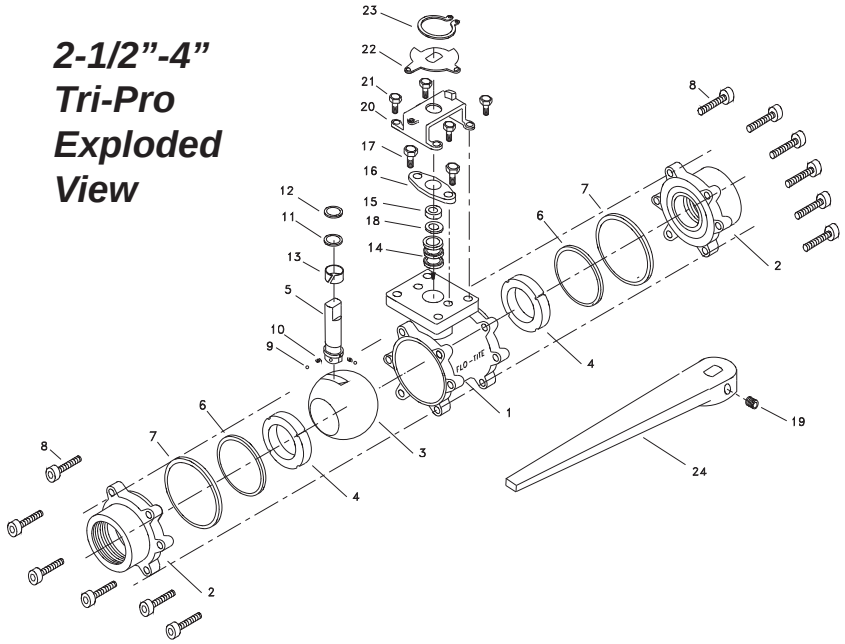


Flo-Tite’s Van Guard Stem Sealing System



Flo-Tite’s Van Guard Seal, state of the art stem sealing system.
Incorporating a triple set of valve stem seals, this unique system eliminates the possibility of valve stem leaks in most all media applications.
Improved thrust washer design allows more sealing surface effectively blocking all leak paths during rotation.
V-Ring Packing Set expands sideways as it is compressed and pressurized blocking all air pockets. The Van-Guard stem system is energized by Belleville washers which continuously adjusts packing compression to compensate for wear, pressure, or temperature fluctuations.
Optional Viton O-Ring can be added
Note: Standard Valve is Fire Safe Design with Graphite Packing.

2-1/2”-4” Tri-Pro Exploded View



BILL OF MATERIALS:

ITEM	NAME	STAINLESS STEEL	CARBON STEEL	QTY
1	BODY	ASTM A351 CF8M	ASTM A216 WCB	1
2	CAP *	ASTM A351 CF8M	ASTM A216 WCB	2
3	BALL	ASTM A351 CF8M	ASTM A351 CF8	1
4	SEAT #	TFM	TFM	2
5	STEM	17-4PH	17-4PH	1
6	GASKET #	TFM	TFM	2
7	GASKET #	Graphite	Graphite	2
8	BOLT	SS316	SS304	16
9	ANTI-STATIC BALL	SS316	SS316	2
10	ANTI-STATIC SPRING	SS301	SS301	2
11	THRUST BEARING #	Carbon PTFE	Carbon PTFE	1
12	THRUST WASHER #	50%SS PTFE	50%SS PTFE	1
13	STEM PACKING #	Graphite	Graphite	1
14	ANTI-EXTRUSION #	50%SS PTFE	50%SS PTFE	1
15	PACKING FOLLOWER	SS304	SS304	1
16	GLAND	SS304	SS304	1
17	GLAND BOLT	SS304	SS304	2
18	STOP HOUSING	ASTM A351 CF8	ASTM A216 WCB	1
19	HOUSING BOLT	SS304	SS304	4
20	TRAVEL STOPPER	SS304	Zinc Plated C.S.	1
21	SNAP RING	Nickel Plated C.S.	Nickel Plated C.S.	1
22	HANDLE	Ductile Iron	Ductile Iron	1
23	SET SCREW	SS304	SS304	1

