CAST OR FORGED

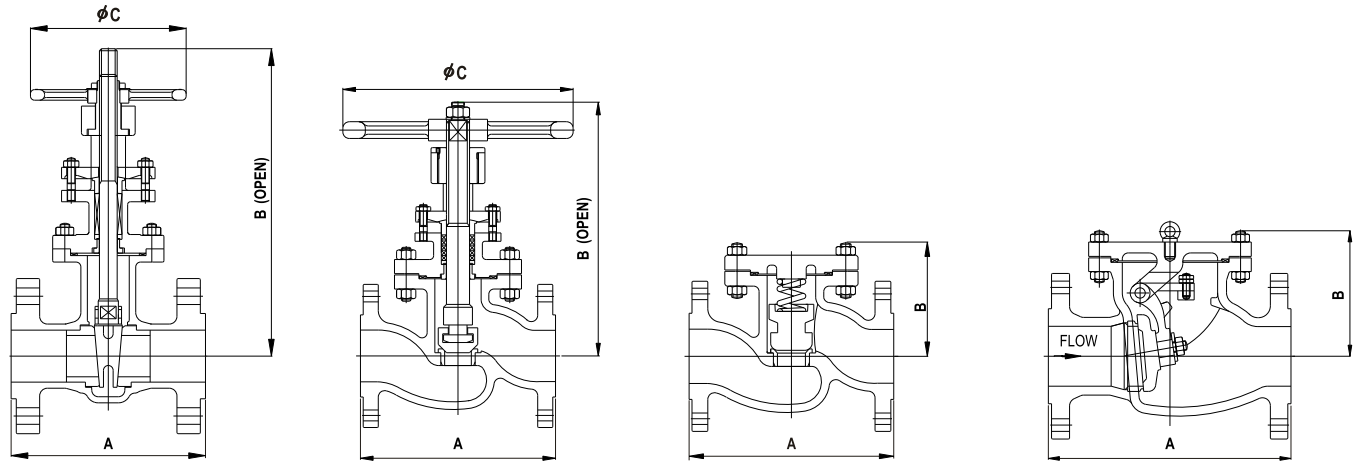
GATE,GLOBE AND CHECK VALVES

MICROFINISH

Pumps • Valves • Automation

CAST GATE, GLOBE AND CHECK VALVES

Design standard :
Gate Valve : API 600, API 6D, BS EN ISO 10434
Globe Valve : BS 1873
Check Valve : BS 1868
Testing standard : API 598, BS EN ISO 12266
Pressure rating : Class 150, 300
Ends : Flanged, class 150, 300



All dimensions are in mm

Size	Gate valve						Globe valve						Lift check valve				Swing check valve			
	A		B		ϕC		A		B		ϕC		A		B		A		B	
	Class		Class		Class		Class		Class		Class		Class		Class		Class		Class	
	150	300	150	300	150	300	150	300	150	300	150	300	150	300	150	300	150	300	150	300
15	108	140	210	210	100	100	108	152	205	205	100	100	108	152	72	72	----	----	----	----
20	117	152	215	215	100	100	117	178	210	210	100	100	117	178	75	75	----	----	----	----
25	127	165	250	250	150	150	127	203	230	230	150	150	127	203	79	79	----	----	----	----
32	140	178	265	265	150	150	140	216	235	235	150	150	140	216	83	83	----	----	----	----
40	165	190	300	300	200	200	165	229	260	260	200	200	165	229	95	95	165	241	95	95
50	178	216	345	345	200	200	203	267	295	295	200	200	203	267	108	108	203	267	120	120

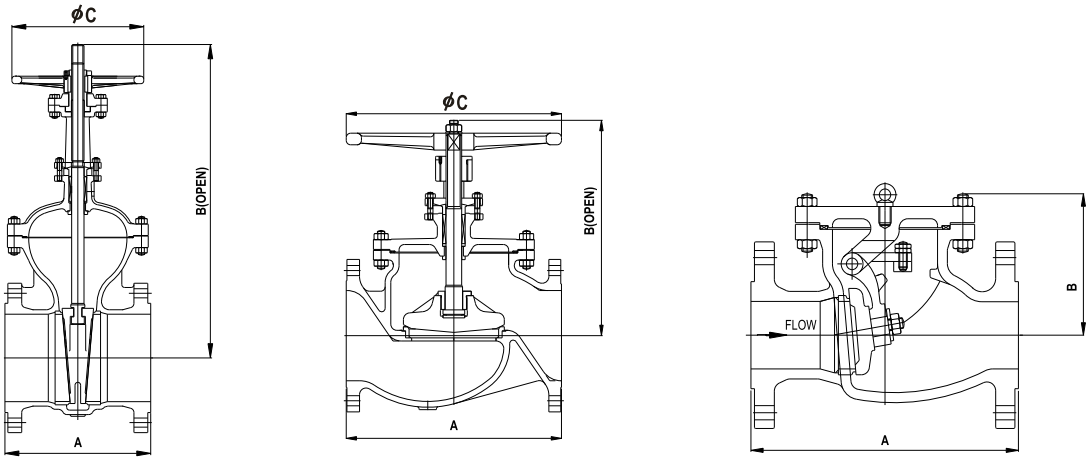
1. Dimension Aas per ASME B16.10
2. Flanges as per ASME B16.5

Name of the part	Materials of construction
Body / Bonnet / Cover	WCB / LCB / CF8 / CF8M
Hand wheel	Malleable iron
Gland bush / Seat ring / Stem	410 / 304 / 316
Yoke sleeve	A 536 Gr.65-45-12
Wedge / Disc / Plug	CA15 / CF8 / CF8M / CF3M
Gland flange	Carbon steel-Galvanised
Gland packing	Grafoil
Gasket	Sprial wound SS 304 with Grafoil filled
Body stud	A 193 Gr.B7-Zn.plated
Body nut	A 194 Gr.2H-Zn.plated
Spring	316

- Stellite trim and Other materials available on request
- IBR III-C Certificate on request
- All Body and bonnet in corrosion resistant materials are investment casting and are radiographic quality as per ASTM E 446 Level III

CAST GATE, GLOBE AND CHECK VALVES

Design standard :
Gate Valve : API 600, API 6D, BS EN ISO 10434
Globe Valve : BS 1873
Check Valve : BS 1868
Testing standard : API 598, BS EN ISO 12266
Pressure rating : Class 150,300
Ends : Flanged, class 150, 300



All dimensions are in mm

Size	Gate valve						Globe valve						Swing check valve			
	A		B		ϕC		A		B		ϕC		A		B	
	Class		Class		Class		Class		Class		Class		Class		Class	
	150	300	150	300	150	300	150	300	150	300	150	300	150	300	150	300
65	190	241	416	425	200	250	216	292	290	351	200	250	216	292	125	135
80	203	283	478	490	250	250	241	318	345	362	250	300	241	318	135	145
100	229	305	555	550	250	300	292	356	355	413	300	450	292	356	155	175
125	254	381	690	700	300	450	356	400	410	471	300	450	330	400	185	205
150	267	403	790	790	300	450	406	444	450	580	450	600	356	444	210	220
200	292	419	950	985	450	450	495	559	553	780	600	750	495	533	226	255
250	330	457	1160	1200	450	600	216	292	290	351	600	GO	622	622	265	305
300	356	502	1370	1450	600	600	241	318	345	362	750	GO	698	711	320	360
350	381	762	1580	1600	600	750	-----	-----	-----	-----	-----	-----	787	838	375	400
400	406	838	1775	1930	600	1000	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
450	432	914	1950	2290	750	GO	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
500	457	991	2225	2440	750	GO	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
600	508	1143	2560	2475	1000	GO	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

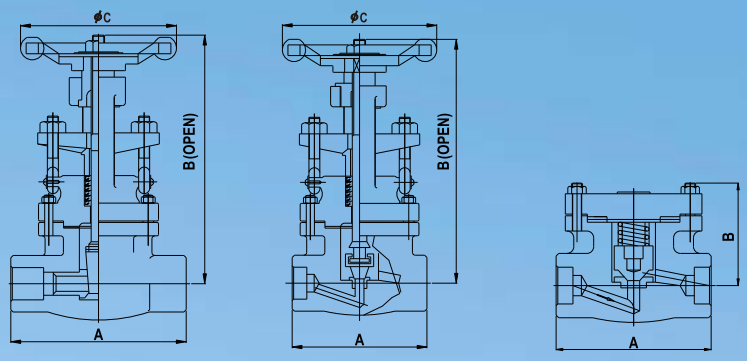
1. Dimension Aa s per ASME B16.10. 2. Flanges as per ASME B16.5. 3. IBR III-C Certificate on request.
4. GO = Gear operated.

Name of the part	Materials of construction
Body / Bonnet / Cover	WCB / LCB / CF8 / CF8M
Seat Ring / Wedge / Disc / Hingel	WCB ✱ / LCB / CF8 / CF8M
Stem / Bonnet bush●/Packing support ring ●/ Disc washer / Hinge pin Spacer washer / Thrust plate / Gland / Disc nut and Pin	410 / 304 / 316
Gland flange	Carbon Steel
Stem packing	Grafoil
Gasket	Sprial wound SS304 with Grafoil filled
Yoke sleeve	A 536 Gr.65-45-12
Hand wheel	Malleable Iron / Carbon Steel
Body stud / Nut	A 194 Gr.2H / A 193 Gr.B7

● Optional for corrosion resistant shell material
✱ 13% Cr. Overlay over WCB except Hinge
■ Stellite trim and Other materials available on request

FORGED GATE, GLOBE AND CHECK VALVES

Design standard : API 602, BS EN ISO 15761
Testing standard: API 5 98, BS EN 12266
Pressure rating : Class 800
Ends : Screwed, Socket, Welding ends
: Flanged, class 150, 300 , 600



All dimensions are in mm RB=Reduced bore SB=Standard bore

Size	Gate valve						Globe valve						Lift check valve			
	A		B		ϕC		A		B		ϕC		A		B	
	RB	SB	RB	SB	RB	SB	RB	SB	RB	SB	RB	SB	RB	SB	RB	SB
15	88	92	162	176	96	96	88	92	170	185	96	96	88	92	54	66
20	92	106	176	195	96	96	92	106	185	194	96	96	92	106	66	72
25	106	128	195	271	96	150	106	128	194	283	96	150	106	128	72	102
32	128	128	271	278	150	150	128	128	283	292	150	150	128	128	102	108
40	128	140	271	278	150	150	128	140	283	292	150	150	128	140	108	108
50	140	----	278	----	150	----	140	----	292	----	150	----	140	----	108	----

1. Dimension Aas p er manufacturers standard
2. Screwed ends to BS 21,ANSI B1.20.1 and IS 554
3. Socket weld ends to ASME B16.11
4. Welding ends to ASME B16.25
5. Valves are available with weld-on-flanges of class 150,300 and 600.Face to Face dimensions for class 150 rating will be as per class 300
6. IBR III-C certificate on request

Name of the part	Materials of construction
Body / Bonnet / Cover	A 105 / LF2 / F304 / F316 / F304L / F316L / F11 / F22
Hand wheel	Malleable iron
Gland bush	410 / 304 / 316 / 304L / 316L
Yoke sleeve	A 536 Gr.65-45-12
Seat ring	410 / 304 / 316 / 304L / 316L
Stem	410 / 304 / 316 / 304L / 316L
Wedge / Disc / Plug	CA-15 / CF8 / CF8M / CF3M
Gland flange	A105-Galvanised
Gland packing	Grafoil
Gasket	Sprial wound SS 304 with Grafoil filled
Body stud	A 193 Gr.B7-Zn.plated
Body nut	A 194 Gr.2H-Zn.plated
Spring	316

■ Stellite trim and Other materials available on request

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E-mail: sales@microfinishgroup.com Website: www.microfinishgroup.com

Swing Check Valves

MICROFINISH VALVES

Quality you can trust.

Swing Check Valve

The Microfinish SCV2000 series, API 6D Swing Check Valve is a rugged piece of piping equipment, designed for use in systems where protection against reverse flow is required. The SCV2000 is a full port design which is optimally designed for use in severe corrosive application such as salt water disposal, CO2 enhanced oil recovery, water desalination plant, and other isolation applications in the process industry.

In the standard operation condition the SCV2000 demonstrates extremely high flow capacity and minimum pressure drop. The SCV2000 is designed for horizontal or vertical installation on pumps, boosters, and filtration systems, providing a quiet closure in the closed condition, and bubble tight sealing capabilities.

Factory certification:	ISO 9001-2015 Quality management system
Valve design and tests:	ANSI B16.34; API 6D; BS 1868; EN12266 -1
Flange design:	ANSI B16.5
Face-to-Face dimension:	ASME B16.10

Main Features

- Reliable operation
- Maintenance free
- Stainless steel material of construction
- High flow capability

The SCV2000 valve is designed for use in system where protection against in-line reverse flow is required.

The force of the stream swings the disc out of the flow path, allowing the fluid to pass through the valve with minimal pressure drop. Once the direction of flow is reversed, the disc weight, along with the force of the reversed flow, will cause the disc to swing into the flow path, and force it to seal tightly against the seat.

The length of the SCV2000 is designed to allow installation in small and narrow systems, between two flanges of short spacing.

Our Range

Size: DN50 – DN300, NPS 2 – 12
Pressure range: Class 150, 300, 600, 900, 1500
Temperature range: - 40°C / - 40°F and up to 425°C / 800°F

Swing Check Valve

SC84, SC85 Series

Full bore, flanged class 150 / 300

NPS 2-12, DN50 - DN300

Dimensional Data

SC84 SERIES - CLASS 150, FULL PORT, FLANGED										
Valve size (DN/NPS)	A	B	C	ØD	ØF	T	PCD	HOLE Ø	No. of Holes	Weight (Kg/lb.)
DN50	49	203	135	152	92	16	121	19	4	12
2	1.94	8.00	5.31	6.00	3.62	0.62	4.75	0.75		26
DN80	75	241	176	191	127	19	152	19	4	25
3	2.94	9.50	6.93	7.50	5.00	0.75	6.00	6.00		55
DN100	100	292	230	229	157	24	191	19	8	41
4	3.94	11.50	9.05	9.00	6.19	0.94	7.50	0.75		90
DN150	151	356	256	279	216	25	241	22	8	76
6	5.94	14.00	10.07	11.00	8.50	1.00	9.50	0.88		168
DN200	202	495	316	343	270	28	298	22	8	115
8	7.94	19.50	12.24	13.50	10.62	1.12	11.75	0.88		253
DN250	252	622	363	406	324	30	362	25	12	210
10	9.94	24.50	14.29	16.00	12.75	1.18	14.25	1.00		463
DN300	303	699	415	483	381	32	432	25	12	325
12	11.94	27.50	16.33	19.00	15.00	1.25	17.00	1.00		716

SC85 SERIES - CLASS 300, FULL PORT, FLANGED										
Valve size (DN/NPS)	A	B	C	ØD	ØF	T	PCD	HOLE Ø	No. of Holes	Weight (Kg/lb.)
DN50	49	267	135	165	92	22	127	19	8	12
2	1.94	10.50	5.31	6.50	3.62	0.87	5.00	0.75		26
DN80	75	318	176	210	127	28	168	22	8	36
3	2.94	12.50	6.93	8.25	5.00	1.12	6.62	0.88		79
DN100	100	356	230	254	157	32	200	22	8	58
4	3.94	14.00	9.05	10.00	6.19	1.25	7.88	0.88		128
DN150	151	445	256	318	216	37	270	22	12	115
6	5.94	14.00	10.07	11.00	8.50	1.00	9.50	0.88		254
DN200	202	533	316	381	270	41	330	25	12	167
8	7.94	21.00	12.24	15.00	10.62	1.62	13.00	1.00		368
DN250	252	622	363	445	324	47	387	29	16	292
10	9.94	24.50	14.29	17.50	12.75	1.87	15.25	1.13		643
DN300	303	711	415	521	381	51	451	32	16	470
12	11.94	28.00	16.33	20.50	15.00	2.00	17.75	1.25		1036

Swing Check Valve

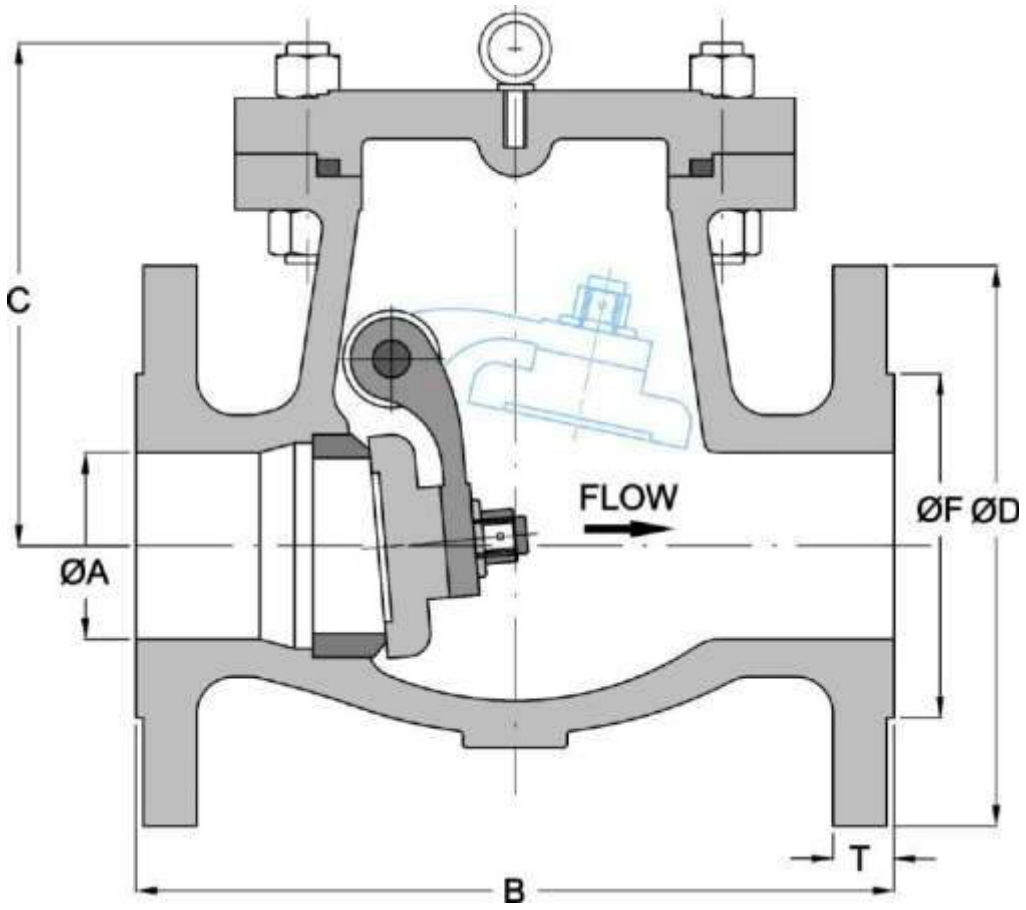
SC87 Series

Full bore, flanged class 600

NPS 2-12, DN50 - DN300

Dimensional Data

SC87 SERIES - CLASS 600, FULL PORT, FLANGED										
Valve size (DN/NPS)	A	B	C	ØD	ØF	T	PCD	HOLE Ø	No. of Holes	Weight (Kg/lb.)
DN50	49	292	135	165	92	25	127	19	8	12
2	1.94	11.50	5.31	6.50	3.62	1.00	5.00	0.75		28
DN80	75	356	176	210	127	32	168	22	8	39
3	2.94	14.00	6.93	8.25	5.00	1.25	6.62	0.88		85
DN100	100	432	230	273	157	38	216	25	8	73
4	3.94	17.00	9.05	10.75	6.19	1.50	8.50	1.00		160
DN150	151	559	256	356	216	48	292	29	12	139
6	5.94	22.00	10.07	14.00	8.50	1.88	11.50	1.13		306
DN200	202	660	316	719	270	56	349	32	12	242
8	7.94	26.00	12.24	16.50	10.62	2.19	13.74	1.25		533
DN250	252	787	363	5.8	324	64	432	35	16	372
10	9.94	31.00	14.29	20.00	12.75	2.50	17.00	1.38		820
DN300	303	838	415	559	381	67	489	35	20	570
12	11.94	33.00	16.33	22.00	15.00	2.62	19.25	1.38		1256



Swing Check Valve

SC89, SC90 Series

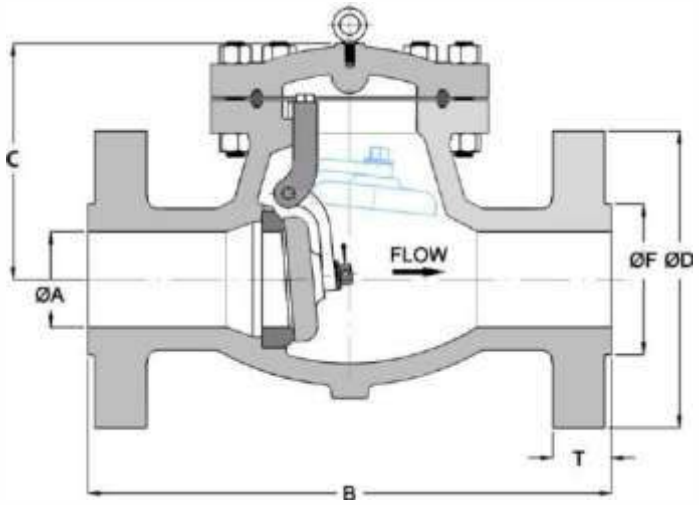
Full bore, flanged class 900 / 1500

NPS 2-12, DN50 - DN300

Dimensional Data

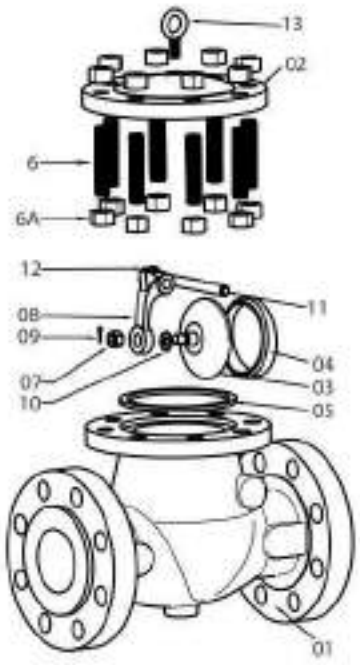
SC89 SERIES - CLASS 300, FULL PORT, FLANGED										
Valve size (DN/NPS)	A	B	C	ØD	ØF	T	PCD	HOLE Ø	No. of Holes	Weight (Kg/lb.)
DN50	49	368	195	215	92	45	165	25	8	17
2	1.94	14.49	7.68	8.46	3.63	1.77	6.50	1.00		37
DN80	75	381	225	240	127	45	191	25	8	50
3	2.94	15.00	8.86	9.45	5.00	1.77	7.50	1.00		110
DN100	100	457	275	290	157	52	235	32	8	94
4	3.94	17.99	10.83	11.42	6.18	2.03	9.25	1.25		207
DN150	151	610	360	380	216	63	318	32	12	175
6	5.94	24.02	14.17	14.96	8.50	2.46	12.50	1.25		386
DN200	202	737	455	470	270	71	394	38	12	310
8	7.95	29.02	17.91	18.50	10.63	2.78	15.51	1.50		683
DN250	252	838	550	545	324	77	470	38	16	482
10	9.92	32.99	21.65	21.46	12.76	3.03	18.50	1.50		1062
DN300	303	965	625	381	381	86	533	38	20	760
12	11.94	37.99	24.61	15.00	15.00	3.40	20.98	1.50		1675

SC90 SERIES - CLASS 1500, FULL PORT, FLANGED										
Valve size (DN/NPS)	A	B	C	ØD	ØF	T	PCD	HOLE Ø	No. of Holes	Weight (Kg/lb.)
DN50	49	368	195	215	92	45	165	25	8	25
2	1.93	14.49	7.68	8.46	3.63	1.77	6.50	1.00		55
DN80	75	470	240	265	127	55	203	32	8	77
3	2.95	18.50	9.45	10.43	5.00	2.17	7.99	1.25		170
DN100	100	546	285	310	157	61	241	35	8	145
4	3.94	21.50	11.22	12.20	6.18	2.40	9.49	1.38		320
DN150	151	705	395	395	216	90	318	38	12	278
6	5.94	27.76	15.55	15.55	8.50	3.54	12.50	1.50		612
DN200	202	832	485	485	270	99	394	45	12	484
8	7.95	32.76	19.00	19.09	10.63	3.90	15.51	1.75		1066
DN250	252	991	590	585	324	115	483	51	12	744
10	9.92	39.02	23.23	23.03	12.76	4.53	19.02	2.01		1640
DN300	303	1130	680	675	381	131	572	54	16	1140
12	11.93	44.49	26.77	26.57	15.00	5.16	22.50	2.13		2512



Material of Construction

Item No.	Part Description	Material Specification
1	Body	ASTM A216 WCB, ASTM A351 Gr CF8, CF8M
2	Cover	ASTM A216 WCB, ASTM A351 Gr CF8, CF8M
3	Disc	ASTM A216 WCB, ASTM A351 Gr CF8, CF8M
4	Seat ring	ASTM A216 WCB, ASTM A351 Gr CF8, CF8M
5	Gasket	SWG SS316 + Grafoil
6	Stud	ASTM A193 Gr. B7M, B8M
6A	Nut	ASTM A194 Gr. 2HM, 8M
7	Disc nut	SS 410, SS 304, SS 316
8	Hinge	ASTM A216 WCB, ASTM A351 Gr CF8, CF8M
9	Disc split pin	SS 410, SS 304, SS 316
10	Disc washer	SS 410, SS 304, SS 316
11	Hinge pin	SS 410, SS 304, SS 316
12	Pipe plug	SS 410, SS 304, SS 316
13	Lifting eye bolt	C.St., S.St.



Build your swing check valve code

SC2" DN50 W87F-44G-R

SC	2" DN50	W	87	F	4	4	G	R
Type	Size	Model	Class	Port	Body cover	Disc	Body cover	End conn.

TYPE	
SC	SCV2000

SIZE
2"-12"DN50-DN300

MODEL	
W	Internal shaft

CLASS	
84	#150
85	#300
87	#600
89	#900
90	#1500

PORT	
F	Full

BODY / COVER	
1	WCB
2	CF8
4	CF8M

DISC	
1	WCB + 13% Cr. Overlay
4	CF8M + STL

BODY SEAL	
G	SWG SS316+Grafoil

END CONNECTION	
R	RF Flange
S	Flat face flange
T	RTJ Flange

SALES OFFICES

BRANCHES	TELEPHONE NO.	E-MAIL ID
AHMEDABAD	09327732402	salesahmedabad@microfinishgroup.com
BARODA	0265 - 2987701 / 9574001348	salesbaroda@microfinishgroup.com
BENGALURU	080 - 29775863 / 23233999	salesbangalore@microfinishgroup.com
CHENNAI	044 - 45576723 / 7871990001	saleschennai@microfinishgroup.com
DELHI	0120 - 2510145 / 4258700 / 7065002286	salesdelhi@microfinishgroup.com
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MICROFINISH VALVES

Quality you can trust.

