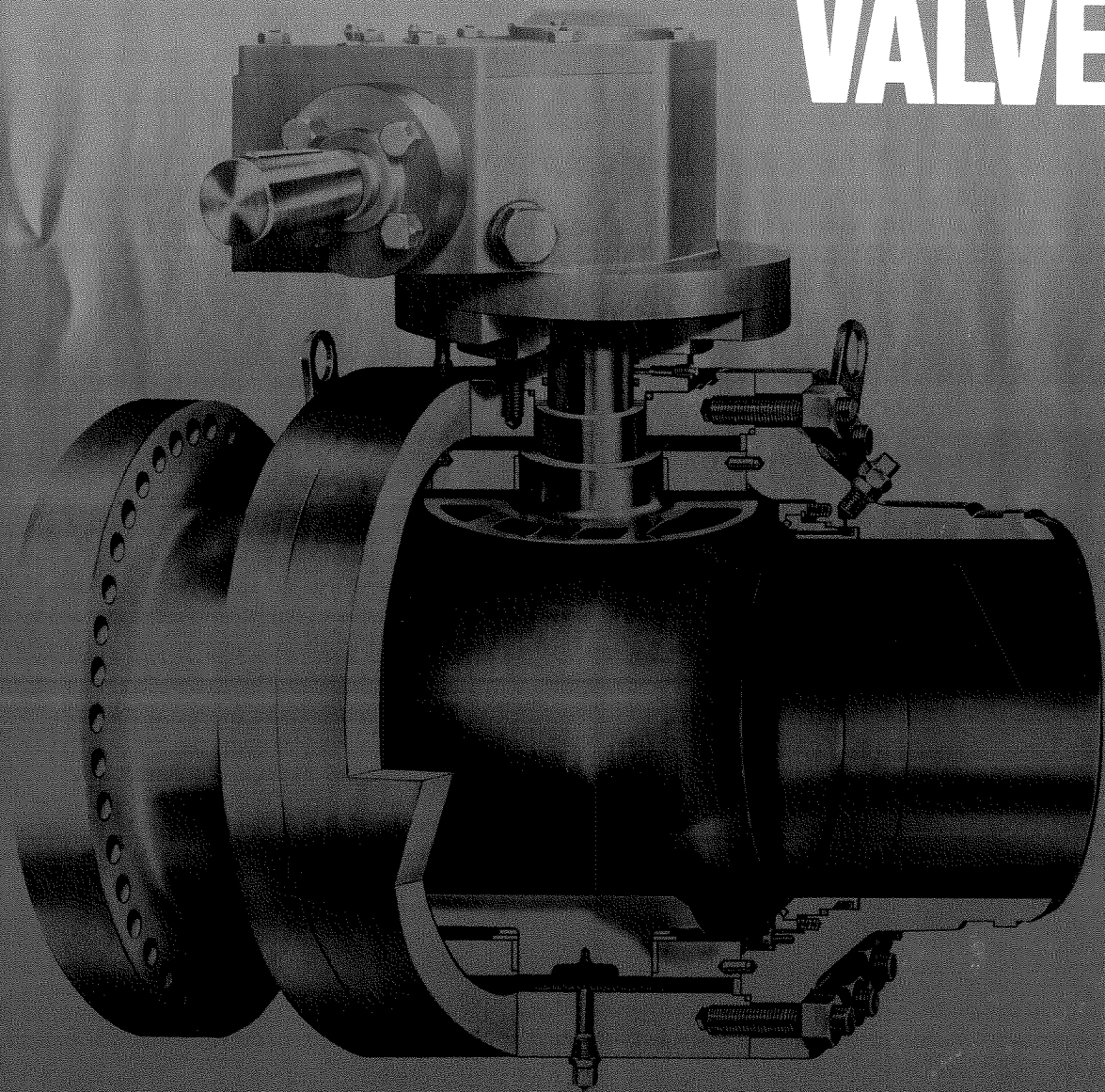


GROVE BALL VALVES



 **GROVE**

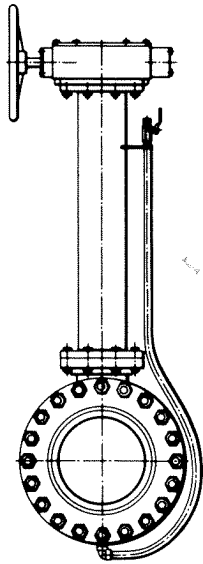
**ENERGY
VALVE DIVISION**

DRESSER

OTHER FEATURES

BALL VALVE REPAIR KITS

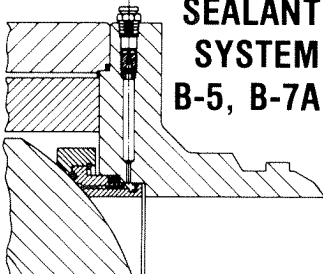
Available kits consist of those parts which most often are required for repair or routine periodic maintenance of Grove ball valves.



EXTENDED DRAIN AND BLOW DOWN VALVES

Grove ball valve body cavities can be vented to atmosphere and completely drained down with the ball in the closed position—and the valve under pressure—by the optional extended blow down valve. The blow down valve extension is attached to the valve's operating extension. (See Page 21-Extensions) Emergency Sealant System described below may be extended above ground also.

EMERGENCY SEALANT SYSTEM B-5, B-7A



In the presence of excessive line contaminants the possibility of leakage, due to erosion, is greater than when a valve is used for normal on-off service. All Grove valves are designed not to require sealants or lubricants; however if the metal-to-metal primary seal and the secondary "O" ring seal are damaged, an emergency shutoff may be obtained with a sealant, injected into a specially designed groove in the seat ring assembly. This feature is especially important in the critical applications where it may be impractical to remove a valve from the line for repair. Sealants or lubricants are **NOT** needed when the valve is installed or during routine maintenance or operation.

TRANSITION PIECES FOR GROVE B-5 BALL VALVES

If valve transition pieces are required, Grove is equipped to machine weld them during the valve manufacture. The customer normally furnishes the transition units compatible with the line pipe to which the valve is to be welded.

ALL GROVE BALL VALVES HAVE THESE DISTINCT FEATURES AND ADVANTAGES

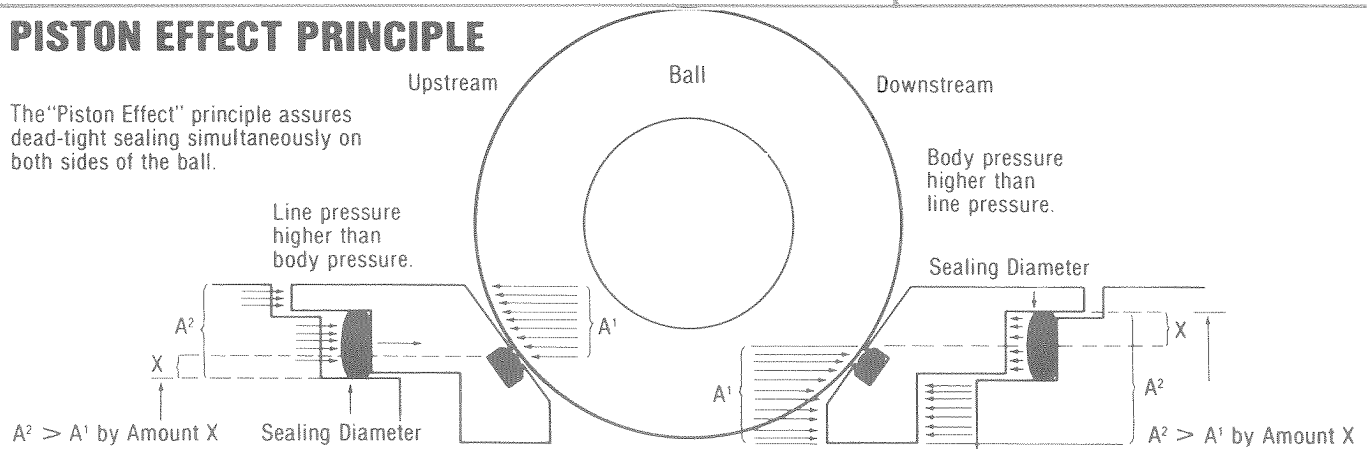
- All sizes can be manufactured as standard to meet or exceed the requirements of API-6D, NACE MR-01-75 and D.O.T. #49CFR192.
- Can be offered in "Fire Safe" design per API-6FA.
- All welded parts are subjected to radiographic or ultrasonic inspection of weld areas.
- Base metals and weld are hardness checked after final heat treatment.
- All valves are tested in accordance with API-6D and/or customers specifications.
- Can be offered with U-cup stem seals.
- Can be adapted to receive all types of electric, pneumatic and hydraulic power actuators.
- Can be disassembled, reassembled and repaired in the field.
- Can have a functional "inside-out" pressure test applied in the field.

STOCK DELIVERY

"Grove Ball valves 2" thru 12" Class 150 thru 900, all end connections are available from stock. Contact your local Grove valve representative or Grove direct for more details.

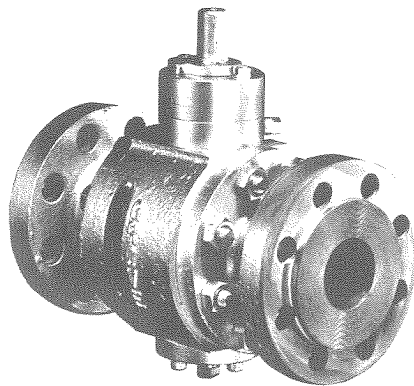
PISTON EFFECT PRINCIPLE

The "Piston Effect" principle assures dead-tight sealing simultaneously on both sides of the ball.





GROVE BALL VALVES FOR PIPELINE SERVICES



Grove B-4B & B-4C steel Ball valves - through conduit, in full opening and Venturi patterns - 2'' thru 6'' x 4' class 150 thru 1500.

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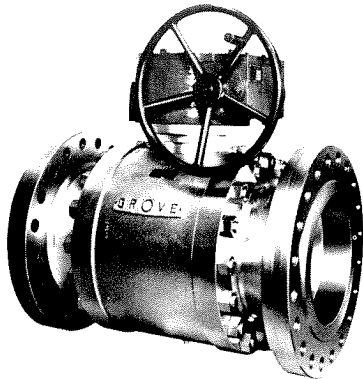
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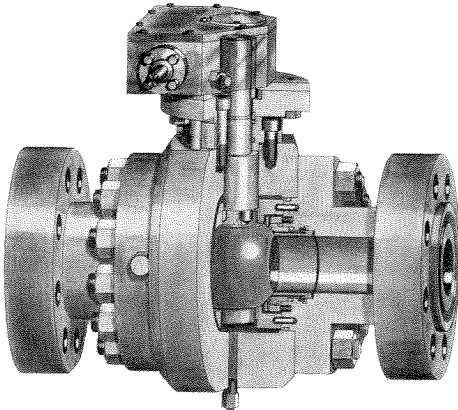
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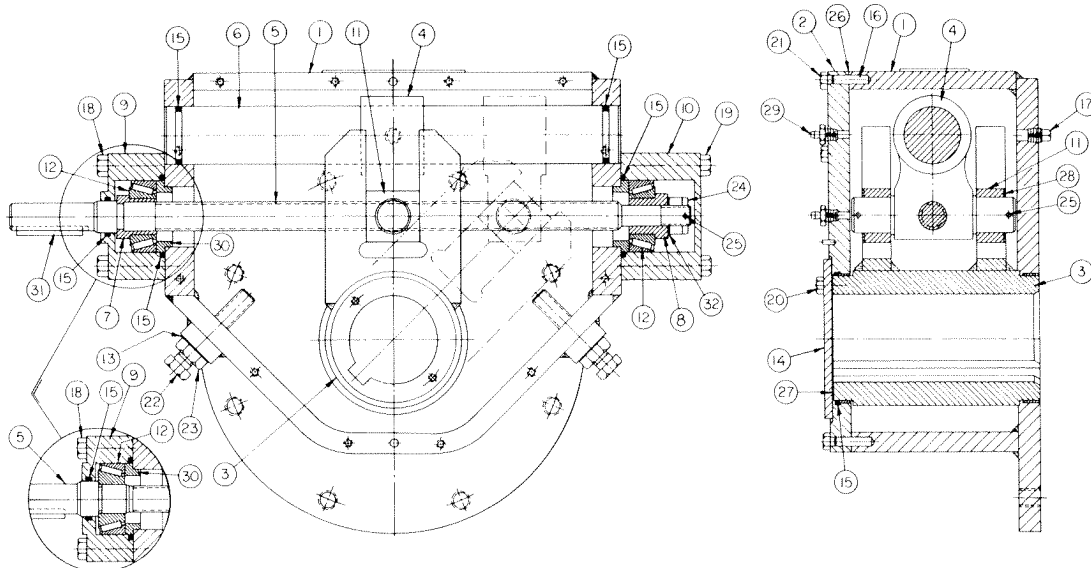
Grove B-5 Fabricated steel Ball valves — through conduit in full opening and Venturi patterns — 6'' thru 48'' class 150 thru 600 — 6'' thru 36'' class 900 — 6'' thru 16'' class 1500.



Grove B-7A Ball valves — through conduit, full opening. 2'' thru 12'' class 2500.

GROVE

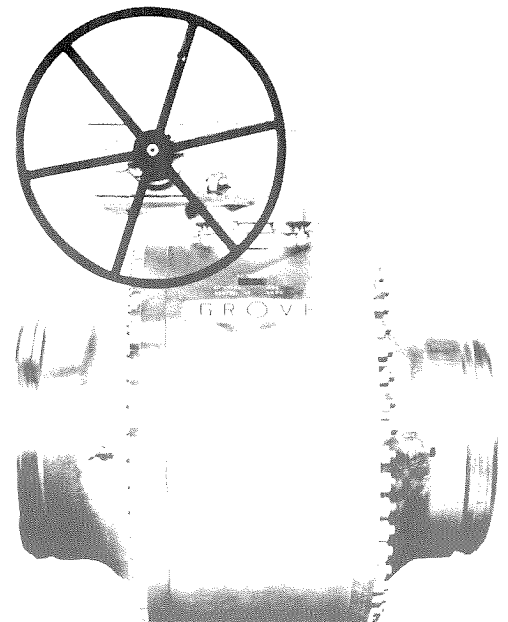
SY SCOTCH YOKE OPERATORS FOR SERIES B-5 & B-7A BALL VALVES



THE QUARTER-TURN SY OPERATOR, EMPLOYING THE SCOTCH YOKE PRINCIPLE, IS DESIGNED SPECIFICALLY FOR USE ON GROVE BALL VALVES. MANUFACTURED IN FIVE SIZES, IT IS AVAILABLE WITH SINGLE OR DUAL INPUT SHAFTS AND FOR STANDARD, BURIED OR SUBMERGED SERVICES. ALTHOUGH USUALLY HANDWHEEL OPERATED, THE SY IS AVAILABLE FOR ELECTRIC OR GAS OPERATORS. THE OPERATOR SHOWN ON THIS PAGE IS TYPICAL OF A SCOTCH YOKE OPERATOR THAT COULD BE SUPPLIED ON GROVE B-5 AND B-7A BALL VALVES. ALWAYS CHECK WITH GROVE FOR EXACT OPERATOR SUPPLIED.

STANDARD MATERIAL SPECIFICATIONS

No. Part Name	Material	No. Part Name	Material
1. Housing	Steel ASTM A-395	18. Capscrew (Bearing Cover)	Steel: ASTM A-449
2. Cover	Steel: ASTM A-36 or A-572	19. Capscrew (Bearing Cover)	Steel: ASTM A-449
3. Drive Sleeve	Steel: ASTM A-36 or AISI 1018 or nodular iron: ASTM A-395 Gr. 60-40-18	20. Capscrew (Indicator Cover)	Steel: ASTM A-449
4. Trunnion	Bronze: ASTM A-147 Gr. BA	21. Capscrew (Cover)	Steel: ASTM A-449
5. Stem	Steel: Stressproof or AISI-4140	22. Capscrew (Stop)	Steel: ASTM A-449
6. Guide Bar	Steel: AISI 1018	23. Jam nut	Steel
7. Bearing Bushing	Steel: AISI B-1113 or C-1213	24. Slotted Nut	Steel
8. Bearing Bushing	Steel: AISI B-1113 or C-1213	25. Cotter Pin	Steel
9. Bearing Cover	Steel: ASTM A-36 or A-572	26. Gasket (Cover)	Fiber
10. Bearing Cover	Steel: ASTM A-36 or A-572	27. Gasket (Ind. Cover)	Fiber
11. Torque Arm Shoe	Bearing Bronze: SAE 660	28. Washer	Steel
12. Bearing (Stem)	Steel	29. Grease Fitting	Steel
13. Seal Washer	Steel & Rubber	30. Bearing Spacer	Steel: AISI 1020
14. Indicator Cover	Steel: ASTM A-36	31. Key	Steel
15. O-Ring	Grove Composition	32. Spacer (SY-25 only)	Steel: AISI 1018 or 1020
16. Roll Pin	Steel		
17. Pipe Plug 1/4"	Steel		