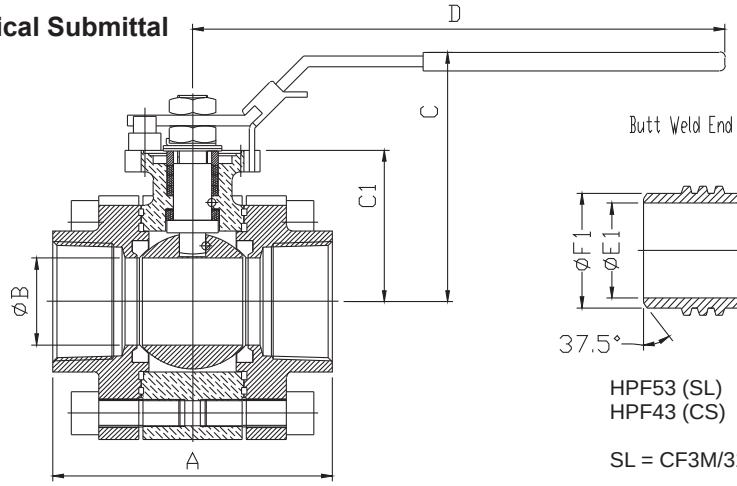
Parts included in the repair kits

Both Full Port and Standard Port Valve Parts are Interchangeable

Dimensions - Full Bore

Model HPF

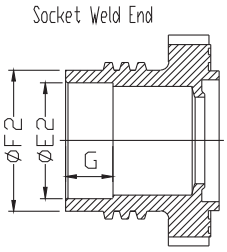
Technical Submittal



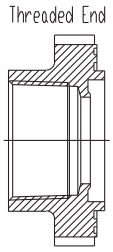
Extra Long Butt Weld & Socket Weld Ends Are Also Available, Consult Factory.

HPF53 (SL)
HPF43 (CS)

SL = CF3M/316L



HPF52 (SL)
HPF42 (CS)



HPF51 (SS)
HPF41 (CS)

SIZE	A NPT	A BW, SW	B	C	C1	D	E1	E2	F1	F2	G	Cv	Torque	Weight Lbs SW
1/4"	2.72	4.81	0.46	2.80	1.54	6.57	0.46	0.56	0.71	1.02	0.39	18	75	2.5
3/8"	2.72	4.81	0.50	2.80	1.54	6.57	0.50	0.69	0.71	1.02	0.39	18	75	2.5
1/2"	2.91	4.89	0.59	2.80	1.54	6.57	0.59	0.85	0.85	1.24	0.39	18	85	3
3/4"	3.39	5.17	0.79	2.95	1.70	6.57	0.79	1.07	1.07	1.52	0.51	42	140	4
1"	3.70	5.24	0.98	3.62	2.06	7.95	0.98	1.33	1.34	1.69	0.51	72	190	5
1 1/4"	4.09	5.72	1.26	3.74	2.19	7.95	1.26	1.67	1.69	2.17	0.51	124	320	9
1 1/2"	4.61	6.19	1.57	4.45	2.65	9.88	1.57	1.91	1.91	2.44	0.51	210	430	12
2"	5.20	6.62	1.97	4.45	2.91	9.88	1.97	2.41	2.38	2.95	0.63	350	560	16
2 1/2"	7.28	8.78	2.56	6.22	3.39	15.5	2.32	2.91	2.87	3.62	0.98	650	950	32
3"	8.74	10.00	2.99	7.13	4.45	15.5	2.99	3.52	3.50	4.29	0.98	950	1200	45
4"	13.50	17.00	3.94	9.41	5.53	22.5	3.82	4.54	4.50	5.31	1.18	1620	2150	62

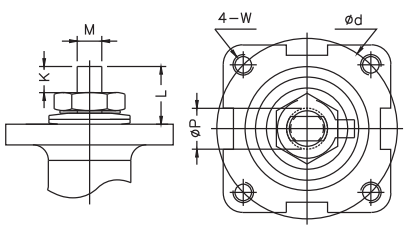
APPLICABLE STANDARDS	
Body Wall Thickness	ASME B16.34
NPT and SW Ends	ASME B16.11
Butt Weld Ends	ASME B16.25
Basic Dimensions	ASME B16.34
Testing Standards	ASME B16.34, API598
NACE	MR-01-75

All valves are hydrostatically shell tested to 1.5 x rating. All valves 100% air tested under water at 80-100 psi. Complies with API-598, BS 6755 Pt. 2.

