



Worcester Controls 44/459 3 -Piece Reduced Ball Valves



Experience In Motion

Almost 40 years ago, Flowserve Worcester Controls' original 3-piece valve was responsible for the development of the UK ball valve market. The Series 44 rapidly established itself as the industry standard for quality, reliability and long service.

As you would expect, Worcester has developed and improved the Series 44 over the years to maintain its position as the 8-50mm valve design which others strive to equal (see Page 11). Now, Worcester's new, larger valve, the 65-150mm Series 459, complements the Series 44 to offer you the most versatile, reliable and widely specified range of 3-piece ball valves available.

Gland nut

Does not need to be removed for actuator mounting thereby maintaining valve integrity

Actuator mounting

Conforms to ISO 5211 for ease of actuation (8-25mm valves use Worcester two hole pattern - see page 4)

Anti-static stem design

Ensures electrical continuity between ball and body

Seats

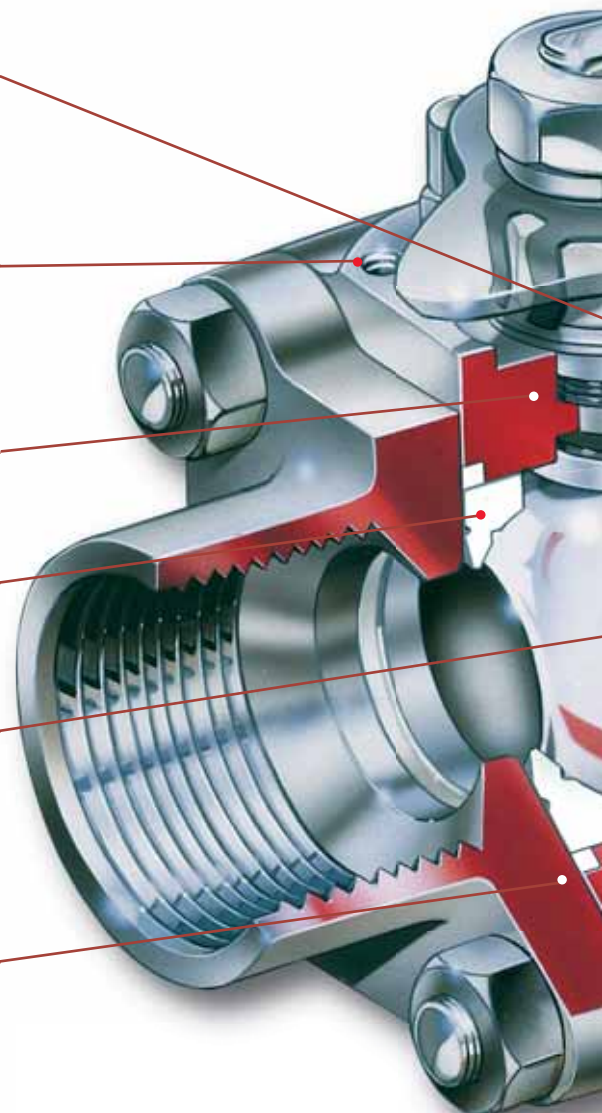
Wide range of seat materials to suit customer applications (see centre pages)