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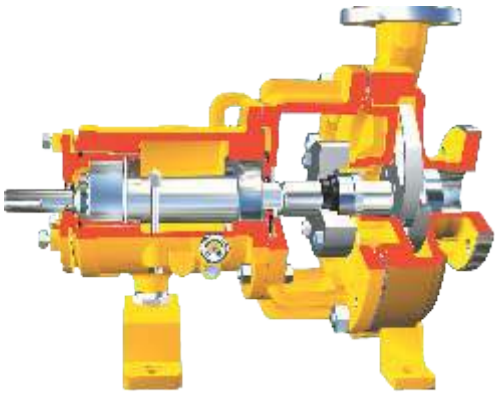
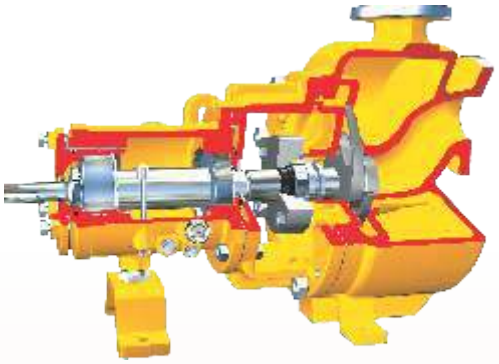




APA

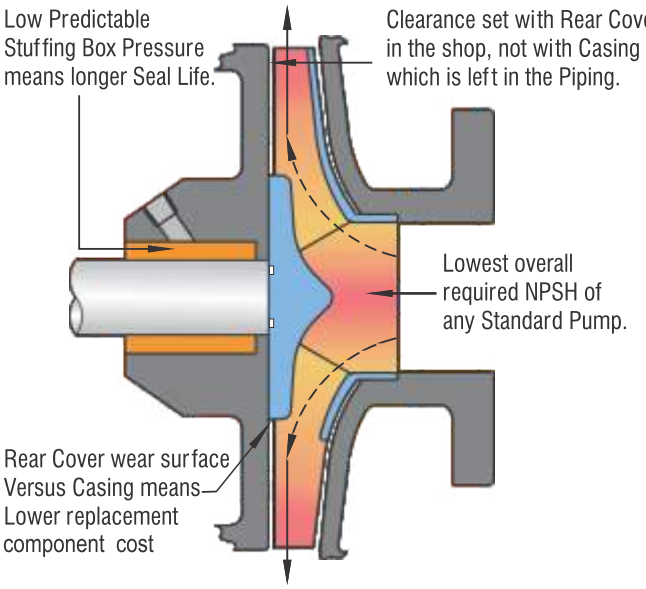
MICROFINISH

ASME PROCESS PUMPS

TÜV CERT
EN ISO 9001
Certificate : 041004477

RWTÜV

MICROFINISH DURCO MARK III IMPELLERS

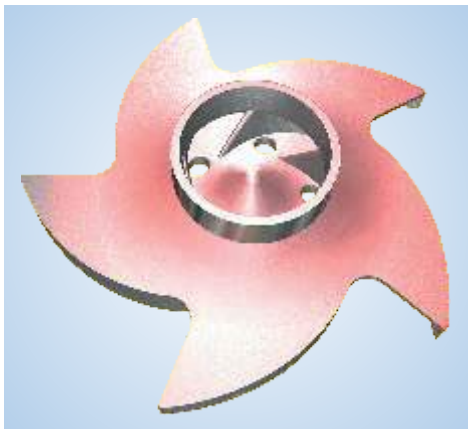


Unique Advantages of Reverse Vane Impeller

Reverse Vane Impeller (semi open) deliver Unequalled Efficiency and Performance. This Exclusive Impeller Design Extends Bearing as well as Seal Life.

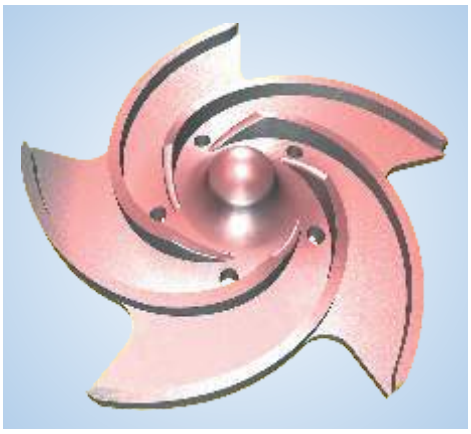
- **Low, Predictable Stuffing Box Pressure and Thrust Loads -** Resulting from Back Vane Pumping Action and Balance Holes.
- **Low Required NPSH -** Provides Efficient Pumping even in marginal NPSH conditions minimizing cavitation problums.
- **Stuffing Box Cover Wear Surface -** as the Flow Path exits at the Rear of the Impeller, thus Abrasive Wear on the Rear Cover rather than on more Expensive Casing.
- **In-shop Impeller Adjustment** with the only Impeller Design that takes full advantage of the back pull out feature. Since the critical running clearance is set between the Rear of the Impeller and the Rear Cover. Both Impeller and Mechanical Seal settings can be done in the Shop, "on the bench," instead of under adverse field conditions.
- **Repeatable Performance Assurance -** with the only Impeller Design that offers repeatability in Seal Chamber Pressure and Bearing Thrust Loads.

In-shop Impeller Adjustment...practical as well as productive!

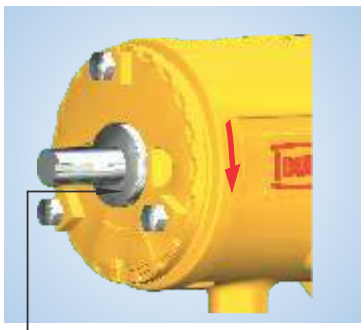


Exclusive Reverse Vane Impeller
With balance holes offers improved performance and reducing maintenance time.

The only ASME Pump Impeller Design that offers repeatable Pump performance throughout the life of the Pump.



Front Vane Open Style Impeller (Optional)
is fully interchangeable with the Reverse Vane limpeller. Excellent choice for Slurry, Stringy and Certain applications requiring high shear against the casing.



Inpro VBX bearing isolator
(ASME 3A Power- End)

Fastest Maintenance Turnaround Time

- Micrometer type Shaft and Impeller Adjustment Accurately Sets Impeller clearance to rear cover in 20 seconds...in the shop or Field.
- Mechanical Seals and all critical settings can be accurately set in the shop or field.

Recognized Worldwide as the Premier Name in ASME Chemical Process Pumps
The advanced design and precision manufacture of the rugged, heavy-duty Mark III Chemical service Pump significantly Enhances Bearing and Seal Life.

It is committed to help users maximize mean time between planned maintenance (MTBPM).

The Unique Features and Enhancements of Durco - Microfinish Pumps provide significant Performance benefits for Pump users.

A Choice of Power Ends

- Standard Mark III Power Ends with oil seals.
- ASME 3A Power Ends (shown here) featuring Inpro VBX bearing isolators and up to a three-year performance guarantee.

Truest Running ASME Pump

- Four precision machined metal-to-metal fit locations. (See on page 6 & 7) Other manufacturers offer only two or three machined fits.
- Precision machined metal-to-metal cap bearing housing reduces stack-ups to improve shaft concentricity.
- Superior to jackscrew designs which can cause cocking.
- Extends bearing and Mechanical Seal Life.

The Mark III ASME Standard Process Pumps cover a broad hydraulic range.

Twenty Nine Sizes

- Two (2). Group 0-K
- Five (5). Group 1K
- Fifteen (15). Group 2K
- Seven (7). Group 3K

Capacities

- 0.6 m^3/h to 1390 m^3/h

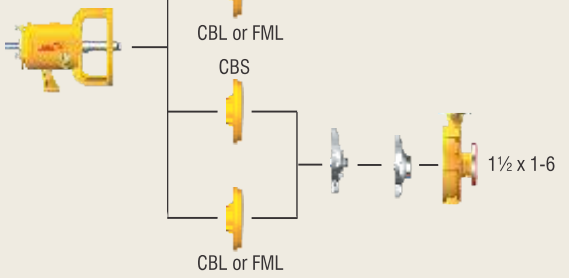
Head

- 3 m to 152 m

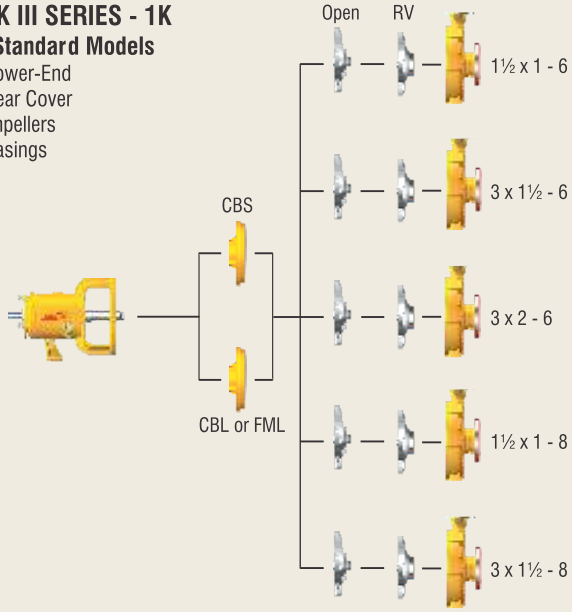
(See pages 3 & 4 for Component Interchangeability & Performance Data.)

MARK III PROCESS PUMP INTERCHANGEABILITY

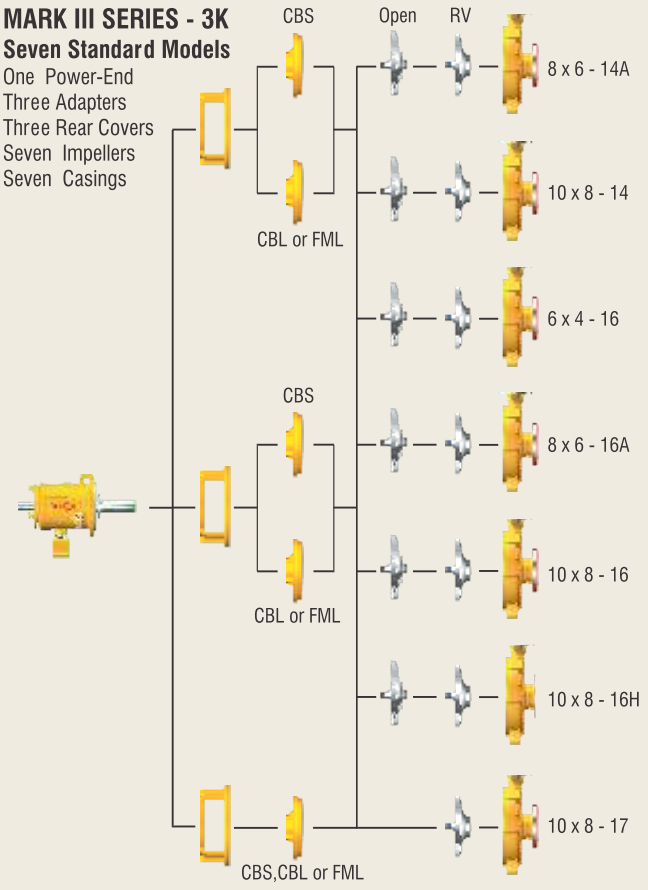
SERIES - 0-K
Two Standard Models
One Power-End
Two Rear Covers
Two Impellers
Two Casings



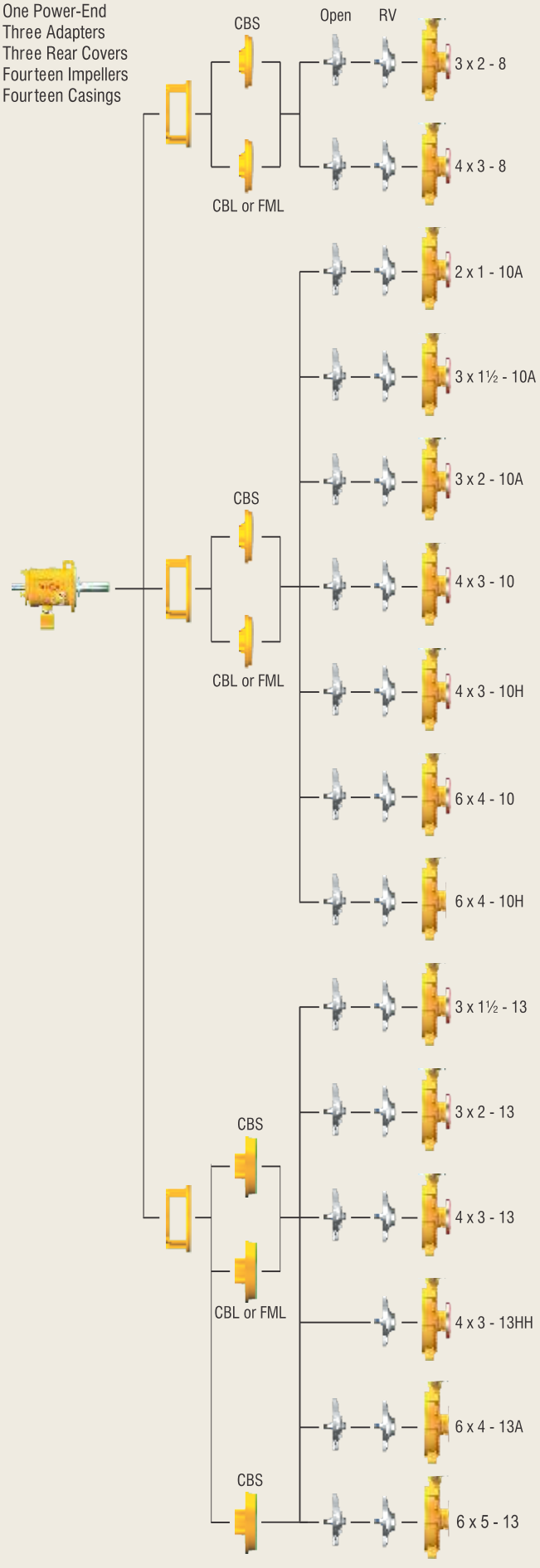
MARK III SERIES - 1K
Five Standard Models
One Power-End
One Rear Cover
Five Impellers
Five Casings



MARK III SERIES - 3K
Seven Standard Models
One Power-End
Three Adapters
Three Rear Covers
Seven Impellers
Seven Casings

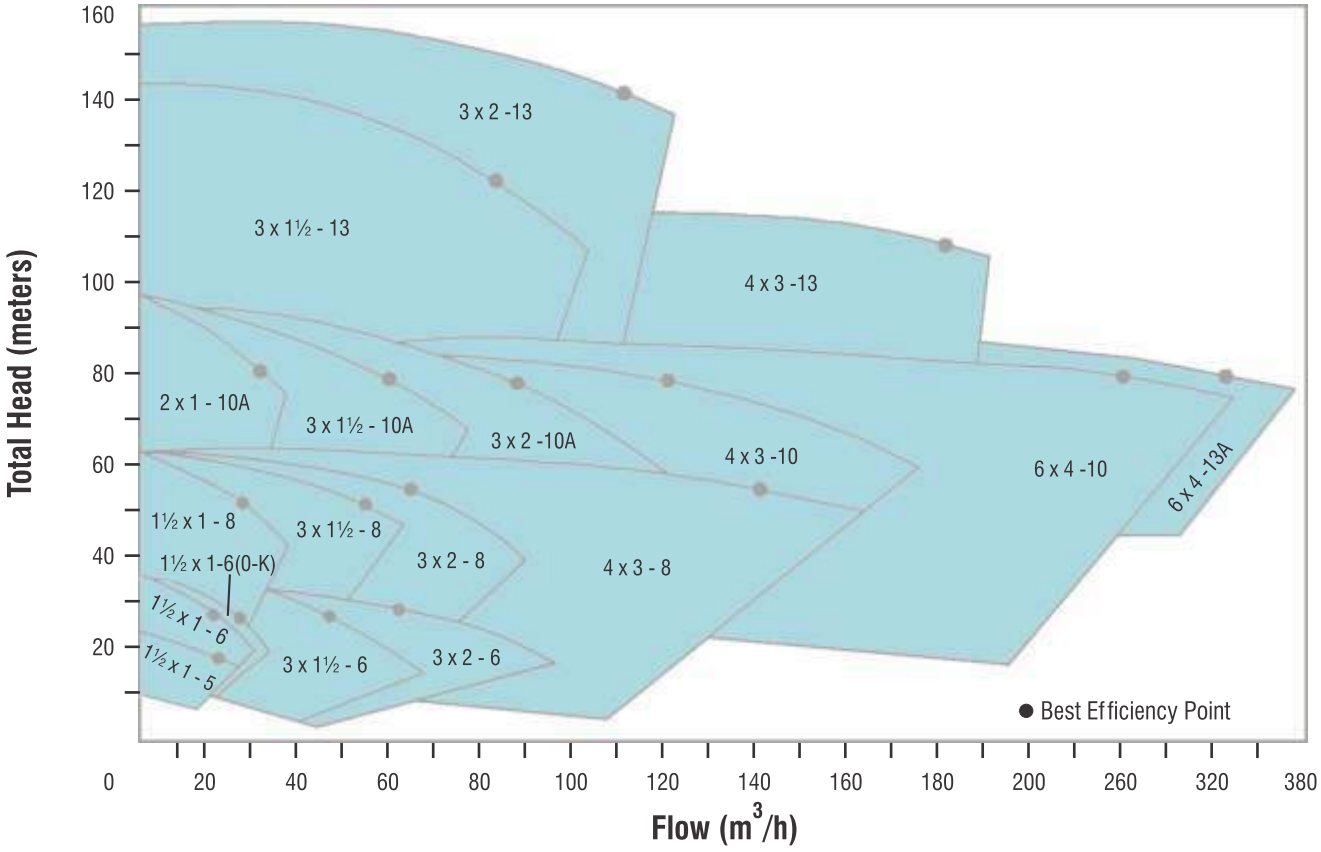


MARK III SERIES - 2K
Fourteen Standard Models
One Power-End
Three Adapters
Three Rear Covers
Fourteen Impellers
Fourteen Casings

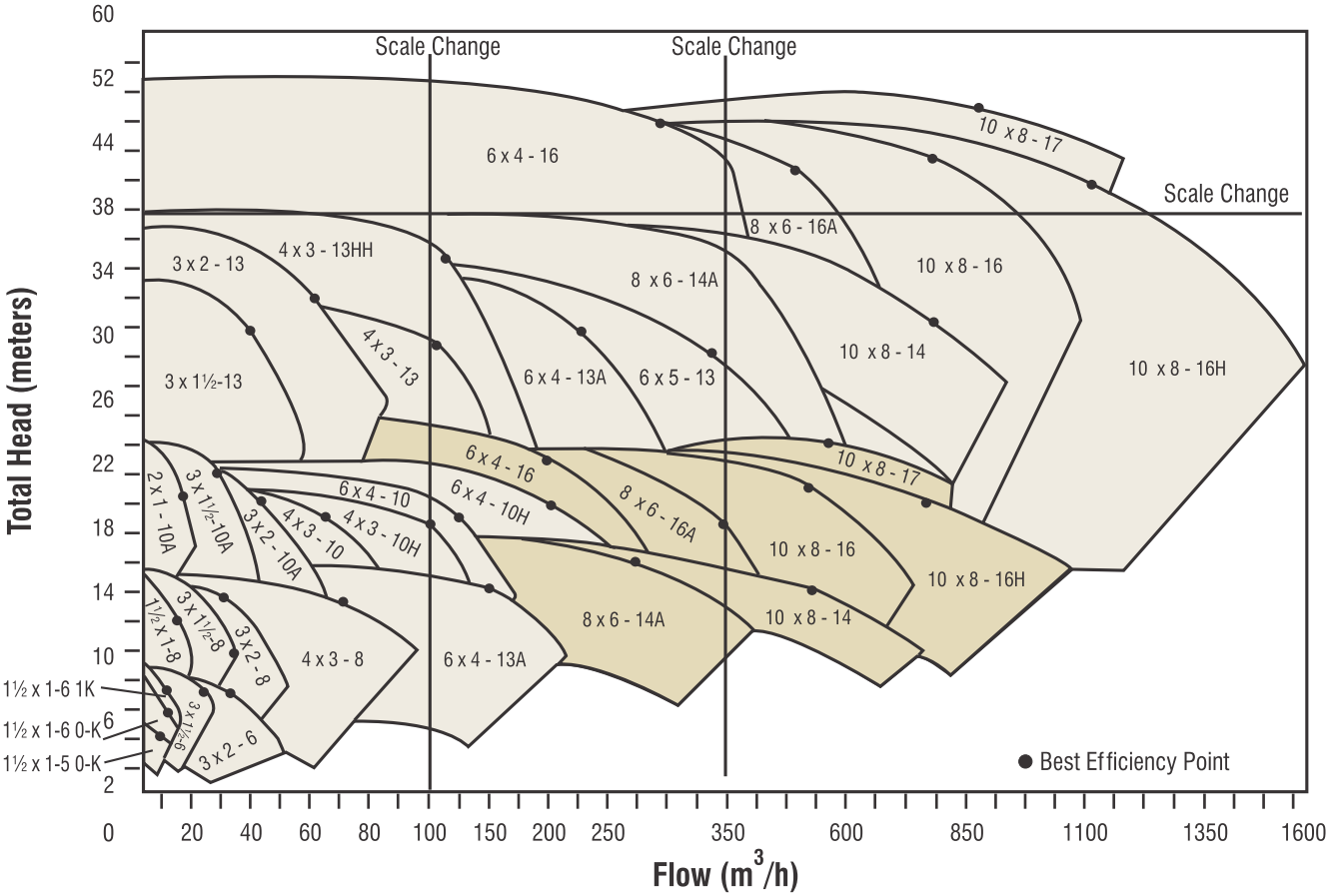


MARK III PROCESS PUMP SELECTION PERFORMANCE CURVES

2900 RPM



1450 and 960 RPM



MARK III ASME PROCESS PUMP TECHNICAL DATA

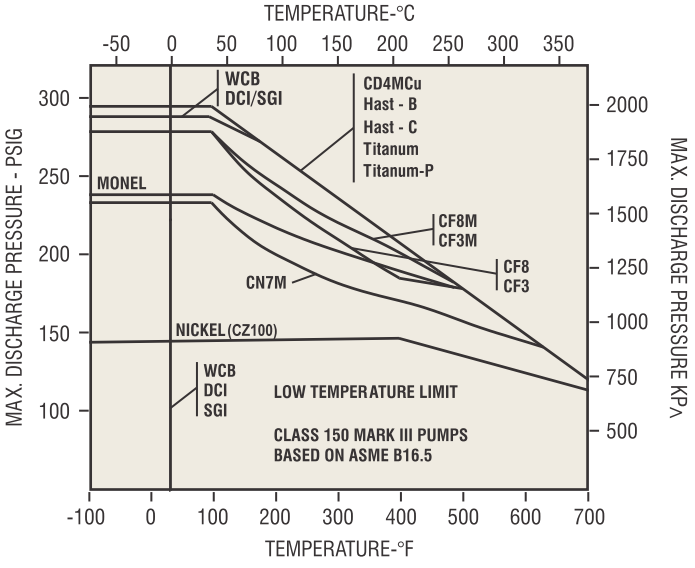
Pump Series	Pump Model	Min. Casing Thickness mm (inch)	Max. Sphere Thru Imp. (RV) mm (inch)	RV Impeller Eye Area cm² (inch²)	Corrosion Allow. mm (inch)	Min. Temp. °C (°F)	Max. Temp. °C (°F)	Max. Allow Horse Power 960 kW	1450 kW	2900 kW	Max. Shaft End Play mm (inch)	Bearing number	Max. Impeller Dia. mm (inch)
0K	1½ x 1 - 5	10 (0.39)	11.1 (0.43)	20 (3.1)	3 (0.12)	-149 (-236.2)	175 (380) [380 (716)] with cooling	6	10	20	0.03 (0.001)	(I.B.) 6305 (O.B.)3305A 5305	130 (5.1)
	1½ x 1 - 6	10 (0.39)	9.5 (0.37)	20 (3.1)									158 (6.2)
1K	1½ x 1 - 6	10 (0.39)	9.5 (0.37)	20 (3.1)				8.5	12.5	25	0.03 (0.001)	(I.B.) 6207 (O.B.) 3306/ 5306	158 (6.2)
	3 x 1½ - 6	10 (0.39)	11.1 (0.43)	28.4 (4.4)									158 (6.2)
	3 x 2 - 6	10 (0.39)	11.1 (0.43)	36.1 (5.6)									158 (6.2)
	1½ x 1 - 8	10 (0.39)	8.7 (0.34)	20 (3.1)									208 (8.2)
	3 x 1½ - 8	11 (0.43)	14.3 (0.56)	35.5 (5.5)									208 (8.2)
2K	3 x 2 - 8	11 (0.43)	13.5 (0.53)	43.8 (6.8)	3 (0.12)	-149 (-236.2)	175 (380) [380 (716)] with cooling	31	46.5	93	0.03 (0.001)	(I.B.) 6310 (O.B.) 3310/ 5310	208 (8.2)
	4 x 3 - 8	11 (0.43)	12.7 (0.50)	80 (12.0)									208 (8.2)
	2 x 1 - 10A	11 (0.43)	10.3 (0.40)	22.6 (3.5)									254 (10.0)
	3 x 1½ - 10A	11 (0.43)	11.9 (0.46)	35.4 (5.5)									254 (10.0)
	3 x 2 - 10A	11 (0.43)	13.5 (0.53)	41.3 (6.4)									254 (10.0)
	4 x 3 - 10	13 (0.51)	16.7 (0.65)	85.2 (13.2)									254 (10.0)
	4 x 3 - 10H	13 (0.51)	19.8 (0.77)	85.2 (13.2)									254 (10.0)
	6 x 4 - 10	13 (0.51)	17.5 (0.68)	126.5 (19.6)						110			254 (10.0)
	6 x 4 - 10H	13 (0.51)	14.3 (0.56)	142 (22.0)									254 (10.0)
	3 x 1½ - 13	11 (0.43)	15.1 (0.59)	48.4 (7.5)						93			330 (13.0)
	3 x 2 - 13	11 (0.43)	10.3 (0.40)	48.4 (7.5)									330 (13.0)
	4 x 3 - 13	11 (0.43)	17.5 (0.68)	98 (15.2)									330 (13.0)
	4 x 3 -13HH	11 (0.43)	17.5 (0.68)	98 (15.2)									330 (13.0)
	6 x 4 - 13A	11 (0.43)	26.2 (1.03)	187.1 (29.0)						110			330 (13.0)
	6 x 5 - 13	11 (0.43)	26.2 (1.03)	187.1 (29.0)									330 (13.0)
3K	8 x 6 - 14A	13 (0.51)	41.3 (1.62)	292 (45.3)	3 (0.12)	-149 (-236.2)	175 (380) [380 (716)] with cooling	134	200	-	0.03 (0.001)	(I.B.) 6314 (O.B.) 3314/ 5314	356 (14.0)
	10 x 8 - 14	16 (0.63)	38.1 (1.50)	410 (63.6)									356 (14.0)
	6 x 4 - 16	16 (0.63)	30.2 (1.18)	172 (26.7)									406 (16.0)
	8 x 6 - 16A	14 (0.55)	31.7 (1.24)	292 (45.3)									406 (16.0)
	10 x 8 - 16	14 (0.44)	39.7 (1.56)	410 (63.6)									406 (16.0)
	10 x 8 - 16H	13 (0.51)	41.3 (1.62)	506 (78.4)									406 (16.0)
	10 x 8 - 17	13 (0.51)	39.7 (1.56)	515 (79.8)									432 (17.0)

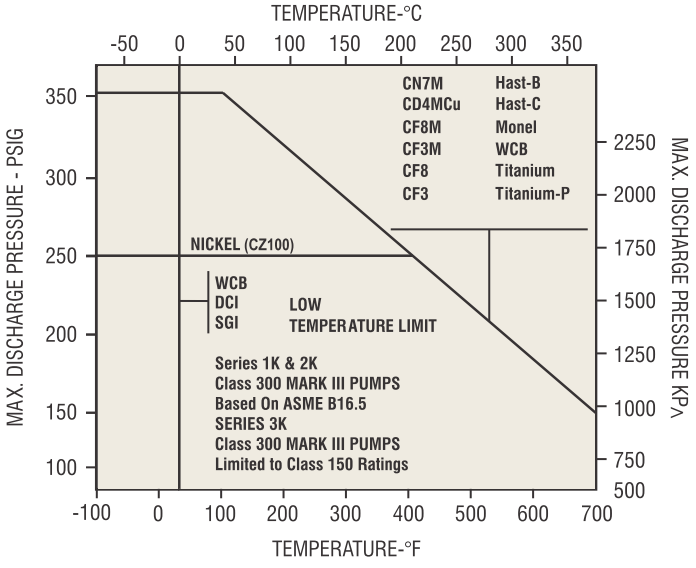
Working Pressure Maximum 20 bar (290 psi) at 38°C (100°F), Test Pressure Maximum 30 bar (435 psi)

PRESSURE TEMPERATURE RATINGS

MARK III PUMPS FOR LOW AND HIGH TEMPERATURE SERVICES

Based on years of satisfactory experience, MARK III Pumps are increasingly being used to handle liquids ranging in temperature from as low as -149°C (-236.2°F) to as high as 380°C (716°F). Combine the great hydraulics, easy maintenance and readily available parts of the Standard MARK III with specific design options and you have an extremely reliable Pump for your demanding services... at a cost less than previously used specific-purpose Pump





MARK III ASME PROCESS PUMPS

Custom Made With Sophisticated Simplicity.