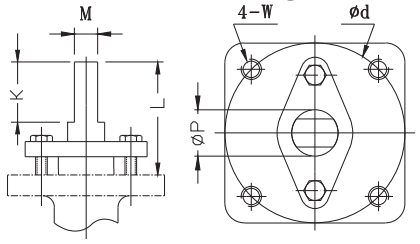
Mounting Dimensions

SIZE	d	K	L	M	P	W	ISO
1/4"	1.65	0.28	0.53	0.25	0.47	#10-24UNC	F04
3/8"	1.65	0.28	0.53	0.25	0.47	#10-24UNC	F04
1/2"	1.65	0.28	0.53	0.25	0.47	#10-24UNC	F04
3/4"	1.65	0.28	0.53	0.25	0.47	#10-24UNC	F04
1"	1.97	0.44	0.74	0.315	0.55	1/4-20UNC	F05
1 1/4"	1.97	0.44	0.74	0.315	0.55	1/4-20UNC	F05
1 1/2"	2.76	0.53	0.88	0.374	0.63	5/16-18UNC	F07
2"	2.76	0.53	0.88	0.374	0.63	5/16-18UNC	F07
2 1/2"	CONSULT FACTORY						
3"	4.02	1.75	2.76	0.669	1.10	1/2-13UNC	F10
4"	4.92	2.03	2.91	1.024	1.34	1/2-13UNC	F12

IMPORTANT: Mounting Dimensions Are for Estimating Purposes Only. Consult Factory Before Manufacturing

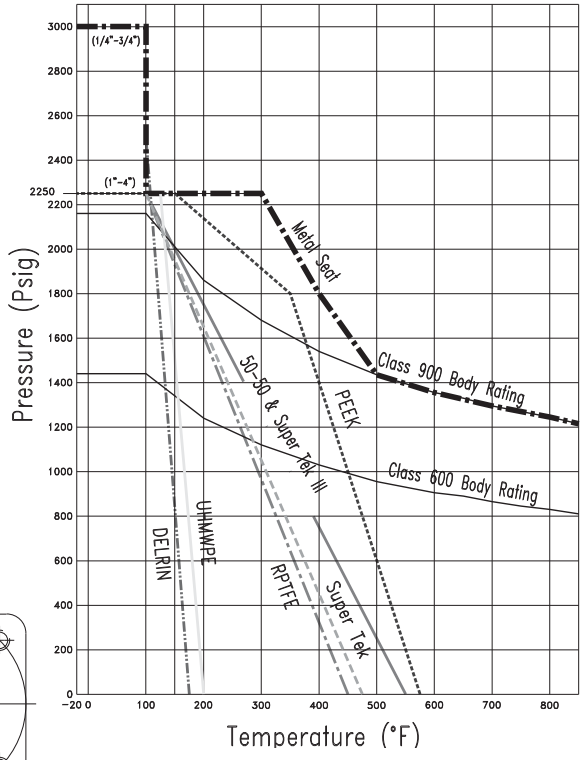


1/4" - 2" Size



3" - 4" Size

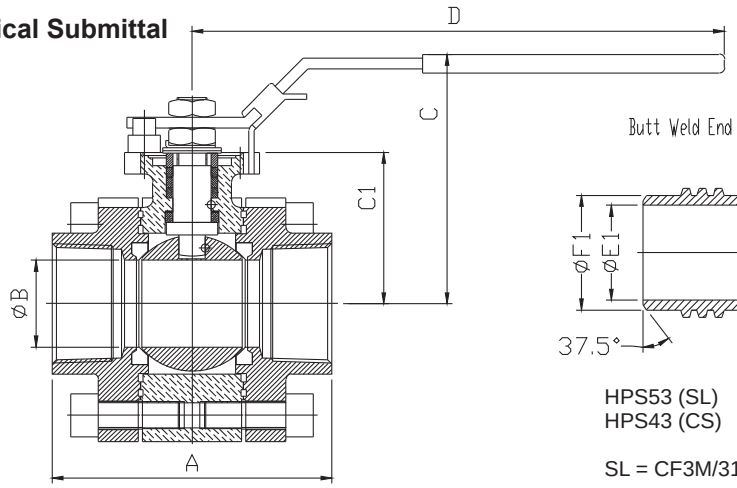
Pressure Temperature Rating



Body rating in the chart is for CF8M material. Max. WCB body rating is 1580 psi for class 600. Consult factory for Rating higher than 800°F

