

# 1/4" – 2" (DN 8 – 50) Clincher® Series 2000 Threaded-End Ball Valves

*Clincher* Series 2000 ball valves are rugged high-performance threaded-end ball valves designed to handle an extremely wide variety of liquids, gases, and slurries.

These compact valves have a two-piece body construction and are available with temperature ratings from -60°F to +500°F (-51°C to +260°C), depending on materials and pressure combinations.

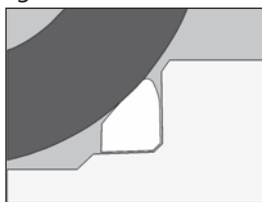
The body style 21 is manufactured in brass. The Fire-Tite® Series 23 is available in carbon steel or stainless steel.

*Clincher* Series 2000 Style 21 valves are available specially prepared for critical services such as oxygen and high-vacuum. Also available are valves conforming to UL approved configurations. (See **Bulletin T110-1**).

## FEATURES

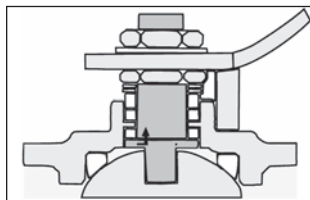
### Unique Flexible-Lip Seat Design

- Exerts continuous pressure against ball for reliable sealing.
- Fluid pressure on the ball increases the effectiveness of the seal on the downstream side.
- Automatically compensates for wear and for changes in temperature and pressure for a high cycle life.



### Excellent Sealing

- The compression of low friction PTFE box rings eliminates stem leakage by avoiding straight-line leakage paths.
- Stem seal adjustment is done simply by tightening the stem nut.



### Easy Maintenance

- Seats and seals are easily replaced; no machining is required.
- Slotted stem and ball drive make assembly virtually mistake-proof.

### High Flow Capacity

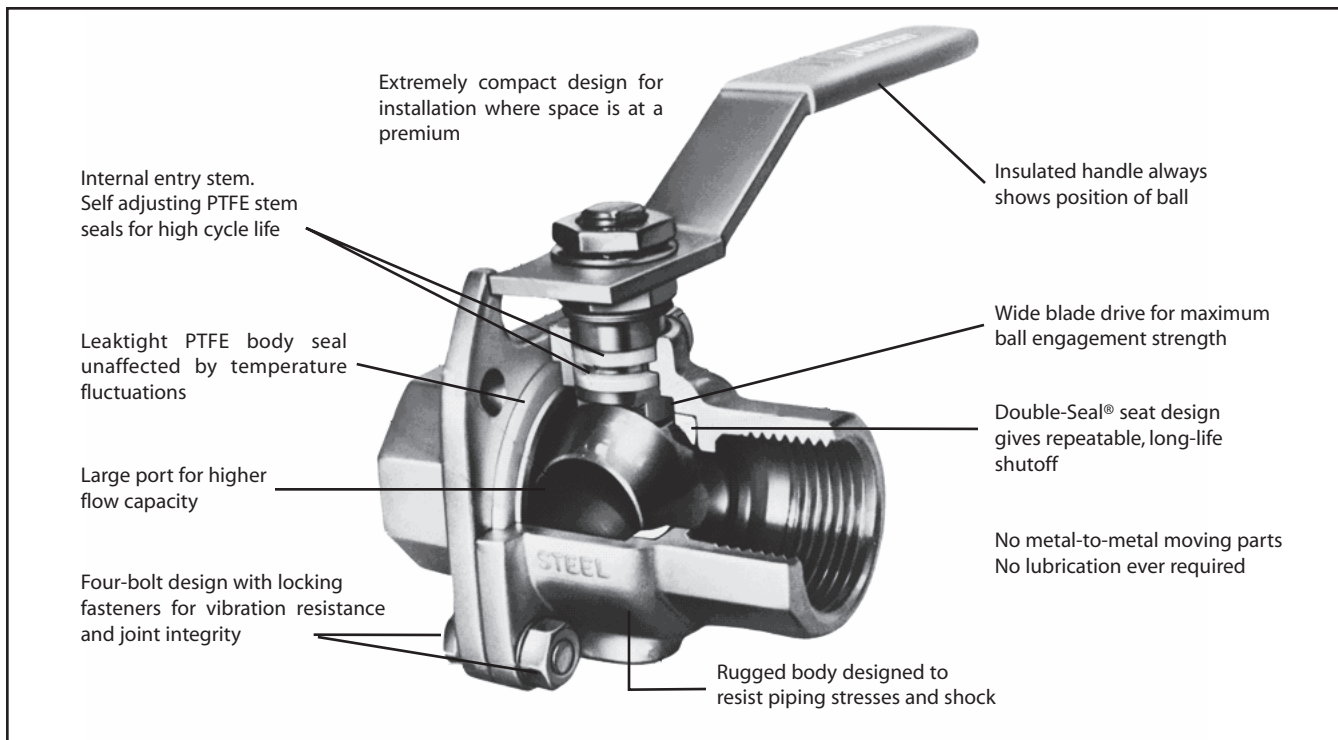
- Large port diameters provide highest flow capacity per dollar of valve cost.