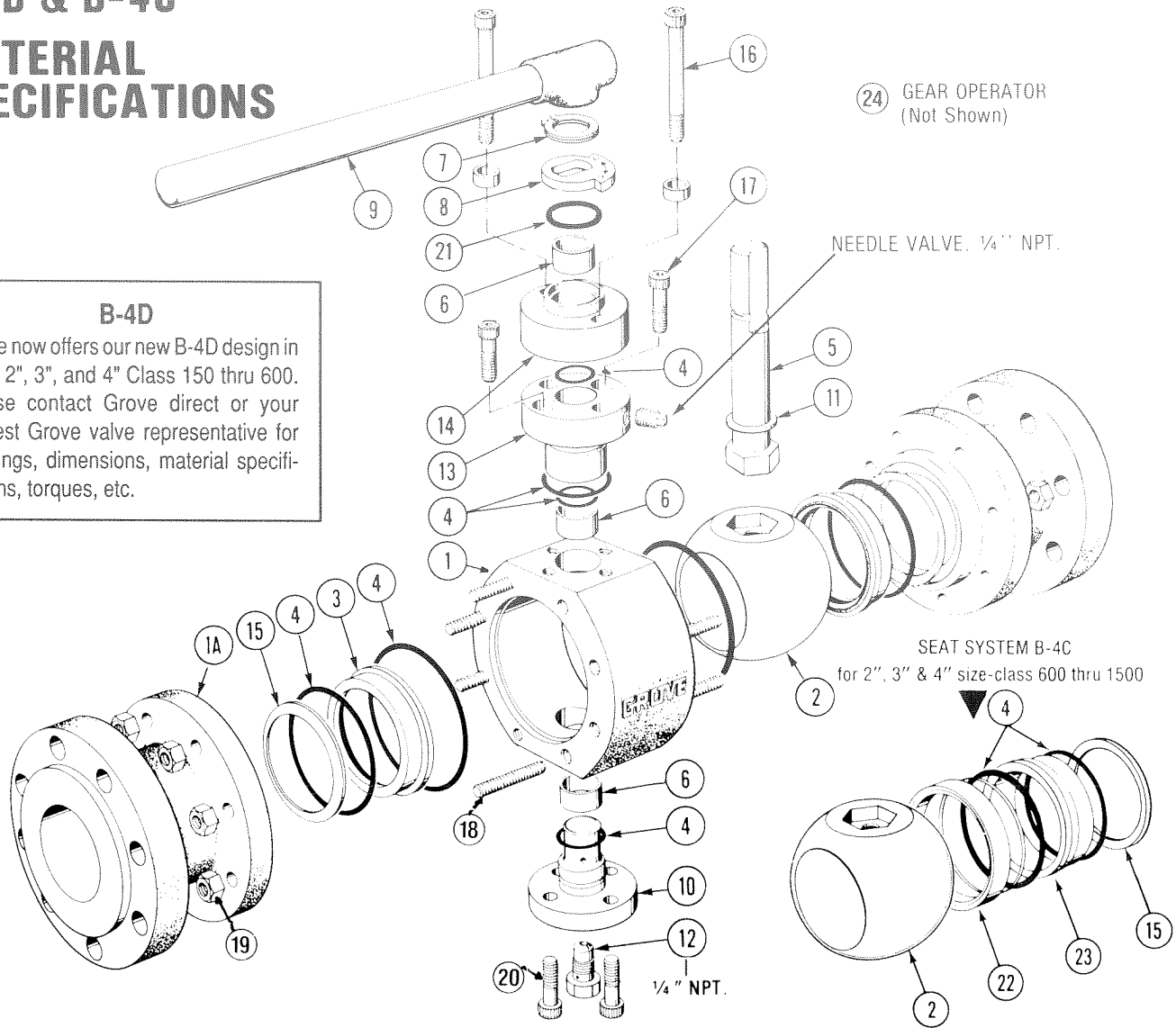


B-4B & B-4C

MATERIAL SPECIFICATIONS

B-4D

Grove now offers our new B-4D design in sizes 2", 3", and 4" Class 150 thru 600. Please contact Grove direct or your nearest Grove valve representative for drawings, dimensions, material specifications, torques, etc.



PART NAME	MATERIAL
1. Body	Steel-ASTM A-106 Gr. B
1A. Closure	Steel-ASTM A-216 Gr. WCB
2. Ball	Steel-AISI 1018 or 4140 Electroless Nickel Plated
3. Seat Unit	Steel-AISI 1015 Electroless Nickel Plated & Synthetic material
4. "O" Rings	Grovex®* Composition
5. Stem	Steel-AISI 1018 or 4140 Electroless Nickel Plated
6. Bearings	DU® Self lubricated TFE fluorocarbon resin bonded to low carbon steel backing
7. Stop Retaining Ring	Steel-AISI 1075 Cadmium plated
8. Stop Collar	Steel-AISI 1020
9. Wrench	Steel-ASTM A-216 Gr. WCB; Nodular Iron ASTM A-395; Pipe-ASTM A-106
10. Trunnion	Steel-AISI 4140 Electroless Nickel Plated

*GROVEX covers a variety of elastometric materials

NOTE: Always consult Grove direct for an exact description of materials currently being used or available, and for different trim and material requirements.

PART NAME	MATERIAL
11. Thrust Washer	Ryton® Coated Steel
12. Drain Valve	Steel-AISI 1018 and AISI 4140
13. Gland Plate	Steel-AISI 1018
14. Bearing Housing	Steel-AISI 1018
15. Spring Washer	Steel-AISI 4130 H.T. Electroless nickel plated
16. Capscrew (Bearing Housing)	Alloy Steel ASTM A-574
17. Capscrew (Gland Plate)	Alloy Steel ASTM A-574
18. Stud	Steel ASTM A-193 B7M
19. Nut	Steel ASTM A-194 2HM
20. Capscrew (Trunnion)	Alloy Steel ASTM A-574
21. Weather Seal	Grovex Composition
22. Outer Seat Ring	Steel-ASTM A-36, A-572, A-537, Electroless nickel plated
23. Inner Seat Ring	Steel-ASTM A-36, A-572, A-537, Electroless nickel plated
24. Worm Gear Operator	Steel

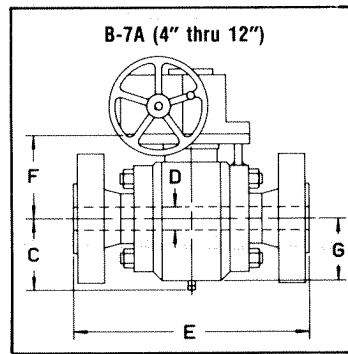
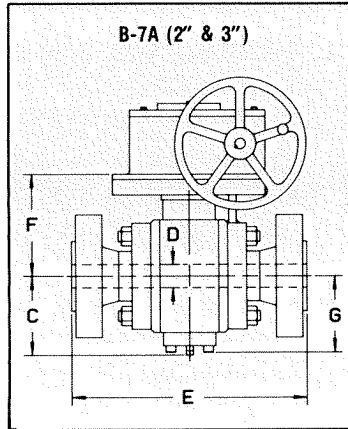
INCHES

CLASS 2500

MILLIMETERS

GEAR OPERATED

B-7A Valve Size	C	D	E			F	G	Weight	
			R.F.	W.E.	R.T.J.			F.E.	W.E.
2	6 1/8	1 3/4	17 3/4	17 3/4	17 7/8	7 3/4	5 3/4	279	230
3	7 3/8	2 1/2	22 3/4	22 3/4	23	9 5/8	7 1/8	509	391
4	9 7/8	3 1/2	26 1/2	26 1/2	26 7/8	10 3/4	8	927	742
6	12	5 1/4	36	36	36 1/2	13 3/8	10 1/8	2023	1498
8	14 7/8	7 1/8	40 1/4	40 1/4	40 7/8	17	13	3793	3038
10	16 7/8	8 7/8	50	50	50 7/8	19	15	5976	4776
12	19 1/2	10 1/2	56	56	56 7/8	21 3/4	17 5/8	9318	7338



GEAR OPERATED

B-7A Valve Size	C	D	E			F	G	Weight Kg.	
			R.F.	W.E.	R.T.J.			F.E.	W.E.
50	155.6	44.5	450.9	444.5	453.4	196.9	146.1	127	104
75	187.3	66.5	577.9	577.9	584.2	244.5	181	231	177
100	250.8	88.9	673.1	673.1	682.6	273.1	203	420	336
150	304.8	133.4	914.4	914.4	927.1	339.7	257.2	918	680
200	377.8	181	1022.4	1022.4	1038.2	431.8	330.2	1720	1378
250	428.6	225.4	1270	1270	1292.2	482.6	381	2711	2166
300	495.3	266.7	1422.4	1422.4	1444.6	522.5	447.7	4227	3328

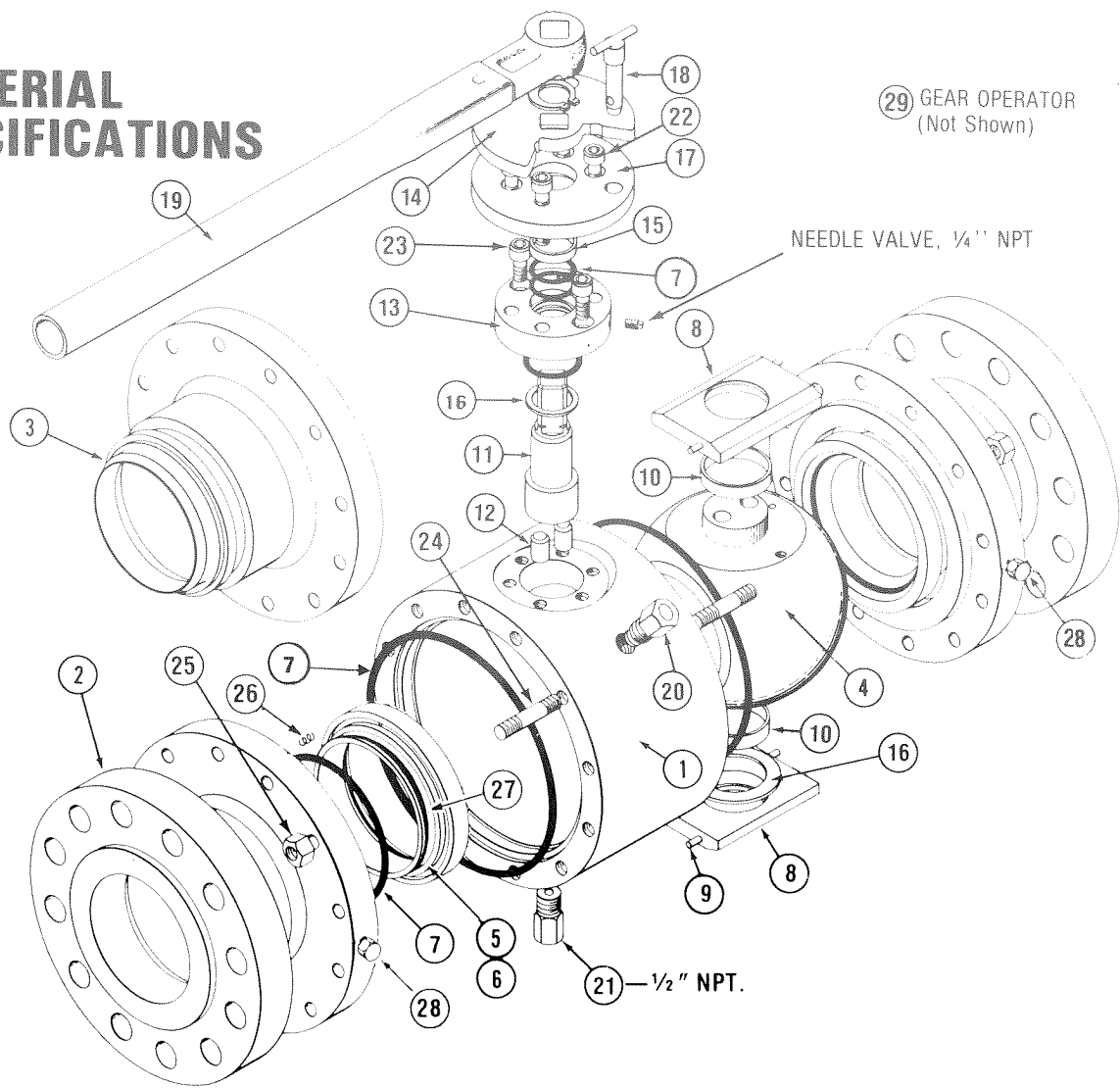
BALL STEM OPERATING TORQUES FOR GROVE SERIES B-4B & B-4C BALL VALVES

Valve Size & Type	Ball Stem Torque Expression Ft.-Lbs.	Class 150		Class 300		Class 600		Class 900		Class 1500	
		At P = 285 Torque Ft.-Lbs.	At P = 740 Torque Ft.-Lbs.	At P = 1480 Torque Ft.-Lbs.	At P = 2880 Torque Ft.-Lbs.	At P = 1480 Torque Ft.-Lbs.	At P = 2880 Torque Ft.-Lbs.	At P = 3705 Torque Ft.-Lbs.			
		Plastic Seat Insert		Rubber Seal-O-Ring						Plastic Seal-O-Ring	
2" B-4B	54 + 0.04*P	65	84								
3" B-4B	138 + 0.10*P	167	212								
4" B-4B	198 + 0.23*P	264	368								
2" B-4C	9 + 0.02*P			39	53						
3" B-4C	54 + 0.06*P			143	187						
4" B-4C	126 + 0.11*P			289	370						
2" B-4C	12 + 0.02*P									86	
3" B-4C	42 + 0.05*P									227	
4" B-4C	102 + 0.08*P									398	

Notes on use of this table:

- Due to normal wear, age soaking/or accumulation of particle matter in the valve, ball stem torque is expected to increase with time. For sizing power operators multiply the normal torque by a minimum safety factor of 1.25, or multiply by a customer specified safety factor, which ever is greater.
- For low operating temperature application, include a torque multiplier. (Contact Grove) The operating temperature refers to actual temperature of the internal valve components. Minimum ambient temperature refers to actual temperature of the internal valve components. Minimum ambient temperature should only be used for valves where the internal components are exposed to ambient temperature, i.e. where fluid or gas velocities are zero, or extremely low. For buried valves use fluid/gas temperatures as the valve operating temperature.
- See "Notes on use of these tables:" page 17, for additional information.

B-5 MATERIAL SPECIFICATIONS



(29) GEAR OPERATOR
(Not Shown)

PART NAME	MATERIAL
1. Body	Steel-A-105, A-350-LF2, A-106, A-216 Gr. WCC or WCB
2. Closure—Flanged End	Steel A-106, A-216 Gr. WCC or WCB, A-350-LF2
3. Closure—Weld End	Steel A-216 Gr. WCB or WXX, A-350-LF2
4. Ball	Nodular Iron-ASTM A-395 Gr. 60-40-18: or Steel ASTM A-148** Gr. 90-60 Electroless Nickel Plated
5. Inner Seat Ring	Steel-ASTM A-572, A-350-LF2 Electroless Nickel Plated
6. Outer Seat Ring	Steel-ASTM A-572, A-350-LF2 Electroless Nickel Plated
7. "O" Rings	* Grovex Composition
8. Bearing Retainers	Steel-ASTM A-36, A-572, A-537
9. Dowel Pins (Retainer)	Steel-AISI C1212, or 4140
10. Bearings	DU® Self lubricated TFE fluorocarbon resin bonded to low carbon steel backing
11. Stem	Steel-AISI, C-1018 Electroless Nickel Plated

PART NAME	MATERIAL
12. Drive Pins	Steel-AISI 4140, Heat Treated
13. Gland Plate	Steel-ASTM A-36, A-572
# 14. Stop collar, (Older Valves)	Steel-ASTM A-36, A-572
15. Gland Bushing	Steel-AISI C-1015, ASTM A-106 Pipe
16. Thrust Washers	Ryton Coated Steel
# 17. Stop-Adaptor Plate	Steel-ASTM A-36
18. Lock Pin	Steel-AISI C-1018
19. Wrench	Nodular Iron-ASTM A-395 Steel-ASTM A-106 Pipe
20. Relief Valve Assembly	Steel-AISI 1018
21. Drain Valve	Steel-AISI 1018 & AISI 4140
22. Capscrew (Stop Plate)	Alloy Steel ASTM A-574
23. Capscrew (Gland Plate)	Alloy Steel ASTM A-574
24. Stud	Steel ASTM A-193 B7M
25. Nut	Steel ASTM A-194 2HM
26. Seat Springs	Inconel X-750
27. U Cup Ring	Grovex Composition
28. Check Valve & Grease Fitting	Steel-AISI C-1018
29. Gear Operator	See Page 18 for Material Spec. on a typical Grove SY Operator

* GROVEX covers a variety of elastomeric materials
** For Class 1500 Valves

NOTE: Always consult Grove direct for an exact description of materials currently being used or available and for different trim and material requirements.

Newer valves have a one piece combination stop plate and adaptor plate.