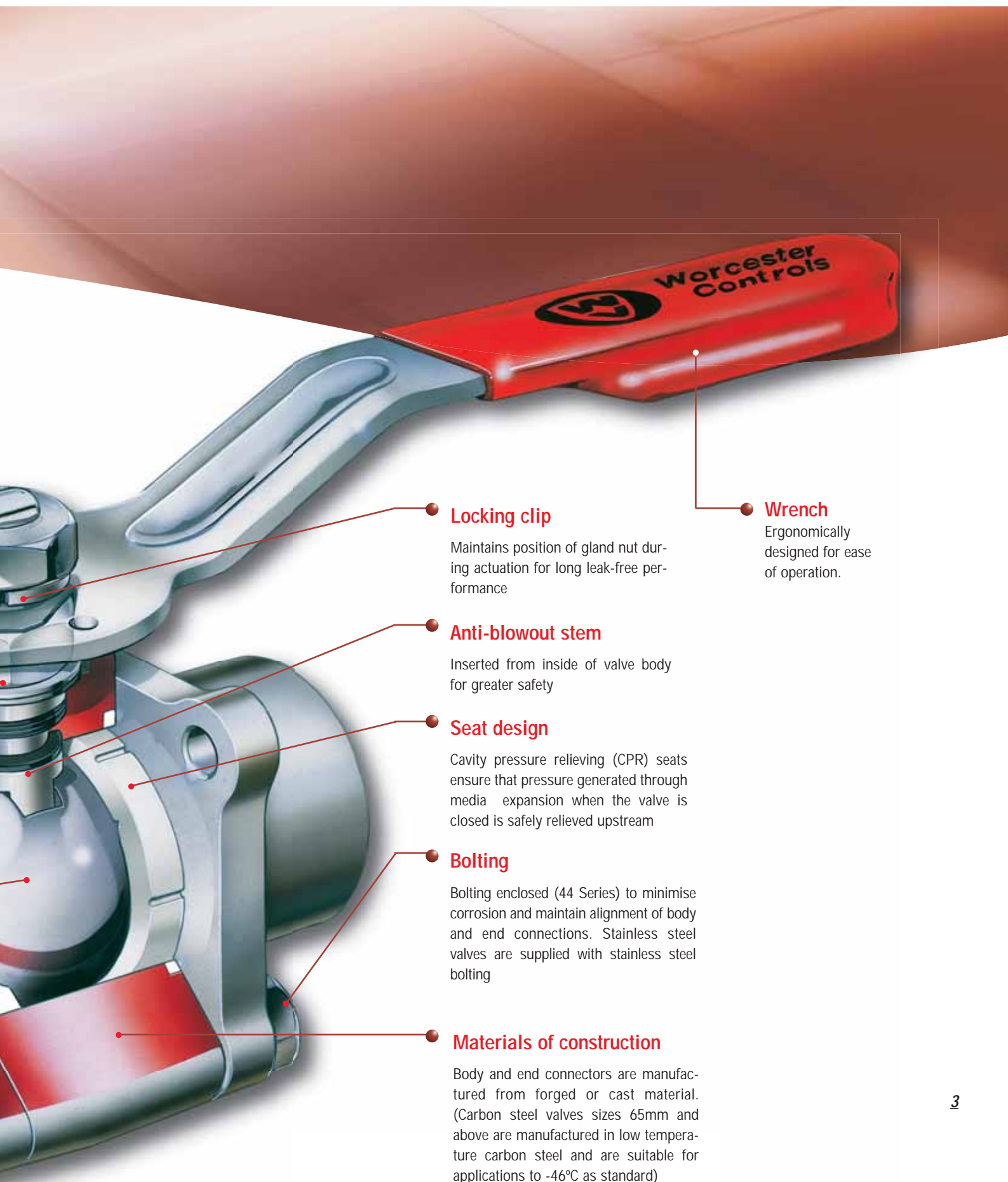
Ball

316 stainless steel as standard with pressure equalising hole to balance cavity pressure with line pressure when valve is open.

Body seals

PTFE as standard for media compatibility but can be interchanged for alternative applications





Locking clip

Maintains position of gland nut during actuation for long leak-free performance

Anti-blowout stem

Inserted from inside of valve body for greater safety

Seat design

Cavity pressure relieving (CPR) seats ensure that pressure generated through media expansion when the valve is closed is safely relieved upstream

Bolting

Bolting enclosed (44 Series) to minimise corrosion and maintain alignment of body and end connections. Stainless steel valves are supplied with stainless steel bolting

Materials of construction

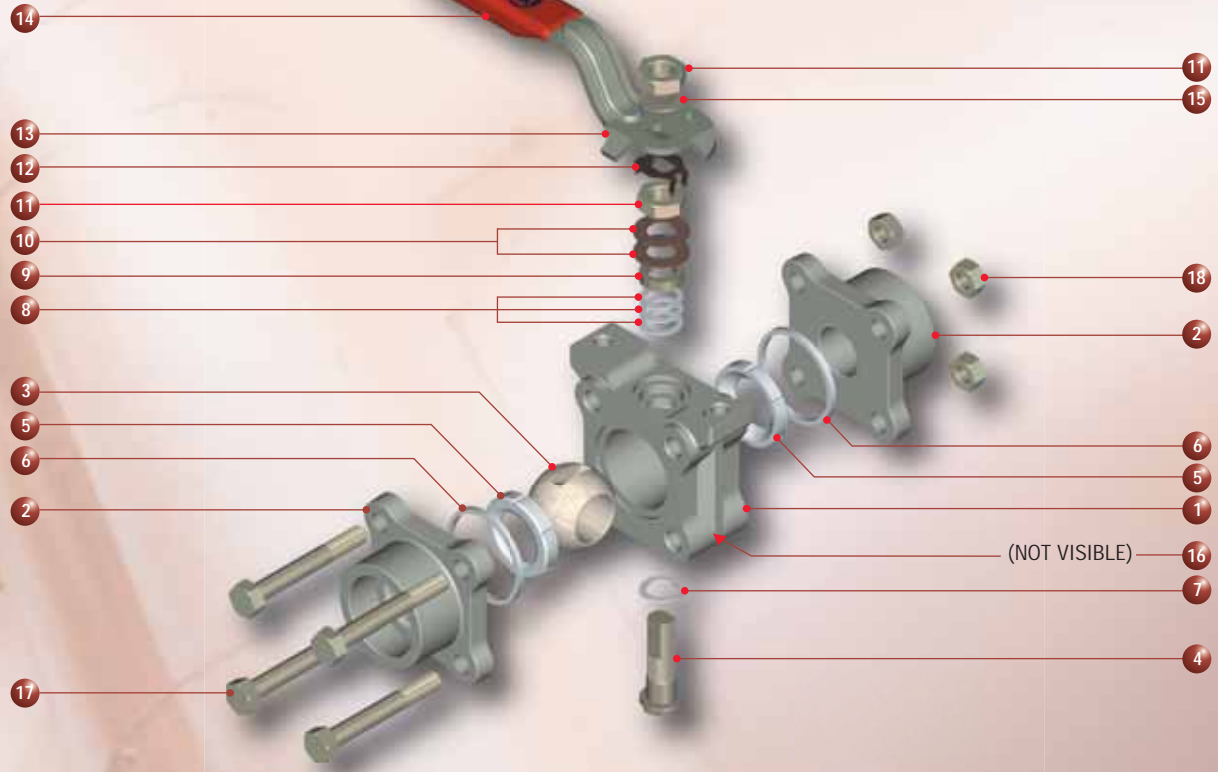
Body and end connectors are manufactured from forged or cast material. (Carbon steel valves sizes 65mm and above are manufactured in low temperature carbon steel and are suitable for applications to -46°C as standard)