Dimensions - Reduced Bore

Technical Submittal

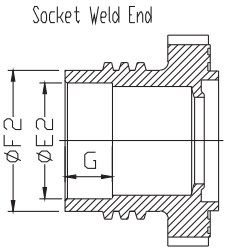


Model HPS

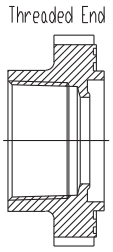
Extra Long Butt Weld & Socket Weld Ends Are Also Available, Consult Factory.

HPS53 (SL)
HPS43 (CS)

SL = CF3M/316L



HPS52 (SL)
HPS42 (CS)



HPS51 (SS)
HPS41 (CS)

SIZE	A NPT	A BW, SW	B	C	C1	D	E1	E2	F1	F2	G	Cv	Torque	Weight Lbs SW
1/2"	2.87	4.85	0.50	2.80	1.54	6.57	0.55	0.85	0.84	1.14	0.39	18	75	3
3/4"	3.11	4.89	0.59	2.80	1.54	6.57	0.74	1.07	1.05	1.38	0.51	20	85	4
1"	3.62	5.17	0.79	2.95	1.70	6.57	0.96	1.33	1.31	1.69	0.51	40	140	5
1 1/2"	4.13	5.72	1.26	3.74	2.19	7.95	1.50	1.91	1.90	2.36	0.51	120	320	12
2"	4.76	6.19	1.57	4.45	2.65	9.88	1.94	2.41	2.37	2.83	0.63	200	430	16
2 1/2"	5.90	8.78	1.97	4.45	2.91	9.88	2.32	2.91	2.87	3.46	0.98	300	580	32
3"	9.06	9.57	2.56	6.22	3.39	15.5	2.90	3.54	3.50	4.18	0.98	640	985	55
4"	13.50	12.01	2.99	7.13	4.45	15.5	3.94	4.59	4.50	5.31	1.18	900	1250	85

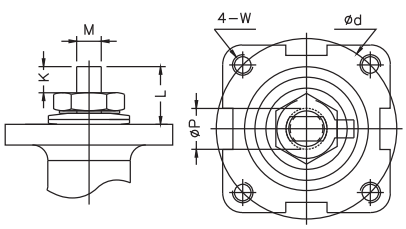
APPLICABLE STANDARDS	
Body Wall Thickness	ASME B16.34
NPT and SW Ends	ASME B16.11
Butt Weld Ends	ASME B16.25
Basic Dimensions	ASME B16.34
Testing Standards	ASME B16.34, API598
NACE	MR-01-75

All valves are hydrostatically shell tested to 1.5 x rating. All valves 100% air tested under water at 80-100 psi. Complies with API-598, BS 6755 Pt. 2.

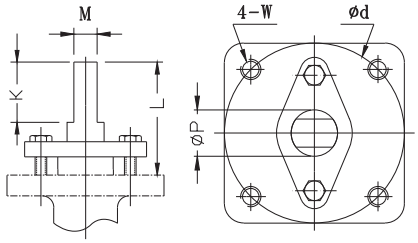
Mounting Dimensions

SIZE	d	K	L	M	P	W	ISO
1/2"	1.65	0.28	0.53	0.25	0.47	#10-24UNC	F04
3/4"	1.65	0.28	0.53	0.25	0.47	#10-24UNC	F04
1"	1.65	0.28	0.53	0.25	0.47	#10-24UNC	F04
1 1/2"	1.97	0.44	0.74	0.315	0.55	1/4-20UNC	F05
2"	2.76	0.53	0.88	0.374	0.63	5/16-18UNC	F07
2 1/2"	2.76	0.53	0.88	0.374	0.63	5/16-18UNC	F07
3"	CONSULT FACTORY						
4"	4.02	1.75	2.76	0.669	1.10	1/2-13UNC	F10

