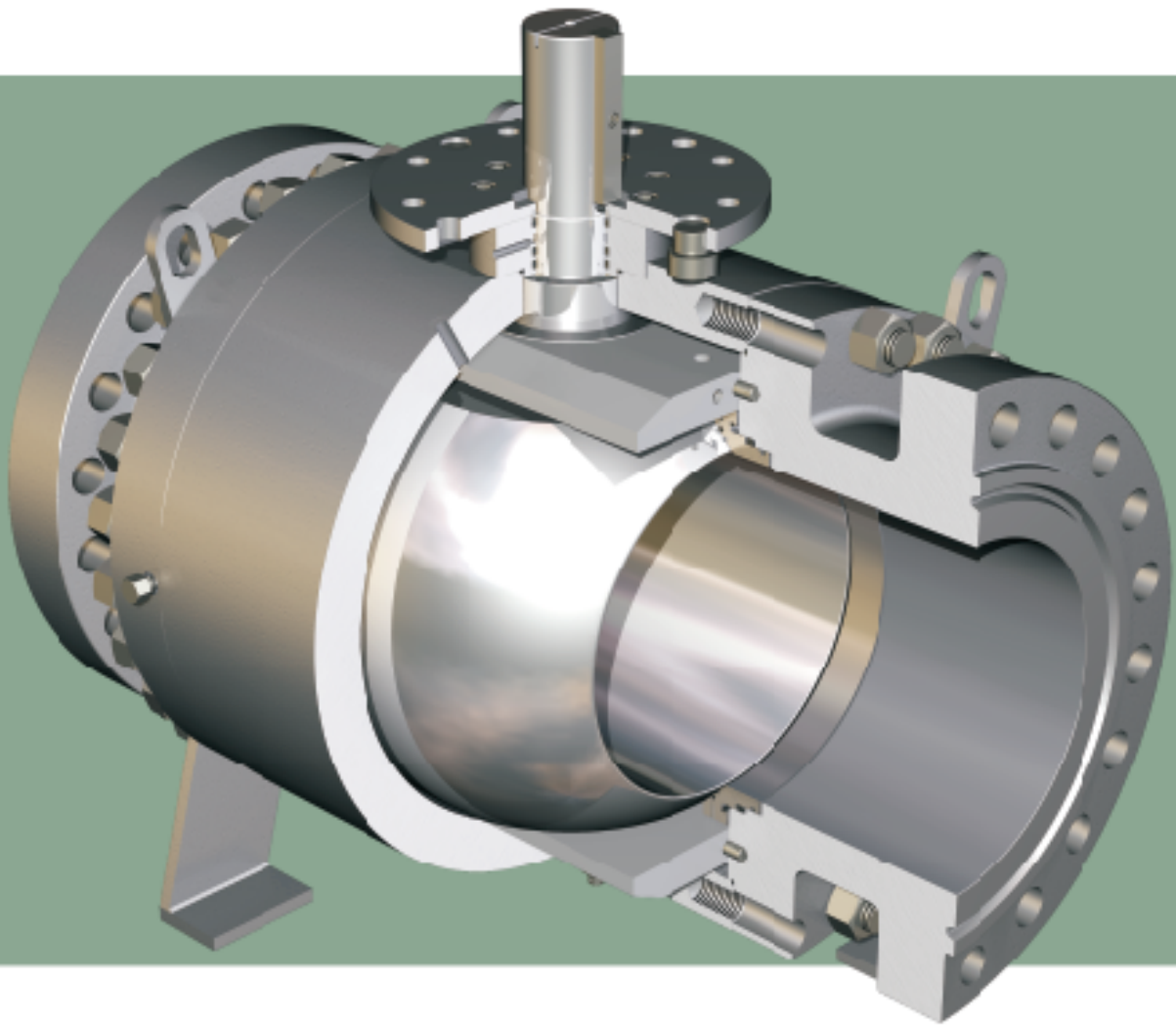


# GROVE<sup>®</sup> B4, B5 & B7 Side Entry Ball Valves



**GROVE<sup>®</sup>**

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## GROVE B4, B5 & B7 SIDE ENTRY BALL VALVES

### THE COMPANY

Cameron's Valves & Measurement (V&M) group is a leading provider of valves and measurement systems to the Oil and Gas industry.

The Engineered Valves division provides large-diameter valves for use in natural gas, LNG, crude oil and refined products transmission lines as well as in many other general industrial applications.

Rigorously tested, field-proven and backed by superior aftermarket service, Cameron's GROVE valves are among the best known valves in the world.

### GENERAL INFORMATION

#### APPLICATIONS

The GROVE Split Body Side Entry Ball Valves are manufactured in a wide range of diameters and pressure classes.

In the standard versions the valves are specified for transmission pipelines, pumping, compression and re-injection units, offshore platforms, onshore terminals, pig traps, measuring stations and surge relief skids.

In the special versions the valves are used for subsea installations and in LNG plants.

Split body construction allows the use of forged materials in various grades of carbon steel, stainless steel and high alloys thus complying with the most severe service conditions.



SIZE		ASME CLASS							
in.	(mm)	150	300	400	600	900	1500	2500	
1 1/2	(40)	●	●	●	●	●	●	▲	
2	(50)	●	●	●	●	●	●	▲	
3	(80)	●	●	●	●	●	●	▲	
4	(100)	●	●	●	●	●	●	▲	
6	(150)	■	■	■	■	■	■	▲	
8	(200)	■	■	■	■	■	■	★	
10	(250)	■	■	■	■	■	■	★	
12	(300)	■	■	■	■	■	■	★	
14	(350)	■	■	■	■	■	■	★	
16	(400)	■	■	■	■	■	■	★	
18	(450)	■	■	■	■	■	■	★	
20	(500)	■	■	■	■	■	■	★	
22	(550)	■	■	■	■	■	■		
24	(600)	■	■	■	■	■	■		
26	(650)	■	■	■	■	■	■		
28	(700)	■	■	■	■	■	■		
30	(750)	■	■	■	■	■	■		
32	(800)	■	■	■	■	■	■		
34	(850)	■	■	■	■	■	■		
36	(900)	■	■	■	■	■	■		
40	(1000)	■	■	■	■	■	■		
42	(1050)	■	■	■	■	■	■		
46	(1150)	■	■	■	■	■	■		
48	(1200)	■	■	■	■	■	■		
56	(1400)	■	■	■	■	■	■		
60	(1500)	■	■	■	■	■	■		

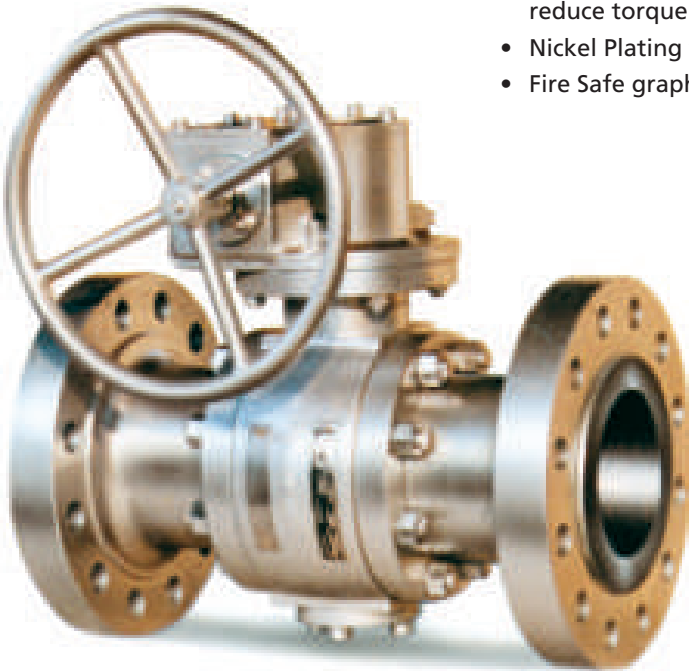
B4 ● B5 ■ B7.1 ▲ B7.B ★

## B4 DESIGN FEATURES

### STANDARD FEATURES

The standard design valve code is B4.D.

- Double barrier stem seals (the upper seal can be replaced with the valves in line, under pressure with the ball in the closed position).
- Short coupled trunnions to minimize unit bearing loads and operating torque.
- Factory positioned external stops.
- Stem separate from the ball, anti-blow-out design. Side load on stem.
- Plastic polymer insert for seat sealing.
- Self Relieving seats for ASME Classes 150, 300.
- Metal-backed self lubricating PTFE sleeve bearing and thrust washers reduce torque and extend service life.
- Nickel Plating for trim parts.
- Fire Safe graphite rings for protection against external leakage.



### FEATURES UPON REQUEST

According to the design impact of the optional features the valve code may change to B4-B, B4-C, etc.

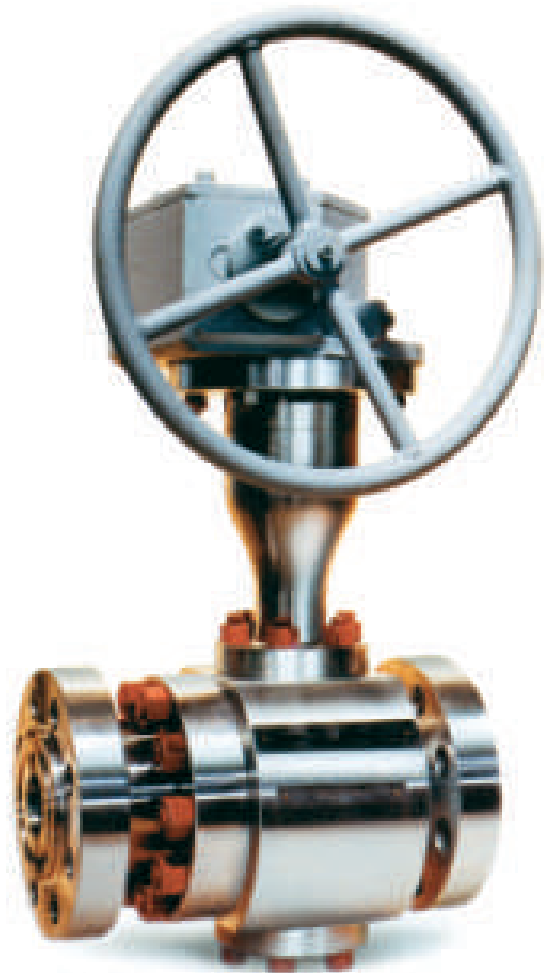
#### B4 ALL TYPES

- PTFE various grades reinforced gaskets, spring energized, for stem and seat sealing.
- Antistatic device.
- Metal-to-Metal Seats.
- Double sealing barrier in both directions (DPE) for ASME Classes 600, 900, 1500. Body relief valve for overpressure due to liquid thermal expansion.
- Double-Block-and-Bleed.
- Explosive Decompression Resistant Seals.

#### B4.B TYPE

When the valve design includes one or more of the following variations with respect to the standard design the denomination becomes B4.B

- Triple barrier stem seals. Upper stem seal "O-Ring" replaceable with pressure in line with the ball in the closed position.
- Self Relieving Seats.



#### B4.C TYPE

This version of the B4 valves (in ASME Classes 600, 900 and 1500) has these features:

- O-Ring Seat Seal.
- Double sealing barrier in both directions (DPE) and body pressure relief valve.

## B4 DESIGN FEATURES

### BODY CONSTRUCTION

The body is made of three forged parts and the bolted construction allows disassembly on the job site for repairs.

The body drain is located in the lowest part of the body cavity and consists of a 1/4 inch NPT drain valve with safety plug.

Graphite rings are provided to guarantee full compliance with API 6FA and BS 6755 part 2 Fire Safe Standards.

### STEM CONSTRUCTION

The stem of the B4 valves is of an anti-blow-out design.

The pressure thrust on the stem is supported by a thrust washer in antifriction material.

The stem function is to transmit torque and to absorb the line pressure thrust together with the trunnion.

The stem design incorporates a double barrier system.

### SEAT SEAL

The soft sealing between the seat and the ball is achieved by a plastic insert on B4.D, B4.B valves and by an O-Ring on B4.C valves.

The Block-and-Bleed and Double-Block-and-Bleed (DBB) requirements are available as per API 6D definition on all types of B4 valves.

Self Relieving seats are standard on all B4.B and B4.D, B4.C ASME Classes 150, 300.

Independent sealing on upstream and downstream seats is available on B4.D and B4.C ASME Classes 600, 900.1500.

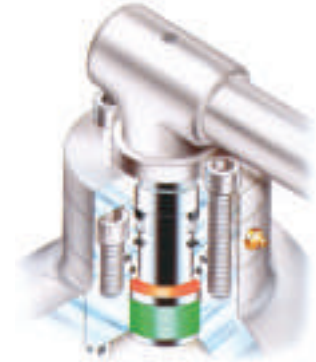
### BALL POSITION

For valves normally mounted with lever, the ball open and closed positions are assured by corresponding stops on the bearing housing.

The lever position parallel to the line flow means the valve is open.

For valves with gear or actuators the stops are set at the factory as primary stops.

An "open/closed" indicator is also provided.



## MATERIALS SPECIFICATION

### MATERIALS SELECTION

The quality of the valve design depends also on the material selection.

After examination of service conditions, the selection criteria are based on the verification of the physical and chemical characteristic of the materials or product.

For the soft sealing (O-Rings, inserts, lip seal gaskets) the guidelines to be followed are relevant for hardness, tensile strength, modulus, compression set, swelling, fluid suitability.

The process is qualified so that the final thickness after machining can guarantee the chemical composition as per the relevant ASTM Standard.

The final check is carried out by the Liquid Penetrant method.

### WELD OVERLAYS

Sealing areas and other critical parts of the valve can be weld overlaid in case of corrosive service.

More frequently used materials are AISI 316L and Alloy 625.

### DUPLEX STAINLESS STEELS METALLURGY

On Duplex (22 Cr - 2 Ni) and Superduplex (25 Cr - 5 Ni) stainless steels corrosion resistance qualification check can be as follows:

- Chloride corrosion as per ASTM G48 (40°C, 72 hours).
- Cracking as per ASTM G36 (150°C, 500 hours).
- Pitting corrosion PRE = 33 min. for Duplex, 40 min. for Superduplex.
- Ferrite content 40-60% as per ASTM E562.



### NACE REQUIREMENTS

On request GROVE Side Entry Ball Valves can be supplied in accordance with NACE MR0175.

### SEVERE WET SOUR GAS SERVICE

In addition to NACE MR0175 the additional qualifications can be:

- Sulphur  $\leq 0,015\%$ .
- Hydrogen Induced Cracking as per NACE TM-02-84 (96 hours).
- Sulphide Stress Corrosion Cracking as per NACE TM-01-77 (720 hours).

## OPTIONAL FEATURES

### METAL-TO-METAL SEATS

The contact area between the seats and the ball can be completely metallic.

This feature is required when the normal soft sealing is no longer suitable due to the unfavorable combination of pressure, temperature and chemical composition of the medium, when solid particles are present, when operating conditions prevail on the need of the fully tight sealing.

In case of Metal-to-Metal seats the ball and seats coating can be obtained by means of various materials and processes such as:

- Electroless Nickel Plating.
- High velocity application of carbide powder.

When utilizing the metallic seats it is necessary to verify very carefully the structure of the stem/ball coupling and the actuator choice as there is an increase in the valve torque.



### STEM EXTENSIONS

GROVE Ball Valves can be provided with optional stem extensions to permit buried or underground installations in remote or inaccessible areas.

When used for buried valve service, the stem extensions can be furnished "watertight" and the piping of the grease injection system will also be extended.

When ordering extensions, please specify the distance required from the valve centerline to the handwheel centerline.

### TRANSITION PIECES

GROVE can weld transition pieces to the valve during the manufacturing process.