### Fire-Tite

- Secondary metal seal provides effective shutoff in the event of a fire.
- Auxiliary graphite stem seal prevents stem leakage if the primary PTFE seal is destroyed.
- Ideal for services such as furnace fuel lines, LP-gas product lines, and in a variety of petroleum and petrochemical piping systems.

### Automatic or Manual Operation

- Quarter-turn operation ensures quick and easy cycling.
- Low torque requirements mean smaller actuators.
- A variety of Jamesbury® actuators and accessories are available mounted and tested on the valves for single-source responsibility.



## SPECIFICATIONS

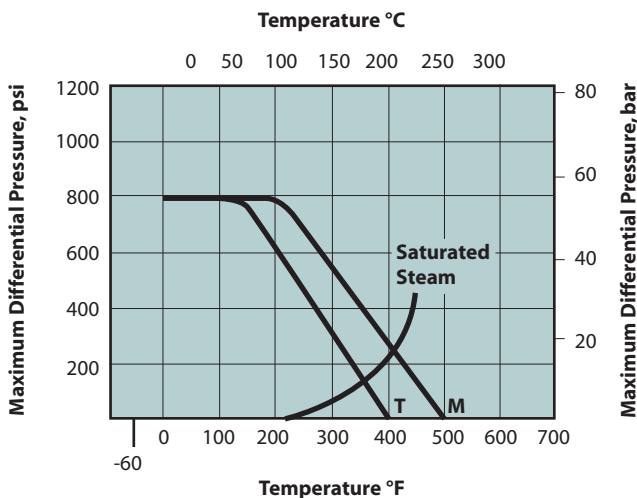
### Valve Seat Ratings

These ratings are based on differential pressure with valve ball in the fully closed position and refer to seats only. Refer to valve body ratings to be sure that all components are satisfactory for the application. Valves in brass and carbon steel are suitable for service to -20°F (-29°C), valves in 316 stainless steel (with stainless steel body bolts) to -60°F (-51°C).

1/4" – 2" (DN 8 – 50) Series 2000 valves with filled PTFE (M) seats are rated for saturated steam service to 250 psi (17.24 bar) when equipped with stainless steel trim. M-seated valves are otherwise steam-rated to 200 psi (13.79 bar).

### Flow data

The table below provides flow coefficients of valves covered in this bulletin. The  $C_v$  values represent the flow of water at +60°F through the valve in U.S. gallons per minute at a pressure drop of 1 psi. The metric equivalent,  $K_v$ , is the flow of water at 16°C through the valve in m<sup>3</sup>/hr at a pressure drop of 1 kg/cm<sup>2</sup>. To convert  $C_v$  to  $K_v$ , multiply by 0.8569.



