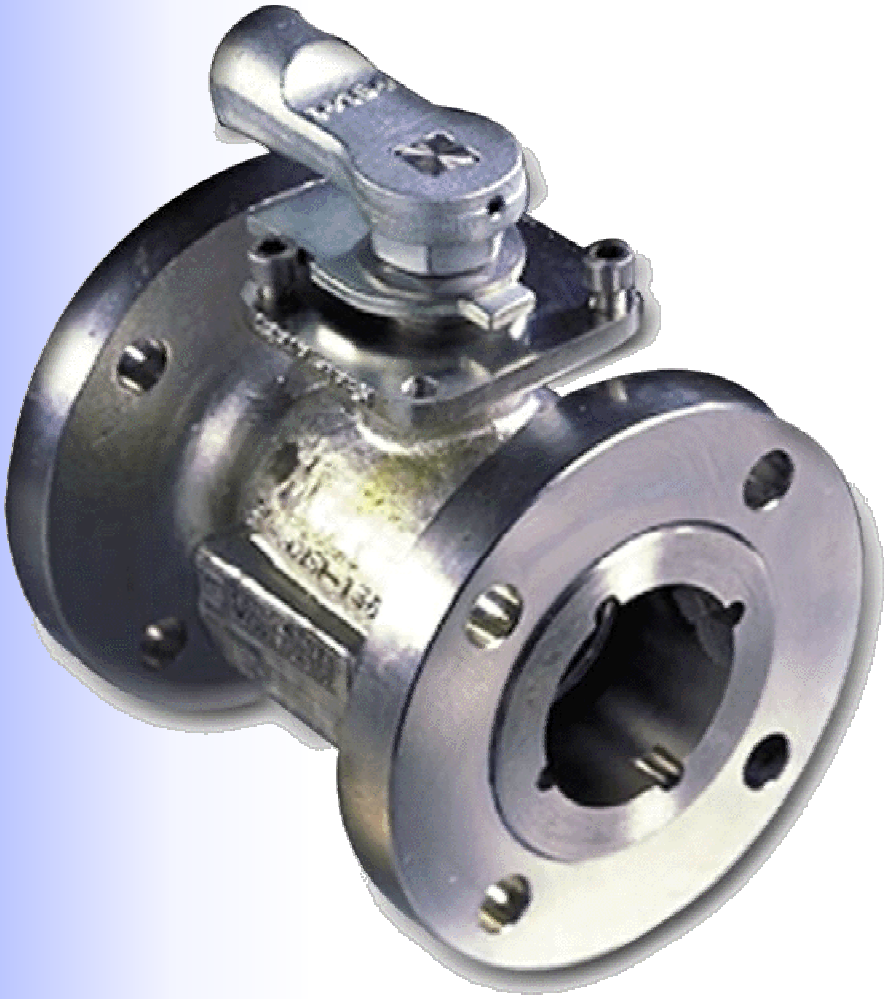
RHINO VALVES WORLDWIDE



Series 150/300

Robustness and dependability define to this valve flanged with body of a piece and plug threaded for further security.
Available in ANSI 150 # and 300 #
In diverse construction materials and seals, as well as several options facilitate their use in all manual or automated application

LICENSE No. 6D-0321

ISO 9001 REGISTERED
MGMT. SYS.
RvA C 024
DNV Certification B.V., The Netherlands

RHINO VALVES WORLDWIDE

SERIES 150 / 300

There are many good reasons to explain why resilient seat ball valves are replacing gate, globe and plug valves in most process industries today. Likewise, there are a lot a good reasons why Rhino flanged valves are the preferred for new or old applications. Series 150/300 gives you the quarter turn valve youre looking for. Economy of purchase and proven reliability are characteristics of Rhino Flanged Valves. When you are considering a 150/300 Series general service valve, you can be sure that with Rhino you are buying the very best valve by design. Normally supplied whit TFE seats, the Series 150/300 flanged valve is available with different seats and seals material for every application.

SPECIFICATIONS:

Valve Size:
1/2", 3/4", 1", 1 1/2", 2", 3", 4", 6", 8".
(15,20,25,40,50,80,100,150,200)

Flanges:
Series 150 - ANSI 150#
Series 300 - ANSI 300#

Body and plug material:
Carbon material: ASTM A216 gr WCB
Stainless Steel: ASTM A351 gr CF8M

Stem design:
Bottom entry stem, live loaded reataining system (two Belleville washers), internal thrust bearing, external stem seal.

Bolts and nuts material:
Bolts: SAE J429 gr5
Nuts: ASTM A563
All nuts and bolts zinc plated. Stainless Steel bolting optional.

Stem seals:
R-PTFE, UHMWPE (1/2" to 2")

Seats:
Buna, PTFE, (1/2" to 8"), Viton (3" to 6"), EPR, "S" Gasket 316 teflon coated Stainless Steel (1/2" to 2")
NOTE: Some others materials for seats and seals are available.

Ball and stem Material:
Carbon Steel: AISI 12L14 or SAE 1112 hard chromed plated ball
Stainless Steel: ASTM A276 gr 316

Design:
3-piece construction (12" to 2")
One piece body (3" to 8")

Operation:
Handle (1/2" to 8") or with pneumatic or electric actuators.

Maiz 263 Col. Valle del Sur Iztapalapa Mexico, D.F.
C.P. 09819 Sales phone 01 (52) 5670-51-55 / 5670-7101
Web page www.worcester.com.mx
E-mail exportrhino@worcester.com.mx / vrubio@worcester.com.mx

RHINO VALVES WORLDWIDE

SERIES 150 / 300

Design Specification:
ANSI B16.10 - Face to Face dimension.
ANSI B16.5 - Flange 150# dimension.
MSS SP72 - Ball valves with flanged or butt-welding ends for general service.
NACE-MRO 1-75 - Material resistance.

SEATS

The design of Worcester/Rhino Valves allows flow pressure in both directions which is transferred to the floating ball. Then, this is pressed against the downstream seat, resulting in a bubble tight sealing. The resilient seats patented by Worcester allow relief the pressure to the upstream seat against the ball, resulting a low torque of operation and a long, soft operation even with high differential pressures. This low torque characteristic, permits a smaller actuator operation, resulting in lower cost. The seats also acts as a ball whipper, as it removes any adhered material to ball for a better sealing.

STEM

The stem is designed for both safety and a long, leak-tight service life. Inserted from the bottom through the cavity, it rests securely against an interior body shoulder.
The stem is held in place by a live loaded retaining system, featuring opposing belleville washers. These flex in response to thermal expansions and contractions and maintain effective sealing pressure as they compensate for normal stem seal wear. The seal can also be easily adjusted in-line by the accessible stem nut. In series 400 and 600, a stem nut retaining clip holds the nut in place and prevents backing off, particularly in high cycle actuated services. In series 152 a CHEVRON° type external stem seal is provided.

TORQUE

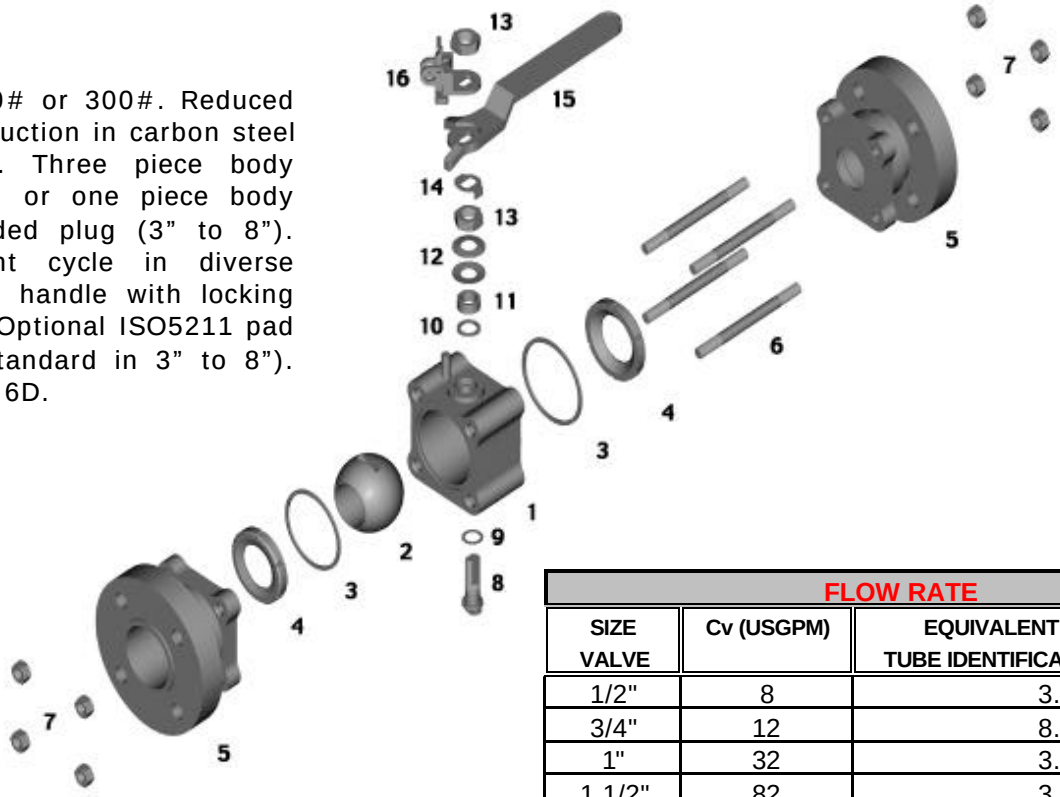
The operating torque of the ball valve is influenced by a number of factors which has to be considered to size a valve for actuation. These factors are divided in Design (type and material of valve seats), and application (pressure, media and frequency of operation).
The torque shown is in function of the pressure, as the friction between the floating ball and the seat is higher as the pressure is incremented.
Note: Our charts were made for reduced port valves (except for Series 152, which can be read directly). If you want to find the torque of a full port valve, please look for the curve of the next higher size, for example if you want to know the torque of a 1" fill port valve, you have to see the 1 1/4" valve readout.

