

48 TuBore

SERIES

TUBE BORE SIZE BALL VALVE



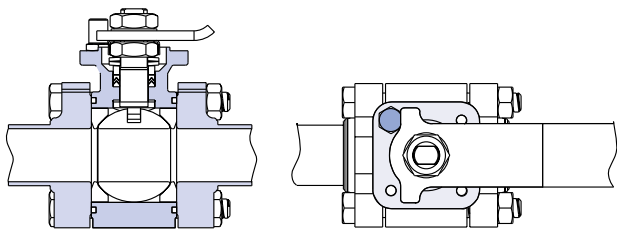
CE

Size Range:	1/2" - 6"
Application:	Pharmaceutical, Biotechnology, Food & Beverage, Cosmetics
Service:	Clean Steam, Purified Water, Water for Injection (WFI), Thermal Fluid, Gas, Chemicals, Solvents
Material:	316L Stainless Steel, Hasteloy-C, Alloy-20, Duplex
End Connection:	Extended Tube OD (ETO), Hygienic Clamp (TC)
Standards:	Conforming to ASME BPE-2002, ANSI B16.34, API 598
Operation:	Hand operated, Gear operated, Actuated

The **48 TuBore** Series is the **HABONIM** line of clean ball valves for the Pharmaceutical and Bioprocessing Industries. The valves are designed for applications which require maximum flow capacity at minimum pressure drop, where sterility, cleanability and drainability are essential for product quality and perfection. The **48 TuBore** valve port matches tube ID dimensions, provides tight shutoff and has exceptional performance in many service applications.

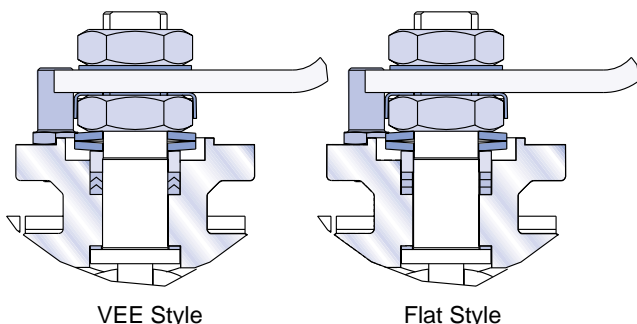
Body Construction

The valve construction is rigid and designed in accordance with ANSI B16.34. The body seal is fully encapsulated which offers improved sealing under fluctuating temperatures and pressures. The valve body has an ISO 5211 mounting flange for attaching actuators, limit switches, fugitive emission bonnets or extended handles. The stem bonnet extends high to allow extra packing. All wetted parts of the body are machined on to a high finish.



Stem Assembly

All valves have blowout proof stems. The stem assembly incorporates a live loaded spring design to compensate for pressure and temperature surges and wear. A locking tab washer ensures the stem nut will not loosen during cyclic operations. The stem is highly polished for better sealing capability. An option of three flat stem seals or a set of "VEE" style PTFE rings minimizes potential leakages.

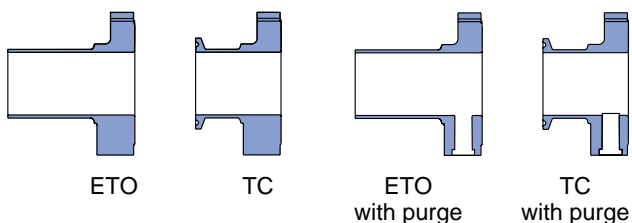


Ball

A highly polished solid ball ensures tight shutoff and long service life. The ball orifice matches the tube internal diameter to reduce product deposits being trapped in the line and minimize pressure drop. Its port leading edges are rounded to eliminate excessive wear of the seats.

End Connections

All ends are one-piece castings and are machined on all wetted parts to a high grade finish. Extended tube ends (ETO) are suitable for in-line Automatic Orbital Welding (AOW). Hygienic Clamp ends (TC) are ideal where valves are regularly removed from the line for maintenance. All ends incorporate a special boss for welding purge port.



The valve end connection dimensions are machined precisely to match joining fittings. ETO ends are machined with facing and dimensions that match joining fittings conforming to ASTM 269 with square ends for AOW. Wall thickness are 0.065" (1.65 mm) sizes 1/2" to 3" and 0.083" (2.11 mm) size 4". TC ends dimensions are kept in accordance with industrial standard clamping devices.

Body and Trim Materials

The valve body and ends are castings made from Stainless Steel conforming to ASTM A351 CF3M which improves the resistance to intergranular corrosion caused by welding. Welded end castings have low sulphur content of 0.005-0.017%. The ball and stem are from Stainless Steel conforming to AISI 316L. Other materials such as AISI 304L, Hastelloy-C, Alloy-20, Duplex or Monel are available on request.

Seats

A flexible seat design provides tight shutoff at high and low pressures, reduces wear and valve torque. The seats are designed for low torque giving bubble tight shutoff and have no equalizing pressure slots or chamfers on the perimeter. Other seat designs available are Cavity Filler seats for reducing dead volume in the valve cavity or one-piece seat/seal for diverter valves.

Standard seat material is **TFM™**. Other seat materials are Virgin PTFE, 15% glass filled PTFE, carbon filled PTFE or **PEEK®**. Please refer to Habonim Bulletin T-624.