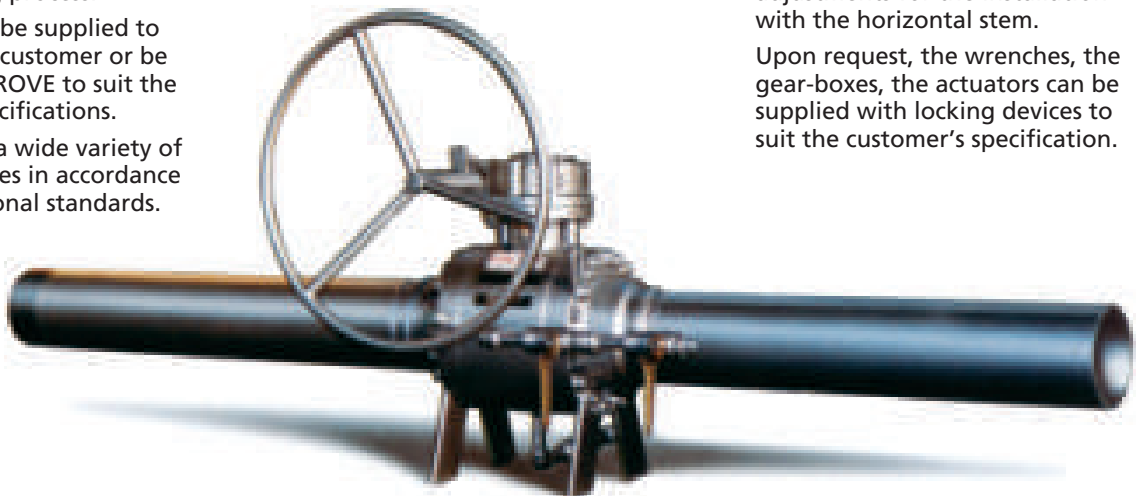
Transition can be supplied to GROVE by the customer or be provided by GROVE to suit the customer's specifications.

GROVE offers a wide variety of weld procedures in accordance with international standards.

### OTHER...

Upon request, the valve can be furnished with specific adjustments for the installation with the horizontal stem.

Upon request, the wrenches, the gear-boxes, the actuators can be supplied with locking devices to suit the customer's specification.



## SPECIAL APPLICATIONS

### “S” DESIGN FOR SUBSEA SERVICE

The “S” valves are the subsea versions of the B4, B5, B7 ball valves, specifically designed to suit subsea service conditions.

The “S” design takes into consideration the restrictive criteria used in the definition of safety coefficients relative to both pressure retaining components and the stem connection between the valve and actuator making the “S” valve suitable for EDS service.

The critical internal sealing surfaces are protected from corrosion resistance by the overlay, generally dictated by customer specifications and checked by chemical analysis of test specimens and the part(s).

The body is coated with special products.

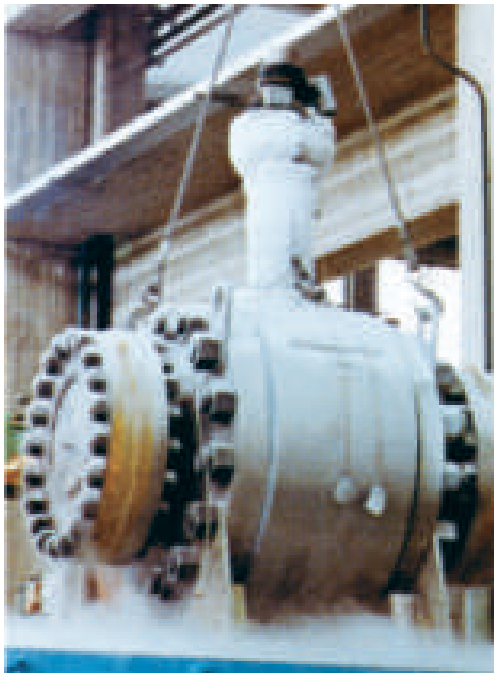
The body/bonnet bolts are protected with special protective coatings and special sealing caps.

The stem and external sealing areas are protected with additional sea water sealing gaskets.

The “S” valve is a reliable product and is designed to provide optimum service with no maintenance.

The “S” valve is usually installed on modular rigs placed on the sea floor complete with necessary components.

When necessary, substitution or complete removal of these modules is possible.



### “L” DESIGN FOR LOW TEMPERATURE SERVICE

For certain gas treatment processes (LNG) and for blow down conditions, it is required that the valve is capable to limit the leakage within specified value and to assure the maneuverability at a low temperature.

The B4-L, B5-L and B7-L valves are suitable for temperature down to -120°C.

The valves are referred to the respective standard types, but materials, parts dimensions, surface finishing, gaskets and stem connections are specifically designed to suit low temperature.

### EPOXY-PHENOLIC INTERNAL COATING

GROVE has developed a technology for anti-corrosive internal coatings.

The products have been designed for oil brine, sea and drinking water service, sour and corrosive applications.

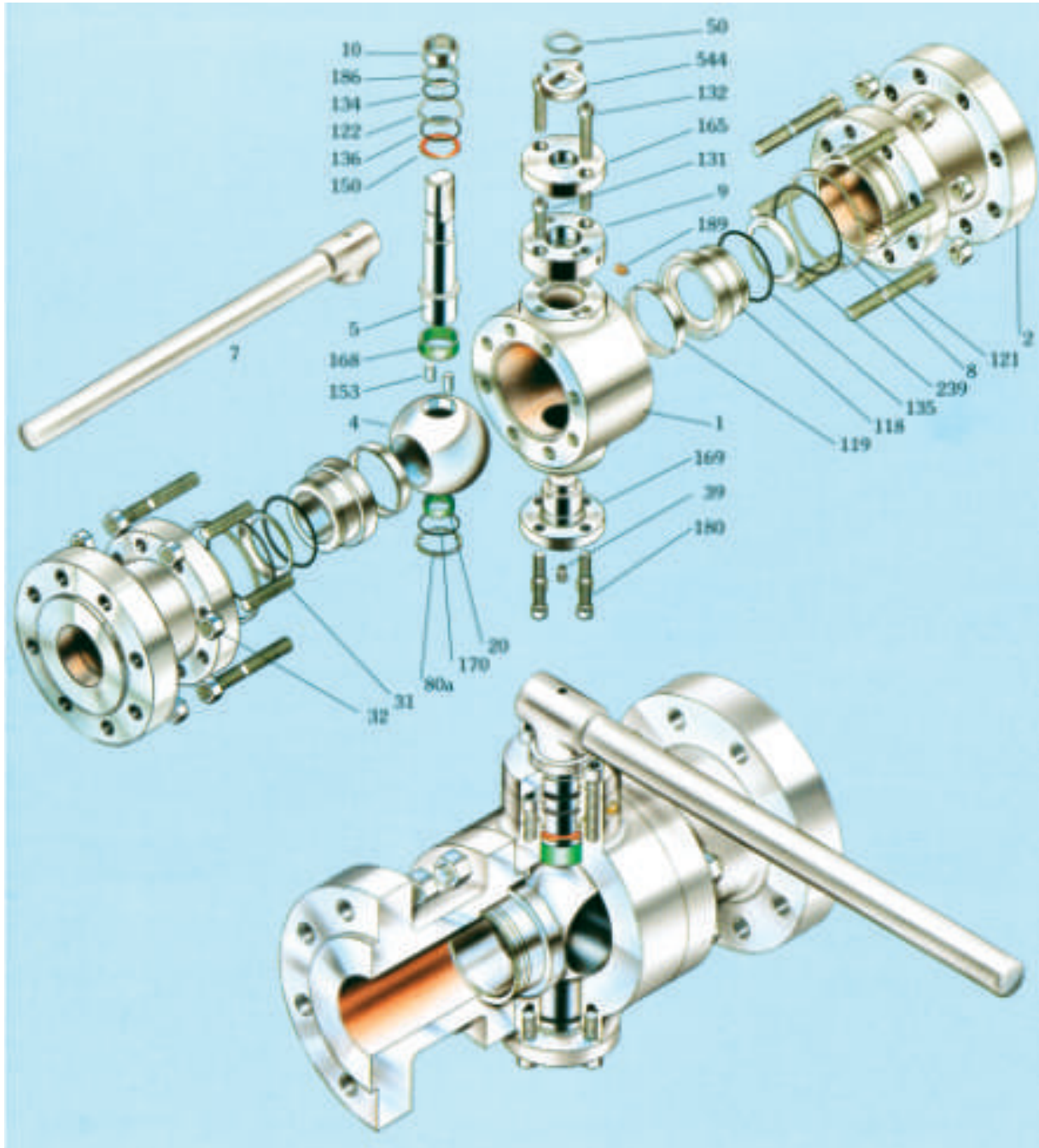
The final thickness can be 180-350 microns.

Hydrostatic shell test before and after coating.

Thickness and holiday testing records are maintained.



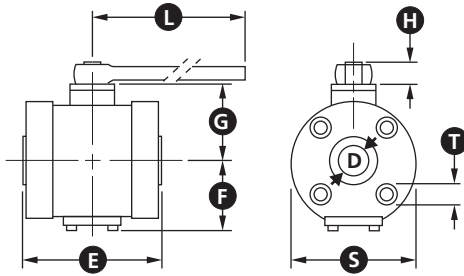
## B4-B4.D VALVE ASSEMBLY AND CROSS SECTION



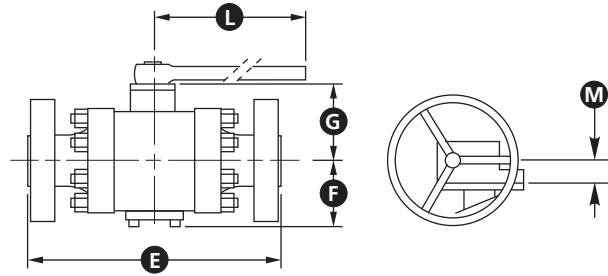
Item	Description	39	Drain Valve	150	Upper Thrust Washer
1	Body	50	Seeger Ring	153	Drive Pin
2	Closure	80a	Lower Trunnion Fire Safe Seal	165	Bearing Housing
4	Ball	118	Standard Seat Ring	168	Stem Bearing
5	Stem	119	Seat Insert	169	Lower Trunnion
7	Wrench Unit	121	Closure Fire Safe Seal	170	Trunnion O-Ring
8	Closure O-Ring	122	Gland Plate Fire Safe Seal	180	Lower Trunnion Capscrew
9	Gland Plate	131	Gland Plate Capscrew	186	Stem Fire Safe Packing
10	Gland Bushing	132	Bearing Housing Capscrew	189	Gland Vent
20	Trunnion Bearing	134	Stem O-Ring	239	Spring Washer
31	Body Stud	135	Seat Gasket O-Ring	544	Stop Collar
32	Body Stud Nut	136	Gland Plate O-Ring		

## B4.D DIMENSIONS AND WEIGHT

### ASME CLASS 150



### ASME CLASS 300



#### Class 150 RF-RTJ Full Bore

Size (in.)	Thread	T (in.) Depth	Hole n.
1 1/2	1/2 UNC	13/16	4
2	5/8 UNC	15/16	4
3	5/8 UNC	15/16	4
4	5/8 UNC	15/16	8

### ASME CLASS 150

SIZE in. (mm)	D	E			F	G	S	H	L	A	K	M	WEIGHT lb. (kg)	
		WE	RF	RTJ									WE	RF/RTJ
1 1/2 (40)	1 1/2 (38)	7 1/2 (191)	6 1/2 (165)	7 (178)	3 7/8 (98)	4 1/4 (108)	5 (127)	7/8 (22)	10 3/4 (273)	-	-	-	29 (13)	31 (14)
2 x 1 1/2 x 2 (50 x 40 x 50)	1 1/2 (38)	8 1/2 (216)	7 (178)	7 1/2 (191)	3 7/8 (98)	4 1/4 (108)	5 (127)	7/8 (22)	10 3/4 (273)	-	-	-	31 (14)	40 (18)
2 (50)	2 (51)	8 1/2 (216)	7 (178)	7 1/2 (191)	4 1/8 (105)	4 5/8 (118)	5 5/8 (143)	7/8 (22)	12 5/8 (321)	-	-	-	37 (17)	51 (23)
3 x 2 x 3 (80 x 50 x 80)	2 (51)	11 1/8 (283)	8 (203)	8 1/2 (216)	4 1/8 (105)	4 5/8 (118)	5 5/8 (143)	7/8 (22)	12 5/8 (321)	-	-	-	53 (24)	60 (27)
3 (80)	3 (76)	11 1/8 (283)	8 (203)	8 1/2 (216)	5 1/8 (130)	5 5/8 (143)	7 3/4 (197)	1 1/8 (28)	16 1/2 (419)	-	-	-	84 (38)	95 (43)
4 x 3 x 4 (100 x 80 x 100)	3 (76)	12 (305)	9 (229)	9 1/2 (241)	5 1/8 (130)	5 5/8 (143)	7 3/4 (197)	1 1/8 (28)	16 1/2 (419)	-	-	-	86 (39)	104 (47)
4 (100)	4 (102)	12 (305)	9 (229)	9 1/2 (241)	6 1/8 (155)	6 5/8 (168)	9 3/8 (238)	1 1/8 (28)	20 1/4 (514)	-	-	-	123 (56)	146 (66)
6 x 4 x 6 (150 x 100 x 150)	4 (102)	18 (457)	15 1/2 (394)	16 (406)	6 1/8 (155)	6 5/8 (168)	9.38 (238)	1 1/8 (28)	20 1/4 (514)	-	-	-	152 (69)	161 (73)

### ASME CLASS 300

SIZE in. (mm)	D	E			F	G	S	H	L	A	K	M	WEIGHT lb. (kg)	
		WE	RF	RTJ									WE	RF/RTJ
1 1/2 (40)	1 1/2 (38)	7 1/2 (191)	7 1/2 (191)	8 (203)	3 7/8 (98)	4 1/4 (108)	5 (127)	7/8 (22)	10 3/4 (273)	-	-	-	29 (13)	40 (18)
2 x 1 1/2 x 2 (50 x 40 x 50)	1 1/2 (38)	8 1/2 (216)	8 1/2 (216)	9 1/8 (232)	3 7/8 (98)	4 1/4 (108)	5 (127)	7/8 (22)	10 3/4 (273)	-	-	-	31 (14)	44 (20)
2 (50)	2 (51)	8 1/2 (216)	8 1/2 (216)	9 1/8 (232)	4 1/8 (105)	4 5/8 (118)	5 5/8 (143)	7/8 (22)	14 5/8 (372)	-	-	-	37 (17)	51 (23)
3 x 2 x 3 (80 x 50 x 80)	2 (51)	11 1/8 (283)	11 1/8 (283)	11 3/4 (298)	4 1/8 (105)	4 5/8 (118)	5 5/8 (143)	7/8 (22)	14 5/8 (372)	-	-	-	53 (24)	75 (34)
3 (80)	3 (76)	11 1/8 (283)	11 1/8 (283)	11 3/4 (298)	5 1/8 (130)	5 5/8 (143)	7 3/4 (197)	1 1/8 (28)	22 3/8 (568)	-	-	-	88 (40)	117 (53)
4 x 3 x 4 (100 x 80 x 100)	3 (76)	12 (305)	12 (305)	12 5/8 (321)	5 1/8 (130)	5 5/8 (143)	7 3/4 (197)	1 1/8 (28)	22.3/8 (568)	-	-	-	90 (41)	123 (56)
4 (100)	4 (102)	12 (305)	12 (305)	12 5/8 (321)	6 1/8 (155)	6 5/8 (168)	9 3/8 (238)	1 1/8 (28)	26 1/8 (664)	-	-	-	128 (58)	170 (77)
6 x 4 x 6 (150 x 100 x 150)	4 (102)	18 (457)	15 7/8 (403)	16 1/2 (419)	6 1/8 (155)	6 5/8 (168)	9.38 (238)	1 1/8 (28)	26 1/8 (664)	-	-	-	165 (75)	223 (101)