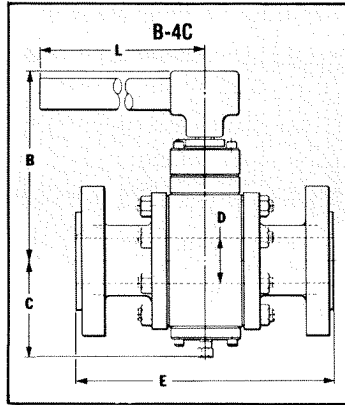
INCHES

CLASS 900

MILLIMETERS

WRENCH OPERATED

B-4C Valve Size	B	C	D	E			L	Weight	
				R.F.	W.E.	R.T.J.		F.E.	W.E.
2	8 1/4	4 3/4	2	14 1/2	14 1/2	14 3/4	24	112	72
3x2x3	8 1/4	4 3/4	2	15	15	15 1/2	24	125	110
3	10 3/4	5 3/4	3	15	15	15 1/2	36	195	150
4x3x4	10 3/4	5 3/4	3	18	18	18 1/2	36	206	155
4	12 1/2	6 1/2	4	18	18	18 1/2	48	355	255
6x4x6	12 1/2	6 1/2	4	24	24	24 1/2	48	495	395

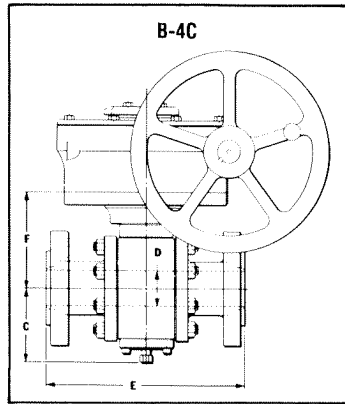


WRENCH OPERATED

B-4C Valve Size	B	C	D	E			L	Weight kg	
				R.F.	W.E.	R.T.J.		F.E.	W.E.
50	210	110	50	368.3	368.3	371.5	600	51	33
75x50x75	210	110	50	381.0	381.0	384.2	600	57	50
75	270	130	75	381.0	381.0	384.2	900	88	68
100x75x100	270	130	75	457.2	457.2	460.4	900	93	70
100	320	170	100	457.2	457.2	460.4	1200	161	116
150x100x150	320	170	100	609.6	609.6	612.8	1200	225	179

GEAR OPERATED

B-4C Valve Size	C	D	E			F	Weight	
			R.F.	W.E.	R.T.J.		F.E.	W.E.
2	4 3/4	2	14 1/2	14 1/2	14 3/4	5 1/2	143	103
3x2x3	4 3/4	2	15	15	15 1/2	5 1/2	155	140
3	5 3/4	3	15	15	15 1/2	7 1/4	215	170
4x3x4	5 3/4	3	18	18	18 1/2	7 1/4	225	180
4	6 1/2	4	18	18	18 1/2	9	375	275
6x4x6	6 1/2	4	24	24	24 1/2	9	510	410

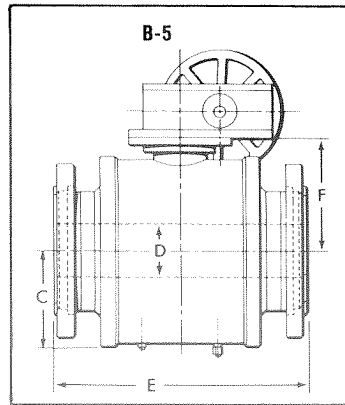


GEAR OPERATED

B-4C Valve Size	C	D	E			F	Weight kg	
			R.F.	W.E.	R.T.J.		F.E.	W.E.
50	110	50	368.3	368.3	371.5	140	65	47
75x50x75	110	50	381.0	381.0	384.2	140	70	64
75	130	75	381.0	381.0	384.2	180	97	77
100x75x100	130	75	457.2	457.2	460.4	180	102	82
100	170	100	457.2	457.2	460.4	230	170	125
150x100x150	170	100	609.6	609.6	612.8	230	231	186

B-5 Valve Size

6	6 3/4	6	24	24	24 1/2	9 3/4	850	650
8x6x8	6 3/4	6	29	29	29 1/2	9 3/4	1,050	750
8	8 1/4	8	29	29	29 1/2	10 7/8	1,225	950
10x8x10	8 1/4	8	33	33	33 1/2	10 7/8	1,525	1,250
10	10	10	33	33	33 1/2	12 3/4	1,800	1,400
12x10x12	10	10	38	38	38 1/2	12 3/4	2,100	1,700
12	11 1/4	12	38	38	38 1/2	14 3/4	2,700	2,200
16x12x16	11 1/4	12	44 1/2	44 1/2	44 3/4	14 3/4	4,200	3,750
14	12 1/2	12 1/2	40 1/2	40 1/2	40 3/4	15 3/4	3,540	2,780
16	14 1/4	14 1/4	44 1/2	44 1/2	44 3/4	17 1/4	4,420	3,500
20x16x20	14 1/4	14 1/4	52	52	52 1/2	17 1/4	5,660	4,075
18	16 1/4	16 1/4	48	48	48 1/2	19 3/4	6,170	4,870
20	17 1/4	18 1/4	52	52	52 1/2	21 1/4	7,610	6,020
24x20x24	17 1/4	18 1/4	61	61	61 3/4	21 1/4	9,900	6,940
22	19 1/4	20 1/4	56	56		23 1/2	9,700	7,500
24	20 1/4	22 1/4	61	61	61 3/4	24 1/4	12,100	9,140
30x24x30	20 1/4	22 1/4	74	74	74 3/4	24 1/4	14,500	10,520
26	23 1/4	24 1/4	65	65	65 3/4	27 1/4	15,750	12,850
30	26 1/4	28 1/4	74	74	74 3/4	31 1/4	21,000	16,500
36x30x36	26 1/4	28 1/4	90	90	91 1/4	31 1/4	23,600	17,700
36	32	33 1/4	90	90	91 1/4	36	29,900	24,500



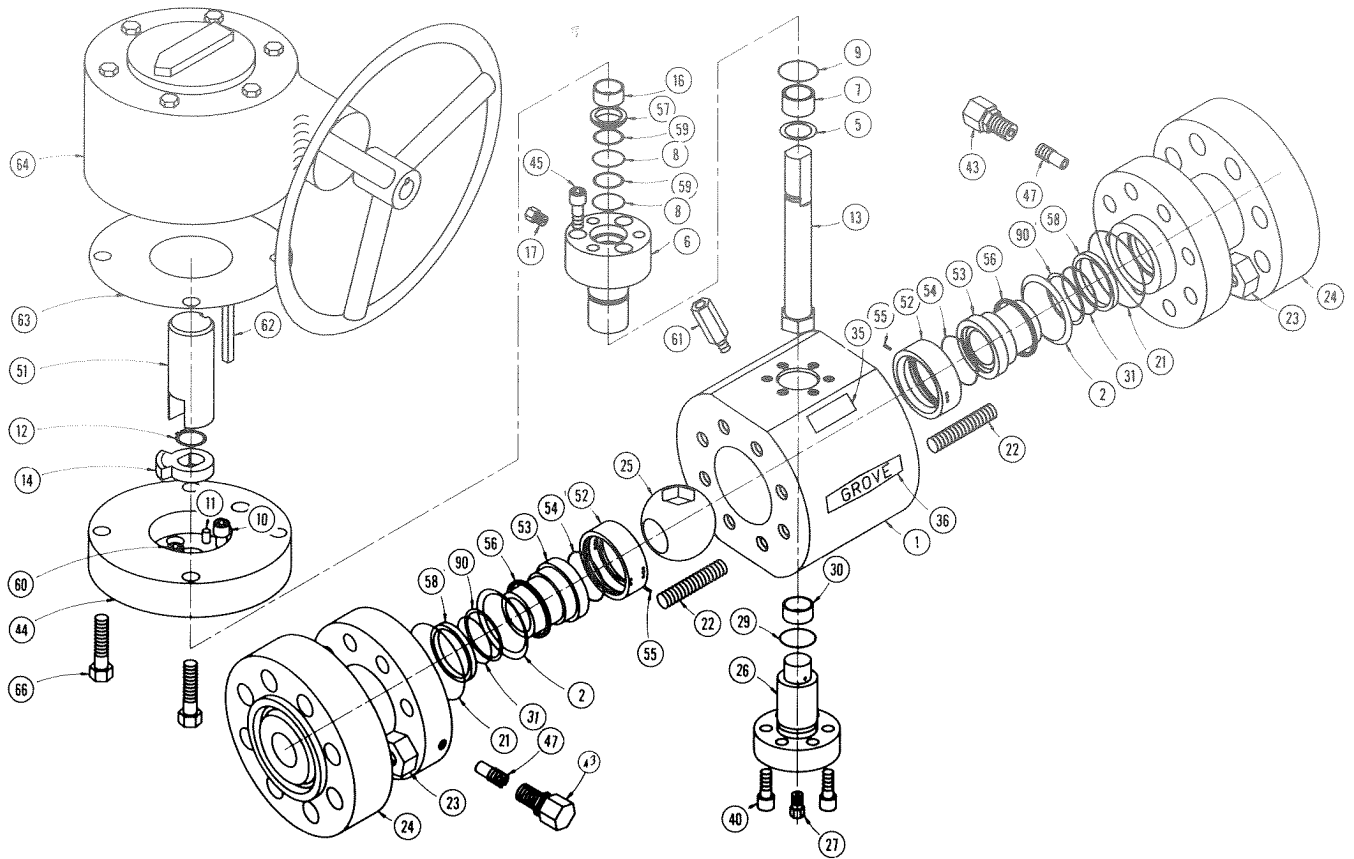
B-5 Valve Size

150	175	150	609.6	609.6	612.8	250	390	295
200x150x200	175	150	736.6	736.6	739.8	250	480	340
200	210	200	736.6	736.6	739.8	280	560	430
250x200x250	210	200	838.2	838.2	841.4	280	690	570
250	250	250	838.2	838.2	841.4	325	820	640
300x250x300	250	250	965.2	965.2	968.4	325	950	770
300	300	300	965.2	965.2	968.4	365	1230	1000
400x300x400	300	300	1130.3	1130.3	1139.8	365	1900	1680
350	320	325	1028.7	1028.7	1038.2	400	1600	1260
400	360	375	1130.3	1130.3	1139.8	440	2000	1590
500x400x500	360	375	1320.8	1320.8	1335.5	440	2570	1850
450	410	425	1219.2	1219.2	1231.9	500	2800	2210
500	450	475	1320.8	1320.8	1333.5	560	3450	2730
600x500x600	450	475	1549.4	1549.4	1568.5	560	4500	3150
550	490	525	1422.4	1422.4		600	4400	3400
600	530	570	1549.4	1549.4	1568.5	630	5490	4150
750x600x750	530	570	1879.6	1879.6	1901.8	630	6580	4780
650	590	620	1651.0	1651.0	1673.2	700	7150	5830
750	680	715	1879.6	1879.6	1901.8	810	9530	7490
900x750x900	680	725	2286.0	2286.0	2314.6	810	10710	8040
900	810	860	2286.0	2286.0	2314.6	915	12200	9730

B-7A

2" & 3"

MATERIAL SPECIFICATIONS



NO	PART NAME	MAJOR COMPONENT MATERIALS	NOTES
1	Body	ASTM A-216 WCC, A-105, A-350 LF2	
2	Spring Washer	Inconel X-750	
5	Thrust Bearing	Teflon & Steel	
6	Gland Plate	AISI 1018	
7	Bearing (Gland Plate)	Teflon & Steel	
8	O-Ring (Stem)	GROVEX	
9	O-Ring (Gland Plate)	GROVEX	
10	Capscrew (BRG Housing)	Alloy Steel	1
13	Stem	AISI 4140	1, 2
15	Bearing Housing	AISI 1018	
16	Bearing (BRG Housing)	Teflon & Steel	
17	Vented Plug (Assy)	AISI 1018 & 4140	1
21	O-Ring (Body)	Viton 615	
22	Stud	ASTM A-193 B7	
23	Nut	ASTM A-194 2H	
24	Closure	ASTM A-216 WCC, A-105	

NO	PART NAME	MAJOR COMPONENT MATERIALS	NOTES
25	Ball	AISI 4140	1, 2
26	Trunnion	AISI 4140	1, 2
27	Drain Valve (Body)	AISI 1018 & 4140	
29	O-Ring (Trunnion)	GROVEX	
30	Bearing (Ball)	Teflon & Steel	
31	O-Ring (Seat Gasket)	GROVEX	
40	Capscrew (Trunnion)	Alloy Steel	
44	Stop-Adaptor Plate	Steel-ASTM A-36	
45	Capscrew (Gland Plate)	Alloy Steel	
52	Seat Ring, Inner	AISI 1015	2
53	Seat Ring, Outer	AISI 1015	2
54	Seal O-Ring	Polyamide 707	
56	Lock Ring, Seat	T-304 C.Re.S.	
58	U-Cup Packing	GROVEX	
59	Back-Up Ring (Stem)	Polyamide 707	
61	Relief Valve	AISI 1018	
64	Gear Operator	See Page 18 for Material Spec. on a typical Grove SY Operator	
90	Back-Up Ring (Seat Gasket)	Polyamide 707	

NOTES: (1) RC-16-22
 (2) Electroless Nickel Coat .0008/.001
 (3) Hardness per NACE MR-0175-90
 (4) Always consult Grove for an exact description of materials currently being offered or available.

INCHES

CLASS 400

MILLIMETERS

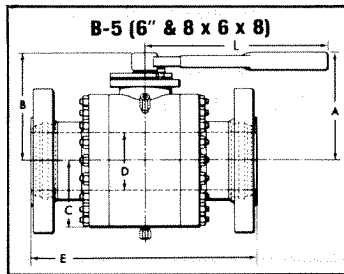
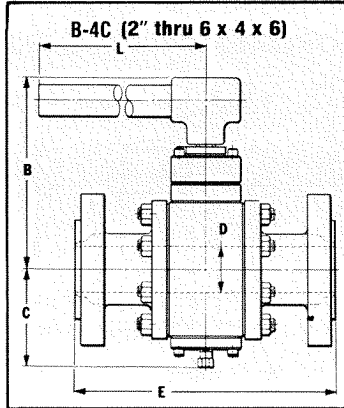
WRENCH OPERATED

B-4C Valve Size	A	B	C	D	E	E	E	L	Weight	
					R.F.	W.E.	R.T.J.		F.E.	W.E.
2										
3x2x3										
3										
4x3x4										
4										
6x4x6										

NO ANSI B16.5 STANDARDS CLASS 600 DIMENSIONS WILL APPLY

B-5 Valve Size	6	10%	10%*	6%	6	19½	19½	19%	36	385	320
8x6x8	10%	10%*	6%	6	23½	23½	23%	36	485	435	

* Centerline to top of stem.

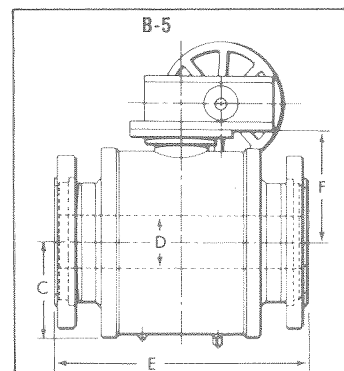
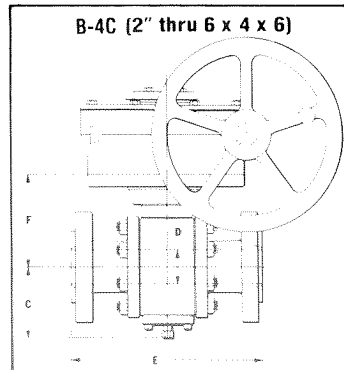


GEAR OPERATED

B-4C Valve Size	C	D	E	E	E	F	Weight	
			R.F.	W.E.	R.T.J.		F.E.	W.E.
2								
3x2x3								
3								
4x3x4								
4								
6x4x6								

NO ANSI B16.5 STANDARDS CLASS 600 DIMENSIONS WILL APPLY

B-5 Valve Size	6	6%	6	19½	19½	19%	8%	500	435
8x6x8	6% <td>6</td> <td>23½</td> <td>23½</td> <td>23%</td> <td>8% <td>600</td> <td>550</td> <td></td> </td>	6	23½	23½	23%	8% <td>600</td> <td>550</td> <td></td>	600	550	
8	8% <td>8</td> <td>23½</td> <td>23½</td> <td>23%</td> <td>10% <td>905</td> <td>805</td> <td></td> </td>	8	23½	23½	23%	10% <td>905</td> <td>805</td> <td></td>	905	805	
10x8x10	8% <td>8</td> <td>26½</td> <td>26½</td> <td>26%</td> <td>10% <td>1,100</td> <td>900</td> <td></td> </td>	8	26½	26½	26%	10% <td>1,100</td> <td>900</td> <td></td>	1,100	900	
10	10	10	26½	26½	26%	12½	1,400	1,200	
12x10x12	10	10	30	30	30%	12½	1,650	1,450	
12	11% <td>12</td> <td>30</td> <td>30</td> <td>30%</td> <td>14% <td>1,825</td> <td>1,625</td> <td></td> </td>	12	30	30	30%	14% <td>1,825</td> <td>1,625</td> <td></td>	1,825	1,625	
16x12x16	11% <td>12</td> <td>35½</td> <td>35½</td> <td>35%</td> <td>14% <td>2,400</td> <td>2,200</td> <td></td> </td>	12	35½	35½	35%	14% <td>2,400</td> <td>2,200</td> <td></td>	2,400	2,200	
14	12% <td>13½</td> <td>32½</td> <td>32½</td> <td>32%</td> <td>15½</td> <td>2,450</td> <td>2,250</td> <td></td>	13½	32½	32½	32%	15½	2,450	2,250	
16	13% <td>15¼</td> <td>35½</td> <td>35½</td> <td>35%</td> <td>17</td> <td>3,075</td> <td>2,675</td> <td></td>	15¼	35½	35½	35%	17	3,075	2,675	
20x16x20	13% <td>15¼</td> <td>41½</td> <td>41½</td> <td>41%</td> <td>17</td> <td>3,875</td> <td>3,475</td> <td></td>	15¼	41½	41½	41%	17	3,875	3,475	
18	15% <td>17¼</td> <td>38½</td> <td>38½</td> <td>38%</td> <td>19</td> <td>4,125</td> <td>3,600</td> <td></td>	17¼	38½	38½	38%	19	4,125	3,600	
20	17¼	19¼	41½	41½	41%	20% <td>5,225</td> <td>4,525</td> <td></td>	5,225	4,525	
24x20x24	17¼	19¼	48½	48½	48% <td>20% <td>6,125</td> <td>5,425</td> <td></td> </td>	20% <td>6,125</td> <td>5,425</td> <td></td>	6,125	5,425	
22	18¼	21¼	45	45	45% <td>22% <td>6,700</td> <td>6,025</td> <td></td> </td>	22% <td>6,700</td> <td>6,025</td> <td></td>	6,700	6,025	
24	20½	23¼	48½	48½	48% <td>23% <td>7,800</td> <td>6,950</td> <td></td> </td>	23% <td>7,800</td> <td>6,950</td> <td></td>	7,800	6,950	
30x24x30	20½	23¼	60	60	60% <td>23% <td>8,950</td> <td>8,100</td> <td></td> </td>	23% <td>8,950</td> <td>8,100</td> <td></td>	8,950	8,100	
26	21¼	25	51½	51½	52	25¼	10,200	8,675	
28	23% <td>27</td> <td>55</td> <td>55</td> <td>55½</td> <td>27½</td> <td>12,000</td> <td>10,950</td> <td></td>	27	55	55	55½	27½	12,000	10,950	
30	23¼	29	60	60	60½	29% <td>14,675</td> <td>13,225</td> <td></td>	14,675	13,225	
36x30x36	24¼	29	74	74	74% <td>29% <td>16,175</td> <td>14,875</td> <td></td> </td>	29% <td>16,175</td> <td>14,875</td> <td></td>	16,175	14,875	
32	26% <td>30¾</td> <td>65</td> <td>65</td> <td>65% <td>30% <td>16,200</td> <td>15,225</td> <td></td> </td></td>	30¾	65	65	65% <td>30% <td>16,200</td> <td>15,225</td> <td></td> </td>	30% <td>16,200</td> <td>15,225</td> <td></td>	16,200	15,225	
34	28	32¾	70	70	70% <td>32½</td> <td>17,750</td> <td>15,700</td> <td></td>	32½	17,750	15,700	
36	29½	34½	74	74	74% <td>33¼</td> <td>19,700</td> <td>17,600</td> <td></td>	33¼	19,700	17,600	
40	32¼	38½	82	82	39¼	25,500	22,500		
42	33½	40¼	86	86	40% <td>29,900</td> <td>26,400</td> <td></td>	29,900	26,400		
48	39% <td>46</td> <td>100</td> <td>100</td> <td>46</td> <td>44,800</td> <td>40,350</td> <td></td>	46	100	100	46	44,800	40,350		



WRENCH OPERATED

B-4C Valve Size	A	B	C	D	E	E	E	L	Weight
					R.F.	W.E.	R.T.J.		kg.
50									
75x50x75									
75									
100x75x100									
100									
150x100x150									

NO ANSI B16.5 STANDARDS CLASS 600 DIMENSIONS WILL APPLY

B-5 Valve Size	150	260	270*	160	150	495.3	495.3	498.5	900	175	145
200x150x200	260	270*	160	150	596.9	596.9	600.1	900	220	195	

* Centerline to top of stem.