Valve Seat Options

Some of the various valve seat characteristics that Habonim have available are detailed below. For more information and other seat options, consult with Habonim.

PTFE

PTFE is the material of choice where the characteristics of low friction, high durability, excellent thermal resistance or chemical inertness are required. Recommended for water, foodstuff and corrosive chemicals. **Identification:** Color white.

TFM™

TFM™ PTFE™ is a chemically modified PTFE that offers enhanced properties while retaining all the proven advantages of conventional PTFE.

Identification: Color white with pink stripe.

PEEK®

Virgin PEEK® (Polyetheretherketone) is a tough, high temperature, semicrystalline thermoplastic offering excellent characteristics such as high tensile strength and elongation properties, excellent shear strength and creep resistance, outstanding fatigue and chemical resistance, no susceptibility to hydrolysis (Steam/Hot Water). **Identification:** Color beige.

Carbon Filled PTFE (NRG)

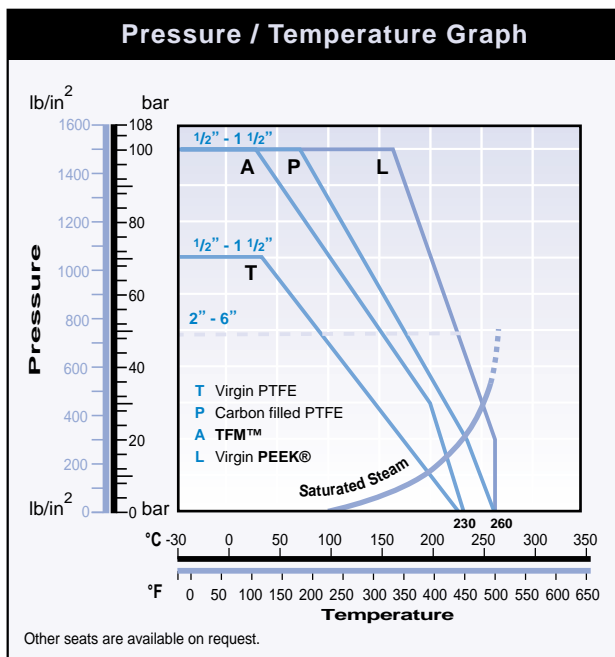
NRG seats are suitable for elevated temperatures, good resistance under high pressure loads, low coefficient of friction and suitable for many corrosive applications. **Identification:** Color charcoal black with white stripe.

Code of Standards

As an ISO 9001 certified company, Habonim works according to internal manufacturing specifications that are written for each customer and for specific applications. From material procurement to final inspection of assembled valves, Habonim controls its procedures for the integrity of the parts, their manufacturing process, storing and preservation and final assembly, to keep the highest standards of cleanliness and perfection of the product.

Assembly and Packaging

Habonim operates a fully equipped positive pressurised cleanroom for the assembly of valves. The filtered laminar air flow eliminates effects of airborne particules from contaminating the product. The room is class 1,000 as defined by Federal Standard 209E and maintains its level of cleanliness year round. All valves are cleaned, dried, assembled, 100% leak tested, inspected and finally packaged in a hermetically sealed bag filled with dry nitrogen. Each valve is individually tagged for traceability and material certification will be provided on request.



Surface Finish

All surfaces which come directly or indirectly in contact with the product are machined to 0.625 micron (25 micro inch Ra, Grit 180). Mechanical polishing to higher levels of surface finish up to 0.25 micron (10 micro inch Ra, Grit 320) are available including internal or external Electropolishing.

Conversion Table of Surface Finishes

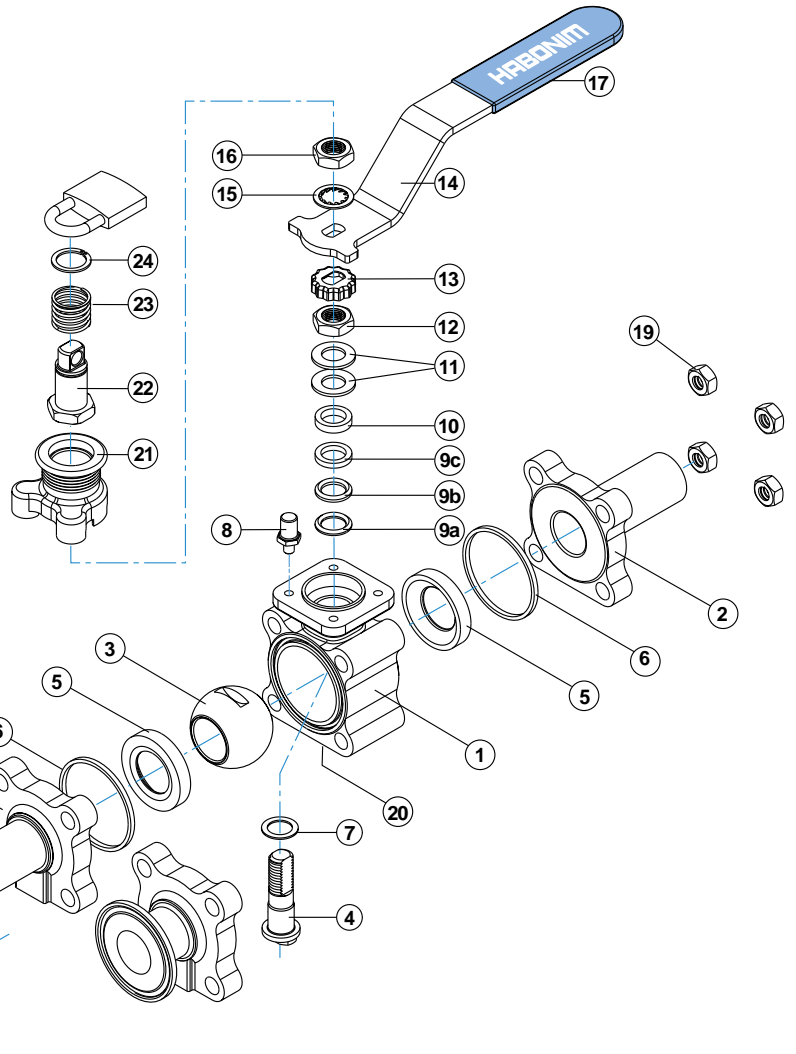
Surface Designation			Mechanically Polished			
HABONIM CODE	ASME BPE	GRIT	Ra Average		Ra Max	
			μ-in	μ-m	μ-in	μ-m
G32	SFV 1	GRIT 320	15	0.375	20	0.50
G24	SFV 2	GRIT 240	20	0.50	25	0.625
G18	SFV 3	GRIT 180	25	0.625	30	0.75