Maiz 263 Col. Valle del Sur Iztapalapa Mexico, D.F.
C.P. 09819 Sales phone 01 (52) 5670-51-55 / 5670-7101
Web page www.worcester.com.mx
E-mail exportrhino@worcester.com.mx / vrubio@worcester.com.mx

RHINO VALVES WORLDWIDE

SERIES 150/300 ½" - 2"

Flanged ANSI 150# or 300#. Reduced port. Strong construction in carbon steel or stainless steel. Three piece body design (½" to 2") or one piece body design with threaded plug (3" to 8"). Seals for frequent cycle in diverse materials. Optional handle with locking device (½" to 2"). Optional ISO5211 pad in ½" to 2" (as standard in 3" to 8"). Other options : API 6D.



FLOW RATE		
SIZE VALVE	Cv (USGPM)	EQUIVALENT LONGITUDE TUBE IDENTIFICATION 40 IN FEET
1/2"	8	3.9
3/4"	12	8.7
1"	32	3.6
1 1/2"	82	3.7
2"	120	6.5

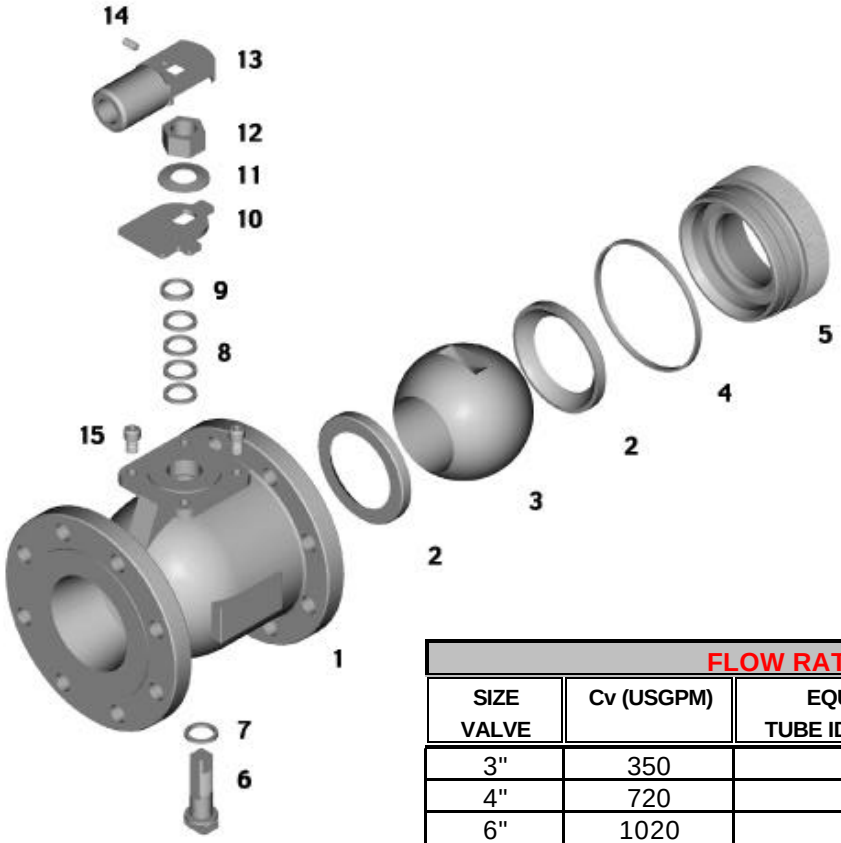
PARTS LISTING OF SERIES 150/300 1/2"- 2"

			MATERIAL	
ITEM	QUANTITY	DESCRIPTION	CARBON STEEL	STAINLESS STEEL
1	1	BODY	ASTM A 216 WCB	ASTM A 351 CF 8M
2	1	BALL	ASTM A 351 CF 8M	ASTM A 351 CF 8M
3	2	SEAL	PTFE	PTFE
4	2	SEAT	PTFE	PTFE
5	2	FLANGE END 150/300	ASTM A 216 WCB	ASTM A 351 CF 8M
6	4	STUD	SAE J429 GR. 5	ASTM F593 TYPE A 304
7	8	NUT	ASTM A 194 2HM	ASTM F594 TYPE A 304
8	1	STEM	AISI 1018-12L14	AISI 316
9	1	TRUST BEARING	R-PTFE 25%	R-PTFE 25%
10	1	STEM SEAL	R-PTFE 15%	R-PTFE 15%
11	1	FOLLOWER	AISI 416	AISI 416
12	2	BELLEVILLE WASHER	AISI 1075	AISI 302
13	2	NUT	ASTM A 194 2HM	ASTM F594 TYPE A 304
14	1	LOCK NUT	AISI 304	AISI 304
15	1	HANDLE	ASTM A 743 CF8/CA15	ASTM A 743 CF8/CA15
16	1	LOCKING DEVICE (OPTIONAL)	ASTM A 743 CF8/CA15	ASTM A 743 CF8/CA15

Maiz 263 Col. Valle del Sur Iztapalapa Mexico, D.F.
C.P. 09819 Sales phone 01 (52) 5670-51-55 / 5670-7101
Web page www.worcester.com.mx
E-mail exportrhino@worcester.com.mx
vrubio@worcester.com.mx

RHINO VALVES WORLDWIDE

SERIES 150/300 3” - 8”



FLOW RATE		
SIZE VALVE	Cv (USGPM)	EQUIVALENT LONGITUDE TUBE IDENTIFICATION 40 IN FEET
3"	350	7.1
4"	720	6.9
6"	1020	20.4
8"	1800	37.7

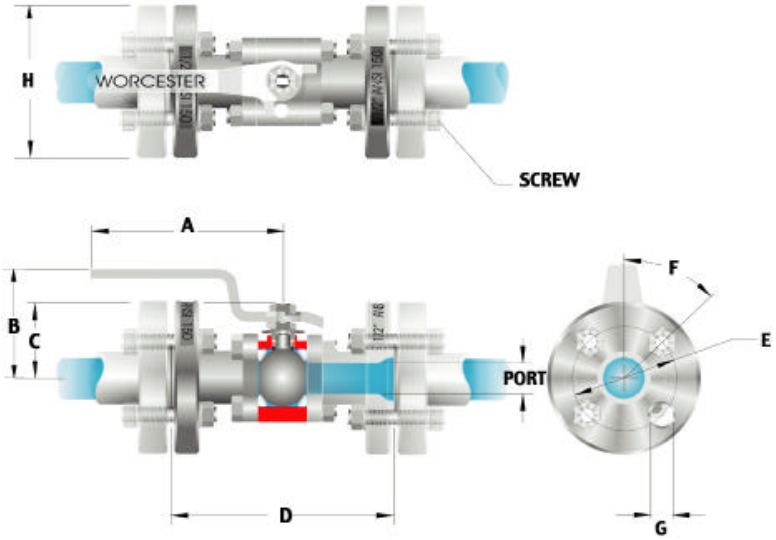
PARTS LISTING OF SERIES 150/300 3"- 8"

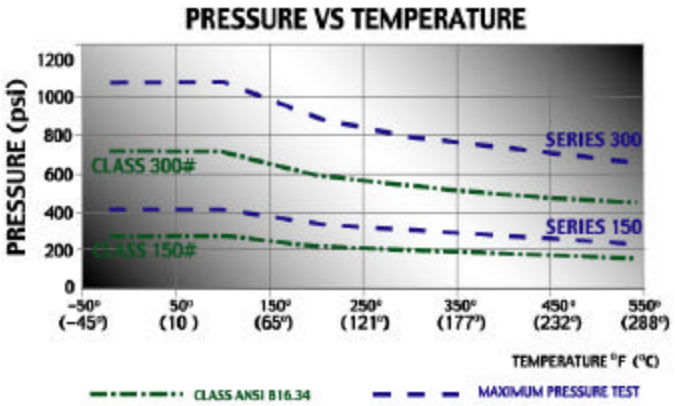
			MATERIAL	
ITEM	QUANTITY	DESCRIPTION	CARBON STEEL	STAINLESS STEEL
1	1	BODY	ASTM A 216 WCB	ASTM A 351 CF 8M
2	2	SEAT	PTFE	PTFE
3	1	BALL	ASTM A 351 CF 8M	ASTM A 351 CF 8M
4	1	SEAL	PTFE	PTFE
5	1	PLUG END 150/300	ASTM A 216 WCB	ASTM A 351 CF 8M
6	1	STEM	AISI 1018-12L14	AISI 316
7	2	THRUST BEARING	R-PTFE 25%	R-PTFE 25%
8	3	STEM SEAL	R-PTFE 15%	R-PTFE 15%
9	1	FOLLOWER	AISI 416	AISI 416
10	1	STOP PLATE	SAE 1018-1020	SAE 1018-1020
11	2	BELLEVILLE WASHER	AISI 1075	AISI 302
12	1	RETAINING NUT	ASTM A 194 2HM	ASTM F594 TYPE A 304
13	1	HANDLE	ASTM A 216 WCB	ASTM A 351 CF 8M
14	1	SET SCREW	AISI 1045	AISI 304
15	2	STOP SCREW	AISI 1045	AISI 304

Maiz 263 Col. Valle del Sur Iztapalapa Mexico, D.F.
C.P. 09819 Sales phone 01 (52) 5670-51-55 / 5670-7101
Web page www.worcester.com.mx
E-mail exportrhino@worcester.com.mx
vrubio@worcester.com.mx

RHINO VALVES WORLDWIDE

SERIES 150 ½" to 2"





Service Conditions :

CONDITIONS	CARBON STEEL	STAINLESS STEEL
ANSI CLASS # (Series 150 Flange Ends)	150	150
OPERATION TEMPERATURE	-20 to 100 F (-29 to 38°C)	-20 to 100 F (-29 to 38°C)
MAX. ALLOWABLE WORKING PRESSURE	285 psi (20Kg/cm2)	275 psi (19.3 Kg/cm2)

SERIES 150/300 1/2" - 2"

SIZE	A	B	C	D	PORT
1/2"	4 1/4	2.69	1.46	4.25	0.438
3/4""	4 1/4	2.78	1.57	4.62	0.563
1"	5 3/4	3.33	2.17	5.00	0.813
1 1/2"	7	4.27	2.88	6.50	1.250
2"	7	4.46	3.07	7.00	1.500

SIZE	Flanged ANSI B 16.5 class 150						
	E	F	G	H	Holes	Bolt Flange	Weight in Lbs.
1/2"	2.38	45º	5/8	3.50	4	1/2	3.527
3/4"	2.75	45º	5/8	3.88	4	1/2	4.696
1"	3.12	45º	5/8	4.25	4	1/2	6.614
1 1/2"	3.88	45º	5/8	5.00	4	1/2	15.300
2"	4.75	45º	5/8	6.00	4	1/2	20.723

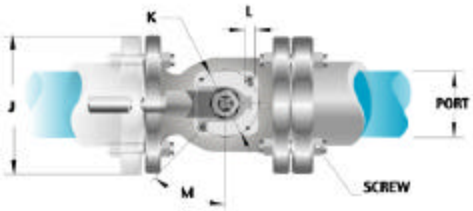
The pipe is exclusively representative. They are only as reference and they are subject to changes without previous notice.