GEAR OPERATED

B-4C Valve Size	C	D	E	E	E	F	Weight
			R.F.	W.E.	R.T.J.		kg.
50							
75x50x75							
75							
100x75x100							
100							
150x100x150							

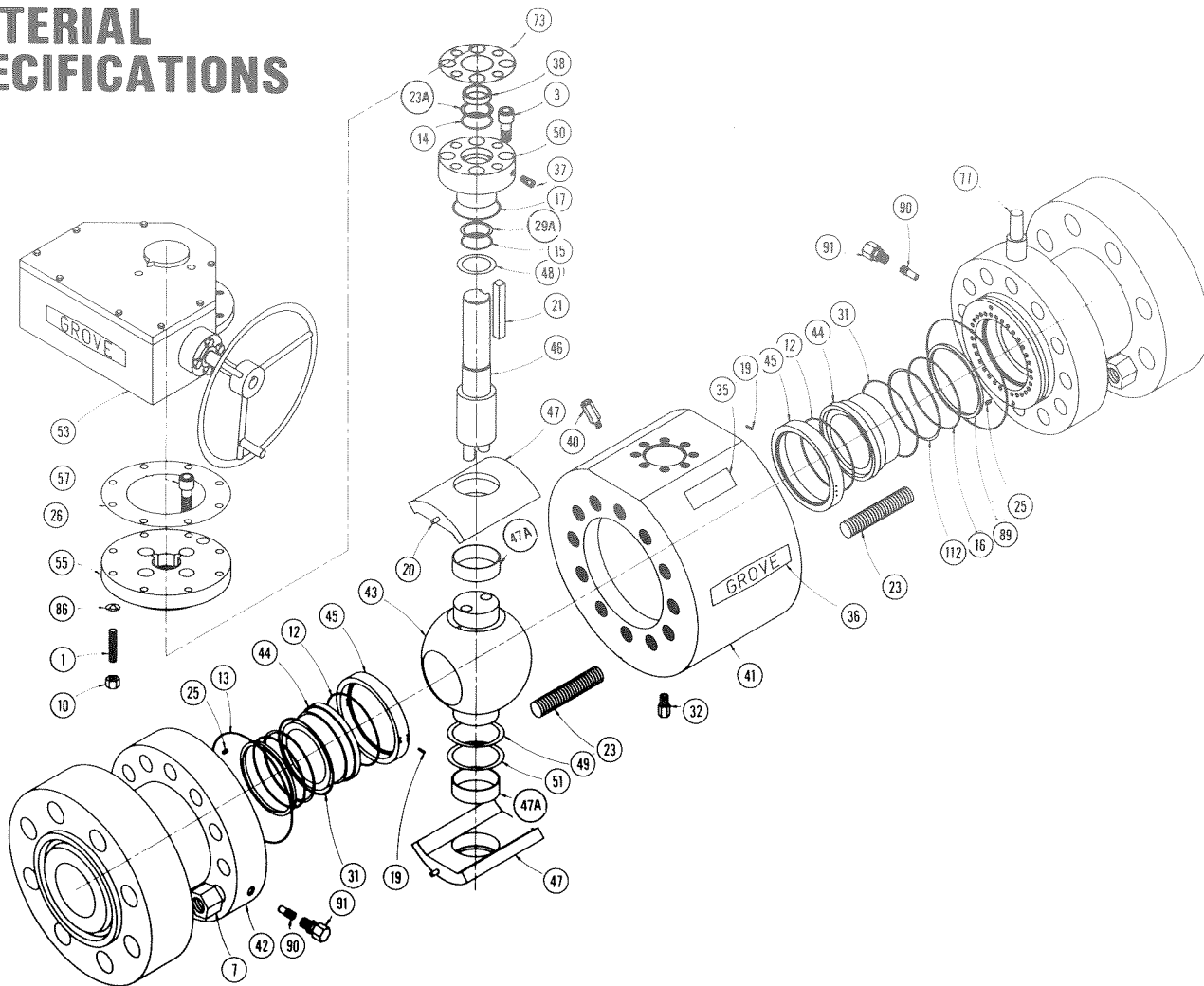
NO ANSI B16.5 STANDARDS CLASS 600 DIMENSIONS WILL APPLY

B-5 Valve Size	150	170	150	495.3	495.3	498.5	220	225	200
200x150x200	170	150	596.9	596.9	600.1	220	270	250	
200	210	200	596.9	596.9	600.1	280	410	365	
250x200x250	210	200	673.1	673.1	676.3	280	500	410	
250	250	250	673.1	673.1	676.3	325	635	545	
300x250x300	250	250	762.0	762.0	765.2	325	750	660	
300	300	300	762.0	762.0	765.2	365	830	740	
400x300x400	300	300	901.7	901.7	904.9	365	1090	1000	
350	310	335	825.5	825.5	828.7	395	1110	1020	
400	350	385	901.7	901.7	904.9	430	1400	1215	
500x400x500	350	385	1054.1	1054.1	1060.5	430	1760	1580	
450	405	440	977.9	977.9	981.1	480	1875	1635	
500	440	490	1054.1	1054.1	1060.5	525	2370	2055	
600x500x600	440	490	1231.9	1231.9	1241.4	525	2780	2465	
550	480	540	1143.0	1143.0	1152.5	560	3040	2735	
600	520	590	1231.9	1231.9	1241.4	600	3540	3160	
750x600x750	520	590	1524.0	1524.0	1536.7	600	4060	3680	
650	550	635	1308.1	1308.1	1320.8	650	4630	3940	
700	590	685	1397.0	1397.0	1409.7	700	5450	4970	
750	630	740	1524.0	1524.0	1536.7	740	6660	6000	
900x750x900	630	740	1879.6	1879.6	1895.5	740	7340	6750	
800	660	780	1651.0	1651.0	1666.9	770	7360	6920	
850	710	830	1778.0	1778.0	1793.9	820	8060	7130	
900	750	870	1879.6	1879.6	1895.5	860	8950	7990	
1000	820	980	2082.8	2082.8	—	1000	11600	10200	
1050	850	1020	2184.4	2184.4	—	1040	13600	12000	
1200	990	1170	2540.0	2540.0	—	1170	20400	18300	

B-7A

4"–12"

MATERIAL SPECIFICATIONS



NO	PART NAME	MAJOR COMPONENT MATERIALS	NOTES
3	Capscrew (Gland Plate)	Alloy Steel	
4	Capscrew (Stop Collar)	Alloy Steel	
7	Nut (Body)	ASTM A-194 2H	
12	Seal O-Ring	Polyamide 707	
13	O-Ring (Body)	GROVEX	
14	O-Ring (Upper Stem Seal)	GROVEX	
15	O-Ring (Lower Stem Seal)	GROVEX	
16	O-Ring (Seat Gasket)	GROVEX	
17	O-Ring (Gland Plate)	GROVEX	
20	Pin (BRG Retainer)	AISI 4140	1
23	Stud (Body) G Housing)	ASTM A-193 B7	
25	Spring (Seat)	Inconel X750	2, 3
29	Backup Ring (Stem)	Polyamide 707	
31	Lock Ring, Seat	T-304 C.Re.S.	
32	Drain Valve, Body	AISI 1018 & 4140	3
37	Vent Plug (Gland Plate)	AISI 1018 & 4140	1

NOTES: (1) RC-16-22
 (2) Electroless Nickel Coat .0008/.001
 (3) Hardness per NACE MR-0175-90
 (4) Dry Film Lubricant
 (5) Always consult Grove for an exact description of materials currently being offered or available.

NO	PART NAME	MAJOR COMPONENT MATERIALS	NOTES
38	Gland Bushing	Mild Steel	
40	Relief Valve	AISI 1018	
41	Body	ASTM A-216 WCC, A-105	
42	Closure	ASTM A-216 WCC, A-105	
43	Ball	AISI 4140 or ASTM A-158 Gr. 90-60	2, 4
44	Seat Ring, Inner	ASTM A-572 GR 50	2
45	Seat Ring, Outer	ASTM A-572 GR 50	2
46	Stem	AISI 4140	
46	Drive Pin	AISI 4140	1
47	Bearing Retainer	ASTM A-216 WCC	
47	Bearing	Teflon & Steel	
48	Thrust Washer, Upper	Steel & Ryton P.P.S.	
49	Thrust Washer, Lower	Steel & Ryton P.P.S.	
50	Gland Plate	ASTM A-537 GR 50	
53	Gear Operator	See Page 18 for Material Spec. on a typical Grove SY Operator	
55	Stop-Adaptor Plate	ASTM 1-36	
89	U-Cup Packing	Viton 615	
112	Backup Ring (Seat Gasket)	Polyamide 707	

INCHES

CLASS 150

MILLIMETERS

WRENCH OPERATED

B-4B Valve Size	B	C	D	E		L	Weight	
				R.F.	W.E.		F.E.	W.E.
2	8¼	4¾	2	7	8½	24	61	57
3x2x3	8¼	4¾	2	8	11½	24	69	63
3	10⅞	5¾	3	8	11½	36	130	125
4x3x4	10⅞	5¾	3	9	12	36	140	130
4	12½	6½	4	9	12	48	210	200
6x4x6	12½	6½	4	10½	15½	48	220	230

Note: Except for 3" x 2" x 3", all B-4B sizes in Class 150 have flanges with tapped bolt holes.

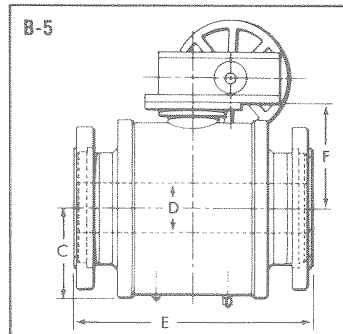
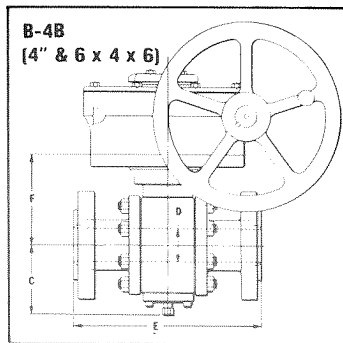
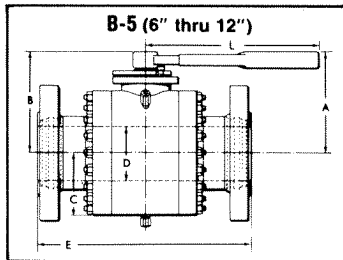
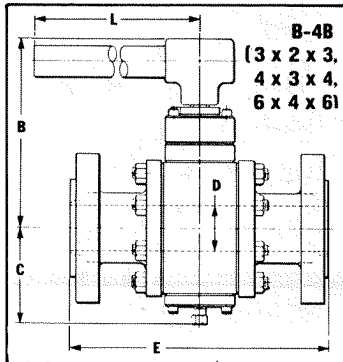
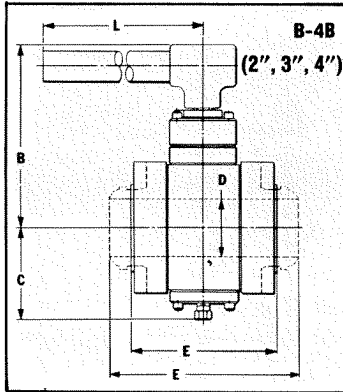
B-5 Valve Size	A	B*	C	D	E		L	Weight	
					R.F.	W.E.		F.E.	W.E.
6	10¾	12¾	6¾	6	15½	18	36	330	305
8x6x8	10¾	12¾	6¾	6	18	20½	36	385	360
8	13	15	8	8	18	20½	48	610	555
10x8x10	13	15	8	8	21	22	48	700	640
10	14¾	16¾	9¾	10	21	22	48	975	915
12x10x12	14¾	16¾	9¾	10	24	25	48	1045	985
12	16¾	18½	11¾	12	24	25	48	1,435	1,335

*Centerline to top of stem.

GEAR OPERATED

B-4B Valve Size	C	D	E		F	Weight	
			R.F.	W.E.		F.E.	W.E.
4	6½	4	9	12	9	230	220
6x4x6	6½	4	10½	15½	9	240	250

B-5 Valve Size	C	D	E		F	Weight	
			R.F.	W.E.		F.E.	W.E.
6	6¾	6	15½	18	8¾	445	425
8x6x8	6¾	6	18	20½	8¾	500	475
8	8	8	18	20½	10¾	775	725
10x8x10	8	8	21	22	10¾	825	775
10	9¾	10	21	22	12¾	1,100	1,050
12x10x12	9¾	10	24	25	12¾	1,175	1,100
12	11¾	12	24	25	14¾	1,550	1,450
16x12x16	11¾	12	30	33	14¾	1,700	1,600
14	12¾	13¼	27	30	15½	1,900	1,800
16	13¾	15¼	30	33	17	2,250	2,150
20x16x20	13¾	15¼	36	39	17	2,475	2,325
18	15¾	17¼	34	36	19	3,175	3,000
20	16¾	19¼	36	39	20¾	4,225	4,050
24x20x24	16¾	19¼	42	45	20¾	4,525	4,350
22	18½	21¼	39	43	22½	5,175	5,025
24	20¼	23¼	42	45	23¾	6,175	6,000
30x24x30	20¼	23¼	51	55	23¾	6,425	6,250
26	21½	25	45	49	25¼	7,750	7,575
28	23¾	27	49	53	27½	8,900	8,675
30	24¾	29	51	55	29¼	10,600	10,400
36x30x36	24¾	29	60	68	29¼	11,000	10,800
32	26¾	30¾	54	60	29¾	12,075	11,825
34	27¾	32¾	58	64	32¾	14,750	14,475
36	28¾	34½	60	68	33¾	16,750	16,650
40	32¼	38½	70	78	37¾	22,600	21,500
42	33¾	40¼	73	82	38½	26,650	25,330
48	38¾	46	84	94	45¾	40,400	39,450



WRENCH OPERATED

B-4B Valve Size	B	C	D	E		L	Weight kg.	
				R.F.	W.E.		F.E.	W.E.
50	210	110	50	177.8	215.9	600	28	26
75x50x75	210	110	50	203.2	282.6	600	31	28
75	270	130	75	203.2	282.6	900	59	57
100x75x100	270	130	75	228.6	304.8	900	64	59
100	320	170	100	228.6	304.8	1200	95	91
150x100x150	320	170	100	266.7	403.2	1200	100	104

Note: Except for 75mm x 50mm x 75mm, all B-4B sizes in Class 150 have flanges with tapped bolt holes.

B-5 Valve Size	A	B*	C	D	E		L	Weight kg.	
					R.F.	W.E.		F.E.	W.E.
150	260	270	160	150	393.7	457.2	900	150	140
200x150x200	260	270	160	150	457.2	520.7	900	175	165
200	330	380	205	200	457.2	520.7	1200	275	250
250x200x250	330	380	205	200	533.4	558.8	1200	320	290
250	380	430	250	255	533.4	558.8	1200	445	415
300x250x300	380	430	250	255	609.6	635.0	1200	475	445
300	420	470	290	305	609.6	635.0	1200	650	605

*Centerline to top of stem.

GEAR OPERATED

B-4B Valve Size	C	D	E		F	Weight kg.	
			R.F.	W.E.		F.E.	W.E.
100	170	100	228.6	304.8	230	104	100
150x100x150	170	100	266.7	403.2	230	109	113

B-5 Valve Size	C	D	E		F	Weight kg.	
			R.F.	W.E.		F.E.	W.E.
150	160	150	393.7	457.2	220	200	195
200x150x200	160	150	457.2	520.7	220	225	215
200	200	200	457.2	520.7	275	350	330
250x200x250	200	200	533.4	558.8	275	375	350
250	250	250	533.4	558.8	325	500	475
300x250x300	250	250	609.6	635.0	325	535	500
300	290	300	609.6	635.0	365	705	660
400x300x400	290	300	762.0	838.2	365	770	725
350	310	335	685.8	762.0	395	865	815
400	350	385	762.0	838.2	430	1020	975
500x400x500	350	385	914.4	990.6	430	1125	1055
450	395	440	863.6	914.4	480	1440	1360
500	430	490	914.4	990.6	525	1920	1840
600x500x600	430	490	1066.8	1143.0	525	2050	1975
550	470	540	990.6	1092.2	560	2350	2280
600	515	590	1066.8	1143.0	600	2800	2730
750x600x750	515	590	1295.4	1397.0	600	2920	2840
650	550	635	1143.0	1244.6	655	3520	3440
700	585	685	1244.6	1346.2	700	4040	3940
750	625	735	1295.4	1397.0	740	4800	4720
900x750x900	625	735	1524.0	1727.2	740	5000	4900
800	665	780	1371.6	1524.0	745	5490	5380
850	700	830	1473.2	1625.6	820	6700	6570
900	730	875	1524.0	1727.2	860	7600	7560
1000	820	980	1778.0	1981.2	950	10250	9750
1050	850	1020	1854.2	2082.8	980	12100	11500
1200	990	1170	2133.6	2387.6	1150	18340	17900

INCHES

WRENCH OPERATED

B-4B Valve Size	B	C	D	E		L	Weight	
				R.F.	W.E.		F.E.	W.E.
2	8 1/4	4 3/8	2	8 1/2	8 1/2	24	68	57
3x2x3	8 1/4	4 3/8	2	11 1/8	11 1/8	24	83	63
3	10 7/8	5 3/8	3	11 1/8	11 1/8	36	150	125
4x3x4	10 7/8	5 3/8	3	12	12	36	160	130
4	12 1/2	6 1/2	4	12	12	48	240	200
6x4x6	12 1/2	6 1/2	4	15 1/8	15 1/8	48	310	230

Note: 2" and 3" flanged B-4B valves in Class 300 have flanges with tapped bolt holes.