Surface Designation			Mechanically and Electropolished			
HABONIM CODE	ASME BPE	GRIT	Ra Average		Ra Max	
			μ-in	μ-m	μ-in	μ-m
E32	SFV 4	GRIT 320	10	0.25	15	0.375
E24	SFV 5	GRIT 240	15	0.375	20	0.50
E18	SFV 6	GRIT 180	20	0.50	25	0.625

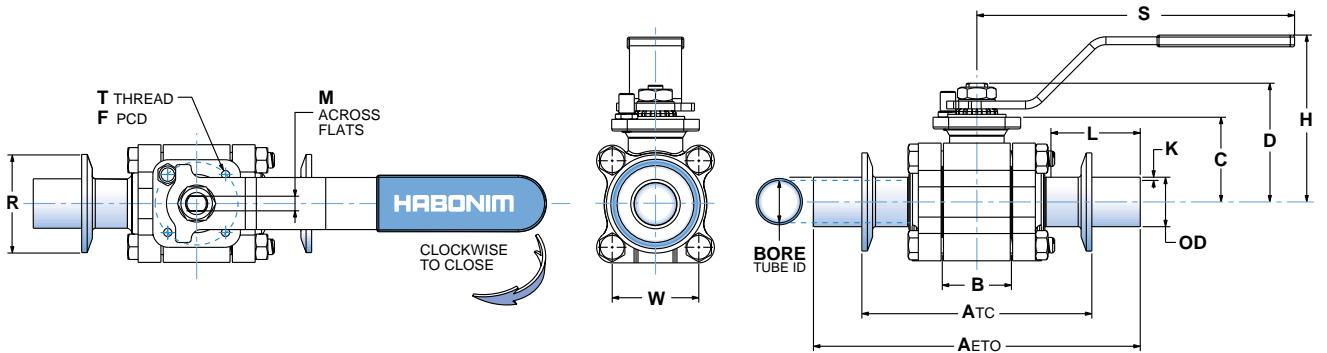
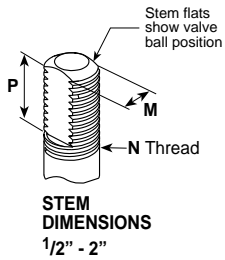
PTFE™ is a trademark of DuPont
 TFM™ is a trademark of Dyneon
 PEEK® is a trademark of VICTREX

ITEM	DESCRIPTION	MATERIAL	QTY.
1	BODY	STAINLESS ST. ASTM A351 CF3M	1
2	END CONNECTOR	STAINLESS ST. ASTM A351 CF3M	2
3	BALL	STAINLESS ST. ASTM A276 316L	1
4	STEM	STAINLESS ST. ASTM A276 316L	1
*5	SEAT	TFM, PTFE, NRG, PEEK	2
*6	BODY SEAL	PTFE, TFM, VITON	2
*7	STEM THRUST SEAL	RPTFE, PEEK	1
8	STOP PIN	STAINLESS ST. AISI 304	1
*9	STEM PACKING	NRG, RPTFE, PTFE	2-3
10	GLAND	STAINLESS ST. AISI 304	1
11	DISC SPRING	STAINLESS ST. 17-7PH	2
12	GLAND NUT	STAINLESS ST. AISI 316	1
13	TAB WASHER	STAINLESS ST. AISI 316	1
14	WRENCH	STAINLESS ST. AISI 430	1
15	SERRATED WASHER	STAINLESS ST. AISI 316	1
16	WRENCH NUT	STAINLESS ST. AISI 316	1
17	SLEEVE	VINYL PLASTISOL	1
18	BODY BOLT	STAINLESS ST. AISI 304	4
19	BODY NUT	STAINLESS ST. AISI 316	4
20	TAG (NOT SHOWN)	STAINLESS ST. AISI 316	1
21	LOCK HOUSING	STAINLESS ST. AISI 304	1
22	LOCK STEM	STAINLESS ST. AISI 304	1
23	LOCK SPRING	STAINLESS ST. AISI 303	1
24	LOCK CIRCLIP	SPRING STEEL	1