Valve Size inches	$C_v$	Valve Size inches	$C_v$
1/4	11	1	49
3/8	16	1-1/4	49
1/2	16	1-1/2	100
3/4	37	2	115

Valve Size DN	$K_v$	Valve Size DN	$K_v$
08	9.4	25	42.0
10	13.7	32	42.0
15	13.7	40	85.7
20	31.7	50	98.5

These ratings are a conservative guide for general service. Previous experience in a process or new developments may permit applications at ratings above those shown. Please consult with the Metso home office for specific recommendations.

### Valve Body Ratings

These are maximum working pressure ratings of valve body/body cap assemblies only. The seat ratings above determine the practical pressure limitations according to

actual service conditions. Working pressure rating is at -20°F to +100°F (-29°C to +38°C). Test pressure is for hydrostatic test with ball half open.

Valve Size	Rating	Maximum Working Pressure with Specified Body Material					
		Brass Body		Carbon Steel, 316 Stainless Body			
		ASTM A449 Body Bolts Code: -0		ASTM A449, A193 Gr.B7 Body Bolts Codes: -0, -1		300 Series SS Body Bolts Code: -3	
		psi	bar	psi	bar	psi	bar
1/4" - 1" (DN 8 - 25)	Working pressure	600	41	800	55	400	28
	Test pressure	900	62	1200	83	600	41
1-1/4" - 2" (DN 30 - 50)	Working pressure	400	28	800	55	400	28
	Test pressure	600	41	1200	83	600	41

### SPECIAL SERVICES

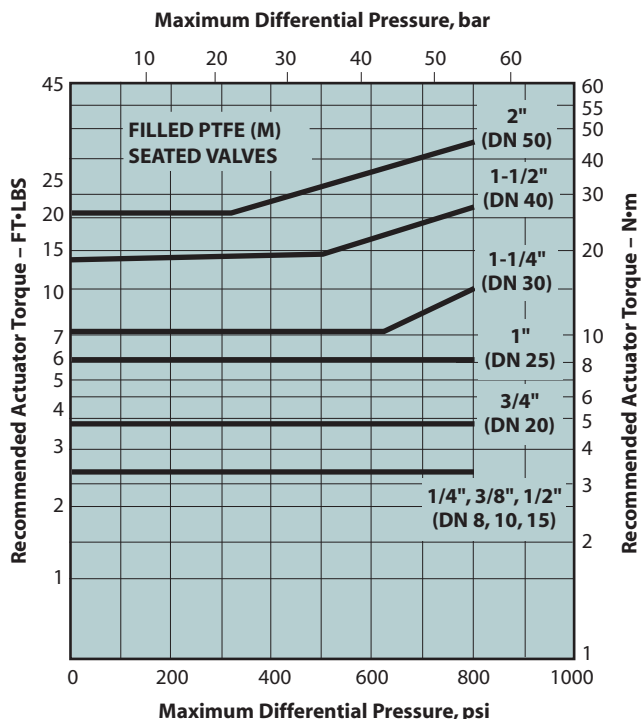
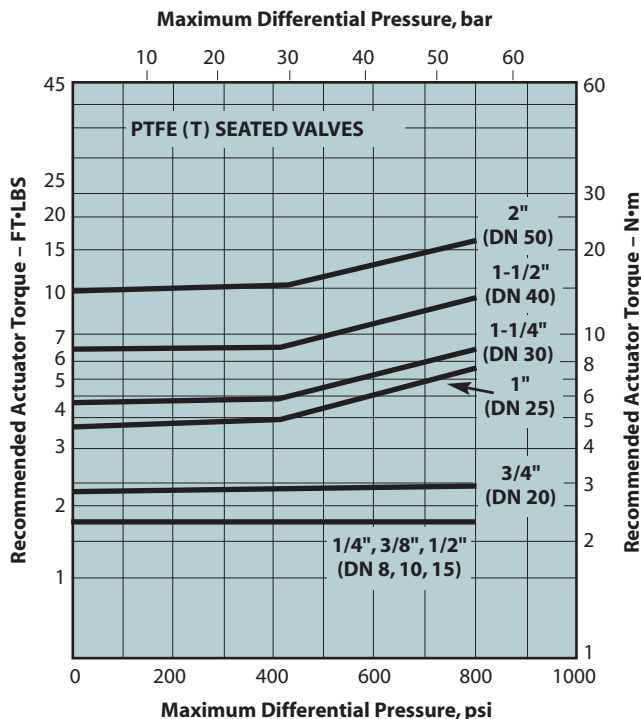
Detailed information about available seat materials, special services, and accessories for Clincher Series 2000 valves is contained in the following bulletins (see page 6 for ordering standard accessories):