B-5 Valve Size	A	B*	C	D		E	L	Weight	
				R.F.	W.E.			F.E.	W.E.
6	10 3/8	10 3/8	6 3/8	6	15 1/8	18	36	360	305
8x6x8	10 3/8	10 3/8	6 3/8	6	19 3/8	20 1/2	36	425	360
8	13	15	8	8	19 3/8	20 1/2	48	710	555
10x8x10	13	15	8	8	22 3/8	22	48	785	640

*Centerline to top of stem

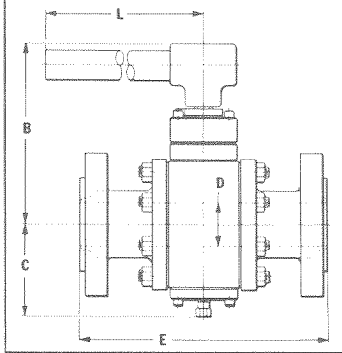
GEAR OPERATED

B-4B Valve Size	C	D	E		F	Weight	
			R.F.	W.E.		F.E.	W.E.
3	5 3/8	3	11 1/8	11 1/8	7 1/4	170	145
4x3x4	5 3/8	3	12	12	7 1/4	180	150
4	6 1/2	4	12	12	9	260	220
6x4x6	6 1/2	4	15 1/8	15 1/8	9	330	250

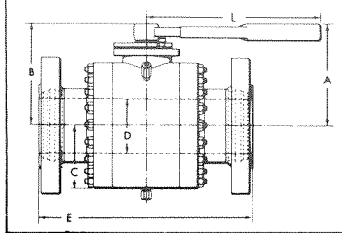
B-5 Valve Size	C	D	E		F	Weight	
			R.F.	W.E.		F.E.	W.E.
6	6 3/8	6	15 1/8	18	8 3/4	485	425
8x6x8	6 3/8	6	19 3/8	20 1/2	8 3/4	550	475
8	8	8	19 3/8	20 1/2	10 7/8	825	725
10x8x10	8	8	22 3/8	22	10 7/8	900	800
10	9 3/4	10	22 3/8	22	12 3/4	1,175	1,025
12x10x12	9 3/4	10	25 1/2	25	12 3/4	1,275	1,125
12	11 1/8	12	25 1/2	25	14 3/8	1,675	1,450
16x12x16	11 1/8	12	33	33	14 3/8	1,850	1,625
14	12 1/2	13 3/4	30	30	15 1/2	1,975	1,800
16	13 3/8	15 1/4	33	33	17	2,850	2,350
20x16x20	13 3/8	15 1/4	39	39	17	3,225	2,775
18	15 1/2	17 1/4	36	36	19	3,750	3,300
20	16 3/8	19 1/4	39	39	20 3/8	4,575	4,050
24x20x24	16 3/8	19 1/4	45	45	20 3/8	4,875	4,350
22	18 1/2	21 1/4	43	43	22 1/8	5,745	5,025
24	20 1/4	23 1/4	45	45	23 3/8	6,775	6,000
30x24x30	20 1/4	23 1/4	55	55	23 3/8	7,025	6,250
26	21 1/2	25	49	49	25 3/4	8,525	7,575
28	23 3/8	27	53	53	27 1/2	10,050	8,700
30	24 3/4	29	55	55	29 1/8	12,275	10,925
36x30x36	24 3/4	29	68	68	29 1/8	13,400	12,075
32	26 3/8	30 3/4	60	60	30 1/2	13,725	12,350
34	27 1/2	32 3/4	64	64	32 3/8	16,200	14,475
36	28 3/4	34 1/2	68	68	33 1/8	18,525	16,650
40	32 1/4	38 1/2	78	78	37 1/8	24,200	21,500
42	33 1/2	40 1/4	82	82	38 1/2	28,500	25,330
48	38 3/8	46	94	94	45 3/8	41,900	39,450

CLASS 300

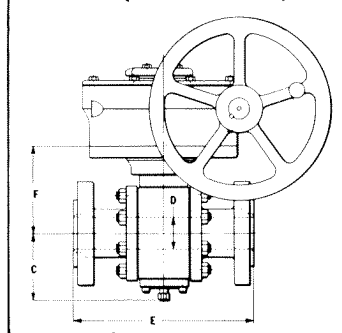
B-4B (2" thru 6 x 4 x 6)



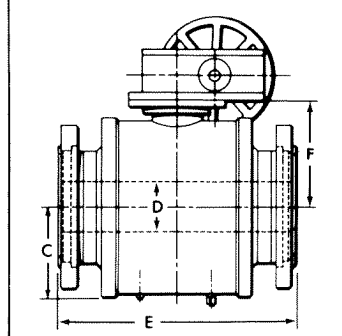
B-5 (6" thru 10 x 8 x 10)



B-4B (3" thru 6 x 4 x 6)



B-5



MILLIMETERS

WRENCH OPERATED

B-4B Valve Size	B	C	D	E		L	Weight kg	
				R.F.	W.E.		F.E.	W.E.
50	210	110	50	215.9	215.9	600	31	26
75x50x75	210	110	50	282.6	282.6	600	37	29
75	270	130	75	282.6	282.6	900	68	57
100x75x100	270	130	75	304.8	304.8	900	73	59
100	320	170	100	304.8	304.8	1200	109	91
150x100x150	320	170	100	403.2	403.2	1200	140	104

Note: 50mm and 75mm flanged B-4B valves in Class 300 have flanges with tapped bolt holes.

B-5 Valve Size	A	B*	C	D		E	L	Weight kg	
				R.F.	W.E.			F.E.	W.E.
150	260	270	160	150	403.2	457.2	900	165	140
200x150x200	260	270	160	150	501.7	520.7	900	195	165
200	330	380	205	200	501.7	520.7	1200	320	250
250x200x250	330	380	205	200	568.3	558.8	1200	355	290

*Centerline to top of stem

GEAR OPERATED

B-4B Valve Size	C	D	E		F	Weight kg	
			R.F.	W.E.		F.E.	W.E.
75	130	75	282.6	282.6	180	77	66
100x75x100	130	75	304.8	304.8	180	82	68
100	170	100	304.8	304.8	230	118	100
150x100x150	170	100	403.2	403.2	230	150	113

B-5 Valve Size	C	D	E		F	Weight kg	
			R.F.	W.E.		F.E.	W.E.
150	160	150	403.2	457.2	220	220	195
200x150x200	160	150	501.7	520.7	220	250	215
200	200	200	501.7	520.7	280	375	330
250x200x250	200	200	568.3	558.8	280	410	365
250	250	250	568.3	558.8	325	535	465
300x250x300	250	250	647.7	635.0	325	580	510
300	290	300	647.7	635.0	365	760	660
400x300x400	290	300	838.2	838.2	365	840	740
350	310	335	762.0	762.0	395	895	820
400	350	385	838.2	838.2	430	1295	1065
500x400x500	350	385	990.6	990.6	430	1465	1260
450	395	440	914.4	914.4	480	1700	1500
500	430	490	990.6	990.6	525	2075	1840
600x500x600	430	490	1143.0	1143.0	525	2215	1975
550	470	540	1092.2	1092.2	560	2610	2325
600	515	590	1143.0	1143.0	600	3075	2725
750x600x750	515	590	1397.0	1397.0	600	3190	2840
650	550	635	1244.6	1244.6	640	3870	3440
700	585	685	1346.2	1346.2	700	4565	3950
750	625	740	1397.0	1397.0	740	5575	4960
900x750x900	625	740	1727.2	1727.2	740	6080	5480
800	665	770	1524.0	1524.0	780	6230	5600
850	700	830	1625.6	1625.6	820	7350	6570
900	730	875	1727.2	1727.2	860	8400	7560
1000	820	980	1981.2	1981.2	950	11,000	9770
1050	850	1020	2082.8	2082.8	980	12,950	11,500
1200	990	1170	2387.6	2387.6	1150	19,000	17,900

GROVE B-7A BALL VALVES 4" — 12"

Class 2500

End Connections: Flanged, Weld, Weld x Flange

FEATURES:

- Through conduit, full opening
- Bubble tight seal
- Nickel plated mirror finish smooth ball
- Double block and bleed
- Trunnion mounted ball for ease of operation at high pressure
- Large diameter, short coupled trunnions to minimize unit bearing loads and operating torque
- Metal-backed DU® * sleeve bearing and Rytan† thrust washers reduce torque and extend service life.
- Free floating stem and rigid bearing construction eliminates cocking of stem and trunnion due to side pressure loads at the ball.
- Double barrier stem seals. Upper seal can be replaced with the valve in the line and under pressure
- Valve is designed to permit field conversion to gear or power operators while valve is in the line and under pressure
- Bolted construction permits disassembly on job-site for repairs
- Locking devices available
- Independent sealing on upstream and downstream seats
- O-ring Seals are protected from line flow, their squeeze action keeps ball clean and easy turning.
- Precision machined metal seat rings for primary sealing, backed up by "O" rings which afford the secondary bubble-tight seal.
- Built in sealant injection system for emergency shut-off. Sealant is not required for normal operation. (See page 20.)
- Integral stop in the adaptor plate for a permanent reference to open and closed positions.

STEM CONSTRUCTION

The stem is separate from the ball. Torque is transmitted to the ball through hardened steel pins in the interface between stem and upper ball trunnion. Bearing retainers are located on the upper and lower ball trunnions which absorb all the pressure load on the ball. The stem is a free member and carries no side thrust. Absence of this side load and friction drag on the stem assures lower operating torque and long trouble-free service life.

STEM SEALS

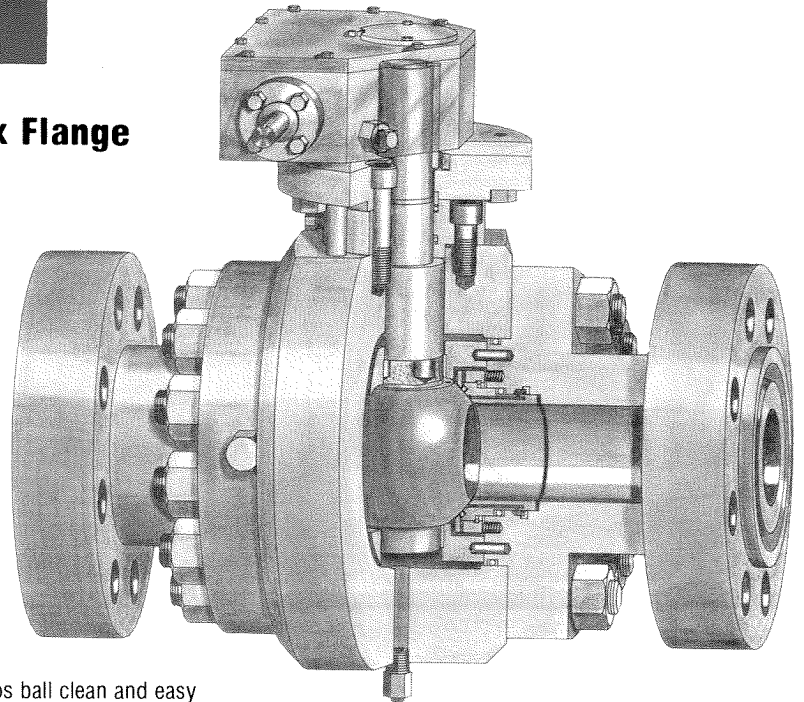
The stem is sealed by means of two "O" rings. If leakage should ever occur through both stem seals, the secondary "O" ring can be replaced with the valve in the line, under pressure. When the valve is in the closed position and the body pressure bled off to atmosphere, it is possible to remove the gland for replacement of both primary and secondary stem "O" rings. Stem can also be removed and replaced if necessary.

TRUNNION DESIGN

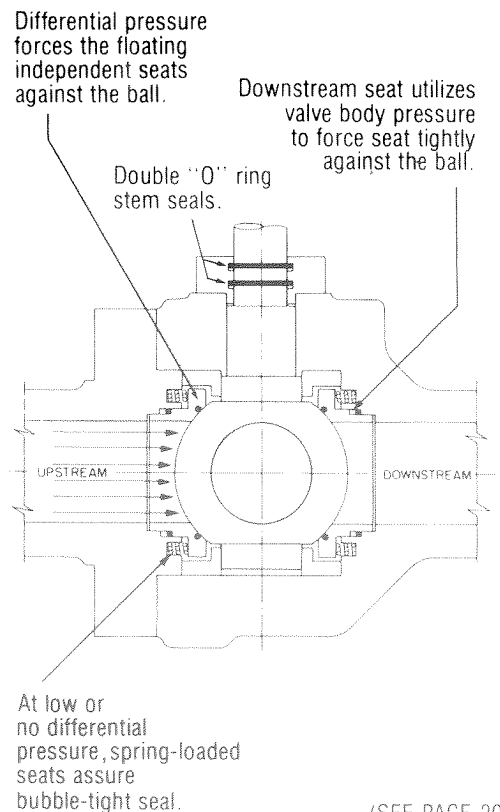
Both trunnions are integral with the ball, large in diameter and close coupled. The trunnions rotate in low friction, long lasting DU® sleeve bearings positioned in each of the bearing blocks.

SEAT SEALS

The patented seat design assures dead-tight independent upstream and downstream sealing. When the ball is in the closed position, sealing is performed by both a primary metal-to-metal seal and a secondary, protected Grovex® ***"O" ring seal. The inner lip of the metal seat and the Grovex seal ride on the mirror-finished surface of the electroless nickel plated ball. This is a trunnion-mounted, fixed-ball design, employing floating seals which achieve independent sealing. The ball is positioned in the valve and restricted to a rotation about its vertical axis by the balls top and bottom trunnions. The initial seal, at extremely low pressure differential, or vacuum conditions, is obtained upstream and downstream with spring-loaded floating seats, which are free to move slightly along the longitudinal axis of the valve. Line pressure behind the upstream seat ring supplements the seat spring load to force the upstream seat tightly against the ball. The downstream seat also utilizes line pressure (or valve body pressure) through an unbalanced pressure principle as a springload supplement to force the downstream seat tightly against the ball (refer to page 20 illustration). This results in upstream and downstream bubble-tight seals which function independently under all pressure conditions.



SEALING PRINCIPLE



(SEE PAGE 20)

* Trademark of The Garlock Company

** Trademark of Grove Valve and Regulator Company

† Trademark of The Phillips 66 Company

INCHES

CLASS 600

MILLIMETERS

WRENCH OPERATED

B-4C Valve Size	A	B	C	D	E	E	E	L	Weight	
	R.F.			W.E.	RTJ	F.E.	W.E.			
2	8 1/4	4 3/8	2	11 1/2	11 1/2	11 1/2	24	79	79	61
3x2x3	8 1/4	4 3/8	2	14	14	14 1/8	24	98	98	68
3	10 7/8	5 3/8	3	14	14	14 1/8	36	160	160	140
4x3x4	10 7/8	5 3/8	3	17	17	17 1/8	36	205	205	155
4	12 1/2	6 1/2	4	17	17	17 1/8	48	295	295	235
6x4x6	12 1/2	6 1/2	4	22	22	22 1/8	48	420	420	315
B-5 Valve Size										
6	10 3/8	10 3/8*	6 3/8	22	22	22 1/8	36	435	435	335
8x6x8	10 3/8	10 3/8*	6 3/8	26	26	26 1/8	36	560	560	460

* Centerline to top of stem

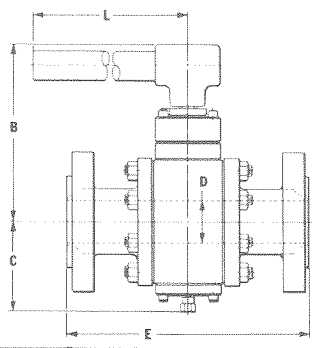
GEAR OPERATED

B-4C Valve Size	C	D	E	E	E	F	Weight	
	R.F.			W.E.	R.T.J.	F	F.E.	W.E.
2	4 3/8	2	11 1/2	11 1/2	11 1/2	5 1/2	110	92
3x2x3	4 3/8	2	14	14	14 1/8	5 1/2	129	100
3	5 3/8	3	14	14	14 1/8	7 1/4	180	160
4x3x4	5 3/8	3	17	17	17 1/8	7 1/4	225	175
4	6 1/2	4	17	17	17 1/8	9	310	250
6x4x6	6 1/2	4	22	22	22 1/8	9	435	330

