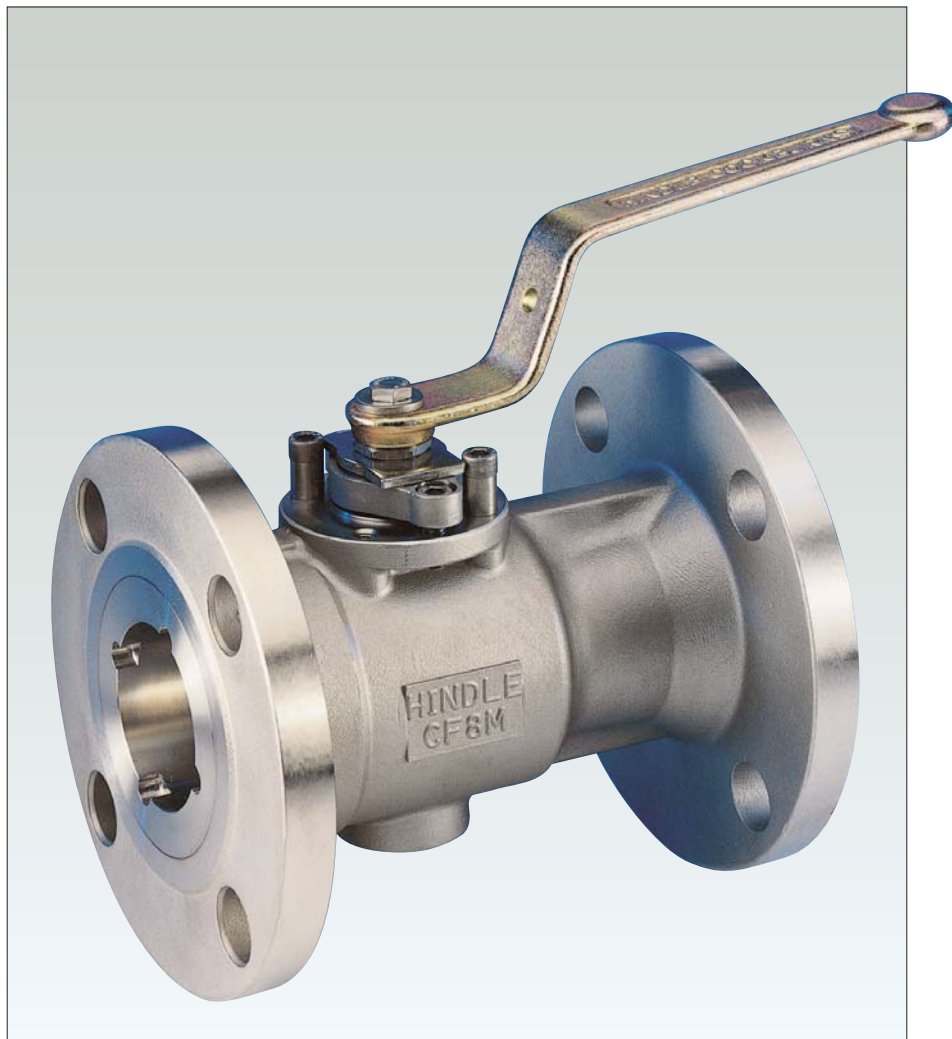


**A range of one piece reduced bore, flanged, free floating (seat supported) ball valves, incorporating mounting flanges to BS EN ISO 5211, featuring soft, metal and carbon seated designs**

#### Features

- One piece reduced bore body, flanged construction in carbon steel, stainless steel and special alloys.
- Compact body design with minimum weight and elimination of potential leak path.
- Designed in accordance with ASME B16.34, BS EN ISO 17292 & ISO 14313/API 6D.
- Floating ball design for bi-directional shut-off.
- Flexing soft seat design for superior shut-off across a range of pressures with minimum operating torque.
- Low temperature and cryogenic designs for service down to -196°C available on request.
- Spring energized metal and carbon seat designs permitting tight shut-off and positive cavity pressure relief.
- Fused hard nickel alloy, chromium carbide or tungsten carbide coated seat and ball designs for abrasive and high temperature service.
- Hard carbon seat design for medium temperature applications.
- High integrity shaft seal minimising the potential for atmospheric leakage.
- Fugitive emission performance to BS EN ISO 15848-2 class A.
- Corrosion resistant trim. Standard valves incorporate balls and shafts of stainless steel for long service life.
- Fire test certified. All sizes and pressure ratings are covered by approved certification.



- Anti-static and blow-out proof shaft design.
- Most designs offer cavity pressure relief to upstream in event of thermal expansion.
- Could be integrated into a SIL 3 environment safety instrumented system.

#### Two design types

There are two separate design types within the one piece Ultra-Seal range, depending upon valve size.

#### Series 110

Reduced bore NPS 1/2 - 2 (DN 15 - 50)

#### Series 200

Reduced bore NPS 3 - 10 (DN 80 - 250).  
NPS 12 - 16 (DN 300 - 400) available on request.

A range of two piece Series 300 Ultra-Seal full bore valves are also available.

## Valve applications

Ultra-Seal ball valves are ideally suited for use in a wide variety of industries including petrochemical, chemical, oil and gas, LNG and marine with a choice of seat designs.

PTFE Seat applications.	Cryogenic temperatures down to -196°C and non abrasive services up to 230°C depending on the grade of material. Vacuum service down to 0.1 mbar.A.
Carbon Seat applications.	Clean service from -20°C up to 300°C, suitable for use with organic solvents. Ideally suited for Purified Terephthalic Acid (PTA).
Metal Seat applications.	Clean or Abrasive services from -50°C up to 450°C and/or applications where positive cavity relief is required together with bi-directional flow.

Soft seat valve sizes NPS 12 - 16 (DN 300 - 400) available on request.

Metal/carbon seated valve sizes NPS 1/2 - 3/4 (DN 15 - 20) available in 2-piece Series 300 full bore.

## Valve seat design range

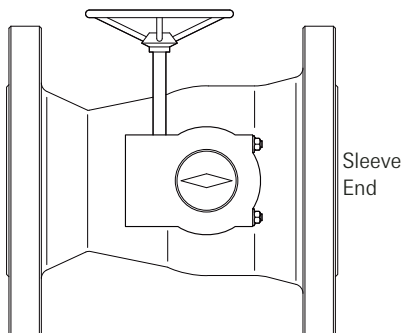
Class	Seat Type	NPS DN	1/2 - 3/4 15 - 20	1 - 2 25 - 50	3 - 6 80 - 150	8 200	10 250
150	Soft		✓	✓	✓	✓	✓
	Metal/Carbon			✓	✓	✓	
300	Soft		✓	✓	✓	✓	✓
	Metal/Carbon			✓	✓		

## Technical specifications

Design	BS EN ISO 17292 (BS 5351)	ISO 14313/API 6D (2)
	BS EN 1983	ASME B16.34
Face to Face (1)	BS EN 558	ASME B16.10
Fire Testing	BS 6755 Pt. 2	API 607
	BS EN ISO 10497	API 6FA
Pressure Testing	BS ISO 5208	API 598
	BS EN 12266-1	ISO 14313/API 6D (2)
Material Certification	BS EN 10204	NACE MR 0175-2002
		MR0103 & ISO 15156-2:2003 on request
Quality Assurance	EN 29001	
	BS EN ISO 9001-2008	
ISO Top Mounting Flange	BS EN ISO 5211	
	BS EN 15081	

## Notes

1. Long and short patterns available.
2. Conformity to ISO 14313/API 6D is limited to all class 150 valves and class 300 up to NPS 8 (DN 200).



## Standard operator for soft seats

		Lever	T-Bar	Gearbox
Class 150	NPS	1/2 to 4	6 & 8	10
	DN	15 to 100	150 & 200	250
Class 300	NPS	1/2 to 3	4 & 6	8 & 10
	DN	15 to 80	100 & 150	200 & 250

## Note

These tables identify the standard face to face length of Ultra-Seal ball valves. Alternative pattern lengths are available on request.