The First Choice of Decision Makers Because they save money in the long run...

- Unique external Micrometer Impeller adjustment for quick, Easy and accurate setting.
- Reverse Vane Impeller requires less NPSH minimizing Cavitation problems. Maintains lower Stuffing Box pressure that increases Mechanical Seal life. Impeller setting against the face of Stuffing Box Cover, so the Wear Surface is Cover and not the more Expensive Casing.
- New Heavy Duty Power-End for rugged dependable service.
- New Pump Sizes for improved Hydraulic coverages and higher Efficiencies resulting in Lower Operating Costs.
- The Built in Quality that makes MARK III the Standard Pump of the Process Industries.

Bearing Housing and Adapter
- S.G. Iron for More Strength (Standard)
- Cast Steel and Stainless Steel (Optional)

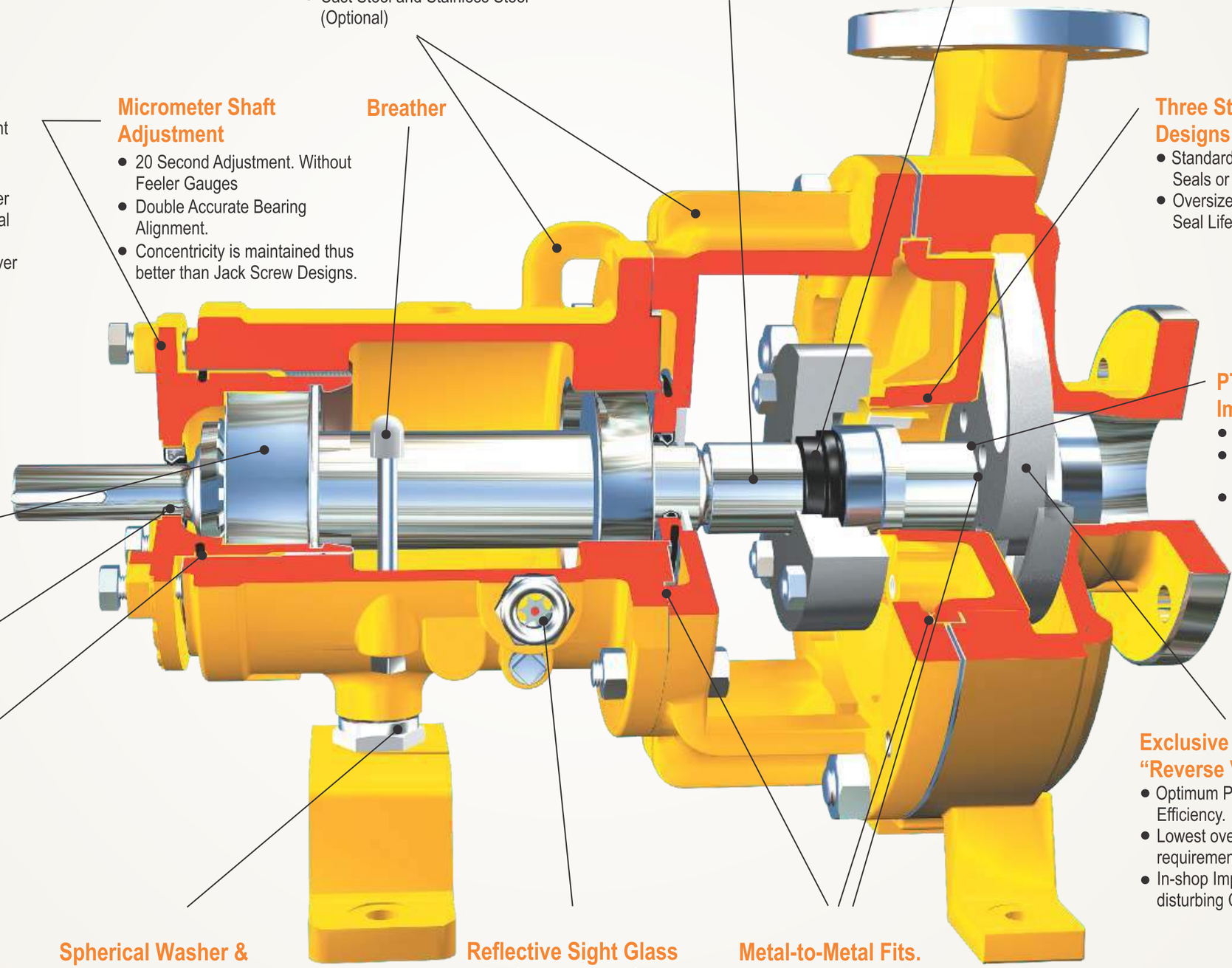
Shafts & Sleeves
- Corrosion, Wear and Shock Resistance.
- Hook Type Sleeve.

Minimum Shaft Deflection
- Less than 0.025 mm (0.001″)
- Mechanical Seals run true

Micrometer Shaft Adjustment
- 20 Second Adjustment. Without Feeler Gauges
- Double Accurate Bearing Alignment.
- Concentricity is maintained thus better than Jack Screw Designs.

Breather

Three Stuffing Box Designs
- Standard Dimension for Most Seals or Packing.
- Oversize Dimensions for Longer Seal Life and Special Seals



PTFE & Silicon Rubber Impeller Gasket.
- Corrosion resistance of PTFE.
- Sealing resiliency of Silicon Rubber.
- Maximum Protection of Impeller and Shaft Threads.

Double Row Thrust. Single Row Radial Bearings.
- Less than 0.03 mm (0.001″) End Play.
- Exceeds Bearing Life of 17,500 hours.

Oil Seals Inboard and Outboard.
- Maintain Clean Bearing Environment.

O-Rings Thread Protection
- Seal Threads from Environment.
- Insures easy Rotating.

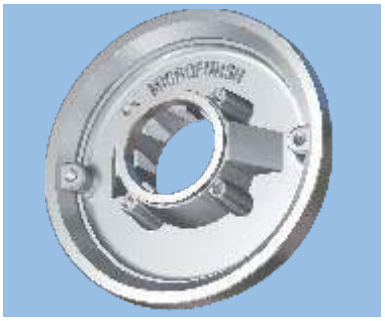
Exclusive MARK III "Reverse Vane" Impeller
- Optimum Performance and Efficiency.
- Lowest overall NPSH requirements.
- In-shop Impeller Setting without disturbing Casing from pipeline.

Spherical Washer & Adjuster
- For Ease of Online Maintenance

Reflective Sight Glass
- For Quick, Accurate Oil Level reading.

Metal-to-Metal Fits.
- Precision Alignment for Longer Mean Time between Planned Maintenance (MTBPM)

MARK III SEALSENTRY FM SERIES SEAL CHAMBERS



Advanced FM SealSentry Design Technology Provides

- Self-Flushing.
- Self-Venting.
- Self-Draining.

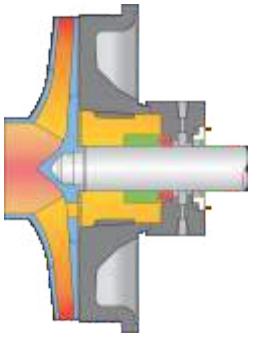
Seal life is extended due to superior purging of Heat, Solids and Vapors. Single Seal can often be selected where Dual Seals or External Flush and Throat Bushing combinations had been used, such as on Solids, Slurry and Liquor services. Flush plans 11, 32, 52, 53, etc; can be eliminated. Costs are reduced where as Pump reliability is increased.

Maximizing Seal Life involves proper selection of the Seal Chamber' Seal and Gland combination. Generally, the Seal Faces should be located directly in the Flush Path.

Flow Modifiers Extend Mechanical Seal MTBPM

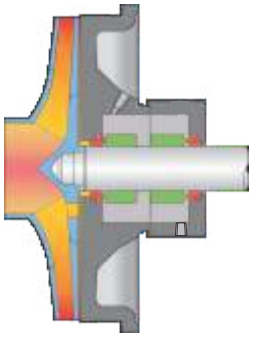
- Flow Modifiers Redirect Flow from Circumferential to Axial.
- Balanced Flow with Low Pressure drop in the Chamber helps keep Solids in suspension, minimizing Erosive Characteristics of the Process.
- A Mechanical Seal creates a Centrifuging Action away from its parts and into the Returning Flow Path of the Process Liquid.
- Solids and Slurry merge in the Returning Flow Path and are Flushed out of the Seal Chamber.

Microfinish SealSentry™ Family of Seal Chambers offers FM (Flow Modifiers) and Cylindrical Bore (CB) Options.



FML
Preferred Selection In Most Applications. Designed for,

- Single Internal Cartridge Seals.
- Dual Internal/External Cartridge Seals.
- Single Internal Component Seals.
- Dual Internal "True" Tandem Design Cartridge Seals.



CBL
Oversize, Cylindrical Step Bore Designed for,

- Dual Internal Component Seals and Isolates the Seal Chamber from the Process with External Source Flush.
- Single Seal with Throttle Bushing and Flush to Boost Pressure Over Flash Point.

JACKETED COMPONENTS

Jacketed Casing
Provide Temperature Control.
Cast Jacket Available.
It's a Customer Choice Depending on Application.

Centerline Mounted Casing
May be used to reduce loads caused by Thermal Expansion. Jacketed Feet with Inlet / Outlet Ports Further Assure Effective Temperature Control. (For Cooling API plan G)

Jacketed Cover
Designed for effective Heat Transfer in the Stuffing Box area or across the entire Surface area of the Process Fluid. It is mandatory for fluid temperature 175°C (347°F) and for high viscous fluid (150 to 600 Cp)

MARK III UNITIZED SELF-PRIMING PUMPS

Conveniently located high and dry at ground level where Installation is simple. Maintenance can more easily and more Economically be Performed

Costing less to buy, install and maintain than **Submersible Pumps**. The Mark III Self-Priming Pumps are designed to draw from liquid sources below the ground levels or from sources which have no positive pressure to naturally Prime the Pumps. Its compact design enables it to fit in tight clearance locations... It can be easily mounted on a trailer for movement to Various Pumping locations such as Wastewater Lagoon Service.

Applications

- Sump Service.
- Tank Car unloading.
- Duplex Pumping Lift Station.
- Available with most of the Standard and Optional Features of the Mark III ASME Standard Pump
- Casing has large Priming Chamber, Air Separator and Volute in one Integral Piece.
- Utilizes Standard Mark III Pump Power-End.

Eight Sizes

- Two. Group 0-K & 1K
  0-K 1½x1US-6
  1K 1½x1½US-8
- Six. Group II
  2K 2x1½US-10A
  2K 3x2US-10
  2K 4x3US-10H
  2K 3x2US-13
  2K 4x3US-13
  2K 6x4US-13A

Capacities

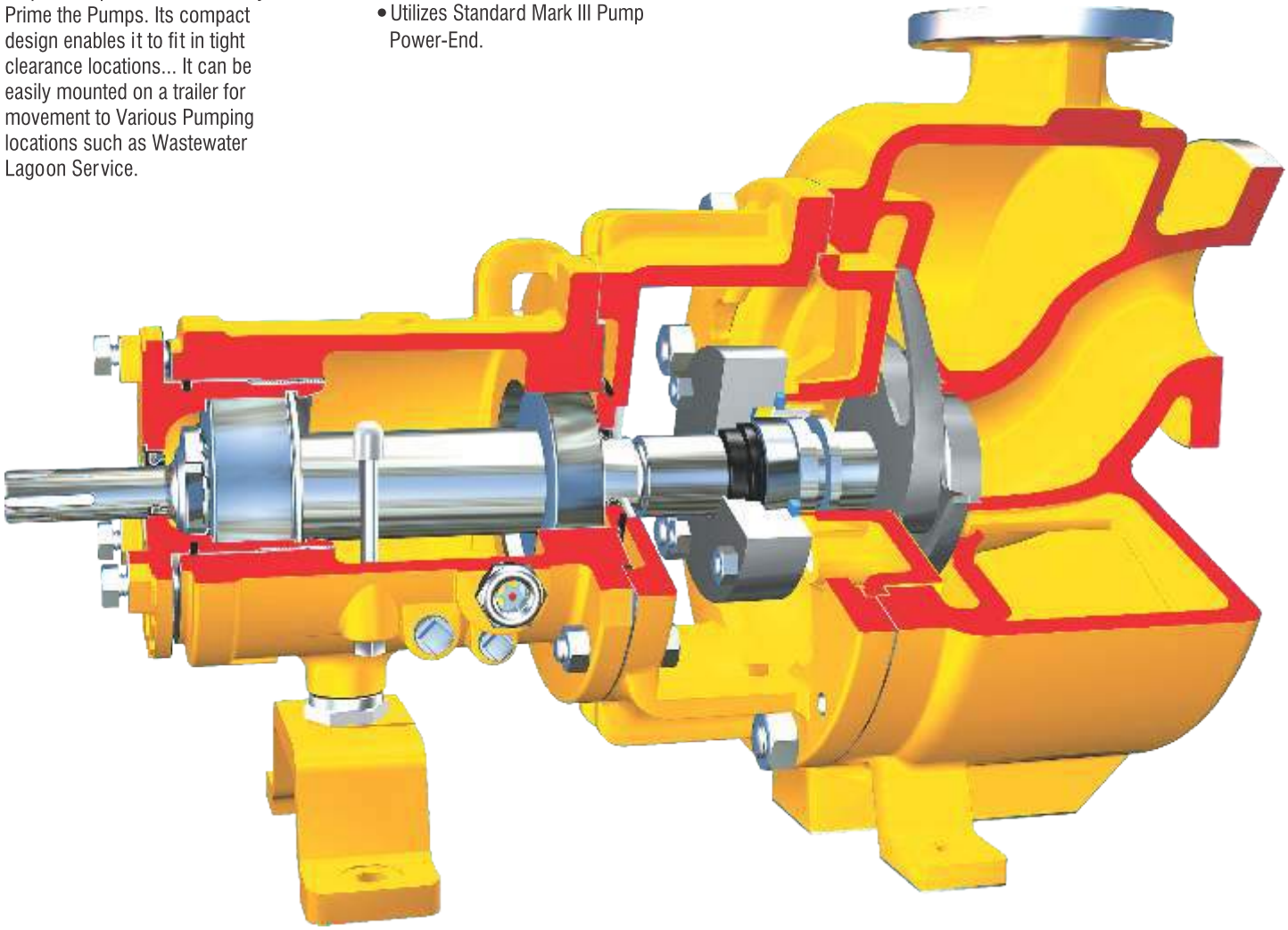
- Up to 265 m^3/h

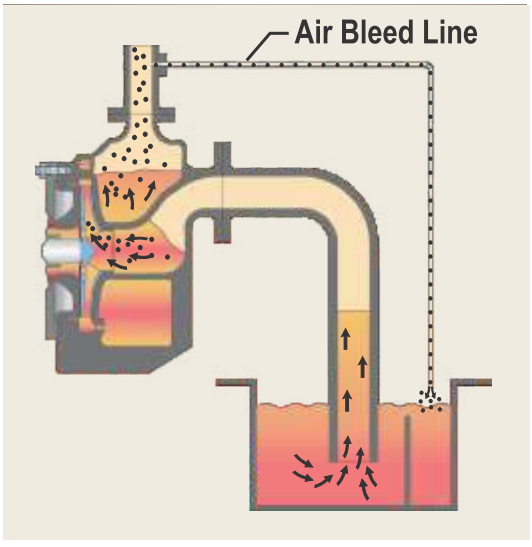
Head

- Up to 85 m

Static Suction Lift

- To 6 m Max with SG of 1.0



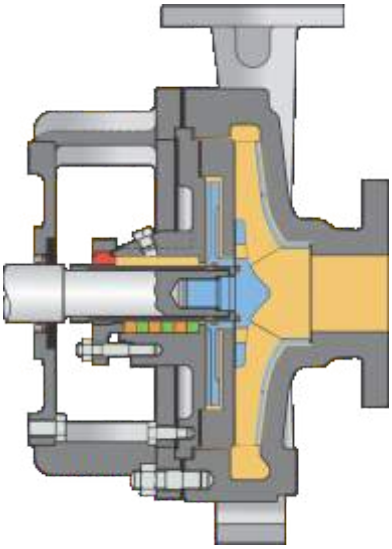


Attention to following criteria will assure Trouble - Free Service from your Self-Priming Pump

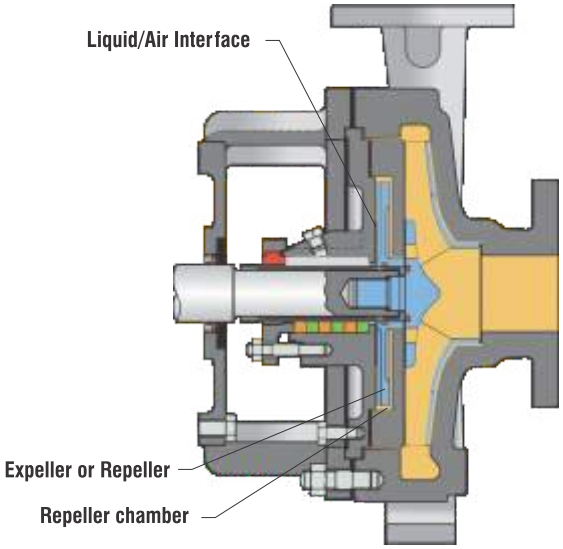
- Locate Pump near Source.
- Limit Suction line lengths to less than 7.6 m (24.9 ft).
- Select Suction pipe size to match suction flange size.
- Avoid Foot Valves on Suction lines.
- Provide a small diameter air bleed line from discharge pipe to Sump if the air is not able to freely vent out from the discharge pipe as shown.

MARK III
SEALMATIC PUMPS

Dynamically Sealed Pump Eliminates the Need for Conventional Mechanical Seal.



STOPPED



RUNNING

No Mechanical Seal is needed during operation as Centrifugal Force created by a Spinning Repeller removes Fluid from the Seal Chamber. When the Pump is stopped, a Static Seal is used to keep it from leaking.
The need for External Flushing and Process contamination controls are eliminated.

Applications

- Tough services where Sealing is difficult.
- Services where a Flush is Undesirable (e.g. Evaporator Feed.)
- Continuous, around-the-clock service.
- Batch operations where a "run dry" condition might exist.

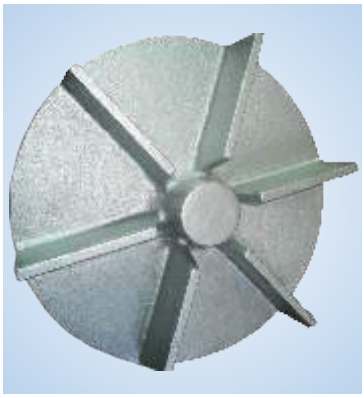
- Available with most of the Standard and Optional Features of the Mark III ASME Standard Pumps (2K & 3K only).
- Standard Mark III Reverse Vane Impeller for Peak Efficiency.
- Sealmatic Design is also available with Recessed Impeller Pumps.
- Performance similar to Mark III Standard ASME Pumps.(Page 4) Repeller power extra
- Standard Mark III Pump can be converted to Sealmatic Pump by replacing cover plate, Repeller and Repeller cover

Seventeen Sizes

- Eleven. Group II
  - 2K 2X1M-10A
  - 2K 3X1½M-10A
  - 2K 3X2M-10A
  - 2K 4X3M-10
  - 2K 4X3M-10H
  - 2K 6X4M-10
  - 2K 6X4M-10H
  - 2K 3X1½M-13
  - 2K 3X2M-13
  - 2K 4X3M-13
  - 2K 6X4M-13A
- Six. Group III
  - 3K 8X6M-14A
  - 3K 10X8M-14
  - 3K 6X4M-16
  - 3K 8X6M-16A
  - 3K 10X8M-16
  - 3K 10X8M-16H

MARK III RECESSED IMPELLER PUMPS

Vortex action assures trouble - free Pumping of large diameter Solids and Slurry Services. Also used to Process Shear Sensitive Products.



Trouble-Free Pumping of Solid, Stringy or Fibrous Slurries
Combines the best design features of the Mark III ASME Standard Pump with the Vortex action of a Recessed Impeller. These specific purpose features along with thick wall, wet-end components offer extended service life when handling media typically too tough for an ASME Process Pump.

Applications

- Light Slurries.
- Corrosive/Erosive services.
- Large diameter Solids.
- Waste Streams.
- Fluid where Shearing must be avoided.
- Protection of Solids Integrity.

- Available with most of the Standard and Optional Features of the Mark III ASME Standard Pump and the Sealmatic dynamically Sealed Repeller design.
- Available with SealSentry or Sealmatic Chambers.
- Tangential discharge minimizes Turbulence.
- Like the Reverse Vane, the Recessed Impeller sets to the rear cover.
- With only a Fraction of the media contacting the Impeller, the Vortex action minimizes abrasive wear while maintaining solids integrity.
- Available in all Standard Alloy materials.
- Utilizes Standard Mark III Pump Power-end.

Five Sizes

- One. Group I
  - 1J 2x2R-6
- Four. Group II
  - 2K 2x2R-10
  - 2K 3x3R-10
  - 2K 4x3R-13
  - 2K 6x4R-13

Capacities

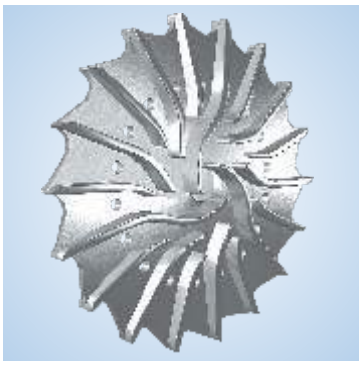
- Up to 394 m^3/h

Head

- Up to 82 m

MARK III
LO-FLO PUMPS

Radial Vane Impeller with Circular Concentric Casing is Specifically Designed for High Head / Low Flow Applications.



The first to introduce ASME Standard High Head / Low Flow Pumps. They are designed with a circular concentric Casing to complement its Radial Vane Impeller. The result has been improved Pump reliability with extended MTBPM at low flow rates.

Applications
Used throughout the Process Industries for general purpose applications requiring high heads with low flow rates.

Circular Concentric Casing and Radial Vane Impeller
The unique design of these components further extends MTBPM when compared with Standard Pumps.

- Radial loads are reduced up to 90% at low flows.
- Shaft vibration is reduced up to 50%.
- Bearing life is extended.
- Mechanical Seal life is extended.

Expanding Volute Casing (Standard Pump)

Radial Vane Impeller Design Provides

- Minimal Thrust Loads.
- Reduced NPSH Requirements.
- Low Seal Chamber Pressures.
- Broader Applications Range.
- Longer Seal and Bearing Life.

- Conforms to Standard ASME dimensions.
- Offered in a wide selection of metallurgy.
- Utilizes Standard Mark III Pump Power End.

Four sizes

- 0-K 1.5 x 1LF-5
- 1K 1.5 x 1LF-8
- 2K 2 x 1LF-10
- 2K 3 x 1.5LF-13

Capacities

- 0.6 m^3/h to 40 m^3/h

Head

- 4 m to190 m

Circular Concentric Casing

MARK III POLYCHEM S-SERIES NON-METALLIC PUMPS

Durco Plastic Lined Sealed Pumps offer outstanding performance and significant economy in highly Corrosive Process applications. Incorporating the advanced design and precision manufacture of the rugged, heavyduty Mark III Chemical Service Pump significantly Enhances bearing and Seal Life.
The PolyChem S-Series Pumps are engineered to maximize mean time between planned maintenance (MTBPM)

Meet the ASME B73.1 dimensional Standard.

A Choice of Power Ends

- Mark III A Features.
- ANSI 3A™ Power End Featuring Inpro VBX Bearing Isolators and a three-year performance guarantee.

Fastest Maintenance Turnaround time

- Micrometer adjustment accurately sets Impeller clearance to Rear Cover in 20 seconds...in the shop or field.
- Mechanical Seals and all critical settings can be accurately set in the shop or field.

Nine Sizes

- Three (3) Group I
- Six (6) Group II

Capacities

- UP to 260 m^3/h

Head

- UP to 160 m

Fluoropolymer PFA Lined Wet End
is globally preferred for its superior corrosion resistance and temperature allowance to 149°C (300°F) PFA is Carbon Reinforced where required for superior stiffness and strength.

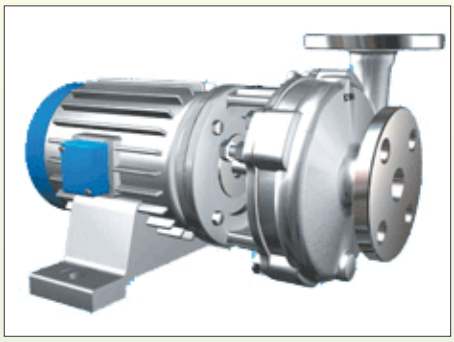
Enclosed Impeller Design
Provides balanced hydraulic loads and superior efficiency compared to open Impeller designs.

Silicon Carbide Shaft Sleeve
Provides optimum corrosion and wear resistance.

Exclusive Oversized "FM" Seal Chamber
The FM (Flow Modifier) is designed to self flush the Mechanical Seal to offer longer seal life. Reduced costs and improved Pump and Seal reliability.

Unique Seal Chamber Canister
allows for double component seals to be applied in the FM Seal Chamber.

- Enables quick retrofit of different Seal styles
- Eliminates the need for stocking additional Rear Covers.



Mono Block Process Pump

Slurry Pump

Hygienic Pump

Sales Offices

Branches	Telephone numbers	Fax	E-mail
BANGALORE	080-32414141		salesbangalore@microfinishgroup.com
BARODA	0265-3250701 0265-2788825	0265-2788826	salesbaroda@microfinishgroup.com
CHENNAI	044-32525558	044-24800175	saleschennai@microfinishgroup.com
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KOLKATA	033-32524442	033-24292085	saleskolkata@microfinishgroup.com
LUCKNOW			
MUMBAI	022-32489966 022-25008254	022-25003942	salesbom@microfinishgroup.com
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MICROFINISH PUMPS PVT. LTD.