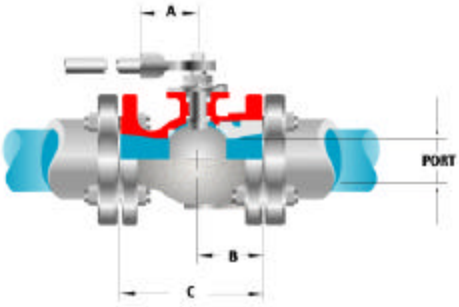
Dimension in inches.

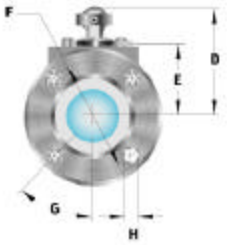
Maiz 263 Col. Valle del Sur Iztapalapa Mexico, D.F.
C.P. 09819 Sales phone 01 (52) 5670-51-55 / 5670-7101
Web page www.worcester.com.mx
E-mail exportrhino@worcester.com.mx
vrubio@worcester.com.mx

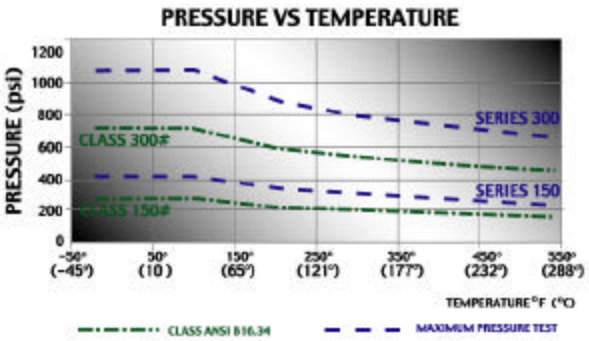
RHINO VALVES WORLDWIDE

SERIES 150 3” to 8”









Service Conditions :

CONDITIONS	CARBON STEEL	STAINLESS STEEL
ANSI CLASS # (Series 150 Flange Ends)	150	150
OPERATION TEMPERATURE	-20 to 100 F (-29 to 38°C)	-20 to 100 F (-29 to 38°C)
MAX. ALLOWABLE WORKING PRESSURE	285 psi (20Kg/cm2)	275 psi (19.3 Kg/cm2)

SERIES 150 3", 4", 6", 8"

SIZE	A	B	C	D	E	PORT
3"	3 1/4	3.62	8.00	5.82	3.88	2.500
4"	3 1/4	3.99	9.00	6.42	4.48	3.250
6"	4 11/32	4.21	10.50	9.00	6.19	4.375
8"	4 11/32	5.25	11.50	10.09	7.28	5.688

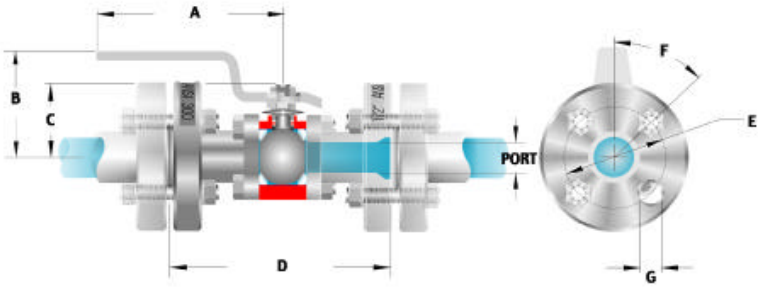
The pipe is exclusively representative. They are only as reference and they are subject to changes without previous notice.
Dimension in inches.

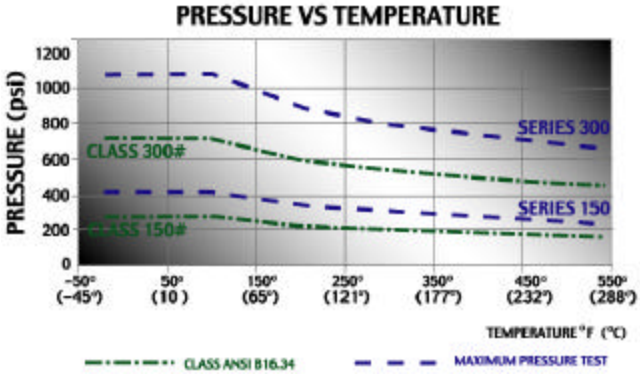
SIZE	Flanged ANSI B 16.5 class 150				Number of Holes	Bolt Flange	PLATE ISO 5211				
	F	G	H	J				K	L	M	Weight in Lbs.
3"	6.00	45º	3/4	7.50	4	5/8	F10	4.02	M10	45º	43.210
4"	7.50	22.5º	3/4	9.00	8	5/8	F10	4.02	M10	45º	68.780
6"	9.50	22.5º	7/8	11.00	8	3/4	F12	4.92	M12	45º	101.410
8"	11.75	22.5º	7/8	13.50	8	3/4	F12	4.92	M12	45º	158.730

Maiz 263 Col. Valle del Sur Iztapalapa Mexico, D.F.
C.P. 09819 Sales phone 01 (52) 5670-51-55 / 5670-7101
Web page www.worcester.com.mx
E-mail exportrhino@worcester.com.mx
vrubio@worcester.com.mx

RHINO VALVES WORLDWIDE

SERIES 300 1/2” to 2”





Service Conditions :

CONDITIONS	CARBON STEEL	STAINLESS STEEL
ANSI CLASS # (Series 150 Flange Ends)	300	300
OPERATION TEMPERATURE	-20 to 100 F (-29 to 38°C)	-20 to 100 F (-29 to 38°C)
MAX. ALLOWABLE WORKING PRESSURE	740 psi (52Kg/cm2)	720 psi (50.6 Kg/cm2)

SERIES 300 1/2" - 2"

SIZE	A	B	C	D	PORT
1/2"	4 1/4	2.68	1.46	5.50	0.438
3/4"	4 1/4	2.78	1.57	6.00	0.563
1"	5 3/4	3.33	2.17	6.50	0.813
1 1/2"	7	4.27	2.88	7.50	1.250
2"	7	4.46	3.07	8.50	1.500

The pipe is exclusively representative.
They are only as reference and they are subject to changes without previous notice.

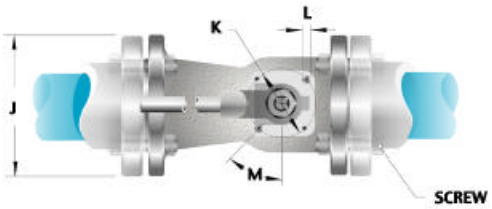
Dimension in inches.

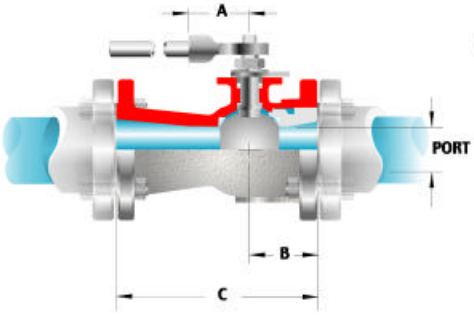
SIZE	Flanged ANSI B 16.5 class 300						
	E	F	G	H	Number of Holes	Bolt Flange	Weight in Lbs.
1/2"	2.62	45º	5/8	3.75	4	1/2	4.387
3/4"	3.25	45º	3/4	4.62	4	5/8	7.033
1"	3.50	45º	3/4	4.88	4	5/8	10.163
1 1/2"	4.50	45º	7/8	6.12	4	3/4	20.723
2"	5.00	22.5º	3/4	6.50	8	5/8	24.736

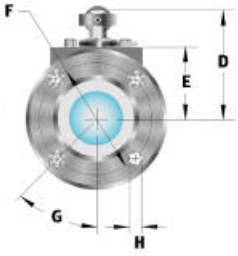
Maiz 263 Col. Valle del Sur Iztapalapa Mexico, D.F.
C.P. 09819 Sales phone 01 (52) 5670-51-55 / 5670-7101
Web page www.worcester.com.mx
E-mail exportrhino@worcester.com.mx
vrubio@worcester.com.mx

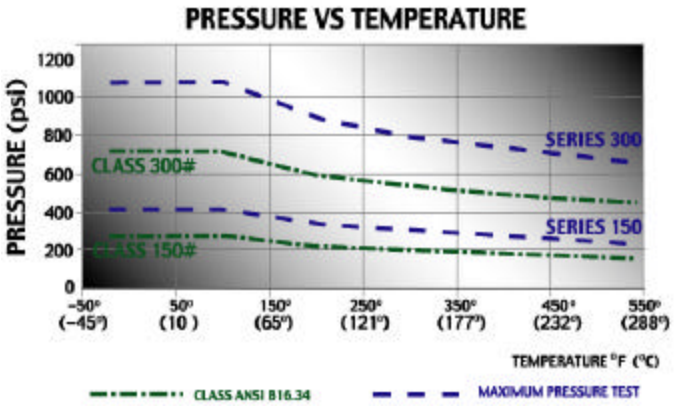
RHINO VALVES WORLDWIDE

SERIES 300 3” to 8”









Service Conditions :

CONDITIONS	CARBON STEEL	STAINLESS STEEL
ANSI CLASS # (Series 150 Flange Ends)	300	300
OPERATION TEMPERATURE	-20 to 100 F (-29 to 38°C)	-20 to 100 F (-29 to 38°C)
MAX. ALLOWABLE WORKING PRESSURE	740 psi (52Kg/cm2)	720 psi (50.6 Kg/cm2)

SERIES 300 3", 4", 6",

SIZE	A	B	C	D	E	PORT
3"	3 1/4	4.27	11.12	5.82	3.88	2.500
4"	3 1/4	4.72	12.00	6.42	4.48	3.250
6"	4 11/32	5.32	15.88	9.00	6.19	4.375
8"	4 11/32	8.19	16.50	10.33	7.56	4.688

The pipe is exclusively representative.
They are only as reference and they are subject to changes without previous notice.