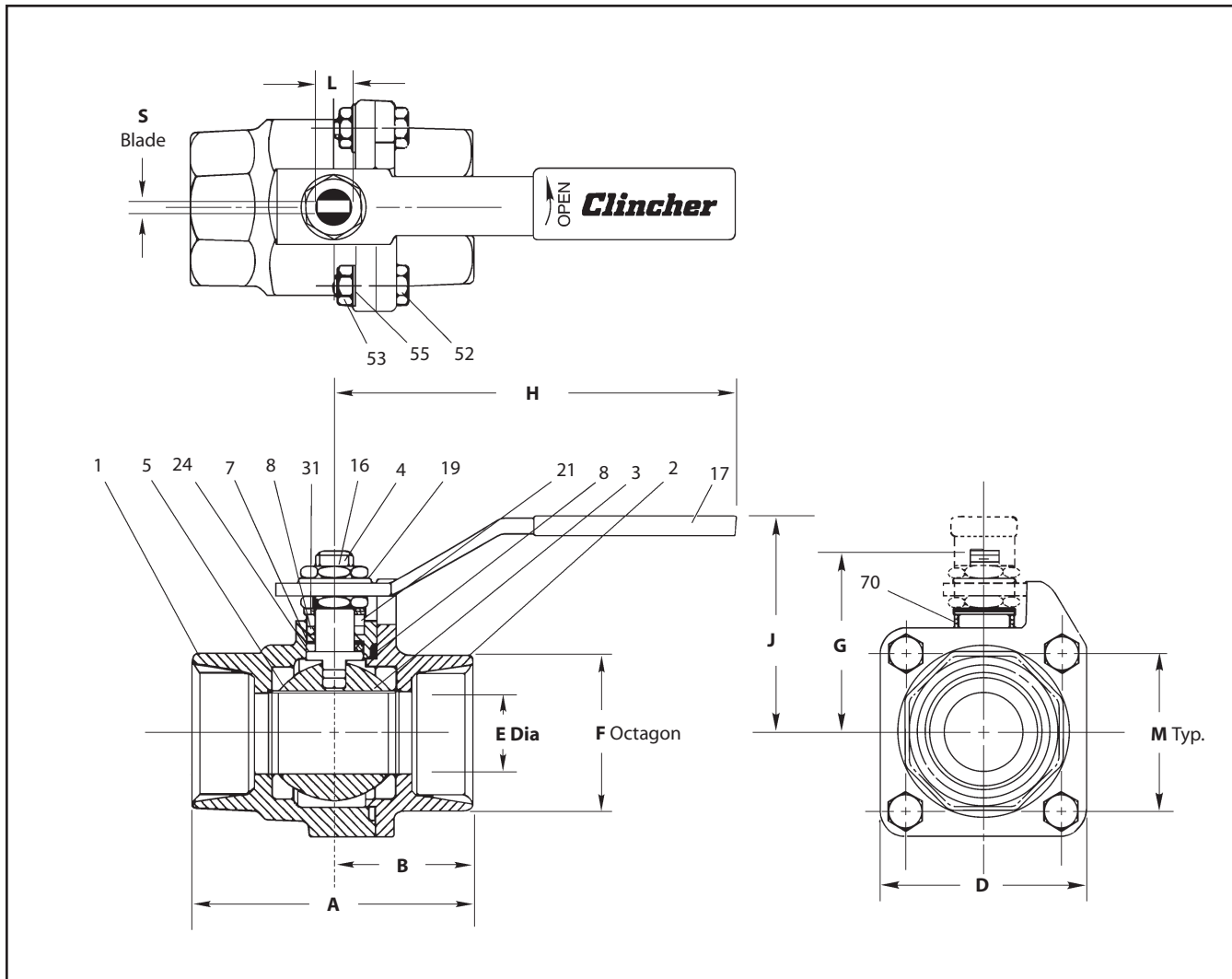
- |                |        |                                    |        |
|----------------|--------|------------------------------------|--------|
| Steam service  | B150-1 | Torq-Handle® spring-return handles | B160-1 |
| Oxygen service | B150-3 | Ball valve seat materials          | T140-1 |
| Vacuum service | B150-4 |                                    |        |