Wrench

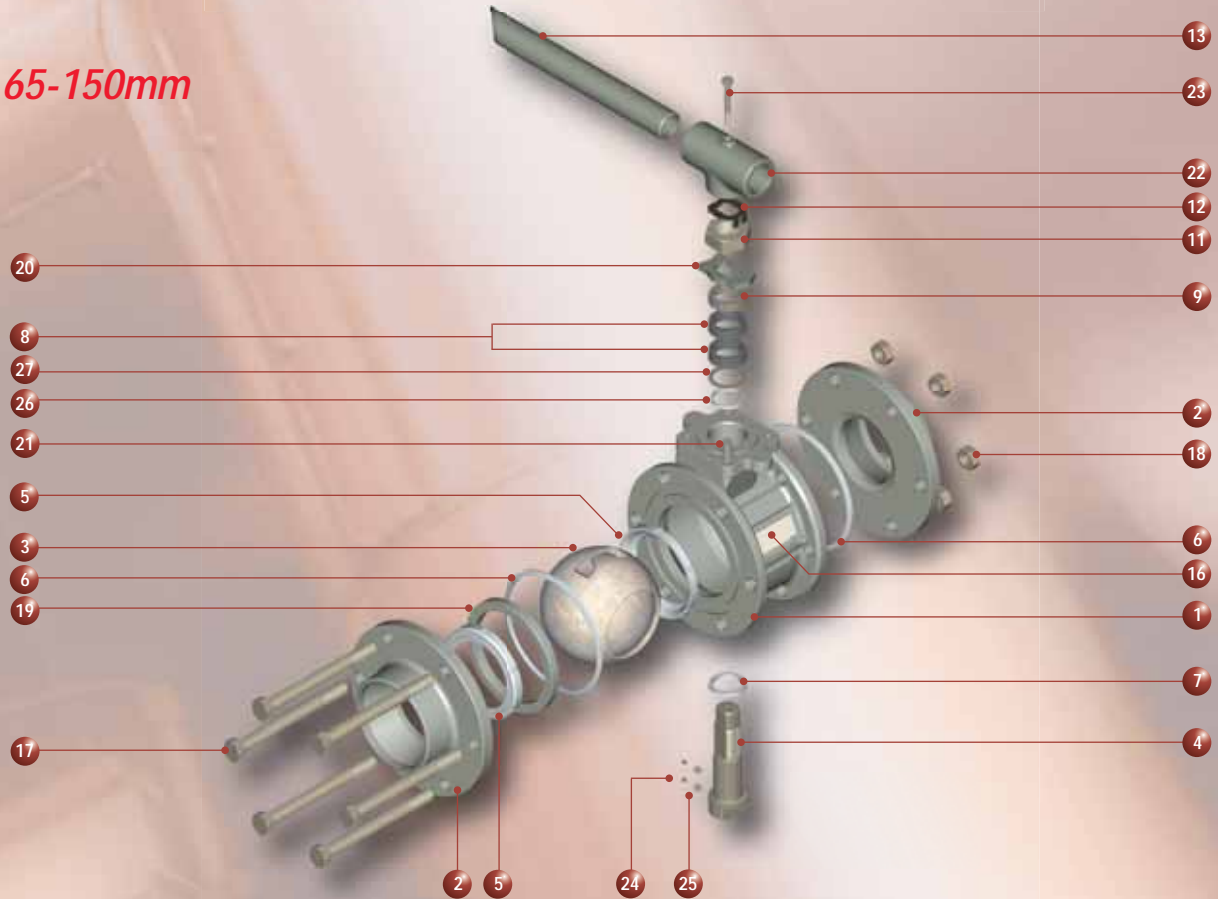
Ergonomically designed for ease of operation.

8-50mm

Please Note: The illustration shown here depicts the 2-hole mounting for the 8-25mm valve. 32-50mm valves have 4-hole ISO mounting.



65-150mm



Parts/Materials List

ITEM & DESCRIPTION	8-50mm	65-150mm
1. BODY		
Stainless Steel ASTM A351 CF8M UNS J92900	•	•
Carbon Steel ASTM A105 UNS K03504	•	
Carbon Steel ASTM A352 LCB UNS J03003		•
Brass BS EN 12165 CW617N	•	
Aluminium BS 1474 6082-T6	•	
Nickel Aluminium Bronze NES 833 Pt. 2 Cl.3 or Gr. 2	•	
2. BODY CONNECTOR		
Stainless Steel ASTM A351 CF8M UNS J92800	•	
Stainless Steel ASTM A351 CF8M UNS J92900	•	
Stainless Steel ASTM A182 F316L UNS S31603	•	•
Carbon Steel ASTM A105 UNS K03504	•	
Carbon Steel ASTM A350 LF2 UNS K03011		•
Brass BS EN 12165 CW617N	•	
Aluminium BS 1474 6082-T6	•	
Nickel Aluminium Bronze NES 833 Pt. 2 Cl.3 or Gr. 2	•	
3. BALL		
Stainless Steel ASTM A351 CF8M UNS J92900	•	•
Stainless Steel ASTM A479 316 UNS S31603	•	•
Stainless Steel ASTM A240 316L UNS S31603		•
Stainless Steel ASTM A312 TP316L UNS S31603		•
Brass BS EN 12164 CW609N / CW617N / CW721R	•	
Nickel Aluminium Bronze NES 833 Pt. 2 Cl.3 or Gr. 2	•	
4. STEM		
Stainless Steel AISI Type 316	•	•
Stainless Steel ASTM A564 Type 630, Condition H900 & H1150 UNS J92900	•	•
Brass BS EN 12163 CW719R	•	
Nickel Aluminium Bronze NES 833 Pt. 2 Gr. 2	•	
5.* SEATS (see also Pages 6-8)		
PTFE Virgin	•	•
PTFE 15% Glass Filled	•	•
PTFE VX1	•	•
Fluorofill	•	•
Acetal Resin	•	•
PEEK	•	•
Metal	•	•
6.* BODY SEAL		
PTFE Virgin	•	•
Buna 'B'	•	•
Viton	•	•
PTFE-coated Stainless Steel	•	
7.* STEM THRUST SEAL		
PTFE 35% Carbon Filled	•	
PTFE 25% Glass Filled		•
PEEK	•	•