IMPORTANT: Mounting Dimensions Are for Estimating Purposes Only. Consult Factory Before Manufacturing

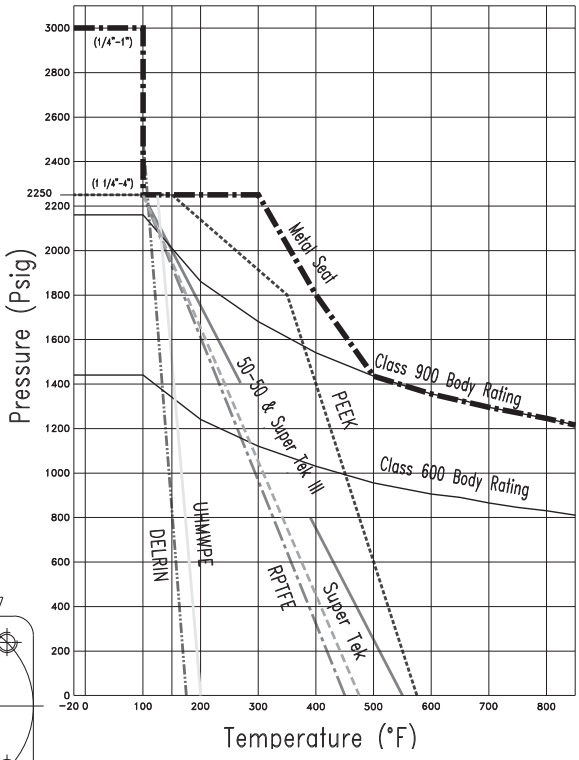


1/4" - 2 1/2" Size



4" Size

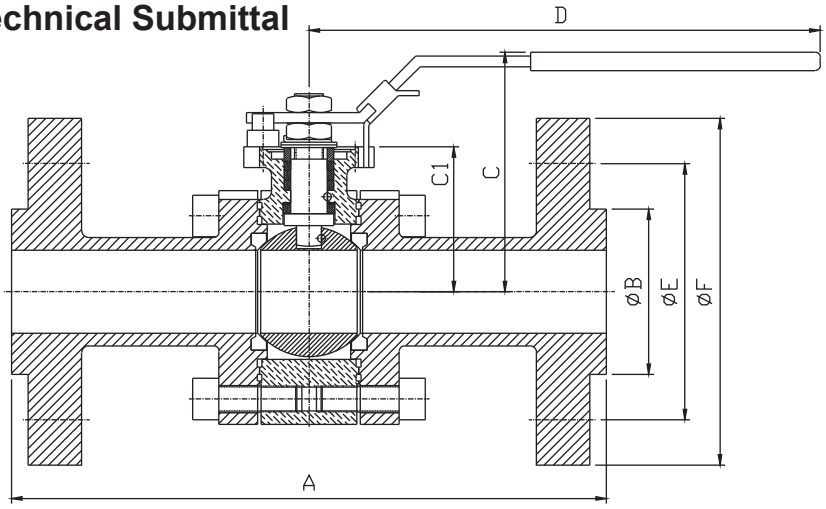
Pressure Temperature Rating



Body rating in the chart is for CF8M material. Max. WCB body rating is 1580 psi for class 600. Consult factory for Rating higher than 800°F