### TORQUE REQUIREMENTS

Use these torque charts for Clincher valves as a guide for actuator selection. Select an actuator that provides the same or greater torque output than that shown in the charts below. Refer to pneumatic and electric actuator bulletins for torque output values and actuator selection tables.

Additional requirements may be imposed by media characteristics, trim, and frequency of valve operation. For clean lubricating fluid service, required torque for PTFE (T) and filled PTFE (M) sealed valves *only* may be reduced 20% when the valve is equipped with 316 stainless steel trim. For difficult service (slurries, semi-solids) increase values by 50%. **If in doubt, select the next larger actuator.**





Valve Size inches	Approximate Dimensions - inches														Approx. Weight lb
	Brass A	All other Materials A	Brass B	All other Materials B	D	E	F	G	H	J	K	L	M	S	
1/4	2.34	2.50	1.25	1.25	1.81	0.44	1.03	1.57	4.00	1.78	0.25	0.31	1.28	0.19	1.1
3/8	2.34	2.50	1.25	1.25	1.81	0.50	1.03	1.57	4.00	1.78	0.25	0.31	1.28	0.19	1.1
1/2	2.34	2.50	1.25	1.25	1.81	0.50	1.03	1.57	4.00	1.78	0.25	0.31	1.28	0.19	1.1
3/4	2.56	2.81	1.28	1.41	2.00	0.69	1.25	1.70	4.00	1.91	0.25	0.31	1.46	0.19	1.2
1	3.06	3.41	1.53	1.70	2.44	0.88	1.50	2.09	5.00	2.50	0.25	0.50	1.77	0.31	2.3
1-1/4	3.44	3.75	1.72	1.88	2.69	1.00	1.88	2.22	5.00	2.66	0.31	0.50	1.94	0.31	3.2
1-1/2	3.72	4.03	1.84	2.02	3.25	1.25	2.13	2.59	6.00	2.97	0.38	0.62	2.30	0.38	4.8
2	4.06	4.38	2.03	2.19	3.63	1.50	2.63	2.75	6.00	3.16	0.38	0.62	2.65	0.38	6.8

Valve Size DN	Approximate Dimensions - mm														Approx. Weight kg
	Brass A	All other Materials A	Brass B	All other Materials B	D	E	F	G	H	J	K	L	M	S	
8	59	64	32	32	46	11	26	40	102	45	6	8	33	5	0.50
10	59	64	32	32	46	13	26	40	102	45	6	8	33	5	0.50
15	59	64	32	32	46	13	26	40	102	45	6	8	33	5	0.50
20	65	71	33	36	51	18	32	43	102	48	6	8	37	5	0.54
25	78	87	39	43	62	22	38	53	127	64	6	13	45	8	1.0
30	87	95	44	48	68	25	48	56	127	68	8	13	49	8	1.5
40	94	102	47	51	83	32	54	66	152	75	10	16	58	10	2.2
50	103	111	52	56	92	38	67	70	152	80	10	16	67	10	3.1