Corporate Office

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Phone No: +91-836-2210611, 2333501 Fax No: +91-836-2331438

E-mail: sales@microfinishgroup.com

Website : www.microfinishgroup.com

TRUNNION MOUNTED BALL VALVES

ENGINEERED FOR HIGH PERFORMANCE AND LOW EMISSIONS

TÜV CERT ISO 9001 : 2000 04100 1994 0477-E3 RWTÜV

6D0301

CE 0045

MICROFINISH

Pumps • Valves • Automation

INTRODUCTION TO THE COMPANY

THE MICROFINISH WAY

Microfinish group is a privately owned and managed organization specializing in industrial valves and pumps for energy, process, and natural resource industries.The guiding principles of Microfinish are:

- Personal commitment to our customers
- Top quality in everything we do
- Best available technology for all our products and services

INTRODUCTION

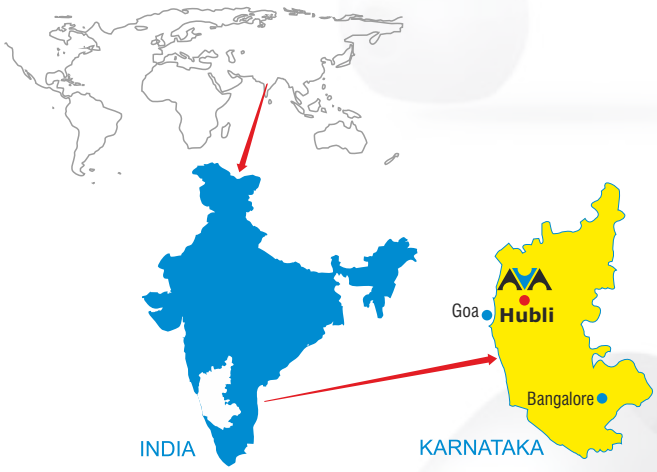
Microfinish group was established in 1971 to manufacture ball valves, bellows sealed globe valves, globe valves for chlorine service, gate, globe check valves, and knife edge gate valves. Other valves and pumps were added to the product range in later years. For the last 35 years we have designed, developed, and supplied our products to:

- Oil and gas facilities, hydrocarbon processing refineries, and petrochemical plants
- Fossil fuel, nuclear, and co-generation power plants
- Fertilizer, chemical, and pharmaceutical industries
- Food and beverage plants
- Mining, minerals processing, and steel sectors
- Pulp and paper mills

We are recognized as a quality manufacturer of reliable valves and pumps for industry. Our wealth of experience has enabled Microfinish to become a prominent supplier of ball valves throughout the world, and of chemical process pumps in India.

Industrial technology is progressing at a remarkable rate, so we have established a research and development department equipped with modern test facilities.

Our manufacturing facilities are located in separate and well laid-out buildings with ample scope for future expansion. The industrial estate in Hubli is one of the biggest and fastest developing manufacturing zones in the state of Karnataka. The city of Hubli is well served by air, rail, and road connections; it is situated on the national highway NH 4 between Mumbai and Bangalore.



PRODUCTS

We manufacture the following products in various materials including carbon steel, stainless steel, duplex, and high nickel alloys.

- Ball valves in floating and trunnion mounted designs with cast and forged bodies, including three way and jacketed configurations, and special versions for cryogenic and high temperature services
- Bellows sealed globe valves
- Globe valves for chlorine service
- Butterfly valves
- Knife edge gate valves
- Gate, globe, and check valves in forged and cast versions
- Chemical process pumps in standard and specialty configurations
- Sanitary and slurry pumps

Microfinish is committed to total quality. Stringent and efficient quality assurance and control systems have been implemented in accordance with ISO 9001: 2000.

In 1994 our organization was the first in India to receive the prestigious ISO 9001 certificate (1994 edition) from RWTÜV in Germany. Microfinish ball valves have also had API 6D certification since February 1999 and PED certification since 2002.

In 1988 the International Labor Organization in Geneva gave Microfinish an award for good working conditions and environment as a result of the hard work of every employee and the commitment of management.

IN-HOUSE FACILITIES FOR QUALIFICATION TESTS

- Fire safe
- High temperature with superheated steam
- Low temperature for cryogenic valves
- Life cycle
- Fugitive emissions
- Pump performance and NPSH
- Noise and vibration

PRODUCTS

Microfinish Trunnion Mounted Ball Valves are available in both reduced bore and full bore designs in sizes from 50 to 900 mm and pressure classes from ANSI 150 to 2500. Ball valves are designed using the latest CAD software to achieve the highest levels of performance, reliability, and safety as required by the user industries.

Design standards are API 6D and ASME B16.34.
Fire safe testing is certified by third party inspectors.

STANDARD DESIGN FEATURES

- Designed and manufactured to API 6D
- Minimum shell thickness to ASME B 16.34
- Fire safe design to API 607 and API 6FA
- Bolted or fully welded body design
- Three alternative seating arrangements
- Double block and bleed
- Face to face dimensions to API 6D and ANSI B16.10
- Flanged and welding ends with or without transition pups
- Actuator mounting flange to ISO 5211
- Lever, gear, electric, pneumatic, hydraulic, gas, and gas over oil operation
- Bidirectional fluid flow

OPTIONAL FEATURES

- Compliant with NACE MR 0175 for sour gas service
- Emergency sealant injection
- Stem extension for underground installations
- Double piston seat effect
- Metal seated ball valves
- High temperature ball valves
- Cryogenic ball valves
- Special overlay on balls and seats for abrasive services
- Special coatings on valve bodies and fasteners

APPLICABLE STANDARDS

Design standard	API 6D, API 608, ASME B 16.34 BS EN ISO 17292
Testing standard	API 6D, API 598, BS EN 12266 ISO 5208, ASME B 16.34
Flange standard	ASME B 16.5
Welding ends	ASME B 16.25
Sour gas service	NACE MR 0175
Fire safe testing	API 607, API 6FA

TEST PRESSURES

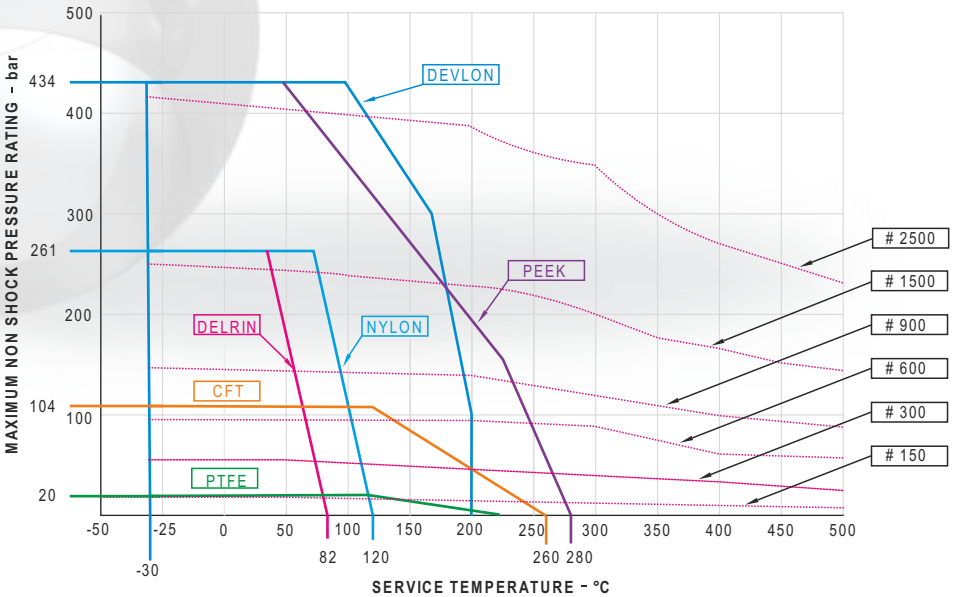
Valve Rating	Test Pressure - bar		
Pressure Class	Hydro Shell*	Hydro Seat*	Air Seat
150	30	22	6
300	77	57	6
600	153	113	6
900	230	169	6
1500	383	281	6
2500	638	468	6

*Applicable for WCB material

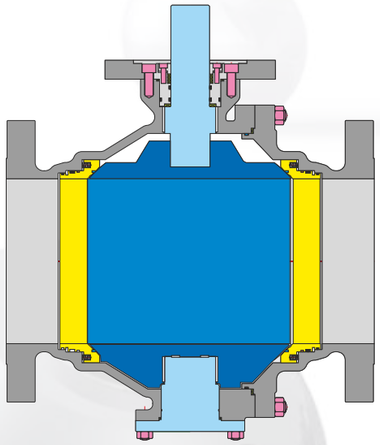
PRESSURE TEMPERATURE RATING OF SEAT

The pressure temperature rating of a ball valve is determined by either the body or the seat limits. Materials of construction, fluid properties, and operating parameters are also influential factors. The ratings in the graph should therefore be used only as a guide. For temperatures below -30°C consult Microfinish.

The dotted lines indicate pressure temperature ratings for metal seated ball valves with SS 316 trim. Ratings may vary with other trim materials.



DESIGN FEATURES FOR CRITICAL APPLICATIONS



Bolted design

VALVE DESIGN

Microfinish valves conform to and exceed the design requirements of API 6D and ASME B 16.34. All valves are fire safe designs. Pressure temperature ratings and flange dimensions conform to ASME B16.34 and 16.5.

The two piece bolted construction provides maximum rigidity to withstand pipeline forces and facilitates maintenance on site. A fully welded body design is also available.

Both reduced bore and full bore configurations are available. End connections may be welding ends or flanged with either raised face or ring type joints.

Fully welded design

LOW EMISSION STEM SEALING

A double o-ring system provides excellent stem sealing in normal operating conditions. A secondary graphite seal is retained by a gland for fire safety. The blowout proof stem design allows replacement of stem seals under pressure when the valve is in either the fully closed or the fully open position, and the pressure in the cavity has been completely released. These valves meet the latest fugitive emission requirements.

SEALANT INJECTION

Microfinish ball valves are designed and manufactured to provide tight shut-off. A sealant injection system can be provided on request. In the event of contaminants causing damage to the seat insert or stem seal, an emergency seal can be formed using the sealant injection system.

DOUBLE SEALING

The body joints are furnished with double sealing arrangements for maximum security.

TRUNNION MOUNTED BALL

Our standard design includes a trunnion mounted ball. Forces acting on the ball are transmitted to the valve body through the stem and trunnion. Steel backed PTFE impregnated bearings support rotation of the stem and trunnion, thus minimizing friction caused by the side thrust resulting from the action of fluid pressure on the ball. The result is a lower operating torque and the bearings are maintenance free.

ANTISTATIC FEATURE

To meet antistatic requirements all valves are provided with stainless steel springs which ensure electrical continuity between ball and stem, and between stem and body.

FIRE SAFE DESIGN

Microfinish trunnion mounted ball valves have been designed to meet the fire safety standards of API 607 and API 6FA. Valves are fire safe tested, witnessed, and certified by an independant third party.

STEM EXTENSION FOR UNDERGROUND INSTALLATIONS

Microfinish supplies valves with suitable stem extensions. All drain, vent, and emergency sealant lines are extended and all pipes are firmly attached to

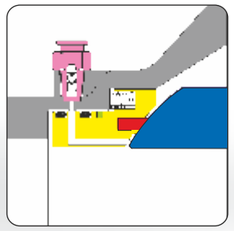
STANDARD SEAT FEATURES

- **Single Seat:** Cavity relief combined with a block and bleed trunnion ball and floating seat guarantees a tight shut-off. Two independent spring loaded seat rings are always in contact with the ball to provide a tight and effective seal at low differential pressures. At higher differential pressures the upstream seat ring becomes pressure energized against the ball to form a tight seal, while the downstream seat remains spring loaded. Springs are fully confined to avoid fluid contact and build up of debris.

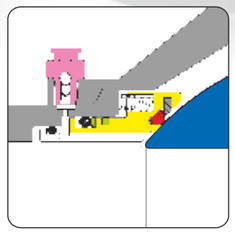
- **Cavity Relief:** This seating system is designed to vent automatically any excess pressure in the body cavity. The floating seat design allows for relief of excess pressure to the downstream side.

- **Double Block and Bleed:** The floating seats provide a double block and bleed function when a drain plug or a bleed valve is mounted on the body. The cavity can be relieved through vent or drain connections. The independent upstream and downstream sealing ensures tight shut-off at the body cavity in the fully open or closed position. This feature prevents fluid contamination and detects seat leakage with out removing the valve from the pipeline.

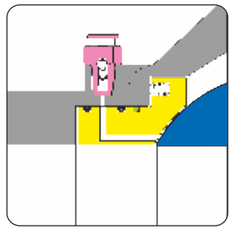
- **Optional Double Sealing Feature:** This is achieved by a seat design with double piston effect. If the upstream seat fails, the down stream seat will seal effectively. This seat design does not provide self body cavity relief unless a relief valve is fitted to the body.



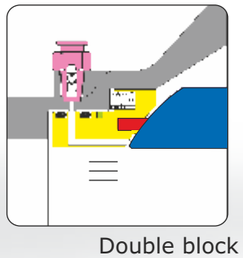
Metal to metal seating with non metallic insert

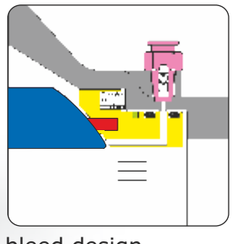


Metal to metal seating with o-ring insert



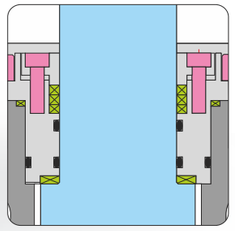
Metal to metal seating



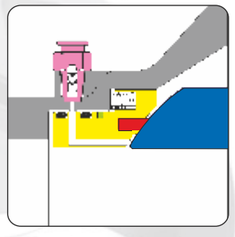


Double block and bleed design

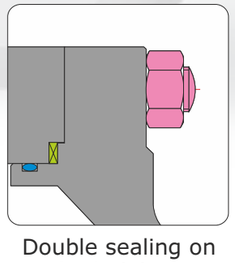
Stem extension for underground installations



Low emission stem sealing



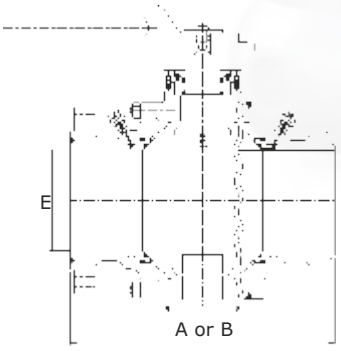
Sealant injection



Double sealing on body joints

DIMENSIONS

- 2-piece design with bolted cast body
- Raised face flanged or welding ends
- Gear operated



- 3-piece design with bolted or welded forged body
- Ring joint flanged or welding ends
- Lever operated

RB = Reduced bore — Class 150, class 300, and class 600 — FB = Full bore

SIZE (mm)		A (Flanged ends - raised face)			B (Welding ends)			E	
		# 150	# 300	# 600	# 150	# 300	# 600	# 150,300,600	
RB	FB							RB	FB
	50	178	216	292	216	216	292		49
80x50	80	203	283	356	283	283	356	49	74
100x80	100	229	305	432	305	305	432	74	100
150x100	150	394	403	559	457	457	559	100	150
200x150	200	457	502	660	521	521	660	150	201
250x200	250	533	568	787	559	559	787	201	252
300x250	300	610	648	838	635	635	838	201	303
350x250	350	686	762	889	762	762	889	252	334
400x300	400	762	838	991	838	838	991	303	385
450x350	450	864	914	1092	914	914	1092	334	436
500x400	500	914	991	1194	991	991	1194	385	487
550x450	550	991*	1092	1295	1092*	1092	1295	436	538
600x500	600	1067	1143	1397	1143	1143	1397	487	589
650x550	650	1143	1245	1448	1245	1245	1448	538	633
700x600	700	1245	1346	1549	1346	1346	1549	589	684
750x600	750	1295	1397	1651	1397	1397	1651	589	735
800x650	800	1372	1524	1778	1524	1524	1778	633	779
850x700	850	1473	1626	1930	1626	1626	1930	684	830
900x750	900	1524	1727	2083	1727	1727	2083	735	874

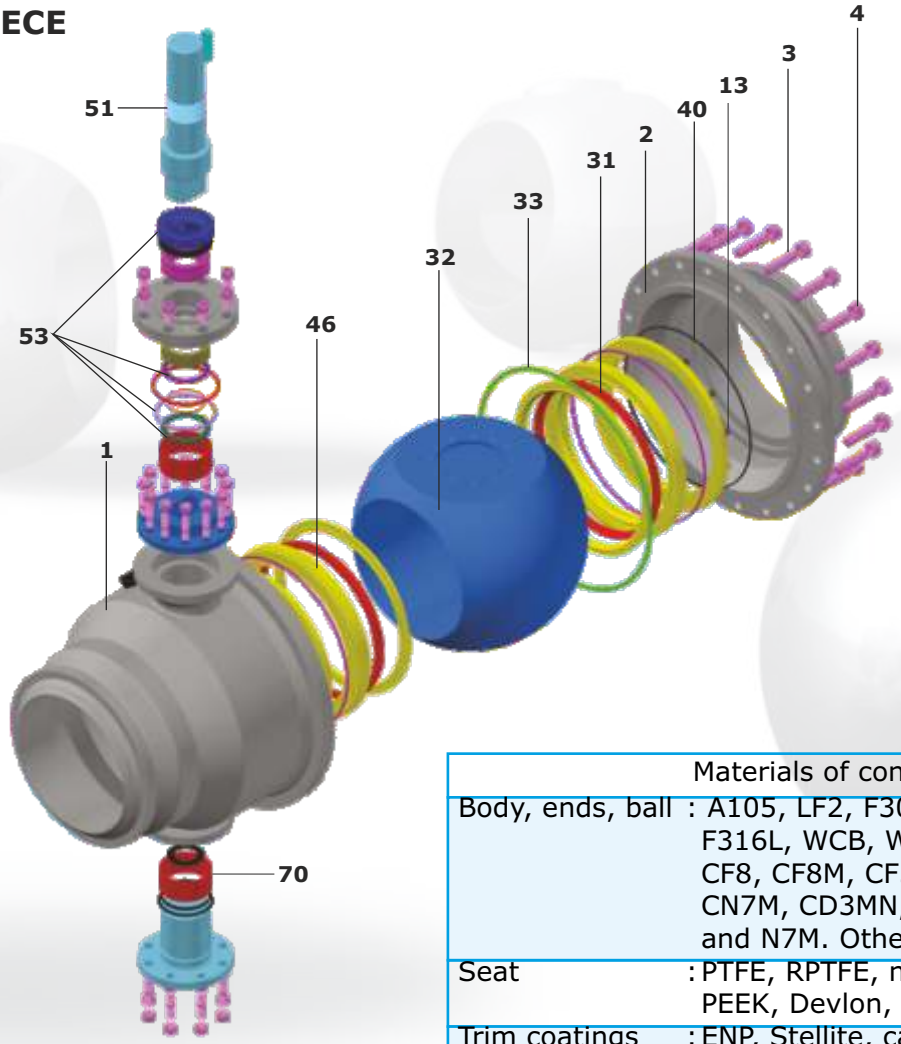
RB = Reduced bore — Class 900 and class 1500 — FB = Full bore

SIZE (mm)		A (Flanged ends - ring joints)		B (Welding ends)		E			
		# 900	# 1500	# 900	# 1500	# 900		# 1500	
RB	FB					RB	FB	RB	FB
	25	254*	254*	254*	254*		25		25
32x25	32	280*	280*	280*	280*	25	32	25	32
40x32	40	305*	305*	305*	305*	32	38	32	38
50x40	50	368	368	368	368	38	49	38	49
80x50	80	381	470	381	470	49	74	49	74
100x80	100	457	546	457	546	74	100	74	100
150x100	150	610	705	610	705	100	150	100	144
200x150	200	737	832	737	832	150	201	144	192
250x200	250	838	991	838	991	201	252	192	239
300x250	300	965	1130	965	1130	252	303	239	287
350x250	350	1029	1257	1029	1257	252	322	239	315
400x300	400	1130	1384	1130	1384	303	373	287	360
450x350	450	1219	--	1219	--	322	423	--	--
500x400	500	1321	--	1321	--	373	471	--	--
550x450	550	1422*	--	1422*	--	423	522	--	--
600x500	600	1549	--	1549	--	471	570	--	--

1. All dimensions are in mm. 2. Dimensions "A" and"B" are certified and others are indicative.
3. Reduced bore valves are also available with one, two, and three size smaller bores. 4.Weights of valves and other dimensions are available on request. 5. Dimensions of class 2500 valves are available on request.
6. * These dimensions are not listed in API 6D standard, so are the Microfinish standard. 7. The following configurations are available on request: fully welded construction; forged steel design; flange drilling other than ANSI.
8. Operators available: lever, gear, electrical, pneumatic, hydraulic, gas, and gas over oil.

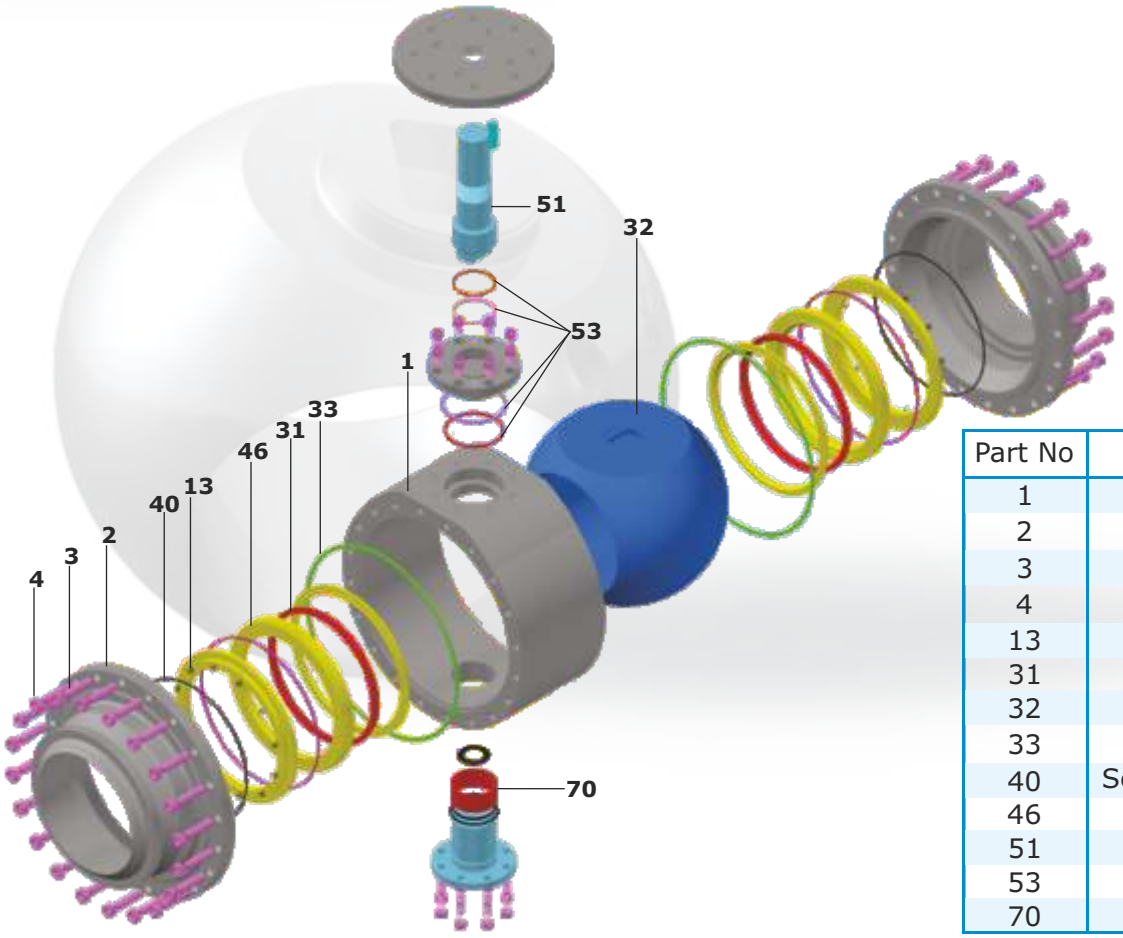
PARTS NUMBERS

TWO PIECE



Materials of construction	
Body, ends, ball	: A105, LF2, F304, F316, F304L, F316L, WCB, WCC, LCB, LCC, CF8, CF8M, CF3, CF3M CD4MCu, CN7M, CD3MN, CN3MN, CW6M and N7M. Other materials on request.
Seat	: PTFE, RPTFE, nylon, Delrin, PEEK, Devlon, metal
Trim coatings	: ENP, Stellite, carbide, or nickel boron

THREE PIECE



Part No	Name of the Part
1	Body
2	Tailpiece
3	Body Stud
4	Body Nut
13	Spring
31	Seat
32	Ball
33	Body Seal
40	Seat Retainer 'O' Ring
46	Seat Retainer
51	Stem
53	Stem Seal
70	Bearing

PRODUCT RANGE						
SERIES	SIZES-mm	SERIES	SIZES-mm	BORE	PRESSURE CLASS	END CONNECTIONS
TWO PIECE CONSTRUCTION		THREE PIECE CONSTRUCTION				
T84R2	50-900	T84R3	50-900	RB	150	FE, WE
T84F2	50-900	T84F3	50-900	FB	150	FE, WE
T85R2	50-900	T85R3	50-900	RB	300	FE, WE
T85F2	50-900	T85F3	50-900	FB	300	FE, WE
T87R2	50-900	T87R3	50-900	RB	600	FE, WE
T87F2	50-900	T87F3	50-900	FB	600	FE, WE
T89R2	25-600	T89R3	25-600	RB	900	FE, WE
T89F2	25-600	T89F3	25-600	FB	900	FE, WE
T90R2	25-400	T90R3	25-400	RB	1500	FE, WE
T90F2	25-400	T90F3	25-400	FB	1500	FE, WE
T91R2	25-300	T91R3	25-300	RB	2500	FE, WE
T91F2	25-300	T91F3	25-300	FB	2500	FE, WE
RB = Reduced bore. FB = Full bore. FE = Flanged ends. WE = Welding ends.						

SALES OFFICES

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CHENNAI	044 - 45576723 / 7871990001	saleschennai@microfinishgroup.com
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INDORE	09329306090	salesindore@microfinishgroup.com
KANPUR	09305509600	saleskanpur@microfinishgroup.com
KOLKATA	033 - 24292085 / 7890018820	saleskolkata@microfinishgroup.com
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PUNE	020 - 25448989 / 25468989	salespune@microfinishgroup.com

EXPORT SALES

Contact the headquarters in Hubli, Karnataka, India at the below address.

MICROFINISH VALVES PVT.LTD.

B161-162, Industrial Estate, Gokul Road, Hubli-580 030 Karnataka, India
Phone No: 91-836-2212404, 2210611 Fax No: 91-836-2331438
E-mail: sales@microfinishgroup.com Website: www.microfinishgroup.com

Floating Ball Valves

TÜV NORD
TÜV India Private Ltd.
ISO 9001

6D 0301

0045

SIL 3 IEC 61508

MICROFINISH
Pumps • Valves • Automation

THE MICROFINISH WAY

Microfinish Valves Pvt. Ltd. is a privately owned and managed company specializing in industrial valves for energy, process, and natural resource industries.

The guiding principles of Microfinish are :

- Personal commitment to our customers
- Top quality in everything we do
- Best available technology for all our products and services

INTRODUCTION

Microfinish Valves Pvt.Ltd. was established in 1971 to manufacture ball valves, bellows sealed globe valves, chlorine globe valves, and knife edge gate valves. For the last 35 years we have designed, developed, and supplied our products to:

- Oil and gas facilities, hydrocarbon processing refineries, and petrochemical plants
- Fossil fuel, Nuclear, and combined cycle power plants
- Fertilizer, chemical, and pharmaceutical industries
- Food and beverage plants
- Mining, minerals processing, and steel sectors
- Pulp and paper mills

We are recognized as a quality manufacturer of reliable valves for industry. Our wealth of experience has enabled Microfinish to become a prominent supplier of ball valves throughout the world.