Dimension in inches.

SIZE	Flanged ANSI B 16.5 class 300						PLATE ISO 5211				
	F	G	H	J	Number of Holes	Bolt Flange		K	L	M	Weight in Lbs.
3"	6.62	22.5º	7/8	8.25	8	3/4	F10	4.02	M10	45º	52.911
4"	7.88	22.5º	7/8	10.00	8	3/4	F10	4.02	M10	45º	88.185
6"	10.62	11.25º	7/8	12.50	12	3/4	F12	4.92	M12	45º	174.165
8"	13.00	15º	1	15.00	12	7/8	F12	4.92	M12	45º	264.554

Maiz 263 Col. Valle del Sur Iztapalapa Mexico, D.F.
C.P. 09819 Sales phone 01 (52) 5670-51-55 / 5670-7101
Web page www.worcester.com.mx
E-mail exportrhino@worcester.com.mx
vrubio@worcester.com.mx

Receiving Inspection.

All valves must be inspected when they arrive at the purchaser site, to verify that no damages have occurred during transportation or handing. Any damage found must be reported immediately.

Handling.

Store the valve in a safety place, free of rain, dust or any agent that can deteriorate it. All our valves are shipped with end protectors, you must keep them until the installation to avoid introduction of dust and other materials to the inside of the valve.
Note : If you plan to stock the valve for a long period of time, we recommend to leave it in the open position to avoid deformation on seats.

GENERAL INFORMATION.

Materials:

DESCRIPTION	***CARBON STEEL***	***STAINLESS STEEL***
BODY	A-216-WCB	A-351-CF8M
SEAT	PTFE	PTFE
BALL	A-351-CF8M / AISI 316	A-351-CF8M / AISI 316
SEAL	PTFE / GRAPHOIL (fire safe)	PTFE / GRAPHOIL (fire safe)
FLANGE END	A-216-WCB	A-351-CF8M
NUT	ASTM A-194-2HM	F-594 TYPE 304
BOLT	SAE J429 Gr.5	A193 B8
THRUST BEARING	R-PTFE	R-PTFE
STEM	AISI 1018 / AISI 12L14 / A105	AISI 316
STEM SEAL	R-TFE / GRAPHOIL (fire safe)	R-TFE / GRAPHOIL (fire safe)
BELLEVILLE WASHER	AISI 1075	AISI 304
NUT LOCK	AISI 304	AISI 304
FOLLOWER	AISI 416	AISI 416
HANDLE (& opt. Locking dev.)	ASTM A-743 CF8 / CA15	ASTM A-743 CF8 / CA15

Service Conditions:

CONDITION	***CARBON STEEL***	***STAINLESS STEEL***
ANSI CLASS # (Series 150 Flange Ends)	150	150
OPERATION TEMPERATURE	-20 to 100°F (-29 to 38°C)	-20 to 100°F (-29 to 38°C)
MAX. ALLOWABLE WORKING PRESSURE	285psi (20 Kg/cm2)	275psi (19.3 Kg/cm2)

CONDITION	***CARBON STEEL***	***STAINLESS STEEL***
ANSI CLASS # (Series 300 Flange Ends)	300	300
OPERATION TEMPERATURE	-20 to 100°F (-29 to 38°C)	-20 to 100°F (-29 to 38°C)
MAX. ALLOWABLE WORKING PRESSURE	740psi (52 Kg/cm2)	720psi (50.6 Kg/cm2)

General Dimensions:

	Series 150 Regular Bore				
DESCRIPTION	½"	¾"	1"	1 ½"	2"
LENGTH in (mm)	4.25 (108)	4.62 (117)	5.00 (127)	6.50 (165)	7.00 (178)
WIDTH in (mm)	3.50 (89)	3.88 (99)	4.25 (108)	5.00 (127)	6.00 (152)
HIGH in (mm) To handle	4.44 (113)	4.72 (120)	5.46 (139)	6.77 (172)	7.40 (188)
WEIGHT lb (Kg)	3.5 (1.60)	4.7 (2.13)	6.6 (3.00)	15.3 (6.94)	20.7 (9.40)

	Series 150 Regular Bore - ISO				
DESCRIPTION	½"	¾"	1"	1 ½"	2"
HIGH in (mm) To top of body (ISO platform)	2.91 (73.9)	3.20 (81.3)	3.69 (93.7)	4.60 (116.8)	5.69 (144.5)
WEIGHT lb (Kg) (including handle)	3.7 (1.66)	4.9 (2.20)	6.9 (3.13)	15.7 (7.14)	21.5 (9.73)

	Series 300 Regular Bore				
DESCRIPTION	½"	¾"	1"	1 ½"	2"
LENGTH in (mm)	5.50 (139.7)	6.00 (152.4)	6.50 (165.1)	7.50 (190.5)	8.50 (215.9)
WIDTH in (mm)	3.75 (95.3)	4.62 (117.3)	4.88 (124)	6.12 (155.4)	6.50 (165.1)
HIGH in (mm) To handle	4.56 (115.8)	5.09 (129.3)	5.77 (146.6)	7.33 (186.2)	7.71 (195.8)
WEIGHT lb (Kg)	4.4 (1.99)	7.0 (3.19)	10.2 (4.61)	20.7 (9.4)	24.7 (11.22)

	Series 300 Regular Bore - ISO				
DESCRIPTION	½"	¾"	1"	1 ½"	2"
HIGH in (mm) To top of body (ISO platform)	3.03 (73.9)	3.57 (81.3)	4.01 (93.7)	5.16 (116.8)	5.54 (144.5)
WEIGHT lb (Kg) (including handle)	4.5 (2.05)	7.2 (3.26)	10.4 (4.74)	21.2 (9.6)	25.5 (11.55)

INSTALLATION AND OPERATION:

Your Series 150 or 300, 3 piece Flanged Ball Valve is ready for its installation. All you need is to choose correctly the Flange Seal or Gasket, according to the media, and place it between the Valve's Flange and the Pipe's flange. Then set up the screws (not included), in each side, tightening them crossed in a gradual way in order to settle them perfectly parallels.
Your valve is bi-directional and you can install it in any position.
It can be operated manually by rotating smoothly the handle 90 degrees. When the handle is parallel with valve line, the valve is opened. At 90 degrees it is in the closed position. Automation devices (optional) can also operate the valve.

Caution : *Remember that a Ball Valve is an OPEN/CLOSE device and it is not designed to control the flow. Never leave the valve in a different position from the OPEN or CLOSE position as it will eventually damage the seats, reducing its life.*

Caution *: Do not install your valve in a high vibrating piping system, as the bolts which joint the the body and ends can get loose. If necessary, add a lock washer in everyone of these bolts (nut's side) to avoid them to move as result of vibration.*

Caution *: After installation, some burrs can stay inside the pipe line. If they are not removed, they can produce scratches in the seats and ball, resulting in leaks. Always clean the pipeline after installation, to remove strange agents.*

The valve will operate with no leaks and low torque for a long life if it is operated under its design parameters. The torque for a new valve depends of its size and the material of the seats installed. Please consult our printed or multimedia catalogs or visit our website: ***www.worcester.com.mx*** at your convenience, to get this data.

After proper installing (or maintenance) and before operation, always follow the safety instructions at the end of this document.

MAINTENANCE :

After operation and depending of the usage's conditions, Valve may need maintenance. Remember that your Valve has one-year warranty, if it is still in that period, please contact with your distributor, do not try to fix it or you may lost the warranty. Use ONLY originals RHINO Spare Parts, it assures you Valve will work according with its specifications. You can request them through the wide net of distributors all around the World.

Stem:

Although the Stem's design includes a self-adjustable system, compensatory of the wear and the contractions and expansions produced by thermal changes, if the valve presents leak for this section you must consider the next recommendations:

a) If your Valve has an actuator installed, check if it is aligned with the stem through the couple. A disaligned actuator can produce laterals pressure on the stem, which will have repercussions on leaks.
b) Tight lightly the adjusting nut of the stem until the leak stops. Remember tightening too much this nut will increase the torque of the Valve and can damage stem seal, reducing its life. If after you tightened the nut a leak continues, follow the next steps:
c) Shutoff the line where the valve is installed, verifying that no pressure and no dangerous media remains in the pipe and inside the valve. Proceed to disassemble the valve following next instructions.

Caution: *Ball Valves can retain pressurized media in the body cavity when closed. Take care when disassembling. Always open Valve to relieve pressure prior to disassembly.*

Caution : *Always depressurize, disconnect and disengaged automation components installed on the valve before you work on it.*

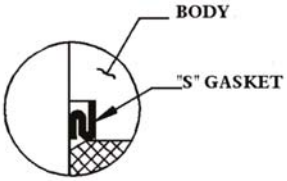
d) Remove the valve from the installation. Take away the Valve's flanged ends removing 4 nuts from the same side of the studs that join the body.
e) Remove the body's seals and seats. Close the Valve and remove the ball, preventing from scratching its surface. Place it over a soft material free of burrs.

Note: Be careful with the seats, do not mistreat or scratch them, otherwise you will need to replace them.