ITEM & DESCRIPTION	8-50mm	65-150mm
8.* GLAND PACKING		
PTFE 35% Carbon Filled	•	
Flexible Graphite		•
9. GLAND FOLLOWER		
Stainless Steel	•	•
Aluminium Bronze	•	
10.* DISC SPRINGS		
Stainless Steel	•	
Copper Beryllium	•	
11.* GLAND/WRENCH NUT		
Stainless Steel	•	•
Aluminium Bronze	•	
Carbon Steel, Rustproofed	•	•
12.* GLAND NUT LOCKING CLIP		
Carbon Steel, Rustproofed	•	•
13. WRENCH		
Stainless Steel	•	
Carbon Steel, Rustproofed	•	•
14. WRENCH SLEEVE		
Vinyl Plastisol	•	
15. SPRING WASHER		
Stainless Steel	•	
16. IDENTIFICATION PLATE		
Stainless Steel	•	•
17. BODY CONNECTOR BOLTS (see Note 1)		
Stainless Steel	•	•
Carbon Steel	•	•
Aluminium Bronze	•	
18. BODY CONNECTOR NUTS		
Stainless Steel	•	•
Carbon Steel	•	•
19. SEAT RETAINING RING		
Carbon Steel		•
Stainless Steel		•
20. STOP INDICATOR		
Stainless Steel		•
Carbon Steel, Rustproofed		•
21. STOP PIN		
Stainless Steel 316	•	•
Carbon Steel, Rustproofed	•	•
22. WRENCH HEAD		
Malleable Iron, Rustproofed		•
23. WRENCH BOLT		
Stainless Steel		•
24. ANTI-STATIC PLUNGER		
Stainless Steel		•
25. ANTI-STATIC SPRING		
Stainless Steel		•
26. STEM LOCATION RING		
Stainless Steel		•
27.* SECONDARY STEM SEAL		
PTFE Virgin		•
Buna 'B'		•
Viton		•

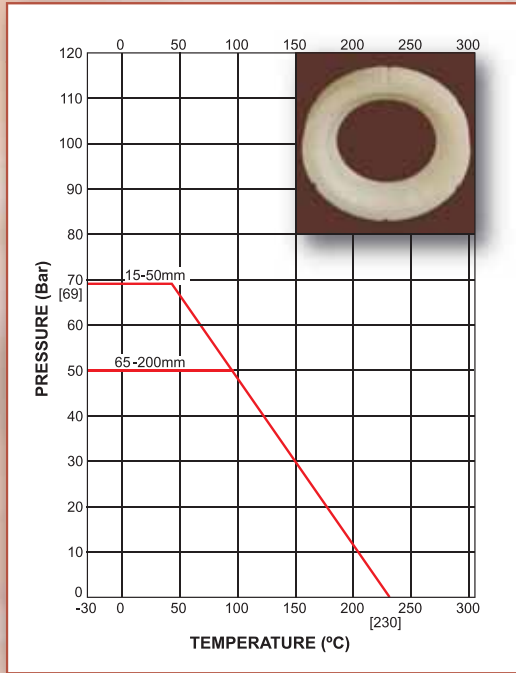
Note 1: 4 bolts for valves up to 50mm, 6 bolts 65-80mm, and 8 bolts for 100mm, 8 studs for 150mm.

* Items marked thus denote components supplied in repair kit.

Pressure/Temperature Ratings

VIRGIN PTFE (T)

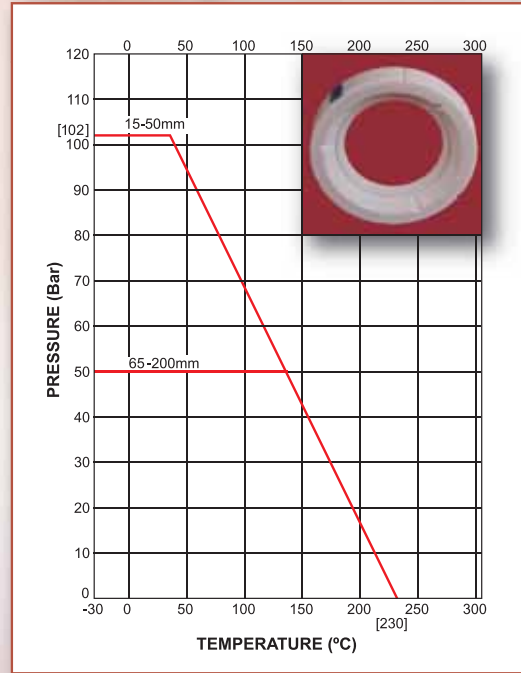
Virgin PTFE is the most common sealing material and is suitable for almost all media as it has excellent chemical resistance.



15% GLASS FILLED PTFE (R)

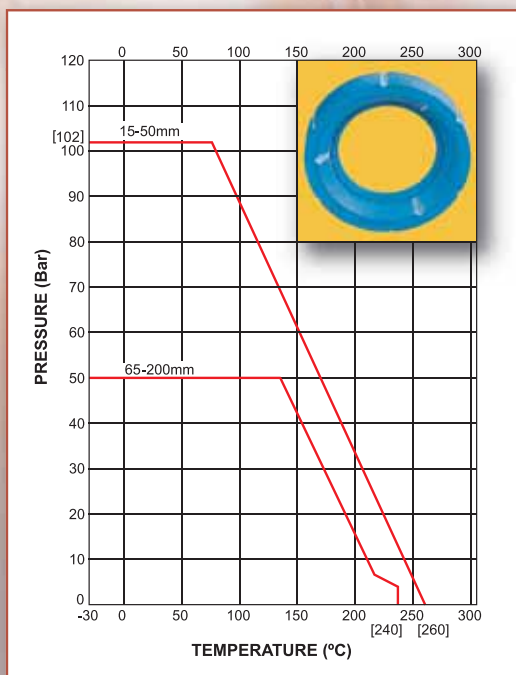
Glass re-inforced PTFE seats are stronger than virgin and have higher pressure/temperature ratings.

Chemical resistance as per virgin PTFE.



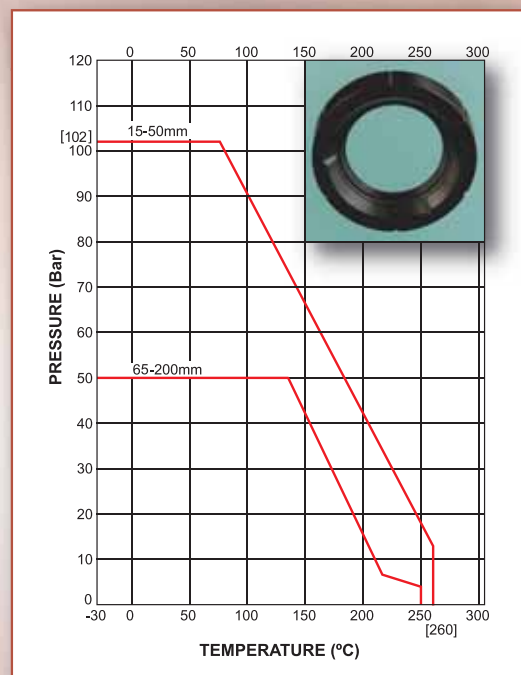
25% GLASS FILLED PTFE (H)

Glass re-inforced PTFE material offering a greater pressure / temperature capability than the R seat.