Face to face standard	ASME B16.10/BS EN 558	Class 150					
<b>NPS</b>	<b>1/2 - 1 1/2</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>6</b>	<b>8</b>	<b>10</b>
<b>DN</b>	<b>15 - 40</b>	<b>50</b>	<b>80</b>	<b>100</b>	<b>150</b>	<b>200</b>	<b>250</b>
Short	✓	✓	✓	✓	✓	✓	✓
Long	✓	✓	✓	✓			

Face to face standard	ASME B16.10/BS EN 558	Class 300					
<b>NPS</b>	<b>1/2 - 1 1/2</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>6</b>	<b>8</b>	<b>10</b>
<b>DN</b>	<b>15 - 40</b>	<b>50</b>	<b>80</b>	<b>100</b>	<b>150</b>	<b>200</b>	<b>250</b>
Short	✓	✓	✓	✓	✓	✓	✓
Long	✓	✓	✓	✓	✓		

## Soft seated design features

Ultra-Seal soft seated ball valves utilise PTFE seats for maximum chemical compatibility combined with minimum coefficient of friction.

### Temperature range

Suitable for a range of non abrasive service temperatures between -196°C and 230°C, depending on the seat material.

### Seat design

The seat rings incorporate a flexing design which ensures positive sealing across the pressure range, even at low differential pressures. Slots on the external diameter ensure pressure equalisation between the upstream and the valve cavity, reducing the load on the downstream seat and minimising operating torques.

### Seat leakage

Floating ball design provides tight shut-off in both direction to BS ISO 5208 rate A.

### Fugitive emissions

High integrity shaft seals give low emission performance, even under thermal cycling. Tested and approved to Shell MESC SPE 77/312 class A for series 110 and class B for series 200. Meets the leakage performance of BS EN ISO 15848-2 class A.

## Metal seated design features

Ultra-Seal metal seated ball valves incorporate proven metal seated technology together with advanced ball/seat coatings, spring materials & low emission seals.

### Temperature range

Suitable for a range of service temperatures between -50°C and 450°C for fluids carrying abrasive particles and where positive cavity relief is required.

For temperatures above 300°C, heat dissipation bonnets are available for gland isolation outside lagging area. Refer to page 4 for minimum bonnet lengths.

### Coatings

A range of ball & seat coating materials are available providing hardness values from 60 HRc up to 75 HRc and coating thicknesses between 500 µm and 200 µm.

### Seat design

Body & seat design ensures controlled spring compression, giving optimum seat & seal performance, together with constant running torque.

Spring and seat seals are protected from the main flowstream to prevent jamming and premature seat failure.

### Seat leakage

The live loaded seat design gives reliable bi-directional sealing to BS ISO 5208 rate A in sizes up to DN50, NPS 2 and rate B for DN80, NPS 3 and above. Leak rates to ANSI/FCI 70-2 are also applicable to class VI up to DN50, NPS 2 and class V for DN80 and above.

### Fugitive emissions

High integrity shaft seals give low emission performance, even under thermal cycling. Tested and approved to Shell MESC SPE 77/312 class A for series 110 and 200. Meets the leakage performance of BS EN ISO 15848-2 class A.

## Carbon seated design features

Incorporating similar design technology to the metal seated range of ball valves, including spring materials and low emission seals.

### Temperature range

Suitable for a range of service temperatures between -20°C and 300°C for use with clean organic solvents including PTA. Not recommended for fluids carrying abrasive particles. Heat dissipation bonnets are available for gland isolation outside lagging area.

### Seat design

Carbon graphite seats are assembled into seat holders by thermal control fitting. This ensures correct support for the seat material throughout the service conditions.

### Seat leakage

The live loaded seat design gives reliable tight shut off in both directions to BS ISO 5208 rate A.

### Fugitive emissions

High integrity shaft seals give low emission performance, even under thermal cycling. Tested to Shell MESG SPE 77/312 class A for series 110 and 200. Meets the leakage performance of BS EN ISO 15848-2 class A.

## Cryogenic service design features

Hindle ball valves are recognised leaders in the field of low temperature and cryogenic applications, with more than twenty years experience in this specialised market sector. Hindle experience includes many substantial international contracts for low temperature and cryogenic valves, including several large projects on Liquefied Natural Gas (LNG) plants, for major users and engineering contractors world-wide.

Ultra-Seal cryogenic ball valves are Type Approval Tested by Shell GSI & listed on Shell TAMAP database.

### Extensions

A one-piece extension bonnet is fitted so as to relocate the shaft seal away from the cold area and to provide a pressurised column within which the cold liquid phase is changed, by heat transfer with the environment, to the gaseous phase. The extension also allows for the insulation of the valve body. Hindle offer two extension lengths for each size of valve, in accordance with Shell specifications.

## Extension bonnet lengths

Valve size			Extension Length			
			-30°C to -109°C		-110°C to -196°C	
DN	NPS	Class	inch	mm	inch	mm
15 - 20	1/2 - 3/4	150	4	100	8	200
		300	4	100	8	200
25 - 50	1 - 2	150	5	125	10	250
		300	5	125	10	250
80 - 100	3 - 4	150	6	150	12	300
		300	6	150	12	300
150 - 200	6 - 8	150	7	175	14	350
		300	7	175	14	350
100 - 200	4 - 8	150	8	200	16	400
		300	8	200	16	400

### Cavity Relief

For temperatures below -50°C a pressure equalising hole is provided in the ball at the upstream (sleeve end) of the valve, to provide positive cavity relief. This renders the valve uni-directional and the body is marked accordingly.

### Operating Torque

Low temperature service requires higher operating torque and gearboxes may be required to replace lever operators. Since temperature is only one of the factors affecting operating torque, customers are advised to provide full application details with enquiries.

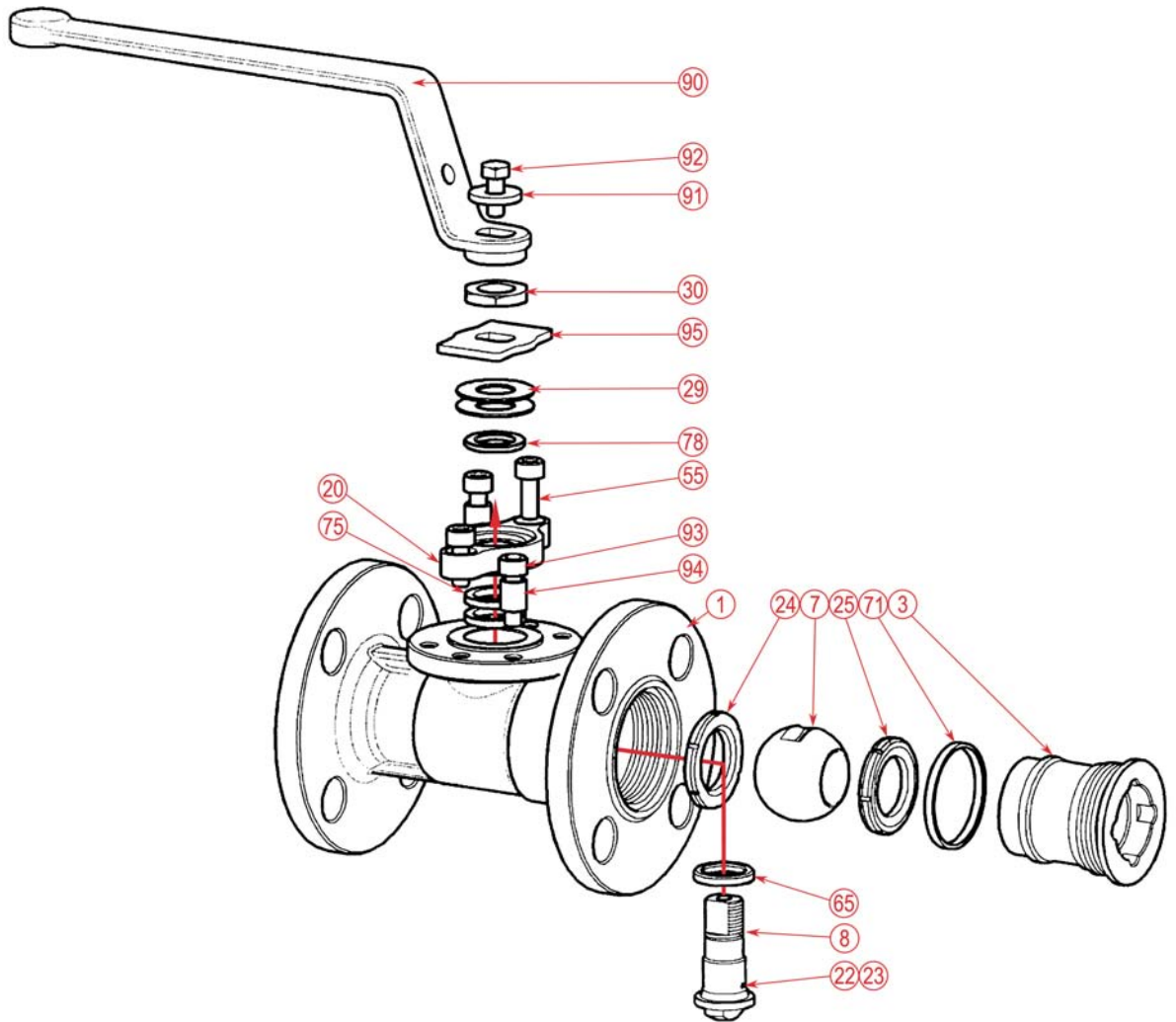
### Drip Collars

Customers may specify the fitting of drip collars/trays, which minimise ice accumulation on the extension and prevent possible damage to lagging.