Dimensions - Flanged Class 600

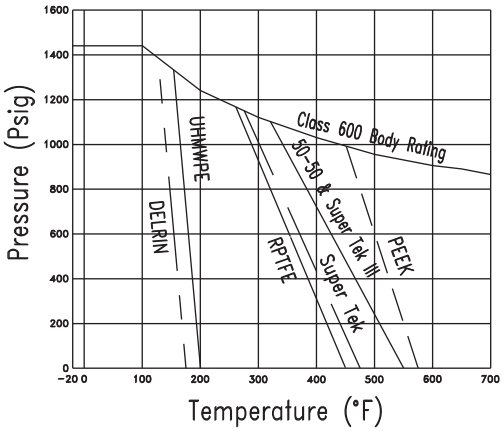
Technical Submittal



SIZE	A	B	C	C1	D	E	F	Cv	Torque in-lb
1/2"	6.50	0.59	2.80	1.54	6.57	2.62	3.75	18	75
3/4"	7.50	0.79	2.95	1.70	6.57	3.25	4.62	42	85
1"	8.50	0.98	3.62	2.06	7.95	3.50	4.88	72	140
1 1/4"	9.00	1.26	3.74	2.19	7.95	3.88	5.25	124	190
1 1/2"	9.50	1.57	4.45	2.65	9.88	4.50	6.12	210	320
2"	11.5	1.97	4.45	2.91	9.88	5.00	6.50	350	430
2 1/2"	13.0	2.56	6.22	3.39	15.5	5.88	7.50	650	580
3"	14.0	2.99	7.13	4.45	15.5	6.62	8.25	950	985
4"	17.0	3.94	9.41	5.53	22.5	8.50	10.75	1620	1250

Valves will be supplied with full cast or weld on flanges

Pressure Temperature Rating



Body rating in this chart is for CF8M material. Max. WCB body rating is 1480 psi for class 600.

APPLICABLE STANDARDS	
Body Wall Thickness	ASME B16.34
NPT and SW Ends	ASME B16.11
Butt Weld Ends	ASME B16.25
Basic Dimensions	ASME B16.34
Testing Standards	ASME B16.34, API598
NACE	MR-01-75

All valves are hydrostatically shell tested to 1.5 x rating. All valves 100% air tested under water at 80-100 psi. Complies with API-598, BS 6755 Pt. 2.

Tri-Pro - Product Identification Code for Full Valve Model Numbers

MODEL	BODY MATERIAL		2ND END CONNECTION		VALVE - SOFT PARTS SEAT		STEM SEAL		BODY SEAL		OPERATOR		SIZE	
SS - Full Port NPT HPF51 SW HPF52 BW HPF53 FLG HPF56	316SS	SS	Threaded	1	TFM	F	TFM	F	TFM	F	Lever Locking	L	1/4	8
CS - Full Port NPT HPF41 SW HPF42 BW HPF43	WCB	CS	Socket Weld	2	CTFM	Y	CTFM	Y	RTFM	X			3/8	10
SS - Reduced Port NPT HPS51 SW HPS52 BW HPS53	Alloy 20	A2	Butt Weld	3	PTFE	T	PTFE	T	PTFE	T	Oval Locking	O	1/2	15
CS - Reduced Port NPT HPS41 SW HPS42 BW HPS43	316L	SL	Flanged 150	4	RPTFE	R	RPTFE	R	RPTFE	R			3/4	20
			Flanged 300	5	50/50	S	50/50	S	50/50	S	Gear	S	1	25
			Flanged 300	6	UHMWPE	U	UHMWPE	U	UHMWPE	U	Deadman	U	1 1/4	32
					PEEK	P	Graphite	G	Graphite	G	Actuator	G	1 1/2	40
					Cavity Filled	C					Bare Stem	N	2	50
					Metal	M							2 1/2	65
													3	80
													4	100

<u>Ball:</u> All ball material is supplied standard as 316SS & 304SS. If different material is required please specify as special feature

<u>Stem:</u> All stem material is supplied standard as 17-4PH. Please specify as special feature if SS316 is needed.

<u>Special Features</u> are noted at the end of the identification number, please see special feature codes. For extended number, see Tech Bulletin page 191.