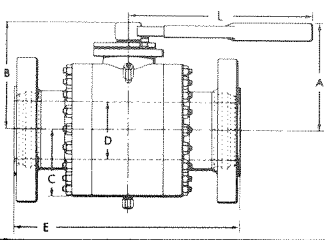
B-5 Valve Size

6	6 3/8	6	22	22	22 1/8	8 3/4	550	450
8x6x8	6 3/8	6	26	26	26 1/8	8 3/4	675	575
8	8 1/4	8	26	26	26 1/8	10 7/8	975	840
10x8x10	8 1/4	8	31	31	31 1/8	10 7/8	1,175	1,000
10	10	10	31	31	31 1/8	12 3/4	1,550	1,250
12x10x12	10	10	33	33	33 1/8	12 3/4	1,950	1,650
12	11 1/8	12	33	33	33 1/8	14 1/8	2,025	1,700
16x12x16	11 1/8	12	39	39	39 1/8	14 1/8	3,000	2,625
14	12 3/8	13 1/4	35	35	35 1/8	15 1/2	2,700	2,350
16	13 7/8	15 1/4	39	39	39 1/8	17	3,375	2,825
20x16x20	13 7/8	15 1/4	47	47	47 1/8	17	4,325	3,775
18	15 7/8	17 1/4	43	43	43 1/8	19	4,700	4,100
20	17 1/4	19 1/4	47	47	47 1/8	20 3/8	5,800	5,100
24x20x24	17 1/4	19 1/4	55	55	55 1/8	20 3/8	7,550	6,850
22	18 3/4	21 1/4	51	51	51 1/8	22 1/2	7,400	6,725
24	20 1/2	23 1/4	55	55	55 1/8	23 3/8	8,700	8,025
30x24x30	20 1/2	23 1/4	65	65	65 1/8	23 3/8	10,400	9,725
26	21 1/2	25	57	57	57 1/8	25 1/4	11,325	9,825
28	22 3/4	27	61	61	61 1/8	28 1/2	13,325	12,250
30	24 1/4	29	65	65	65 1/8	29 1/8	14,725	13,450
36x30x36	24 1/4	29	82	82	82 1/8	29 1/8	16,225	14,950
32	26 1/2	30 3/4	70	70	70 1/8	30 1/4	17,200	16,100
34	28	32 3/4	76	76	76 1/8	32 1/2	18,700	16,650
36	29 1/2	34 1/2	82	82	82 1/8	33 1/4	23,400	20,860
40	33	38 1/2	92	92	92 1/8	40 1/2	32,200	28,000
42	34 1/2	40 1/4	96	96	96 1/8	39 1/2	35,900	31,300
48	40 1/2	46	112	112	112 1/8	46	62,000	57,000

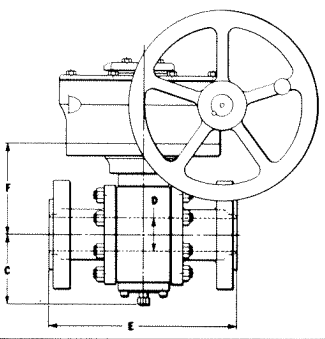
B-4C (2" thru 6 x 4 x 6)



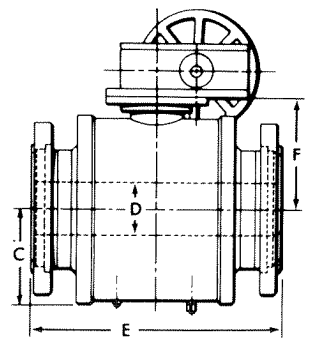
B-5 (6" & 8 x 6 x 8)



B-4C (2" thru 6 x 4 x 6)



B-5



WRENCH OPERATED

B-4C Valve Size	A	B	C	D	E	E	E	L	Weight kg.	
	R.F.			W.E.	R.T.J.	F.E.	W.E.			
50	210	110	50	292.1	292.1	295.3	600	36	28	
75x50x75	210	110	50	355.6	355.6	358.8	600	44	31	
75	270	130	75	355.6	355.6	358.8	900	72	63	
100x75x100	270	130	75	431.8	431.8	435.0	900	93	70	
100	320	170	100	431.8	431.8	435.0	1200	134	107	
150x100x150	320	170	100	558.8	558.8	562.0	1200	191	143	
B-5 Valve Size										
150	260	270*	160	150	558.8	558.8	562.0	900	195	150
200x150x200	260	270*	160	150	660.4	660.4	663.6	900	255	210

*Centerline to top of stem

GEAR OPERATED

B-4C Valve Size	C	D	E	E	E	F	Weight kg.	
	R.F.			W.E.	R.T.J.	F	F.E.	W.E.
50	110	50	292.1	292.1	295.3	140	50	42
75x50x75	110	50	355.6	355.6	358.8	140	58	45
75	130	75	355.6	355.6	358.8	180	82	72
100x75x100	130	75	431.8	431.8	435.0	180	102	79
100	170	100	431.8	431.8	435.0	230	141	113
150x100x150	170	100	558.8	558.8	562.0	230	197	150

B-5 Valve Size

150	170	150	558.8	558.8	562.0	220	250	204
200x150x200	170	150	660.4	660.4	663.6	220	310	260
200	210	200	660.4	660.4	663.6	280	440	380
250x200x250	210	200	787.4	787.4	790.6	280	580	450
250	250	250	787.4	787.4	790.6	325	700	570
300x250x300	250	250	838.2	838.2	841.4	325	890	750
300	300	300	838.2	838.2	841.4	365	920	770
400x300x400	300	300	990.6	990.6	993.8	365	1360	1190
350	310	335	889.0	889.0	892.2	395	1230	1070
400	350	385	990.6	990.6	993.8	430	1530	1280
500x400x500	350	385	1193.8	1193.8	1200.2	430	1960	1710
450	405	440	1092.2	1092.2	1095.4	480	3130	1860
500	440	490	1193.8	1193.8	1200.2	525	2630	2310
600x500x600	440	490	1397.0	1397.0	1406.5	525	3430	3110
550	480	540	1295.4	1295.4	1304.9	560	3360	3050
600	520	590	1397.0	1397.0	1406.5	600	3950	3640
750x600x750	520	590	1651.0	1651.0	1663.7	600	4720	4420
650	560	635	1447.8	1447.8	1460.5	650	5140	4460
700	570	685	1549.4	1549.4	1562.1	725	6050	5560
750	620	740	1651.0	1651.0	1663.7	740	6690	6110
900x750x900	620	740	2082.8	2082.8	2098.7	740	7370	6790
800	665	780	1778.0	1778.0	1793.9	770	7820	7320
850	710	830	1930.4	1930.4	1946.3	820	8490	7560
900	750	880	2082.8	2082.8	2098.7	860	10620	9380
1,000	840	980	2336.8	2336.8	—	1020	14600	12700
1050	880	1020	2438.4	2438.4	—	1010	16300	14210
1,200	1020	1170	2844.8	2844.8	—	1170	28200	25900

GROVE B-7A BALL VALVES 2" — 3"

Class 2500

End Connections: Flanged, Weld, Weld x Flange

FEATURES:

- Through conduit, full opening
- Bubble tight seal
- Nickel plated mirror finish smooth ball
- Double block and bleed
- Trunnion mounted ball for ease of operation at high pressure
- Large diameter, short coupled trunnions to minimize unit bearing loads and operating torque
- Metal-backed DU® * sleeve bearing and Ryton† thrust washers reduce torque and extend service life.
- Free floating stem and rigid bearing construction eliminates cocking of stem and trunnion due to side pressure loads at the ball.
- Double barrier stem seals. Upper seal can be replaced with the valve in the line and under pressure
- Valve is designed to permit field conversion to gear or power operators while valve is in the line and under pressure
- Bolted construction permits disassembly on job-site for repairs
- Locking devices available
- Independent sealing on upstream and downstream seats
- O-ring Seals are protected from line flow, their squeeze action keeps ball clean and easy turning.
- Precision machined metal seat rings for primary sealing, backed up by "O" rings which afford the secondary bubble-tight seal.
- Built in sealant injection system for emergency shut-off. Sealant is not required for normal operation. (see page 20.)
- Integral stop in the adaptor plate for a permanent reference to open and closed positions.

SEAT SEALS

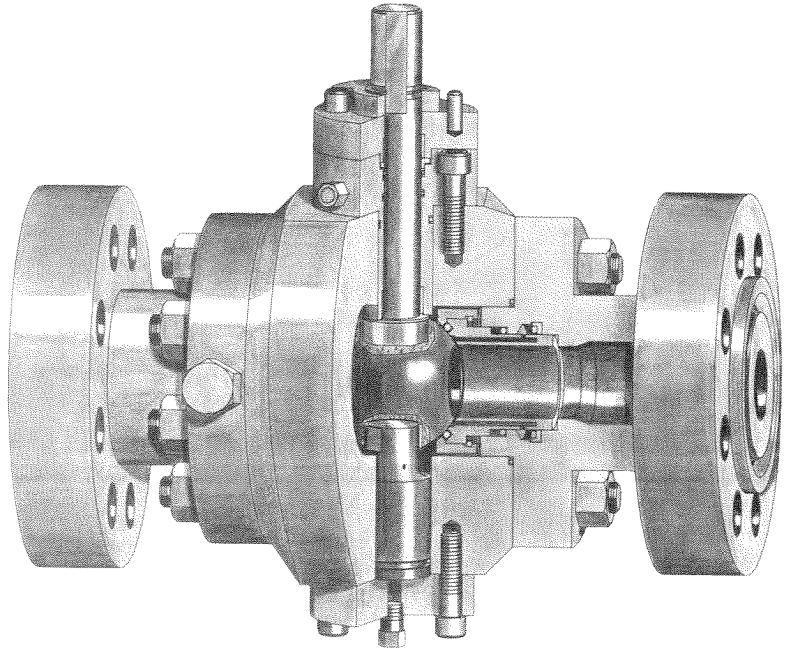
This is a trunnion-mounted, fixed ball design, employing floating seats which achieve independent sealing. The patented seat design assures dead-tight independent upstream and downstream sealing. With the ball in the closed position, sealing is performed by both a primary metal-to-metal seal and a secondary, protected GROVEX** "O" ring seal. The inner lip of the metal seat and the "O" ring seal ride on the surface of the smooth electroless nickel plated ball. The ball rotates about its vertical axis between the stem and bottom trunnion. The initial seal, at extremely low pressure differential, is obtained by the spring-loaded floating seats, which are free to move slightly along the longitudinal axis of the valve. Line pressure behind the upstream seat ring supplements the seat spring load to force the upstream seat tightly against the ball. The valve body cavity, with the valve in closed position, is sealed from line pressure by the upstream and downstream seats. This type of sealing assures double block and bleed service.

STEM SEALS

The stem is sealed by means of two "O" rings. If leakage should ever occur through both stem seals, the secondary "O" ring can be replaced with the valve in the line, under pressure. A needle valve is provided in the area between the two stem "O" rings to check integrity of stem seals. Should both "O" ring seals fail, the stem seal integrity can be renewed by the injection of plastic packing.

STEM & TRUNNION CONSTRUCTION

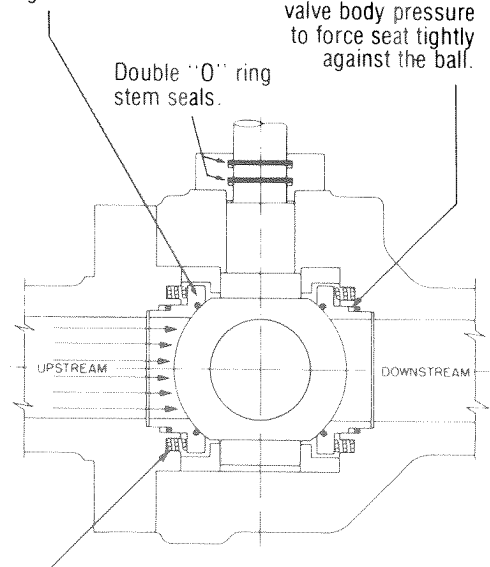
The stem and trunnion are separate from the ball. The separate stem-to-ball connection is achieved by close tolerance fit between the hex head on the stem and a corresponding hex socket in the ball. The stem shoulder bears against a Ryton† thrust washer. The stem rotates in a pair of DU® * bearings which are widely spaced to afford maximum rigidity. The lower trunnion is bolted to the body and engages a DU® * bearing located in a machined recess in the ball. This system effectively eliminates any cocking tendency which results in lower torques.



SEALING PRINCIPLE

Differential pressure forces the floating independent seats against the ball.

Downstream seat utilizes valve body pressure to force seat tightly against the ball.



At low or no differential pressure, spring-loaded seats assure bubble-tight seal.

(SEE PAGE 20)

* Trademark of The Garlock Company

** Trademark of Grove Valve and Regulator Company

† Trademark of Phillips 66 Company

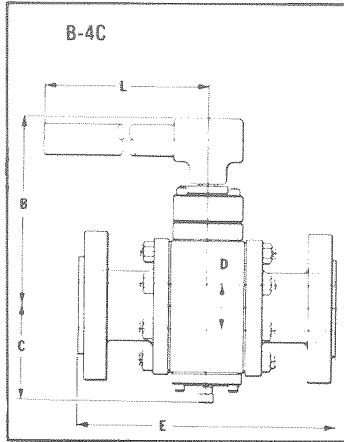
INCHES

CLASS 1500

MILLIMETERS

WRENCH OPERATED

B-4C Valve Size	B	C	D	E			L	Weight	
				R.F.	W.E.	R.T.J.		F.E.	W.E.
2	8¼	4¾	2	14½	14½	14¾	24	130	82
3x2x3	8¼	4¾	2	18½	18½	18¾	24	180	165
3	10¾	5¾	3	18½	18½	18¾	36	255	185
4x3x4	10¾	5¾	3	21½	21½	21¾	36	325	270
4	12½	6½	4	21½	21½	21¾	48	430	290
6x4x6	12½	6½	4	27¾	27¾	28	48	645	535

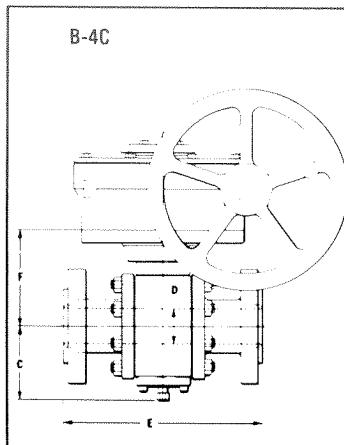


WRENCH OPERATED

B-4C Valve Size	B	C	D	E			L	Weight kg	
				R.F.	W.E.	R.T.J.		F.E.	W.E.
50	210	110	50	368.3	368.3	371.5	600	59	37
75x50x75	210	110	50	469.9	469.9	473.1	600	82	75
75	270	130	75	469.9	469.9	473.1	900	116	84
100x75x100	270	130	75	546.1	546.1	549.3	900	147	123
100	320	170	100	546.1	546.1	549.3	1200	195	132
150x100x150	320	170	100	704.9	704.9	711.2	1200	293	243

GEAR OPERATED

B-4C Valve Size	C	D	E			F	Weight	
			R.F.	W.E.	R.T.J.		F.E.	W.E.
2	4¾	2	14½	14½	14¾	5½	160	113
3x2x3	4¾	2	18½	18½	18¾	5½	210	200
3	5¾	3	18½	18½	18¾	7¼	275	220
4x3x4	5¾	3	21½	21½	21¾	7¼	345	290
4	6½	4	21½	21½	21¾	9	450	310
6x4x6	6½	4	27¾	27¾	28	9	660	550

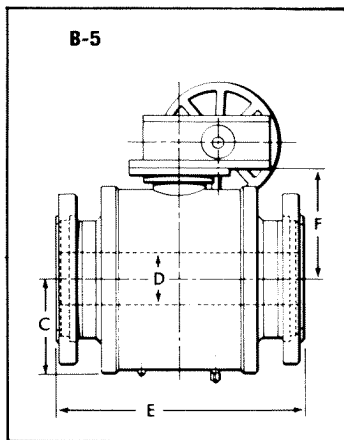


GEAR OPERATED

B-4C Valve Size	C	D	E			F	Weight kg	
			R.F.	W.E.	R.T.J.		F.E.	W.E.
50	110	50	368.3	368.3	371.5	140	72	51
75x50x75	110	50	469.9	469.9	473.1	140	95	91
75	130	75	469.9	469.9	473.1	180	125	100
100x75x100	130	75	546.1	546.1	549.3	180	157	132
100	170	100	546.1	546.1	549.3	230	204	141
150x100x150	170	100	704.9	704.9	711.2	230	299	250

B-5 Valve Size

6	8¾	5¾	2.¾	27¾	28	11¾	1270	970
8x6x8	8¾	5¾	32¾	32¾	33¾	11¾	1520	1050
8	10¾	7¾	32¾	32¾	33¾	13¾	1650	1190
10x8x10	10¾	7¾	39	39	39¾	13¾	2040	1260
10	12¾	9½	39	39	39¾	15¾	2620	1840
12x10x12	12¾	9½	44½	44½	45¾	15¾	2940	1960
12	13¾	11¾	44½	44½	45¾	17	3640	2660
14x12x14	13¾	11¾	49½	49½	50¾	17	4210	2690
16x12x16	13¾	11¾	54½	54½	55¾	17	4780	2780
14	16¾	12½	49½	49½	50¾	20¾	6100	4500
16	18¾	14¾	54½	54½	55¾	22¾	8800	6750



B-5 Valve Size

150	210	150	704.9	704.9	711.2	300	575	440
200x150x200	210	150	831.9	831.9	841.4	300	690	475
200	260	200	831.9	831.9	841.4	350	750	540
250x200x250	260	200	990.6	990.6	1000.1	350	925	570
250	310	240	990.6	990.6	1000.1	400	1190	835
300x250x300	310	240	1130.3	1130.3	1146.2	400	1335	890
300	350	290	1130.3	1130.3	1146.2	430	1650	1210
350x300x350	350	290	1257.3	1257.3	1276.4	430	1910	1220
400x300x400	350	290	1384.3	1384.3	1406.5	430	2170	1260
350	395	320	1257.3	1257.3	1276.4	510	2780	2050
400	445	360	1384.3	1384.3	1406.5	570	4000	3070

CLASS 2500

GROVE NOW OFFERS OUR NEW B-7A BALL VALVE FOR CLASS 2500 SERVICE. FOR TECHNICAL INFORMATION, MATERIALS OF CONSTRUCTION, ETC., SEE PAGES 6,7,8,9,16, AND 17 OF THIS CATALOG. FOR INFORMATION ON OUR ORIGINAL B-7 CLASS 2500 BALL VALVE PLEASE CONTACT GROVE DIRECT OR YOUR LOCAL AUTHORIZED GROVE VALVE REPRESENTATIVE.