### Acceptance testing

Dedicated in-house test facilities enable valves to be performance tested, at cryogenic temperatures, in accordance with major international standards or customer's individual requirements.

Parts identification series 110 - reduced bore soft seated



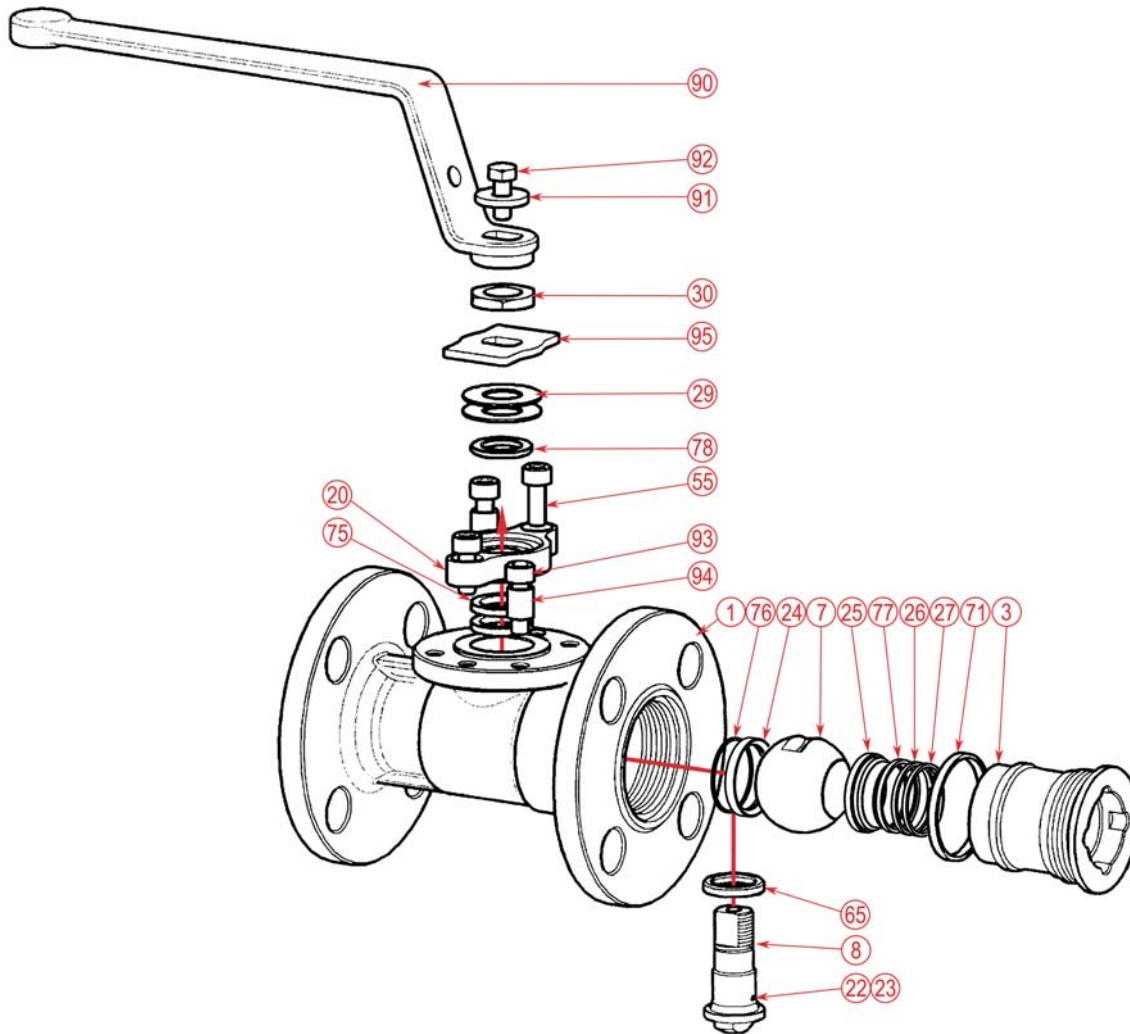
Parts list

Item	Component
1	Body
3	Sleeve
7	Ball
8	Shaft
20	Gland
22	Shaft Anti-Static Ball
23	Shaft Anti-Static Spring
24	Body Seat
25	Sleeve Seat
29	Gland Spring
30	Shaft Nut
55	Gland Screw
65	Shaft Primary Seal
71	Sleeve Seal
75	Shaft Fire Seal
78	Wiper Seal
90	Handlever
91	Handlever Washer
92	Handlever Screw
93	Stop Screw
94	Stop Collar
95	Stop Plate

Notes

1. Standard materials of construction are given on page 14.

## Parts identification series 110 - reduced bore metal / carbon seated



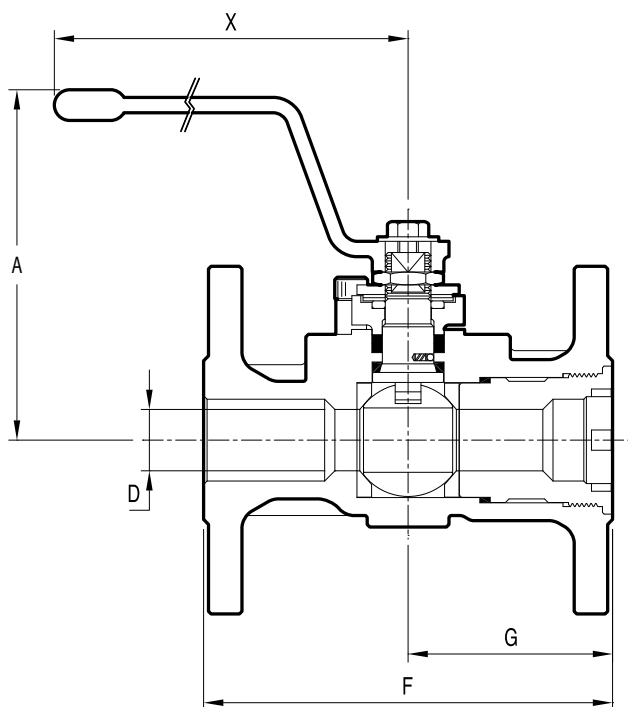
### Parts list

Item	Component
1	Body
3	Sleeve
7	Ball
8	Shaft
20	Gland
22	Shaft Anti-Static Ball
23	Shaft Anti-Static Spring
24	Body Seat
25	Sleeve Seat
26	Seat Energiser
27	Seat Spring
29	Gland Spring
30	Shaft Nut
55	Gland Screw
65	Shaft Primary Seal
71	Sleeve Seal
75	Shaft Fire Seal
76	Body Seat Seal
77	Sleeve Seat Seal
78	Wiper Seal
90	Handlever
91	Handlever Washer
92	Handlever Screw
93	Stop Screw
94	Stop Collar
95	Stop Plate

### Notes

1. Standard materials of construction are given on page 14.
2. Heat dissipation bonnets available for gland isolation outside lagging areas.

