HABONIM
INDUSTRIAL VALVES LTD.

BULLETIN P-111

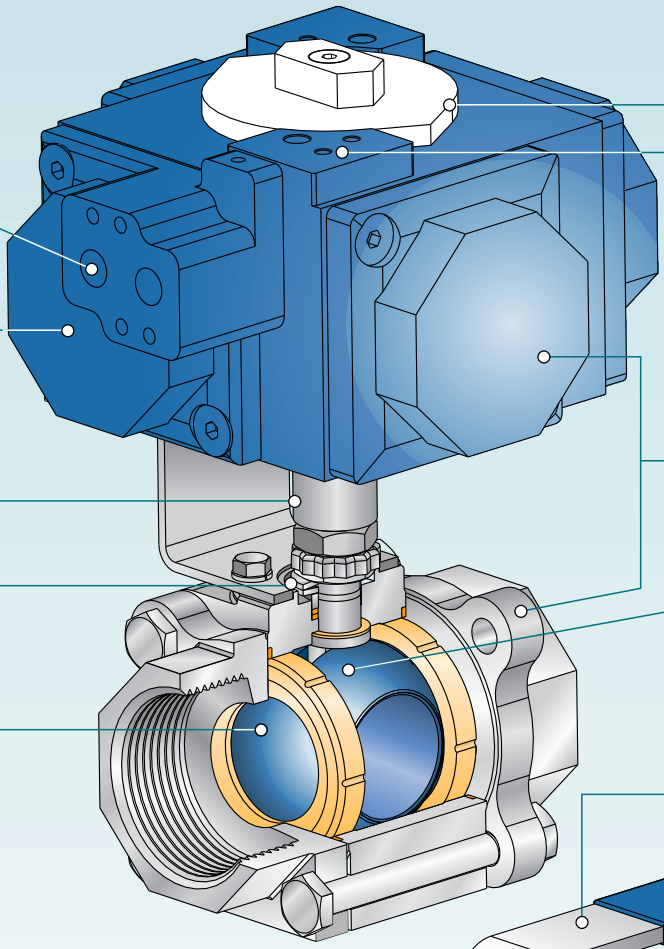
47P&46 Series

three piece ball valve

Reduce & Full Bore

Size Range:	1/4" - 6" (DN6 - DN150)
Application:	General Service, Chemical, Petrochemical, Oil and Gas, Refinery, Energy, Pharmaceutical, Food & Beverage, Cosmetics, Semiconductor
Service:	Water, Gas, Steam, Chemicals, Solvents, Thermal Fluid
Pressure Range:	Vacuum 10^{-6} torr to 210 bar (3000 psig)
Temperature Range:	-40°C to 400°C (-40°F to 750°F)
Materials:	Carbon Steel, Stainless Steel, Hasteloy-C, Alloy-20, Monel, Duplex 2205
End Connection:	Screwed, Socket & Butt weld, Flanged, Clamp, Compression Fitting
Standards:	Firesafe to API 607 4th Edt. and BS 6755 Pt 2
Operation:	Hand or Gear operated, Pneumatic or Electric Actuated

The 46 and 47P Series are the main lines of HABONIM 3-piece ball valves for industrial applications. The valves are suitable for applications which require high flow capacity and tight shuttoff, where reliability, functionality and interchangeability are essential for the product quality. HABONIM has various valve designs and sollutions that give the end user the freedom of choice for the toughest requirements imposed by the industry and by international standards.



NAMUR interface enables mounting of compatible solenoid

Spring Return or Double Acting actuators

Quarter Turn operation suitable for pneumatic, electric or hydraulic actuation

Spring loaded stem seal with locking clip

Bi-directional shutoff from vacuum to high pressures

Rugged construction with ISO top mounting flange for actuation

A large range of end connections for Full or Reduce bore valves

High flow capacity with low pressure drop at full opening

Visual Indication of valve position

Threaded holes for additional instrumentation

Valve and actuator packages for on/off or control applications

Floating Ball concept for positive shutoff

Rigid handles indicating flow direction with optional Locking Devices

Interchangeable seats, balls, stems and seals for various applications

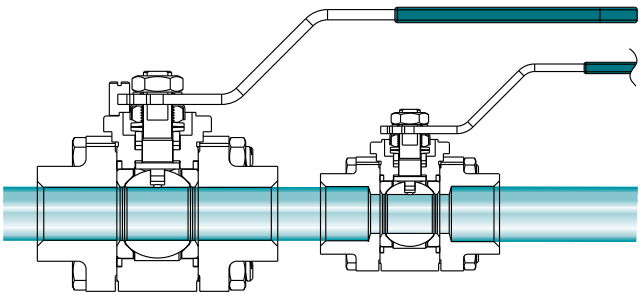
Blowout proof stem with optional firesafe and Antistatic device

Various type of seat designs and materials including characterized metal seats for control applications

Easy in-line serviceable with swing-out body

Reduce Bore and Full Bore

HABONIM's 47P and **46** series valves are **"Reduce Bore"**, (Nominal Bore) where the ball port ID is reduced from the nominal pipe ID. This reduction creates a pressure drop across the valve and must be considered when doing flow calculations. **HABONIM's B47P** and **B46** series valves are **"full bore"**, where the ball port ID matches the nominal pipe ID. The full bore valve is "one-size-up" body and trim with a "full bore" end connection. Full bore valves are used when maximum flow at minimum pressure drop is required.
All the types of end connections are available in both reduce bore or full bore.
For any fixed nominal pipe size you can have a "reduce bore" valve with regular ends, or a "full bore" valve with full bore ends and "one-size-up" body and ball. This is illustrated below:



Full Bore **Reduce Bore**

Body and Trim Materials

Standard HABONIM bodies and ends material are in **Carbon Steel** or **Stainless Steel**. Carbon steel bodies and ends are forgings to ASTM A105 or castings to ASTM A216 WCB. Stainless Steel bodies are casting to ASTM A351 CF8M. The ends are casting to ASTM A351 CF3M material having lower carbon content for weldeability.

The standard ball and stem material is stainless steel 316. All high torque valves stems are in high tensile 17-4PH stainless steel. Balls in 17-4PH stainless steel are also available. Other valve and trim materials such as Alloy-20, Hastelloy-C, AISI 304L, Duplex or Monel are available for specified applications on request.

All valve pressure containing parts such as bodies and ends are heat numbered and can be traced by their work number which is stamped on the valve tag. Documentation will be supplied and are on request.

Stainless steel valves have stainless steel bolts and nuts. Carbon steel valves have plated carbon steel bolts and nuts. Special alloy valves carry stainless steel bolts and nuts unless otherwise specified.

End Connections

HABONIM has many types of end connections to suit most customer requirements. The typical types are screwed, welded or flanged connections.

Screwed Ends

Screwed ends are identified by a marking on the end face:
BSPT - no identification
NPT - concentric groove
BSPP DIN 2999 - external chamfer
DIN 3852 - concentric groove and external chamfer
Other screwed ends identification will be advised on request.

Pipe weld Ends

Welded ends are available according to the pipe type and schedule in buttweld and socket weld design. The standard pipe schedule is 40. Buttweld ends are available from Sch 5 to Sch 180 and socket weld ends are available up to Sch 40 on reduce bore and up to Sch 80 in full bore.

Tube weld ends

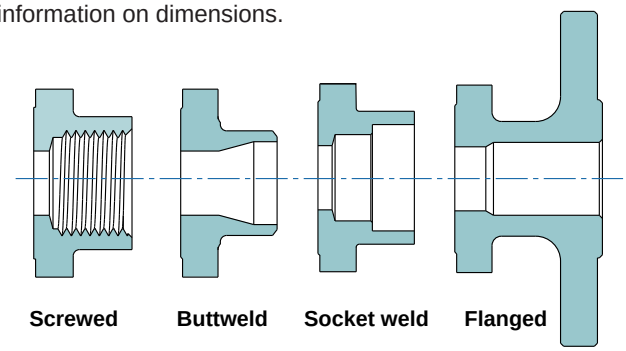
Tube ends are available in OD or metric sizes. The ends are short stubs or one piece extended stubs suitable for AOW (automatic orbital welding). Weld end valves can be installed in-line without dismantling the valve or changing internal parts, as long as the proper welding procedures is kept. Please refer to Habonim Welding Instructions for more information.

Flange Ends

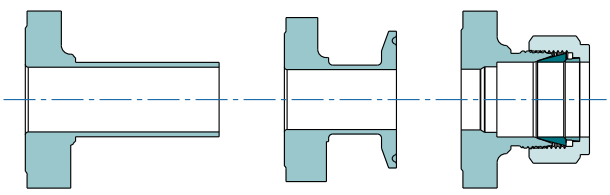
Flanged ends complying to class 150 ANSI B16.5 and DIN 3202 F1 face-to-face dimensions are available in reduced or full bore. In some cases ANSI flange end valves will comply to class 300 face-to-face dimensions only.

Other Ends

Other available ends are Tri-Clamp ends for the Biopharm and food industry, Let-Lok ends for Instrumentation and the Semiconductor industry, Extended pipe ends for the chemical industry and others. Please refer to Bulletin C-515 for additional information on dimensions.