GROVE B-5 BALL VALVES

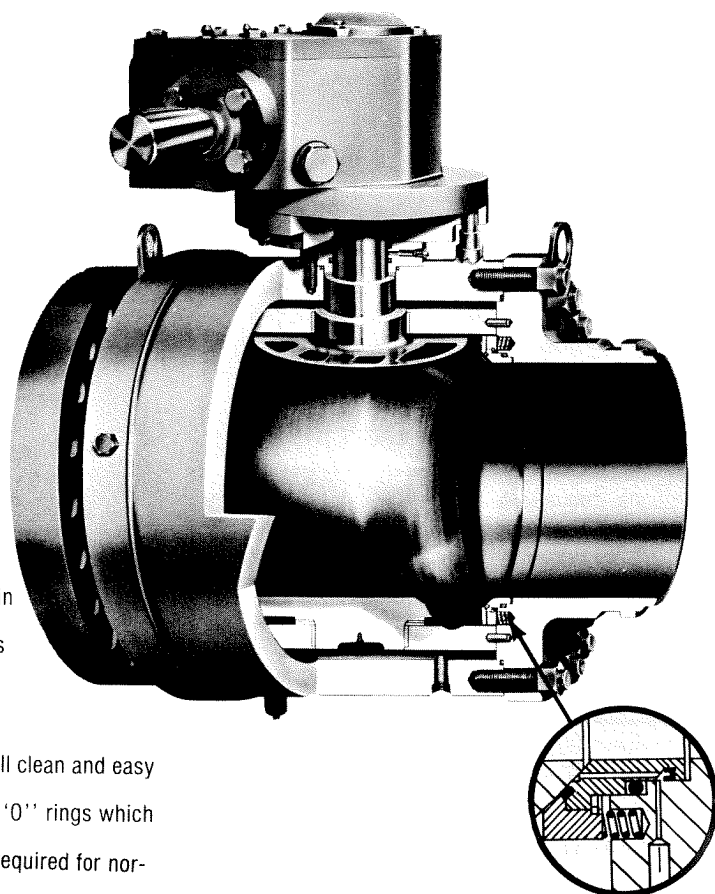
6" — 48"

Class 150-1500

End Connections: Flanged, Weld, Weld x Flange

FEATURES:

- Through conduit, full opening, or venturi
- Bubble tight seal
- Nickel plated mirror finish smooth ball
- Double block and bleed
- Trunnion mounted ball for ease of operation at high pressure
- Large diameter, short coupled trunnions to minimize unit bearing loads and operating torque
- Metal-backed DU® * sleeve bearing and Ryton† thrust washers reduce torque and extend service life.
- Free floating stem and rigid bearing construction eliminates cock-of stem and trunnion due to side pressure loads at the ball.
- Double barrier stem seals. Upper seal can be replaced with the valve in the line and under pressure
- Valve is designed to permit field conversion to gear or power operators while valve is in the line and under pressure
- Bolted construction permits disassembly on job-site for repairs
- Locking devices available
- Independent sealing on upstream and downstream seats
- O-ring Seals are protected from line flow, their squeeze action keeps ball clean and easy turning
- Precision machined metal seat rings for primary sealing, backed up by "O" rings which afford the secondary bubble-tight seal.
- Built in sealant injection system for emergency shut-off. Sealant is not required for normal operation. (See page 20.)
- Integral stop in the adaptor plate for a permanent reference to open and closed positions.



STEM CONSTRUCTION

The stem is separate from the ball and is positioned to the upper ball trunnion by hardened steel pins. Bearing retainers are located on the upper and lower ball trunnions which absorb all the pressure load on the ball. The stem is a free member and carries no side thrust. Absence of this side load and friction drag on the stem assures lower operating torque and long trouble-free service life.

STEM SEALS

The stem is sealed by means of two "O" rings. If leakage should ever occur through both stem seals, the secondary "O" ring can be replaced with the valve in the line, under pressure. When the valve is in the closed position and the body pressure bled off to atmosphere, it is possible to remove the gland for replacement of both primary and secondary stem "O" rings. Stem can also be removed and replaced if necessary.

SEAT SEALS

The patented seat design assures dead-tight independent upstream and downstream sealing. When the ball is in the closed position, sealing is performed by both a primary metal-to-metal seal and a secondary, protected Grovex® ***"O" ring seal. The inner lip of the metal seat and the Grovex seal ride on the mirror-finished surface of the electroless nickel plated ball. This is a trunnion-mounted, fixed-ball design, employing floating seals which achieve independent sealing. The ball is positioned in the valve and restricted to a rotation about its vertical axis by the balls top and bottom trunnions. The initial seal, at extremely low pressure differential, or vacuum conditions, is obtained upstream and downstream with spring-loaded floating seats, which are free to move slightly along the longitudinal axis of the valve. Line pressure behind the upstream seat ring supplements the seat spring load to force the upstream seat tightly against the ball. The downstream seat also utilizes line pressure (or valve body pressure) through an unbalanced pressure principle as a springload supplement to force the downstream seat tightly against the ball (refer to page 20 illustration). This results in upstream and downstream bubble-tight seals which function independently under all pressure conditions. This type of sealing pressure assures double block and bleed service.

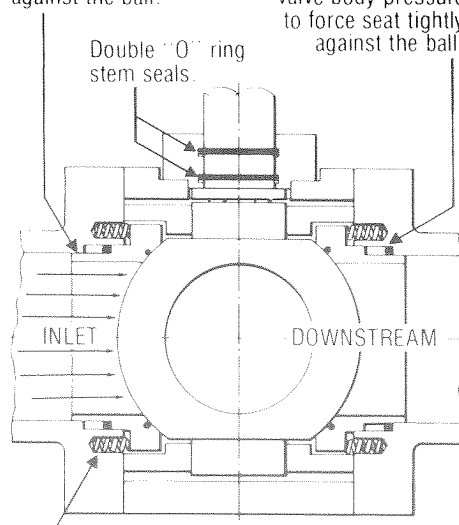
TORQUES

Grove's low operating torques are due to our "separate" free floating stem design, which does not absorb any side loads brought on by differential pressures. Our lower operating torques eliminates the need for spur or compound gearing. This results in a lesser number of hand wheel turns to operate our ball valves and/or smaller power actuators.

SEALING PRINCIPLE

Differential pressure forces the floating independent seats against the ball.

Downstream seat utilizes valve body pressure to force seat tightly against the ball.



At low or no differential pressure, spring-loaded seats assure bubble-tight seal.

(SEE PAGE 20)

* Trademark of The Garlock Company

** Trademark of Grove Valve and Regulator Company

† Trademark of The Phillips 66 Company

BALL STEM TORQUES FOR GROVE SERIES B-5 & B-7A BALL VALVES

The following formula should be used to find the normal ball stem torque to operate new GROVE Ball Valves.

P = Differential pressure across the valve (PSI). For pressures less than 100 PSI use $P = 100$.

Ball Stem torques for Class 150, 300, 400, 600, 900, 1500 and 2500 valves at maximum differential pressure are tabulated.

B - 5 SERIES

VALVE SIZE	BALL STEM TORQUE	CALSS 150	CLASS 300	CLASS 400	CLASS 600	VALVE SIZE	BALL STEM TORQUE	CLASS 900	VALVE SIZE	BALL STEM TORQUE	CLASS 1500
	EXPRESSION Ft.-Lbs.	AT P=285 TORQUE Ft.-Lbs.	AT P=740 TORQUE Ft.-Lbs.	AT P=990 TORQUE Ft.-Lbs.	AT P=1480 TORQUE Ft.-Lbs.		EXPRESSION Ft.-Lbs.	AT P=2220 TORQUE Ft.-Lbs.		EXPRESSION Ft.-Lbs.	AT P=3705 TORQUE Ft.-Lbs.
6	176 + 0.19*P	229	314	361	453	6	176 + 0.19*P	598	6	240 + 0.50*P	2,093
8	303 + 0.44*P	428	629	739	954	8	303 + 0.44*P	1,280	8	368 + 0.77*P	3,221
10	440 + 0.60*P	612	888	1,039	1,335	10	440 + 0.60*P	1,783	10	512 + 0.96*P	4,069
12	560 + 0.96*P	834	1,270	1,510	1,981	12	560 + 0.96*P	2,691	12	672 + 1.10*P	4,768
14	930 + 1.00*P	1,215	1,670	1,920	2,140	14	930 + 1.03*P	3,217	14	1,120 + 1.89*P	8,122
16	1,270 + 1.16*P	1,601	2,128	2,418	2,987	16	1,270 + 1.42*P	4,422	16	1,520 + 2.50*P	10,783
18	1,640 + 3.06*P	2,512	3,904	4,669	6,169	18	1,640 + 3.64*P	9,721	18	2,000 + 4.59*P	19,006
20	1,860 + 4.16*P	3,046	4,938	5,978	8,017	20	1,860 + 4.93*P	12,805	20	2,480 + 7.34*P	29,675
22	2,710 + 5.06*P	4,152	6,454	7,719	10,199	22	2,710 + 6.02*P	16,074			
24	2,800 + 5.46*P	4,356	6,840	8,205	10,881	24	2,800 + 6.55*P	17,341			
26	5,845 + 6.04*P	7,566	10,315	11,825	14,784	26	5,845 + 7.33*P	22,118			
28	6,770 + 7.05*P	8,779	11,987	13,570	17,204	28	6,770 + 8.58*P	25,818			
30	7,380 + 9.08*P	9,968	14,099	16,369	20,818	30	7,380 + 10.97*P	31,733			
32	7,846 + 12.28*P	11,346	16,933	20,003	26,020	32	7,846 + 14.67*P	40,413			
34	8,310 + 13.08*P	12,038	17,989	21,259	27,668	34	8,310 + 15.63*P	43,009			
36	9,080 + 14.53*P	13,221	19,832	23,465	30,584	36	9,080 + 17.35*P	47,597			
38	10,300 + 16.67*P	15,051	22,636	26,803	34,972						
40	11,000 + 18.00*P	16,130	24,320	28,820	37,640						
42	11,800 + 19.67*P	17,406	26,356	31,273	40,912						
48	14,400 + 39.67*P	25,706	43,756	53,673	73,112						
56	19,200 + 65.75*P	37,939	67,855	84,293	116,510						

Notes on use of these tables:

- Due to normal wear, age soaking and/or accumulation of particle matter in the valve, ball stem torque is expected to increase with time. For sizing power operators, multiply the normal torque by a minimum safety factor of 1.25, or multiply by a customer specified safety factor, which ever is greater.
- For low operating temperature application, include a torque multiplier. (Contact Grove) The operating temperature refers to actual temperature of the internal valve components. Minimum ambient temperature should only be used for valves where the internal components are exposed to ambient temperature, i.e. where fluid or gas velocities are zero, or extremely low. For buried valves use fluid/gas temperature as the valve operating temperature.
- Top works dimensions for B-5 Ball Valves less operators are listed on page 19. For top works dimensions for class 1500 B-5's, Class 2500 B-7A's and all diameters and pressure classes of B-4B's and B-4C's contact Grove direct or your local Grove valve representative.
- Due to on-going technical changes always consult your local Grove valve representative or contact Grove direct for our most current torque data.

B-7A SERIES

VALVE SIZE	BALL STEM TORQUE EXPRESSION Ft.-Lbs.	CLASS 2500 AT P=6170 TORQUE Ft.-Lbs.
2	105 + 0.038*P	339
3	180 + 0.075*P	643
4	132 + 0.090*P	687
6	270 + 0.228*P	1,677
8	456 + 0.456*P	3,270
10	672 + 0.774*P	5,448
12	900 + 1.060*P	7,440

FLANGE STANDARDS

Flanges for flanged valves will be in accordance with the following specifications:

Classes 150 thru 1500

Sizes thru 24" (except 22") in accordance with ANSI B16.5.
22" Class 150 thru 600 in accordance with MSS SP-44.
22" Class 900 flange dimensions subject to negotiation.

Class 150 thru 900

Sizes 26" thru 48" in accordance with MSS SP-44.

Class 2500

Sizes 2" thru 12" in accordance with ANSI B16.5.
Face-to-face and end-to-end dimensions conform to API Standard 6-D Table 4.4, "Flanged-End and Welding-End Valves," "Full Bore and Reduced Bore."

PRESSURE DROP ACROSS GROVE VENTURI BALL VALVES

Contact your local Grove Valve representative or Grove direct for tables showing the expected pressure drop for equivalent length of pipe (ft.) for Grove Venturi Ball Valves shown in this catalog.

INSTALLATION, REPAIR, & MAINTENANCE

Contact your local Grove Valve Representative or Grove direct for a copy of our Grove B-5, B-4B & B-4C Installation & Maintenance Manual and our Ball Valve Maintenance, Repair, & Installation VHS Video Tape.

GROVE B-4B & B-4C BALL VALVES 2"-4"

Model B-4B Class 150 & 300
Model B-4C Class 600 thru 1500
End Connections:
Flanged, Weld, Weld x Flange

FEATURES:

- Through conduit, full opening, or venturi
- Bubble tight seal
- Nickel plated mirror finish smooth ball
- Double block and bleed
- Trunnion mounted ball for ease of operation at high pressure
- Short coupled trunnions to minimize unit bearing loads and operating torque
- Metal-backed DU® * sleeve bearing and Ryton† thrust washers reduce torque and extend service life.
- Free floating stem and rigid bearing construction eliminates cocking of stem and trunnion due to side pressure loads at the ball.
- Double barrier stem seals. Upper seal can be replaced with the valve in the line and under pressure
- Valve is designed to permit field conversion to gear or power operators while valve is in the line and under pressure
- Bolted construction permits disassembly on job-site for repairs
- Locking devices available
- Automatic internal body relief to downstream on B-4B
- Independent sealing on upstream and downstream seats on B-4C
- Rugged factory positioned external stops

SEAT SEALS

Grove B-4B & B-4C Ball Valves feature a trunnion-mounted, fixed ball design, employing floating seats which achieve bubble tight sealing. The ball rotates about its vertical axis between the stem and bottom trunnion. The initial seal, at extremely low pressure differential, is obtained by the spring-loaded floating seats, which are free to move slightly along the longitudinal axis of the valve. Line pressure behind the upstream seat ring supplements the seat spring load to force the upstream seat tightly against the ball. The valve body cavity, with the valve in closed position, is sealed from line flow and pressure by the upstream and downstream seats. This type of sealing assures double block and bleed service. The 2", 3", and 4", class 600 thru 1500, use a synthetic "O" ring seal in a two-piece metal seat ring (see insert) while all others have a reinforced synthetic seal of trapezoidal cross section imbedded within a one-piece metal seat ring.

STEM & TRUNNION CONSTRUCTION

The stem and trunnion are separate from the ball. The stem-to-ball connection is achieved by close tolerance hex in the ball socket drive. The stem shoulder bears against a Ryton† thrust washer. A hex socket in the ball transmits torque from stem to ball. The stem rotates in a pair of DU® * bearings with a wide separation to afford maximum rigidity. The lower trunnion is rigidly bolted to the body, with a long DU® * bearing in the ball. This system effectively eliminates cocking tendencies, which results in lower torques.

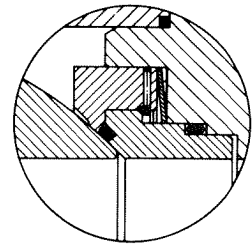
STEM SEALS

A needle valve is provided in the area between the two stem "O" rings to check the integrity of the stem seals. If the bottom stem "O" ring fails it will blow thru the middle needle valve. Sealing integrity is then renewed by closing the needle valve, thereby energizing the top stem "O" ring.

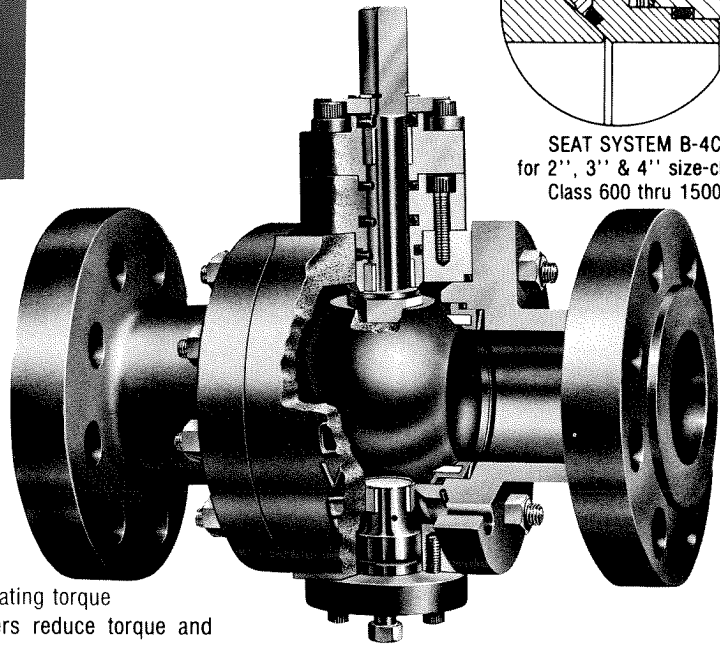
FLANGED VALVES

In order to meet API-6D face-to-face dimensions, the end flanges of some CL. 150 & 300 valves are supplied with bolt holes drilled and tapped to receive studs. The use of end flanges with tapped holes is permitted by a recent supplement to API Spec. 6D.

NOTE: For class 400 B-4C dimensions see page 12.

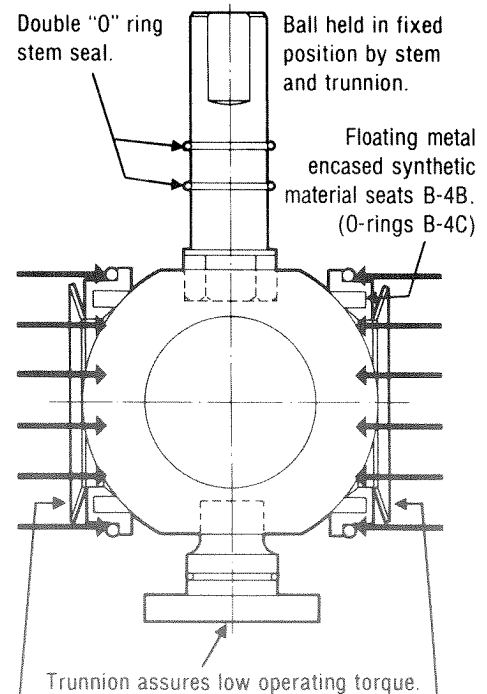


SEAT SYSTEM B-4C
for 2", 3" & 4" size-class
Class 600 thru 1500



B-4B

Sealing Principle



AT LOW OR NO DIFFERENTIAL PRESSURE—
force of Belleville spring assures bubble-tight seal.
INCREASED DIFFERENTIAL PRESSURE—
forces the seat against the ball—assuring an
upstream and downstream seal for block and bleed.