## Dimensions series 110 - reduced bore soft seat illustrated



### Notes

#### Series 110

Size Range: Class 150/300 NPS 1/2 - 2  
(DN 15 - 50)

1. All sizes have lever operator as standard.
2. Face to face dimensions (F in table) conform to ASME B16.10 and BS EN 558.
3. See page 14 for materials of construction.
4. Top mounting flange details are given on page 8.
5. Flange dimensions conform to ASME B16.5.

### Class 150 - model 115R class 300 - model 130R

Size	NPS DN	1/2 15	3/4 20	1 25	1 1/2 40	2 50
A	ins	3 5/8	3 11/16	4 11/16	5 1/16	5 5/16
	mm	92.1	93.7	119.1	128.6	134.9
D	ins	3/8	1/2	3/4	1 3/16	1 7/16
	mm	9.5	12.7	19.1	30.2	36.5
F	Class 150	ins	4 1/4	4 5/8	5	6 1/2
		mm	108	117.5	127.5	165.1
F	Class 300	ins	5 1/2	6	6 1/2	7 1/2
		mm	139.7	152.4	165.1	190.5
G	Class 150/300	ins	2	2 1/8	2 1/2	2 3/4
		mm	50.8	54	63.5	69.9
X		ins	5 13/16	5 13/16	7 1/2	7 1/2
		mm	147.6	147.6	190.5	190.5
Wt.	Class 150	kg	1.5	2	3	5
Wt.	Class 300	kg	2.3	3.3	4.5	8



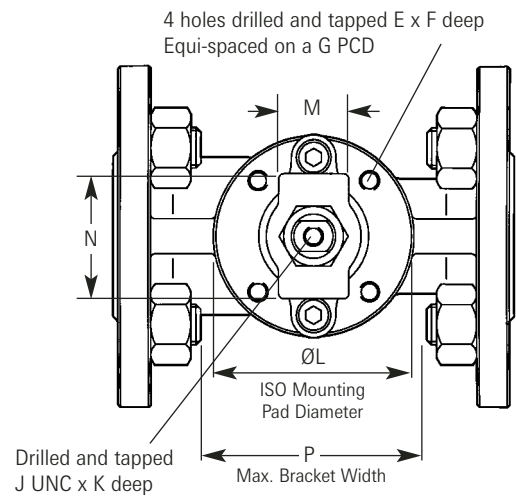
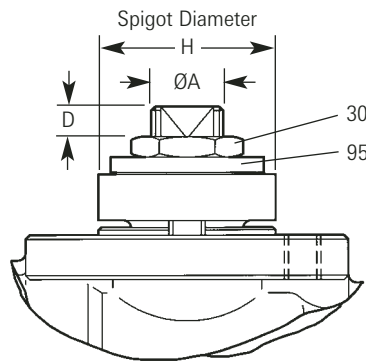
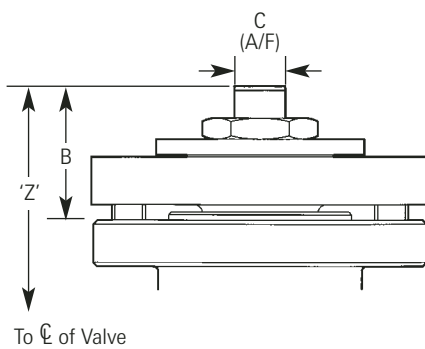
## ISO flange size identification

Valve sizes		Shaft sizes	
NPS	DN	150	300
1/2	15	6	6
3/4	20	6	6
1	25	7	7
1 1/2	40	7	7
2	50	7	7

## Notes

1. Topworks dimensions are determined according to the valve shaft size (Shaft size 6 or 7, see chart).

## Topworks Drawings



## Topworks dimensions

Shaft size	6		7	
ISO Flange	type	F03	F05	
A	ins	0.375/0.372	0.560/0.557	
	mm	9.525/9.449	14.224/14.148	
B	ins	0.714	0.989	
	mm	18.1	25.1	
C	ins	0.253/0.250	0.382/0.379	
	mm	6.426/6.350	9.703/9.627	
D	ins	0.138	0.250	
	mm	3.5	6.4	
E		M5	M6	
F	ins	0.281	0.375	
	mm	7.1	9.5	
G	ins	1.417	1.968	
	mm	36.0	50.0	
H	ins	0.984/0.974	1.378/1.368	
	mm	25.00/24.75	35.00/34.75	
J	ins	No. 8UNC	1/4"UNC	
K	ins	0.375	0.500	
	mm	9.5	12.7	
L	ins	1.875	2.500	
	mm	47.6	63.5	
M	ins	0.690	1.020	
	mm	17.5	25.9	
N	ins	1 3/16	1 9/16	
	mm	30.2	39.7	
P(max)	ins	1 5/8	2 1/2	
	mm	41.3	63.5	

## Dimension 'Z'

Valve Size	NPS	1/2	3/4	1	1 1/2	2
Z	ins	1.43	1.53	2.28	2.65	2.84
	mm	36.3	38.9	57.9	67.3	72.1

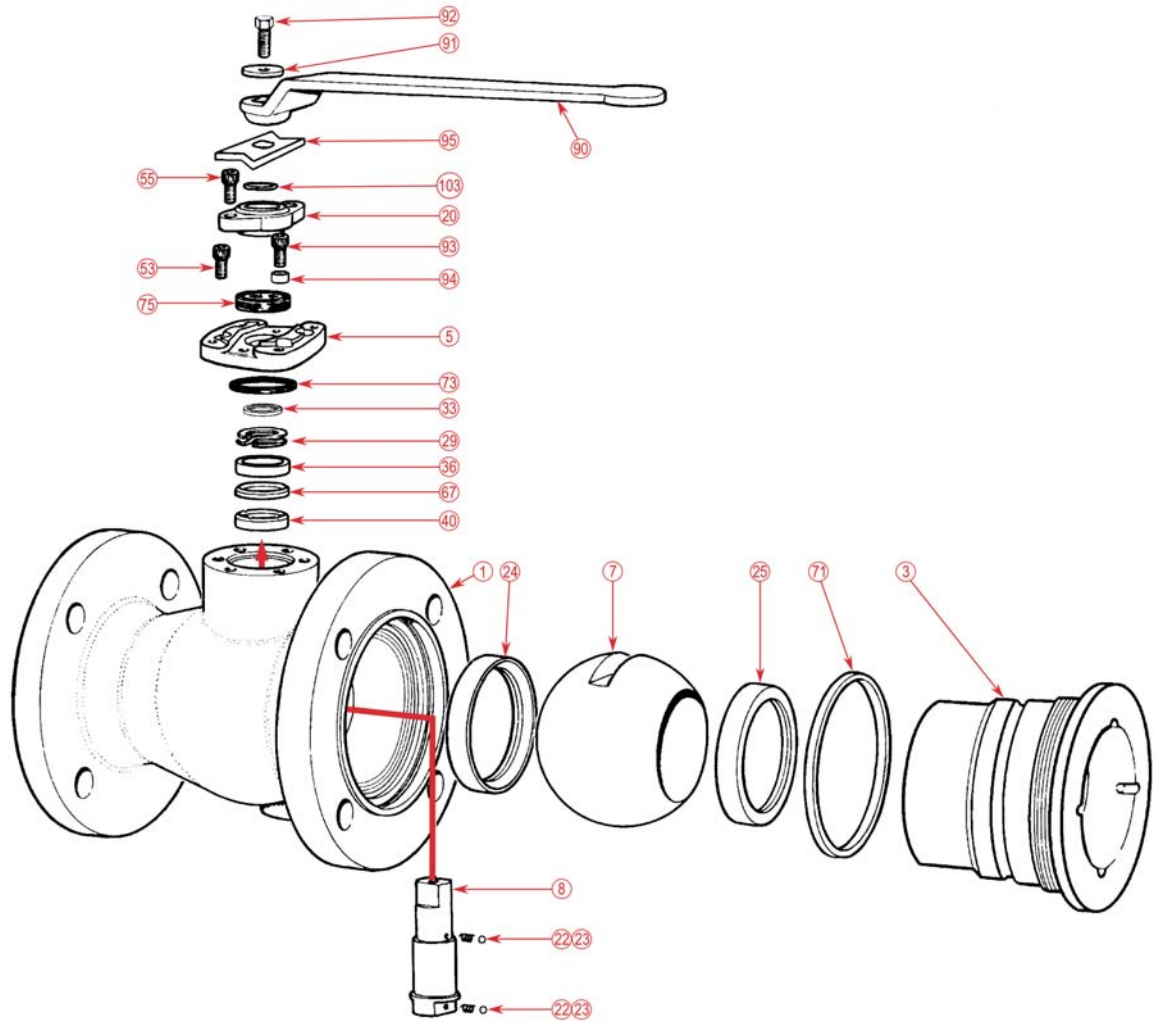
## Notes

When fitting actuation, please note the following:

1. The stop plate (95) and shaft nut (30) are left in place.
2. Stop screws (93) and stop collars (94) are to be removed before fitting the coupling.
3. The coupling is secured to the valve shaft using the tapped hole in the top of the shaft.