Material Specifications 1/2" - 2"



* STANDARD ITEMS FOR REPAIR KITS

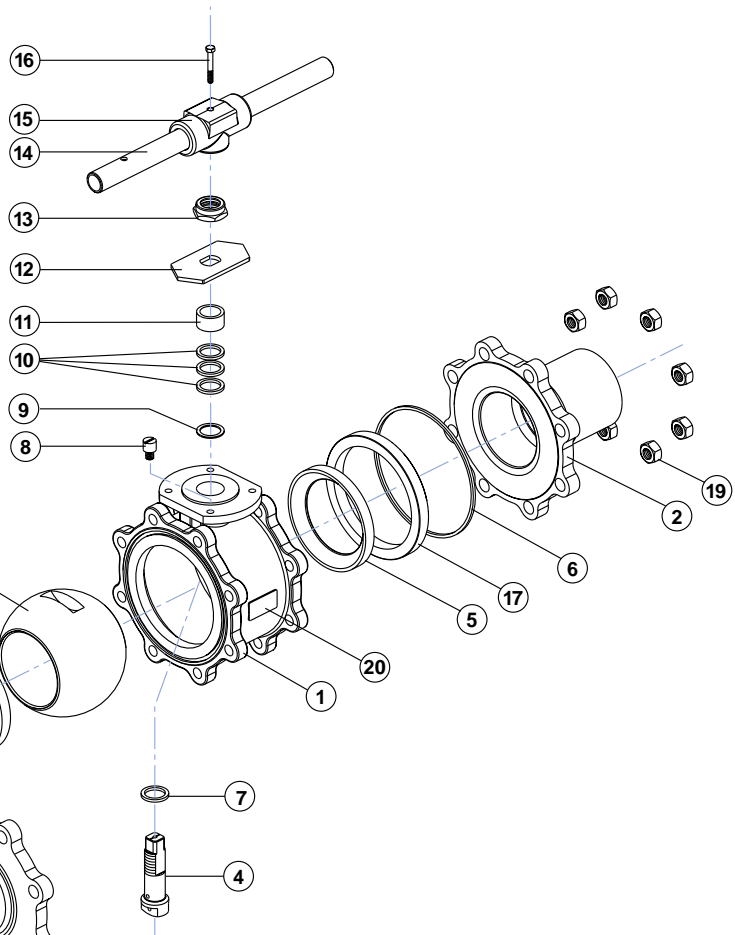


Valve Dimensions 1/2" - 2"