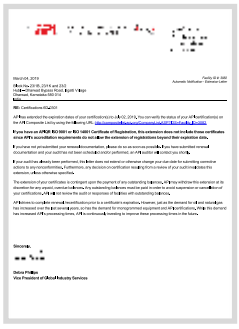
Industrial technology is progressing at a remarkable rate, so we have established a research and development department equipped with modern test facilities.

Our new state of art manufacturing facilities is located in Itigatti village 10 kms from Hubballi City

QUALITY

Microfinish is committed to total quality. Stringent and efficient quality assurance and control systems have been implemented in accordance with ISO 9001.

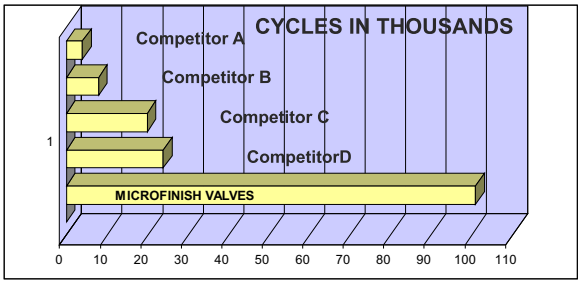
In 1994 our organization was the first in India to receive the prestigious ISO 9001 certificate (1994 edition) from RWTUV in Germany. Microfinish ball valves have also had API-6D certification since February 1999 and CE certification since 2002.



IN-HOUSE FACILITIES FOR QUALIFICATION TESTS

- Fire safe testing
- High temperature testing by superheated steam
- Low temperature testing for cryogenic valves
- Cycle testing
- Fugitive-emission

Stem Leakage Test Results



- **MICROFINISH Valve has stem seal integrity without packing adjustment even after 100,000 cycle**
- **This is four times more cycles than the best competitive valve could achieve**
- **Valve tested with Water at Room temperature at 20 bar pressure. Each valve is fully pressurized while in the closed position & depressurized**

FLOATING BALL VALVES

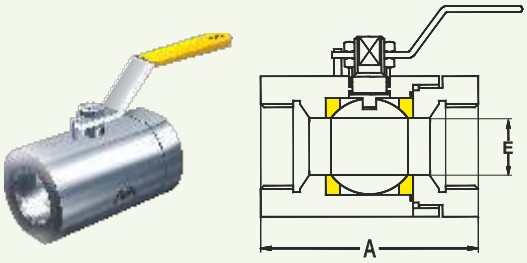
MICROFINISH Floating Ball valves with unmatched features:

- Designed to handle most severe service applications
- Internally mounted Blow-out proof stem
- Standard live loaded stem design meets stringent Fugitive norms
- Fire safe & Antistatic design to meet API-607 standard
- High cycle life
- Actuator mounting pad as per ISO-5211
- Improved seat design for long life & bubble tight shut off having low Torque
- Choice of Seat material

SINGLE TWO PIECE & THREE PIECE BALL VALVES

SERIES 80BK Pr. Rating #300

Ends : Screwed



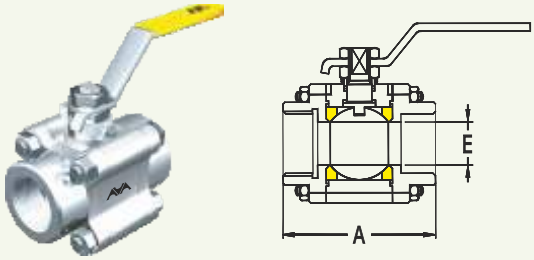
REDUCED BORE

Dimensions are in mm & Weight (approx) in kgs

	SIZE	A	E	WEIGHT
SINGLE PIECE	8	70	9.5	0.5
	10	70	9.5	0.5
	15	70	9.5	0.5
	20	80	13.0	0.8
	25	90	15.0	1.3
	32	110	19.0	3.0
	40	115	25.0	3.2
	50	125	32.0	3.8

SERIES 81R3 / 81F3 Pr. Rating #600 and #800

Ends : Screwed, Socket & Butt Weld

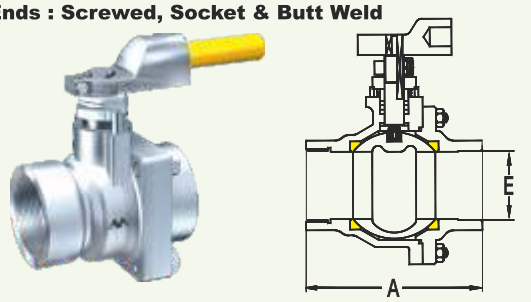


RB = REDUCED BORE **FB = FULL BORE**

	SIZE	A		E		WEIGHT	
		RB	FB	RB	FB	RB	FB
THREE PIECE	8	64	64	6.0	6.0	0.7	0.7
	10	64	64	6.0	9.5	0.7	0.8
	15	64	64	9.5	13.0	0.7	0.8
	20	70	75	13.0	19.0	0.8	1.3
	25	88	88	19.0	25.0	1.5	1.9
	32	105	105	25.0	32.0	1.8	3.3
	40	114	114	32.0	38.0	3.1	4.1
	50	130	130	38.0	50	4.3	6.5

SERIES 81R2 / 81F2 Pr. Rating #300

Ends : Screwed, Socket & Butt Weld

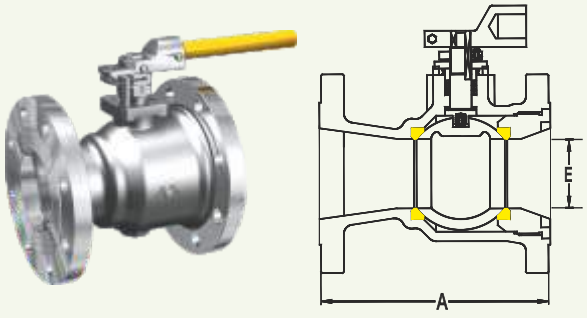


RB = REDUCED BORE **FB = FULL BORE**

	SIZE	A		E		WEIGHT	
		RB	FB	RB	FB	RB	FB
TWO PIECE	50	-	130	-	50	-	6
	65	150	170	50	65	10	12
	80	170	200	58	76	14	16
	100	200	229	76	102	30	35
	150	275	315	98	152	52	60

SERIES 84R1 Pr. Rating #150
85R1 Pr. Rating #300

Ends : Flanged



RB = REDUCED BORE

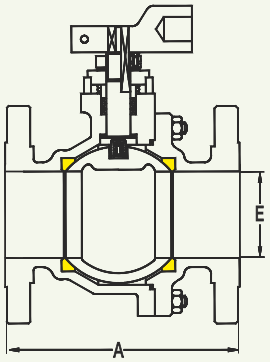
	SIZE	A		E	WEIGHT	
		150	300		150	300
SINGLE PIECE	15	108	140	9.5	1.6	2.8
	20	117	152	13.0	2.0	3.9
	25	127	165	19.0	2.9	5.0
	32	140	178	25.0	3.5	8.0
	40	165	190	32.0	5.0	10.0
	50	178	216	38.0	8.5	12.0
	65	190	241	50.0	11.0	18.0
	80	203	283	58.0	17.0	27.0
	100	229	305	76.0	25.0	42.0
	150	267	403	102.0	42.0	76.0
	200	292	419	144.0	75.0	153.0
	250	330	457	187.0	126.0	192.0

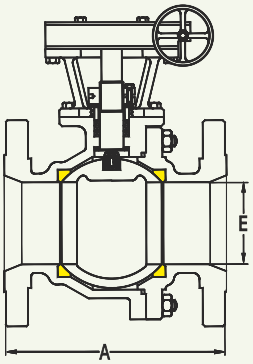
TWO PIECE & JACKETED BALL VALVES

SERIES

84R2 / 84F2 Pr Class # 150
85R2 / 85F2 Pr Class # 300
87R2 / 87F2 Pr Class # 600
89R2 / 89F2 Pr Class # 900
90R2 / 90F2 Pr Class # 1500

Ends : Flanged & Butt Weld





RB = REDUCED BORE **FB = FULL BORE**

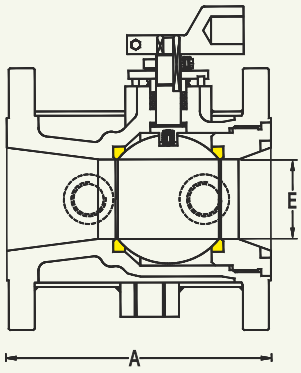
Dimensions are in mm & Weights (approx) in kgs

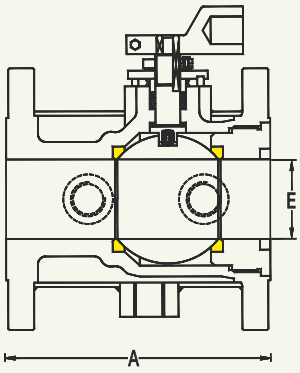
SIZE	A				E		WEIGHT									
	Class						Class 150		Class 300		Class 600		Class 900		Class 1500	
	150	300	600	900&1500	RB	FB	RB	FB	RB	FB	RB	FB	RB	FB	RB	FB
15	108	140	165	216	9.5	13	1.5	1.5	2.5	2.8	3.2	3.3	4.6	4.9	5.0	6.0
20	117	152	190	229	13	19	1.7	2.5	3.5	4.0	4.8	5.0	6.5	7.1	7.5	9.5
25	127	165	216	254	19	25	2.6	2.8	4.5	5.0	6.5	6.7	8.8	13	10	14
32	140	178	229	280	25	32	3.8	5.4	5.3	7.0	8.4	9.0	12.5	21	13	23
40	165	190	241	305	32	38	5.5	6.5	9.5	10	13	13	20	28	23	29
50	178	216	292	368	38	50	8.3	9.5	12	15	16	21	27	31	31	-
65	190	241	330	419	50	65	11	16	14	22	25	30	40	50	-	-
80	203	283	356		58	76	17	19	25	31	33	38				
100	229	305	432		76	98	25	33	41	52	65	90				
150	267	403	559		98	152	42	60	70	141	85	-				
200	292	419	-		144	203	76	98	157	221	-	-				
250	330	457	-		187	250	129	160	200	280	-	-				
300	356	502	-		228	-	150	-	275	-	-	-				

SERIES

84R1-J / 84F1-J Pr Class # 150
85R1-J / 85F1-J Pr Class # 300

Ends : Flanged





RB = REDUCED BORE **FB = FULL BORE**

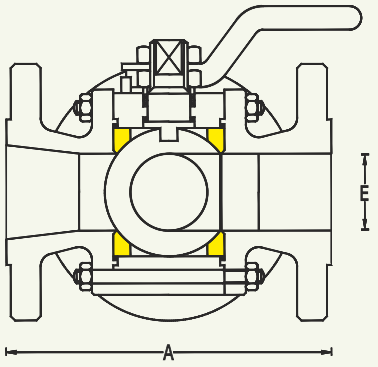
SIZE	A		E		WEIGHT			
	Class				Class 150		Class 300	
	150	300	RB	FB	RB	FB	RB	FB
15 x 25	108	140	9.5	13	2.5	3.0	3.5	4.0
20 x 32	117	152	13	19	3.0	4.5	4.5	5.0
25 x 40	127	165	19	25	6.0	7.0	7.0	7.5
32 x 50	140	178	25	32	9.0	10.0	10.0	11.0
40 x 65	165	190	32	38	10.0	11.0	11.5	12.0
50 x 80	178	216	38	50	12.0	16.5	18.0	20.0
65 x 100	190	241	50	65	18.0	19.5	26.0	28.0
80 x 150	203	283	58	76	35.0	40.0	42.0	44.0
100 x 150	229	305	76	102	-	60.0	-	80.0
150 x 250	267	403	98	152	-	120.0	-	150.0
200 x 300	292	419	144	203	-	160.0	-	320.0
250 x 350	330	-	187	250	-	376.0	-	-

THREE WAY BALL VALVES

THREE PIECE DESIGN

Series 71R3 / 71F3 Pr Class # 150
74R3 / 74F3 Pr Class # 300

Ends : Screwed, Socket, Butt Weld & Flanged



RB = REDUCED BORE **FB = FULL BORE**

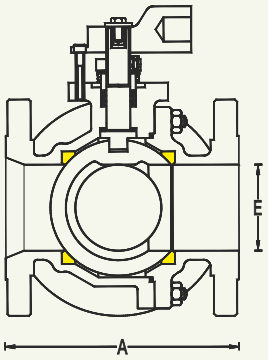
Dimensions are in mm & Weight (approx) in kgs

SIZE	A		E		WEIGHT			
	Class				Class 150		Class 300	
	150	300	RB	FB	RB	FB	RB	FB
15	108	140	9.5	13	1.8	2.0	3.0	3.5
20	117	152	13	19	2.2	3.0	4.0	4.6
25	127	165	19	25	3.2	3.5	5.0	5.8
32	140	178	25	32	4.6	4.8	6.0	7.6
40	165	190	32	38	6.5	7.5	10.0	12.0
50	178	216	38	-	9.6	-	12.0	-

TWO PIECE DESIGN

Series 71R2 / 71F2 Pr Class # 150
74R2 / 74F2 Pr Class # 300

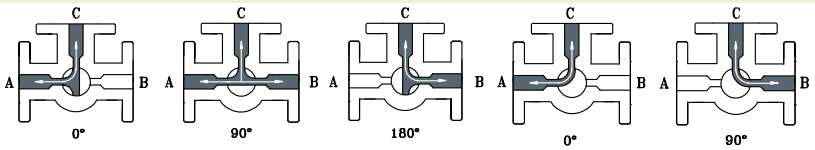
Ends : Flanged & Butt Weld



RB = REDUCED BORE **FB = FULL BORE**

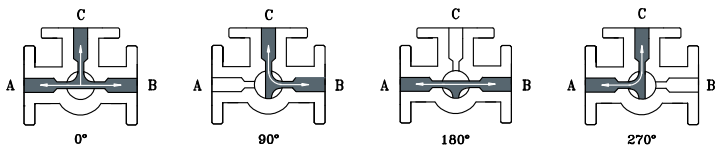
SIZE	A			E		WEIGHT			
	Class 150		Class 300			Class 150		Class 300	
	TWO SEATS	THREE SEATS	TWO&THREE SEATS	RB	FB	RB	FB	RB	FB
50	178	203	216	-	50	-	14	-	19
65	190	222	241	50	65	17	24	18	29
80	203	241	283	58	76	26	29	33	40
100	229	305	305	76	98	38	50	53	68
150	267	394	403	102	148	48	90	91	136
200	457	457	502	148	198	100	147	180	190
250	533	533	568	187	248	168	240	270	380
300	610	610	648	228	298	195	300	350	425

FLOW PATTERNS

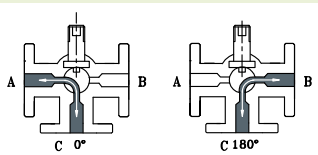


TWO SEATS, SIDE 'T' PORT STYLE : T

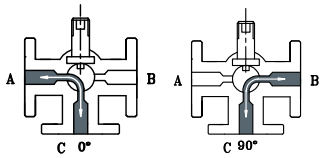
TWO SEATS, SIDE 'L' PORT STYLE : L



THREE SEATS, SIDE 'T' PORT STYLE : 3



TWO SEATS, BOTTOM 'L' PORT STYLE : B



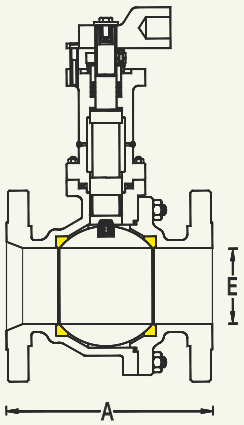
TWO SEATS, BOTTOM 'L' PORT STYLE : D

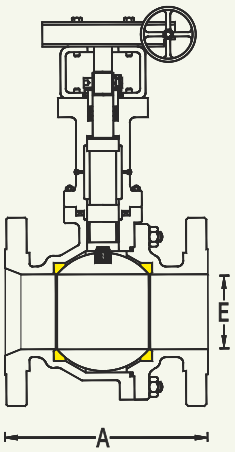
CRYOGENIC BALL VALVES

SERIES

84R2 / 84F2 Pr Class #150 Ext'n.
85R2 / 85F2 Pr Class #300 Ext'n.

Ends : Screwed, Socket, Butt Weld & Flanged





RB = REDUCED BORE **FB = FULL BORE**

Dimensions are in mm & Weight (approx) in kgs

SIZE	A		E		WEIGHT			
	Class				Class 150		Class 300	
	150	300	RB	FB	RB	FB	RB	FB
15	108	140	9.5	13	1.8	2.2	3.0	3.5
20	117	152	13	19	2.0	3.3	4.3	4.8
25	127	165	19	25	3.2	3.5	5.6	6.4
32	140	178	25	32	4.7	5.4	6.6	8.5
40	165	190	32	38	6.8	8.5	12.5	14
50	178	216	38	50	10.6	15	15	16
65	190	241	50	65	14	22	17	23
80	203	283	58	76	17	26	32	38
100	229	305	76	98	31	41	52	95
150	267	403	98	152	52	81	118	176
200	292	419	144	203	96	140	196	276
250	330	457	187	250	162	200	250	350
300	356	502	228	-	187	-	340	-

Applicable Standards

Design Std	ISO-17292, ASME B - 16.34
Testing Std	ISO 5208, API-598
Face to Face Dimension	ASME B 16.5
Socket Weld Ends	ASME B16.11
Buttweld Ends	ASME B 16.25
Flanged Ends	ASME B16.5
Sour Service	NACE MR01 75
Fire Safe Testing	API-607 & API-6FA

Pressure Testing

Valve Rating	Test Pressure - Bar		
Class	**Shell***	**Seat***	**Air-seat**
# 150	30	22	6
# 300	77	57	6
# 600	153	113	6
# 800	230	169	6
# 900	383	281	6
# 1500	638	468	6

*Test Pressure for WCB Material

TECHNICAL INFORMATION

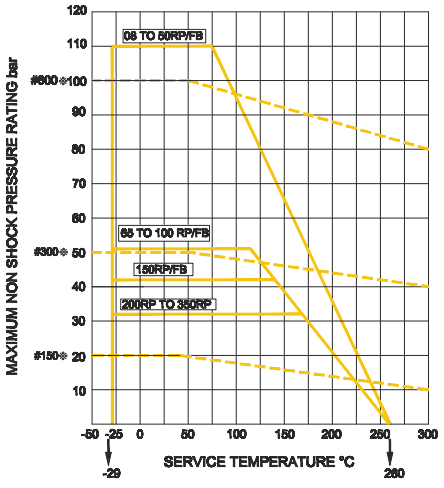
● BREAK AWAY TORQUE VALUE- Nm

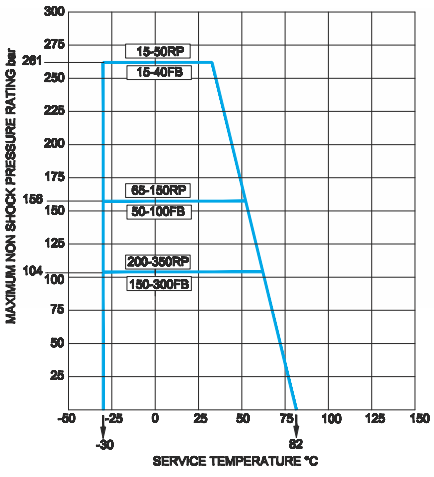
ΔP BAR	Class 150 and 300						Class 600				Class 800					
	20		40		50		60		100		20		60		80	
SIZE mm	RB	FB	RB	FB	RB	FB	RB	FB	RB	FB	RB	FB	RB	FB	RB	FB
8	-	-	-	-	-	-	-	-	-	-	3	3	10	10	12	12
10	-	-	-	-	-	-	-	-	-	-	3	3	10	10	12	12
15	3.3	3.3	3.7	3.8	4.0	4.0	10	15	12	20	3	3	10	10	12	12
20	3.3	7.0	3.8	7.2	4.0	8.0	10	15	15	21	3	10	10	15	12	18
25	6.5	8.0	7.0	10	8.0	11.5	14	25	18	35	10	14	15	25	18	25
32	12	15	13.5	20	14.5	21	20	35	35	45	14	25	25	35	25	40
40	15	21	15.5	24	16	25	28	43	48	52	25	42	35	55	40	60
50	20	35	23.5	43	24	50	-	-	-	-	42	46	55	80	60	80
65	37	67	52	85	66	96	-	-	-	-	46	80	80	130	80	140
80	50	93	79	106	88	120	-	-	-	-	80	95	130	175	140	185
100	88	155	109	174	120	185	-	-	-	-	95	160	175	325	185	390
150	185	360	201	485	210	545	-	-	-	-	160	460	325	1195	390	1434
200	250	460	468	-	-	-	-	-	-	-	-	-	-	-	-	-
250	865	1200	1195	-	-	-	-	-	-	-	-	-	-	-	-	-
300	1130	2600	-	-	-	-	-	-	-	-	-	-	-	-	-	-

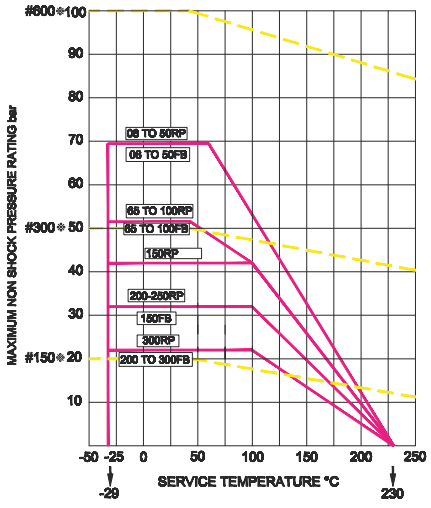
NOTE : ● With PTFE Seats ■ For reinforced PTFE multiply by factor 1.1 ■ For infrequent operation multiply by factor 1.2 ■ For metal seat multiply by factor 2.5

Materials of Construction

Body and tail piece	Casting : WCB, WCC, LCB, LCC, CF8, CF8M, CF3, CF3M, CD4MCU, CN7M, CD3MN, CN3MN, CW-6M, N-7M Duplex and other exotic alloys. Other materials on request Forging : A105, LF2, F304 and F316
Ball	WCB, LCB with ENP, CA15, CF8, CF8M, CF3, CF3M, CD4MCU, CN7M, CD3MN, CN3MN, CW-6M, N-7M Duplex and other exotic alloys
Stem and gland	410, 304, 316, A20, 31803, Inconel and Nickel alloys
Seat	PTFE, RPTFE, NYLON, DELRIN, PEEK, DEVLON and METAL
Stem washer	RPTFE
Stem seal	Grafoil and PTFE
Body seal	Grafoil and Spiral Wound gasket with filler
Body stud	B7, L7, B8, B8M
Body nut	2H, 2HM, 8, 8M







SALES OFFICES

BRANCHES	TELEPHONE NO.	E-MAIL ID
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BENGALURU	080 - 29775863 / 23233999	salesbangalore@microfinishgroup.com
CHENNAI	044 - 45576723 / 7871990001	saleschennai@microfinishgroup.com
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WORKS

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Hubli Dharwad By-Pass Road, Village Itigatti – 580 114, Taluk & Dist – Dharwad.

MICROFINISH VALVES PVT. LTD.

B161-162, Industrial Estate, Gokul Road, Hubballi-580 030, Karnataka, India.
Phone No: 91-836-2212404, 2210611 Fax No: 91-836-2331438
E-mail: sales@microfinishgroup.com Website: www.microfinishgroup.com

TERATORK

ACTUATORS ENGINEERED FOR QUARTER TURN APPLICATIONS

MICROFINISH

Pumps • Valves • Automation

Design Features

Robust construction for reliability

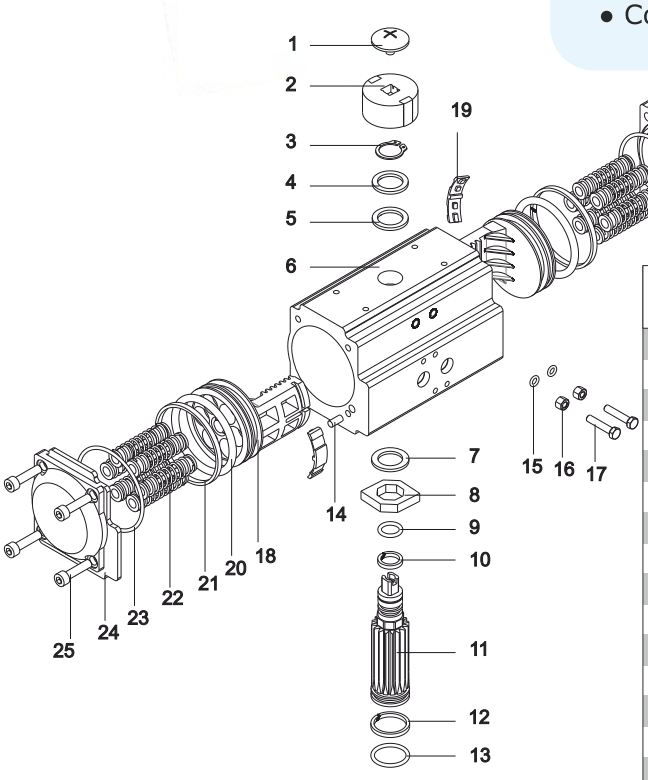
- Innovative rugged dual piston and pinion design
- High cycle life and fast operation
- Anti blow-out drive shaft
- Extruded hard anodized aluminium body
- Die cast aluminum alloy powder coated covers
- SS fasteners for long protection from corrosion

Precision for high performance

- Low friction due to multiple bearings and guides on rack and piston
- Modular pre-loaded corrosion resistant coated spring cartridge design
- Fully machined teeth for accurate positioning, low backlash and higher efficiency
- Easy conversion from double acting to spring return
- Two external travel stops for ±5 degree adjustment

Wide application range

- Air supply pressure 2 to 8 bar
- Operating temperature from -20°C to +80°C
- Low temperature version to -40°C
- High temperature version to +150°C
- Compliance to ISO 5211 and NAMUR specifications



Part No.	Spare part		Part description	Material	Qty.
1			Indicator screw	ABS	1
2			Indicator	ABS	1
3			Snap ring	SS	1
4			Washer	SS	1
5		□	Outside washer	ABS	1
6			Body	Al. alloy-hard anodized	1
7		□	Inside washer	ABS	1
8			Cam	1040+ENP	1
9	•	□	O-ring-top	NBR	1
10		□	Bearing-top	ABS	1
11			Pinion	1040+ENP	1
12		□	Bearing-bottom	ABS	1
13	•	□	O-ring-bottom	NBR	1
14	•	□	Plug	NBR	1
15	•	□	O-ring-adjust screw	NBR	2
16			Nut	SS	2
17			Adjustable screw	SS	2
18			Piston die cast	Al. alloy-hard anodized	2
19			Guide-piston	ABS	2
20	•	□	O-ring-piston	NBR	2
21		□	Bearing-piston	ABS	2
22			Springs	Spring steel	**
23	•	□	O-ring end cap	NBR	2
24			End cap die cast	Al. alloy-powder coated	2
25			Screw-end cap	SS	8

• O-ring spare kit parts □ Spare kit parts
** Refer name plate for quantity
ABS - Acrylonitrile Butadiene Styrene
NBR - Nitrile Butadiene Rubber, Al.-Aluminium

Actuator Output Torque (Nm)