Change the thrust bearing and stem's seal, taking out the handle, the adjustment's nut, the lock nut, the Belleville washers and the follower.

f) Reassemble the stem's elements in an inverse way you took them out. Tighten lightly to the stem's adjusting nut (once you have installed the valve on line, you can give the final adjustment).

g) Reassemble the Valve placing new body seals (if your Valve includes a "S-Gasket" install new ones with the wider face of the side of the body). Remember ball only can be assembled with the valve in the closed position.



h) Tight the nuts of the studs which join the body with its ends, with next recommended torques:

Bolt Diameter	***Recommended Torque of Three piece Body Nuts***			
	Carbon Steel		***Stainless Steel***	
	(lb*plg)	***Nm***	***(lb*plg)***	***Nm***
¼"	*96-120*	10.8-13.6	*72-94*	8.1-10.6
5/16"	*156-204*	17.6-23.1	*120-144*	13.6-16.3
3/8"	*216-264*	24.4-29.8	*192-216*	21.7-24.4
7/16"	*480-540*	54.2-61.0	*336-384*	38.0-43.4

i) If you remove the actuator bracket, place it again together with the coupling element. Be sure all assembling is aligned in the center. If the actuator is not aligned and/or the coupling element is not perpendicular with the valve, the whole element could not work properly and/or media could leaks through the stem.

j) Place again the Valve on line with its seal or packing, tighten gradually the screws in a crossing way so the flanges will rest parallels.

Seals:

In case of leak between the body and ends, you may consider next recommendations:

a) Verify the good condition of the seal or gasket between flanges. Check if the torque of the screws that joint the valve with the pipe flanged is appropriate, if it is necessary tight the screws.

b) Verify that the nuts of the studs that join the three parts of the body are tightened as per the recommended torque. Tight them as necessary, if this happens often, it may be due to an excessive line vibration. We might suggest you to include "Expansion Joints" in the line to avoid it. If this is not possible or enough, you can install pressure nuts in each nut to reduce this effect.

c) If leak persists, disassemble the Valve according to the steps "c", *"d" and "e"* of the previous section.

d) Reassemble the Valve placing new seals according to the steps "h", "i", "j" and "k" of the previous section

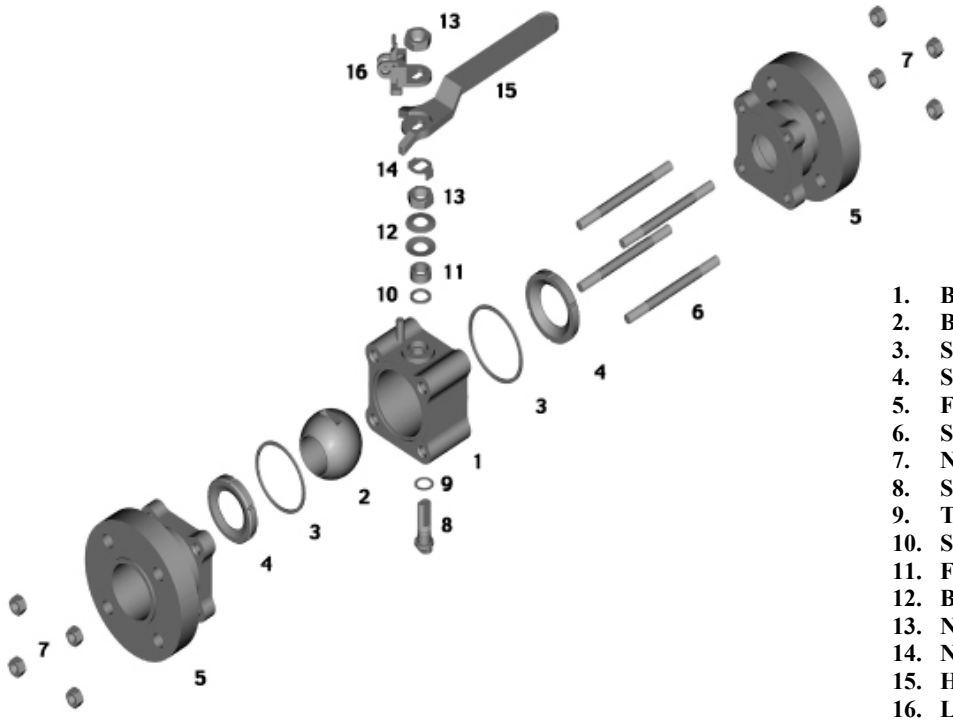
Internal Leak:

If the Valve presents internal leak (the fluid goes through it in closed position) it may be due to a wear on the seats or a scratch in the seats or ball. We suggest you to consider the next recommendations:

a) Some solid materials can clog between seat and ball. Operate the Valve several occasions to try to unblock these residues.

b) If your Valve has an actuator installed, check if it completes its own route and close perfectly, if not, maybe the Valve has and elevated torque or the actuator may be disaligned or defective. Verify that the voltage and/or air pressure of automation components is correct. If it is necessary, we recommend removing the actuator and manually operating the valve to check if this is the cause of the leak.
c) If the valve has an excessive torque, try loosing lightly the stem nut. If this is not enough or a stem leak appears, you must change the stem seals.
d) If the leak persists, disassemble the Valve following the steps "c", *"d" and "e"* of the "stem" section.
e) Check carefully the seats and the ball, paying attention on the surfaces of mutual contact. Look for any clog material and any scratch or imperfection and in any case replace the damaged part.
f) Reassemble the Valve placing new seals according to steps "h", "i", "j" and "k" of the "stem" section.

Note : *The seats made from harder material as Delrin, Peek, etc. are factory-adjusted during the valve assemble to get the softer torque without leaks. If you replace these kind of seats in the field and notice a dramatically higher torque of the valve, we recommend to reduce the height of the seats until get the desired torque. You can use sandpaper on a flat surface, moving the seats circularly over it avoiding a wavy or not flat back seat face.*



1. **BODY**
2. **BALL**
3. **SEAL**
4. **SEAT**
5. **FLANGED END**
6. **STUD**
7. **NUT**
8. **STEM**
9. **THRUST BEARING**
10. **STEM SEAL**
11. **FOLLOWER**
12. **BELLEVILLE WASHER**
13. **NUT**
14. **NUT LOCK**
15. **HANDLE**
16. **LOCKING DEVICE (OPT)**

SAFETY :

WARNING !

Valves are actually pressure vessels, which can be dangerous if they are not properly calculated, selected, installed, maintenance and operated. To prevent risks, follow the next precautions :

1. **Always select the proper pressure rating of the Valve according with your application.**

Series	ANSI Class #	Maximum Operating Pressure psi (kg cm²)	
		Carbon Steel Body	Stainless Steel Body
150	150	285psi (20 Kg/cm2)	275psi (19.3 Kg/cm2)
300	300	740psi (52 Kg/cm2)	720psi (50.6 Kg/cm2)

2. **Always choose the appropriate materials for your application, by checking them in corrosion charts or consulting with our factory. An aggressive media can wear the Valve's metal, make it thinner and less pressure resistant. Aggressive media, can destroy their seal capability as it can also attack soft elements (seats and seals).**

3. **Choose and protect the valve accordingly to the facility conditions. Remember that Carbon Steel Valves are subject to environment corrosion. Don't leave them in the open environment without proper protection. The Black Oxidized given in our factory is to protect them from corrosion during stock and handling exclusively.**

4. **Always use the appropriate equipment as gloves to handle and install valves, as some sharp ends can remain in the Valve. Valves can be heavy, use always appropriated equipment to handle it, including industrial shoes and back support. Extremely hot or cold media can be flown through the valve, placing you in risk if you touch it without protection. Also the valves can conduct extremely dangerous media, existing the risk of permanent injury to your person if any leakage in the piping system, including the valve. Always use the appropriate aids as gloves, safety glasses or mask to operate a valve.**

5. **Do not install or use the valve at the end of the line or in a safety loop.**

6. **Always review bolting torque and adjust as necessary after installation and before to operate the valve.**

7. **After operation, and even if the line has been shutdown, a dangerous pressure can remain into the Valve as Ball Valves can retain pressurized media in the body cavity when closed. Take care when disassembling. Always open the Valve to relieve pressure prior to disassembly. Depressurize, drain and vent the line before working with the valve.**

8. **Do not introduce your hands or other part of your body into the Valve, specially if the Valve has been automated, as the ball can spin suddenly and risk of bite or loose of part of your body can occur. Always depressurize, disconnect and disengaged automation components installed on the valve before you work on it.**

9. **Do not use non-OEM parts. No warranty will apply if you do.**

10. **Consult and follow all local rules applicable.**

Visit our web site : *www.worcester.com.mx*

Receiving Inspection.

All valves must be inspected when they arrive at the purchaser site, to verify that no damages have occurred during transportation or handing. Any damage found must be reported immediately.

Handling.

Store the valve in a safety place, free of rain, dust or any agent that can deteriorate it. All our valves are shipped with end protectors, you must keep them until the installation to avoid introduction of dust and other materials to the inside of the valve.
Note : If you plan to stock the valve for a long period of time, we recommend to leave it in the open position to avoid deformation on seats.

GENERAL INFORMATION.