* Trademark of The Garlock Company
 ** Trademark of Grove Valve and Regulator Company
 † Trademark of Phillips 66 Company

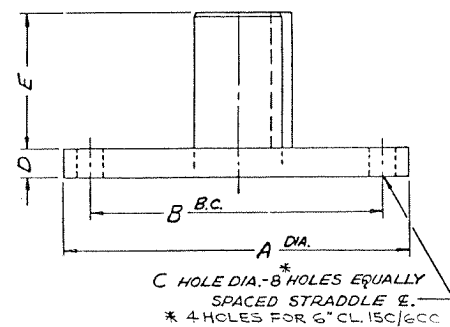
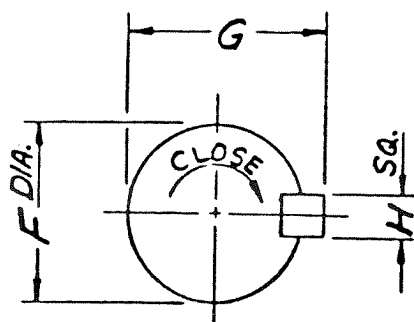
TOP MOUNTING DIMENSIONS FOR GROVE B-5 BALL VALVES LESS GEAR OPERATORS

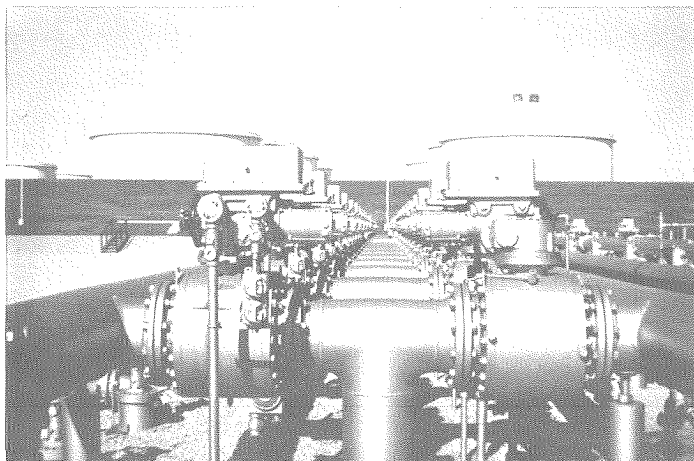
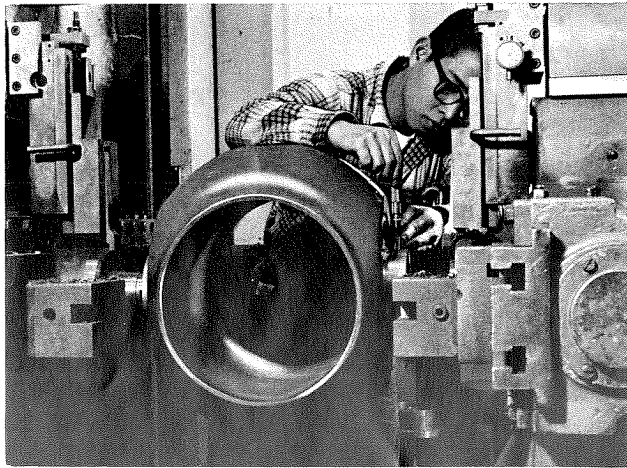
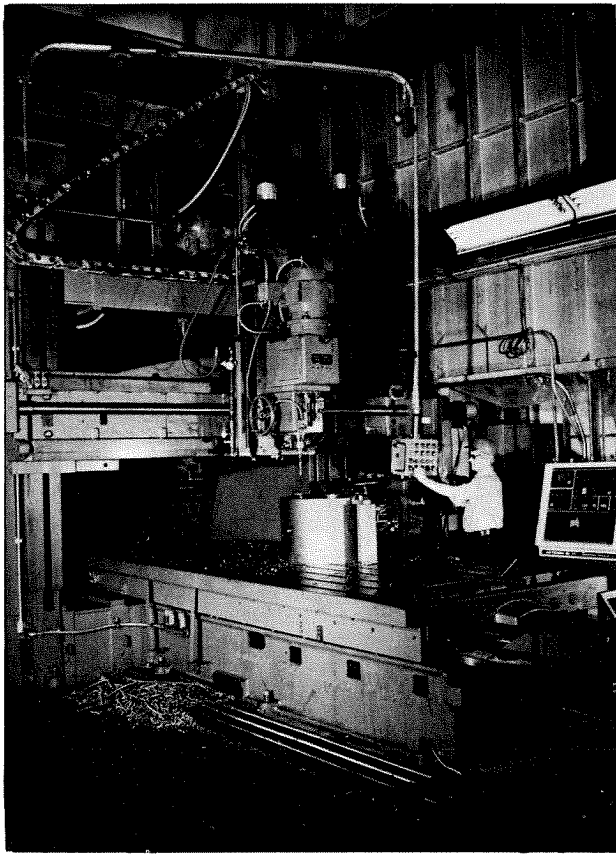
NOTE: TO OPERATOR MANUFACTURERS.

1. KEY IS IN LINE (PARALLEL) WITH BORE OF BALL.
2. OPERATOR MUST BE ARRANGED FOR 91° ROTATION INCLUDING ADJUSTABLE 1/2° ROTATION AT EACH END OF TRAVEL. ADJUSTMENT TO BE EXTERNAL TYPE.
3. ALL OPERATORS AND MOUNTING ADAPTATION TO BE FULLY ENCLOSED AND WEATHER PROOF.
4. FOR TOP MOUNTING CLEARANCE DIMENSIONS FOR MOUNTING CYLINDER OPERATOR OR TOP MOUNTING DIMENSIONS FOR CLASS 1500 B-5's, CONTACT GROVE DIRECT.

CAUTION MINIMUM OPERATOR STEM ENGAGEMENT (E-1") DIM. MUST BE FULLY ENGAGED BY OPERATOR DRIVE SLEEVE.

VALVE SIZE	CLASS	A	B	C	D	E	F ^{+ .000} _{- .004}	G ^{+ .000} _{- .010}	H ^{+ .000} _{- .002}
6"	150/600	9-3/4	8-1/4	13/16	7/8	3-9/16	1.750	1.917	.375
6"	900	11-1/2	10-1/4	11/16	1-5/16	3-3/4	2.374	2.646	.625
8"	150/900	11-1/2	10-1/4	11/16	1-5/16	3-3/4	2.374	2.646	.625
10"	150/900	11-1/2	10-1/4	11/16	1-5/16	3-3/4	2.374	2.646	.625
12"	150/600	11-1/2	10-1/4	11/16	1-5/16	3-3/4	2.374	2.646	.625
12"	900	15-5/8	14	13/16	1-5/16	4-1/2	2.874	3.200	.750
14"	150/300	11-1/2	10-1/4	11/16	1-5/16	3-3/4	2.374	2.646	.625
14"	400/900	15-5/8	14	13/16	1-5/16	5-1/2	3.499	3.882	.875
16"	150	11-1/2	10-1/4	11/16	1-5/16	3-3/4	2.374	2.646	.625
16"	300/900	15-5/8	14	13/16	1-5/16	5-1/2	3.499	3.882	.875
18"	150/900	15-5/8	14	13/16	1-9/16	5-1/2	3.499	3.882	.875
20"	150/600	15-5/8	14	13/16	1-9/16	5-1/2	3.499	3.882	.875
20"	900	15-5/8	14	13/16	1-9/16	6	4.748	5.292	1.250
22"	150	15-5/8	14	13/16	1-9/16	5-1/2	3.499	3.882	.875
22"	300/600	15-5/8	14	13/16	1-9/16	6	4.748	5.292	1.250
22"	900	18	16	1-1/16	1-9/16	6	4.748	5.292	1.250
24"	150/600	15-5/8	14	13/16	1-9/16	6	4.748	5.292	1.250
24"	900	18	16	1-1/16	1-3/16	6	4.748	5.292	1.250
26"	150/400	15-5/8	14	13/16	1-7/8	6	4.748	5.292	1.250
26"	600	18	16	1-1/16	1-9/16	6	4.748	5.292	1.250
26"	900	18	16	1-1/16	1-3/4	6	4.748	5.292	1.250
28"	150	15-5/8	14	13/16	2-1/16	6	4.748	5.292	1.250
28"	300/600	18	16	1-1/16	1-13/16	7	5.998	6.655	1.500
28"	900	18	16	1-1/16	1-13/16	7	5.998	6.655	1.500
30"	150	15-5/8	14	13/16	2-1/16	6	4.748	5.292	1.250
30"	300/600	18	16	1-1/16	1-13/16	7	5.998	6.655	1.500
30"	900	22	20	1-1/16	2-1/16	7-1/2	6.498	7.162	1.500
32"	150	15-5/8	14	13/16	2-1/16	6	4.748	5.292	1.250
32"	300/600	18	16	1-1/16	1-13/16	7	5.998	6.655	1.500
32"	900	22	20	1-1/16	2-1/16	7-1/2	6.498	7.162	1.500
34"	150/600	18	16	1-1/16	2-3/16	7	5.998	6.655	1.500
36"	150/600	18	16	1-1/16	2-3/16	7	5.998	6.655	1.500
36"	900	22	20	1-1/16	2-3/16	7-1/2	6.498	7.162	1.500
40"	150/400	18	16	1-1/16	2-3/16	7	5.998	6.655	1.500
40"	600	22	20	1-1/16	2-1/16	7-1/2	6.498	7.162	1.500
42"	150/300	18	16	1-1/16	2-3/16	7	5.998	6.655	1.500
42"	400/600	22	20	1-1/16	2-1/16	7-1/2	6.498	7.162	1.500
42"	900	25	22	1-1/16	3-1/4	8	7.496	8.364	2.000





HOW TO ORDER

Special requirements should be stated on all orders, otherwise valves will be supplied in standard materials and end connections.

VALVES

A complete valve specification requires the following data:

1. Valve size—Include nominal size of piping and valve bore size desired.
Note: Bore size will comply with API 6D section 4.3a and 4.3b and table 4.5.
2. Pressure Class
3. End connections (for welding ends, specify wall thickness and minimum yield strength of connecting pipe)
4. Trim material—if trims other than standard are required, order should state line medium and temperature.
5. Any special features—operating extensions, etc.
6. Type of operator.
 - a. Manual—wrench or gear.
 - b. Power—pneumatic, hydraulic or electric.

POWER OPERATORS

If Power Operators are to be furnished a complete specification requires the following data:

Note: If power operator is being ordered for field conversion, describe operator presently on valve.

1. Type of power operator—pneumatic, hydraulic, electric.
2. Maximum differential pressure across valve during operation.
3. Speed of operation.
 - a. To open.
 - b. To close.
 - c. Maximum permissible variation in cycle time.
4. Probable frequency of operation.
5. For pneumatic or hydraulic operators specify:
 - a. Line pressure.
 - b. Operating medium.
 1. Air or gas.
 2. Fluid—specify type.
 - c. Minimum and maximum pressure available.
 - d. Optional equipment required—hand pump, filter, control valving—i.e., manual, electric or pneumatic.
 1. For electric control valving specify voltage (A.C. or D.C.) and if explosion-proof closure is required.
 2. For pneumatic control valving specify signal pressure available.
6. For electric operators specify:
 - a. Power supply.
 1. Voltage (state if A.C. or D.C.)
 2. Single or 3-phase.
 3. Frequency (cycle).
 - b. Type of motor—i.e., weather-proof, explosion-proof or other.
 - c. Optional equipment required—limit and torque switches, reversing controller (starter), push button station, etc.

For the control equipment specify:

 1. Control voltage (A.C. or D.C.)
 2. Enclosure (explosion- or weather-proof).
 3. Location (remote or integral mounting).

OPERATION, FIELD WELDING, & EXTENSIONS

BLOCK AND BLEED

Grove B-4B ball valves are equipped with a special 1/4" NPT vent plug installed in the lower body area. A needle valve located in the vent plug permits venting and draining of the body cavity with the valve in the closed position under pressure: confirming block and bleed capability.

Grove B-4C, B-5 & B-7A ball valves feature double block and bleed. The B-7A (sizes 2" & 3") has a special 1/4" NPT vent plug. The B-7A (sizes 4" & 12") and all sizes of the B-5 are supplied with a special 1/2" NPT vent plug installed in the lower body area. For 14" and larger full bore valves a 1" hole is drilled and tapped and a 1/2" bushing is installed to receive the special 1/2" NPT vent plug.

Valve body cavities can be vented to atmosphere and completely drained down with the ball in the closed position—and the valve under pressure—by the special vent plug described above. Valve body cavities can be completely drained and flushed by: (1) removing the special vent plug after pressure has been vented, (2) removing the 1/2" NPT relief valve from the upper body area and (3) flushing through upper relief valve connection and allowing drainage through the lower vent plug connection hole.

BODY RELIEF VALVES

The B-4B design affords internal self relief of excess body pressure as might be caused by thermal expansion of liquids entrapped in valve body. A body relief valve is not required.

A compact steel 1/2" NPT body relief valve, installed in the upper body area, is optional on all sizes of B-4C, B-5 & B-7A ball valves, and is normally recommended in liquid service.

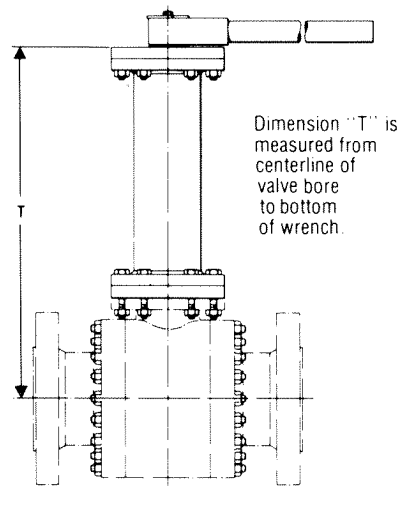
FIELD WELDABILITY-WELDING END VALVES

Grove B-4B ball valves with weld end connection, use ASTM A-216 grade WCB or WCC steel castings. The weld end connections of Grove B-5 and B-7A ball valves use ASTM A-105, A-216 Gr. WCC or WCB, A-350-LF2 steel. These types are readily field weldable and have a yield strength very near that of API 5LX-52 pipe. This offers the advantages of weld transition pieces or pipe nipples without the added expense of such fittings. When welding Grove valves in the line, standard welding techniques and procedures are satisfactory. Weld nose details are tailored to pipe wall thickness and yield strength requirements.

EXTENSIONS

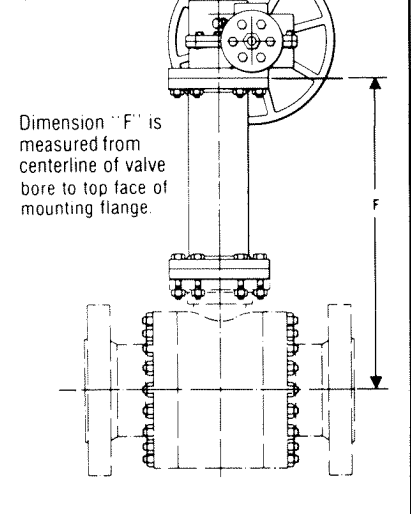
B-4B & B-4C

Type "A"
WRENCH
OPERATED



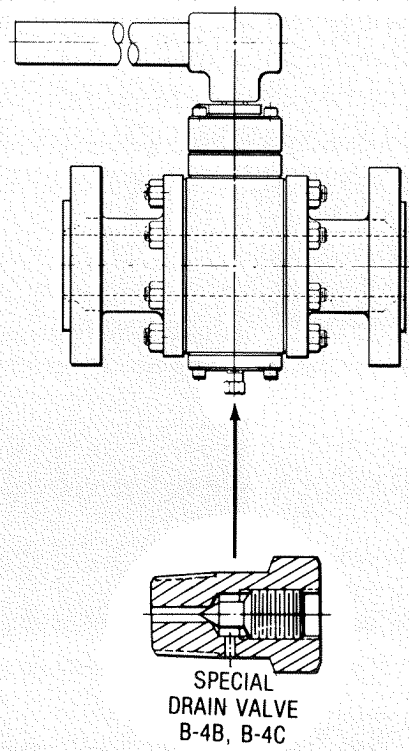
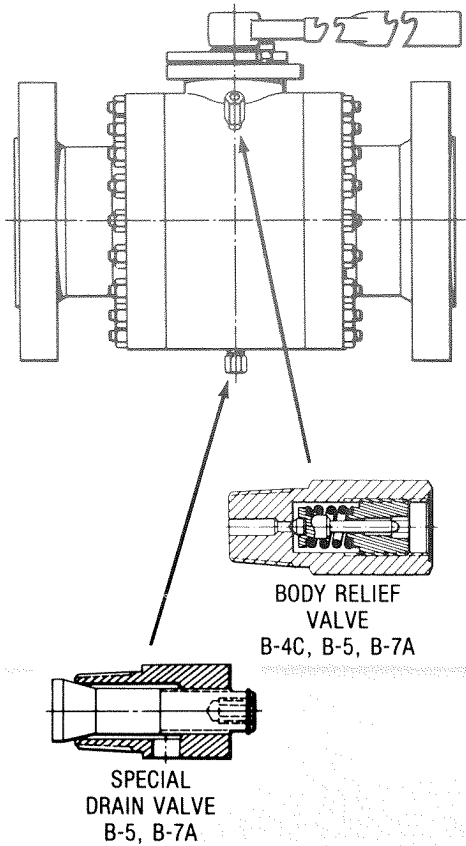
B-5 & B-7A

Type "B"
ELEVATED
GEARING



Grove Ball Valves are available with operating extensions to permit buried or underground installation or for installation in remote or inaccessible piping. Valves can also be equipped with 2" SQUARE OPERATING NUTS on request. Both Type "A" and Type "B" extensions are extended yoke and drive tube design, and are furnished "watertight" for buried valve service. Either Type "A" or Type "B" extensions can be supplied with POWER OPERATOR MOUNTING FLANGE. (See Page 19)

NOTE: Customer must specify "T" or "F" dimension





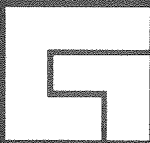
ENERGY
VALVE DIVISION

DRESSER

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