Double acting actuator

Model	Air pressure (bar)							
	2	3	4	5	5.5	6	7	8
DA-T32	3.1	4.6	6.1	7.6	8.4	9.2	10.7	12.2
DA-T45	6.0	9.1	12.1	15.1	16.6	18.1	21.1	24.2
DA-T52	8.1	12.1	16.1	20.2	22.2	24.2	28.2	32.3
DA-T63	14.2	21.3	28.4	35.5	39.1	42.6	49.7	56.8
DA-T75	20.1	30.2	40.3	50.3	55.4	60.4	70.5	80.5
DA-T83	30.8	46.2	61.6	77.1	84.8	92.5	107.9	123.3
DA-T92	45.4	68.2	90.9	113.6	125.0	136.3	159.1	181.8
DA-T105	65.8	98.7	131.6	164.4	180.9	197.3	230.2	263.1
DA-T125	103.0	154.0	205.0	256.0	282.0	308.0	359.0	410.0
DA-T140	175.0	263.0	351.0	439.0	482.0	526.0	614.0	702.0
DA-T160	267.0	401.0	535.0	668.0	735.0	802.0	935.0	1069.0
DA-T190	431.0	646.0	861.0	1077.0	1185.0	1292.0	1508.0	1723.0
DA-T210	526.0	789.0	1052.0	1316.0	1447.0	1579.0	1842.0	2105.0
DA-T240	773.0	1160.0	1546.0	1933.0	2126.0	2320.0	2706.0	3093.0
DA-T270	1174.0	1761.0	2349.0	2936.0	3229.0	3523.0	34110.0	4697.0
DA-T300	1526.0	2289.0	3052.0	3815.0	4197.0	4578.0	5341.0	6104.0
DA-T350	2285.0	3427.0	4570.0	5712.0	6283.0	6854.0	7997.0	9139.0
DA-T400	3256.0	4883.0	6511.0	8139.0	8953.0	9767.0	11394.0	13022.0
DA-T450	5076.0	7614.0	10153.0	12591.0	13960.0	15229.0	17768.0	20306.0
DA-T500	7162.0	10744.0	14325.0	17907.0	19697.0	21488.0	25069.0	28651.0
DA-T550	9750.0	14625.0	19500.0	24375.0	26813.0	29251.0	34125.0	39001.0
DA-T600	12893.0	19339.0	25786.0	32232.0	35455.0	38679.0	45125.0	51572.0
DA-T700	21058.0	31588.0	42117.0	52646.0	57911.0	63176.0	73705.0	84234.0
DA-T800	32089.0	48134.0	64178.0	80223.0	88246.0	96268.0	112313.0	128357.0

Single acting actuator

Model	Air pressure (bar)															
	2		3		4		5		6		7		8		Spring Torque	
	Spring	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	90°	0°
	Qty.	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End
SR-T45	5	3.0	1.2													4.6	2.9
	6	2.3	0.2	4	3.3											5.5	3.5
	7			4.8	2.3	7.8	5.3									6.5	4.1
	8			4.2	1.3	7.2	4.3	10.2	7.3							7.4	4.6
	9					6.6	3.4	9.6	6.4	12.6	9.4					8.3	5.2
	10					6.1	2.4	9.0	5.4	12.0	8.4	15.0	11.4	18.1	14.5	9.2	5.8
	11							8.4	4.4	11.4	7.4	14.4	10.4	17.5	13.5	10.1	6.4
	12							7.8	3.5	10.8	6.5	13.8	9.5	16.9	12.6	11.1	7.0
SR-T52	5	3.7	1.6													6.2	4.2
	6	2.8	0.3	6.8	4.3											7.4	5.1
	7			5.9	3.0	9.9	7.0	14.0	11.1							8.6	5.9
	8			5.0	1.7	9.0	5.7	13.1	9.8							9.9	6.8
	9					8.1	4.4	12.2	8.5	16.2	12.5					11.1	7.6
	10					7.2	3.1	11.3	7.2	15.3	11.2	19.3	15.2	23.4	19.3	12.4	8.5
	11							10.4	5.9	14.4	9.9	18.4	13.9	22.5	18.0	13.6	9.3
	12							9.5	4.6	13.5	8.6	17.5	12.6	21.6	16.7	14.8	10.1
SR-T63	5	7.0	3.2													10.4	6.8
	6	5.6	1.0	12.7	8.1											12.5	8.2
	7			11.2	5.9	18.3	13.0	26.8	21.9							14.6	9.6
	8			9.8	3.7	16.9	10.8	24.0	17.9							16.7	10.9
	9					15.4	8.6	22.5	15.7	29.6	22.8					18.8	12.3
	10					14.0	6.4	21.1	13.5	28.2	20.6	35.3	27.7	42.4	34.8	20.9	13.7
	11							19.7	11.3	26.8	18.4	33.9	25.5	41.0	32.6	22.9	32.6
	12							18.2	9.1	25.3	16.2	32.4	23.3	39.5	30.4	25.0	16.4
SR-T75	5	9.0	4.9													14.5	10.5
	6	6.8	1.8	16.9	11.9											17.4	12.7
	7			14.7	8.9	24.8	19.0	35.4	29.9							20.3	14.8
	8			12.4	5.8	22.5	15.9	32.5	25.9							23.2	16.9
	9					20.3	12.9	30.3	22.9	40.4	33.0					26.1	19.0
	10					18.1	9.8	28.1	19.8	38.2	29.9	48.3	40.0	58.3	50.0	29.1	21.1
	11							25.9	16.8	36	26.9	46.1	37.0	56.1	47.0	31.9	23.2
	12							23.7	13.7	33.8	23.8	43.9	33.9	53.9	43.9	34.7	25.3
SR-T83	5	14.2	6.6													23.0	15.8
	6	10.8	1.7	26.2	17.1											27.6	19.0
	7			22.9	12.3	3.8	27.7	56.2	46.2							32.2	22.1
	8			19.6	7.4	35.0	22.8	50.5	38.3							36.8	25.3
	9					31.6	18.0	47.1	33.5	62.5	48.9					41.4	28.5
	10					28.3	13.2	43.8	28.7	59.2	44.1	74.6	59.5	90.0	74.9	46.0	31.6
	11							40.5	23.8	55.9	39.2	71.3	54.6	86.7	70.0	50.6	34.8
	12							37.1	19.0	52.5	34.4	67.9	49.8	83.3	65.2	55.2	38.0

Actuator Output Torque (Nm)

Single acting actuator

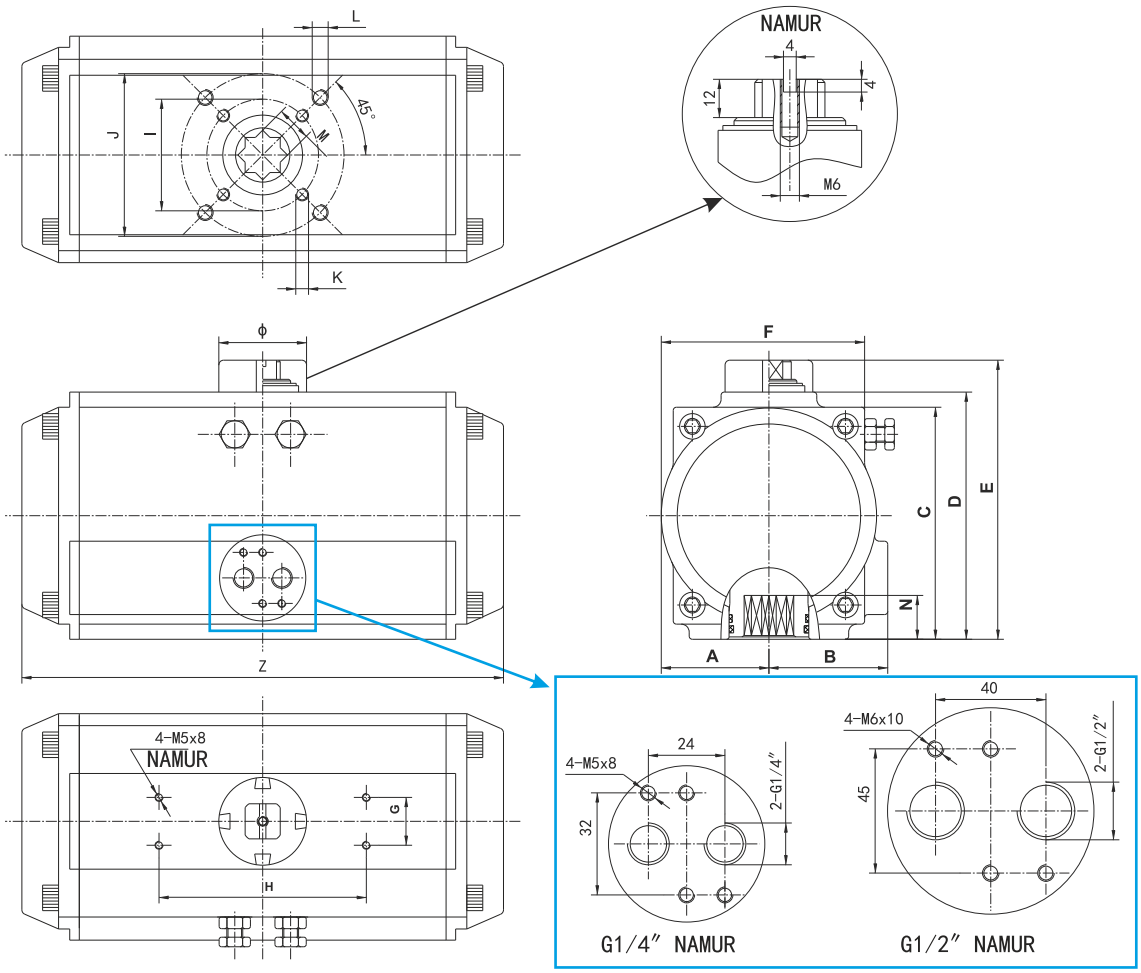
Model	Air pressure (bar)																	
		2		3		4		5		6		7		8		Spring Torque	
	Spring	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	90°	0°
	Qty.	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End
SR-T92	5	20	9													34	23
	6	15	2	38	24											41	28
	7			33	17	56	40	80	64							48	32
	8			28	10	51	33	74	55							55	37
	9					46	25	69	48	92	71					61	42
	10					41	18	64	41	87	63	110	86	132	109	68	46
	11							59	34	82	56	105	79	127	102	75	51
	12							54	26	77	49	100	72	122	95	82	56
SR-T105	5	32	14													49	31
	6	25	3	58	36											59	38
	7			52	26	85	59	121	96							68	44
	8			45	15	78	48	111	81							78	50
	9					71	38	104	71	137	104					88	56
	10					65	28	97	60	130	93	163	126	196	159	98	63
	11							91	50	124	83	156	116	189	149	108	69
	12							84	40	117	73	150	105	183	138	118	75
SR-T125	5	47	20													78	52
	6	36	4	87	55											94	62
	7			76	38	127	89	178	141							109	73
	8			65	22	116	73	167	124							125	83
	9					105	56	156	107	208	159					141	94
	10					94	40	145	91	197	143	248	194	299	245	156	104
	11							134	74	186	126	237	177	288	228	172	115
	12							123	58	175	110	226	161	277	212	188	125
SR-T140	5	84	39													129	85
	6	66	12	154	100											154	102
	7			136	73	224	161	308	247							180	120
	8			118	45	206	133	294	221							260	137
	9					188	106	276	194	363	281					232	154
	10					170	79	258	167	345	254	433	342	521	430	257	171
	11							240	140	327	227	415	315	503	403	283	188
	12							222	113	309	200	379	288	485	376	309	205
SR-T160	5	120	47													208	139
	6	90	3	224	137											250	168
	7			195	94	329	228	469	373							292	196
	8			165	50	299	184	432	317							333	223
	9					270	140	403	273	537	407					375	251
	10					241	96	374	229	508	363	641	496	775	630	417	279
	11							344	185	478	319	611	452	745	586	458	307
	12							315	141	449	275	582	408	716	542	500	335
SR-T190	5	220	105													293	190
	6	178	40	393	255											352	227
	7			385	190	566	405	784	631							410	265
	8			309	125	524	340	740	556							469	303
	9					482	275	698	491	913	706					527	341
	10					440	210	656	426	871	641	1087	857	1302	1072	586	379
	11							614	361	829	576	1045	792	1206	1007	645	417
	12							572	296	787	511	1003	727	218	942	703	455
SR-T210	5	237	126													360	260
	6	179	46	442	309											432	313
	7			384	23	647	493	908	754							503	365
	8			326	150	589	413	853	677							575	417
	9					531	333	795	597	1058	860					647	469
	10					473	253	737	517	1000	780	1263	1043	1526	1306	719	521
	11							679	437	942	700	1205	963	1468	1226	791	573
	12							621	357	884	620	1147	883	1410	1146	863	625
SR-T240	5	341	190													525	389
	6	255	73	642	460											630	467
	7			555	344	941	730	1349	1149							735	544
	8			469	227	855	613	1242	1009							840	622
	9					768	496	1155	883	1542	1270					945	700
	10					682	380	1069	767	1456	1154	1842	1540	2229	1927	1050	778
	11							983	650	1370	1037	1756	1423	2143	1810	1155	855
	12							896	533	1283	920	1669	1306	2056	1698	1260	933

Actuator Output Torque (Nm)

Single acting actuator

Model	Air pressure (bar)																	
		2		3		4		5		6		7		8		Spring Torque	
	Spring	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	90°	0°
	Qty.	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End
SR-T270	5	585	346													745	530
	6	467	181	1054	768											894	636
	7			937	602	1525	1190	2141	1823							1043	472
	8			819	437	1407	1025	1994	1612							1192	848
	9					1289	859	1876	1446	2463	2033					1341	954
	10					1171	694	1758	1281	2345	1868	2932	2455	3519	3042	1490	1060
	11							1640	1115	2227	1702	2814	2289	3401	2876	1639	1166
	12							1523	950	2110	1537	2697	2124	3284	2711	1788	1272
SR-T300	5	715	347													1061	730
	6	553	112	1316	875											1273	876
	7			1153	639	1916	1402									1485	1022
	8			991	403	1754	1166	2517	1929							1697	1168
	9					1592	930	2355	1693	3118	2456					1909	1314
	10					1430	695	2193	1458	2956	2221	3719	2984	4482	3747	2122	1460
	11							2030	1222	2793	1985	3556	2748	4319	3511	2334	1606
	12							1868	986	2631	1749	3394	2512	4157	3275	2546	1752
SR-T350	5	982	393													1702	1173
	6	721	15	1863	1157											2043	1408
	7			1602	779	2745	1922									2383	1642
	8			1341	401	2484	1544	3626	2686							2724	1877
	9					2224	1165	3366	2307	4508	3449					3064	2112
	10					1963	787	3105	1929	4247	3071	5390	4214	6532	5356	3405	2346
	11							2804	1551	3986	2693	5129	3836	6271	4978	3745	2581
	12							2584	1172	3726	2314	4869	3457	6011	4599	4086	2816
SR-T400	7	1215	56													2880	1837
	8			255	1225											3292	2100
	9			2259	768	3887	2396									3703	2362
	10			1967	311	3595	1939	5223	3567							4115	2624
	11					3303	1482	4931	3110	6559	4738					4526	2887
	12					3012	1025	4640	2653	6268	4281	7895	5908	9523	7536	4938	3149
	13							4348	2195	5976	3823	7603	5450	9231	7078	5349	3412
	14							4057	1738	5658	3866	7312	4993	8940	6621	5761	3674
	15							3765	1281	5393	2909	7020	4536	8648	6164	6172	3937
	16									5101	2452	6728	4079	8356	5707	6584	4199
SR-T450	4			4888	3235	7497	5844	10130	8452	12715	11061	15324	13670	17932	16279	4951	2937
	6			3420	2227	6028	3548	8637	6157	11246	8766	13855	11375	16464	13983	6886	4406
	8					4560	1252	7168	3861	9777	6470	12386	9079	14995	11688	9182	5875
	10							5698	1566	8307	4174	10916	6783	13525	9392	11478	7345
	12									6838	1879	9447	4488	12056	7096	13773	8814
SR-T500	4			7536	5985	11558	9010	15580	13032	19602	17054	23624	21076	27646	25098	7078	4530
	6			5271	2541	9293	5471	13315	9493	17337	13515	21359	17537	25381	21559	10617	6795
	8					7028	1932	11050	5954	15072	9976	19094	13998	23116	18020	14156	9060
	10							8785	2414	12807	6436	16829	10458	20851	14480	17696	11325
	12									10542	2897	14564	6919	18586	10941	21235	13590
SR-T600	4			11589	7670	17774	13855	23960	20041	30145	26226	36330	32410	42516	38596	10885	6966
	6			8106	4008	14290	8412	20476	14598	26661	20782	32846	26967	39032	33153	163328	10449
	8					10807	2968	16993	9154	23178	15339	29362	21524	35548	27710	21771	13933
	10							13509	3711	18694	9896	25879	16081	32065	22267	27214	17416
	12									16212	4454	22396	10639	28582	16825	32656	20899
SR-T700	4					26662	20783	39541	30062	45219	39340	54497	48618	63775	57896	16329	10450
	6					21436	12618	30715	21897	39993	31175	49271	40453	58549	49731	24494	15676
	8					16211	4453	25490	13732	34160	23010	44046	32288	53324	41566	32659	20901
	10							20264	5567	29542	14845	38820	24123	48098	33401	40824	26127
	12									24317	6681	33595	15959	42873	25237	48988	31352
SR-T800	4					46083	35922	62120	51958	78156	67994	94192	84031	110229	100068	28224	18062
	6					37051	21810	53088	37846	69123	53882	85160	69919	101197	85956	42336	27049
	8					28020	7698	44056	23734	60092	39770	76129	55807	92166	74844	56448	36126
	10							35024	9622	51060	25658	67096	41695	83133	57732	70560	45158
	12									42028	11546	58065	27583	74102	43620	84672	54189

Actuator Dimensions



Dimensions in mm

Model	A	B	C	D	E	F	G	H	I	J	K	L	M	N	Z	ϕ	Air Connection
T52	30.0	41.5	65.5	72.0	92.0	65.0	30	80	ϕ36	ϕ50	4-M5x8	4-M6x10	11	14	147	40	NAMUR G1/4"
T63	36.0	47.0	81.0	87.5	107.5	72.0	30	80	ϕ50	ϕ70	4-M6x10	4-M8x13	14	18	168	40	NAMUR G1/4"
T75	42.0	53.0	94.0	99.5	119.5	81.0	30	80	ϕ50	ϕ70	4-M6x10	4-M8x13	14	18	184	40	NAMUR G1/4"
T83	46.0	57.0	98.5	108.7	128.5	92.0	30	80	ϕ50	ϕ70	4-M6x10	4-M8x13	17	21	204	40	NAMUR G1/4"
T92	50.0	58.5	111.0	116.5	136.5	98.0	30	80	ϕ50	ϕ70	4-M6x10	4-M8x13	17	21	262	40	NAMUR G1/4"
T105	57.5	64.0	122.5	133.0	153.0	109.5	30	80	ϕ70	ϕ102	4-M8x13	4-M10x16	22	26	268	40	NAMUR G1/4"
T125	67.5	74.5	145.5	155.0	185.0	127.5	30	130	ϕ70	ϕ102	4-M8x13	4-M10x16	22	26	301	55	NAMUR G1/4"
T140	75.0	77.0	161.0	172.0	202.0	137.5	30	130	ϕ102	ϕ125	4-M10x16	4-M12x20	27	31	390	55	NAMUR G1/4"
T160	87.0	87.0	184.0	197.0	227.0	158.0	30	130	ϕ102	ϕ125	4-M10x16	4-M12x20	27	31	458	55	NAMUR G1/4"
T190	103.0	103.0	216.0	230.0	260.0	189.0	30	130	-	ϕ140	-	4-M16x25	36	50	525	80	NAMUR G1/4"
T210	113.0	113.0	235.5	255.0	255.0	210.0	30	130	-	ϕ140	-	4-M16x25	36	50	532	80	NAMUR G1/4"
T240	130.0	130.0	264.5	290.0	290.0	245.0	30	130	-	ϕ165	-	4-M20x25	46	60	602	80	NAMUR G1/4"
T270	147.0	147.0	299.0	330.0	330.0	273.0	30	130	-	ϕ165	-	4-M20x25	46	60	722	80	NAMUR G1/2"
T300	162.0	162.0	330.0	354.0	354.0	312.0	30	130	-	ϕ165	-	4-M20x25	46	60	820	80	NAMUR G1/2"
T350	190.0	190.0	383.0	410.0	440.0	362.0	30	130	-	ϕ165	-	4-M20x25	46	60	900	80	NAMUR G1/2"
T400	260.0	260.0	441.0	466.0	496.0	450.0	30	130	ϕ165	ϕ254	4-M20x25	4-M16x25	46	60	940	80	NAMUR G1/2"

Additional Technical Data

Model	T52	T63	T75	T83	T92	T105	T125	T140	T160	T190	T210	T240	T270	T300	T350	T400
Air volume opening (L)	0.11	0.2	0.29	0.41	0.62	0.94	1.47	2.43	3.65	5.9	7.4	10.7	16.9	23.8	35.1	52.6
Air volume closing (L)	0.14	0.23	0.38	0.55	0.91	1.18	1.85	3.2	5.03	7.9	9.7	14.3	22.5	29.7	46.3	36
Weight DA (kg)	1.4	2.1	2.7	3.2	4.6	6.8	8.9	13.3	20.2	31.3	46.8	67.3	97	110	186	289
Weight SR (kg)	1.5	2.3	2.9	3.6	5.3	8	10.1	15.6	24	35.3	54.8	80.2	118	130	234	360

Wide range of accessories

Limit switches
- Mechanical, proximity types
- IS, FP, WP, SIL
- Aluminium, SS, Resin enclosures

Air filter regulator (SS, Aluminium)

Solenoid valves
- 3/2 way, 4/2 way, 5/2 way
- Aluminium, Brass, SS body
- IS, FP, WP, SIL
- Auto reset, manual reset

Cable glands

Junction box

Manual override

Volume tank with accessories

Fire safe enclosure

Fire resistant jacket

Positioner

Position transmitter

Volume booster

Pilot operated valve

Quick exhaust valve

Flow control valve

Air lock relay

Non return valve

Pressure relief valve

Fusible plug

Bug screens, silencers

Local control panel

Tubing and fittings

Valve automation for quarter turn valves

Microfinish has proven expertise in valve automation technology and capabilities to offer complete systems. Our wide range of valves, actuators, controls, and accessories enables us to be a single source for integrated automated valve systems that include:

- Pneumatic, electric, hydraulic, and electro hydraulic actuated valves and systems
- Gas, and gas over oil automation systems
- On-off remotely operated valves with automation systems
- Emergency shutdown(ESD) valves with automation systems
- Vertical actuators for special applications
- Fire proof enclosures for actuators and accessories
- Compliance to ISO 5211 and Namur specifications

GLOBAL SALES OFFICES

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BARODA	0265 - 2987701 / 9574001348	salesbaroda@microfinishgroup.com
BENGALURU	080 - 29775863 / 23233999	salesbangalore@microfinishgroup.com
CHENNAI	044 - 45576723 / 7871990001	saleschennai@microfinishgroup.com
DELHI	0120 - 2510145 / 4258700 / 7065002286	salesdelhi@microfinishgroup.com
HYDERABAD	040 - 40273832 / 7997102345	saleshyd@microfinishgroup.com
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E-mail: sales@microfinishgroup.com Website: www.microfinishgroup.com

3DD029-B08 Rev 02

Y Valves

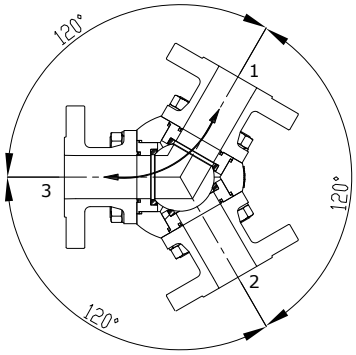
Diverters for the solid phase

MICROFINISH VALVES

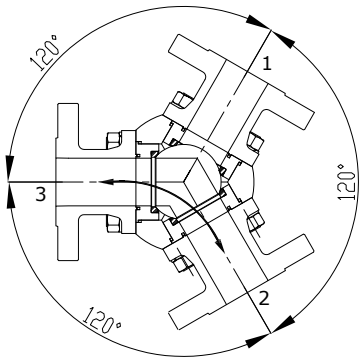
Quality you can trust.

Microfinish Y series

The new Y series valve is a unique addition to the Microfinish diverter floating ball valve line. With a distinctive design, the Y-pattern valve, with its compact design and 120 degree flow direction, excels in diverting within a single valve body. These 120 degree 3-way valves are used for diverting solids, highly viscous or slurry media in the petrochemical, chemical and the food and beverage industries. The Microfinish Y-pattern valve provides the optimal solution for diverting solid laden process streams, in a free flow diversion, all while reducing required space.