## Parts identification series 200 - reduced bore soft seated



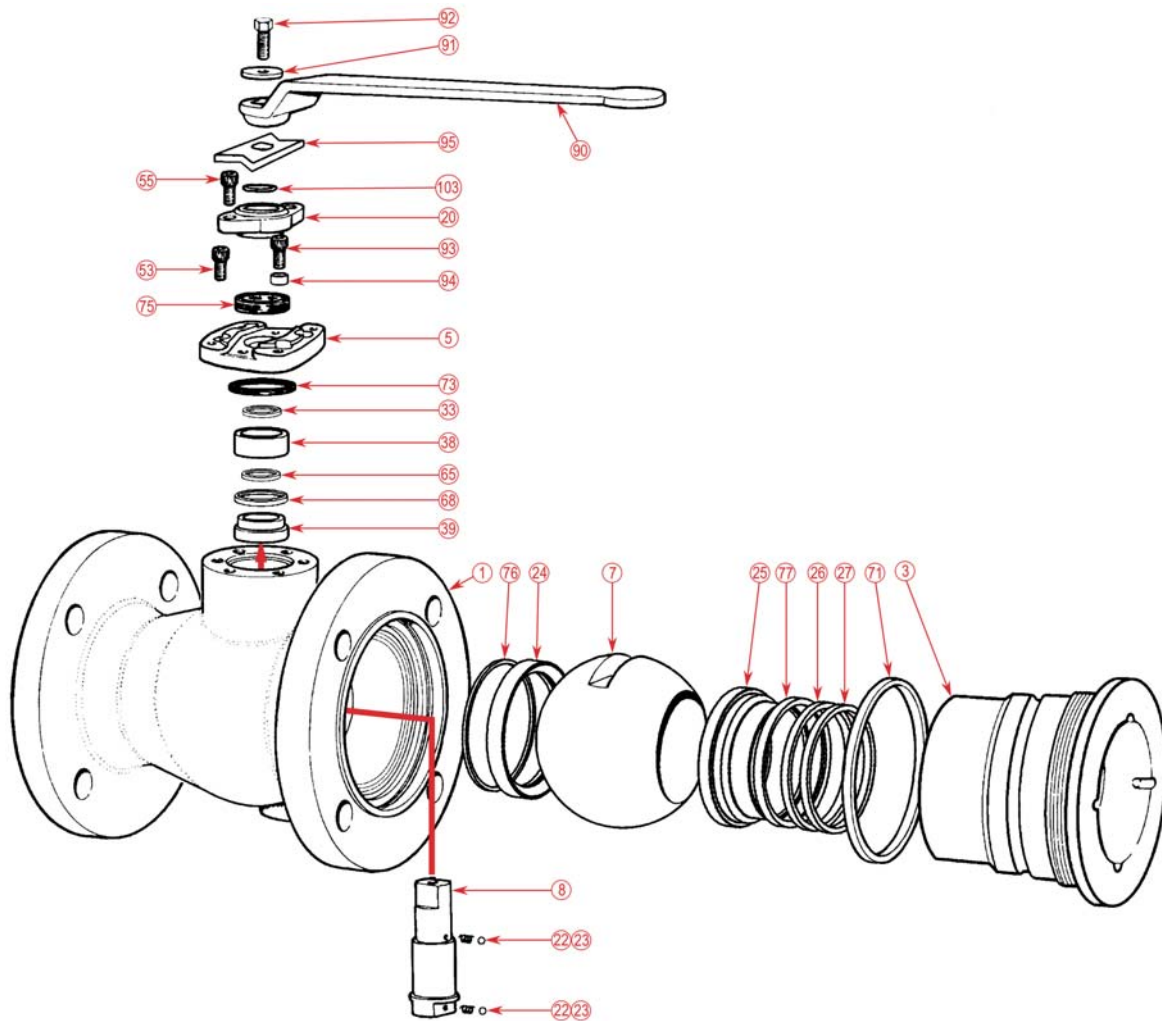
### Parts list

Item	Component
1	Body
3	Sleeve
5	Cover
7	Ball
8	Shaft
20	Gland
22	Shaft Anti-Static Ball
23	Shaft Anti-Static Spring
24	Body Seat
25	Sleeve Seat
29	Gland Spring
33	Shaft Thrust Bearing
36	Header Ring
40	Spreader Ring
53	Cover Screw
55	Gland Screw
67	Chevron Seal
71	Sleeve Seal
73	Cover Seal
75	Shaft Fire Seal
90	Handlever
91	Handlever Washer
92	Handlever Screw
93	Stop Screw
94	Stop Collar
95	Stop Plate
103	Weather Seal

### Notes

1. Standard materials of construction are given on page 14.
2. Illustration shown is of a size utilising valve ISO flange size F07, in which there is one chevron seal ring. All other sizes utilise two chevron seal rings.