## PARTS AND BILLS OF MATERIALS FOR CLINCHER VALVES

Part No.	Part Name	MATERIAL		
		Standard	Fire-Tite	
		Style 21-11****	Style 23-22	Style 23-36
1	Body	Brass ASTM B283 Alloy 377	Carbon steel ASTM A216 GR. WCB	Stainless steel ASTM A351 GR. CF8M
2	Body Cap	Brass ASTM B283 Alloy 377	Carbon steel ASTM A216 GR. WCB	Stainless steel ASTM A351 GR. CF8M
3	Ball	Brass***, 316 Stainless steel	316 Stainless steel	
4	Stem	Brass***, 316 Stainless steel	316 Stainless steel	
5	Seat	PTFE or filled PTFE – as specified		
6	Body seal	PTFE	Spiral Wound 316 Stainless steel and PTFE	
7	Secondary Stem Seal	Not required	Graphite	
8	Upper Stem Seal	PTFE		
16	Stem Nut	Carbon steel	Stainless steel	
17	Handle	Carbon steel or Stainless steel**	Carbon steel	
19	Shakeproof Washer	Carbon steel or stainless steel		
21	Compression Ring	Brass	316 Stainless steel	
24	Lower Stem Seal	PTFE		
31	Spring Washer*	Carbon steel-zinc plated		
52	Body Bolt†	ASTM A449 or 300 series stainless	ASTM A193 Gr. B7	
53	Hex Nut	Carbon steel or 300 series stainless	ASTM A193 Gr. 2H	
55	Lockwasher	–	Carbon steel	
70	Top Ground Spring	Stainless steel	–	

\* Furnished only on 1" (DN 25) and larger valves with brass or 316 stainless steel ball.

\*\* Stainless steel on valves with stainless steel body bolts.

† Valves furnished with actuators are equipped with ASTM A193 Gr. B7 bolts.

\*\*\* 1/4" – 3/4" (DN 8 – 20) brass valves equipped with actuator must have 316 stainless steel trim.

\*\*\*\* Attention: The state of California has determined lead and lead compounds are known to cause cancer, birth defects and reproductive harm. The state of California prohibits the use of brass valves for drinking water service.

### ACTUATOR

Metso offers a full line of integrally designed actuators for automated systems or for easier control of inaccessible or remote valves. Pneumatic actuators, including both double-acting and spring-return types, and electric actuators are available for all valves. Electric actuators are available in both watertight and hazardous location models. For further information on actuators for *Clincher* valves see the following technical bulletins:

Type	Bulletin
Spring-Diaphragm Actuators	A110-4
Valv-Powr® Series VP-VL	
Double-Opposed Piston Actuators	A111-5
V-Series Electric Actuators	A200-1
ADC-Series Electric Actuators	A201-1
LCU-Series Electric Actuators	A202-1
LCR-Series Electric Actuators	A203-1