Flanges in accordance with ASME B16.5

Shaded Bore Sizes (D) accordance to API 6D

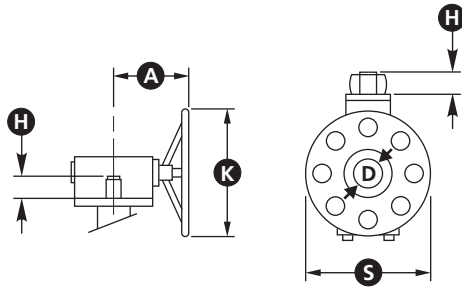
Shaded End-to-End Dimensions (E) accordance to API 6D

Butt Welding Ends accordance to ASME B16.25

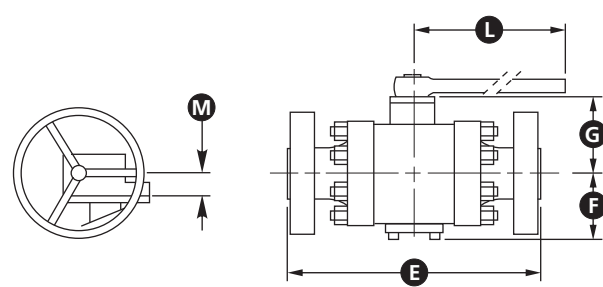
Outlined End-to-End Dimensions (E) according to ASME B16.10

## B4.D DIMENSIONS AND WEIGHT

### ASME CLASS 400



### ASME CLASS 600



### ASME CLASS 400

SIZE in. (mm)	D	E			F	G	S	H	L	A	K	M	WEIGHT	
		WE	RF	RTJ									WE	lb. (kg) RF/RTJ
1 1/2 (40)	1 1/2 (38)	9 1/2 (241)	9 1/2 (241)	9 1/2 (241)	3 7/8 (98)	4 1/4 (108)	5 (127)	7/8 (22)	10 3/4 (273)	-	-	-	30 (13)	43 (20)
2 x 1 1/2 x 2 (50 x 40 x 50)	1 1/2 (38)	11 1/2 (292)	11 1/2 (292)	11 5/8 (295)	3 7/8 (98)	4 1/4 (108)	5 (127)	7/8 (22)	10 3/4 (273)	-	-	-	33 (15)	49 (22)
2 (50)	2 (51)	11 1/2 (292)	11 1/2 (292)	11 5/8 (295)	4 1/8 (105)	4 5/8 (118)	5 5/8 (143)	7/8 (22)	14 5/8 (372)	-	-	-	41 (19)	56 (25)
3 x 2 x 3 (80 x 50 x 80)	2 (51)	14 (356)	14 (356)	14 1/8 (359)	4 1/8 (105)	4 5/8 (118)	5 5/8 (143)	7/8 (22)	14 5/8 (372)	-	-	-	56 (25)	80 (36)
3 (80)	3 (76)	14 (356)	14 (356)	14 1/8 (359)	5 1/8 (130)	5 5/8 (143)	7 3/4 (197)	1 1/8 (28)	22 3/8 (568)	-	-	-	93 (42)	123 (56)
4 x 3 x 4 (100 x 80 x 100)	3 (76)	16 (406)	16 (406)	16 1/8 (410)	5 1/8 (130)	5 5/8 (143)	7 3/4 (197)	1 1/8 (28)	22 3/8 (568)	-	-	-	103 (47)	146 (47)
4 (100)	4 (102)	16 (406)	16 (406)	16 1/8 (410)	6 1/8 (155)	6 5/8 (168)	9 3/8 (238)	1 1/8 (28)	26 1/8 (664)	-	-	-	146 (66)	198 (90)
6 x 4 x 6 (150 x 100 x 150)	4 (102)	19 1/2 (495)	19 1/2 (495)	19 5/8 (499)	6 1/8 (155)	6 5/8 (168)	9.38 (238)	1 1/8 (28)	26 1/8 (664)	-	-	-	179 (81)	279 (127)

### ASME CLASS 600

SIZE in. (mm)	D	E			F	G	S	H	L	A	K	M	WEIGHT	
		WE	RF	RTJ									WE	lb. (kg) RF/RTJ
1 1/2 (40)	1 1/2 (38)	9 1/2 (241)	9 1/2 (241)	9 1/2 (241)	3 7/8 (98)	4 1/4 (108)	5 (127)	7/8 (22)	11 7/8 (302)	-	-	-	31 (14)	46 (21)
2 x 1 1/2 x 2 (50 x 40 x 50)	1 1/2 (38)	11 1/2 (292)	11 1/2 (292)	11 5/8 (295)	3 7/8 (98)	4 1/4 (108)	5 (127)	7/8 (22)	11 7/8 (302)	-	-	-	35 (16)	53 (24)
2 (50)	2 (51)	11 1/2 (292)	11 1/2 (292)	11 5/8 (295)	4 1/8 (105)	4 5/8 (118)	5 5/8 (143)	7/8 (22)	16 7/8 (429)	-	-	-	44 (20)	62 (28)
3 x 2 x 3 (80 x 50 x 80)	2 (51)	14 (356)	14 (356)	14 1/8 (359)	4 1/8 (105)	4 5/8 (118)	5 5/8 (143)	7/8 (22)	16 7/8 (429)	-	-	-	60 (27)	86 (39)
3 (80)	3 (76)	14 (356)	14 (356)	14 1/8 (359)	5 1/8 (130)	5 5/8 (143)	7 3/4 (197)	1 1/8 (28)	26 1/4 (667)	-	-	-	97 (44)	130 (59)
4 x 3 x 4 (100 x 80 x 100)	3 (76)	17 (432)	17 (432)	17 1/8 (435)	5 1/8 (130)	5 5/8 (143)	7 3/4 (197)	1 1/8 (28)	26 1/4 (667)	-	-	-	115 (52)	168 (76)
4 (100)	4 (102)	17 (432)	17 (432)	17 1/8 (435)	6 1/8 (155)	6 5/8 (168)	9 3/8 (238)	1 1/8 (28)	30 1/8 (765)	-	-	-	192 (87)	335 (152)
6 x 4 x 6 (150 x 100 x 150)	4 (102)	22 (559)	22 (559)	22 1/8 (562)	6 1/8 (155)	6 5/8 (168)	9.38 (238)	1 1/8 (28)	30 1/8 (765)	-	-	-	192 (87)	335 (152)

Flanges in accordance with ASME B16.5

Shaded Bore Sizes (D) accordance to API 6D

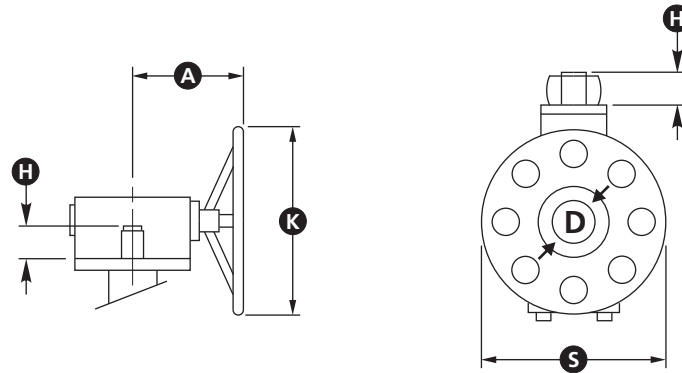
Shaded End-to-End Dimensions (E) accordance to API 6D

Butt Welding Ends accordance to ASME B16.25

Outlined End-to-End Dimensions (E) according to ASME B16.10

## B4.D DIMENSIONS AND WEIGHT

### ASME CLASS 900/1500



### ASME CLASS 900

SIZE in. (mm)	D	E			F	G	S	H	L	A	K	M	WEIGHT lb. (kg)	
		WE	RF	RTJ									WE	RF/RTJ
1 1/2 (40)	1 1/2 (38)	12 (305)	12 (305)	12 (305)	4 (102)	4 1/2 (114)	5 1/8 (130)	7/8 (22)	13 1/2 (343)	-	-	-	44 (20)	68 (31)
2 x 1 1/2 x 2 (50 x 40 x 50)	1 1/2 (38)	14 1/2 (368)	14 1/2 (368)	14 5/8 (372)	4 (102)	4 1/2 (114)	5 1/8 (130)	7/8 (22)	13 1/2 (343)	-	-	-	49 (22)	95 (43)
2 (50)	2 (51)	14 1/2 (368)	14 1/2 (368)	14 5/8 (372)	4 1/2 (114)	4 7/8 (124)	6 3/8 (162)	7/8 (22)	22 (559)	-	-	-	77 (35)	130 (59)
3 x 2 x 3 (80 x 50 x 80)	2 (51)	15 (381)	15 (381)	15 1/8 (359)	4 1/2 (114)	4 7/8 (124)	6 3/8 (162)	7/8 (22)	22 (559)	-	-	-	108 (49)	143 (65)
3 (80)	3 (76)	15 (381)	15 (381)	15 1/8 (359)	5 5/8 (143)	6 1/8 (156)	8 3/8 (213)	1 1/8 (28)	35 7/8 (911)	-	-	-	157 (71)	187 (85)
4 x 3 x 4 (100 x 80 x 100)	3 (76)	18 (457)	18 (457)	18 1/8 (460)	5 5/8 (143)	6 1/8 (156)	8 3/8 (213)	1 1/8 (28)	35 7/8 (911)	-	-	-	159 (72)	240 (109)
4 (100)	4 (102)	18 (457)	18 (457)	18 1/8 (460)	6 7/8 (175)	7 1/2 (191)	11 1/2 (292)	2 1/8 (54)	10 7/8 (276)	23 5/8 (600)	1 3/4 (44)	353 (160)	390 (177)	
6 x 4 x 6 (150 x 100 x 150)	4 (102)	24 (610)	24 (610)	24 1/8 (613)	6 7/8 (175)	7 1/2 (191)	10 1/4 (260)	2 1/8 (54)	10 7/8 (276)	23 5/8 (600)	1 3/4 (44)	357 (162)	489 (222)	

### ASME CLASS 1500

SIZE in. (mm)	D	E			F	G	S	H	L	A	K	M	WEIGHT lb. (kg)	
		WE	RF	RTJ									WE	RF/RTJ
1 1/2 (40)	1 1/2 (38)	12 (305)	12 (305)	12 (305)	4 (102)	4 1/2 (114)	5 1/8 (130)	7/8 (22)	15 7/8 (403)	-	-	-	44 (20)	68 (31)
2 x 1 1/2 x 2 (50 x 40 x 50)	1 1/2 (38)	14 1/2 (368)	14 1/2 (368)	14 5/8 (372)	4 (102)	4 1/2 (114)	5 1/8 (130)	7/8 (22)	15 7/8 (403)	-	-	-	49 (22)	95 (43)
2 (50)	2 (51)	14 1/2 (368)	14 1/2 (368)	14 5/8 (372)	4 1/2 (114)	4 7/8 (124)	6 3/8 (162)	7/8 (22)	24 1/4 (616)	-	-	-	77 (35)	130 (59)
3 x 2 x 3 (80 x 50 x 80)	2 (51)	18 1/2 (470)	18 1/2 (470)	18 5/8 (473)	4 1/2 (114)	4 7/8 (124)	6 3/8 (162)	7/8 (22)	24 1/4 (616)	-	-	-	108 (49)	168 (76)
3 (80)	3 (76)	18 1/2 (470)	18 1/2 (470)	18 5/8 (473)	5 5/8 (143)	6 1/8 (156)	8 3/8 (213)	2 1/8 (54)	6 3/4 (171)	11 3/4 (298)	1 1/4 (32)	179 (81)	240 (109)	
4 x 3 x 4 (100 x 80 x 100)	3 (76)	21 1/2 (546)	21 1/2 (546)	21 5/8 (549)	5 5/8 (143)	6 1/8 (156)	8 3/8 (213)	2 1/8 (54)	6 3/4 (171)	11 3/4 (298)	1 1/4 (32)	185 (84)	311 (141)	
4 (100)	4 (102)	21 1/2 (546)	21 1/2 (546)	21 5/8 (549)	6 7/8 (175)	7 1/2 (191)	12 1/4 (311)	2 1/8 (54)	10 7/8 (276)	23 5/8 (600)	1 3/4 (44)	355 (161)	399 (181)	
6 x 4 x 6 (150 x 100 x 150)	4 (102)	27 3/4 (705)	27 3/4 (705)	28 (711)	6 7/8 (175)	7 1/2 (191)	10 1/4 (260)	2 1/8 (54)	10 7/8 (276)	23 5/8 (600)	1 3/4 (44)	366 (166)	628 (285)	

Flanges in accordance with ASME B16.5

Shaded Bore Sizes (D) accordance to API 6D

Shaded End-to-End Dimensions (E) accordance to API 6D

Butt Welding Ends accordance to ASME B16.25

Outlined End-to-End Dimensions (E) according to ASME B16.10

## B5 DESIGN FEATURES

### STANDARD FEATURES

- Double barrier stem seals.
- Stem separated from the ball, anti-blow-out design. No side load on the stem. Bearing blocks adsorb the pressure load on the ball.
- Primary Metal-to-Metal Seal and secondary protected synthetic O-Ring Seal.
- Double sealing barrier in both directions (DPE).  
Body relief valve for overpressure due to liquid thermal expansion.
- Built in sealant injection system for emergency seat seal.
- Metal-backed self lubricating PTFE sleeve bearings and thrust washer reduce torque and extend service life.
- Nickel plating for trim parts.
- Trunnion mounted ball for ease of operation at high pressure.
- Large diameter short coupled trunnions to minimize unit bearing loads and operating torque.
- Bolted construction permits disassembly on job site for repairs.
- Integral stop in the adapter plate for a permanent reference to open and closed position.
- Antistatic device.

### FEATURES UPON REQUEST

- Triple barrier stem seals.
- Emergency grease fitting for stem.
- Self Relieving Seats.
- Plastic polymer O-Ring or insert for primary seat sealing.
- Double-Block-and-Bleed.
- PTFE various grades of reinforced gaskets, springs energized, for stem and seat sealing.
- Metal-to-Metal Seat.
- Explosive Decompression Resistant Seal.



## B5 DESIGN FEATURES

### BODY CONSTRUCTION

The body is made of three forged parts and the bolted construction allows disassembly on the job site for repairs.

The bolts threads areas are per ISO metric or ASME imperial, depending on the market request.

The tightening of the bolts is made by hydraulic tools with a predetermined torque.

The body drain is located in the lowest part of the body cavity and consists of a NPT drain valve with safety plug.

### STEM CONSTRUCTION

The stem is separated from the ball and is connected to the upper ball trunnion by steel pins.

Bearing blocks 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.

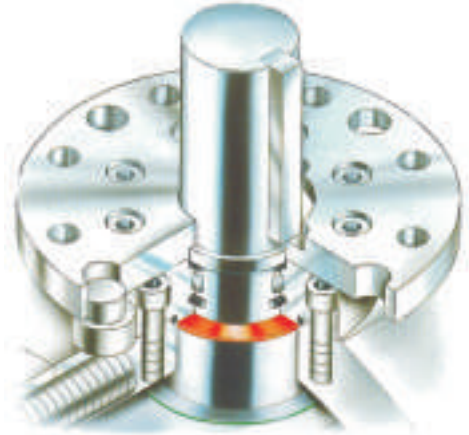
The absence of this side load and friction drag on the stem assures lower operating torque and long trouble-free service life.