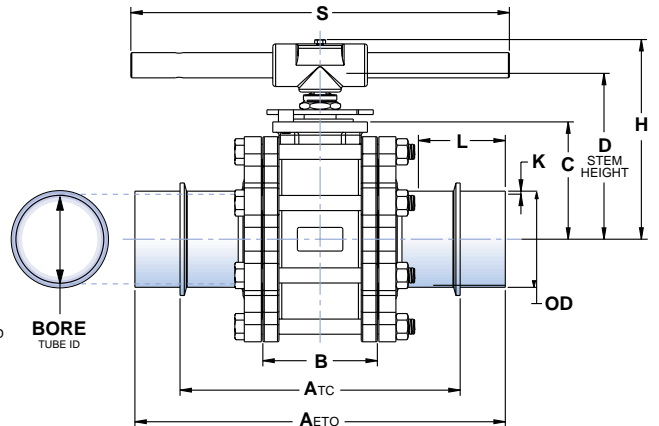
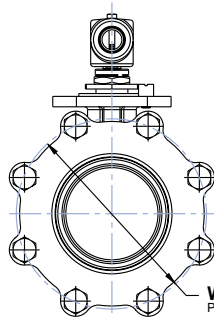
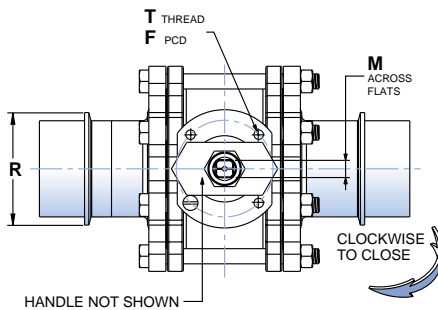
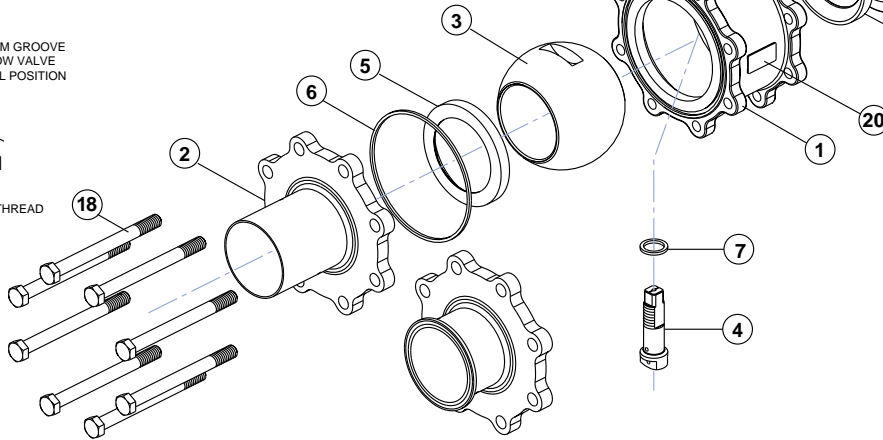
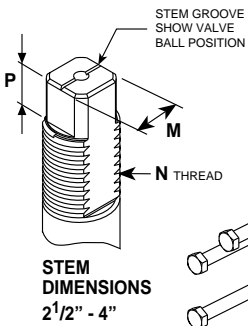
SIZE	OD	BORE	A _{Eto}	A _{Tc}	B	C	D	H	S	W	R	T	F	M	N	P	K	L	WEIGHT
1/2" INCH	0.50	0.37	5.39	3.50	0.811	1.142	1.50	2.42	5.91	1.250	0.992	M5	1.417	0.218	3/8" UNF	0.256	0.065	1.63	2.0 LB
	12.7	9.40	137	89	20.6	29.0	38.0	61.6	150.0	31.8	25.2	M5	36.0	5.54	3/8" UNF	6.50	1.65	41.5	0.9 KG
3/4" INCH	0.75	0.62	5.79	4.00	0.967	1.417	1.77	2.67	5.91	1.500	0.992	M5	1.417	0.218	3/8" UNF	0.280	0.065	1.73	2.1 LB
	19.03	15.75	147	102	24.6	36.0	45.0	67.9	150.0	38.1	25.2	M5	36.0	5.54	3/8" UNF	7.10	1.65	43.9	1.0 KG
1" INCH	1.00	0.87	6.61	4.65	1.398	1.713	2.41	3.34	7.36	1.750	1.984	M5	1.654	0.297	7/16" UNF	0.362	0.065	1.73	3.8 LB
	25.4	22.10	168	118	35.5	43.5	61.0	84.8	187.0	44.5	50.4	M5	42.0	7.54	7/16" UNF	9.20	1.65	43.9	1.7 KG
1 1/2" INCH	1.50	1.37	7.31	5.57	1.969	2.185	3.35	4.22	9.29	2.250	1.984	M6	1.969	0.343	9/16" UNF	0.512	0.065	1.73	7.7 LB
	38.2	34.80	186	141	50.0	55.5	85.0	107.1	236.0	57.2	50.4	M6	50.0	8.71	9/16" UNF	13.00	1.65	44.0	3.5 KG
2" INCH	2.00	1.87	8.77	7.23	2.860	2.756	4.41	5.63	10.08	3.307	2.527	M8	2.756	0.547	M20	1.226	0.065	1.77	20.8 LB
	50.8	47.50	223	184	72.7	70.0	112.1	143.1	256.0	84.0	64.2	M8	70.0	13.9	M20	31.15	1.65	45.0	9.4 KG

ITEM	DESCRIPTION	MATERIAL	QTY.
1	BODY	STAINLESS ST. ASTM A351 CF3M	1
2	END CONNECTOR	STAINLESS ST. ASTM A351 CF3M	2
3	BALL	STAINLESS ST. ASTM A276 316L	1
4	STEM	STAINLESS ST. ASTM A276 316L	1
*5	SEAT	TFM, PTFE, NRG, PEEK	2
*6	BODY SEAL	PTFE, TFM, VITON	2
*7	STEM THRUST SEAL	RPTFE, PEEK	1
8	STOP PIN	STAINLESS ST. AISI 304	1
9	STEM LOCATION RING	STAINLESS ST. AISI 316	1
*10	STEM PACKING	NRG, RPTFE, PTFE	3
11	GLAND	STAINLESS ST. AISI 316	1
12	STOP PLATE	STAINLESS ST. AISI 304	1
13	GLAND NUT	STAINLESS ST. AISI 316	1
14	WRENCH HANDLE	STAINLESS ST. AISI 304	1
15	WRENCH HEAD	STAINLESS ST. ASTM A351 CF8M	1
16	WRENCH BOLT	STAINLESS ST. AISI 304	1
17	SEAT RETAINING RING	STAINLESS ST. ASTM A351 CF3M	1
18	BODY BOLT	STAINLESS ST. AISI 304	8
19	BODY NUT	STAINLESS ST. AISI 316	8
20	TAG	STAINLESS ST. AISI 316	1

Material Specifications 2 1/2" - 4"



* STANDARD ITEMS FOR REPAIR KITS



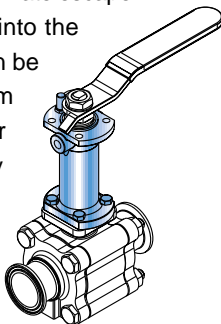
Valve Dimensions 2 1/2" - 4"