Materials:

DESCRIPTION	***CARBON STEEL***	***STAINLESS STEEL***
BODY	A-216-WCB	A-351-CF8M
SEAT	PTFE	PTFE
BALL	A-351-CF8M	A-351-CF8M
SEAL	PTFE / GRAPHOIL (fire safe)	PTFE / GRAPHOIL (fire safe)
PLUG END	A-216-WCB	A-351-CF8M
THIN WASHER	R-PTFE	R-PTFE
STEM	AISI 1018 / AISI 12L14	AISI 316
PACKING	R-PTFE	R-PTFE
BELLEVILLE WASHER	AISI 1075	AISI 302
FOLLOWER	AISI 304	AISI 416
STOP PLATE	AISI 1018-1020	AISI 1018-1020
STEM NUT	ASTM A194 2HM	ASTM F594 TYPE A304
HANDLE	ASTM A-216 WCB	ASTM A-351 CF8M
RETENTION SCREW	AISI 1045	AISI 304
STOP SCREW	AISI 1045	AISI 304

Service Conditions:

CONDITION	***CARBON STEEL***	***STAINLESS STEEL***
ANSI CLASS #	150	150
OPERATION TEMPERATURE	-20 to 100°F (-29 to 38°C)	-20 to 100°F (-29 to 38°C)
MAX. ALLOWABLE WORKING PRESSURE	285psi (20 Kg/cm2)	275psi (19.3 Kg/cm2)

General Dimensions:

DESCRIPTION	***3"***	***4"***	***6"***	***8"***
LENGTH in (mm)	8.00 (203)	9.00 (229)	10.50 (267)	11.50 (292)
WIDTH in (mm)	7.50 (191)	9.00 (229)	11.00 (279)	13.50 (343)
HIGH in (mm)	9.57 (243)	10.92 (277)	14.50 (368)	16.84 (428)
WEIGHT lb (Kg)	43.2 (19.60)	68.8 (31.20)	101.4 (46)	158.7 (72)

INSTALLATION AND OPERATION:

Your Series 150 Flanged Ball Valve is ready for its installation. All you need is to choose correctly the Flange Seal or Gasket, according to the media, and place it between the Valve's Flange and the Pipe's flange. Then set up the screws (not included), in each side, tightening them crossed in a gradual way in order to settle them perfectly parallels.
Your valve is bi-directional and you can install it in any position.
It can be operated manually by rotating smoothly the handle 90 degrees. When the handle is parallel with valve line, the valve is opened. At 90 degrees it is in the closed position. Automation devices (optional) can also operate the valve.
To operate it manually only a short device is supplied to operate it through a pipe extension (no included). The reason is because these kind of valves need a long lever to operate them which if it is permanently fitted, may not be suitable for your facility space and/or may be dangerous as it can be accidentally moved. We recommend the lever must not remain installed in the Valve. Keep it near of your Valve, *not installed!*

Caution : *Remember that a Ball Valve is an OPEN/CLOSE device and it is not designed to control the flow. Never leave the valve in a different position from the OPEN or CLOSE position as it will eventually damage the seats, reducing its life.*

Caution *: Do not install your valve at the end of the line or in a safety loop.*

Caution *: After installation, some burrs can stay inside the pipe line. If they are not removed, they can produce scratches in the seats and ball, resulting in leaks. Always clean the pipeline after installation, to remove strange agents.*

The valve will operate with no leaks and low torque for a long life if it is operated under its design parameters. The torque for a new valve depends of its size and the material of the seats installed. Please consult our printed or multimedia catalogs or visit our website: ***www.worcester.com.mx*** at your convenience, to get this data.

After proper installing (or maintenance) and before operation, always follow the safety instructions at the end of this document.

MAINTENANCE :

After operation and depending of the usage's conditions, Valve may need maintenance. Remember that your Valve has one-year warranty, if it is still in that period, please contact with your distributor, do not try to fix it or you may lost the warranty. Use ONLY originals RHINO Spare Parts, it assures you Valve will work according with its specifications. You can request them through the wide net of distributors all around the World.

Stem:

Although the Stem's design includes a self-adjustable system, compensatory of the wear and the contractions and expansions produced by thermal changes, if the valve presents leak for this section you must consider the next recommendations:

a) If your Valve has an actuator installed, check if it is aligned with the stem through the couple. A disaligned actuator can produce laterals pressure on the stem, which will have repercussions on leaks.

b) Tight lightly the adjusting nut of the stem until the leak stops. Remember tightening too much this nut will increase the torque of the Valve and can damage stem seal, reducing its life. If after you tightened the nut a leak continues, follow the next steps:
c) Shutoff the line where the valve is installed, verifying that no pressure and no dangerous media remains in the pipe and inside the valve. Proceed to disassemble the valve following the next instructions:

Caution: *Ball Valves can retain pressurized media in the body cavity when closed. Take care when disassembling. Always open Valve to relieve pressure prior to disassembly.*

Caution : *Always depressurize, disconnect and disengaged automation components installed on the valve before you work on it.*

d) Remove the Valve from the installation; unscrew the plug end with the appropriate tool. Be careful to avoid any damage to the plug slots.
e) Remove the ball, preventing from scratching its surface. Place it over a soft material free of burrs.
f) Change the stem's seals, taking out the handle (loosing its retaining screw), the adjustment's nut, the Belleville washers, the stop plate and the follower.
g) Reassemble your Valve placing the stem's elements in an inverse way you took them out. Tighten lightly to the stem's adjusting nut (once you have installed the valve on line, you can give the final adjustment).
h) Finish the Valve assembly placing the ball (remember ball only can be assembled with the valve in the closed position.

Note: Be careful with the seats, do not mistreat or scratch them, otherwise you will need to replace them.

i) Place a new body seal and then screw back the plug to the body, tightening it down all the way. The height of the plug measured from the flange surface must be between .040" and .060" (between 1 and 1.5 mm).
j) Place again the Valve on line with its seal or packing, tighten gradually the screws in a crossing way so the flanges will rest parallels.
k) Place the actuating elements back on the top of the valve (if any).

Seals:

In case of leak between the body and plug, you may consider next recommendations:

a) Verify the good condition of the seal or gasket between flanges. Check if the torque of the screws that joint the valve with the pipe flanged is appropriate, if it is necessary tight the screws.
b) Check if the plug of the valve in all the way down in its position. Remember it must be raised between .040" and .060" (between 1 and 1.5 mm) from the flange surface. If it is necessary tight the plug.
c) If leak persist, disassemble the Valve according to the steps "c", *"d" and "e"* of the previous section.
d) Reassemble the Valve placing a new seal according to the steps *"i"*, *"j"* and *"k"* of the previous section.

Internal Leak:

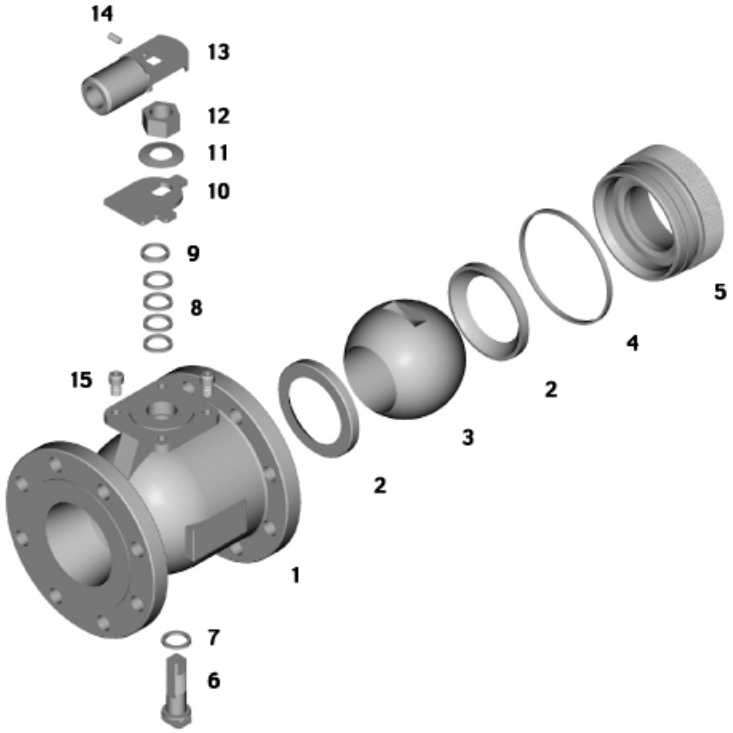
If the Valve presents internal leak (the fluid goes through it in closed position) it may be due to a wear on the seats or a scratch in the seats or ball. We suggest considering the next recommendations:

a) Some solid materials can clog between seat and ball. Operate the Valve several occasions to try to unblock these residues.
b) If your Valve has an actuator installed, check if it completes its own route and close perfectly, if not, maybe the Valve has and elevated torque or the actuator may be disaligned or defective. Verify that the voltage and/or air pressure of automation components is correct. If it is necessary, we recommend removing the actuator and manually operating the valve to check if this is the cause of the leak.
c) If the valve has an excessive torque, try loosing lightly the stem nut. If this is not enough or a stem leak appears, you must change the stem seals.

Note : If you just changed the seats and/or seal of the valve and you are unable to close it completely because of high torque, another reason may be due to an excessive pressure of the plug against the seat. Try unscrewing the plug a little. If the ball is then able to close all the way, the height of the seal or the seats may be wrong. Please consult with our factory.

Note : The seats made from harder material as Delrin, Peek, etc. are factory-adjusted during the valve assemble to get the softer torque without leaks. If you replace these kind of seats in the field and notice a dramatically higher torque of the valve, we recommend to reduce the height of the seats until get the desired torque. You can use sandpaper on a flat surface, moving the seats circularly over it avoiding a wavy or not flat back seat face.

d) If the leak persists, disassemble the Valve following the steps "c", *"d"* and *"e"* of the Stem's section.
e) Check carefully the seats and the ball, paying attention on the surfaces of mutual contact. Look for any clog material and any scratch or imperfection and in any case replace the damaged part.
f) Reassemble the Valve placing new seals according to the steps *"h"*, *"i"*, *"j"* and *"k"* of the Stem's section.



1. **Body**
2. **Seats**
3. **Ball**
4. **Seal**
5. **Plug**
6. **Stem**
7. **Thin Washer**
8. **Seal Packing**
9. **Follower**
10. **Stop Plate**
11. **Belleville Washer**
12. **Stem nut**
13. **Handle**
14. **Retaining screw**
15. **Stop Screw**

SAFETY :

WARNING !