The stem is sealed by means of two O-Rings.

If leakage should ever occur through both stem seals, the outer O-Ring can be replaced with the valve in the line, under pressure with the ball in the closed position.

With no pressure in line, it is possible to remove the gland plate for replacement of both primary and outer stem O-Rings.

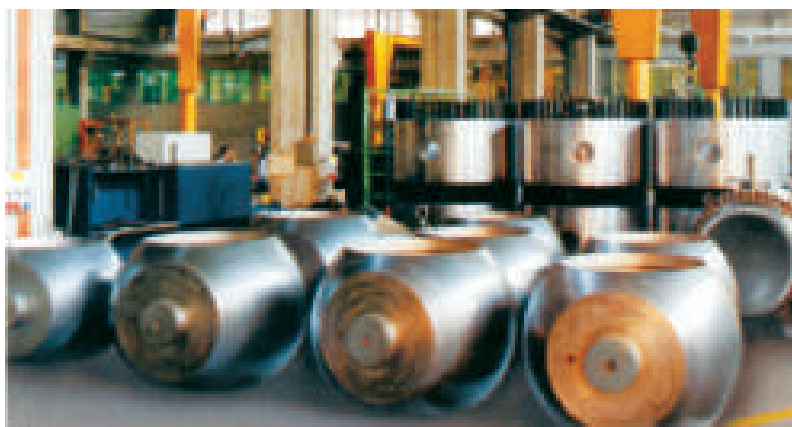
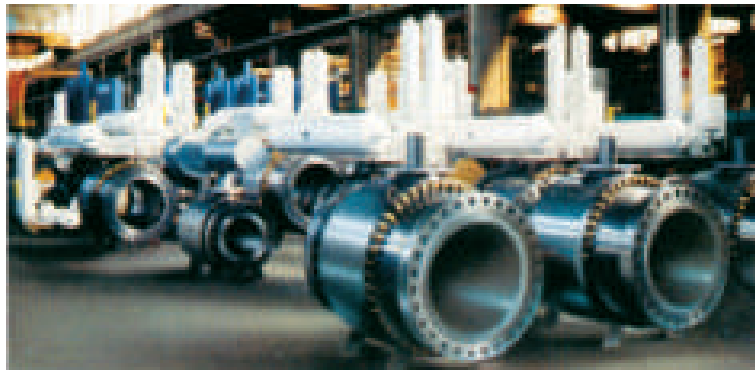
The stem can also be removed and replaced if necessary.



### TORQUE

GROVE'S low operating torque is due to a combination of factors:

- The design of the stem which is separated from the ball;
- the side loads, brought on by differential pressure, are absorbed by two (upper and lower) rigid bearing retainers, large diameter short coupled trunnions to minimize unit bearing loads;
- the metal backed, self lubricating sleeve bearing and the thrust washers reduce the torque and extend the service life.



### BALL POSITION

The ball open and closed positions are assured by corresponding stops on the adapter plate.

The valve is normally mounted with the actuator stops or the gear stops set at the factory as primary stops.

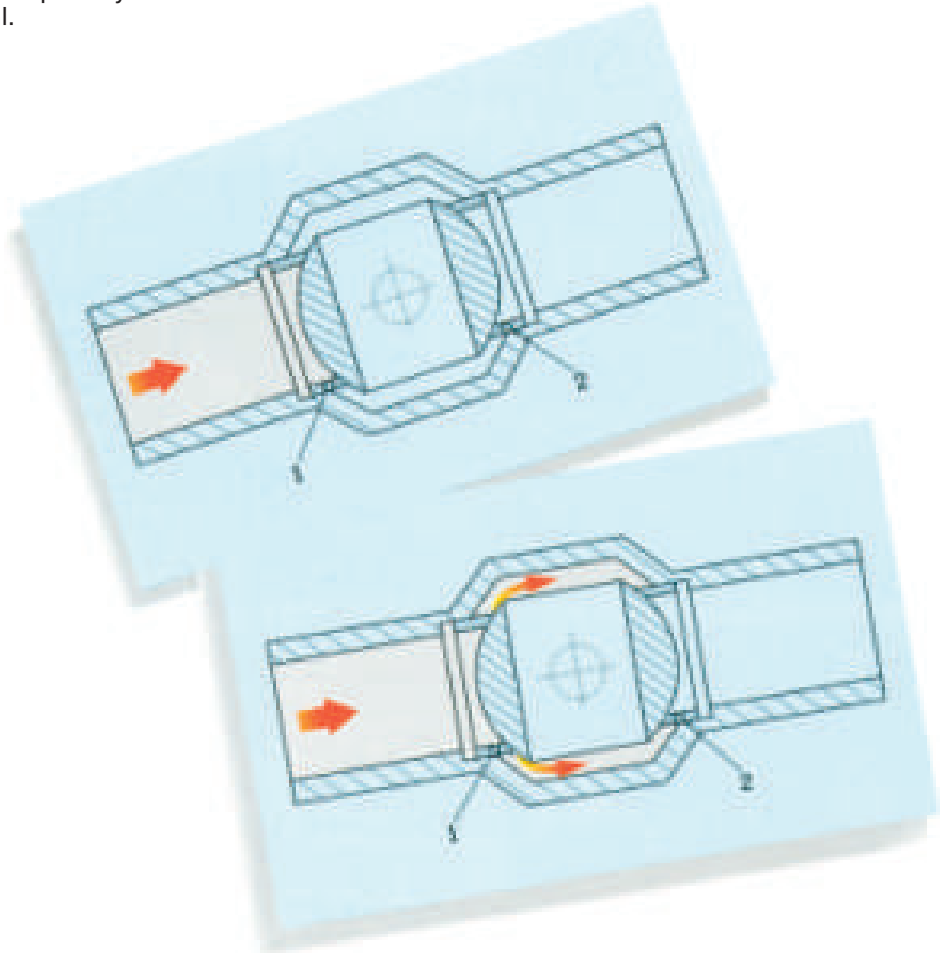
An "open/closed" indicator is also provided.

## B5 DESIGN FEATURES

### SEAT SEALS

The B5 seat design assures double barrier of sealing in both directions (the normal Self Relieving seats are a simple barrier of sealing).

The sealing is performed by both a primary Metal-to-Metal Seal and a secondary protected O-Ring Seal.



### DOUBLE PISTON EFFECT (DPE)

The DPE seat design was invented and patented by GROVE.

The DPE seat design allows for both seats to seal with pressure acting from the same side of the valve.

In the event one seat becomes damaged, the user has the added advantage of the opposite seat sealing.

By means of this double barrier, the sealing is assured regardless of the direction of the flow through the valve.

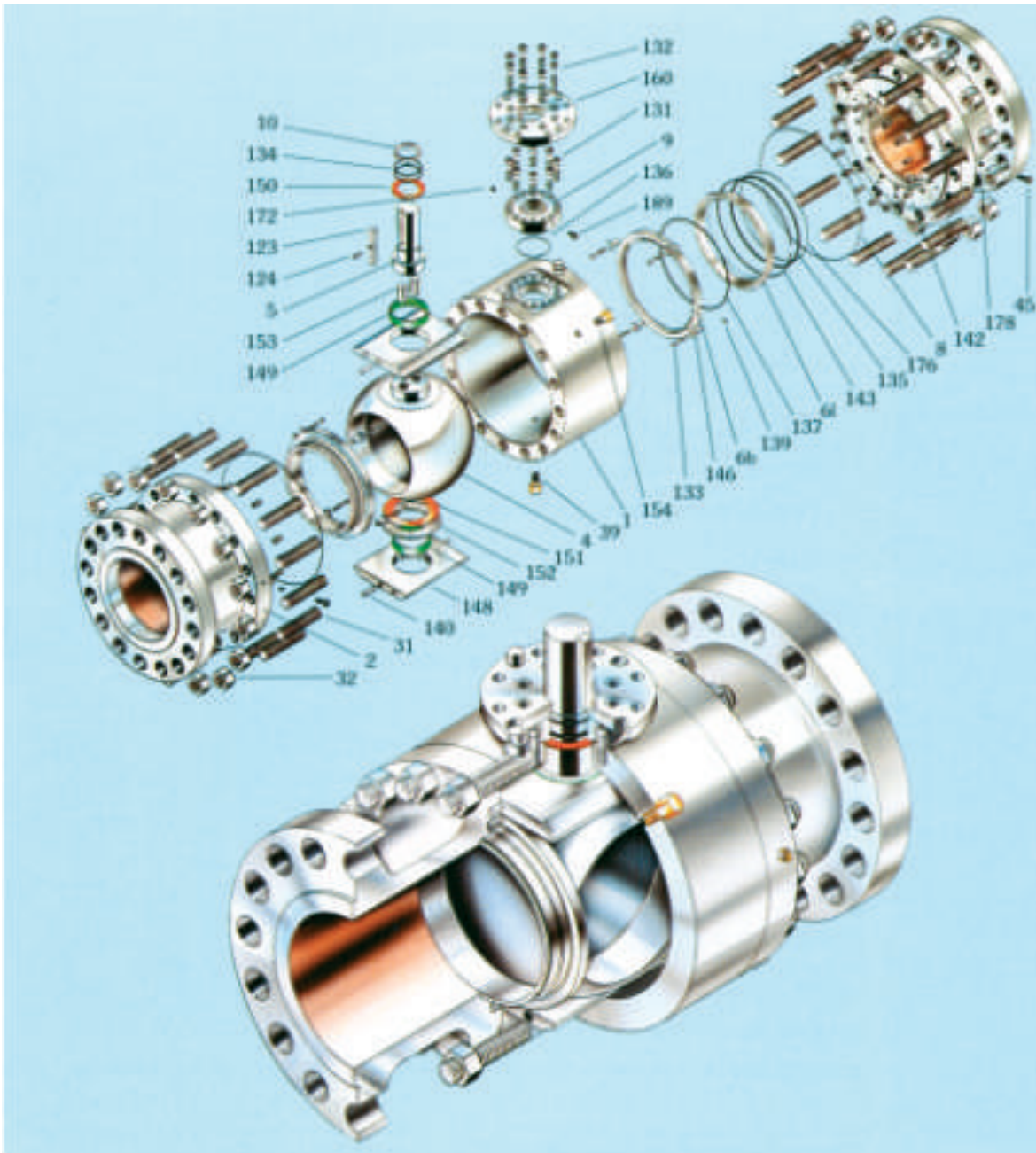
If the upstream seat (1) becomes damaged and leaks, the pressure entering the body cavity acts on the downstream seat (2) sealing the downstream seat tightly against the ball.

NOTE: the DPE feature and the Double-Block-and-Bleed (DBB) feature are not to be confused with each other.

The initial seal, at extremely low pressure differential or vacuum conditions, is obtained with spring loaded floating seats, which are free to move slightly along the longitudinal axis of the valve.

Line pressure behind the seat ring supplements the seat spring load to force the seat tightly against the ball.

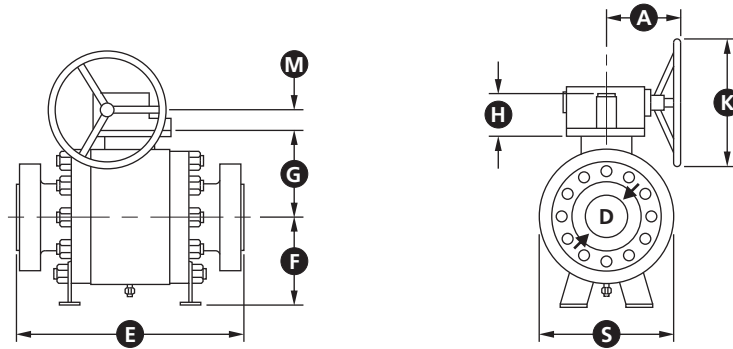
## B5 VALVE ASSEMBLY AND CROSS SECTION



Item	Description		Description		Description
1	Body	45	Grease Fitting	146	Puller Bushing
2	Closure	123	Stem Key	148	Bearing Retainer
4	Ball	124	Stem Key Capscrew	149	Bearing
5	Stem	131	Gland Plate Capscrew	150	Upper Thrust Washer
6 b	Outer Seat Ring	132	Adapter Plate Capscrew	151	Lower Thrust Washer
6 l	Inner Seat Ring	134	Stem O-Ring	152	Spacer
8	Body O-Ring	135	Seat O-Ring	153	Drive Pin
9	Gland Plate	136	Gland Plate O-Ring	154	Relief Valve
10	Gland Bushing	137	Seal O-Ring	160	Adapter Plate
31	Body Stud	139	Seat Spring Pin	172	Vent Plug
32	Body Stud Nut	140	Bearing Retainer Pin	176	U-Cup Packing
39	Drain Valve	142	Spring	178	Check Valve
		143	Seat Lock Ring	189	Gland Vent