FLUOROFILL (P)

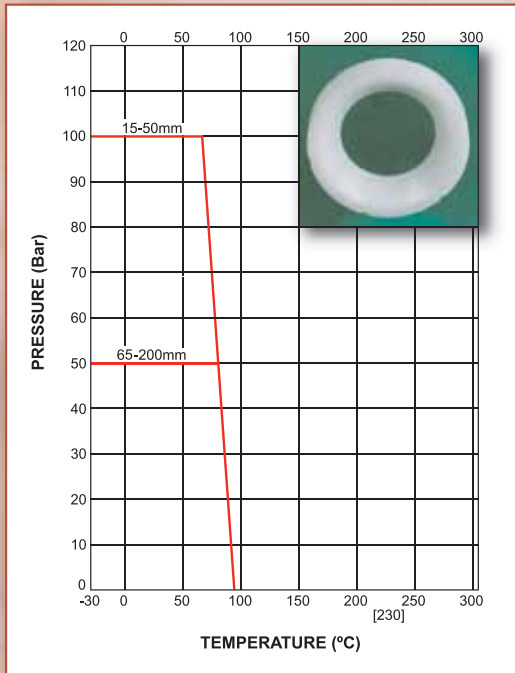
Carbon, glass and graphite filled PTFE material, an excellent seat material for steam and thermal services. Due to its high cycling capabilities, it is the recommended soft seat for modulating control applications.



Pressure/Temperature Ratings

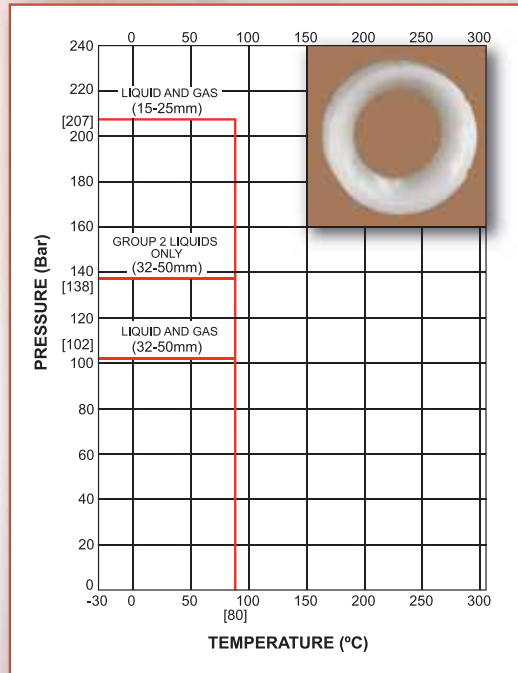
UHMWPE (U)

Ultra High Molecular Weight Polyethylene offers good performance characteristics in applications where PTFE is not suitable (for example on tobacco duty). It also has good abrasion resistance..



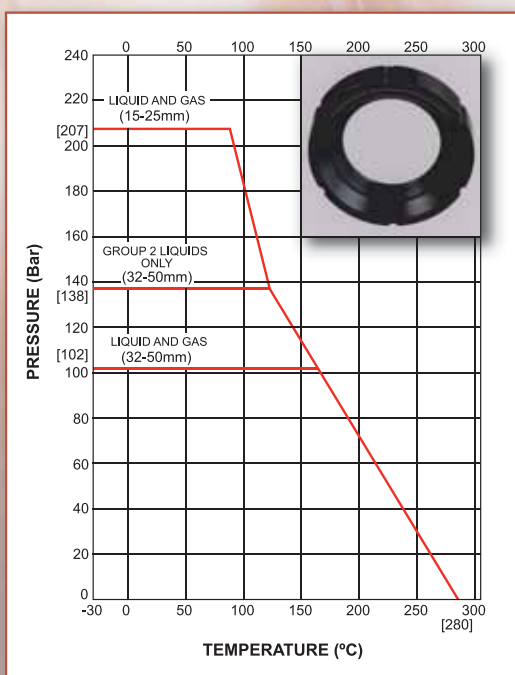
ACETAL (Y)

Machined from acetal homopolymer, these seats are capable of handling extremely high pressures. Please note this material should not be used on oxygen service.



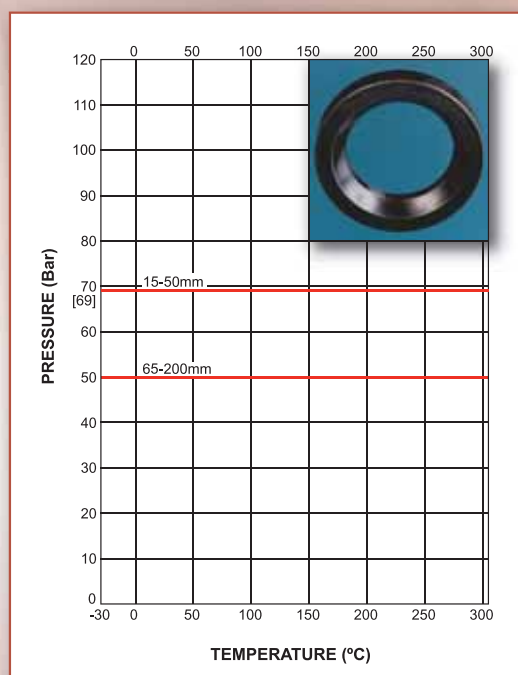
PEEK (A - DN15-25) (X - DN32-150)

PEEK is Poly Ether Ether Ketone, a material which demonstrates outstanding pressure capabilities at elevated temperatures. PEEK has excellent chemical and abrasion resistance.