### ACCESSORIES

#### Locking Devices

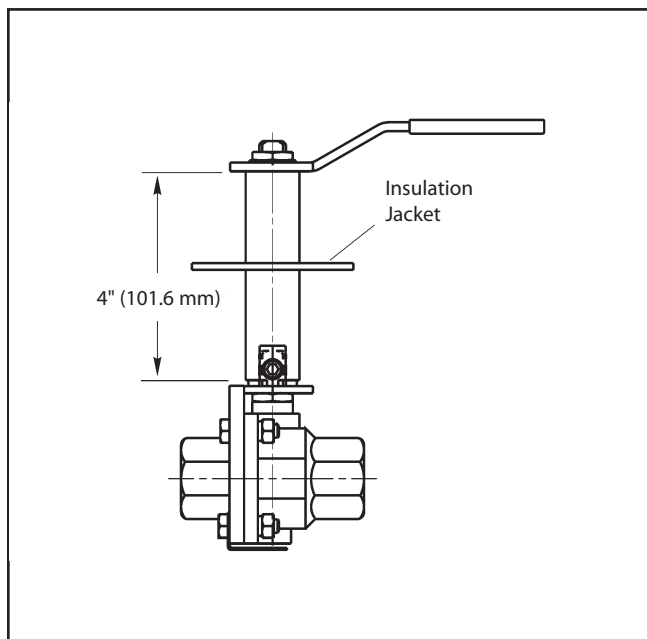
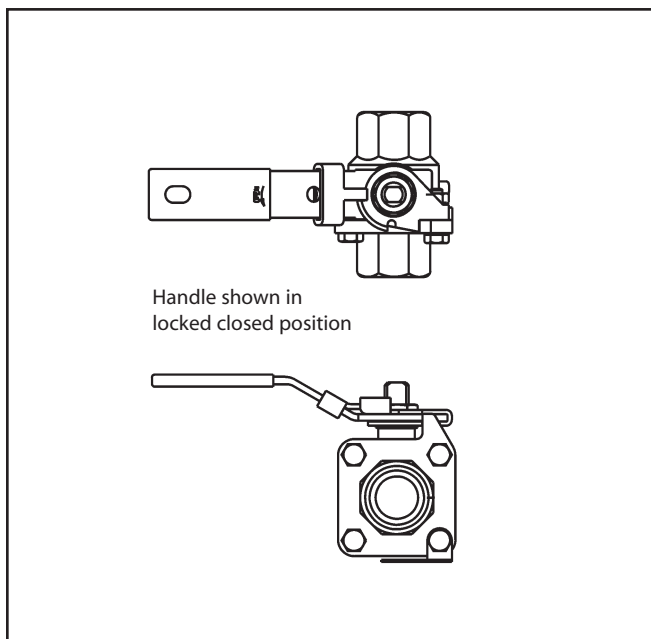
When security measures are necessary for handling hazardous or valuable fluids, or are needed for applications covered by certain government regulations, reliable locking devices can be provided to hold the valves inoperative. The following table provides kit numbers for ordering purposes.

Locking Devices		
Valve Size		Part Number
inches	DN	
1/4 – 3/4	8 – 20	LD53
1 – 1-1/4	25 – 30	LD54
1-1/2 – 2	40 – 50	LD55

#### Stem Extensions

A standard 4" (101.6 mm) stem extension is offered for Series 2000 valves for improved accessibility, particularly when used in insulated pipelines. (These extensions should not be confused with extended bonnets customarily used on cryogenic valves.) Stem extensions can be provided factory mounted or shipped separately for field mounting.

Stem Extension		
Valve Size		Part Number
inches	DN	
1/4 – 3/4	8 – 20	SE063
1 – 1-1/4	25 – 30	SE064
1-1/2 – 2	40 – 50	SE065



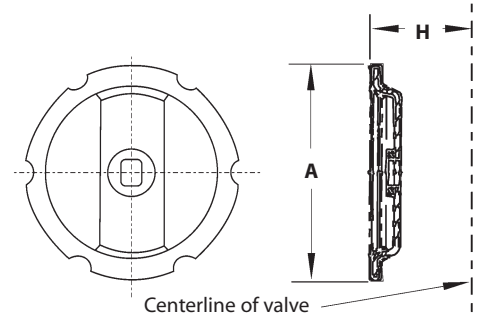
### Round Handles

Series 2000 ball valves are optionally available equipped with circular handles instead of lever handles for use when the valves are to be installed in confined piping arrangements where there is insufficient space for 90° lever operation. They

are also ideal for cases where projecting lever handles are prohibited. These handles have a plastic coating on the gripping area for added comfort and insulation. They are available in carbon or stainless steel.