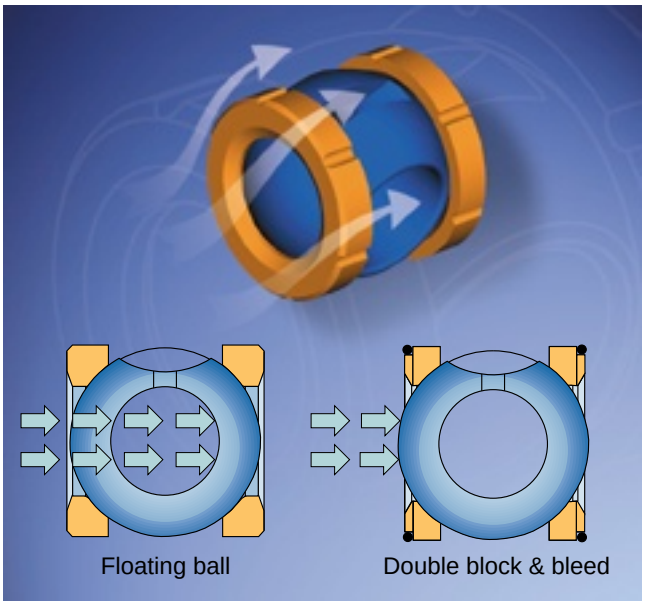
Screwed **Buttweld** **Socket weld** **Flanged**



Extended Tube **Tri-Clamp** **Let-Lok**

Floating Ball Principle

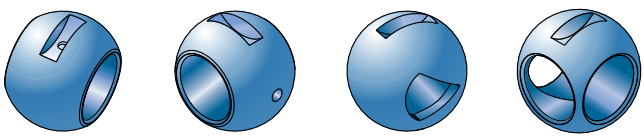
The floating ball design is based on the concept that both the **seat preload** and the **line pressure** contribute to a compressive force between the ball and seat to create a bubble tight shut-off at low and high pressure drops. The line pressure forces the ball to the downstream seat, the seat flexes and creates the seal. The upstream seat is forced forward, allowing the pressure to penetrate from behind through the grooves and into the body cavity, relieving the load and reducing its wear. Other designs such as diverter and double block and bleed seats, incorporate a “seat/seal” or seat with a backup O-ring to seal from the upstream side of the valve.



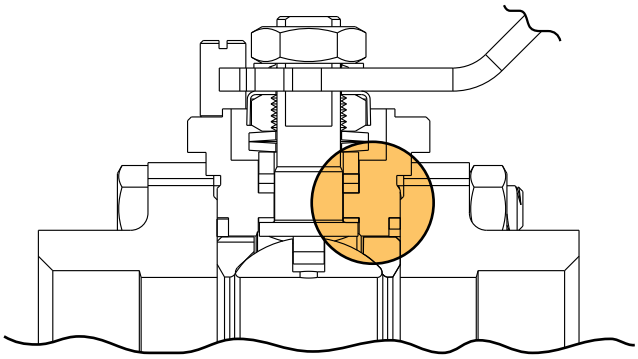
Ball Material

A highly polished solid ball ensures tight shutoff and long service life. All balls are solid and have specially rounded leading edges to eliminate excessive seat wear during rotation. The balls have a hole in the stem slot to equalize pressure behind the ball in the valve cavity (see illustration below). Standard ball materials are 316 Stainless Steel, Hasteloy-C, Monel, Alloy-20, Duplex and Inconel. All materials (ecxept 316 SS) are marked in the slot for identification. Other ball designs such as diverter balls, cavity pressure relief balls with a vent hole to the upstream side, characterized port balls for control applications, balls for flushing body cavity and more are available on request (see illustration below).

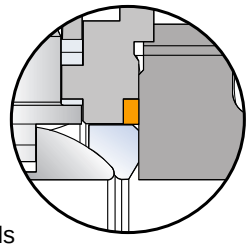
Equalizing pressure hole in slot | **Upstream pressure relief hole** | **Characterised port for control** | **Additional port for flushing**



Body Seals

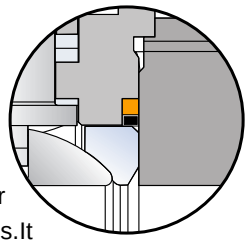


Standard Body Seal



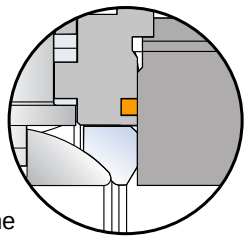
The standard valve body seal is constructed with three closed sides and one side open into the valve cavity. Pressure in the valve cavity forces the seal to the corners, thus creating a tight seal. All seal materials are flexible and will compress according to the groove shape. Each time the valve is opened for repair, the seals must be replaced with new ones.

Metal Ring



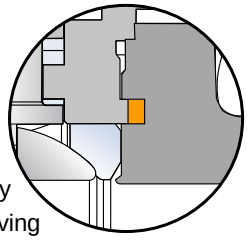
The Metal Ring Encapsulated Groove design uses a thinner body seal supported by a metal ring and is used in the standard body. It provides tighter compression of the body seal for higher pressure and temperature fluctuations.It also serves a barrior for all flexible graphite body seals from penetrating into the valve body.

Encapsulated Groove



The fully Encapsulated Groove body serves the same purpose as the Metal Ring design, only the groove is machined in the valve body. This body construction utilizes the same seals without the metal ring.

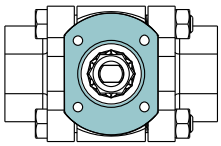
Tongue & Groove



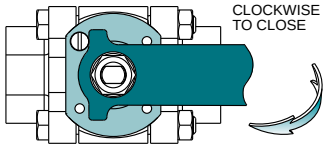
The Tongue & Groove design is used in all firesafe valves and is intended to allow full compression of the flexible graphite and the alignment of the body and ends. This is implemented by having the body seal groove in the end connector and not in the body. Firesafe bodies and end connectors are not interchangeable with the standard bodies and ends.

Valve Construction

The rigid valve body construction is designed in accordance with ANSI B16.34 and BS 5351. The 47P series valve bodies have a top mounting flange conforming to ISO 5211 with centering ring for direct mounting of actuators, limit switches, fugitive emission bonnets or extended handles.



Top mounting flange for Actuation & Accesories



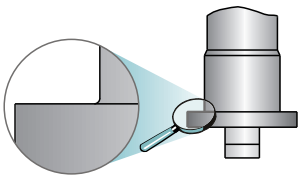
Top mounting flange Manually Operated

The 3-piece body construction enables valve in-line maintenance and replacement of internal parts. The standard 47P valve bodies have through body bolts. The Firesafe valves have threaded body screws. With the ISO mounting flange there is no need to loosen body bolts when fitting actuators. The 47P & 46 series ball, seats and seals are interchangeable with all 31/32 series valves and with valves up to 2" of full bore 73/74/78 series. Stem assemblies are interchangeable through out.

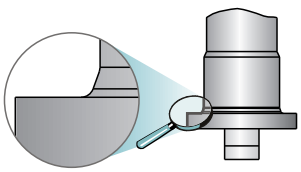
Stem

A precision machined blowout proof stem is inserted into the valve body from within. Available as standard, antistatic or firesafe. The firesafe stem has a special contour for metal to metal contact in the event of fire. Stems 1/2" to 21/2" output shaft are double "D". 3" and above stems have square shaft.

Standard Stem

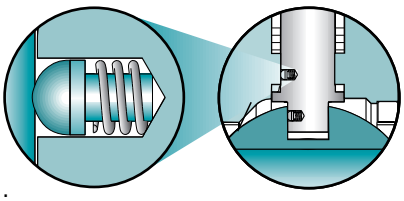


Firesafe Stem



Antistatic Device

Antistatic device to discharge static electricity buildup on the ball, conforming to BS 5351 for continual electrical contact between ball/stem and stem/body. The contact is made by a spring loaded stainless steel element inserted in the stem or a conductive PTFE stem seal. Valve sizes up to 2" require a stem/body contact, while larger size valves also need ball/stem contact.

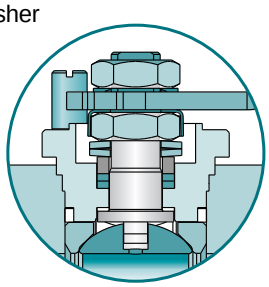


Stem Assemblies

All valves have blowout proof stems. The stem assembly incorporates live loaded springs 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 machined with a high surface finish for better sealing capability. Optional stem seal material and shapes are available. Special HIGH CYCLE stem arrangements are availbale on request.

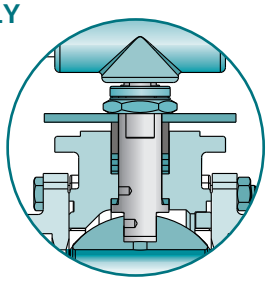
STANDARD STEM ASSEMBLY
Sizes 1/4" to 2 1/2"

A blowout-proof stem and thrust washer are inserted in the valve body from its cavity. A set of one or two stem packing followed by a stem-centering gland are spring loaded and fastened by a nut and lock tab washer from the outside. A rigid handle is fastened above it by a second nut and serrated washer.