## B5 DIMENSIONS & WEIGHT ASME CLASS 150



### ASME CLASS 150

SIZE in. (mm)	D	E			F	G	S	H	L	A	K	M	WEIGHT	
		WE	RF	RTJ									WE	RF/RTJ
6 (150)	6 (152)	18 (457)	15 1/2 (394)	16 (406)	11 7/8 (302)	8 1/2 (108)	11 7/8 (302)	2 3/4 (70)	-	8 3/4 (222)	13 3/4 (349)	2 5/8 (67)	440 (200)	520 (236)
8 (200)	8 (203)	20 1/2 (521)	18 (457)	18 1/2 (470)	13 3/8 (340)	9 7/8 (108)	15 5/8 (397)	2 3/4 (70)	-	8 3/4 (222)	13 3/4 (349)	2 5/8 (67)	720 (327)	850 (386)
10 (250)	10 (254)	22 (559)	21 (533)	21 1/2 (546)	14 7/8 (378)	11 5/8 (118)	18 1/4 (464)	2 3/4 (70)	-	8 3/4 (222)	13 3/4 (349)	2 5/8 (67)	1050 (476)	1250 (567)
12 (300)	12 (305)	25 (635)	24 (610)	24 1/2 (622)	16 3/8 (416)	13 1/2 (118)	21 5/8 (549)	2 3/4 (70)	-	8 3/4 (222)	13 3/4 (349)	2 5/8 (67)	1450 (658)	1740 (789)
14 (350)	13 1/4 (337)	30 (762)	27 (686)	27 1/2 (699)	18 3/8 (467)	14 5/8 (143)	23 (584)	3 3/4 (95)	-	11 1/2 (292)	13 3/4 (349)	3 (76)	1800 (816)	2160 (980)
16 (400)	15 1/4 (387)	33 (838)	30 (762)	30 1/2 (775)	19 7/8 (505)	16 1/4 (143)	26 3/8 (670)	3 3/4 (95)	-	11 1/2 (292)	13 3/4 (349)	3 (76)	2160 (980)	2570 (1166)
18 (450)	17 1/4 (438)	36 (914)	34 (864)	34 1/2 (876)	21 1/2 (546)	18 (168)	29 7/8 (759)	4 1/2 (114)	-	11 1/2 (292)	13 3/4 (349)	3 (76)	3020 (1370)	3610 (1637)
20 (500)	19 1/4 (489)	39 (991)	36 (914)	36 1/2 (927)	23 1/8 (587)	19 3/8 (168)	32 7/8 (835)	4 1/2 (114)	-	11 1/2 (292)	13 3/4 (349)	3 (76)	4050 (1837)	4850 (2200)
22 (550)	21 1/4 (540)	(1)	(1)	(1)	24 7/8 (632)	21 1/8 (537)	36 1/4 (921)	4 1/2 (114)	-	15 3/4 (400)	23 5/8 (600)	4 3/8 (111)	5020 (2277)	6010 (2726)
24 (600)	23 1/4 (591)	45 (1143)	42 (1067)	42 1/2 (1080)	26 3/8 (670)	22 1/2 (572)	38 7/8 (988)	7 1/8 (181)	-	21 5/8 (549)	31 1/2 (800)	4 3/8 (111)	6010 (2726)	7200 (3266)
26 (650)	25 (635)	49 (1245)	45 (1143)	(1)	28 1/4 (718)	24 1/2 (622)	41 3/4 (1060)	7 1/8 (181)	-	21 5/8 (549)	31 1/2 (800)	4 3/8 (111)	7600 (3447)	9120 (4137)
28 (700)	27 (686)	53 (1346)	49 (1245)	(1)	29 5/8 (753)	25 7/8 (657)	44 3/4 (1137)	7 1/8 (181)	-	21 5/8 (549)	31 1/2 (800)	4 3/8 (111)	8700 (3946)	10440 (4736)
30 (750)	29 (737)	55 (1397)	51 (1295)	(1)	31 3/4 (806)	27 1/2 (699)	48 5/8 (1235)	7 1/8 (181)	-	21 5/8 (549)	31 1/2 (800)	4 3/8 (111)	10420 (4726)	12500 (5670)
32 (800)	30 3/4 (781)	60 (1524)	54 (1372)	(1)	33 1/4 (845)	29 (737)	51 (1295)	8 1/8 (206)	-	21 5/8 (549)	23 5/8 (600)	5 3/8 (137)	11860 (5380)	14210 (6446)
34 (850)	32 3/4 (832)	64 (1626)	58 (1473)	(1)	34 3/8 (873)	30 7/8 (784)	53 3/8 (1356)	8 1/8 (206)	-	21 3/4 (552)	23 5/8 (600)	5 3/8 (137)	14500 (6577)	17390 (7888)
36 (900)	34 1/2 (876)	68 (1727)	60 (1524)	(1)	35 3/4 (908)	32 3/8 (822)	56 3/4 (1441)	8 1/8 (206)	-	21 3/4 (552)	23 5/8 (600)	5 3/8 (137)	16880 (7657)	20260 (9190)
40 (1000)	38 1/2 (978)	(1)	(1)	(1)	39 3/8 (1000)	35 5/8 (905)	63 7/8 (1623)	8 1/8 (206)	-	21 3/4 (552)	23 5/8 (600)	5 3/8 (137)	21560 (9779)	25850 (11725)
42 (1050)	40 1/4 (1022)	(1)	(1)	(1)	40 3/4 (1035)	38 1/8 (968)	67 3/8 (1711)	8 1/8 (206)	-	21 3/4 (552)	23 5/8 (600)	5 3/8 (137)	25390 (11517)	30460 (13816)
46 (1150)	44 (1118)	(1)	(1)	(1)	44 5/8 (1134)	42 1/2 (1080)	74 1/2 (1892)	8 1/8 (206)	-	22 7/8 (581)	23 5/8 (600)	6 1/4 (159)	30860 (13998)	37030 (16797)
48 (1200)	46 (1168)	(1)	(1)	(1)	46 3/8 (1178)	44 3/8 (1127)	77 1/2 (1969)	8 1/8 (206)	-	22 7/8 (581)	23 5/8 (600)	6 1/4 (159)	35270 (15998)	42320 (19196)
56 (1400)	54 1/2 (1384)	(1)	(1)	(1)	52 3/4 (1321)	50 3/8 (1280)	89 3/4 (2280)	9 5/8 (245)	-	-	-	-	54010 (24499)	64810 (29397)
60 (1500)	57 1/2 (1461)	(1)	(1)	(1)	56 3/8 (1432)	55 1/8 (1400)	96 3/8 (2448)	9 5/8 (245)	-	-	-	-	66130 (29996)	79360 (35997)

(1) Upon Request

Shaded Bore Sizes (D) accordance to API 6D

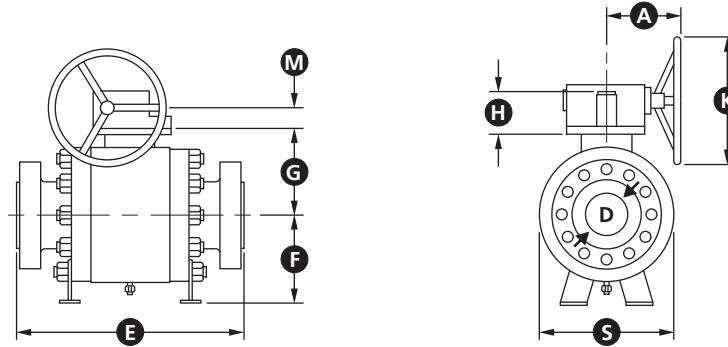
Shaded End-to-End Dimensions (E) accordance to API 6D

Butt Welding Ends accordance to ASME B16.25

Larger Sizes Available on Request.

Reduced Bore Valves also Available.

Flanges in accordance with ASME B16.5

**B5 DIMENSIONS & WEIGHTS ASME CLASS 300**

**ASME CLASS 300**

SIZE in. (mm)	D	E			F	G	S	H	L	A	K	M	WEIGHT	
		WE	RF	RTJ									WE	RF/RTJ
6 (150)	6 (152)	18 (457)	15 7/8 (403)	16 1/2 (419)	11 7/8 (302)	8 1/2 (108)	12 (305)	2 3/4 (70)	-	8 3/4 (222)	13 3/4 (349)	2 5/8 (67)	460 (209)	550 (249)
8 (200)	8 (203)	20 1/2 (521)	19 3/4 (502)	20 3/8 (518)	13 3/8 (340)	9 7/8 (108)	15 7/8 (403)	2 3/4 (70)	-	8 3/4 (222)	13 3/4 (349)	2 5/8 (67)	740 (336)	880 (399)
10 (250)	10 (254)	22 (559)	22 3/8 (568)	23 (584)	14 7/8 (378)	11 5/8 (118)	18 3/8 (467)	3 3/4 (95)	-	11 1/2 (292)	13 3/4 (349)	3 (76)	1100 (499)	1320 (599)
12 (300)	12 (305)	25 (635)	25 1/2 (648)	26 1/8 (664)	16 3/8 (416)	13 1/2 (118)	21 3/4 (552)	3 3/4 (95)	-	11 1/2 (292)	13 3/4 (349)	3 (67)	1520 (689)	1800 (816)
14 (350)	13 1/4 (337)	30 (762)	30 (762)	30 5/8 (778)	18 3/8 (467)	14 5/8 (143)	23 1/4 (591)	4 1/2 (114)	-	11 1/2 (292)	13 3/4 (349)	3 (76)	1890 (857)	2270 (1030)
16 (400)	15 1/4 (387)	33 (838)	33 (838)	33 5/8 (854)	19 7/8 (505)	16 1/4 (143)	26 3/4 (679)	4 1/2 (114)	-	11 1/2 (292)	13 3/4 (349)	3 (76)	2240 (1016)	2680 (1216)
18 (450)	17 1/4 (438)	36 (914)	36 (914)	36 5/8 (930)	21 1/2 (546)	18 (168)	30 1/4 (768)	4 1/2 (114)	-	15 3/4 (400)	23 5/8 (600)	4 3/8 (111)	3150 (1429)	3760 (1706)
20 (500)	19 1/4 (489)	39 (991)	39 (991)	39 3/4 (1010)	23 1/8 (587)	16 7/8 (429)	33 1/4 (845)	7 1/8 (181)	-	21 5/8 (549)	31 1/2 (800)	4 3/8 (111)	4250 (1928)	5090 (2309)
22 (550)	21 1/4 (540)	43 (1092)	43 (1092)	43 7/8 (1115)	24 7/8 (632)	21 1/8 (537)	36 5/8 (930)	7 1/8 (181)	-	21 5/8 (549)	31 1/2 (800)	4 3/8 (111)	5260 (2386)	6300 (2858)
24 (600)	23 1/4 (591)	45 (1143)	45 (1143)	45 7/8 (1165)	26 3/8 (670)	22 1/2 (572)	39 1/4 (997)	7 1/8 (181)	-	21 5/8 (549)	31 1/2 (800)	4 3/8 (111)	6300 (2858)	7560 (3429)
26 (650)	25 (635)	49 (1245)	49 (1245)	50 (1270)	28 1/4 (718)	24 1/2 (622)	42 1/8 (1070)	8 1/8 (206)	-	21 3/4 (552)	23 5/8 (600)	5 3/8 (137)	7980 (3620)	9560 (4336)
28 (700)	27 (686)	53 (1346)	53 (1346)	54 (1372)	29 5/8 (753)	25 7/8 (657)	45 1/4 (1149)	8 1/8 (206)	-	21 3/4 (552)	23 5/8 (600)	5 3/8 (137)	9120 (4137)	10930 (4958)
30 (750)	29 (737)	55 (1397)	55 (1397)	56 (1422)	31 3/4 (806)	27 1/2 (699)	49 1/8 (1248)	8 1/8 (206)	-	21 3/4 (552)	23 5/8 (600)	5 3/8 (137)	10930 (4958)	13110 (5947)
32 (800)	30 3/4 (781)	60 (1524)	60 (1524)	61 1/8 (1553)	33 1/4 (845)	29 (737)	51 1/2 (1308)	8 1/8 (206)	-	21 3/4 (552)	23 5/8 (600)	5 3/8 (137)	12430 (5638)	14900 (6759)
34 (850)	32 3/4 (832)	64 (1626)	64 (1626)	65 1/8 (1654)	34 3/8 (873)	30 7/8 (784)	53 7/8 (1369)	8 1/8 (206)	-	21 3/4 (552)	23 5/8 (600)	5 3/8 (137)	15210 (6899)	18250 (8278)
36 (900)	34 1/2 (876)	68 (1727)	68 (1727)	69 1/8 (1756)	35 3/4 (908)	32 3/8 (822)	57 3/8 (1457)	8 1/8 (206)	-	22 7/8 (581)	23 5/8 (600)	6 1/4 (159)	17720 (8038)	21250 (9639)
40 (1000)	38 1/2 (978)	(1)	(1)	(1)	39 3/8 (1000)	35 5/8 (905)	64 1/2 (1638)	8 1/8 (206)	-	22 7/8 (581)	23 5/8 (600)	6 1/4 (159)	22610 (10256)	27130 (12306)
42 (1050)	40 1/4 (1022)	(1)	(1)	(1)	40 3/4 (1035)	38 1/8 (968)	68 1/8 (1730)	9 5/8 (245)	-	22 7/8 (581)	23 5/8 (600)	6 1/4 (159)	26650 (12088)	31960 (14497)
46 (1150)	44 (1118)	(1)	(1)	(1)	44 5/8 (1134)	42 1/2 (1080)	75 1/4 (1911)	9 5/8 (245)	-	22 7/8 (581)	23 5/8 (600)	6 1/4 (159)	32400 (14696)	38880 (17636)
48 (1200)	46 (1168)	(1)	(1)	(1)	46 3/8 (1178)	44 3/8 (1127)	78 1/4 (1988)	9 5/8 (245)	-	25 5/8 (651)	47 1/4 (1200)	6 5/8 (168)	37030 (16797)	44440 (20158)
56 (1400)	54 1/2 (1384)	(1)	(1)	(1)	52 3/4 (1321)	50 3/8 (1280)	90 3/4 (2305)	9 5/8 (245)	-	-	-	-	56700 (25719)	68030 (30858)
60 (1500)	57 1/2 (1461)	(1)	(1)	(1)	56 3/8 (1432)	55 1/8 (1400)	97 1/2 (2477)	9 5/8 (245)	-	-	-	-	69440 (31497)	83330 (37798)

(1) Upon Request

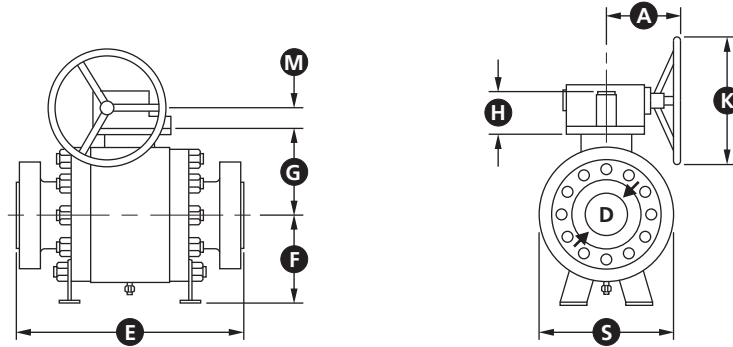
Shaded Bore Sizes (D) accordance to API 6D