## Parts identification series 200 - reduced bore metal / carbon seated



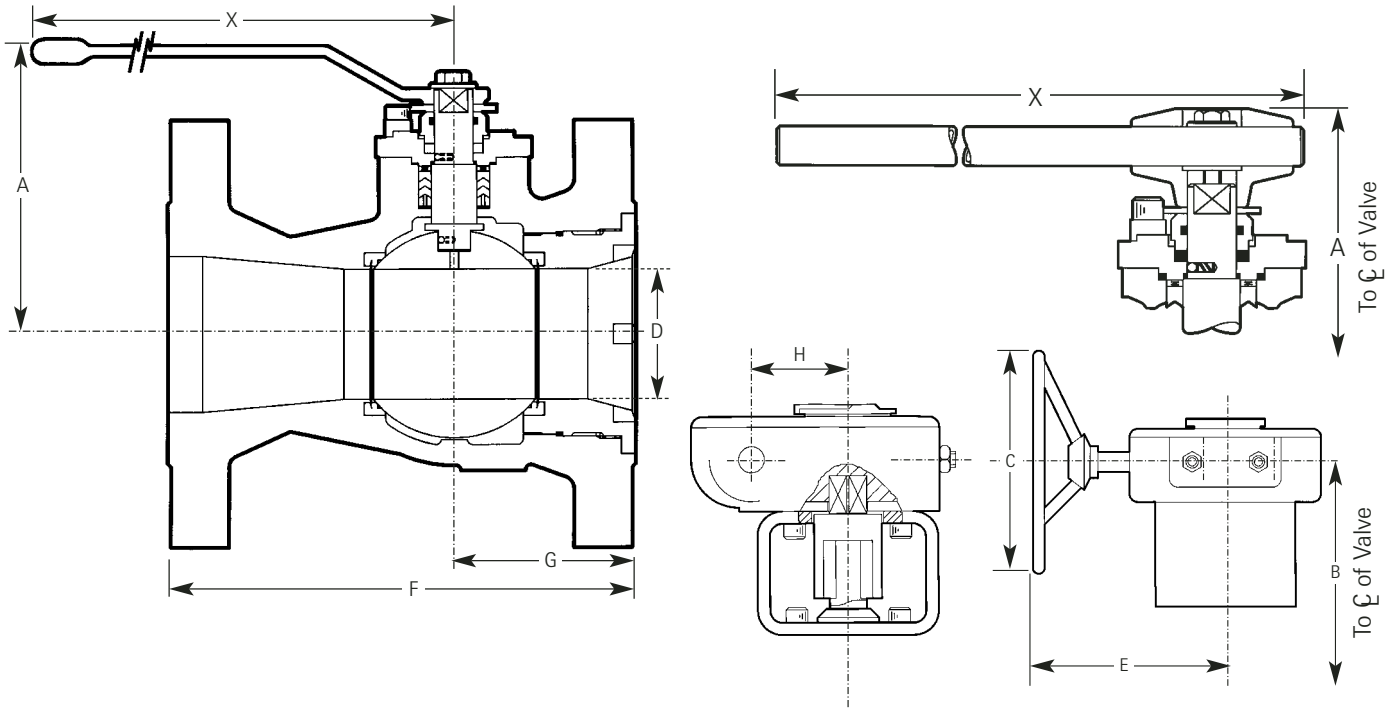
### Parts list

Item	Component
1	Body
3	Sleeve
5	Cover
7	Ball
8	Shaft
20	Gland
22	Shaft Anti-Static Ball
23	Shaft Anti-Static Spring
24	Body Seat
25	Sleeve Seat
26	Seat Energiser
27	Seat Spring
33	Shaft Thrust Bearing
38	Upper Stuffing Box Bush
39	Lower Stuffing Box Bush
53	Cover Screw
55	Gland Screw
65	Shaft Primary Seal
68	Stuffing Box Seal
71	Sleeve Seal
73	Cover Seal
75	Shaft Fire Seal
76	Body Seat Seal
77	Sleeve Seat Seal
90	Handlever
91	Handlever Washer
92	Handlever Screw
93	Stop Screw
94	Stop Collar
95	Stop Plate
103	Weather Seal

### Notes

1. Standard materials of construction are given on page 14.
2. Heat dissipation bonnets available for gland isolation outside lagging areas.

## Dimensions series 200 - reduced bore soft seated



### Notes

#### Series 200 Soft Seat Size Range: Class 150/300 NPS 3 - 10 (DN 80 - 250)

1. The type of operator supplied, as standard, for each size of valve is given on page 2.
2. Face to face dimensions (F in table) conform to ASME B16.10 and BS EN 558. Details of standard patterns are given on page 2.
3. Top mounting flange details are given on page 13.
4. Flange dimensions conform to ASME B16.5.

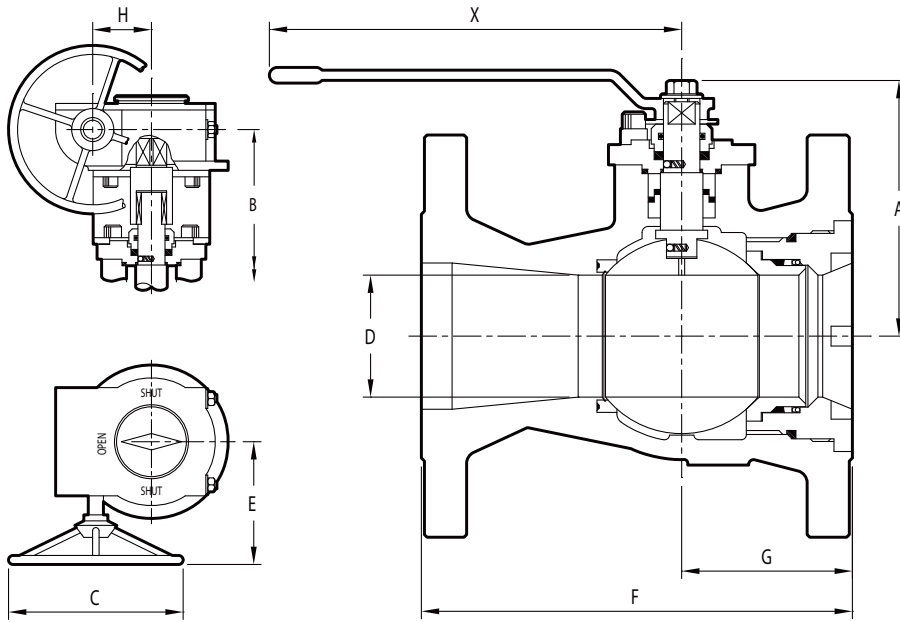
#### Class 150 - model 215R

Size	NPS	3	4	6	8	10
	DN	80	100	150	200	250
A	ins	5 11/16	6 5/16	8 3/4	10 1/4	-
	mm	144.5	160.3	222.3	260.4	-
B	ins	-	-	10.24	12.20	14.76
	mm	-	-	260	310	375
C	ins	-	-	7.87	7.87	19.7
	mm	-	-	200	200	500
D	ins	2 1/2	3	4 1/2	6	7 3/8
	mm	63.5	76.2	114.3	152.4	187.3
E	ins	-	-	8.58	8.66	11.34
	mm	-	-	218	220	288
F	ins	8	9	10 1/2	11 1/2	13
	mm	203.2	228.6	266.7	292.1	330.2
G	ins	3 1/2	3 1/2	4 1/2	5	6
	mm	88.9	88.9	114.3	127	152.4
H	ins	-	-	1.77	2.80	2.80
	mm	-	-	45	71	71
X	ins	10 1/4	10 1/4	20	26 1/2	-
	mm	260.4	260.4	508.0	673.1	-
Wt	kg	17	27	50	80	110

#### Class 300 - model 230R

Size	NPS	3	4	6	8	10
	DN	80	100	150	200	250
A	ins	5 11/16	7 3/4	8 7/8	10 3/8	-
	mm	144.5	196.9	225.4	263.5	-
B	ins	-	-	10.24	12.20	14.76
	mm	-	-	260	310	375
C	ins	-	-	7.90	7.90	19.7
	mm	-	-	200	200	500
D	ins	2 1/2	3	4 1/2	6	7 3/8
	mm	63.5	76.2	114.3	152.4	187.3
E	ins	-	-	8.58	8.66	11.34
	mm	-	-	218	220	288
F	ins	11 1/8	12	15 7/8	16 1/2	18
	mm	282.6	304.8	403.2	419.1	457.2
G	ins	3 1/2	4 1/4	4 1/2	5	6
	mm	88.9	108	114.3	127	152.4
H	ins	-	-	1.77	2.80	2.80
	mm	-	-	45	71	71
X	ins	10 1/4	20	20	26 1/2	-
	mm	260.4	508.0	508.0	673.1	-
Wt	kg	26	41	76	115	160

## Dimensions series 200 – reduced bore metal / carbon seated



### Class 150 – model 215RM / 215RC

Size	NPS DN	Handlever		Gearbox			
		3 80	4 100	6 150	8 200		
A	ins	5 11/16	-	-	-		
	mm	144.5	-	-	-		
B	ins	-	8	10 1/4	12		
	mm	-	203	260	305		
C	ins	-	7 7/8	7 7/8	11 7/8		
	mm	-	200	200	300		
D	ins	2 1/2	3	4 1/2	6		
	mm	63.5	76.2	114.3	152.4		
E	ins	-	9 1/4	9 7/8	10 1/2		
	mm	-	235	250	265		
F	ins	8	9	10 1/2	11 1/2		
	mm	203.2	228.6	266.7	292.1		
G	ins	3 1/2	3 1/2	4 1/2	5		
	mm	88.9	88.9	114.3	127		
H	ins	-	1.77	2.80	3.38		
	mm	-	45	71	86		
X	ins	10 1/4	-	-	-		
	mm	260.4	-	-	-		
Wt	kg	17	31	59	94		

### Class 300 – model 230RM / 230RC

Size	NPS DN	Gearbox		
		3 80	4 100	6 150
A	ins	-	-	-
	mm	-	-	-
B	ins	7 3/8	9 1/8	10 1/4
	mm	187	232	260
C	ins	7 7/8	7 7/8	11 7/8
	mm	200	200	300
D	ins	2 1/2	3	4 1/2
	mm	63.5	76.2	114.3
E	ins	9 1/4	9 7/8	10 1/2
	mm	235	250	265
F	ins	11 1/8	12	15 7/8
	mm	282.6	304.8	403.2
G	ins	3 1/2	4 1/4	4 1/2
	mm	88.9	108	114.3
H	ins	1.77	2.80	3.38
	mm	45	71	86
X	ins	-	-	-
	mm	-	-	-
Wt	kg	30	50	90

### Notes

#### Series 200 Metal / Carbon Seat Size Range: Class 150/300 NPS 3 - 8 (DN 80 - 200)

1. The type of operator supplied, as standard, for each size of valve is given on page 2.
2. Face to face dimensions (F in table) conform to ASME B16.10 and BS EN 558. Details of standard patterns are given on page 2.
3. Top mounting flange details are given on page 13.
4. Flange dimensions conform to ASME B16.5.