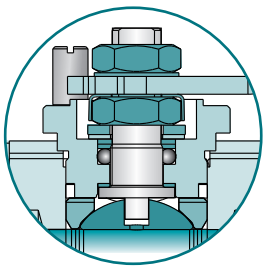
STANDARD STEM ASSEMBLY
Sizes 3" to 6"

A blowout-proof stem and thrust washer are inserted in the valve body from its cavity. A set of three stem packing followed by a stem-centering gland and stop plate are fastened by a locking nut from the outside. A pipe wrench is inserted into a "TEE" head and fastened by a screw to the stem.



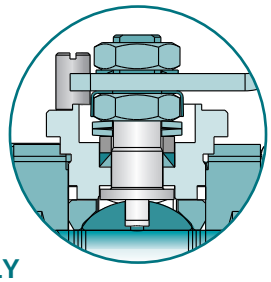
O-RING STEM ASSEMBLY

An O-ring stem assembly for searching gases, high vacuum and other special applications such as Ammonia or high cycle applications are fitted to the valve. The O-ring is secured in place by a metal washer and bearing.



V-RING STEM ASSEMBLY

V-ring stem seals are some times more efficient for applications such as high cycle or where it is essential to have low emissions and they can be fitted to the standard valve body.

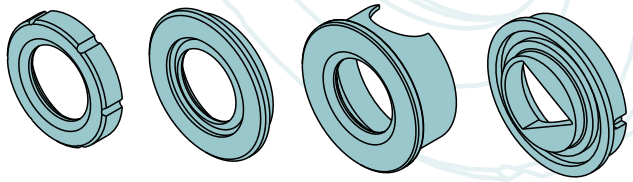


HIGH CYCLE STEM ASSEMBLY

In high cycle applications where the valves may be cycled many operations a year, an upgrade of the stem parts and materials is done according to the working conditions. The thrust seal material is wear resistance, the stem is polished and hardened and special stem seals are suggested accordingly. A unique grooved O-ring gland with live loading spring pack give the valve long service life.

Seats Type and material

A flexible seat design provides tight shutoff at high and low pressures, reduces wear and valve torque. The seat perimeter has equalizing pressure slots to allow penetration of pressure to the body cavity for better sealing capability. Other available seat designs are Cavity Filler seats for reducing dead volume in the ball cavity, one-piece seat/seal for diverter valves or Double-Block and Bleed seats with O-ring.



Standard seat with slots | **Diverter seat/seal** | **Cavity Filler seat** | **Characterized metal seat**

Habonim has a line of metal seated valves for severe service applications where high temperature, abrasion and corrosion restrict the use of soft seats.Please refer to Habonim Bulletin T-624 for additional information on seat materials and pressure temperature limits.

T 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.

A TFM™ (Modified PTFE)

TFM™ is a chemically modified PTFE™ that offers enhanced properties while retaining all the proven advantages of conventional PTFE.
Identification: Color white with brown stripe.

R J Glass Filled PTFE

Glass filled PTFE has virtually the same chemical compatibility as virgin PTFE but extends the pressure/temperature rating of the valve. Its superior compression and heat resistance provide the seat good wear resistance at high loads and is particularly good for steam application.
Available with glass fibre content of 15% (R) or 25% (J).
Identification 15% GF: Color off-white with blue stripe.
Identification 25% GF: Color off-white with red stripe.

P 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. It is available in two different profiles to suit both steam or thermal fluid at high temperature and cryogenic applications.
Identification: Color charcoal black with white stripe.

H Glass & Metal Oxide Filled PTFE

This seat withstands higher temperatures and pressures than glass filled PTFE, has good resistance under load, not recommended for foodstuff
Identification: Color blue.

U UHMWPE (Ultra High Molecular Weight)

UHMWPE is mainly used where PTFE is not acceptable. It has high radioactive resistance of 2 x 10 rads. Other typical applications are the tobacco industry, H_2SO_4 and the handling of highly abrasive media.
Identification: Color pale white with green stripe.

Y Delrin®(Acetal Resin)

Delrin® is used at high pressure applications where resistance to wear and deformation under load is essential. It is mainly used in the Petroleum industry. Its maximum temperature is limited to 80°C (176°F) under full load.
Delrin® must not be used in presence of OXYGEN.
Identification: Color creamy white with black stripe.

K Carbon Filled PEEK®

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 black with yellow stripe.

L Virgin PEEK™

Virgin PEEK® has no fillers and comprises similar physical characteristics as filled PEEK®. It has higher radiation resistance and is suitable for food, tabacco and pharmaceutical applications.
Identification: Color beige.

S Vespel™

Vespel® is a polyimide material that has high temperature capabilities under load and is mainly used for heat transfer applications, hot gases and oils.
Vespel must not be used in with STEAM or media containing WATER or WATER VAPOR.
Identification: Color brown.

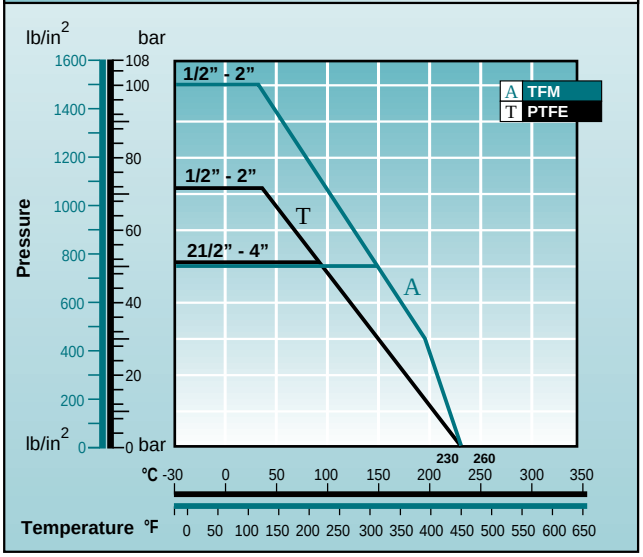
C PCTFE (Kel-F®)

PCTFE material, better known as Kel-F® (Chloro Tri Floro Ethylene) is used extensively for cryogenic services for temperatures down to -196°C (-320F°) to 121°C (250°F). Its main applications are for gas production, transportaion and storage. Identification: Color see through white.

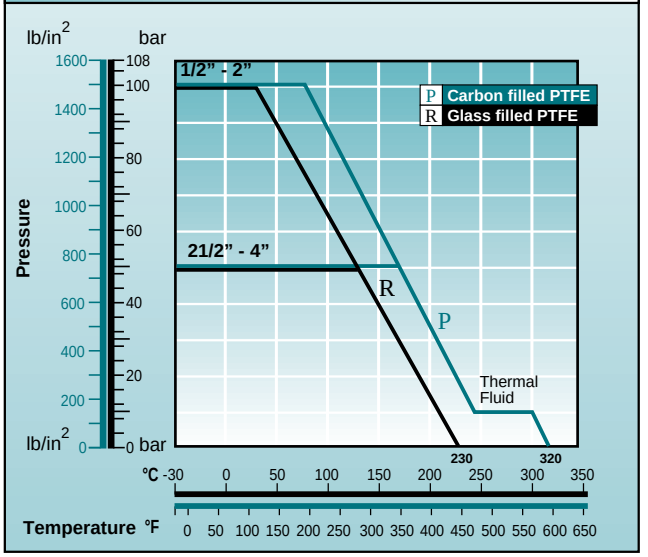
Pressure / Temperature Rating

The solid lines in the Pressure/Temperature (PT) graphs are the maximum seat rating for each material*, and are not the valve body rating. Valves above 2” have a limiting body rating of #300 for all seat material. The PT lines are based on differential pressure with the valve in the closed position. Data is given from field applications and laboratory tests.