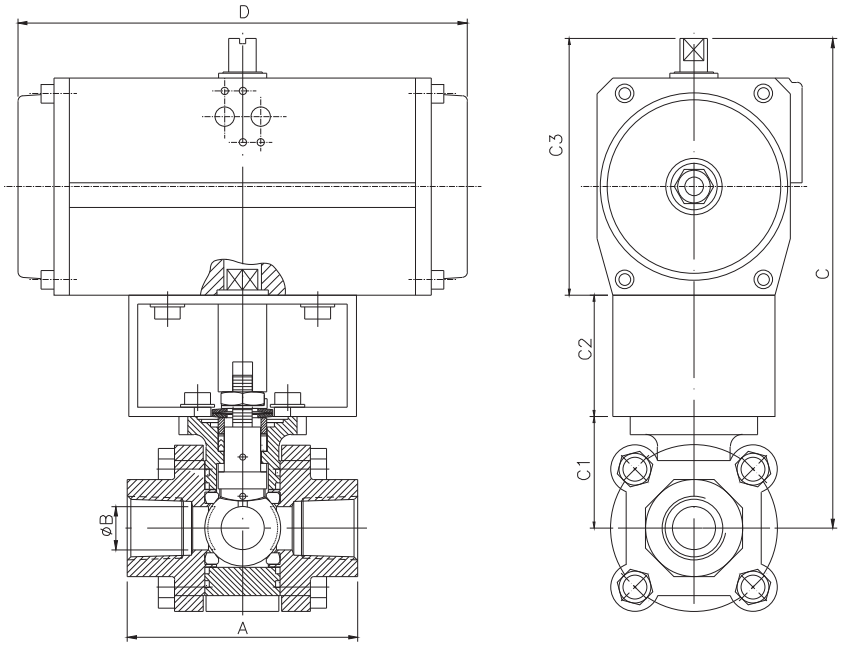
Ordering Examples by Part Numbers

MODEL	BODY MATERIAL	2ND END CONNECTION	SEAT	STEM SEAL	BODY SEAL	OPERATOR	SIZE	SPECIAL FEATURE
NPT END REDUCED PORT CS BODY	WCB	SW	TFM	Graphite	TFM	Lever	2"	Media Containment
HPS41	CS -	2 -	F	G	F -	L -	50 -	H3

Ordering Information

When placing an order or requesting a quotation, please provide as many details on the application as possible such as media type, temperature, pressure, pipe size, etc.

Dimensions - Actuation / Flow Data



Pneumatic Actuator Dimensions shown in this drawing are for full port units based on 80 psi air to actuator, valves with standard seats, clean fluid only at ambient temperatures and pressures not to exceed 800 psi. Consult factory for additional actuator types and dimensional drawings.

SIZE	A 600# Flange	A NPT	A BW, SW	B	C1	C2	Spring Return Actuator 80psi				Double Acting Actuator 80psi			
							C3	C	D	Actuator Model	C3	C	D	Actuator Model
1/4'	-	2.72	4.81	0.46	1.54	1.57	4.23	7.34	6.61	SR063.9	3.15	6.26	4.81	DA040
3/8"	-	2.72	4.81	0.50	1.54	1.57	4.23	7.34	6.61	SR063.9	3.15	6.26	4.81	DA040
1/2"	6.50	2.91	4.89	0.59	1.54	1.57	4.23	7.34	6.61	SR063.9	3.15	6.26	4.81	DA040
3/4"	7.50	3.38	5.17	0.79	1.70	1.57	4.23	7.50	6.61	SR063.12	3.62	6.89	5.79	DA052
1"	8.50	3.70	5.24	0.98	2.06	1.57	4.23	7.86	6.61	SR063.9	4.23	7.86	6.61	DA063
1 1/4"	9.00	4.09	5.72	1.26	2.19	1.57	5.07	8.83	8.03	SR083.12	4.70	8.46	7.24	DA075
1 1/2"	9.50	4.61	6.19	1.58	2.65	1.88	5.39	9.92	10.4	SR092.12	5.07	9.60	8.03	DA083
2"	11.5	5.20	6.62	1.97	2.91	1.88	6.02	10.8	10.6	SR105.12	6.02	10.8	10.6	DA105
2 1/2"	13.0	7.28	8.78	2.56	3.39	4.00	6.89	14.3	11.7	SR125.12	6.02	13.5	10.6	DA105
3"	14.0	8.70	10.04	2.99	4.45	4.00	7.54	16.0	15.4	SR140.8	6.89	15.4	11.7	DA125
4"	17.0	9.84	13.00	3.94	5.53	4.00	8.54	20.1	18.1	SR160.9	7.54	19.1	15.4	DA140

All figures stated above are generally accepted average breakaway torque ratings for clean wet service

Torque Factors for Special Applications:

1 - increase the breakaway torque by 20% for dry gas service or demineralized water;
2 - add 10% for infrequent cycling;
3 - add 40% for slurry or light abrasive content;
4 - add 60% for metal seated valves, class V shut-off
5 - deduct 10% for high lubricity service

Torque figures are for valves up to 800 psi service. For higher pressure applications consult factory. Valve torque can vary due to pressure, media and temperature.

The information provided above should be considered as a guide only and must be adjusted according to experience and judgment.