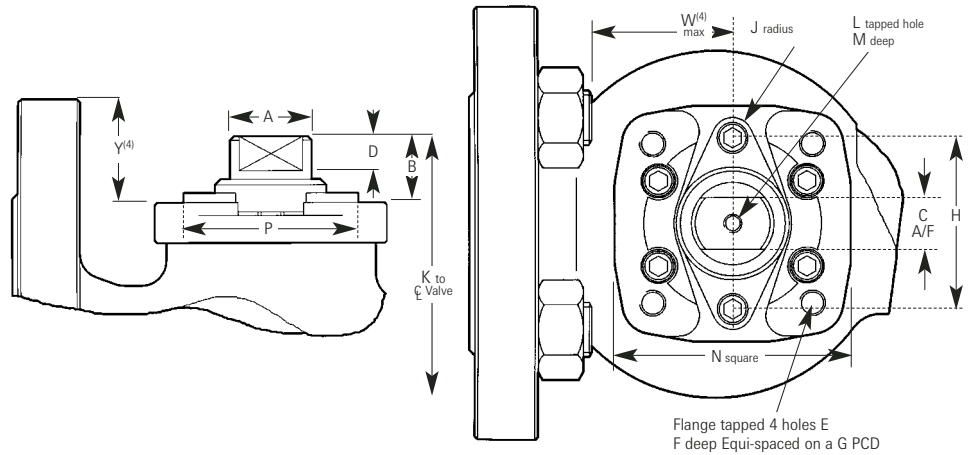
## Notes

- Series 200 utilise four standard shaft sizes.
- Top works dimensions are determined according to the valve shaft size.
- To determine the relevant shaft size for a given valve, refer to table and locate the model concerned by size and pressure rating. Then identify the required dimension.
- Dimensions Y and W are only applicable when height of cover falls below top of flange (as shown). Only these valve sizes are affected. Dimension W is based on bolting to ASME B18.2.2 heavy hex nuts.

## Class 150 - model 215R class 300 - model 230R

Shaft Size	Size		Class 150	Class 300	K	
	NPS	DN			ins	mm
1	3	80	215	230	4 3/4	121
	4	100	215	-	5 13/32	137
2	4	100	-	230	6	152
	6	150	215	230	7 1/16	179
3	8	200	215	230	8 21/32	220
4	10	250	215	230	12 11/16	322

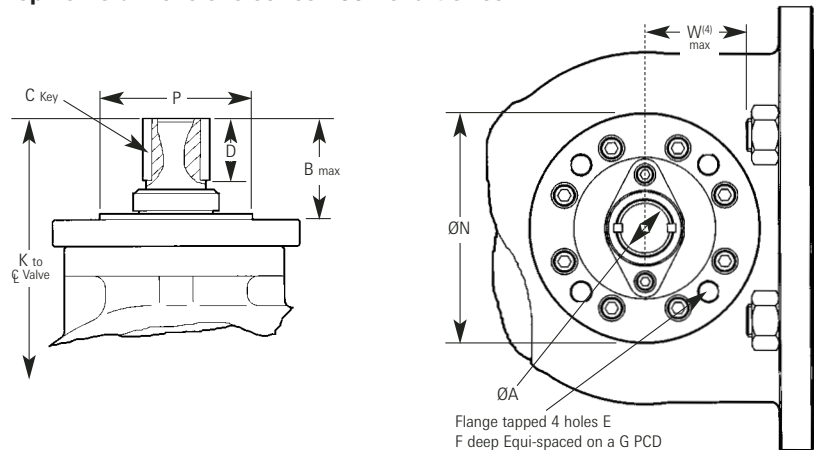
### Topworks dimensions series 200 - shaft sizes 1, 2, 3



## Dimensions

Model 230R	NPS DN	3 80	4 100	6 150	8 200
Y	ins	0.22	0.13	0.32	0.25
	mm	5.5	3.0	8.0	6.0
W	ins	1.472	2.866	3.169	4.090
	mm	37.4	72.8	80.5	104

### Topworks dimensions series 200 - shaft sizes 4



## Topworks dimensions series 200

Shaft size	ISO Flange Type	A		B		C		D		E	F	
		ins	mm	ins	mm	ins	mm	ins	mm	mm	ins	mm
1	F07	0.750	19.05	0.820	20.80	0.505	12.83	15/32	12	M8 x 1.25	1/2	12.7
		0.748	19.00			0.500	12.70					
2	F10	1.125	28.58	1.077	27.40	0.755	19.18	17/32	13	M10 x 1.50	1/2	12.7
		1.123	28.53			0.750	19.05					
3	F12	1.374	34.90	1.460	37.10	1.005	25.53	13/16	20	M12 x 1.75	7/8	22.2
		1.372	34.85			1.000	25.40					
4	F16	1.999	50.78	3.483	88.47	1/2 x 5/16 Key		2 1/4	57	M20 x 1.50	7/8	22.2
		1.997	50.72									

Shaft size	ISO Flange Type	G		H		J		L	M		N		P	
		ins	mm	ins	mm	ins	mm	ins	ins	mm	ins	mm	ins	mm
1	F07	2.250	70	2.093	53.16	5/16	8	1/4	5/8	16	2 7/8	73	2.165	55.0
						UNC								
2	F10	4.016	102	3.062	77.77	3/8	10	5/16	5/8	16	4 1/8	106	2.755	70.0
						UNC								
3	F12	4.920	125	3.500	88.90	5/8	16	3/8	3/4	19	4 1/2	114.3	3.345	85.0
						UNC								
4	F16	6.496	165	N/A	N/A	N/A	N/A	N/A	N/A	8.268	210	5.115	130	

## Principal components

No.	Component	Carbon Steel Valves	Stainless Steel Valves
1	Body	ASTM A216 WCB (1)	ASTM A351 CF8M / CF3M
3	Sleeve	ASTM A216 WCB (1)	ASTM A351 CF8M / CF3M
5	Cover	ASTM A216 WCB (1)	ASTM A351 CF8M
7	Ball (3 & 4)	316/316L Stainless Steel	316/316L Stainless Steel
7	Ball (5)	AISI 316Ti (with hard metal alloy coating)	AISI 316Ti (with hard metal alloy coating)
8	Shaft	316 / 316L Stainless Steel	316 / 316L Stainless Steel
8	Shaft (4 & 5)	17-4 PH	17-4 PH (alternative XM19)
24/25	Seat Ring (3)	Virgin PTFE	Virgin PTFE
24/25	Seat Ring (4)	316 / 316L Stainless Steel (with carbon insert)	316 / 316L Stainless Steel (with carbon insert)
24/25	Seat Ring (5)	AISI 316Ti (with hard metal alloy coating)	AISI 316Ti (with hard metal alloy coating)

## Other components

Materials which are common for both Carbon Steel and Stainless Steel Valves

No.	Component	Material
20	Gland	ASTM A351 CF8M
22	Anti-static Ball	ASTM A276-316
23	Anti-static Spring	ASTM B164 MONEL 400
26	Sleeve/Connector Seat Energiser	ASTM A276-316 / 316L
27	Seat Spring	ASTM A313-631 17-7 PH (up to 350°C) / Alloy A 286 (up to 450°C)
29	Gland Spring	17-7 PH Stainless Steel (up to 350°C) Inconel (above 350°C)
30	Shaft Nut	ASTM A240-304H
33	Shaft Thrust Bearing	PTFE
36	Header Ring	PTFE
38	Upper Stuffing Box Bush	ASTM A276-316 & Nitrided
39	Lower Stuffing Box Bush	ASTM A276-316 & Nitrided
40	Spreader Ring	PTFE
53	Cover Screw	ASTM A193 B7 / ASTM A193 B8
55	Gland Screw	ASTM A193 B7 / ASTM A193 B8
65	Primary Shaft Seal	25% GF PTFE (3), Flexible Graphite (4 & 5)
67	Chevron Seal	PTFE
68	Stuffing Box Seal	Flexible Graphite
71	Sleeve Seal (3)	PTFE
71	Sleeve Seal (4 & 5)	Flexible Graphite
73	Cover Seal	Flexible Graphite/316 Laminate
75	Shaft Fire Seal	Flexible Graphite
76	Body Seat Seal	Flexible Graphite
77	Sleeve Seat Seal	Flexible Graphite
78	Wiper Seal	PTFE (3), Flexible Graphite (4 & 5)
90	Handlever (2)	ASTM A576-1035
91	Handlever Washer (2)	ASTM A240-304H
92	Handlever Screw (2)	A2-70
93	Stop Collar Screw (2)	A2-70
94	Stop Collar	Brass, Nickel Plated
95	Stop Plate	ASTM A276-304
103	Weather Seal (Series 110) (3)	PTFE
103	Weather Seal (Series 200) (3)	Viton
103	Weather Seal (4 & 5)	Flexible Graphite
104	T-Bar Adapter (2)	ASTM A536 65-45-12 / ASTM A351 CF8M
105	T-Bar Tube (2)	ASTM A573-70
106	T-Bar Washer (2)	ASTM A240-304H
107	T-Bar Screw (2)	A2-70

## Notes

1. Max. Carbon content 0.25%.
2. Operator type varies by size (see pages 7, 11 & 12).
3. Soft Seated Valves.
4. Carbon Seated Valves.
5. Metal Seated Valves.