Shaded End-to-End Dimensions (E) accordance to API 6D

Flanges in accordance with ASME B16.5

Butt Welding Ends accordance to ASME B16.25

## B5 DIMENSIONS & WEIGHT ASME CLASS 400



### ASME CLASS 400

SIZE in. (mm)	D	E			F	G	S	H	L	A	K	M	WEIGHT	
		WE	RF	RTJ									WE	RF/RTJ
6 (150)	6 (152)	19 1/2 (495)	19 1/2 (495)	19 5/8 (499)	12 1/8 (308)	8 1/2 (108)	12 1/8 (308)	2 3/4 (70)	-	8 3/4 (222)	13 3/4 (349)	2 5/8 (67)	520 (236)	610 (277)
8 (200)	8 (203)	23 1/2 (597)	23 1/2 (597)	23 5/8 (600)	13 5/8 (346)	9 7/8 (108)	16 (406)	3 3/4 (95)	-	11 1/2 (292)	13 3/4 (349)	3 (76)	850 (386)	1010 (458)
10 (250)	10 (254)	26 1/2 (673)	26 1/2 (673)	26 5/8 (676)	15 1/4 (387)	11 5/8 (118)	18 5/8 (473)	3 3/4 (95)	-	11 1/2 (292)	13 3/4 (349)	3 (76)	1250 (567)	1490 (676)
12 (300)	12 (305)	30 (762)	30 (762)	30 1/8 (765)	16 3/4 (425)	13 1/2 (118)	22 (559)	3 3/4 (95)	-	11 1/2 (292)	13 3/4 (349)	3 (67)	1740 (789)	2070 (939)
14 (350)	13 1/4 (337)	32 1/2 (826)	32 1/2 (826)	32 5/8 (829)	18 3/4 (476)	14 5/8 (143)	23 1/2 (597)	4 1/2 (114)	-	11 1/2 (292)	13 3/4 (349)	3 (76)	2160 (980)	2570 (1166)
16 (400)	15 1/4 (387)	35 1/2 (902)	35 1/2 (902)	35 5/8 (905)	20 3/8 (518)	16 1/4 (143)	27 (686)	4 1/2 (114)	-	11 1/2 (292)	13 3/4 (349)	3 (76)	2570 (1166)	3080 (1397)
18 (450)	17 1/4 (438)	38 1/2 (978)	38 1/2 (978)	38 5/8 (981)	21 7/8 (556)	18 (168)	30 1/2 (775)	7 1/8 (181)	-	21 5/8 (549)	31 1/2 (800)	4 3/8 (111)	3610 (1637)	4320 (1960)
20 (500)	19 1/4 (489)	41 1/2 (1054)	41 1/2 (1054)	41 3/4 (1056)	23 1/2 (597)	19 3/8 (492)	33 1/2 (851)	7 1/8 (181)	-	21 5/8 (549)	31 1/2 (800)	4 3/8 (111)	4870 (2209)	5840 (2649)
22 (550)	21 1/4 (540)	45 (1143)	45 (1143)	45 3/8 (1153)	25 3/8 (645)	21 1/8 (537)	37 (940)	7 1/8 (181)	-	21 5/8 (549)	31 1/2 (800)	4 3/8 (111)	6040 (2740)	7230 (3279)
24 (600)	23 1/4 (591)	48 1/2 (1232)	48 1/2 (1232)	48 7/8 (1242)	26 7/8 (683)	22 1/2 (572)	39 5/8 (1007)	8 1/8 (206)	-	21 3/4 (552)	23 5/8 (600)	5 3/8 (137)	7230 (3279)	8660 (3928)
26 (650)	25 (635)	51 1/2 (1308)	51 1/2 (1308)	51 (1295)	28 7/8 (734)	24 1/2 (622)	42 1/2 (1080)	8 1/8 (206)	-	21 3/4 (552)	23 5/8 (600)	5 3/8 (137)	9170 (4159)	11000 (4990)
28 (700)	27 (686)	55 (1397)	55 (1397)	55 1/2 (1410)	30 1/4 (768)	25 7/8 (657)	45 5/8 (1159)	8 1/8 (206)	-	21 3/4 (552)	23 5/8 (600)	5 3/8 (137)	10490 (4758)	12580 (5706)
30 (750)	29 (737)	60 (1524)	60 (1524)	60 1/2 (1537)	32 3/8 (822)	27 1/2 (699)	49 5/8 (1261)	8 1/8 (206)	-	21 3/4 (552)	23 5/8 (600)	5 3/8 (137)	12560 (5697)	15070 (6836)
32 (800)	30 3/4 (781)	65 (1651)	65 (1651)	65 5/8 (1667)	33 7/8 (861)	29 (737)	52 (1321)	8 1/8 (206)	-	22 7/8 (581)	23 5/8 (600)	6 1/4 (159)	14280 (6477)	17120 (7766)
34 (850)	32 3/4 (832)	70 (1778)	70 (1778)	70 5/8 (1794)	35 1/8 (892)	30 7/8 (784)	54 1/2 (1384)	8 1/8 (206)	-	22 7/8 (581)	23 5/8 (600)	6 1/4 (159)	17480 (7929)	20960 (9507)
36 (900)	34 1/2 (876)	74 (1880)	74 (1880)	74 5/8 (1896)	36 1/2 (927)	32 3/8 (822)	58 (1473)	8 1/8 (206)	-	22 7/8 (581)	23 5/8 (600)	6 1/4 (159)	20370 (9240)	24420 (11077)
40 (1000)	38 1/2 (978)	(1)	(1)	(1)	40 1/8 (1019)	35 5/8 (905)	65 1/8 (1654)	9 5/8 (245)	-	22 7/8 (581)	23 5/8 (600)	6 1/4 (159)	25990 (11789)	31170 (14138)
42 (1050)	40 1/4 (1022)	(1)	(1)	(1)	41 1/2 (1054)	38 1/8 (968)	68 3/4 (1746)	9 5/8 (245)	-	22 7/8 (581)	23 5/8 (600)	6 1/4 (159)	30640 (13898)	36770 (16679)
46 (1150)	44 (1118)	(1)	(1)	(1)	45 5/8 (1159)	42 1/2 (1080)	76 (2007)	9 5/8 (245)	-	22 7/8 (581)	23 5/8 (600)	6 1/4 (159)	37250 (16896)	44700 (20276)
48 (1200)	46 (1168)	(1)	(1)	(1)	47 3/8 (1203)	44 3/8 (1127)	79 (1988)	9 5/8 (245)	-	25 5/8 (651)	47 1/4 (1200)	6 5/8 (168)	42590 (19319)	51100 (23179)
56 (1400)	54 1/2 (1384)	(1)	(1)	(1)	53 3/4 (1365)	50 3/8 (1280)	91 5/8 (2327)	11 (279)	-	-	-	-	65180 (29565)	78210 (35475)
60 (1500)	57 1/2 (1461)	(1)	(1)	(1)	57 1/2 (1461)	55 1/8 (1400)	98 3/8 (2499)	11 (279)	-	-	-	-	79850 (36219)	95810 (43459)

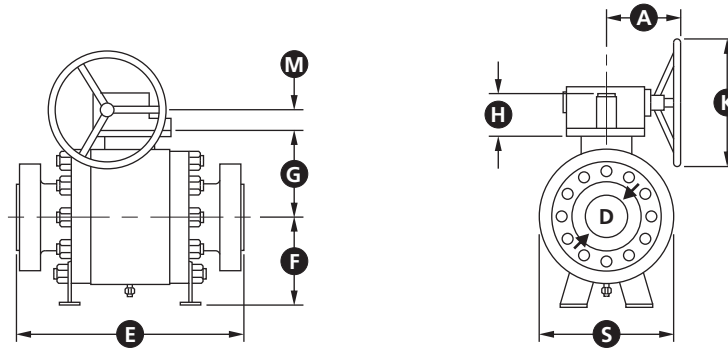
(1) Upon Request

Shaded Bore Sizes (D) accordance to API 6D

Shaded End-to-End Dimensions (E) accordance to API 6D

Flanges in accordance with ASME B16.5

Butt Welding Ends accordance to ASME B16.25

**B5 DIMENSIONS & WEIGHTS ASME CLASS 600**

**ASME CLASS 600**

SIZE in. (mm)	D	E			F	G	S	H	L	A	K	M	WEIGHT	
		WE	RF	RTJ									WE	RF/RTJ
6 (150)	6 (152)	22 (559)	22 (559)	22 1/8 (562)	12 1/4 (311)	8 1/2 (108)	12 1/4 (311)	2 3/4 (70)	-	8 3/4 (222)	13 3/4 (349)	2 5/8 (67)	570 (259)	680 (308)
8 (200)	8 (203)	26 (660)	26 (660)	26 1/8 (664)	13 3/4 (349)	9 7/8 (108)	16 1/8 (410)	3 3/4 (95)	-	11 1/2 (292)	13 3/4 (349)	3 (76)	920 (417)	1100 (500)
10 (250)	10 (254)	31 (787)	31 (787)	31 1/8 (790)	15 3/8 (391)	11 5/8 (118)	18 7/8 (480)	3 3/4 (95)	-	11 1/2 (292)	13 3/4 (349)	3 (76)	1360 (617)	1630 (739)
12 (300)	12 (305)	33 (838)	33 (838)	33 1/8 (841)	16 7/8 (429)	13 1/2 (118)	22 1/4 (565)	3 3/4 (95)	-	11 1/2 (292)	13 3/4 (349)	3 (67)	1890 (857)	2270 (1030)
14 (350)	13 1/4 (337)	35 (889)	35 (889)	35 1/8 (892)	18 7/8 (480)	14 5/8 (143)	23 3/4 (603)	4 1/2 (114)	-	11 1/2 (292)	13 3/4 (349)	3 (76)	2330 (1057)	2790 (1266)
16 (400)	15 1/4 (387)	39 (991)	39 (991)	39 1/8 (994)	20 1/2 (521)	16 1/4 (143)	27 1/4 (692)	4 1/2 (114)	-	15 3/4 (400)	23 5/8 (600)	4 3/8 (111)	2790 (1266)	3350 (1520)
18 (450)	17 1/4 (438)	43 (1092)	43 (1092)	43 1/8 (1095)	22 1/8 (562)	18 (168)	30 7/8 (784)	7 1/8 (181)	-	21 5/8 (549)	31 1/2 (800)	4 3/8 (111)	3920 (1778)	4690 (2127)
20 (500)	19 1/4 (489)	47 (1194)	47 (1194)	47 1/4 (1200)	23 3/4 (603)	19 3/8 (492)	33 7/8 (861)	7 1/8 (181)	-	21 5/8 (549)	31 1/2 (800)	4 3/8 (111)	5290 (2400)	6340 (2876)
22 (550)	21 1/4 (540)	51 (1295)	51 (1295)	51 3/8 (1305)	25 5/8 (651)	21 1/8 (537)	37 3/8 (949)	8 1/8 (206)	-	21 5/8 (549)	23 5/8 (600)	5 3/8 (137)	6560 (2976)	7870 (3570)
24 (600)	23 1/4 (591)	55 (1397)	55 (1397)	55 3/8 (1407)	27 1/8 (689)	22 1/2 (572)	40 1/8 (1019)	8 1/8 (206)	-	21 3/4 (552)	23 5/8 (600)	5 3/8 (137)	7870 (3570)	9430 (4277)
26 (650)	25 (635)	57 (1448)	57 (1448)	57 1/2 (1461)	29 1/8 (740)	24 1/2 (622)	43 (1092)	8 1/8 (206)	-	22 7/8 (581)	23 5/8 (600)	6 1/4 (159)	9980 (4527)	11970 (5430)
28 (700)	27 (686)	61 (1549)	61 (1549)	61 1/2 (1562)	30 1/2 (775)	25 7/8 (657)	46 1/8 (1172)	8 1/8 (206)	-	22 7/8 (581)	23 5/8 (600)	6 1/4 (159)	11410 (5175)	13690 (6210)
30 (750)	29 (737)	65 (1651)	65 (1651)	65 1/2 (1664)	32 5/8 (829)	27 1/2 (699)	50 1/8 (1273)	9 5/8 (245)	-	22 7/8 (581)	23 5/8 (600)	6 1/4 (159)	13690 (6210)	16420 (7448)
32 (800)	30 3/4 (781)	70 (1778)	70 (1778)	70 5/8 (1794)	34 1/4 (870)	29 (737)	52 1/2 (1334)	9 5/8 (245)	-	22 7/8 (581)	23 5/8 (600)	6 1/4 (159)	15560 (7058)	18670 (8469)
34 (850)	32 3/4 (832)	76 (1930)	76 (1930)	76 5/8 (1946)	35 3/8 (899)	30 7/8 (784)	55 (1397)	9 5/8 (245)	-	22 7/8 (581)	23 5/8 (600)	6 1/4 (159)	19040 (8636)	22830 (10356)
36 (900)	34 1/2 (876)	82 (2083)	82 (2083)	82 5/8 (2099)	36 7/8 (937)	32 3/8 (822)	58 1/2 (1486)	9 5/8 (245)	-	22 7/8 (581)	23 5/8 (600)	6 1/4 (159)	22200 (10070)	26630 (12079)
40 (1000)	38 1/2 (978)	(1)	(1)	(1)	40 1/2 (1029)	35 5/8 (905)	65 7/8 (1673)	9 5/8 (245)	-	22 7/8 (581)	23 5/8 (600)	6 1/4 (159)	28320 (12846)	33990 (15418)
42 (1050)	40 1/4 (1022)	(1)	(1)	(1)	42 (1067)	38 1/8 (968)	69 1/2 (1765)	9 5/8 (245)	-	25 5/8 (651)	47 1/4 (1200)	6 5/8 (168)	33390 (15145)	40070 (18175)
46 (1150)	44 (1118)	(1)	(1)	(1)	46 1/8 (1171)	42 1/2 (1080)	76 3/4 (1949)	9 5/8 (245)	-	25 5/8 (651)	47 1/4 (1200)	6 5/8 (168)	40600 (18416)	48720 (22099)
48 (1200)	46 (1168)	85 7/8 (2181)	85 7/8 (2181)	(1)	47 7/8 (1216)	44 3/8 (1127)	79 7/8 (2029)	9 5/8 (245)	-	25 5/8 (651)	47 1/4 (1200)	6 5/8 (168)	46400 (21047)	55680 (25256)
56 (1400)	54 1/2 (1384)	(1)	(1)	(1)	54 3/8 (1381)	50 3/8 (1280)	92 5/8 (2353)	11 (279)	-	-	-	-	71050 (32228)	85250 (38669)
60 (1500)	57 1/2 (1461)	(1)	(1)	(1)	58 1/8 (1476)	55 1/8 (1400)	99 3/8 (2524)	11 (279)	-	-	-	-	87010 (39467)	104400 (47355)

(1) Upon Request

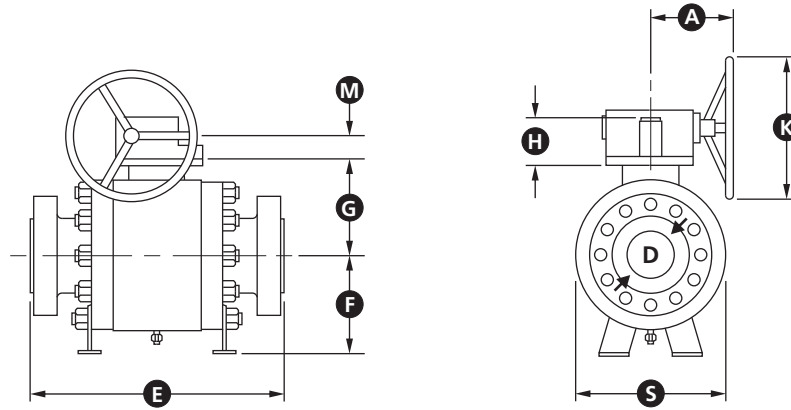
Shaded Bore Sizes (D) accordance to API 6D