Position-1 (Flow from 3 to 1)



Position-2 (Counterclockwise rotation) flow from 3 to 2

Standards of compliance

- Size: 2" [DN50] – 8" [DN200]
- Pressure: Vacuum to Class 150 and Class 300
- Temperature: -46°C to 260°C [-50°F to 500°F]
- Connection: Flanged, Threaded, Welded ends
- Media: Crude oil, HDPE, PP, Fly ash, Slurry, Powder, Dough, Wax

Features

- Divert the flow to one of the downstream angled legs.
- Minimal areas for solids to accumulate reduces the likelihood of plugging in hydrocarbon streams that are prone to coke formation.
- Single 120 degree actuator required to automate.
- Cast construction WCB, WCC, LCB, LCC, CF8, CF8M (other materials upon request)
- Three seat floating ball valve construction
- Lockable design

Optional features

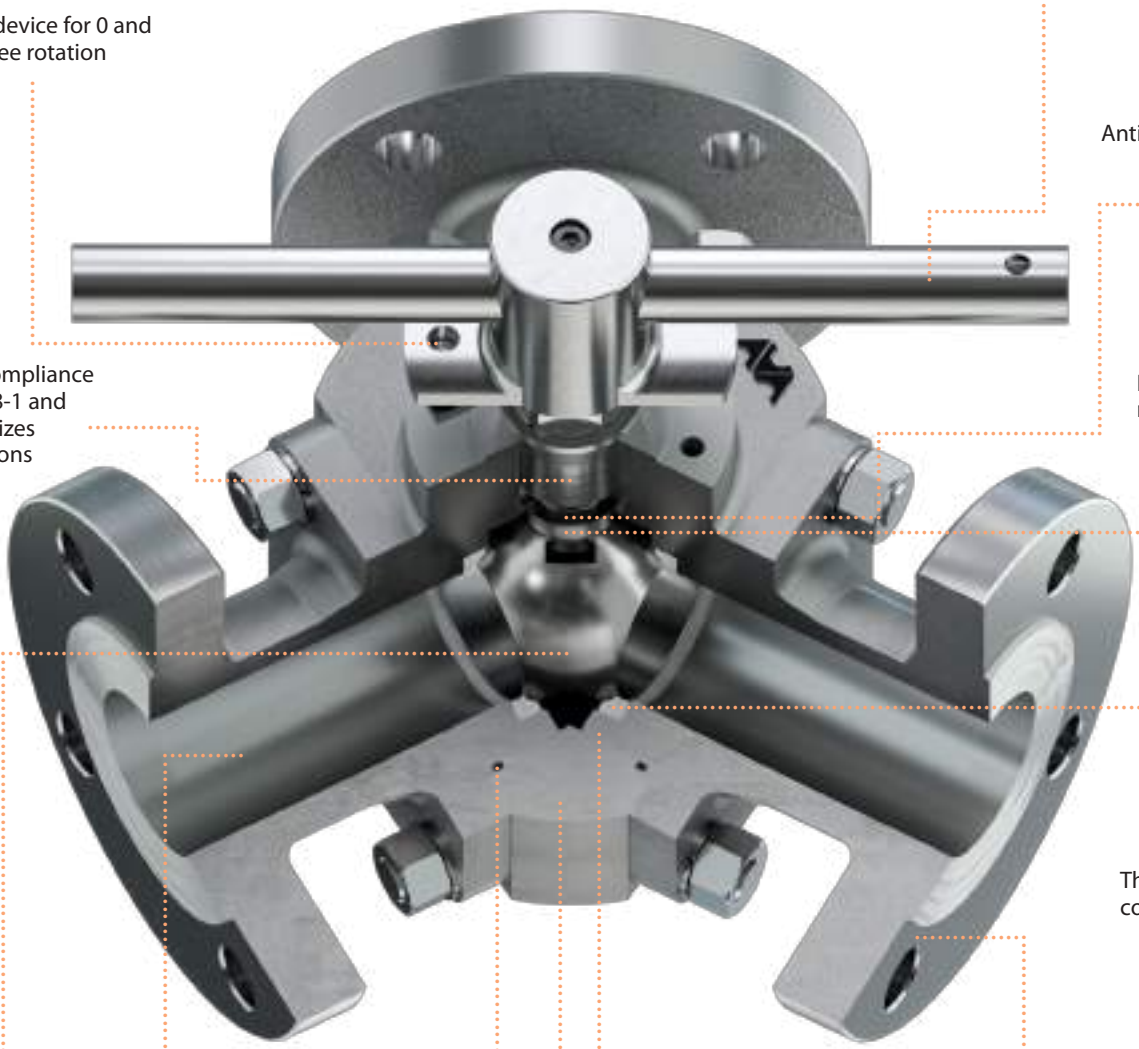
- Cryogenic design as per BS6364
- Chromium Carbide over Cobalt base metal seats
- Thermal jacket for highly viscous media

Standards of compliance

- Quality management system: ISO 9001-2015
- Valve design : ANSI B16.34; ISO 17292; API 608; API 6D / ISO 14313
- Testing for metallic valves: API 598; EN 12266-1; API 6D / ISO 14313
- Emission control: ISO 15848-1; API 641

Unique features

Y-Valve



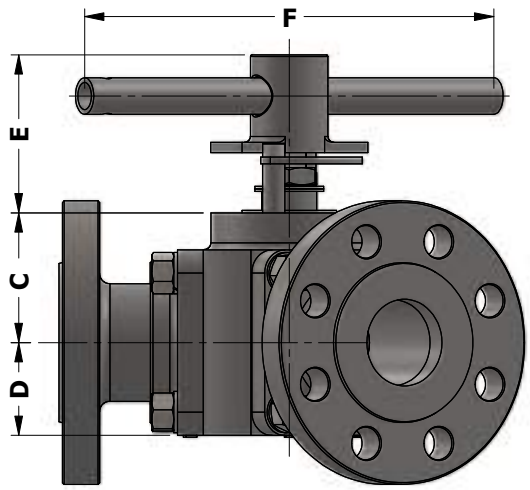
Y-Valve

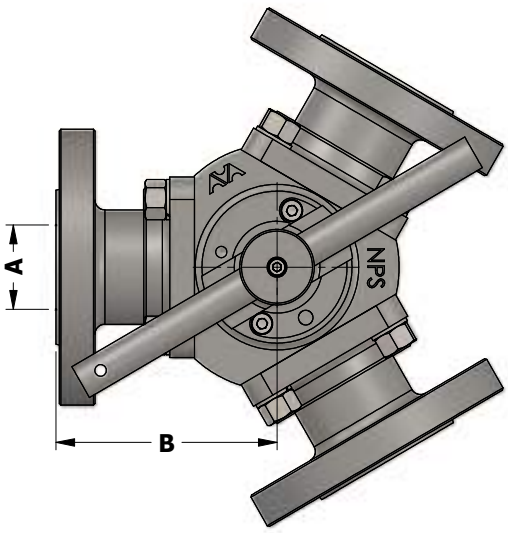
A71A3, A74A3 Series
Full bore, flanged class 150/300
NPS 2-8, DN50-DN200

Dimensional data

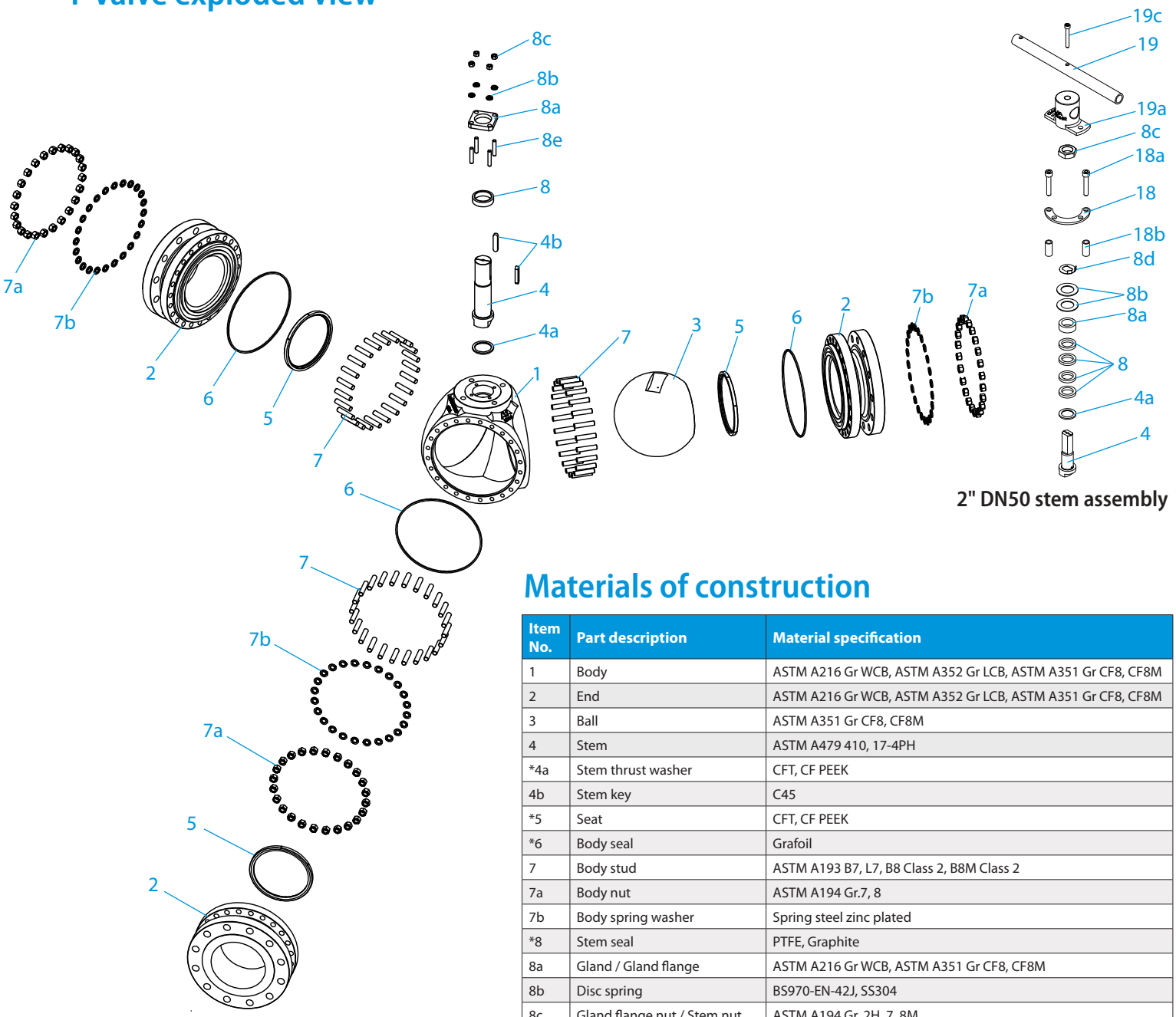
A71A3 - CLASS 150 FULL BORE FLANGED VALVE									
Valve size (DN/NPS)	**A**	**B**	**C**	**D**	**E**	**F**	**Trim number**	**Weight (Kg / lbs)**	**Kv / Cv**
DN50	50	89	100	54	92	320	22	16	335
2	1.97	3.50	3.94	2.13	3.62	12.60		35	387
DN80	76	101.5	135	89	-	-	30	55	818
3	2.99	4.00	5.31	3.50	-	-		121	946
DN100	102	114.5	154	116	-	-	40	104	1520
4	4.02	4.51	6.06	4.57	-	-		229	1757
DN150	152	197	194	152	-	-	48	186	3486
6	5.98	7.76	7.64	5.98	-	-		410	4029
DN200	203	228.5	206	172	-	-	60	295	6434
8	7.99	9.00	8.11	6.77	-	-		650	7438

A74A3 - CLASS 300 FULL BORE FLANGED VALVE									
Valve size (DN/NPS)	**A**	**B**	**C**	**D**	**E**	**F**	**Trim number**	**Weight (Kg / lbs)**	**Kv / Cv**
DN50	50	108	114	56	92	320	22	18	335
2	1.97	4.25	4.49	2.20	3.62	12.60		40	387
DN80	76	141.5	149	108	-	-	30	64	818
3	2.99	5.57	5.87	4.25	-	-		141	946
DN100	102	152.5	172	130	-	-	48	126	1520
4	4.02	6.00	6.77	5.12	-	-		278	1757
DN150	152	201.5	207	168	-	-	48	202	3486
6	5.98	7.93	8.15	6.61	-	-		445	4029
DN200	203	251	220.5	190.5	-	-	60	313	6434
8	7.99	9.88	8.68	7.50	-	-		690	7438





Y-Valve exploded view

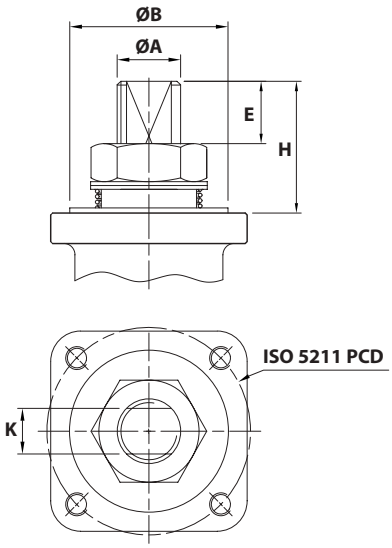


2" DN50 stem assembly

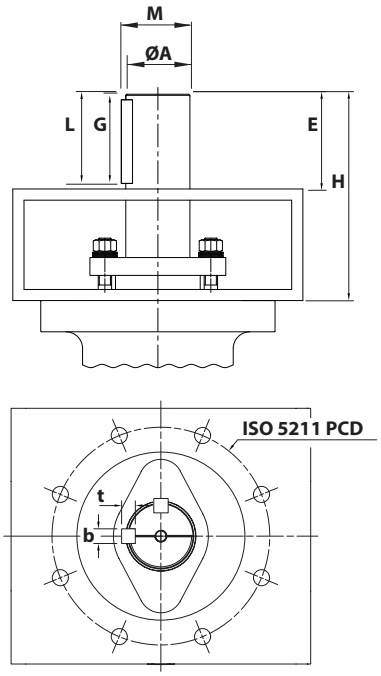
Materials of construction

Item No.	Part description	Material specification
1	Body	ASTM A216 Gr WCB, ASTM A352 Gr LCB, ASTM A351 Gr CF8, CF8M
2	End	ASTM A216 Gr WCB, ASTM A352 Gr LCB, ASTM A351 Gr CF8, CF8M
3	Ball	ASTM A351 Gr CF8, CF8M
4	Stem	ASTM A479 410, 17-4PH
*4a	Stem thrust washer	CFT, CF PEEK
4b	Stem key	C45
*5	Seat	CFT, CF PEEK
*6	Body seal	Grafoil
7	Body stud	ASTM A193 B7, L7, B8 Class 2, B8M Class 2
7a	Body nut	ASTM A194 Gr.7, 8
7b	Body spring washer	Spring steel zinc plated
*8	Stem seal	PTFE, Graphite
8a	Gland / Gland flange	ASTM A216 Gr WCB, ASTM A351 Gr CF8, CF8M
8b	Disc spring	BS970-EN-42J, SS304
8c	Gland flange nut / Stem nut	ASTM A194 Gr. 2H, 7, 8M
8d	Nut lock clip	SS304
8e	Gland flange stud	ASTM A193 B7, L7, B8 Class 2, B8M Class 2
16	Antistatic plunger (not shown)	SS304
16a	Antistatic spring (not shown)	SS304
17	Valve tag (not shown)	SS304
18	Locking disc	WCB
18a	Locking disc bolt	HT GR.12.9
18b	Locking disc bushing	CS Zinc plated
19	Handle	CS Zinc plated
19a	Handle adaptor	ASTM A216 Gr WCB
19b	Handle sleeve	PVC
19c	Adaptor bolt	C.st HT Gr 12.9
19d	Handle bolt	CS Zinc plated
19e	Handle bolt washer	CS Zinc plated

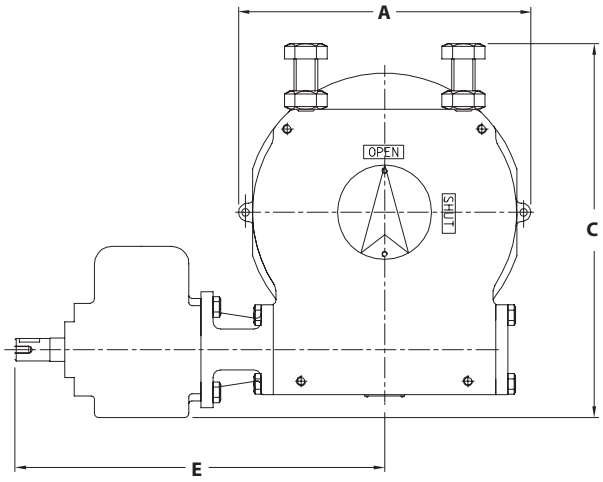
* Repair kit item



Trim 22 - Trim 48



TRIM 60



Gearbox top view

Top mounting dimensions and Maximum Allowable Stem Torque (MAST)

Trim number	ISO 5211 PCD	Unit	ØA	ØB	E	K	H	Unit	M.A.S.T. 17-4PH	M.A.S.T. XM-19
22	F07	mm	M20X2P	55.0	15.0	14.0	50	N-m	337	189
		inch		2.165	0.591	0.551	1.969	lbf-in.	2983	1673
30	F10	mm	24.5	70.0	25.0	19.0	62.0	N-m	1048	587
		inch	0.965	2.756	0.984	0.748	2.441	lbf-in.	9274	5192
40	F12	mm	32	85.0	30.0	22.0	70.0	N-m	2662	1491
		inch	1.260	3.346	1.181	0.866	2.756	lbf-in.	23561	13196
48	F14	mm	44.8	100.0	35.0	36.0	84.0	N-m	4420	2475
		inch	1.764	3.937	1.378	1.417	3.307	lbf-in.	39120	21903

Trim number	ISO 5211 PCD	Unit	ØA	E	G	H	L	M	b	t	Unit	M.A.S.T. 17-4PH	M.A.S.T. XM-19
60	F16	mm	57.5	85.0	75.0	185.0	80.0	61.5	16.0	10.0	N-m	11723	6565
		inch	2.264	3.346	2.953	7.283	3.150	2.421	0.630	0.394	lbf-in.	103757	58102

Gearbox dimensions and selection

Trim number	ISO 5211 PCD	Unit	A	C	E	Gear Height	Shaft diameter	Hand wheel diameter	Drive bore diameter	Weight (Kg / lbs)	Maximum input torque (Nm / lbf-in)	Maximum output torque (Nm / lbf-in)
30	F10	mm	88	116	153	62	16	250	30	3.20	44	440
		inch	3.465	4.567	6.024	2.441	0.630	9.843	1.181	7.05	389	3894
40	F12	mm	127	158	199	79	20	450	35.5	8.00	89	981
		inch	5.000	6.220	7.835	3.110	0.787	17.717	1.398	17.64	789	8683
48	F14	mm	230	249	254	107	20	550	43.5	22.00	202	3236
		inch	9.055	9.803	10.000	4.213	0.787	21.654	1.713	48.50	1790	28641
60	F16	mm	265	288	256	114	20	600	57.5	34.00	98	4905
		inch	10.433	11.339	10.079	4.488	0.787	23.622	2.264	74.96	868	43413

Build your Y valve code

BV 2" DN50 A74A3-1492GG-0RAL-000-000

BV	2" DN50	A	74	A3	-	1	4	9	2	G	G	-
Type	Size	Model	Class	Port size / Construction		Body / End	Ball	Stem	Seat	Stem seal	Body seal	

O	R	A	L	-	00	-	0	-	000
Features	End connection	Bonnet / Ext / Pad	Operator		Special testing		Special construction or assembly		Trim metal treatment

Type	Size NPS	Size MM
BV	**2"-8"**	**DN50-DN200**

Model	
A	**Std. temperature -29° C ≤ T ≤ +204° C**
V	Eleveted temp. -29° C ≤ T ≤ +260° C
H	High temperature -29° C ≤ T ≤ +540° C
L	Low temperature -49° C ≤ T ≤ +204° C
P	Low temperature -100° C ≤ T ≤ +204° C
W	Low and elevated temp. -49° C ≤ T ≤ +260° C
C	Cryogenic temp. -196° C ≤ T ≤ +150° C
M	Metal seats

Class	
71	**#150**
74	**#300**

Port size / Construction	
A3	**Y-Valve / 120° Diverter / Full bore**

Body / End	
1	**WCB**
2	CF8
4	CF8M
9	LCB
F	CD3MN A995 4A
G	CE3MN A995 5A
H	CD3MWCuN A995 6A
U	CD4MCuN A995 1B

Ball	
2	CF8 - 304
4	**CF8M - 316**
F	CD3MN A995 4A
G	CE3MN A995 5A
H	CD3MWCuN A995 6A
U	CD4MCuN A995 1B

Stem	
5	Nitronic 50 (XM19)
9	17-4PH (H1150D)
E	**SS410**
F	Duplex 2205 (UNS 31803)
G	Super duplex 2507
H	Super duplex (UNS 32760)

Seat	
2	TFM
3	**CFT (CF PTFE)**
4	DEVLON
5	PEEK (VIRGIN)
6	PCTFE
7	RTFM (CF TFM)
8	CF PEEK

Metal seat	
E	F6A / SS 410 / CA15
F	Duplex 2205 (UNS 31803)
Y	CF8 SS304 F304
Z	CF8M SS316 F316

Stem seal	
3	**CFT (CF PTFE)**
G(1)	Graphite
H	Graphite Cup-n-Cone
P	CFT Cup-n-Cone
S	PTFE Cup-n-Cone
T	Virgin PTFE

Body seal	
1	Viton FKM O-ring
3	NBR O-ring
5	HNBR O-ring
7	EPDM O-ring
G(1)	**Graphite**
T	**Virgin PTFE**

Features	
0	Non-Fire Safe
F	Fire safe to atmosphere

End connection	
A	NPT
B	BSPT
C	Socket-Weld-End (SWE)
K	BW Sch. 10
L	BW Sch. 40
R	**RF Flange**
S	Flat face flange
U(2)	Extended-pups BW Sch. 10
V(2)	Extended-pups BW Sch. 40
Z(2)	Extended-pups SW

Bonnet / Extension / Valve pad	
A	**ISO 5211 pad**
C	Cryogenic bonnet BS6364 (10 inch / 250 MM)
D	Cryogenic bonnet BS6364 Cold box
E	Extension 10 inch / 250 mm

Operator	
B	Bare stem
C	Lever
D	Pneumatic actuator and manual override
E	Electric actuator
G	Gear
K	Lockable gear
L	**Lockable lever**
P	Pneumatic actuator

Special testing			
0	**None**	**0**	**None**
1	Positive Material Identification (PMI)	1	Impact test @ -1° C
2	Radiographic Test (RT)	2	Impact test @ -29° C
3	Ultrasonic Test (UT)	3	Impact test @ -49° C
4	Die Penetrat (DP)	4	Impact test @ -101° C
		5	Impact test @ -196° C
		6	Class VI metal seat leak rate
		8	Helium Test (HT)

Special construction or assembly	
0	**None**
C	Special cleaning for Oxygen service
H	Valve with counter slip-on flange fasteners and gasket
J	Valve with counter weld-neck flange fasteners and gasket

Trim metal treatment			
Ball		**Seat**	**Stem**
0	**None**		
E	ENP 25 micron		
F	ENP 50 micron		
N	ENP 75 micron		
H	Nitrid hardening		
S	Stellite		
T	Tungsten carbide (HVOF)		
C	Chromium carbide (HVOF)		

(1) Graphite body seal material shall be selected for fire safe valve.
(2) Default pups-end is 2 times DN.

Note (1) : **Bold mark font** indicates standard price list, short delivery item.

MICROFINISH VALVES

Quality you can trust.

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3DD029-B11-R01-25012021

Cryogenic Valves

MICROFINISH VALVES

Quality you can trust.

Cryogenic Valves

Cryogenic service in industrial valve applications is defined as at or below -50°C (-58° F). Liquefied Natural Gas (LNG), Liquid Oxygen (LOX), Liquid Nitrogen (LN2) are some common cryogens handled by cryogenic service valves.

The challenge involved in the design of cryogenic valves is immense. The valve must function properly at pressures as high as ASME Class 2500 and at temperatures as low as -269°C (-452°F). The design starts with selecting the materials suitable for extremely low temperatures; then determining the dimensions of pressure containing parts and trim elements. Precise tolerances are set for those parts to be subjected to thermal shock and shrinkage. Furthermore some cryogens such as LOX and LNG are flammable; so the valve must be designed to be fire safe as specified in API 607 and ISO 10497 standards.

Microfinish has worked with EPC and end user companies for more than 30 years and earned a reputation for quality and reliability in its comprehensive range of valve products. It has established an extensive installed base of cryogenic valves and automation packages for ethylene plants, Air Separation Units (ASU), and the entire LNG value chain.

Standards of compliance

Factory certification:

- ISO 9001-2015 Quality management system

Valve design and tests:

- ANSI B16.34; ISO 17292; API 608; API 6D / ISO 14313
- BS 6364 Specification for valves for cryogenic service
- ISO 28921-1 Industrial valves: isolating valves for low temperature applications (optional)
- EN 12266-1; API 598 Testing of metallic valves
- API 6FA; API 607; ISO 10497 Testing of valves to fire type-testing requirements
- ISO 15848-1 measurement, test and qualification procedures for fugitive emissions
- API 641 Type Testing of Quarter-turn Valves for Fugitive Emissions

Serving the entire LNG value chain

Our Technology

Design

Microfinish introduced to the market a distinctive design of trunnion mounted ball valve for cryogenic service. The design is built as per BS6364 and API 6D, DIB-2 configuration. With the valve in its closed position, both upstream and downstream seats work in tandem to block in-line leak. Cavity pressure build-up, due to thermal expansion, is released safely through the upstream SPE seat design. Microfinish's proven valve design can increase significantly the MTTF and MTBF of trunnion mounted valves in extreme cryogenic temperature conditions, and hence maximizes plant productivity and site safety.

Cleaning

Microfinish cleaning procedures are in full compliance with the following international standards and corporate specifications: CGA G-4.1, ASTM A380/A380M; EIGA 33.06; Linde standard LS 141-47 part 1 and 2; Linde standard LS 031-6X7; Praxair standard GS-38 and GS-40; and Reliance standard spec No.100080-1-SS-PP-004-Part IV App. B and E. Microfinish's verified and repeatable cleaning process including 100% cleaning inspection eliminates hydrocarbon, oil, grease, metal chips and other ignition hazards that can be introduced by a deburring process or shop dirt.

Assembly

Valves are assembled in an oil free zone. This designated area is equipped with dedicated clean tools. Valve assembly is done by trained personnel who are qualified for this particular task. The employees wear clean working clothes and latex gloves throughout the complete process of assembly, testing, and packing the final product in a clean plastic bag ready for shipping.

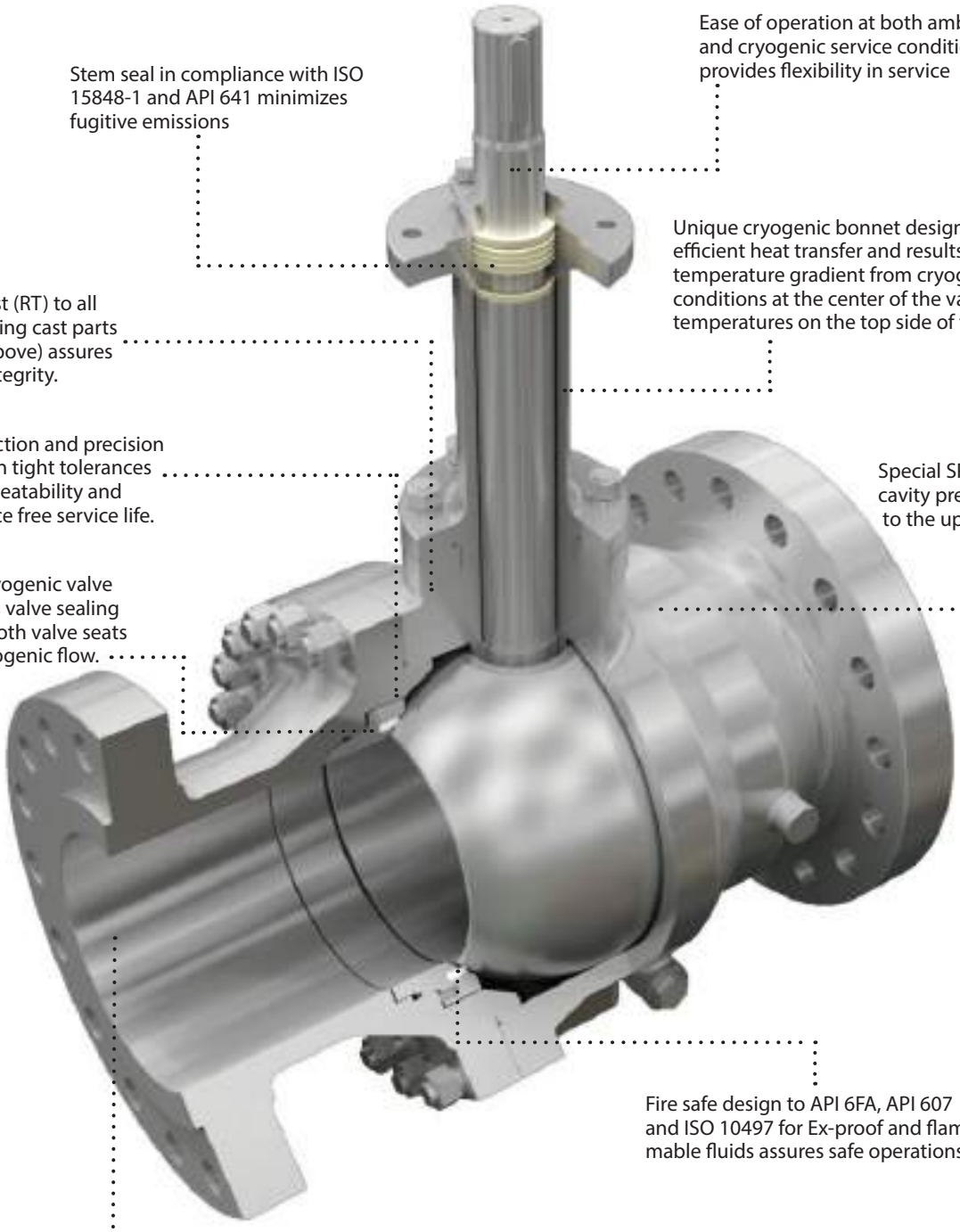
Testing

The complete assembled cryogenic valve is meticulously tested to meet EN 12266-1, API 598, ISO 5208, and API 6D standards including:

- Hydrostatic shell test at 1.5 times the valve pressure rating, before the cleaning process commences.
- In-line seat test using 99.999% clean compressed nitrogen at 1.1 times the valve pressure rating.
- Functional test using the method in EN 1779 with vacuum technique: A.3 helium leakage ≤ 1E-6 Pa mm^3/sec
- All pressure containing cast parts rated class 600 and above, and all welded parts are tested radiographically as per ASME B16.34 standard for severe cyclic service.
- Cryogenic test service in compliance with BS 6364 standard is available in-house upon request.
- Additional in-house optional tests are listed in the 'build your cryogenic valve code' section of this Catalog.