All Tri-Pro Valves have integrally cast mounting pad for ease of mounting actuation equipment.

Tri-Pro in Control Valve Service

Flo-Tite also offers modulating V-port control valves. The V-ball is characterized to meet virtually all flow requirements. See tech bulletin 120.

V-ports 15, 30, 60, 90 deg V & custom designs are available.

Tri-Pro in Crygenic Service

The Tri-Pro series can be provided specifically for cryogenic applications.All cryogenic ball valves have extended bonnets. They offer exceptional performance under the most extreme cold working temperature conditions.
See tech bulletin page 138.

True High Performance Ball Valve Technology

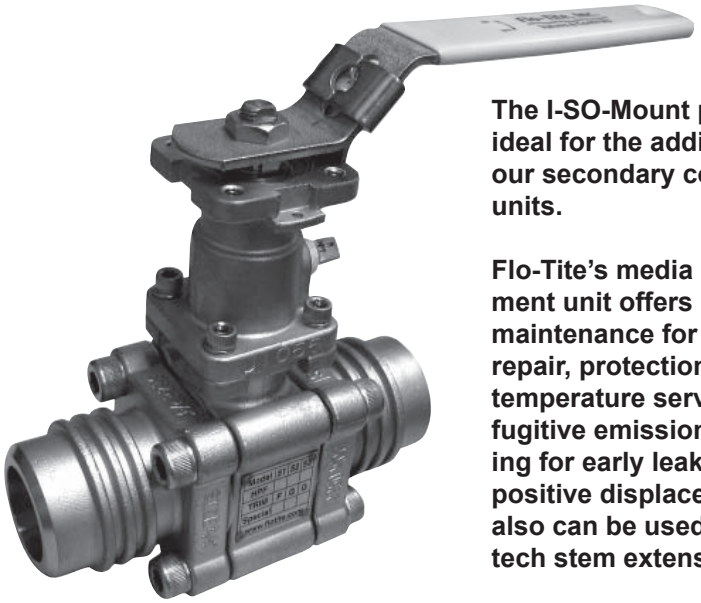
A superior quality, rugged, and universal purpose valve for all fluids ideal for saturated or superheated steam, slurries, semi-solids and corrosive services in endless industrial, chemical, power, gas, paper and original equipment applications.

Three Piece Design	Offers a wide selection of pipe end connections. Swing-out center body allows easy access to internal valve components.
Fully Protected Body Seals	Prevents seal ruptures in high pressure or steam applications.
Live-Loaded-Blow-Out-Proof Bottom Entry System	Self adjust with pressure and temperature fluctuations. Blow-out proof Bottom Entry Stem, antistatic grounds help prevent accidents and injuries.
Secure Body Bolting	Cap screws - fully encapsulated secure end caps to tapped center body. Insuring ease of foolproof body assembly every time. Also protects bolts from outside environment.
Integral Actuator Moutning Pad	Ideal for actuation, ISO-5211 bolting, actuators may be retrofitted without disturbing the pipeline. Allows for secondary containment unit to be added when necessary.
Captured Seats	Pocketed and recessed seats with secondary metal backup seal, meeting API607-4. Super-TEK TFM, S-TEK 50/50, metal seats and more.
Weld-in-Place	Heat sink construction allows in-place welding, prevents damage to soft seat rings and eliminates the need to disassemble valve for welding. Assures safe & cost effective installation.
High Strength Stem	Parallel flat stem head for positive ball position indication. High strength 17-4 PH stainless steel is provided as standard.
Lockable Safety Handle	Prevents valves from being opened or closed accidently. Lock-out meets OSHA standards with locking device.

MATERIAL IDENTIFICATION

Flo-Tite's marking system follows MSS SP-25-1998 guidelines. In addition to the casted body information, all valves have metal name plates that identify all valve soft parts. Valve users worldwide will be able to contact Flo-Tite quickly for any installation or service requirements as the company website address will be on all valves.

Tri-Pro with Media Containment Units



The I-SO-Mount platform is ideal for the addition of our secondary containment units.

Flo-Tite's media containment unit offers in-line maintenance for stem repair, protection for high temperature service, fugitive emission monitoring for early leak detection, positive displacement. It also can be used as a high tech stem extension.

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