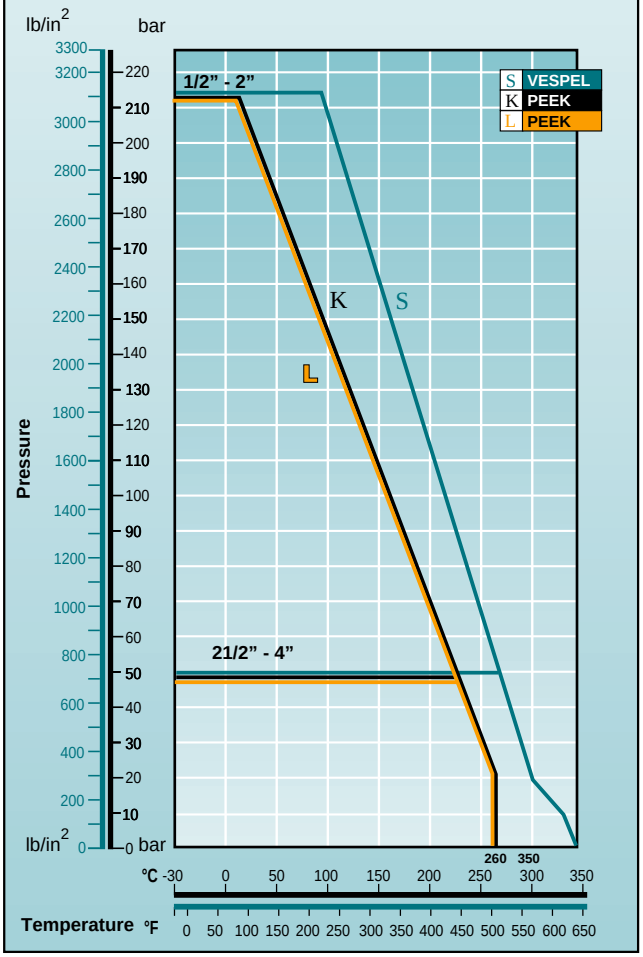
T PTFE™ / A TFM™



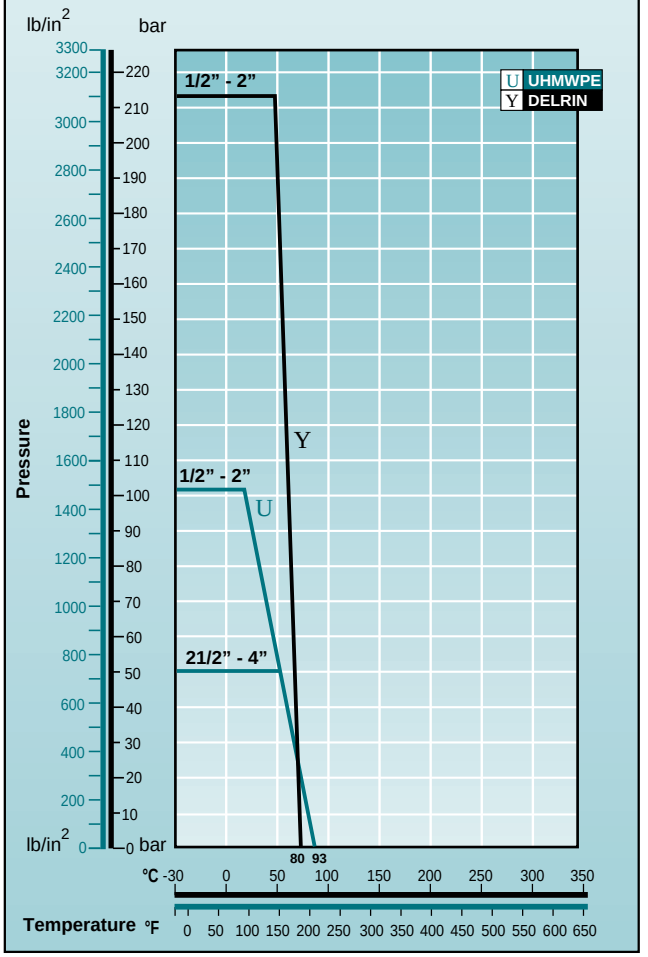
P NRG / R Glass Filled PTFE



S VESPEL™ / K L PEEK®



Y Delrin® / U UHMWPE



* Additional information of other seats material is available on request.

Main Valve Applications

Some of the main valve applications that Habonim have are specified and detailed below. For more information on other options, consult with Habonim.

Firesafe Valves

The "**AF**" series Fire Safe valves are designed and tested to the requirements of API 607 4th Edition and to BS 6755 Part 2 specifications. The valves contain soft seat rings. In the event of fire, a secondary metalic machined ring comes in contact with the ball and prevents leakage through the valve port. The stem incorporates a machined ring shaped surface which will prevent leakage, once the thrust seal has been burned off. All firesafe valves are fitted with flexible graphite body seals and graphite stem seals. Bulletin: P - 115

Control Valves

The "**N**" series V-port control valves are used in many industrial processes such as steam, pH, pressure, temperature and other control applications. The specially mate-lapped hard coated ball and characterised metal seats, matched ball and stem, direct ISO mounting pad and fastened adaptor mounting kit provide reduced hysteresis, precise control and tight shuttoff. A wide range of end connectors are available together with various types of seat and seat materials. Bulletin: P - 411/94 (characterized) P - 411 (round port)

Diverter Valves

The "**D**" and "**S**" series diverting valves reduce the number of valves in a system, thereby saving cost and giving the user easier control by using a single valve in place of multiple valves. The diverter valve can be used with all the standard end connections and has various types of ball porting. Bulletin: P - 108

Instrumentation Valves

Valves for instrumentation applications are assembled with the "Let-Lok" compression fitting ends. The ends are one-piece casting, machined to fit Imperial or Metric tubing from 1/4" to 1" or 6 mm to 25 mm. Pressure rating up to 3000 psi (210 bar) and temperatures up to 250°C (not combined). Bulletin: A - 116

Steam and Thermal Fluid Valves

The "**W**" series valves for Saurated Steam service up to 35 bar and Heat Transfer Fluids for temperatures up to 320°C have NRG, PEEK or VESPEL* seats, encapsulated graphite body seal and graphite stem packing. The valve has a red sleeved handle for identification and is available with stem extension for actuation. Bulletin: P - 113

** VESPEL must NOT be used with steam.*

High Pressure Valves

Valves for high pressure applications in 46 and 47P series include Acetal Resin (Delrin) seats, Buna-O shore 90 body seals, Nylatron thrust seal and 17-4PH stem material. Valves up to 1" are suitable for pressures up to 3000 psi (210 bar) and 2300 psi (160 bar) from 1¼" to 2". For pressures up to 6000 psi (400 bar) please refer to the Habonim H23 and H27 series valves.

H23 Series A - 104 **H27** Series A - 106

Cryogenic Valves

The "**C**" series valves for cryogenic service applications include the speciality gas production, Food industry, Metallurgy, Transportation and other. With a precision welded body and extended bonnet, one piece high tensile stem, PCTFE or NRG seat material and chevron stem packing, the valves can operate at temperatures down to -196°C (-320°F) and pressures up to 100 bar (1500 psi). The valve ball has a upstream relief hole to prevent the line pressure buildup in the body cavity. Bulletin: A - 119

Clean Valves

The Habonim line of Clean Valve applications include the Semiconductor, Pharmaceutical, Biotechnology, Food and Beverage and Cosmetic industries. Special body and trim material selection, machining procedures, assembly and testing in a class 1000 cleanroom are some of the valve specifications. The "**I**" series High Purity valves for the Semiconductor industry including the FDS lateral valves are well proved worldwide.

High Purity Ball Valves, 67 Series FDS Valves, 48 Series Valves

Vacuum and Searching Gas Valves

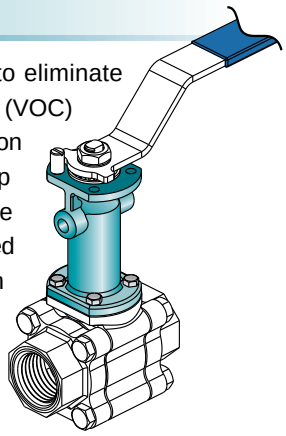
The "**V**" series are valves for high vacuum and searching gas applications and they include Viton O-ring body seals and a special O-ring stem assembly. The valves are suitable for vacuum down to 10^{-6} torr and lower. All valves are assembled, tested and packaged in a cleanroom area. Bulletin: D - 502

Special Application

Valves for Oxygen, Chlorine or Ammonia service are specified "Special Application Valves" and each oblige strict routines. The "**O**" series are valves for Oxygen and they include very selective body and trim materials and cleaning procedures. The "**K**" series valves for Dry Chlorine service are in accordance with the guidelines of the Chlorine Institute Pamphlet 6. Ammonia service valves have special stem arrangement and are defined "**A0866**". All valves are assembled, tested and packaged in a cleanroom area.

Oxygen Service: D - 503 **Chlorine** Service: D - 501

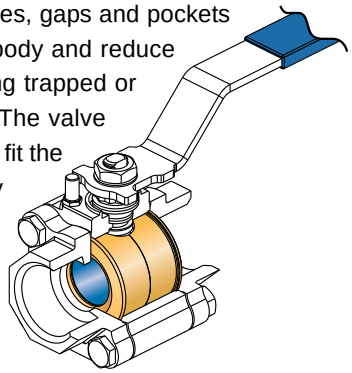
Fugitive Emissions



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. 47P series ISO platform make the valves ideal for add-to such as extended handles, spring return handles and other attachments.

Cavity Filler Valves

All the 46 and 47P series valves are available with cavity filler seats that eliminate all crevices, gaps and pockets between the ball and valve body and reduce the risk of contaminants being trapped or the solidification of product. The valve body is specially machined to fit the seat/seal dimensions. Cavity filler valve bodies cannot be repalced with standard bodies as they have larger bore dimensions.