Shaded End-to-End Dimensions (E) accordance to API 6D

Flanges in accordance with ASME B16.5

Butt Welding Ends accordance to ASME B16.25

## B5 DIMENSIONS & WEIGHT ASME CLASS 900



### ASME CLASS 900

SIZE in. (mm)	D	E			F	G	S	H	L	A	K	M	WEIGHT	
		WE	RF	RTJ									WE	RF/RTJ
6 (150)	6 (152)	24 (610)	24 (610)	24 1/8 (613)	9 7/8 (251)	9 1/2 (241)	13 1/4 (337)	3 3/4 (95)	-	11 1/2 (292)	13 3/4 (349)	3 (76)	720 (327)	850 (386)
8 (200)	8 (203)	29 (737)	29 (737)	29 1/8 (740)	11 3/8 (289)	10 7/8 (276)	16 1/2 (419)	3 3/4 (95)	-	11 1/2 (292)	13 3/4 (349)	3 (76)	1190 (540)	1410 (640)
10 (250)	10 (254)	33 (838)	33 (838)	33 1/8 (841)	13 5/8 (346)	12 1/2 (318)	20 1/8 (511)	4 1/2 (114)	-	11 1/2 (292)	13 3/4 (349)	3 (76)	1760 (798)	2110 (957)
12 (300)	12 (305)	38 (965)	38 (965)	38 1/8 (968)	15 3/8 (391)	14 3/8 (365)	23 5/8 (600)	4 1/2 (114)	-	11 1/2 (292)	13 3/4 (349)	3 (67)	2440 (1107)	2930 (1329)
14 (350)	12 3/4 (324)	40 1/2 (1029)	40 1/2 (1029)	40 7/8 (1038)	17 3/4 (451)	15 3/8 (391)	26 3/4 (679)	4 1/2 (114)	-	15 3/4 (400)	23 5/8 (600)	4 3/8 (111)	3020 (1370)	3610 (1637)
16 (400)	14 3/4 (375)	44 1/2 (1130)	44 1/2 (1130)	44 7/8 (1140)	19 5/8 (499)	16 7/8 (429)	30 3/8 (772)	7 1/8 (181)	-	21 5/8 (549)	31 1/2 (800)	4 3/8 (111)	3630 (1647)	4360 (1978)
18 (450)	16 3/4 (425)	48 (1219)	48 (1219)	48 1/2 (1232)	21 5/8 (549)	19 1/8 (486)	33 1/2 (851)	7 1/8 (181)	-	21 5/8 (549)	31 1/2 (800)	5 3/8 (137)	5090 (2309)	6100 (2767)
20 (500)	18 5/8 (473)	52 (1321)	52 (1321)	52 1/2 (1334)	23 1/4 (591)	20 7/8 (530)	36 1/4 (921)	8 1/8 (206)	-	21 3/4 (552)	23 5/8 (600)	6 1/4 (159)	6870 (3116)	8240 (3738)
22 (550)	20 5/8 (524)	(1)	(1)	(1)	25 3/4 (654)	21 7/8 (556)	40 1/2 (1029)	8 1/8 (206)	-	22 7/8 (581)	23 5/8 (600)	6 1/4 (159)	8530 (3869)	10220 (4636)
24 (600)	22 1/2 (572)	61 (1549)	61 (1549)	61 3/4 (1568)	27 1/2 (699)	24 3/8 (619)	43 3/4 (1111)	9 5/8 (245)	-	22 7/8 (581)	23 5/8 (600)	6 1/4 (159)	10220 (4636)	12250 (5557)
26 (650)	24 3/8 (619)	(1)	(1)	(1)	29 7/8 (759)	26 1/4 (667)	47 1/4 (1200)	9 5/8 (245)	-	22 7/8 (581)	23 5/8 (600)	6 1/4 (159)	12960 (5879)	15540 (7049)
28 (700)	26 1/4 (667)	(1)	(1)	(1)	31 7/8 (810)	27 7/8 (708)	50 3/4 (1289)	9 5/8 (245)	-	22 7/8 (581)	23 5/8 (600)	6 1/4 (159)	14830 (6727)	17790 (8069)
30 (750)	28 1/8 (715)	(1)	(1)	(1)	32 3/4 (832)	29 5/8 (753)	53 3/8 (1356)	9 5/8 (245)	-	22 7/8 (581)	23 5/8 (600)	6 1/4 (159)	17790 (8069)	21340 (9680)
32 (800)	30 (762)	(1)	(1)	(1)	35 7/8 (911)	31 7/8 (810)	57 1/2 (1461)	9 5/8 (245)	-	22 7/8 (581)	23 5/8 (600)	6 1/4 (159)	20210 (9167)	24250 (11000)
34 (850)	31 7/8 (810)	(1)	(1)	(1)	37 3/4 (959)	33 3/8 (848)	61 (1549)	9 5/8 (245)	-	22 7/8 (581)	23 5/8 (600)	6 1/4 (159)	24750 (11226)	29690 (13467)
36 (900)	33 3/4 (857)	(1)	(1)	(1)	40 1/8 (1019)	34 3/4 (883)	64 3/8 (1635)	11 (279)	-	22 7/8 (581)	23 5/8 (600)	6 1/4 (159)	28850 (13086)	34610 (15699)
40 (1000)	37 5/8 (956)	(1)	(1)	(1)	44 1/8 (1121)	38 1/4 (972)	71 1/4 (1810)	11 (279)	-	22 7/8 (581)	23 5/8 (600)	6 1/4 (159)	36810 (16697)	44170 (20035)
42 (1050)	39 5/8 (1007)	(1)	(1)	(1)	47 1/4 (1200)	41 3/4 (1060)	74 3/4 (1888)	11 (279)	-	22 7/8 (581)	23 5/8 (600)	6 1/4 (159)	43400 (19686)	52070 (23619)
46 (1150)	43 3/8 (1102)	(1)	(1)	(1)	50 3/8 (1280)	43 3/4 (1111)	81 1/2 (2070)	11 (279)	-	22 7/8 (581)	23 5/8 (600)	6 1/4 (159)	52770 (23936)	63310 (28717)
48 (1200)	45 1/4 (1149)	(1)	(1)	(1)	52 3/8 (1330)	45 1/4 (1149)	85 (2159)	11 (279)	-	25 5/8 (651)	47 1/4 (1200)	6 5/8 (168)	60310 (27356)	72370 (32826)

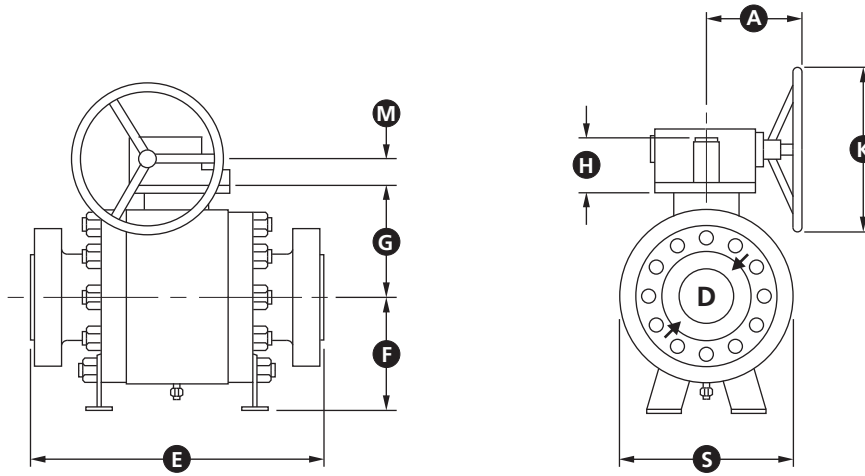
(1) Upon Request

Flanges in accordance with ASME B16.5

Shaded Bore Sizes (D) accordance to API 6D

Shaded End-to-End Dimensions (E) accordance to API 6D

Butt Welding Ends accordance to ASME B16.25

**B5 DIMENSIONS & WEIGHTS ASME CLASS 1500**

**ASME CLASS 1500**

SIZE in. (mm)	D	E			F	G	S	H	L	A	K	M	WEIGHT lb. (kg)	
		WE	RF	RTJ									WE	RF/RTJ
6 (150)	5 3/4 (146)	27 3/4 (705)	27 3/4 (705)	28 (711)	12 5/8 (321)	11 (279)	16 7/8 (429)	3 3/4 (95)	-	11 1/2 (292)	13 3/4 (349)	3 (76)	850 (386)	1010 (458)
8 (200)	7 5/8 (194)	32 3/4 (832)	32 3/4 (832)	33 1/8 (841)	14 5/8 (372)	12 7/8 (327)	21 1/8 (537)	4 1/2 (114)	-	11 1/2 (292)	13 3/4 (349)	3 (76)	1410 (640)	1670 (757)
10 (250)	9 1/2 (241)	39 (991)	39 (991)	39 3/8 (1000)	17 3/8 (441)	15 3/8 (391)	25 3/4 (654)	4 1/2 (114)	-	11 1/2 (292)	13 3/4 (349)	3 (76)	2110 (957)	2530 (1148)
12 (300)	11 3/8 (289)	44 1/2 (1130)	44 1/2 (1130)	45 1/8 (1146)	19 5/8 (499)	16 5/8 (422)	30 1/4 (768)	4 1/2 (114)	-	11 1/2 (292)	13 3/4 (349)	3 (67)	2930 (1329)	3500 (1610)
14 (350)	12 1/2 (318)	49 1/2 (1257)	49 1/2 (1257)	50 1/4 (1276)	22 5/8 (575)	19 5/8 (499)	34 1/4 (870)	7 1/8 (181)	-	15 3/4 (400)	23 5/8 (600)	4 3/8 (111)	3610 (1637)	4320 (1960)
16 (400)	14 1/4 (362)	54 1/2 (1384)	54 1/2 (1384)	55 3/8 (1407)	25 1/4 (641)	22 (559)	38 3/4 (984)	7 1/8 (181)	-	21 5/8 (549)	31 1/2 (800)	4 3/8 (111)	4360 (1978)	5220 (2368)
18 (450)	16 1/4 (413)	(1)	(1)	(1)	27 3/4 (705)	23 1/4 (591)	42 7/8 (1089)	8 1/8 (206)	-	21 5/8 (549)	31 1/2 (800)	4 3/8 (111)	6100 (2767)	7310 (3316)
20 (500)	18 (457)	(1)	(1)	(1)	29 7/8 (759)	28 1/2 (724)	46 3/8 (1178)	9 5/8 (245)	-	21 3/4 (552)	23 5/8 (600)	5 3/8 (137)	8240 (3738)	9870 (4477)
22 (550)	19 3/4 (502)	(1)	(1)	(1)	33 (838)	30 1/4 (768)	51 7/8 (1318)	9 5/8 (245)	-	22 7/8 (581)	23 5/8 (600)	6 1/4 (159)	110220 (4636)	12250 (5557)
24 (600)	21 5/8 (549)	(1)	(1)	(1)	35 1/8 (892)	32 (813)	55 7/8 (1419)	9 5/8 (245)	-	22 7/8 (581)	23 5/8 (600)	6 1/4 (159)	112250 (5557)	14700 (6668)
26 (650)	23 1/2 (597)	(1)	(1)	(1)	38 1/4 (972)	35 1/2 (902)	60 1/2 (1537)	11 (279)	-	-	-	-	15540 (7049)	18650 (8459)
28 (700)	25 1/4 (641)	(1)	(1)	(1)	40 7/8 (1038)	37 (940)	65 (1651)	11 (279)	-	-	-	-	17790 (8069)	21340 (9680)
30 (750)	27 (686)	(1)	(1)	(1)	42 (1067)	40 3/4 (1035)	68 3/8 (1737)	11 (279)	-	-	-	-	21340 (9680)	25590 (11607)
32 (800)	28 3/4 (730)	(1)	(1)	(1)	45 7/8 (1165)	41 3/4 (1060)	73 5/8 (1870)	11 (279)	-	-	-	-	24250 (11000)	29100 (31200)
34 (850)	30 1/2 (775)	(1)	(1)	(1)	48 3/8 (1229)	44 7/8 (1137)	78 1/8 (1984)	11 (279)	-	-	-	-	229690 (13467)	35620 (16157)
36 (900)	32 1/4 (819)	(1)	(1)	(1)	51 3/8 (1305)	46 1/2 (1181)	82 3/8 (2092)	11 (279)	-	-	-	-	34610 (15699)	41530 (18838)

(1) Upon Request

Shaded Bore Sizes (D) accordance to API 6D

Shaded End-to-End Dimensions (E) accordance to API 6D

Flanges in accordance with ASME B16.5

Butt Welding Ends accordance to ASME B16.25

## B7 DESIGN FEATURES

### STANDARD FEATURES

#### B7.1

- Triple barrier stem seals.
- Factory positioned external stops.
- Emergency grease fitting for stem.
- Stem separated from the ball, anti-blow-out design.
- Plastic polymer insert for seat sealing.
- Self Relieving seats.
- Metal-backed self lubricating bearings/washers.
- Nickel Plated for trim parts.
- Fire Safe graphite rings.
- Antistatic device.

#### B7.B

- Triple barrier stem seals.
- Stem separate from the ball, anti-blow-out design.
- Ball load on the bearing blocks.
- Double barrier sealing in both directions (DPE).
- Body relief valve for overpressure.
- Sealant injection system for emergency seal.
- Metal-backed self lubricating bearings/washers.
- Nickel plating for trim parts.
- Trunnion mounted ball.

### FEATURES UPON REQUEST

#### B7.1

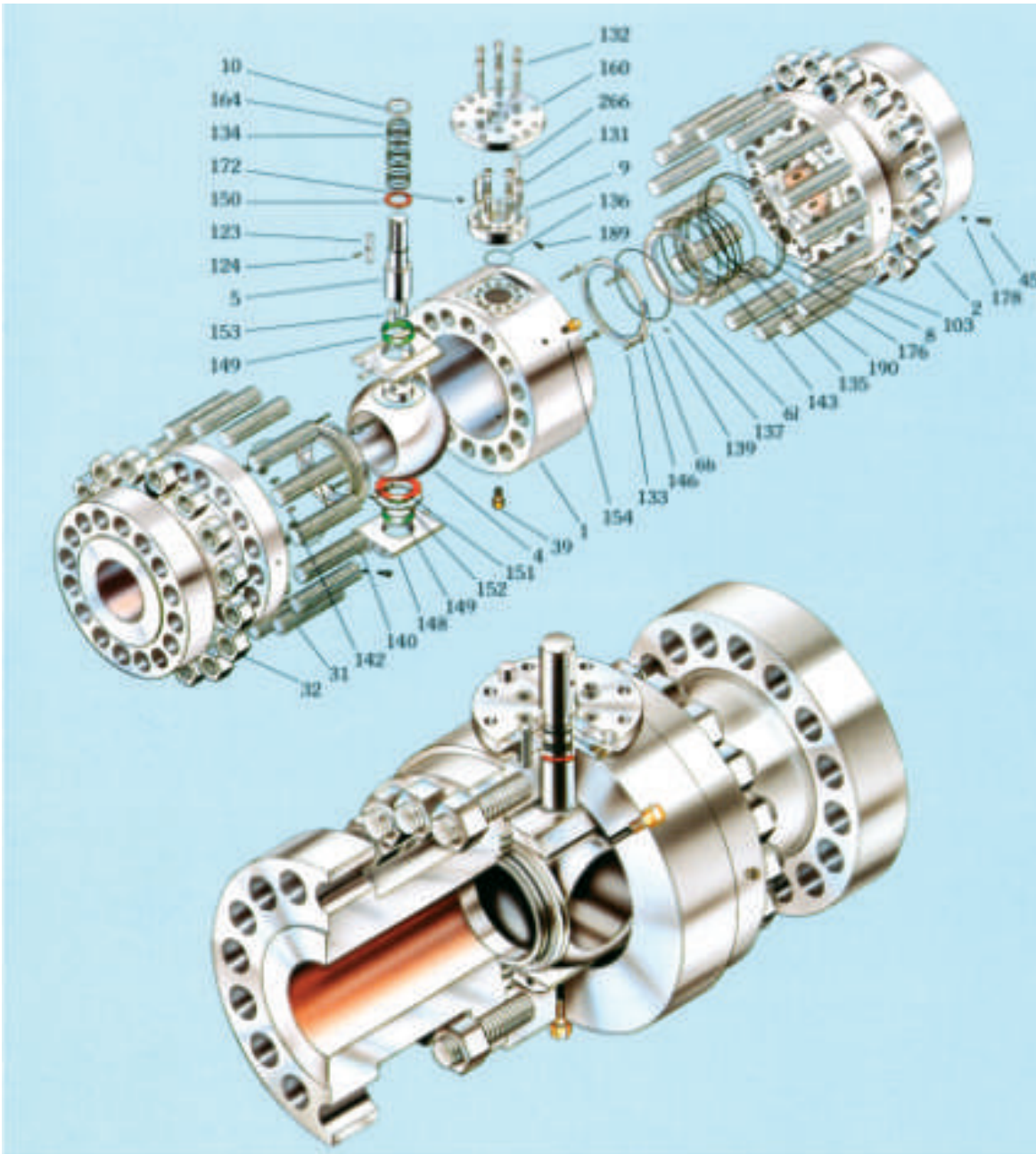
- PTFE various grades reinforced gaskets, spring energized, for stem and seat sealing.
- Metal-to-Metal seats.
- Double barrier of sealing in both directions (DPE).
- Body relief valve for overpressure.
- Double-Block-and-Bleed.

### VALVE CONSTRUCTION

The B7 denomination identifies the side entry ball valve ASME Class 2500.

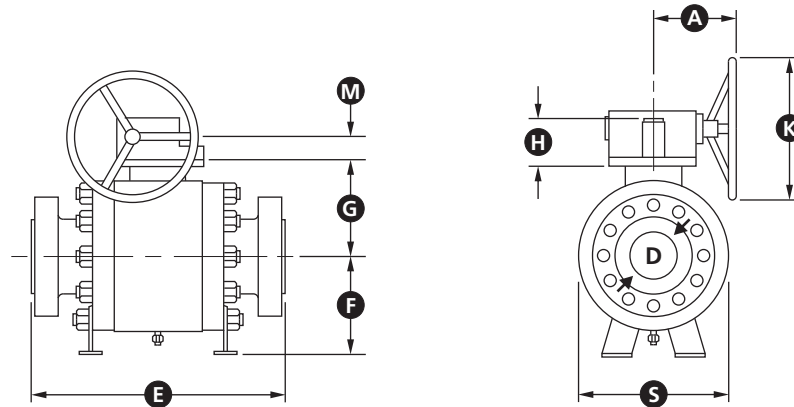
Due to the high pressure and strong force involved the materials selection is carried out by GROVE paying particular attention to the anti-extrusion features of the gaskets and to the resistance of the ball and the stem materials.