Valves are actually pressure vessels, which can be dangerous if they are not properly calculated, selected, installed, maintenance and operated. To prevent risks, follow the next precautions :

1. **Always select the proper pressure rating of the Valve according with your application.**

Series	ANSI Class #	Maximum Operating Pressure psi (kg cm²)	
		Carbon Steel Body	Stainless Steel Body
150	150	285 (20Kg/cm2)	275 (19.3 Kg/cm2)

2. **Always choose the appropriate materials for your application, by checking them in corrosion charts or consulting with our factory. An aggressive media can wear the Valve's metal, make it thinner and less pressure resistant. Aggressive media, can destroy their seal capability as it can also attack soft elements (seats and seals).**

3. **Choose and protect the valve accordingly to the facility conditions. Remember that Carbon Steel Valves are subject to environment corrosion. Don't leave them in the open environment without proper protection. The Black Oxidized given in our factory is to protect them from corrosion during stock and handling exclusively.**

4. **Always use the appropriate equipment as gloves to handle and install valves, as some sharp ends can remain in the Valve. Valves can be heavy, use always appropriated equipment to handle it, including industrial shoes and back support. Extremely hot or cold media can be flown through the valve, placing you in risk if you touch it without protection. Also the valves can conduct extremely dangerous media, existing the risk of permanent injury to your person if any leakage in the piping system, including the valve. Always use the appropriate aids as gloves, safety glasses or mask to operate a valve.**

5. **Do not install or use the valve at the end of the line or in a safety loop.**

6. **Always review bolting torque and adjust as necessary after installation and before to operate the valve.**

7. **After operation, and even if the line has been shutdown, a dangerous pressure can remain into the Valve as Ball Valves can retain pressurized media in the body cavity when closed. Take care when disassembling. Always open the Valve to relieve pressure prior to disassembly. Depressurize, drain and vent the line before working with the valve.**

8. **Do not introduce your hands or other part of your body into the Valve, specially if the Valve has been automated, as the ball can spin suddenly and risk of bite or loose of part of your body can occur. Always depressurize, disconnect and disengaged automation components installed on the valve before you work on it.**

9. **Do not use non-OEM parts. No warranty will apply if you do.**

10. **Consult and follow all local rules applicable.**

Visit our web site : *www.worcester.com.mx*

Receiving Inspection.

All valves must be inspected when they arrive at the purchaser site, to verify that no damages have occurred during transportation or handing. Any damage found must be reported immediately.

Handling.

Store the valve in a safety place, free of rain, dust or any agent that can deteriorate it. All our valves are shipped with end protectors, you must keep them until the installation to avoid introduction of dust and other materials to the inside of the valve.
Note : If you plan to stock the valve for a long period of time, we recommend to leave it in the open position to avoid deformation on seats.

GENERAL INFORMATION.

Materials:

DESCRIPTION	***CARBON STEEL***	***STAINLESS STEEL***
BODY	A-216-WCB	A-351-CF8M
SEAT	PTFE	PTFE
BALL	A-351-CF8M	A-351-CF8M
SEAL	PTFE / GRAPHOIL (fire safe)	PTFE / GRAPHOIL (fire safe)
PLUG END	A-216-WCB	A-351-CF8M
THIN WASHER	R-PTFE	R-PTFE
STEM	AISI 1018 / AISI 12L14	AISI 316
PACKING	R-PTFE	R-PTFE
BELLEVILLE WASHER	AISI 1075	AISI 302
FOLLOWER	AISI 304	AISI 416
STOP PLATE	AISI 1018-1020	AISI 1018-1020
STEM NUT	ASTM A194 2HM	ASTM F594 TYPE A304
HANDLE	ASTM A-216 WCB	ASTM A-351 CF8M
RETENTION SCREW	AISI 1045	AISI 304
STOP SCREW	AISI 1045	AISI 304

Service Conditions:

CONDITION	***CARBON STEEL***	***STAINLESS STEEL***
ANSI CLASS #	300	300
OPERATION TEMPERATURE	-20 to 100°F (-29 to 38°C)	-20 to 100°F (-29 to 38°C)
MAX. ALLOWABLE WORKING PRESSURE	740psi (52 Kg/cm2)	720psi (50.6 Kg/cm2)

General Dimensions:

DESCRIPTION	***3"***	***4"***	***6"***	***8"***
LENGTH in (mm)	11.12 (282)	12.00 (305)	15.88 (403)	16.50 (419)
WIDTH in (mm)	8.25 (210)	10.00 (254)	12.50 (318)	15.00 (381)
HIGH in (mm)	9.95 (253)	11.42 (290)	15.25 (387)	17.83 (453)
WEIGHT lb (Kg)	52.9 (24)	88.2 (40)	174.2 (79)	264.6 (120)

INSTALLATION AND OPERATION:

Your Series 300 Flanged Ball Valve is ready for its installation. All you need is to choose correctly the Flange Seal or Gasket, according to the media, and place it between the Valve's Flange and the Pipe's flange. Then set up the screws (not included), in each side, tightening them crossed in a gradual way in order to settle them perfectly parallels.
Your valve is bi-directional and you can install it in any position.
It can be operated manually by rotating smoothly the handle 90 degrees. When the handle is parallel with valve line, the valve is opened. At 90 degrees it is in the closed position. Automation devices (optional) can also operate the valve.
To operate it manually only a short device is supplied to operate it through a pipe extension (no included). The reason is because these kind of valves need a long lever to operate them which if it is permanently fitted, may not be suitable for your facility space and/or may be dangerous as it can be accidentally moved. We recommend the lever must not remain installed in the Valve. Keep it near of your Valve, *not installed!*

Caution : *Remember that a Ball Valve is an OPEN/CLOSE device and it is not designed to control the flow. Never leave the valve in a different position from the OPEN or CLOSE position as it will eventually damage the seats, reducing its life.*

Caution *: Do not install your valve at the end of the line or in a safety loop.*

Caution *: After installation, some burrs can stay inside the pipe line. If they are not removed, they can produce scratches in the seats and ball, resulting in leaks. Always clean the pipeline after installation, to remove strange agents.*

The valve will operate with no leaks and low torque for a long life if it is operated under its design parameters. The torque for a new valve depends of its size and the material of the seats installed. Please consult our printed or multimedia catalogs or visit our website: ***www.worcester.com.mx*** at your convenience, to get this data.

After proper installing (or maintenance) and before operation, always follow the safety instructions at the end of this document.

MAINTENANCE :

After operation and depending of the usage's conditions, Valve may need maintenance. Remember that your Valve has one-year warranty, if it is still in that period, please contact with your distributor, do not try to fix it or you may lost the warranty. Use ONLY originals RHINO Spare Parts, it assures you Valve will work according with its specifications. You can request them through the wide net of distributors all around the World.

Stem:

Although the Stem's design includes a self-adjustable system, compensatory of the wear and the contractions and expansions produced by thermal changes, if the valve presents leak for this section you must consider the next recommendations:

a) If your Valve has an actuator installed, check if it is aligned with the stem through the couple. A disaligned actuator can produce laterals pressure on the stem, which will have repercussions on leaks.

b) Tight lightly the adjusting nut of the stem until the leak stops. Remember tightening too much this nut will increase the torque of the Valve and can damage stem seal, reducing its life. If after you tightened the nut a leak continues, follow the next steps:
c) Shutoff the line where the valve is installed, verifying that no pressure and no dangerous media remains in the pipe and inside the valve. Proceed to disassemble the valve following the next instructions:

Caution: *Ball Valves can retain pressurized media in the body cavity when closed. Take care when disassembling. Always open Valve to relieve pressure prior to disassembly.*

Caution : *Always depressurize, disconnect and disengaged automation components installed on the valve before you work on it.*

d) Remove the Valve from the installation; unscrew the plug end with the appropriate tool. Be careful to avoid any damage to the plug slots.
e) Remove the ball, preventing from scratching its surface. Place it over a soft material free of burrs.
f) Change the stem's seals, taking out the handle (loosing its retaining screw), the adjustment's nut, the Belleville washers, the stop plate and the follower.
g) Reassemble your Valve placing the stem's elements in an inverse way you took them out. Tighten lightly to the stem's adjusting nut (once you have installed the valve on line, you can give the final adjustment).
h) Finish the Valve assembly placing the ball (remember ball only can be assembled with the valve in the closed position.

Note: Be careful with the seats, do not mistreat or scratch them, otherwise you will need to replace them.

i) Place a new body seal and then screw back the plug to the body, tightening it down all the way. The height of the plug measured from the flange surface must be between .040" and .060" (between 1 and 1.5 mm)
j) Place again the Valve on line with its seal or packing, tighten gradually the screws in a crossing way so the flanges will rest parallels.
k) Place the actuating elements back on the top of the valve (if any).

Seals:

In case of leak between the body and plug, you may consider next recommendations:

a) Verify the good condition of the seal or gasket between flanges. Check if the torque of the screws that joint the valve with the pipe flanged is appropriate, if it is necessary tight the screws.
b) Check if the plug of the valve in all the way down in its position. Remember it must be raised between .040" and .060" (between 1 and 1.5 mm) from the flange surface. If it is necessary tight the plug.
c) If leak persist, disassemble the Valve according to the steps "c", *"d" and "e"* of the previous section.
d) Reassemble the Valve placing a new seal according to the steps *"i"*, *"j"* and *"k"* of the previous section.