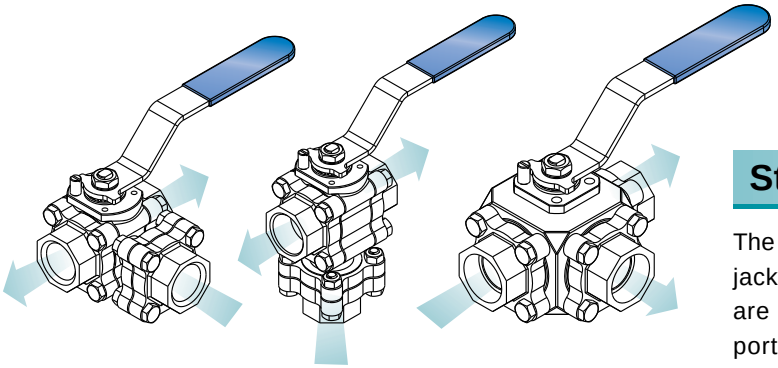


Bulletin: P - 117

Diverter Valves

Habonim's line of diverting valves are available in D47P, S47P or 61/62P series. The valves have 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 incoporating the same body dimensions that will allow any standard end connection to be fitted to the valve. The valves incoporate all the additional options of the two way valves including cavity seats (in D47, S47 series only).

Bulletin: P - 108 Bulletin: P - 120

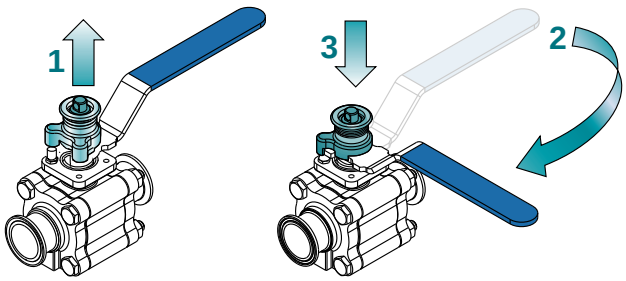


S47P Side Entry **D47P Diverter** **61/62P Multi-Port**

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".

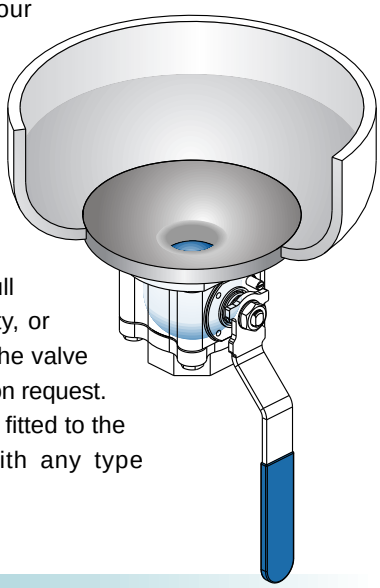


Valve in OPEN position **Valve in CLOSED position**

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**).

Flush Bottom Tank

Valves with special flush tank ends that are welded or bolted 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.

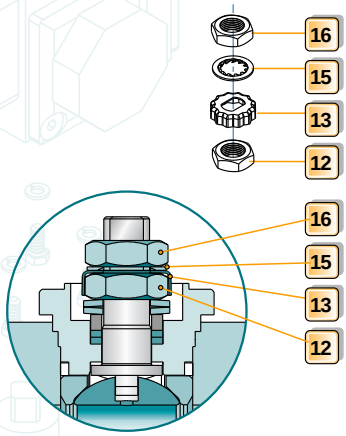
Bulletin: P - 119.

Steam Jacketed Valves

The 46 and 47P series valves are available with steam jackets for thermal fluids, hot water or steam. The valves are available with any number or type of inlet and outlet ports. The steam jacket is welded to the center body to minimize heat loss.

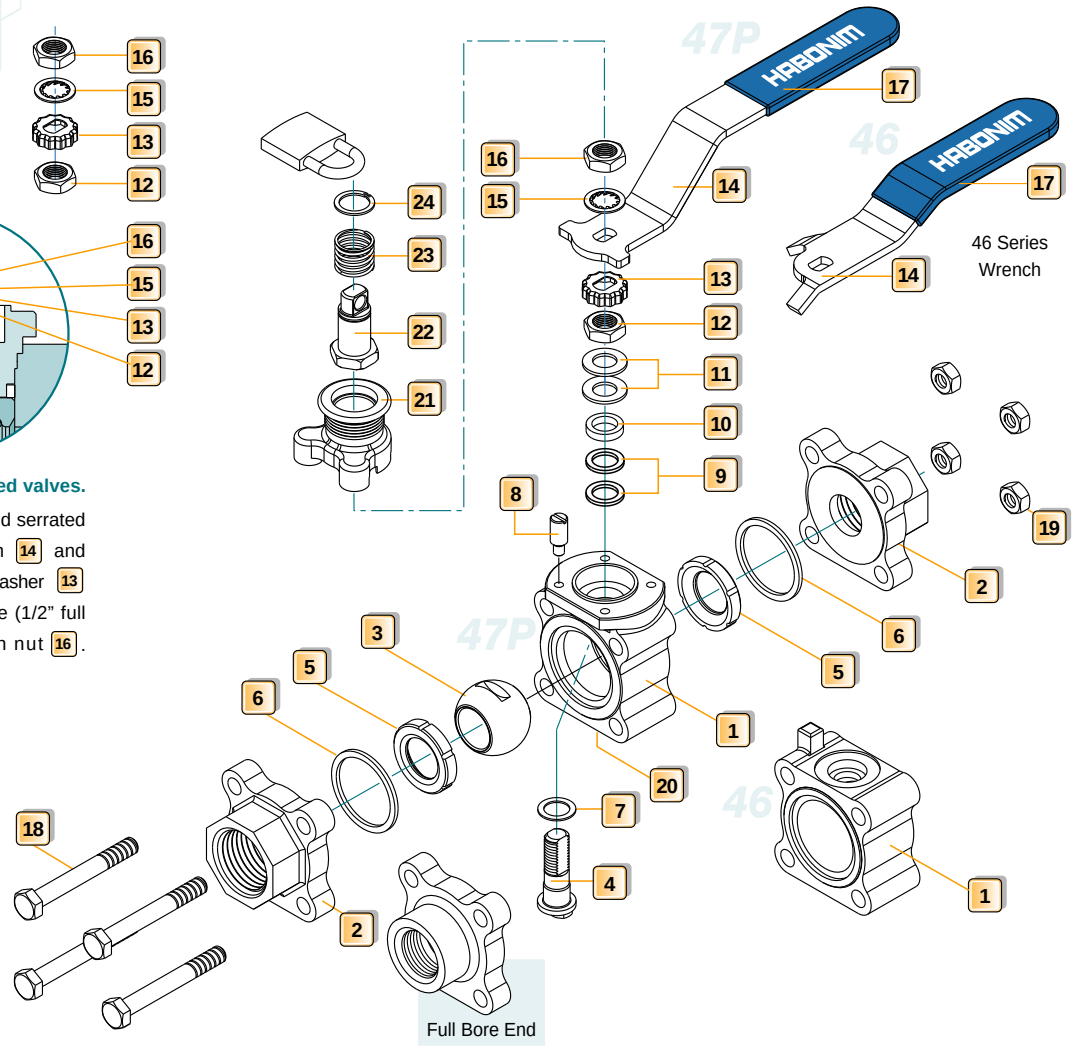
Specifications

Material Specifications 1/2" - 2 1/2"



Stem arrangement for actuated valves.

Release the wrench nut 16 and serrated washer 15 remove the wrench 14 and refasten the nut 16 on the tab washer 13 Valves 1/2" to 3/4" reduce bore (1/2" full bore) do require the wrench nut 16.



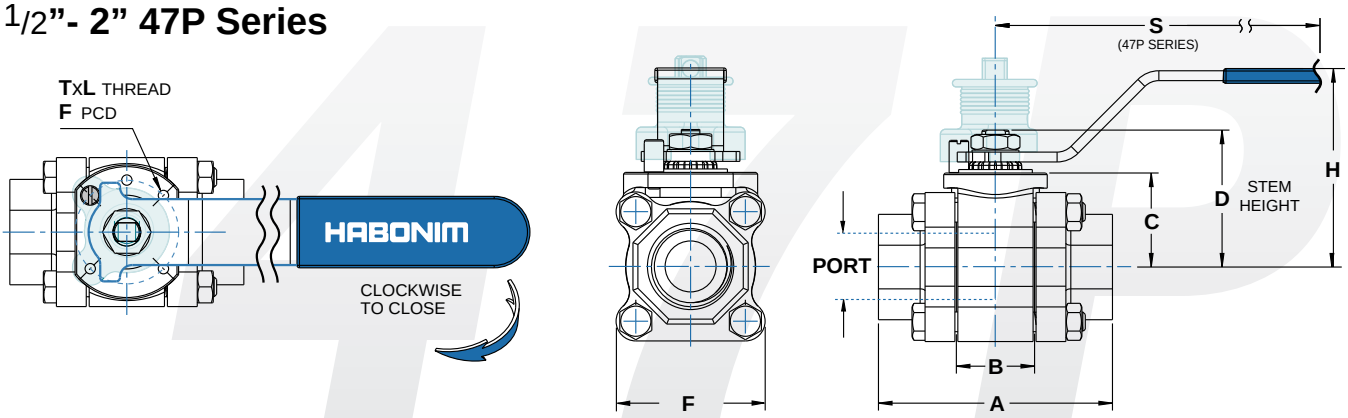
ITEM	DESCRIPTION	MATERIAL	QTY.
1	BODY	STAINLESS ST. ASTM A351 CF8M CARBON ST. AI05, WCB HASTELOY-C, ALLOY-20, MONEL	1
2	END CONNECTOR	STAINLESS ST. ASTM A351 CF3M CARBON ST. AI05, WCB HASTELOY-C, ALLOY-20, MONEL	2
3	BALL	STAINLESS ST. ASTM A276 316L HASTELOY-C, ALLOY-20, MONEL	1
4	STEM	STAINLESS ST. ASTM A276 316L STAINLESS ST 17-4PH HASTELOY-C, ALLOY-20, MONEL	1
*5	SEAT	PTFE, RPTFE, NRG, PEEK, TFM, UHMWPE, VESPEL	2
*6	BODY SEAL	PTFE, RPTFE, TFM, UHMWPE, GRAPHITE, METAL O-RING	2
*7	STEM THRUST SEAL	PTFE, RPTFE, PEEK, NYLATRON, UHMWPE, VESPEL	1
8	STOP PIN	STAINLESS ST. AISI 304	1
*9	STEM PACKING	PTFE, RPTFE, TFM, UHMWPE, GRAPHITE, O-RINGS	2-3
10	GLAND	STAINLESS ST. AISI 304	1-2