Round Handle Dimensions - inches				
Valve Size inches	Part Number		A	H
	Stainless Steel	Carbon Steel		
1/4 - 3/4	012-0783-30	012-0783-22	3.75	1.91
1	012-0546-30	012-0546-22	3.75	2.38
1-1/4	012-0546-30	012-0546-22	3.75	2.53
1-1/2	012-0734-30	012-0734-22	4.75	2.53
2	012-0734-30	012-0734-22	4.75	3.03

Round Handle Dimensions - mm				
Valve Size DN	Part Number		A	H
	Stainless Steel	Carbon Steel		
8 - 20	012-0783-30	012-0783-22	95	49
25	012-0546-30	012-0546-22	95	60
30	012-0546-30	012-0546-22	95	60
40	012-0734-30	012-0734-22	121	64
50	012-0734-30	012-0734-22	121	77



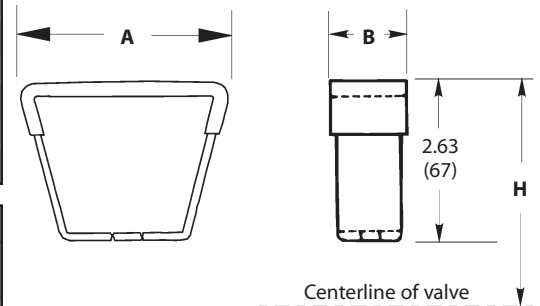
### D-Ring Handles

When piping is to be insulated, *Clincher* ball valves can be equipped with D-ring handles. They provide for easy operation of the valve with the piping and all but the

bonnet surface of the valve fully insulated, assuring minimum loss or absorption.

D-Ring Handle Dimensions - inches				
Valve Size inches	Part Number	A	B	H
1/4 - 1/2	BHK 28	3.00	1.00	3.75
3/4	BHK 28	3.00	1.00	4.00
1	BHK 29	3.00	1.00	4.17
1-1/4	BHK 29	3.00	1.00	4.31
1-1/2	012-0752-22	3.38	1.50	4.50
2	012-0752-22	3.38	1.50	4.69

D-Ring Handle Dimensions - mm				
Valve Size DN	Part Number	A	B	H
8 - 15	BHK 28	76	25	95
20	BHK 28	76	25	102
25	BHK 29	76	25	106
30	BHK 29	76	25	109
40	012-0752-22	86	38	114
50	012-0752-22	86	38	119



## HOW TO ORDER

Catalog numbers are fully descriptive of a valve. They are made up of size and a ten-digit figure designation with coding as shown below:

<b>1</b>	---	<b>2</b>	<b>3</b>	---	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	---	<b>8</b>
1		21	-		11	00	T	T		0

<b>1</b>	<b>Size</b>
<b>inches</b>	1/4, 3/8, 1/2, 3/4, 1, 1-1/4, 1-1/2, 2
<b>DN</b>	08, 10, 15, 20, 25, 30, 40, 50

<b>2</b>	<b>Body Style</b>
<b>21</b>	Standard screwed end (Brass only)
<b>23</b>	Fire-Tite screwed end

<b>3</b>	<b>Special Service</b>
<b>V</b>	High vacuum (Brass only)
<b>VC</b>	High vacuum certified (Brass only)
<b>O</b>	(No entry if standard) (Brass only)

<b>4</b>	<b>Body Material</b>
<b>11</b>	Brass*
<b>22</b>	Carbon steel***
<b>36</b>	316 Stainless steel***

<b>5</b>	<b>Trim Material</b>
<b>00</b>	Same as body material* (Carbon steel not available)
<b>36</b>	316 Stainless steel

<b>6</b>	<b>Seat Materials</b>
<b>T</b>	PTFE
<b>M</b>	Filled PTFE

<b>7</b>	<b>Seal Material</b>
<b>T</b>	PTFE

<b>8</b>	<b>Body Fasteners</b>	
	<b>Bolts</b>	<b>Nuts</b>
<b>0</b>	ASTM A449	Carbon Steel
<b>1</b>	ASTM A193 Gr. B7†	ASTM A194 Gr. 2H†
<b>3</b>	300 series stainless steel**	

\* 1/4" – 3/4" (DN 8 – 20) brass valves equipped with actuator must have 316 stainless trim.

\*\* Not suitable for fire-tested applications

\*\*\* Only available as Fire-Tite

† Required for Fire-Tite (23-) valves.

Clincher, Double-Seal and Fire-Tite are trademarks of Jamesbury.

Subject to change without prior notice.

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