## Alternative materials

### Body and Trim

Low Carbon Steel - LCC  
 Duplex Stainless Steel  
 Aluminium Bronze  
 Monel  
 Other materials available on request.

### Seats

Reinforced PTFE  
 Carbon Filled PTFE  
 TFM 1600  
 Carbon Graphite filled PEEK™

## Accessories

Actuation Controls  
 Locking Devices  
 Lagging Extensions

## Notes

Certification is available on standard production, as follows:  
 - hydrostatic body and seat test.  
 - pneumatic seat test.  
 - material (chemical and physical) to BS EN 10204 - 3.1.

## Principal components

Coating type	Description	Coating thickness	Coating hardness	Temp. limit
HTN-60	Nickel alloy coating Flame spraying and fusing	500 micron	60 HRc	450°C
HTC-70	Chromium carbide coating HVOF spray	200 micron	70 HRc	450°C
HTT-75	Tungsten carbide coating HVOF spray	200 micron	75 HRc approx.	350°C

## Carbon Graphite Material

Carbon graphite type	Description	Density	Coefficient of thermal expansion	Temp. limit
HTCG	Hard Carbon Graphite A strong antimony impregnated carbon graphite. Suitable for clean organic solvents and purified terephthalic acid (PTA).	2.50 x 10 <sup>3</sup> kg.m <sup>-3</sup>	4.7 x 10 <sup>-6</sup> °C	300°C

## Graph line identification

	Size	Seat Material	
		PTFE	RTFE
NPS	1/2 to 2	B	A
DN	15 to 50		
NPS	3 to 6	C	A
DN	80 to 150		
NPS	8	D	C
DN	200		
NPS	10	D	D
DN	250		

## Standard paint/finish

### Carbon Steel Valves

Series 110 Phosphate corrosion protection.  
Series 200 Red oxide primer.

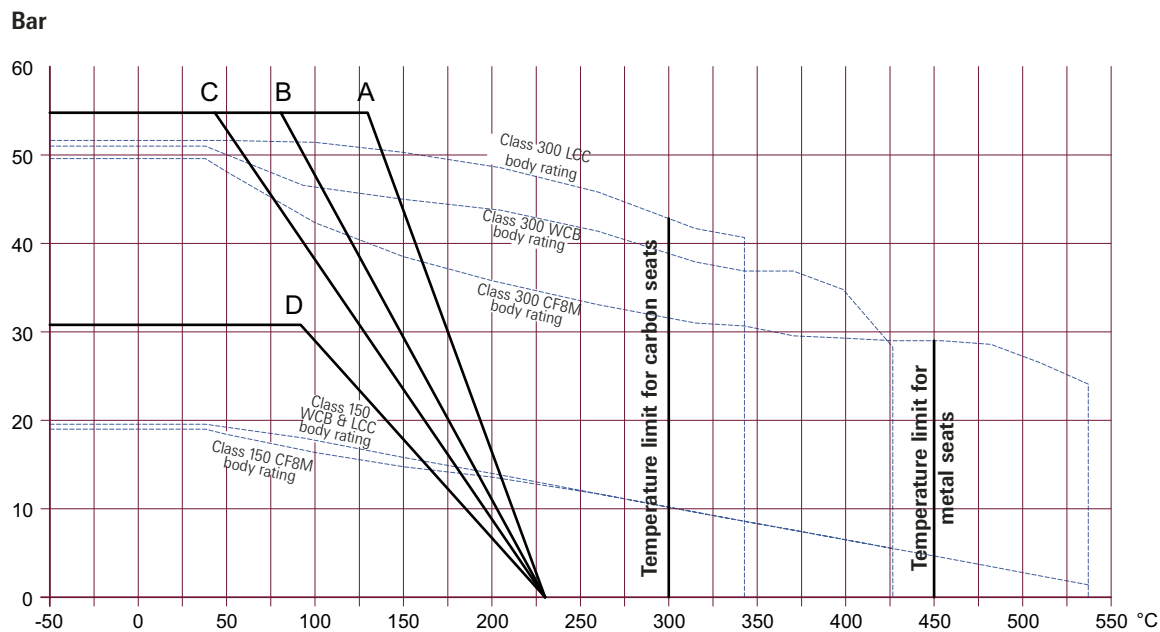
### Stainless Steel Valves

Castings are acid pickled and passivated to remove surface impurities.

### Paint Finishes

A range of painting specifications for offshore and onshore service conditions are available to customer requirements.

## Pressure/temperature Graph



## Notes

1. The maximum working capability of any given valve is either the body rating or seat rating, whichever is the lower.
2. The Graph Line Identification table indicates the valve seat materials represented by lines A to D on the graph.
3. For Metal & Carbon seats use the maximum body ratings. Carbon seats can only achieve 300°C max.



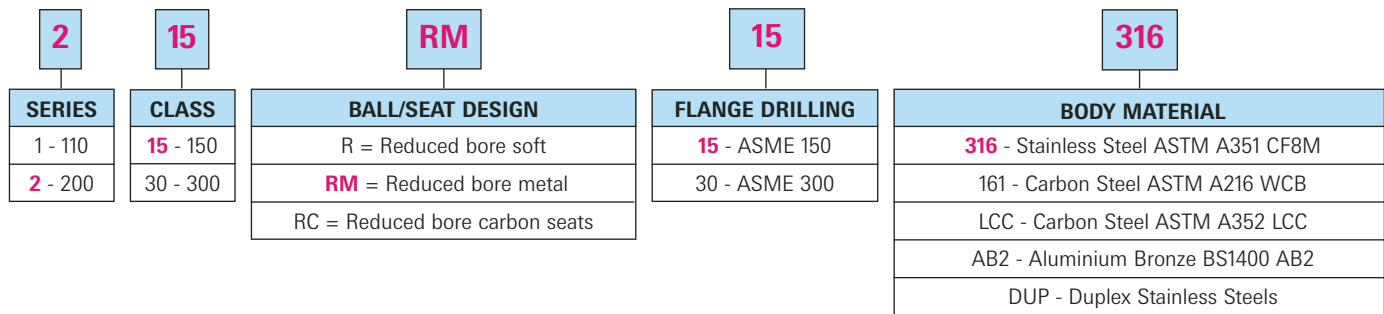
## Cv/Kv - values

Valve size		Cv	Kv	Valve size		Cv	Kv
NPS	DN			NPS	DN		
1/2	15	6	7	3	80	310	360
3/4	20	10	12	4	100	480	557
1	25	28	32	6	150	1000	1160
1 1/2	40	73	85	8	200	1760	2042
2	50	110	128	10	250	2660	3086

## Valve coding system

Individual model numbers are derived from a combination of:

- Design Series Number (110, 200)
- Design Pressure Class (150, 300)
- Ball and seat design (R, RM, RC)
- Flange drilling (ASME 150, 300)
- Body material (161, 316)



## Notes

- Flow Coefficients are for valves in the fully open position.
- Ultra-Seal Ball Valve Models are categorised by a four part code indicating design type, ball and seat, flange drilling and body material.  
**Example given:** (215RM - 15 - 316).
- Other flange drillings available on request.
- Trim and Other Component materials for standard valves are given on page 14.