ITEM	DESCRIPTION	MATERIAL	QTY.
11	DISC SPRING	STAINLESS ST. 17-7PH	1
12	GLAND NUT	STAINLESS ST. AISI 316 CARBON ST. ZINC PLATED	1
13	TAB WASHER	STAINLESS ST. AISI 316	1
14	WRENCH	STAINLESS ST. AISI 430 CARBON ST. ZINC PLATED	1
15	SERRATED WASHER	STAINLESS ST. AISI 316	1
16	WRENCH NUT	STAINLESS ST. AISI 316 CARBON ST. ZINC PLATED	1
17	SLEEVE	VINYL PLASTISOL	1
18	BODY BOLT	STAINLESS ST. AISI 304 CARBON ST. ZINC PLATED	4
19	BODY NUT	STAINLESS ST. AISI 316 CARBON ST. ZINC PLATED	4
20	TAG (NOT SHOWN)	STAINLESS ST. AISI 316	1
21	LOCK HOUSING	STAINLESS ST. AISI 304	1
22	LOCK STEM	STAINLESS ST. AISI 316	1
23	LOCK SPRING	STAINLESS ST. AISI 303	1
24	LOCK CIRCLIP	STAINLESS ST. AISI 304	1

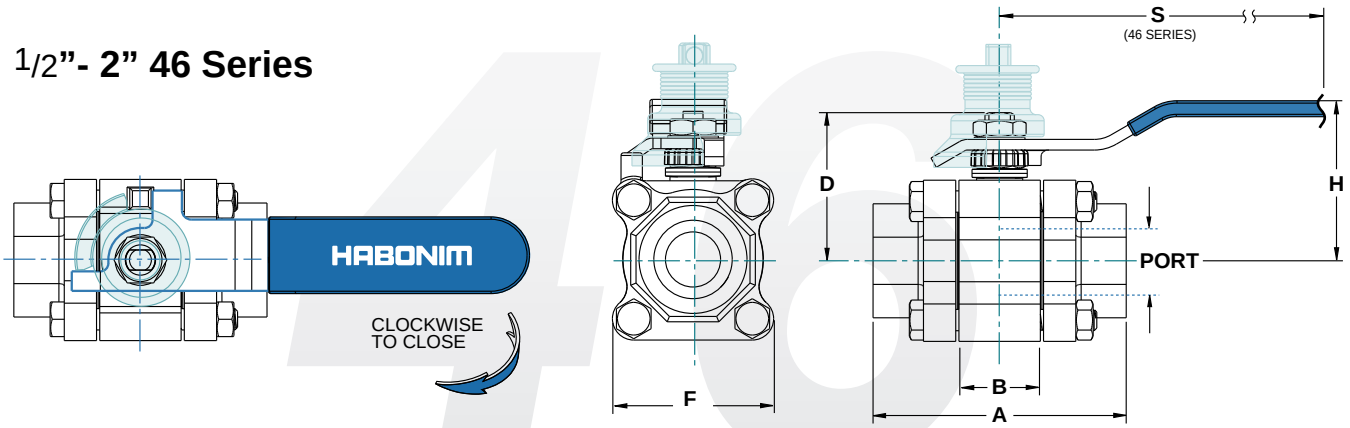
* STANDARD ITEMS FOR REPAIR KITS

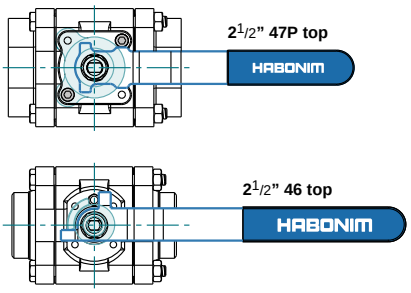
Valve Dimensions 1/2" - 2 1/2"

1/2"- 2" 47P Series

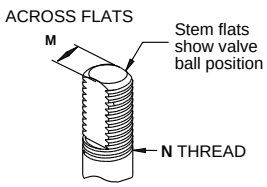


1/2"- 2" 46 Series

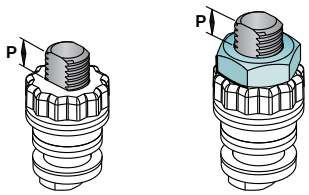




STEM DIMENSIONS



PREPARATION FOR ACTUATION



1/2", 3/4" & 2 1/2" without nut 16

1"- 2" with nut 16

Valve Dimensions 1/2" - 2 1/2" (1/2" - 2" Full Bore)

RB	FB	Unit	Port	A	B	C	D	H	S(47P)	S(46)	F	M	N	P	TXL	ISO	Weight
1/2"	1/4", 3/8"	mm	11.1	66	206	29	38.7	61.5	150	114	47.0	5.5	3/8" UNF	7.2	M5x10	FO3	0.6 Kg
		inch	0.44	2.598	8.110	1.142	1.524	2.421	5.906	4.49	1.850	0.217		0.283			1.33 lb
3/4"	1/2"	mm	14.3	71	24.5	32.4	41.4	63.9	150	114	53.7	5.5	3/8" UNF	7.2	M5x10	FO3	0.8 Kg
		inch	0.56	2.795	0.965	1.236	1.618	2.516	5.906	4.49	2.114	0.217		0.283			1.77 lb
1"	3/4"	mm	20.6	95	31.7	38.2	55.6	79.4	187	146	63.7	7.54	7/16" UNF	7.2	M5x10	FO4	1.6 Kg
		inch	0.81	3.740	1.248	1.504	2.189	3.126	7.362	5.75	2.507	0.297		0.283			3.54 lb
1 1/4"	1"	mm	25.4	108	40.9	37.2	60.2	84.1	187	146	71.7	7.54	7/16" UNF	7.2	M5x10	FO4	2.5 Kg
		inch	1.00	4.252	1.610	1.465	2.370	3.311	7.362	5.75	2.822	0.297		0.283			5.53 lb
1 1/2"	1 1/4"	mm	31.8	115.5	48.4	43.6	73	97	237	178	86.7	8.71	9/16" UNF	8.0	M6x12	FO5	3.6 Kg
		inch	1.25	4.547	1.906	1.717	2.874	3.819	9.331	7.00	3.413	0.343		0.315			7.96 lb
2"	1 1/2"	mm	38.1	128	56.3	48.3	77.8	101.8	237	178	96.9	8.71	7/16" UNF	8.5	M6x12	FO5	4.5 Kg
		inch	1.50	5.039	2.217	1.902	3.063	4.008	9.331	7.00	3.815	0.343		0.334			9.95 lb
2 1/2"	2"	mm	50.8	158*	72.6	70	88.1	115.1	237	287	108	13.9	M20	13.5	M8x12	FO7	9.5 Kg
		inch	2.50	6.220	2.858	2.756	3.469	4.531	9.331	11.3	4.252	0.547		0.531			21.0 lb

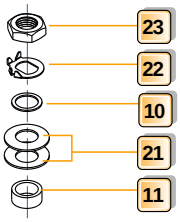
* **2" valve** Full Bore "A" dimension is 151.3 mm (5.956 in)

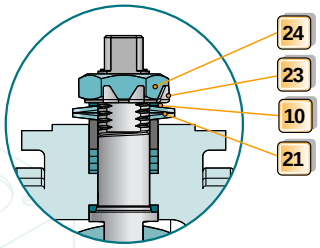
Specifications

Material Specifications 2 1/2" - 4"

Stem arrangement for actuated valves.

Release the wrench bolt 17 and remove the wrench handle 16 the wrench head 14, the gland nut 12 and stop plate 13. Assemble the two disc springs 21, stem location ring 22, tab washer 9 and refasten the non-slotted gland nut 23.