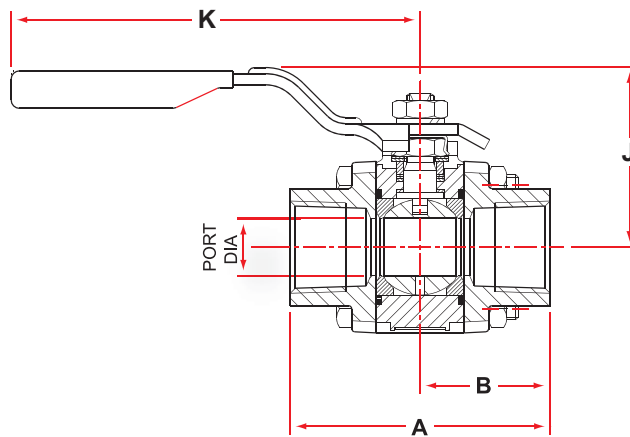
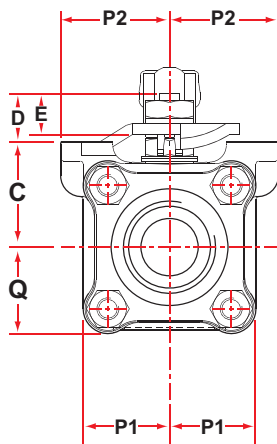
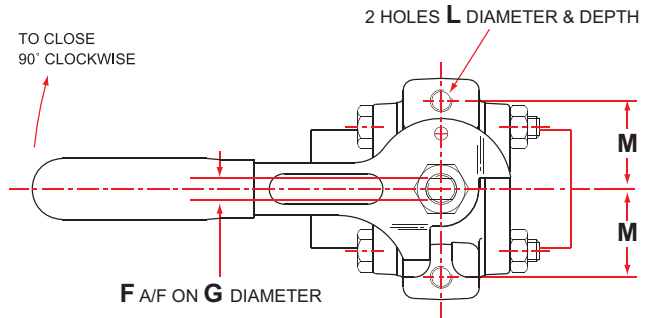
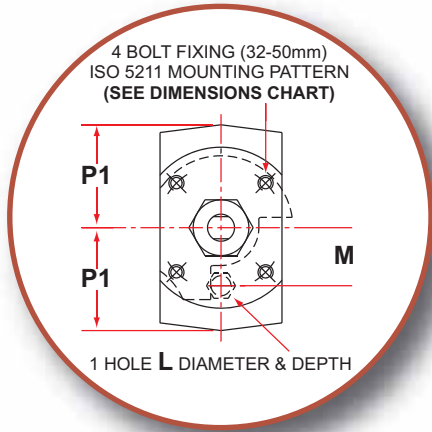


METAL - ALPHA (N)

A 316L sintered metal seat impregnated with PTFE, this material combines the strength and abrasion resistance of metal with the lubrication properties of PTFE. A graphite-impregnated metal seat is also available.



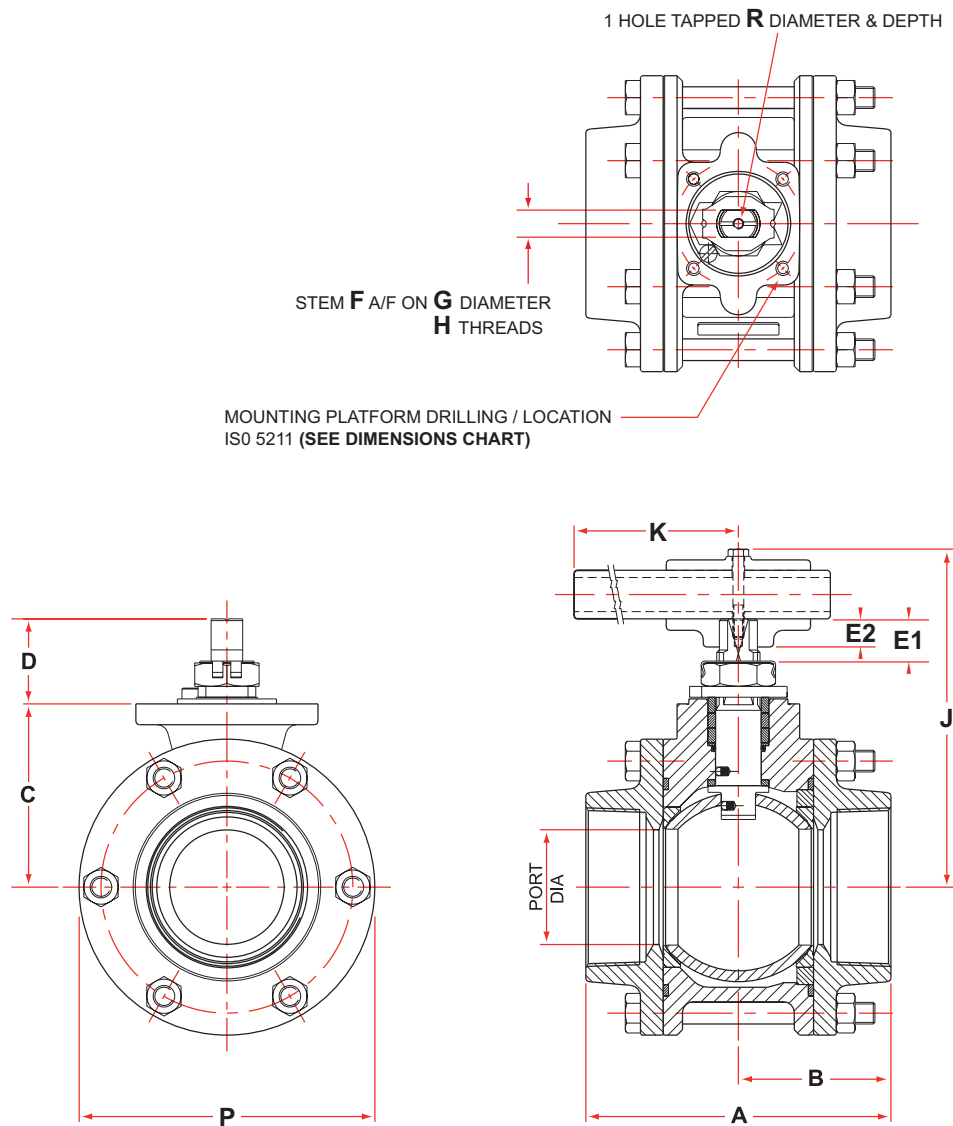
8-50mm



Valve Dimensions (mm)