## B7.B VALVE ASSEMBLY AND CROSS SECTION



Item	Description	Item	Description	Item	Description
1	Body	123	Stem Key	149	Bearing
2	Closure	124	Stem Key Capscrew	150	Upper Thrust Washer
4	Ball	131	Gland Plate Capscrew	151	Lower Thrust Washer
5	Stem	132	Adapter Plate Capscrew	152	Spacer
6 b	Outer Seat Ring	133	Puller Bushing Capscrew	153	Drive Pin
6 l	Inner Seat Ring	134	Stem O-Ring	154	Relief Valve
8	Body O-Ring	135	Seat O-Ring	160	Adapter Plate
9	Gland Plate	136	Gland Plate O-Ring	164	Stem Backup Ring
10	Gland Bushing	137	Seal O-Ring	172	Vent Plug
31	Body Stud	139	Seat Spring Pin	176	U-Cup Packing
32	Body Stud Nut	140	Bearing Retainer Pin	178	Check Valve
39	Drain Valve	142	Spring	189	Gland Vent
45	Grease Fitting	143	Seat Lock Ring	190	Seat Backup Ring
103	Closure Backup Ring	146	Puller Bushing	299	Stop Spring Pin
		148	Bearing Retainer		



**B7.1 & B7.B DIMENSIONS & WEIGHTS ASME CLASS 2500**

**ASME CLASS 2500**

SIZE in. (mm)	D	E			F	G	S	H	L	A	K	M	WEIGHT lb. (kg)	
		WE	RF	RTJ									WE	RF/RTJ
1 1/2 (40)	1 1/4 (32)	15 1/8 (384)	15 1/8 (384)	15 1/4 (387)	3 7/8 (98)	5 1/2 (140)	6 7/8 (175)	2 3/8 (60)	-	7 1/2 (191)	7 7/8 (200)	1 3/4 (44)	80 (36)	130 (59)
2 x 1 1/2 x 2 (50 x 40 x 50)	1 1/4 (32)	17 3/4 (451)	17 3/4 (451)	17 7/8 (454)	3 7/8 (98)	5 1/2 (140)	6 7/8 (175)	2 3/8 (60)	-	7 1/2 (191)	7 7/8 (200)	1 3/4 (44)	90 (41)	180 (82)
2 (50)	1 3/4 (44)	17 3/4 (451)	17 3/4 (451)	17 7/8 (454)	4 3/8 (111)	6 1/4 (159)	7 7/8 (200)	2 3/8 (60)	-	7 1/2 (191)	7 7/8 (200)	1 3/4 (44)	150 (68)	260 (118)
3 x 2 x 3 (80 x 50 x 80)	1 3/4 (44)	22 3/4 (578)	22 3/4 (578)	23 (584)	4 3/8 (111)	6 1/4 (159)	7 7/8 (200)	2 3/8 (60)	-	7 1/2 (191)	7 7/8 (200)	1 3/4 (44)	210 (95)	330 (150)
3 (80)	2 1/2 (64)	22 3/4 (578)	22 3/4 (578)	23 (584)	5 1/2 (140)	7 1/8 (181)	9 7/8 (251)	2 1/2 (64)	-	8 3/4 (222)	13 3/4 (349)	2 5/8 (67)	350 (159)	480 (218)
4 x 3 x 4 (100 x 80 x 100)	2 1/2 (64)	26 1/2 (673)	26 1/2 (673)	26 7/8 (683)	5 1/2 (140)	7 1/8 (181)	9 7/8 (251)	2 1/2 (64)	-	8 3/4 (222)	13 3/4 (349)	2 5/8 (67)	370 (168)	620 (281)
4 (100)	3 1/2 (89)	26 1/2 (673)	26 1/2 (673)	26 7/8 (683)	9 7/8 (251)	7 7/8 (200)	14 5/8 (372)	3 (76)	-	11 1/2 (292)	13 3/4 (349)	3 (76)	700 (318)	790 (358)
6 x 4 x 6 (150 x 100 x 150)	3 1/2 (89)	36 (914)	36 (914)	36 1/2 (927)	9 7/8 (251)	7 7/8 (200)	14 5/8 (372)	3 (76)	-	11 1/2 (292)	13 3/4 (349)	3 (76)	730 (331)	1250 (567)
6 (150)	5 1/4 (133)	36 (914)	36 (914)	36 1/2 (927)	11 3/8 (289)	9 1/4 (235)	16 7/8 (429)	4 5/8 (118)	-	11 1/2 (292)	13 3/4 (349)	3 (76)	1480 (671)	1650 (748)
8 x 6 x 8 (200 x 150 x 200)	5 1/4 (133)	40 1/4 (1022)	40 1/4 (1022)	40 7/8 (1038)	11 3/8 (289)	9 1/4 (235)	16 7/8 (429)	4 5/8 (118)	-	11 1/2 (292)	13 3/4 (349)	3 (76)	1890 (857)	2180 (989)

SIZE in. (mm)	D	E			F	G	S	H	L	A	K	M	WEIGHT lb. (kg)	
		WE	RF	RTJ									WE	RF/RTJ
8 (200)	7 1/8 (181)	40 1/4 (1022)	40 1/4 (1022)	40 7/8 (1038)	15 1/8 (384)	15 1/2 (394)	26 (660)	4 5/8 (118)	-	15 3/4 (400)	23 5/8 (600)	4 3/8 (111)	3650 (1656)	4340 (1969)
10 (250)	8 7/8 (226)	50 (1270)	50 (1270)	50 7/8 (1292)	17 1/8 (435)	18 1/4 (464)	31 1/8 (790)	5 1/2 (140)	-	21 5/8 (549)	31 1/2 (800)	4 3/8 (111)	5480 (2486)	6590 (2989)
12 (300)	10 1/2 (267)	56 (1422)	56 (1422)	56 7/8 (1445)	19 5/8 (499)	20 1/2 (521)	34 1/4 (870)	5 1/2 (140)	-	21 5/8 (549)	31 1/2 (800)	4 3/8 (111)	7600 (3447)	9100 (4128)
14 (350)	12 1/4 (311)	(1)	(1)	(1)	22 7/8 (581)	24 3/4 (629)	39 (991)	8 1/8 (206)	-	21 3/4 (552)	23 5/8 (600)	5 3/8 (137)	9390 (4259)	11220 (5089)
16 (400)	13 7/8 (353)	(1)	(1)	(1)	26 3/8 (670)	28 3/8 (721)	43 1/4 (1099)	8 1/8 (206)	-	21 3/4 (552)	23 5/8 (600)	5 3/8 (137)	11330 (5139)	13580 (6160)
18 (450)	15 5/8 (397)	(1)	(1)	(1)	29 1/8 (740)	31 7/8 (810)	47 7/8 (1216)	11 (279)	-	22 7/8 (581)	23 5/8 (600)	6 1/4 (159)	15870 (7199)	19020 (8627)
20 (500)	17 1/4 (438)	(1)	(1)	(1)	32 1/2 (826)	35 3/8 (899)	52 1/8 (1324)	11 (279)	-	22 7/8 (581)	23 5/8 (600)	6 1/4 (159)	21420 (9716)	25660 (11639)

Flanges in accordance with ASME B16.5

Shaded Bore Sizes (D) accordance to API 6D

Shaded End-to-End Dimensions (E) accordance to API 6D

Butt Welding Ends accordance to ASME B16.25

Outlined End-to-End Dimensions (E) according to ASME B16.10

## QUALITY SYSTEM

### QUALITY ASSURANCE PROGRAM

ISO 9001:2000 and API Q1 Standards.

All valves are designed in accordance with the most stringent industry procedures and standards and are built according to the European Directives PED and ATEX upon request.



### APPROVALS

GROVE is authorized licensee to use the American Petroleum Institute (API) monogram for specification API 6D and API 6A.

### CERTIFICATION

API 6D and API 6A specifications.

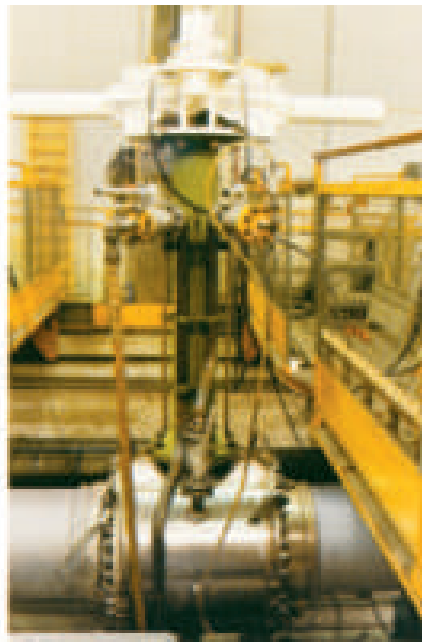
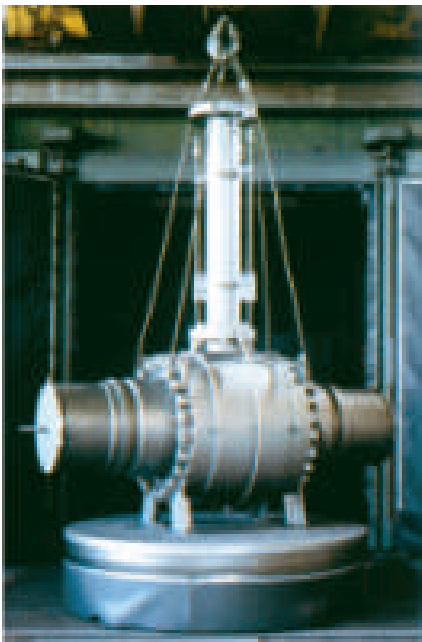
### INSPECTION

Inspection is done per the Quality System requirements based on ISO 9001:2000 and API Q1.

The GROVE Quality Control Department verifies all processes from material receipt to final customer inspection, including the liaison with third party inspection and certifying authorities.

All products can be supplied with certified test reports which include pressure testing, NDT and chemical and physical analysis, along with any other specified special test requirements.

The material certification of the valve parts can be furnished in accordance with DIN 50049-EN 10204 3.1 (at least) or 3.2.



### SPECIAL PROCESS

GROVE operates its own in-house Electroless Nickel Plating (ENP) facility.

ASTM B656 and ASTM B733 are the reference standards for plating process and control.

Strict quality control procedures for critical process conditions and for the plated components maintain plating consistency.

## QUALIFICATION TESTING

### RESEARCH AND DEVELOPMENT LAB

GROVE valves are designed in accordance with the applicable or requested codes and are subjected to full in-house qualification testing.

Our in-house testing facilities with the participation of the major oil and gas companies R&D programs allows GROVE to supply the highest quality products.

Hydraulic and gas sealing tests, functional tests, cycling and torque tests are all carried out on prototype valves.

These test procedures ensure that the design safety factors, the maximum allowable leakage rates and the expected valve service life are achieved.

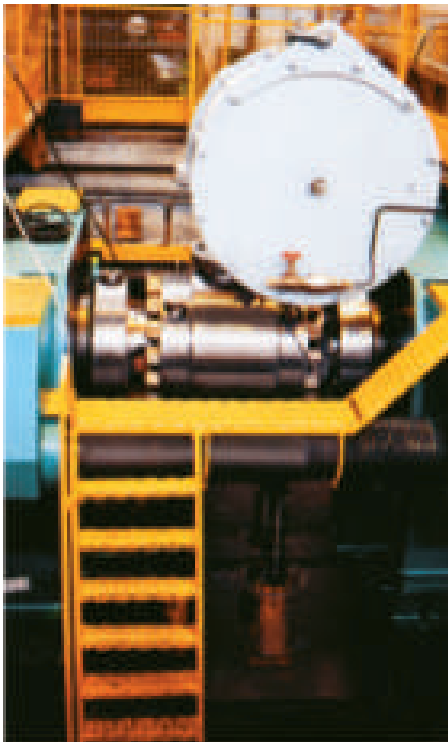
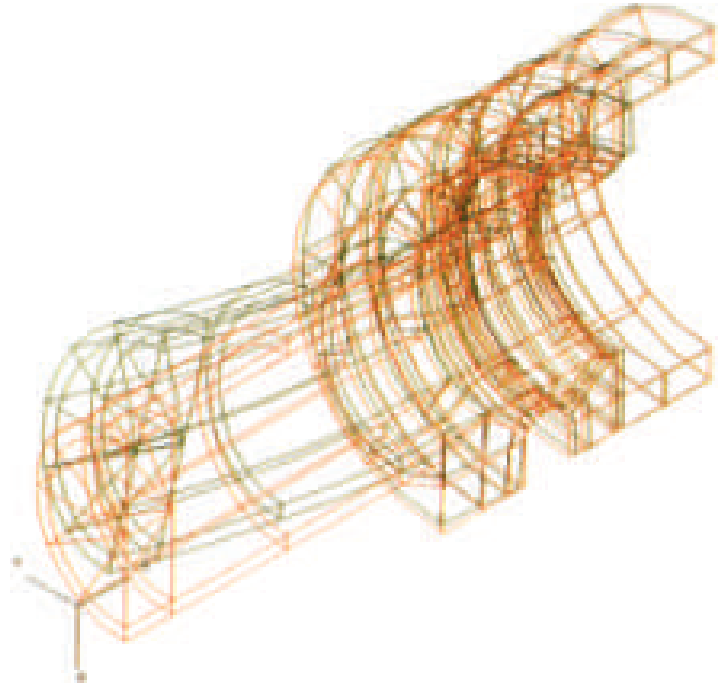
### STRUCTURAL VERIFICATION

The GROVE engineering department operates the most advanced 3D CAD system and conducts Finite Element Analysis (FEA) to simulate various load conditions to determine a components suitability for the intended service.

### FIRE SAFE TESTS & CERTIFICATIONS

GROVE conducts in-house Fire Safe testing and GROVE valves are certified in compliance with API 6FA and BS 6755 part 2 Fire Safe Standards.

A complete reference list of qualified and certified valves can be made available upon customers request.



### CYCLING TEST UNDER FLOW CONDITIONS

Through its in-house flow facility, GROVE verifies the behavior of valves subjected to cycle testing under dynamic flow conditions with the presence of abrasive particles.

This test loop has the capacity to test valves up to 6 inch nominal bore with a maximum service pressure of 200 bars (2900 psi)

The main test parameters are PC entered and recorded for future design reference.

### HIGH PRESSURE GAS TESTING

Customers specifications may dictate more severe testing in addition to conventional hydrostatic testing.

GROVE is fully equipped to carry out enhanced gas testing at ambient, low and high temperatures using specially equipped bunkers.

External leakage rates (if any) are verified by means of a mass-spectrometer. Leakage through the seats (if any) is verified by means of calibrated flow meters.

For low and high temperature service, gas testing can be performed to customer specified critical dimensions.

GROVE has test facilities for various valve dimensions.

Testing can be performed at range of temperatures from -120°C (-184°F) to + 400°C (+752°F).

## TRADEMARK INFORMATION

GROVE® is a registered trademark which is owned by Cameron.

This document contains references to registered trademarks or product designations, which are not owned by Cameron.

<b>Trademark</b>	<b>Owner</b>
Celcon	Hoechst Celanese Corporation
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Hydrin	Zeon Chemicals USA, Inc.
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Inconel	INCO Nickel Sales, Inc.
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**VALVES & MEASUREMENT**

3250 Briarpark Drive, Suite 300  
Houston, Texas 77042  
USA Toll Free 800 323 9160

For the most current contact and location information go to: [www.c-a-m.com/valvesandmeasurement](http://www.c-a-m.com/valvesandmeasurement)