ITEM	DESCRIPTION	MATERIAL	QTY.
1	BODY	STAINLESS ST. ASTM A351 CF8M CARBON ST. WCB HASTELOY-C, ALLOY-20, MONEL	1
2	END CONNECTOR	STAINLESS ST. ASTM A351 CF3M CARBON ST. WCB HASTELOY-C, ALLOY-20, MONEL	2
3	BALL	STAINLESS ST. ASTM A276 316L HASTELOY-C, ALLOY-20, MONEL	1
4	STEM	STAINLESS ST. ASTM A276 316L STAINLESS ST 17-4PH HASTELOY-C, ALLOY-20, MONEL	1
*5	SEAT	PTFE, RPTFE, NRG, PEEK, TFM, UHMWPE, VESPEL	2
*6	BODY SEAL	PTFE, RPTFE, TFM, UHMWPE, GRAPHITE, METAL O-RING	2
*7	STEM THRUST SEAL	PTFE, RPTFE, PEEK, NYLATRON, UHMWPE, VESPEL	1
8	STOP PIN	STAINLESS ST. AISI 304	1
9	STEM LOCATION RING	STAINLESS ST. AISI 316	1
*10	STEM PACKING	PTFE, RPTFE, TFM, UHMWPE, GRAPHITE, O-RINGS	2-3 1

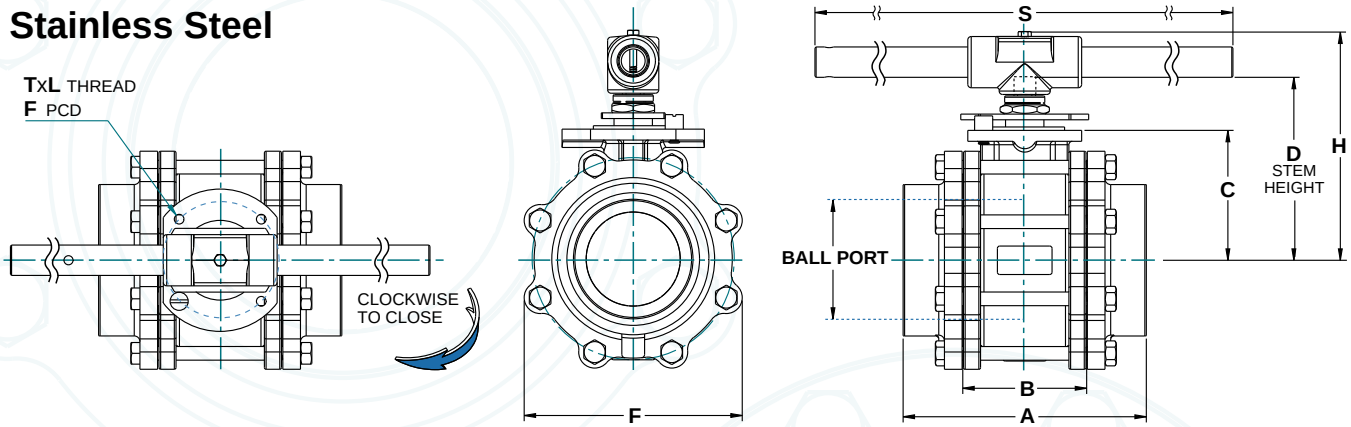
ITEM	DESCRIPTION	MATERIAL	QTY.
11	GLAND	STAINLESS ST. AISI 304	1
12	STOP PLATE	STAINLESS ST. 430 CARBON ST. ZINC PLATED	1
13	GLAND NUT	STAINLESS ST. AISI 316 CARBON ST. ZINC PLATED	1
14	WRENCH HANDLE	STAINLESS ST. AISI 430 STAINLESS ST. AISI 316	1
15	WRENCH HEAD	MALEABLE IRON	1
16	WRENCH BOLT	CARBON ST. ZINC PLATED	1
17	SEAT RETAINING RING	STAINLESS ST. ASTM A351 CF8M CARBON ST. WCB HASTELOY-C, ALLOY-20, MONEL	1
18	BODY BOLT	STAINLESS ST. AISI 304 CARBON ST. ZINC PLATED	8
19	BODY NUT	STAINLESS ST. AISI 304 CARBON ST. ZINC PLATED	8
20	TAG	STAINLESS ST. AISI 316	1
21	DISC SPRING	STAINLESS ST. 17-7PH	2
22	TAB WASHER	STAINLESS ST. AISI 316	1
23	GLAND NUT, (NON-SLOTTED)	STAINLESS ST. AISI 316 CARBON ST. ZINC PLATED	1

* STANDARD ITEMS FOR REPAIR KITS

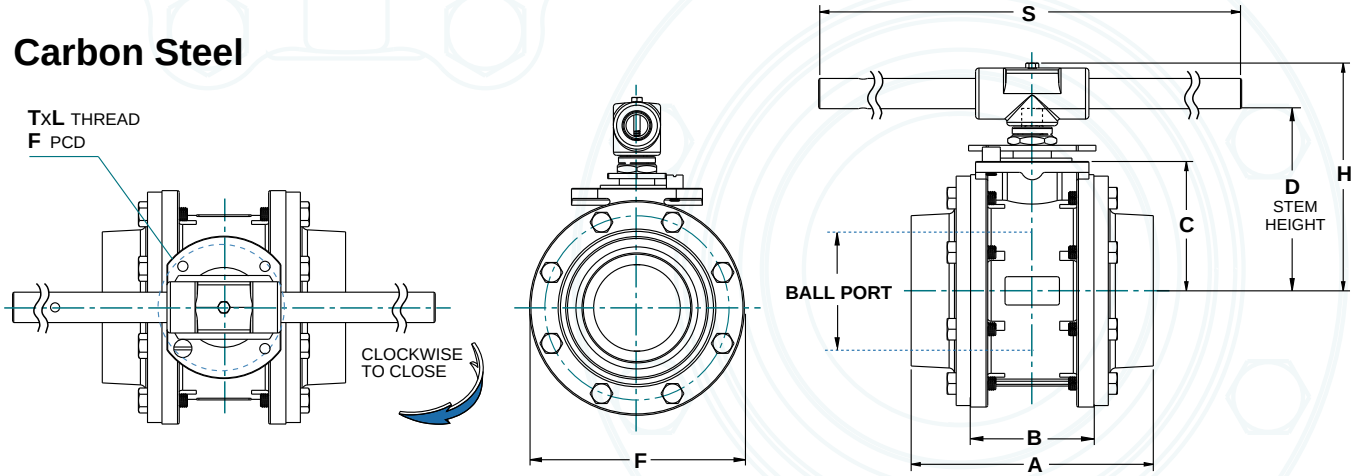
Dimensions

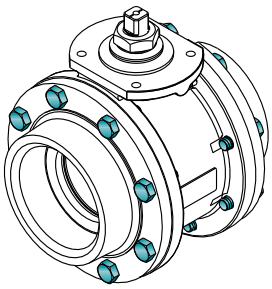
Valve Dimensions 2 1/2" - 4"

Stainless Steel

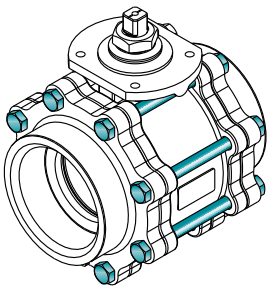


Carbon Steel



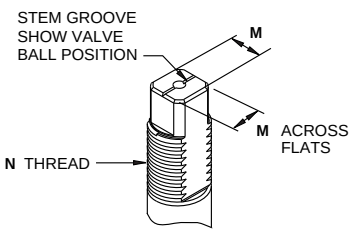


Carbon Steel Valves
with threaded bolts

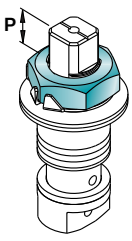


Stainless Steel Valves
with thru bolts

STEM DIMENSIONS



PREPARATION FOR ACTUATION



Valve Dimensions 3" - 4" (2 1/2" - 4" full bore)

RB	FB	Port	A R/B	A F/B	B	C	D	H	S	F	M	N	P	TxL	ISO	Weight
3"	2 1/2"	63.5	169	169	83.3	98.3	144.9	185.1	400	139.7	18.9	1" UNS	16.5	M10x20	F10	13.7 Kg
		2.50	6.653	6.653	3.280	3.870	5.705	7.287	15.75	5.500	0.744		0.649			30.28 lb
4"	3"	82.6	214	195	108.8	114.1	160.7	200.5	600	177	18.9	1" UNS	16.5	M10x20	F10	23.7 Kg
		3.25	8.425	7.677	4.283	4.492	6.327	7.894	23.62	6.969	0.744		0.649			52.4 lb
	4"	100		239	123	124	170.5	210.8	600	200	18.9	1" UNS	16.5	M10x20	F10	30.0 Kg
		3.94		9.409	4.843	4.882	6.713	8.299	23.62	7.874	0.744		0.649			66.3 lb

6" VALVE DIMENSIONS WILL BE GIVEN ON REQUEST

ISO 9001 Certified

As an ISO 9001 certified company Habonim operates according to internal manufacturing specifications that are written for each application and for specific customers. 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 perfection of the product.