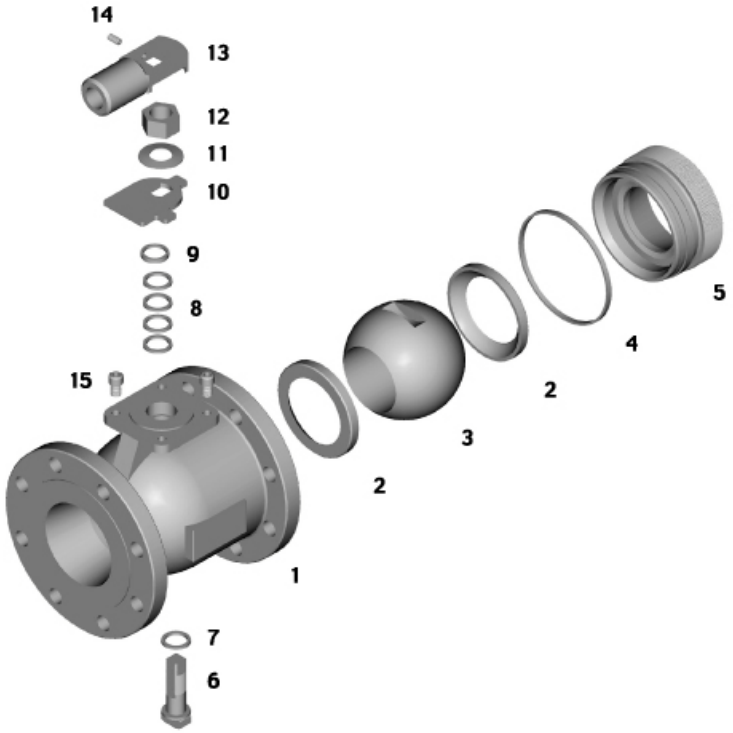
Internal Leak:
If the Valve presents internal leak (the fluid goes through it in closed position) it may be due to a wear on the seats or a scratch in the seats or ball. We suggest considering the next recommendations:

a) Some solid materials can clog between seat and ball. Operate the Valve several occasions to try to unblock these residues.
b) If your Valve has an actuator installed, check if it completes its own route and close perfectly, if not, maybe the Valve has and elevated torque or the actuator may be disaligned or defective. Verify that the voltage and/or air pressure of automation components is correct. If it is necessary, we recommend removing the actuator and manually operating the valve to check if this is the cause of the leak.
c) If the valve has an excessive torque, try loosing lightly the stem nut. If this is not enough or a stem leak appears, you must change the stem seals.

Note : If you just changed the seats and/or seal of the valve and you are unable to close it completely because of high torque, another reason may be due to an excessive pressure of the plug against the seat. Try unscrewing the plug a little. If the ball is then able to close all the way, the height of the seal or the seats may be wrong. Please consult with our factory.

Note : The seats made from harder material as Delrin, Peek, etc. are factory-adjusted during the valve assemble to get the softer torque without leaks. If you replace these kind of seats in the field and notice a dramatically higher torque of the valve, we recommend to reduce the height of the seats until get the desired torque. You can use sandpaper on a flat surface, moving the seats circularly over it avoiding a wavy or not flat back seat face.

d) If the leak persists, disassemble the Valve following the steps "c", *"d"* and *"e"* of the Stem's section.
e) Check carefully the seats and the ball, paying attention on the surfaces of mutual contact. Look for any clog material and any scratch or imperfection and in any case replace the damaged part.
f) Reassemble the Valve placing new seals according to the steps *"h"*, *"i"*, *"j"* and *"k"* of the Stem's section.



1. **Body**
2. **Seats**
3. **Ball**
4. **Seal**
5. **Plug**
6. **Stem**
7. **Thin Washer**
8. **Seal Packing**
9. **Follower**
10. **Stop Plate**
11. **Belleville Washer**
12. **Stem nut**
13. **Handle**
14. **Retaining screw**
15. **Stop Screw**

SAFETY :

WARNING !

Valves are actually pressure vessels, which can be dangerous if they are not properly calculated, selected, installed, maintenance and operated. To prevent risks, follow the next precautions :

1. **Always select the proper pressure rating of the Valve according with your application.**

Series	ANSI Class #	Maximum Operating Pressure psi (kg cm²)	
		Carbon Steel Body	Stainless Steel Body
300	300	740 (52Kg/cm2)	720 (50.6 Kg/cm2)

2. **Always choose the appropriate materials for your application, by checking them in corrosion charts or consulting with our factory. An aggressive media can wear the Valve's metal, make it thinner and less pressure resistant. Aggressive media, can destroy their seal capability as it can also attack soft elements (seats and seals).**

3. **Choose and protect the valve accordingly to the facility conditions. Remember that Carbon Steel Valves are subject to environment corrosion. Don't leave them in the open environment without proper protection. The Black Oxidized given in our factory is to protect them from corrosion during stock and handling exclusively.**

4. **Always use the appropriate equipment as gloves to handle and install valves, as some sharp ends can remain in the Valve. Valves can be heavy, use always appropriated equipment to handle it, including industrial shoes and back support. Extremely hot or cold media can be flown through the valve, placing you in risk if you touch it without protection. Also the valves can conduct extremely dangerous media, existing the risk of permanent injury to your person if any leakage in the piping system, including the valve. Always use the appropriate aids as gloves, safety glasses or mask to operate a valve.**

5. **Do not install or use the valve at the end of the line or in a safety loop.**

6. **Always review bolting torque and adjust as necessary after installation and before to operate the valve.**

7. **After operation, and even if the line has been shutdown, a dangerous pressure can remain into the Valve as Ball Valves can retain pressurized media in the body cavity when closed. Take care when disassembling. Always open the Valve to relieve pressure prior to disassembly. Depressurize, drain and vent the line before working with the valve.**

8. **Do not introduce your hands or other part of your body into the Valve, specially if the Valve has been automated, as the ball can spin suddenly and risk of bite or loose of part of your body can occur. Always depressurize, disconnect and disengaged automation components installed on the valve before you work on it.**

9. **Do not use non-OEM parts. No warranty will apply if you do.**

10. **Consult and follow all local rules applicable.**

Visit our web site : *www.worcester.com.mx*

RHINO VALVES WORLDWIDE

APPLICABLE INTERNATIONAL STANDARDS

APPLICABLE INTERNATIONAL STANDARDS				
Norm	**Description**	**Applicable in**	**Size**	**Content**
NACE MR-01-75	Valves that require special resistance to fractures and hydrosulfuric attack	All the models except Brass	1/4" - 8"	For sour environment, stainless ferrous and not ferrous metals
ANSI/FCI 70-2	for seat leaks of control valves. Class VI	All the models	1/4" - 8"	(pneumatic) trapped air test
MSS-SP-26	System of Marking Standard	All the models except series 42, 43, 1000	1/4" - 8"	Size-thread-temperature. Pressure-material-Nom. Casting Heat. No.
MSS-SP-55	Visual inspection Method acceptance of cast steel valves	All the models except Brass	1/2" - 8"	12 types of frequent surface irregularities identifiable by comparative visual inspection
API 6D	Specification for piping and valves	All the models	2" - 8"	Quality system according to American Petroleum Institute
API 607	"Fire Safe" testing	All the models except series 42, 43 and 1000	1/4" - 8"	Available certificate in some valves
API 598	Inspection and test of valves	All the models	1/4" - 2"	Hydrostatic and pneumatic inspection
ANSI B 16.5	Flanges for steel pipe lines	All the flanged models	1/2" - 8"	Dimension-material-range. Pressure temperature-facing. Different types of flanges
ANSI B 16.10	End to end dimensions of valves with flanges and/or to weld ends	All the flanged models and weld end models	1/2" - 8"	Face to face Dimensions
ANSI B 16.11	End Dimensions: S.W. (Socket Weld) S.E. (Threaded)	All the models except flanged	1/4" - 6"	Face to face Dimensions
ANSI B 16.34	Steel valves	All the models	1/4" - 14"	Wall Thickness designs. Material-specifications. Range-Pressure-Temperature. Hydrostatic Test
ANSI B 16.25	Buttweld ends	All the models except flanged	1/2" - 6"	Angle of machine beveling and O.D. And I.D.

Maiz 263 Col. Valle del Sur Iztapalapa Mexico, D.F.
C.P. 09819 Sales phone 01 (52) 5670-51-55 / 5670-7101
Web page www.worcester.com.mx
E-mail exportrhino@worcester.com.mx / vrubio@worcester.com.mx

RHINO VALVES WORLDWIDE

HOW TO ORDER

HOW TO ORDER TO RHINO VALVES

1 1/2"	D	4	4	6	T	T	SW
Valve Size	Type	Series	Material: Body, pipe ends	Material: Ball Steam	Material: Seat	Material: Body Seals	Ends
1/4" 3/8" 1/2" 3/4" 1" 1 1/4" 1 1/2" 2" 3" 4" 6" 8"	- Normal FS - Fire Safe D - Diverter T - 3 Ways C - Cryogenic PT - Full Port	4 - 400 (44) 6 - 600 H6 - H600 42 - Mite 43 - Mass 60 - 6000 45 150 151 152 300 302 10 - 1000 20 - 2000	1 - Brass 4 - Carbon Steel 6 - Stainless Steel 6L - Stainless Steel CF-3M	1 - Brass 4 - Carbon Steel 6 - Stainless Steel	B - Buna T - Ptfe R - Tfe Y - Lubetal (Delrin) MT - Multifil U - Uhmwpe D - Devlon Note : Use only one letter if body seal is to be same material as seat	B - Buna T - Ptfe R - Tfe Y - Lubetal (Delrin) MT - Multifil U - Uhmwpe D - Devlon G - Graphoil V - Viton	SE - Screw End SW - Socket Weld BW - Butt Weld 150# - Ansi 150 300# - Ansi 300

NOT ALL THE COMBINATIONS ARE AVAILABLE. SEE THE FOLLOWING TABLE AND CONSULT TO THE COMPANY OR AUTHORIZED DISTRIBUTOR FOR AVAILABILITY.
THERE ARE SOME OTHER MATERIALS, OPTIONS AND ENDS AVAILABLE

COMMON COMBINATION FOR SEALS AND SEATS MATERIALS

SERIES	SEATS	BODY SEALS	STEAM SEAL
ALL	BUNA	BUNA	RTFE
ALL	PTFE	PTFE	RTFE
ALL	RTFE	PFTE	RTFE
ALL	LUBETAL	VITON	RTFE
ALL	MULTIFIL	MULTIFIL	MULTIFIL
ALL	UHMWPE	VITON	RTFE
FS ONLY	PTFE	GRAPHOIL	GRAPHOIL
H600 ONLY	DELRIN	VITON	DELRIN/MULTIFIL
6000 ONLY	DELRIN/VITON	VITON	DELRIN/MULTIFIL

Maiz 263 Col. Valle del Sur Iztapalapa Mexico, D.F.
C.P. 09819 Sales phone 01 (52) 5670-51-55 / 5670-7101
Web page www.worcester.com.mx
E-mail exportrhino@worcester.com.mx / vrubio@worcester.com.mx