Valve Size (mm)	Port Ø Min.	A	B	C	D	E	STEM		J	K	L THREAD & DEPTH	M	P1	P2	Q	MOUNTING PLATFORM (ISO 5211)			WEIGHT
							F A/F	G THREAD								ISO SIZE	MOUNTING HOLES	PLATFORM RECESS	
15	10.9	66.25 64.52	32.69	26.7 26.5	11.68 11.04	10.69 10.19	5.54 5.46	3/8"-24 UNF	57.9	136.0	M6 x1.0p 9.5 MIN	24.0	23.8	30.4	23.8				0.7
20	14.0	71.81 70.09	35.48	29.1 28.9	11.68 11.04	10.69 10.19	5.54 5.46	3/8"-24 UNF	60.3	136.0	M6 x1.0p 9.5 MIN	27.0	27.2	33.4	27.2				0.9
25	20.4	94.55 92.82	46.84	38.1 37.9	17.94 17.16	15.19 14.69	7.54 7.47	7/16"-20 UNF	64.8	149.0	M8 x1.25p 9.7 MIN	31.75	32.7	40.5	32.7				1.6
32	25.1	106.90 105.17	53.02	37.10 36.85	23.74 22.91	15.19 14.69	7.54 7.47	7/16"-20 UNF	69.6	149.0	M5 x0.8p 6.0 MIN	19.5	36.3		36.3	F04	4 OFF M5 x0.8p x7.5 DEEP MIN ON 42.0 P.C.D.	Ø 30.15/30.02 x4.29/3.52 DEEP	2.2
40	31.3	115.41 113.69	57.28	44.0 43.75	29.55 28.73	18.39 17.89	8.71 8.64	9/16"-18 UNF	77.9	181.0	M6 x1.0p 7.5 MIN	23.0	42.3		42.3	F05	4 OFF M6 x1.0p x8.7 DEEP MIN ON 50.0 P.C.D.	Ø 35.15/35.02 x4.01/3.26 DEEP	3.2
50	37.7	127.94 126.21	63.54	48.75 48.50	29.55 28.73	18.39 17.89	8.71 8.64	9/16"-18 UNF	82.6	181.0	M6 x1.0p 8.7 MIN	23.0	47.4		47.4	F05	4 OFF M6 x1.0p x8.7 DEEP MIN ON 50.0 P.C.D.	Ø 35.15/35.02 x4.01/3.26 DEEP	4.3

65-150MM



Valve Dimensions (mm)

Valve Size (mm)	Port Ø Min.	A	B	C	D	E MIN	E1 MIN	F A/F	STEM		J	K	P Ø	R THREAD & DEPTH	MOUNTING PLATFORM (ISO 5211)			WEIGHT
									G Ø	H THREAD					ISO SIZE	MOUNTING HOLES	PLATFORM RECESS	
65	50.8	149.74 148.11	74.46	87.57 86.87	43.83 41.50	13.15	-	14.0 13.9	-	M20 x1.5p	156.1	225.0	148.0	M6 x1.0p x10.0 MIN	F07	4 OFF M8 x1.25p ON 70.0 P.C.D.	Ø 54.97 / 54.90 x3.0 / 2.6 HIGH	9.0
80	63.55	170.04 168.31	84.59	101.90 101.10	51.10 48.44	19.37	16.80	15.1 15.0	21.2 21.0	M24 x2.0p	200.4	350.0	168.0	M6 x1.0p x12.0 MIN	F07	4 OFF M8 x1.25p ON 70.0 P.C.D.	Ø 54.97 / 54.90 x3.0 / 2.6 HIGH	13.3
100	76.2	214.67 212.94	106.9	119.90 119.10	55.70 53.04	21.67	21.00	19.3 19.2	27.2 27.0	M30 x2.0p	213.5	557.0	196.0	M6 x1.0p x12.0 MIN	F10	4 OFF M10 x1.5p ON 102.0 P.C.D.	Ø 69.97 / 69.85 x3.0 / 2.6 HIGH	23.0
150	102.0	299.26 297.54	149.2	147.10 146.30	73.05 70.39	30.27	28.20	26.6 26.5	33.2 33.0	M36 x2.0p	274.8	850.0	256.0	M8 x1.25p x12.0 MIN	F12	4 OFF M12 x1.75p ON 125.0 P.C.D.	Ø 84.97 / 84.85 x3.0 / 2.6 HIGH	51.0

Standards of Compliance

Threaded Connections	Body connector screwed female to the following thread specifications: NPT ANSI B1.20.1 (NPT) BSPT ISO R/7.BS 21 (Rc) BSPP ISO R/7.BS 2779.BS 21.
Socket Weld	Body connectors bored suitable Connections for accepting plain end pipe to the following specifications: BS 1600 API 5L BS 3600
Butt Weld Connections	Body connectors prepared in accordance with relevant material specification & ASME code section IX. For butt welding pipe to the following specifications: API 5L BS 1600 schedules 80/40/10/5
Pressure Test Specification	BS 6755 Part 1 and EN 17
Quality Assurance	BS EN ISO 9001

Limiting Stem Input Torque

Valve Size mm	Limiting Stem Input Torque (Nm)		
	316S16	431S29	17/4 PH
15	13.2	32	90
20			
25	24.4	59	165
32			
40	48.6	118	268
50			
65	192	644	1187
80			
100	620	1921	3540
150			
150	1138	4210	7758

Notes

- 8-50mm valve balls are parallel bore.
- When wrench not fitted flats on stem, when parallel to pipeline axis, denote ball open position.
- All weld end valves are assembled with Buna 'O' ring body connector seals with the correct body seals supplied loose.
This provides for the valves to be tested by Worcester Controls, disassembled by the customer to weld in line, and reassembled. Instructions will be supplied for fitting fire seals.
- Limiting stem input torque figures are based on random practical laboratory tests.
- For temperatures below -30°C, consult Worcester Controls.
- Installation, Operating and Maintenance Instructions are available on request.