Standards of Compliance

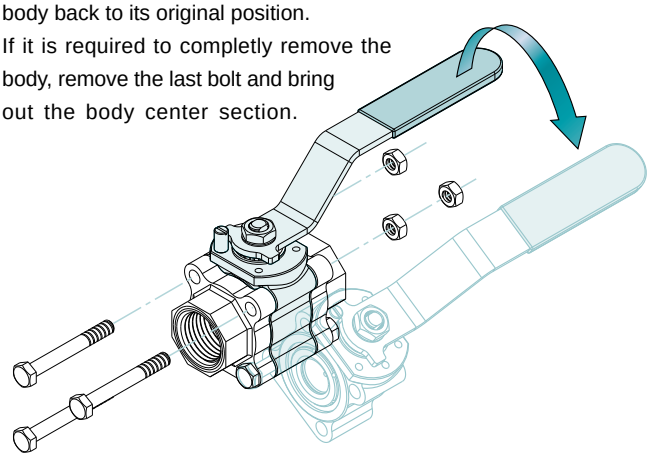
Design:	ANSI B16.34
	BS 5351, BS 5159
Threaded End Connections:	NPT ANSI B1.20.1
	BSPT ISO R/7, BS 21
	BSPP ISO R/7, BS 2779
	DIN 2999, DIN 3852
Socket Weld End Connections:	BS 1600. API 5L.
	ANSI B16.11, DIN 3239/Pt 2
Buttweld End Connections:	API 5L. BS 1600
(Schedules 5, 10, 40, 80)	ANSI B16.25, DIN 3239/Pt 1
Pressure Testing:	API 598. BS 6755 Pt. 1
	ISO 5208
Fire Testing:	API 607 4th Edt. API 6F
	BS 6755 Pt. 2.
NACE	MR-01-75
(option must be specified)	
Quality Assurance	ISO 9001

In-Line Maintenance

The 47P and 46 series 3-piece ball valves are in-line repearable, thus reducing on maintenance time and cost when servicing the valves. This allows quick and easy replacement of the valve trim or upgrading for new applications without loss of downtime.

Prior to servicing the valve, bring the valve to the open position making sure to release line pressure and drain all trapped media from the valve cavity. Keep the valve in the open position and remove all but one body bolt, so the valve body can swing away from its installed position and be brought out of the pipe line. In this position it is easy to replace all internal parts and then swing the body back to its original position.

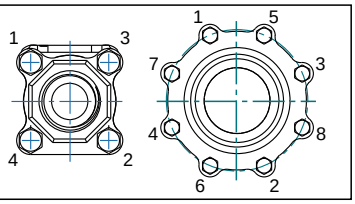
If it is required to completly remove the body, remove the last bolt and bring out the body center section.



Assembly, Marking and Packaging

All valves are 100% leak tested before packaging. Each valve is tagged for traceability and material certification will be provided on request. Habonim valves are delivered in the open position and with capped ends. Keep the valve in the open position and remove end caps only prior to installation. Actuated valves are kept in their Fail-Safe position. Use the bolt torque figures according to the tightening patterns shown below for safe operation. It is recommended to flush the pipe line before operating the valve, to prevent seat damage.

Valve Size	Bolt Size	Tightening Torque	
		Nm	in.lb
1/2"-3/4"	M6	10	88.6
1"-1 1/4"	M8	22	195
1 1/2"-3"	M10	45	400
4"	M12	75	655
6"	M16	161	1425



VALVE SIZE		Cv Values		Limiting Stem input Torque			
		FLOW COEFFICIENTS		316 S/S		17- 4PH	
RB	FB	Cv	Kv	Nm	in-lb	Nm	in-lb
1/2"		8	6.9	13.2	117	91	800
3/4"	1/2"	12	10.4	13.2	117	91	800
1"	3/4"	32	28.1	24.4	216	165	1,460
1 1/4"	1"	57	49.3	24.4	216	165	1,460
1 1/2"	1 1/4"	80	69.2	48.6	430	268	2,370
2"	1 1/2"	104	90	48.6	430	268	2,370
2 1/2"	2"	240	208	NONE	NONE	268	2,370
3"	2 1/2"	320	277	385	3400	1932	17,122
4"	3"	580	501	385	3400	1932	17,122
	4"	2400	2070	NONE	NONE	1932	17,122

Cv- flow in US GPM, pressure in psi **Kv**- flow in m^3/hr, pressure in bar

Valve flow rates are determined in full open position with water temperature of 15 C° (60 F°)

Actuated Valves

Where automation is required, the 47P series ball valves are available with Habonim's unique 4-Piston pneumatic Compact actuator. The Compact actuator is available in 8 sizes, spring return or double acting. All sizes exept the H15, have NAMUR air connections for attaching solenoids. Limit switches and positioners can be mounted on the actuator top face according to NAMUR or ISO bolt pattern interface. Please refer to Bulletin B-301.

Valve Actuator Sizing

Valve Sizing Tables of the Compact actuators on Habonim Valves are available on request. The sizing table is based on the line pressure, valves seats, working temperature and other factors. The valve torque figures are calculated from tests using water at room temperature at different pressure drops for each seat material and actuator air pressure.

Please contact HABONIM for more details.

Identification Code

The HABONIM 47P & 46 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 . . . 30
1 0	A F B	4 7 P	–	6 6	6 6	T T	/	B S P T	
SIZE	SERVICE	SERIES	–	BODY END	BALL STEM	SEAT SEAL	/	END TYPE	SPECIAL APPLICATION

SIZE

Code	Inch	mm
02	1/4"	8
03	3/8"	10
05	1/2"	15
07	3/4"	20
10	1"	25
12	1 1/4"	32
15	1 1/2"	40
20	2"	50
25	2 1/2"	65
30	3"	80
40	4"	100
60	6"	150

SERVICE

- **A** Antistatic
- **B** Full bore
- **C** Cryogenic
- **D** Diverter bottom entry
- **F** Firesafe
- **H** High pressure
- **I** High purity
- **K** Dry Clorine
- **L** Let Lok
- **N** Control
- **O** Oxygen
- **Q** Cavity filler
- **R** Bottom tank
- **S** Diverter side entry
- **V** Vacuum
- **W** Steam Thermal Fluid

BODY / END

BALL / STEM

- **1** Bronze
- **4** Carbon Steel
- **5** Brass
- **6** S. St. 316 (L)
- **7** Monel
- **8** S. St. 304
- **9** C. Steel LCB
- **A** Alloy-20
- **C** Hasteloy-C
- **D** Duplex
- **M** 17-4PH

SEAT

- **C** PCTFE
- **F** PFA
- **H** VX1
- **J** Reinforced PTFE 25%
- **K** Glass filled PEEK
- **L** Virgin PEEK
- **M** Metal
- **P** NRG
- **R** Reinforced PTFE 15% Glass filled
- **S** VESPEL
- **T** PTFE
- **U** UHMWPE
- **Y** Acetal Resin

SEAL

- **B** Buna "N" Shore 90
- **E** EPDM (EPR) Expanded
- **G** Graphite
- **I** Impregnated Graphite
- **J** Reinforced PTFE 25% Glass filled
- **K** Kalrez® S. St O-Ring
- **M** PTFE coated
- **N** Neoprene
- **R** Reinforced PTFE 15% Glass filled
- **T** PTFE
- **U** UHMWPE
- **V** Viton®

END CONNECTION

- **BSPT** BS 21
- **DIN** DIN 2999(BSPP)
- **NPT** B1.20.1
- **BW** Buttweld Sch 10, 40, 80
- **XBW** Extended Buttweld
- **SW** Socketweld
- **SWO** Socketweld OD tube
- **TC** Tri-Clamp
- **ETO** Extended OD tube
- **BWO** OD tube
- **KLM** Copper tube
- **ETB** Extended Copper tube
- **LL** Let Lok (Inch)
- **LM** Let Lok (Metric)
- **PN40** Flanged DIN PN40/F1

Special Application

- **XS3** 3" Extended stem
- **T** T port ball (61 series)
- **L** L port ball (61 series)
- **X** X port ball (62 series)
- **90°** Diverter ball valve 90° turn
- **180°** Diverter ball valve 180° turn
- **A0866** Stem seal Ammonia service
- **P043** Stem seal for gas service
- **F043** Stem seal Neoprene Ball with Pressure
- **P250** relief hole
- **J2N05** Jacketed valve, No. Outlets, Type, Size
- **FE** Fugitive Emission
- **V60** Control valve seat
- **DBB** Double Block & Bleed
- **NACE** Nace service
- **LD** Swivel Locking device
- **K** **LLP** Locking device
- **EP** Electro Polish
- **G18** Grit 180
- **G24** Grit 240

How to order

When placing an order for HABONIM valve please provide as many details as possible: Media, Temperature, Pressure, Pipe line size and type of connection.

Example A: 1" (10), Antistatic (A), Firesafe (F), Fullbore (B), Three piece (46), S. St 316 Body, End & Trim (6), PTFE Seats & Seals (T), Buttweld ends (BW) **10-AFB46-6666TT/BW**

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