SIZE	OD	BORE	A _{Eto}	A _{Tc}	B	C	D	H	S	W	R	T	F	M	N	P	K	L	WEIGHT
2 1/2" INCH	2.50	2.37	10.0	6.66	3.28	3.87	5.70	7.29	15.79	5.50	3.047	M10	4.016	0.744	1" UNS	0.654	0.065	2.25	30.3 LB
MM	63.5	60.20	250.4	169.1	83.35	98.3	144.9	185.1	401.0	139.7	77.4	M10	102.0	18.9	1" UNS	16.60	1.65	57.2	13.7 KG
3" INCH	3.00	2.87	11.9	7.60	3.80	4.15	5.99	7.57	15.79	6.30	3.579	M10	4.016	0.744	1" UNS	0.654	0.065	2.75	39.1 LB
MM	76.2	72.90	302	193.0	96.4	105.5	152.2	192.4	401.0	160.0	90.9	M10	102.0	18.9	1" UNS	16.60	1.65	70.0	17.7 KG
4" INCH	4.00	3.83	12.5	9.30	4.84	4.88	6.71	8.30	24.37	7.87	4.681	M10	4.016	0.744	1" UNS	0.654	0.083	2.40	69.2 LB
MM	101.6	97.38	317.5	236.2	123	124.0	170.6	210.8	619.0	200.0	118.9	M10	102.0	18.9	1" UNS	16.60	2.10	61.0	31.3 KG

6" VALVE DIMENSIONS WILL BE GIVEN ON REQUEST

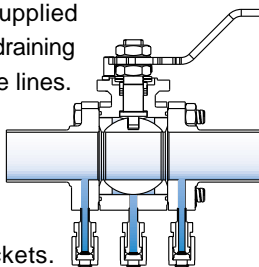
Fugitive Emissions

In applications where it is essential to eliminate escape of volatile organic compounds (VOC) into the atmosphere, a Fugitive Emission kit can be mounted directly onto the top ISO platform of the valves. The kits are available for all sizes and can be operated manually or with an actuator. Each housing has two threaded ports for connecting tubing or instrumentation for registering potential leaks.



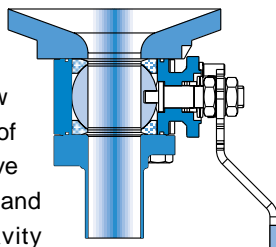
Purge Ports

Valve bodies and ends may be supplied with additional purge ports to allow draining of the body cavity or for flushing the lines. This enables in-line maintenance for clean in place (CIP) or steam in place (SIP) where traces of product and contaminants must be effectively removed from all pockets.



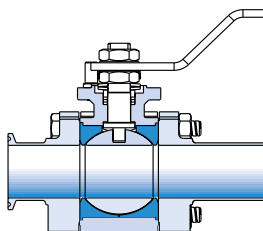
Flush Bottom Tank

Valves with special flush tank ends that are welded or connected flush to the bottom of reactors or vessels allow complete drainage and stirring of product leaving no pockets above the ball. The tank end contour and radius provide effective gravity drainage, removing any traces of liquids. Special or custom designed tank ends are optional. Additional options such as special "C-Balls" for full drainability of body cavity, or purge ports for flushing the valve or the tank are available on request. The valves can be fitted to the piping system with any type of end connector.



Cavity Filler Seats

All valves are available with special cavity filler seats that eliminate all crevices, gaps and pockets between the ball and valve body, reduce the risk of contaminants being trapped or the solidification of product. The valve body is specially machined to fit the seat/seal dimensions.



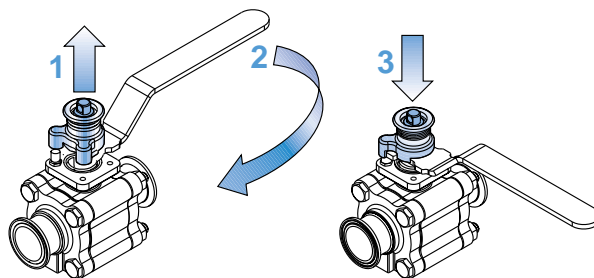
Steam Jacketed Valves

Valves with steam jackets for thermal fluids, hot water or steam are available with any number or type of inlet ports. The steam jacket is welded to the center body to minimize heat loss.

Locking Device

LLP (Locked in Last Position)

The Habonim spring loaded locking device (LD) is ideal for applications where it is critical to keep the valve position without the risk of accidental operation. The locking device fits easily to the valve stem by simply removing the stem nut and threading the lock stem above the handle. The LD can lock the valve in closed or open position. The LD can be fitted to the valve in-line. Available in sizes 1/2" to 2".

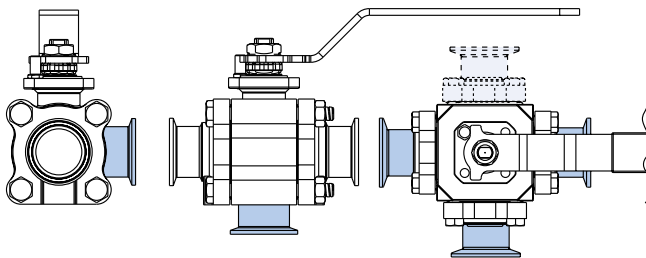


Valve in OPEN position Valve in CLOSED position

While lifting the lock housing above the stop pin (1) turn the wrench (2) to its new position. When the handle is in its new position release the housing to fit on the stop pin (3).