Flow Coefficients

Valve Size		Flow Coefficients		Equivalent Length of Pipe	
mm	in	Cv	Kv	Feet	Metres
15	½	8.3	7.2	1.9	0.58
20	¾	13.6	11.8	5.5	1.67
25	1	37.5	32.6	3	0.91
32	1¼	57	49.3	3.1	0.94
40	1½	79.7	69.1	3.9	1.19
50	2	106	91.8	7.5	2.28
65	2½	188	163	150	1.52
80	3	435	377	7	2.13
100	4	638	553	27	8.21
150	6	675	585	41	12.47

Cv – Flow in US GPM Pressure – psi
Kv – Flow in M³/hr Pressure – bar









IMPORTANT NOTE

The information given in the pressure/temperature graphs on pages 6/7 indicates the maximum performance capabilities of these seat materials. The full potential of virgin and re-inforced PTFE can be realised in the standard Worcester valve build. For more demanding applications requiring the greater pressure/temperature capabilities of the other seat materials, it is essential that the appropriate valve build is specified. Examples of these applications include the following:

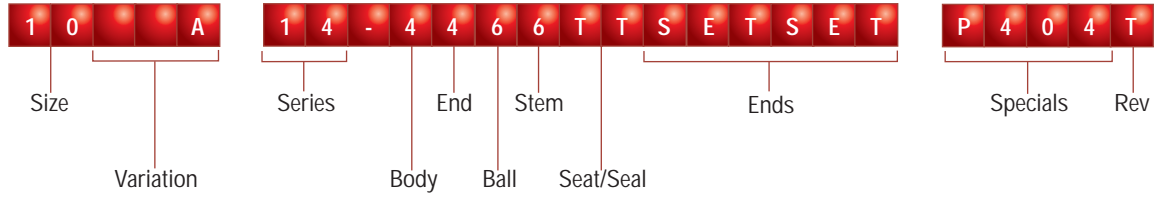
- Thermal Fluids
- Nuclear Service
- Oxygen Service
- Tobacco
- Ammonia
- Helium
- Toxic Chemicals (e.g. Chlorine, Hydrogen Peroxide, Phosgene etc.) – Envirosafe Build
- Vacuum Service and many more.

To ensure that the correct valve is supplied, please consult Worcester Controls.

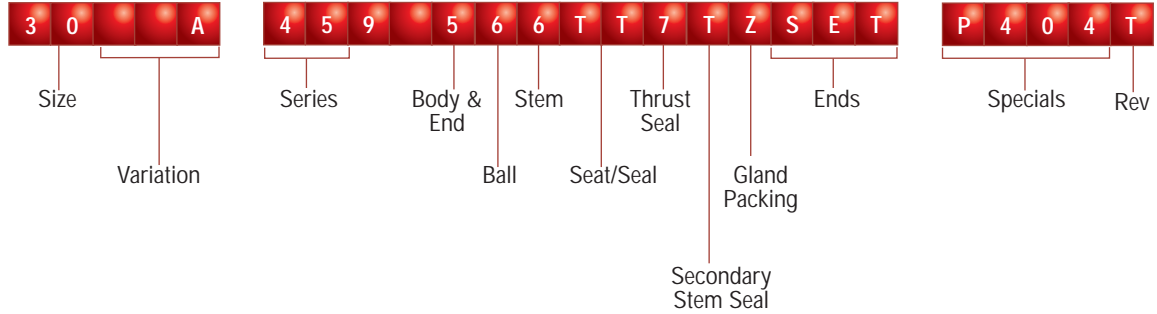
Standard Valve Variants

<p>AW44</p> 	<p>Specifically designed for on/off steam applications in conditions up to 250 psi (continuous saturated steam) or 1500 psi (thermal fluids), the AW44 is available in stainless or carbon steel in sizes from 8-50mm (¼"-2").</p>
<p>F44</p> 	<p>The F44 is particularly suitable for hazardous areas in hydrocarbon and chemical process lines, and is anti-static and firesafe to BS 6755 Part 2. It is available in stainless or carbon steel from 8 to 50mm (¼"-2").</p>
<p>13/14</p> 	<p>13/14 Worcester Series 13/14 range of three-way valves has been designed for diverting and mixing process media, and features a number of variants which provide a range of operational solutions.</p>
<p>5HP 44</p> 	<p>The 5HP 44 is Worcester's three-piece ball valve for high pressure hydraulic systems up to 345 Bar (5000 psi).</p>
<p>WK44</p> 	<p>This valve has been specifically developed for use in semi-conductor, pharmaceutical and bio-tech applications. Highly polished internally, the WK44 has no crevices or bug traps and ensures contamination-free media.</p>
<p>SMP 44</p> 	<p>Worcester's SMP 44 sample/purge three-piece valve allows steam purging of a process line between batches or for sampling media requiring a high degree of cleanliness from a storage/process vessel.</p>
<p>C44</p> 	<p>The C44 cryogenic valve is suitable for low temperature applications, including CO₂, N₂, Ar, O₂, LNG and other liquid gases. It is available in stainless steel or brass, sizes 8-50mm (¼"-2").</p>
<p>AS44</p> 	<p>Worcester's swivel-end connector AS44 allows for simple orientation and installation of butt welded valves, particularly when long, complicated sections of pre-fabricated pipework are used.</p>

Product Coding 44 Series



Product Coding 459 Series



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To find your local Flowserve representative:

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