Diverter Valves

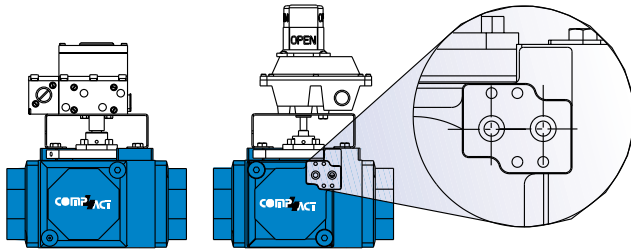
Habonim's line of diverting valves is available in D48, S48 or 61/62/63 series. The valves have many ball types for any flow pattern. These flow combinations reduce the number of valves in a system, thereby saving costs and giving the user easier control by using a single valve in place of multiple valves. They have the advantage of incorporating the same body dimensions that will allow any standard end connection to be fitted to the valve. The valves incorporate all the additional options of the two way valves including CIP purge ports and cavity seats (in diverter valves only).



S48 Side Entry D48 Diverter 61P / 62P Multi-Port

Actuated Valves

The 48 series ball valves are available with Habonim's unique 4-Piston pneumatic Compact actuators where automation is required. The Compact actuators come in 8 sizes, spring return or double acting with solenoid connections according to NAMUR standards. Additional limit switches and positioners can be directly mounted on the actuators top pad.

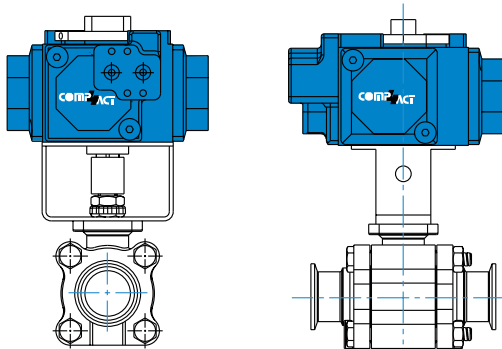


Positioner with I/P & Transmitter

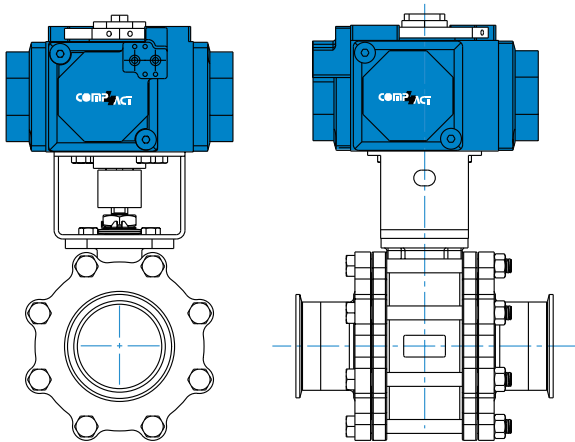
Limit Switch with NAMUR Connections

Standard NAMUR Solenoid Interface

Valve Sizes 1/2" - 2"



Valve Sizes 2 1/2" - 4"



Valve Actuator Sizing

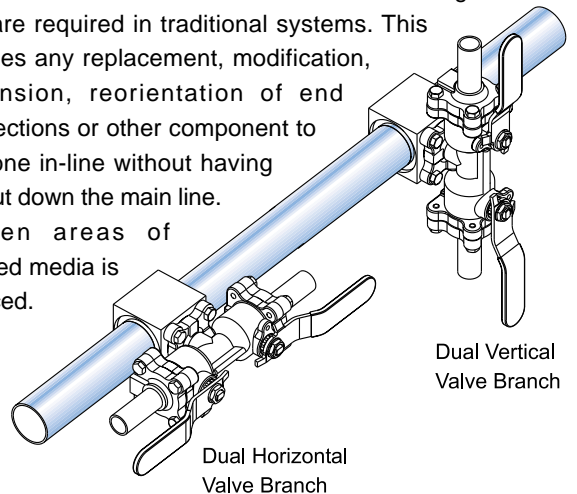
48 Series valve with TFM Seats

VALVE SIZE	Double Acting (DA)			Spring Return (SR)		
	60 psi	80 psi	100 psi	60 psi	80 psi	100 psi
1/2"	H15	H15	H15	H20-2A2B	H15-1B2	H15-2
3/4"	H20	H15	H15	H20-2A2B	H15-1B2	H15-2
1"	H20	H20	H20	H25-2A2B	H20-2C	H20-3
1 1/2"	H25	H25	H20	H30-2A2B	H25-2C	H25-3
2"	H30	H25	H25	H35-2A2B	H30-2C	H30-3
2 1/2"	H30	H30	H25	H45-2A2B	H35-2C	H35-3
3"	H45	H35	H30	H60-2A2B	H45-2C	H35-3
4"	H60	H45	H35	H60-2A2B	H60-2C	H45-3

Valve Sizing Table is based on normal working conditions. Valve torque values are calculated from tests using water at room temperature and using Virgin TFM seats. For other seat materials and air pressures, please contact HABONIM. Refer to our Compact Pneumatic Actuator catalogue for more details.

Fluid Delivery Systems (FDS)

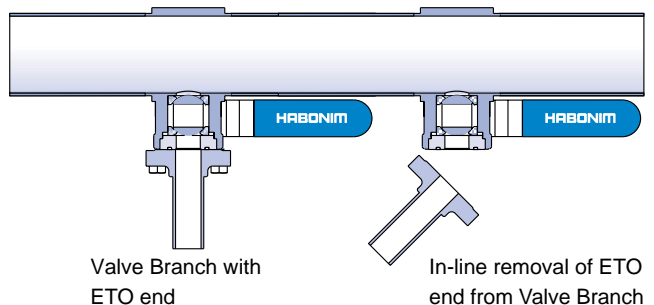
Habonim has designed, developed and produced a patent pending modular valve for fluid delivery systems (FDS). The design is compact, structurally strong, has reduced dead volume and reduces the number of welds and fittings that are required in traditional systems. This enables any replacement, modification, expansion, reorientation of end connections or other component to be done in-line without having to shut down the main line. Hidden areas of trapped media is reduced.



Dual Vertical Valve Branch

Dual Horizontal Valve Branch

Below is a configuration of a main line with branching valves. The end connectors can be replaced or reoriented without shutting the main system. Additional valves can be added with no cutting or welding in-line and at very short time.



Valve Branch with ETO end

In-line removal of ETO end from Valve Branch

The HABONIM TuBore Ball Valve Identification Code

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
0	5			D	4	8	-	6	6	6	6	A	T	/	E	T	O	-	E	2	4	-	2	M	-	J	3	N	K	
1	2	3	-	4	5	6	/	7	-	8	-	9	10																	

1 SIZE	
05	1/2"
07	3/4"
10	1"
15	1 1/2"
20	2"

2 SERVICE	
A	ANTI-STATIC
D	DIVERTER BOTTOM ENTRY
N	CONTROL
S	DIVERTER SIDE ENTRY
Q	CAVITY FILLER
R	FLUSH BOTTOM TANK
V	VACUUM
W	STEAM

3 SERIES	
48	TuBore PORT
46	REGULAR PORT
47	ISO REGULAR PORT

4 BODY/END	
5 BALL/STEM	
6	STAINLESS ST. 316L
8	STAINLESS ST. 304L
7	MONEL
A	ALLOY - 20
C	HASTELOY - C

6 SEAT/SEAL	
A	TFM (MODIFIED PTFE)
T	PTFE VIRGIN
P	PTFE CARBON FILLED
R	PTFE 15% GF
L	PEEK VIRGIN
K	PEEK CARBON FILLED

7 CONNECTION	
BWO	BW O.D.
ETO	EXTENDED BW O.D.
TC	CLAMP FITTING
ETC	ETO / CLAMP FITTING

8 SURFACE FINISH	
MECHANICALLY-POLISHED <i>(Ra Average, ASME BPE)</i>	
G32	GRIT 320 (Ra 15, SFV1)
G24	GRIT 240 (Ra 20, SFV2)
G18	GRIT 180 (Ra 25, SFV3)

MECHANICALLY-POLISHED & ELECTRO-POLISH <i>(Ra Average, ASME BPE)</i>	
E32	GRIT 320 (Ra 10, SFV4)
E24	GRIT 240 (Ra 15, SFV5)
E18	GRIT 180 (Ra 20, SFV6)

ELECTRO-POLISH	
EP	STANDARD FINISH

9 PURGE	
1	PURGE ON ONE END
2	PURGE ON TWO ENDS
3	PURGE ON ENDS & BODY
B	PURGE ON BODY
C	VCR FEMALE
L	S/S COMPRESSION
M	VCR MALE
V	VALVE
O	O.D. TUBE
T	CLAMP FITTING

10 OTHER FEATURES	
J	STEAM JACKET
3	NUMBER OF INLETS
N	INLET TYPE
	N - NPT
	B - BSPT
	W - WELDED
O	OVAL HANDLE
K	KEY LOCK (LLP)

The HABONIM TuBore FDS Identification Code

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
0	5				6	7	-	6	6	6	6	A	T	/	E	T	O	-	E	2	4	-	X	2	1	S	M	K	O	
1	2	3	-	4	5	6	/	7	-	8	-	9	10	11	12	13	14													

3 SERIES	
68	FDS TuBore TUBE PORT
67	FDS REGULAR PORT

4 - 8
SAME AS VALVE CODE ABOVE

9 PATTERN	
X1	SINGLE HORIZONTAL CROSS
X2	DUAL HORIZONTAL CROSS
T1	SINGLE HORIZONTAL TEE
T2	DUAL HORIZONTAL TEE
T3	SINGLE VERTICAL TEE
T4	DUAL VERTICAL TEE
V2	DUAL HORIZONTAL VEE CROSS

10 LINE / BRANCH SIZE	
1	1 1/2" x 1/2"
2	2" x 3/4"
6	2" x 1/2"
7	1" x 1/2"
8	1" x 3/4"
9	3/4" x 1/2"
B	2" x 1"
D	1 1/2" x 3/4"
E	2" x 1 1/2"
N	1 1/2" x 1"

11 LINE MATERIAL	
S	316L STAINLESS STEEL
J	304L STAINLESS STEEL

12 PURGE	
M	VCR MALE
L	S/S COMPRESSION

13 LOCKING DEVICE	
K	KEY LOCK (LLP)

13 OTHER FEATURES	
O	OVAL HANDLE



In accordance with our policy to strive for continuous improvement of the product, we reserve the right to alter the dimensions, technical data and information included in this catalogue when required.