Unique features

Trunnion mounted cryogenic ball valve



Stem seal in compliance with ISO 15848-1 and API 641 minimizes fugitive emissions

Ease of operation at both ambient and cryogenic service conditions provides flexibility in service

Unique cryogenic bonnet design allows efficient heat transfer and results in a steep temperature gradient from cryogenic service conditions at the center of the valve to ambient temperatures on the top side of the bonnet.

Radiographic Test (RT) to all pressure containing cast parts (Class 600 and above) assures valve envelop integrity.

Durable construction and precision machining within tight tolerances leads to high repeatability and long maintenance free service life.

Special SPE seat relieve cavity pressure build-up to the upstream side.

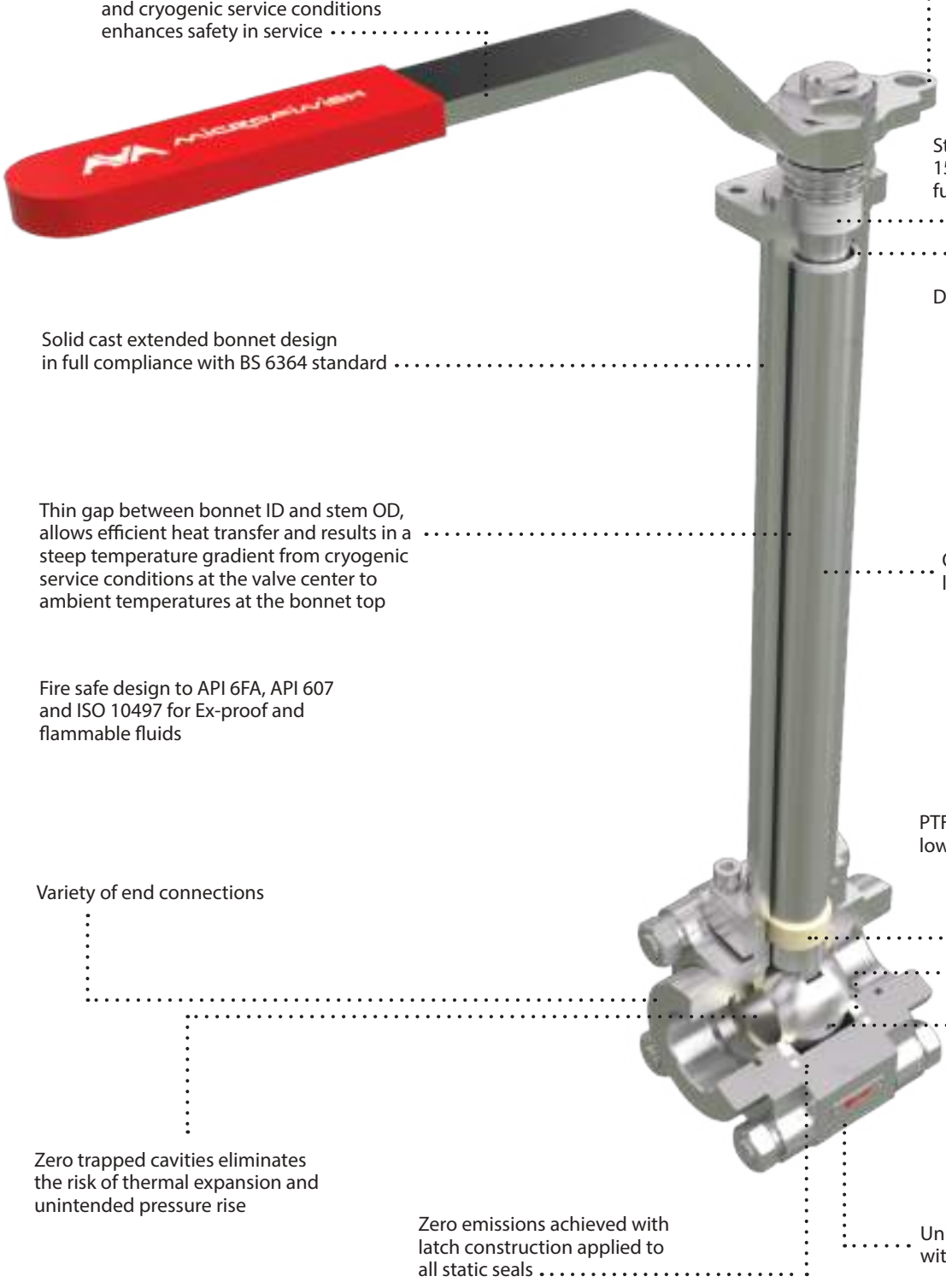
Unique DIB-2 cryogenic valve design enhances valve sealing capabilities, as both valve seats block in-line cryogenic flow.

Fire safe design to API 6FA, API 607 and ISO 10497 for Ex-proof and flammable fluids assures safe operations

High level of cleanliness reduces the risk of ignition in flammable service.

Unique features

Cryogenic floating ball valve



Integral locking mechanism

Ease of operation at both ambient and cryogenic service conditions enhances safety in service

Stem seal in compliance with ISO 15848-1 and API 641 minimizes fugitive emissions

Durable PCTFE or CFT thrust washer

Solid cast extended bonnet design in full compliance with BS 6364 standard

Thin gap between bonnet ID and stem OD, allows efficient heat transfer and results in a steep temperature gradient from cryogenic service conditions at the valve center to ambient temperatures at the bonnet top

One-size-up stem endures high load at extreme conditions

Fire safe design to API 6FA, API 607 and ISO 10497 for Ex-proof and flammable fluids

PTFE guide bearing for smooth and low torque operation

Variety of end connections

PCTFE or CFT seat material

Cavity relief hole faces upstream in the closed position

Zero trapped cavities eliminates the risk of thermal expansion and unintended pressure rise

Zero emissions achieved with latch construction applied to all static seals

Unidirectional valve labeled with a distinctive arrow flow tag

Our range

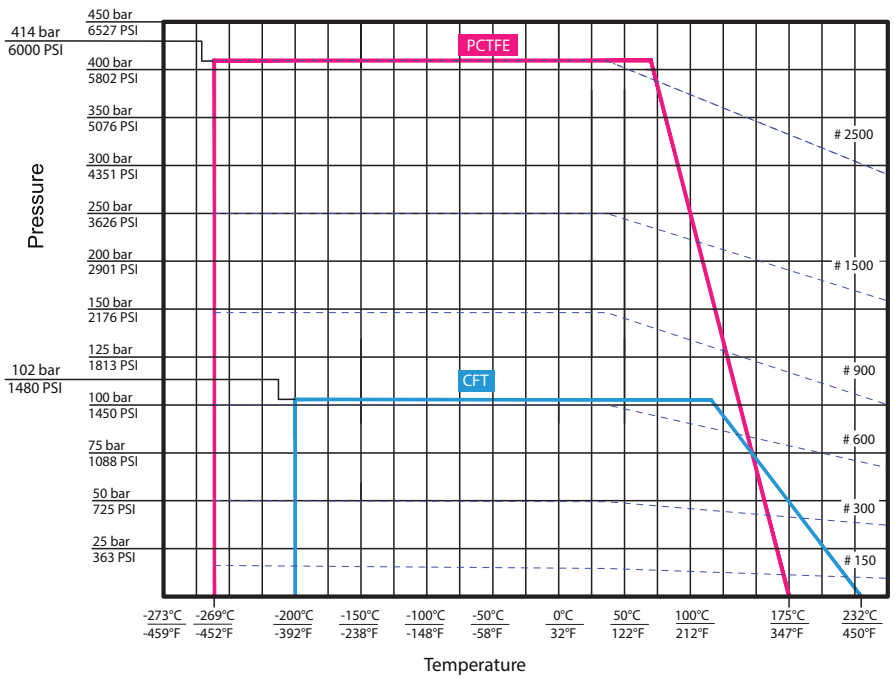
Trunnion mounted ball valves for cryogenic service

Series	Pressure class	Full port size range		Construction	End connections
CT84	150	2"-36"	DN50-DN900	API 6D DIB-2; full, reduced, and double reduced bore; two and three piece;	Butt-Weld, Socket-Weld, flanged
CT85	300	2"-36"	DN50-DN900		
CT87	600	2"-36"	DN50-DN900		
CT89	900	2"-24"	DN50-DN600		
CT90	1500	2"-24"	DN50-DN600		
CT91	2500	2"-12"	DN50-DN300		

Floating ball valves for cryogenic service

Series	Pressure class	Full port size range		Construction	End connections
C84	150	1/2"-10"	DN15-DN250	Full bore and reduced bore; one and two piece design	Flanged
C85	300	1/2"-10"	DN15-DN250		
		2"-6"	DN50-DN150	Full bore and reduced bore; three piece design	Threaded, Butt-Weld, Socket-Weld, flanged
C87	600	1/2"-2"RP	DN15-DN50RP		
		1/2"-4"	DN15-DN100	Full bore and reduced bore; one and two piece design	Flanged
C89	900	1/2"-2"	DN15-DN50	Full bore and reduced bore; three piece design	Threaded, Butt-Weld, Socket-Weld, flanged
C90/C91	2500/ 1500	1/2"-2"	DN15-DN50		

Pressure-Temperature (P-T) chart for PCTFE (KEL-F) and Carbon Filled TFE (CFT) seat material



PCTFE

CFT

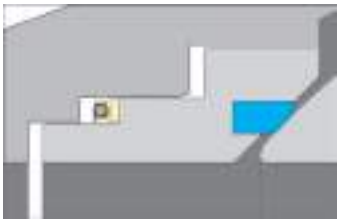
The Pressure - Temperature rating of a ball valve is limited by either the valve rating or the seat capability.

DIB-2 cryogenic trunnion mounted valve

Single Piston Effect (SPE) seats

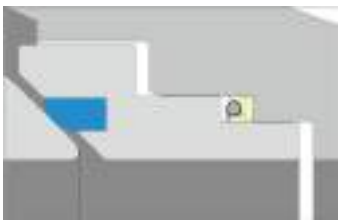
Most trunnion mounted ball valves in industry are based on double-block-and-bleed (DBB) designs. Two identical seats are assembled symmetrically on the upstream and downstream sides of the ball to create a bi-directional valve. With the ball in the closed position both seats block in-line flow into the valve cavity, hence creating a perfectly insulated barrier at atmospheric pressure between the upstream and downstream lines.

In the event of build-up of pressure in the valve cavity the seats are designed to yield and relieve excess pressure in-line. This safety feature is critical, especially in services which are sensitive to thermal expansion such as all cryogenic applications. For example: LNG at -162° C occupies about 1/600th the volume of natural gas in the gaseous state. Another way to look at it is: LNG in a closed vessel at 1 bar pressure will vaporise to **600 bar** pressure in the gaseous state!



SPE Seat

The drawback of the SPE design is that it is relies on only one upstream seat to block in-line flow. In the event of seat damage a leak into the cavity will build sufficient pressure to push the downstream seat backwards. This will disconnect the ball seat sealing surface resulting in free flow in-line.



DPE Seat

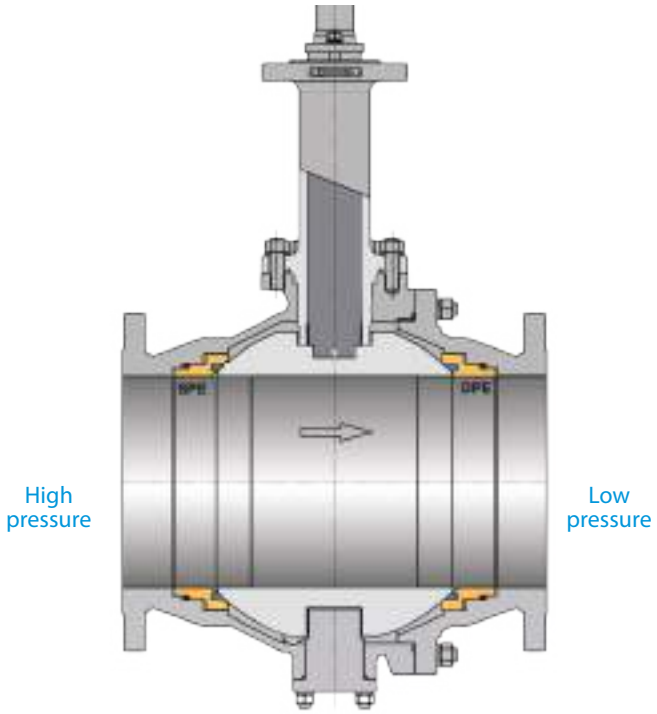
Double Piston Effect (DPE) seat

The DPE seat design is used rarely in industry because it has no integral mechanism for relieving build-up of cavity pressure. A valve with DPE seats will normally include an external pressure relief mechanism for the valve cavity. In the event of excess pressure the cavity contents will be released to the environment creating a concern for safety. On the positive side, valves with DPE seats dramatically extend the life time in service. This is because both upstream and downstream seats are working to block in-line leaks. Even when the upstream seat is damaged, the downstream seat will act as a secondary backup to block the leak.

Microfinish cryogenic DIB-2 valve design

Microfinish has created a superior design as a combination of an SPE seat design on the valve high pressure (HP) side and a DPE seat design on the valve low pressure (LP) side. This creates an optimal design for cryogenic service because it includes the advantages and eliminates the disadvantages of both SPE and DPE designs.

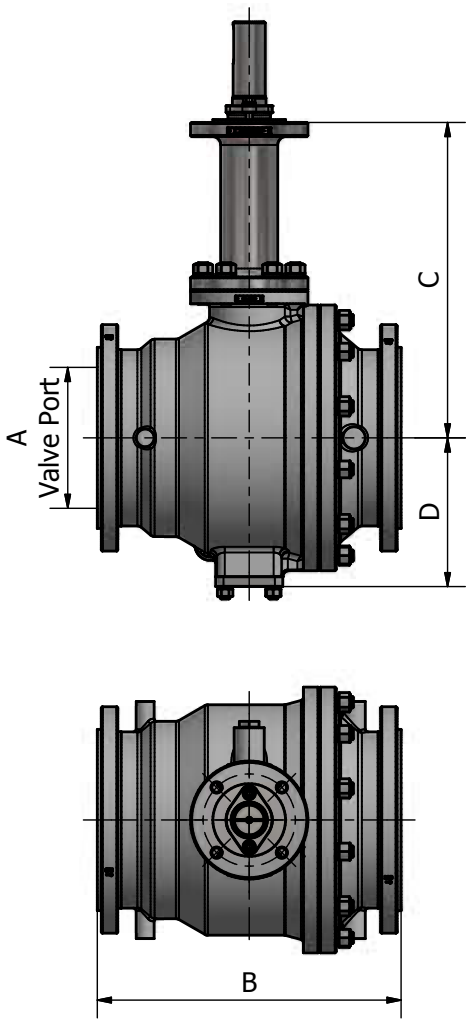
In normal conditions with the valve in its closed position, both SPE seat and DPE seat work in tandem to block in-line cryogen flow. The Mean-Time-To-Failure (MTTF) and overall reliability of the valve are dramatically increased. In the event of build-up of cavity pressure, the SPE seat on the HP side performs exactly like a pressure relief mechanism to release excess pressure. The relief direction is always to the HP side, and not randomly directed to either side as in a DBB design.



DIB-2 cryogenic valve design

Trunnion mounted cryogenic ball valve

CT84F2, CT85F2, CT87F2 Series
Full bore, two piece, flanged class 150 / 300 / 600
NPS 2-16, DN50-DN400



Dimensional data

CT84F2 - CLASS 150 FULL PORT TWO PIECE SERIES

Valve size (DN/NPS)	A	B		C	D	Trim number	Weight (kg / lb)	Kv / Cv
		Short Ptn.	Long Ptn.					
DN50	49	178	-	369	92	22DD	17	402
2	1.93	7.01	-	14.53	3.62		37	465
DN80	74	203	-	415	111.5	30DD	26	1023
3	2.91	7.99	-	16.34	4.39		57	1183
DN100	100	229	-	425	125	30DD	42	1826
4	3.94	9.02	-	16.73	4.92		93	2111
DN150	150	-	394	470.5	171	40	65	4299
6	5.91	-	15.51	18.52	6.73		143	4970
DN200	201	-	457	519.5	215	48	176	7964
8	7.91	-	17.99	20.45	8.46		388	9207
DN250	252	-	533	546	248.5	60	295	12863
10	9.92	-	20.98	21.50	9.78		650	14869
DN300	303	-	610	600.5	301	60	405	18596
12	11.93	-	24.02	23.64	11.85		893	21497
DN350	334	686	-	678.8	340.5	68	624	22595
14	13.15	27.01	-	26.72	13.41		1376	26120
DN400	385	762	-	696.5	379.5	68	810	31249
16	15.16	30.00	-	27.42	14.94		1786	36123

CT85F2 - CLASS 300 FULL PORT TWO PIECE SERIES

Valve size (DN/NPS)	A	B		C	D	Trim number	Weight (kg / lb)	Kv / Cv
		Short Ptn.	Long Ptn.					
DN50	49	216	-	369	92	22DD	22	402
2	1.93	8.50	-	14.53	3.62		49	465
DN80	74	283	-	415	111.5	30DD	39	1023
3	2.91	11.14	-	16.34	4.39		86	1183
DN100	100	305	-	431	132	30DD	48	1826
4	3.94	12.01	-	16.97	5.20		106	2111
DN150	150	403	-	470.5	173.5	40	70	4299
6	5.91	15.87	-	18.52	6.83		154	4970
DN200	201	-	502	519.5	215	48	210	7964
8	7.91	-	19.76	20.45	8.46		463	9207
DN250	252	-	568	564	284.5	60	385	12863
10	9.92	-	22.36	22.20	11.20		849	14869
DN300	303	-	648	644	318.5	60	490	18596
12	11.93	-	25.51	25.35	12.54		1080	21497
DN350	334	762	-	687.5	340.5	68	860	22595
14	13.15	30.00	-	27.07	13.41		1896	26120
DN400	385	838	-	707	404.5	68	1045	31249
16	15.16	32.99	-	27.83	15.93		2304	36123

CT87F2 - CLASS 600 FULL PORT TWO PIECE SERIES

Valve size (DN/NPS)	A	B Long Ptn.	C	D	Trim number	Weight (kg / lb)	Kv / Cv
DN50	49	292	388	92	22DD	26	402
2	1.93	11.50	15.28	3.62		57	465
DN80	74	356	415	118.5	30DD	58	1023
3	2.91	14.02	16.34	4.67		128	1183
DN100	100	432	430.5	141	30DD	90	1826
4	3.94	17.01	16.95	5.55		198	2111
DN150	150	559	481.5	176	48	160	4299
6	5.91	22.01	18.96	6.93		353	4970
DN200	201	660	528.5	227	60	340	7964
8	7.91	25.98	20.81	8.94		750	9207
DN250	252	787	607.5	280.5	68	650	12863
10	9.92	30.98	23.92	11.04		1433	14869
DN300	303	838	644	318.5	82	820	18596
12	11.93	32.99	25.35	12.54		1808	21497
DN350	334	889	692	370.5	82	1150	22595
14	13.15	35.00	27.24	14.59		2535	26120
DN400	385	991	721	404.5	90	1650	31249
16	15.16	39.02	28.39	15.93		3638	36123

(1) For top mounting dimensions and MAST values please refer to pages 16,17

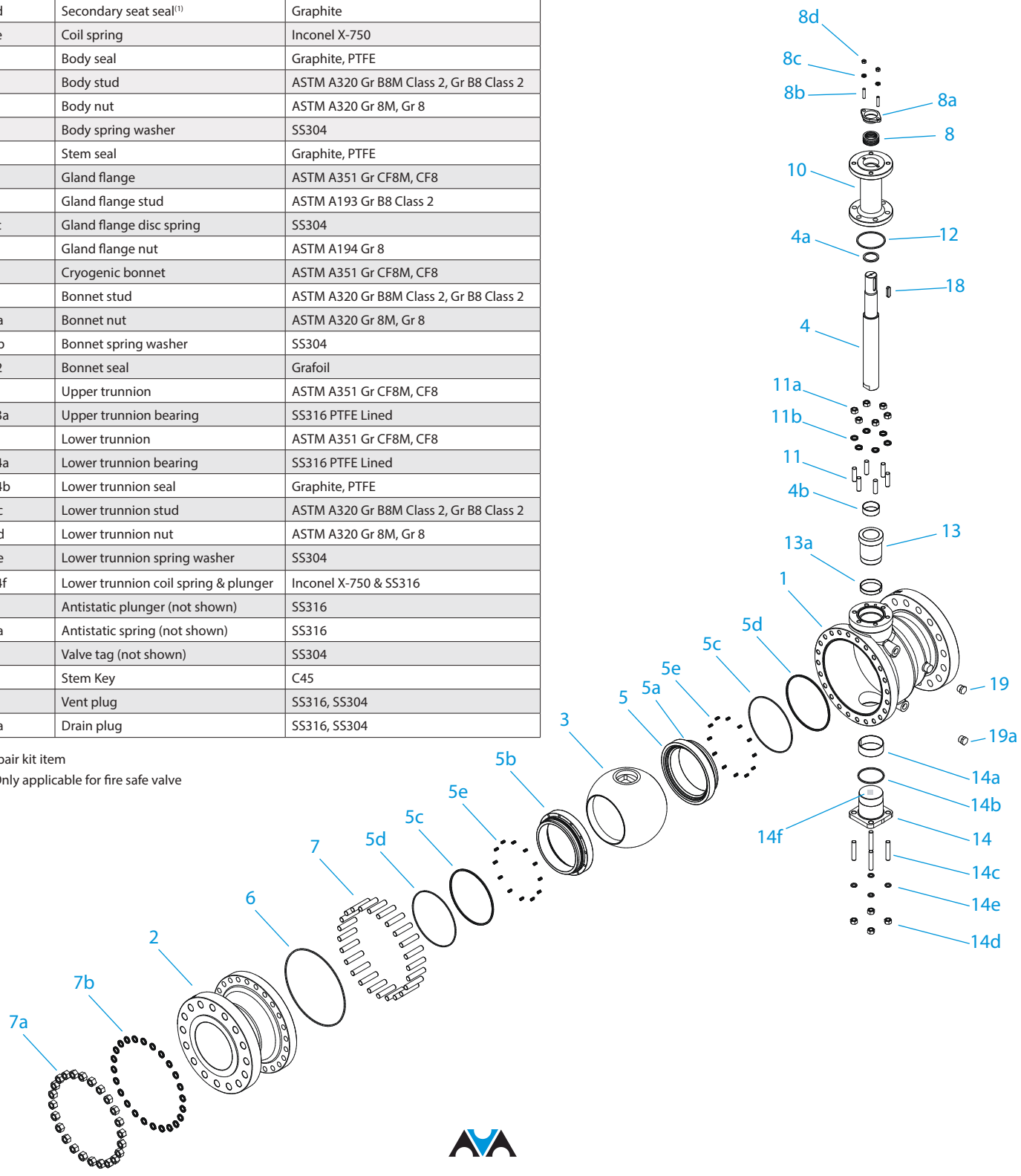
Materials of construction

Item No.	Part description	Material specification
1	Body	ASTM A351 Gr CF8M, CF8
2	End	ASTM A351 Gr CF8M, CF8
3	Ball	ASTM A351 Gr CF8M, CF8
4	Stem	Nitronic XM-19
*4a	Stem thrust washer	PCTFE, CFT
*4b	Stem bearing	SS316 PTFE Lined
*5	Seat insert	PCTFE, CFT
*5a	Upstream seat retainer (SPE)	ASTM A351 Gr CF8M, CF8
*5b	Downstream seat retainer (DPE)	ASTM A351 Gr CF8M, CF8
*5c	Seat seal	PTFE (Lip seal)
*5d	Secondary seat seal(1)	Graphite
*5e	Coil spring	Inconel X-750
6	Body seal	Graphite, PTFE
7	Body stud	ASTM A320 Gr B8M Class 2, Gr B8 Class 2
7a	Body nut	ASTM A320 Gr 8M, Gr 8
7b	Body spring washer	SS304
*8	Stem seal	Graphite, PTFE
8a	Gland flange	ASTM A351 Gr CF8M, CF8
8b	Gland flange stud	ASTM A193 Gr B8 Class 2
*8c	Gland flange disc spring	SS304
8d	Gland flange nut	ASTM A194 Gr 8
10	Cryogenic bonnet	ASTM A351 Gr CF8M, CF8
11	Bonnet stud	ASTM A320 Gr B8M Class 2, Gr B8 Class 2
11a	Bonnet nut	ASTM A320 Gr 8M, Gr 8
11b	Bonnet spring washer	SS304
*12	Bonnet seal	Grafoil
13	Upper trunnion	ASTM A351 Gr CF8M, CF8
*13a	Upper trunnion bearing	SS316 PTFE Lined
14	Lower trunnion	ASTM A351 Gr CF8M, CF8
*14a	Lower trunnion bearing	SS316 PTFE Lined
*14b	Lower trunnion seal	Graphite, PTFE
14c	Lower trunnion stud	ASTM A320 Gr B8M Class 2, Gr B8 Class 2
14d	Lower trunnion nut	ASTM A320 Gr 8M, Gr 8
14e	Lower trunnion spring washer	SS304
*14f	Lower trunnion coil spring & plunger	Inconel X-750 & SS316
16	Antistatic plunger (not shown)	SS316
16a	Antistatic spring (not shown)	SS316
17	Valve tag (not shown)	SS304
18	Stem Key	C45
19	Vent plug	SS316, SS304
19a	Drain plug	SS316, SS304

* Repair kit item

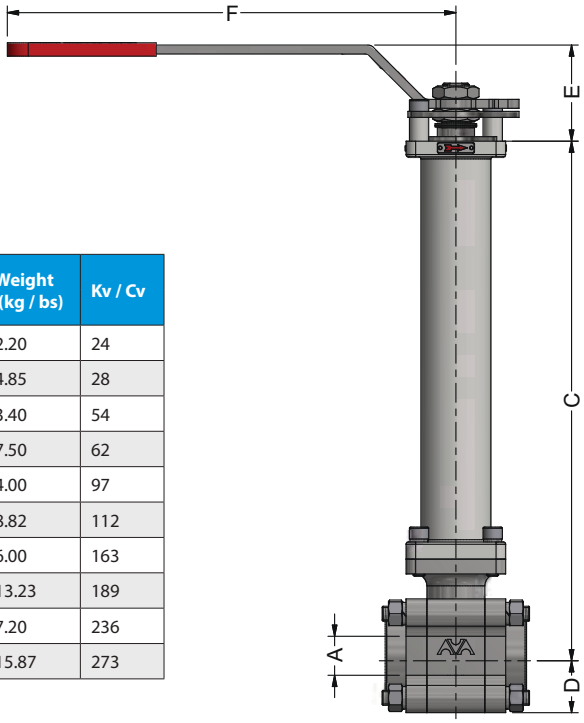
(1) Only applicable for fire safe valve

Valve exploded view



Cryogenic floating ball valve

C87R3, C87F3 Series - 3 pcs CLASS 600
Full or reduced bore, three piece, flanged,
threaded or welded end connection
NPS 1/2-2 DN15-DN50

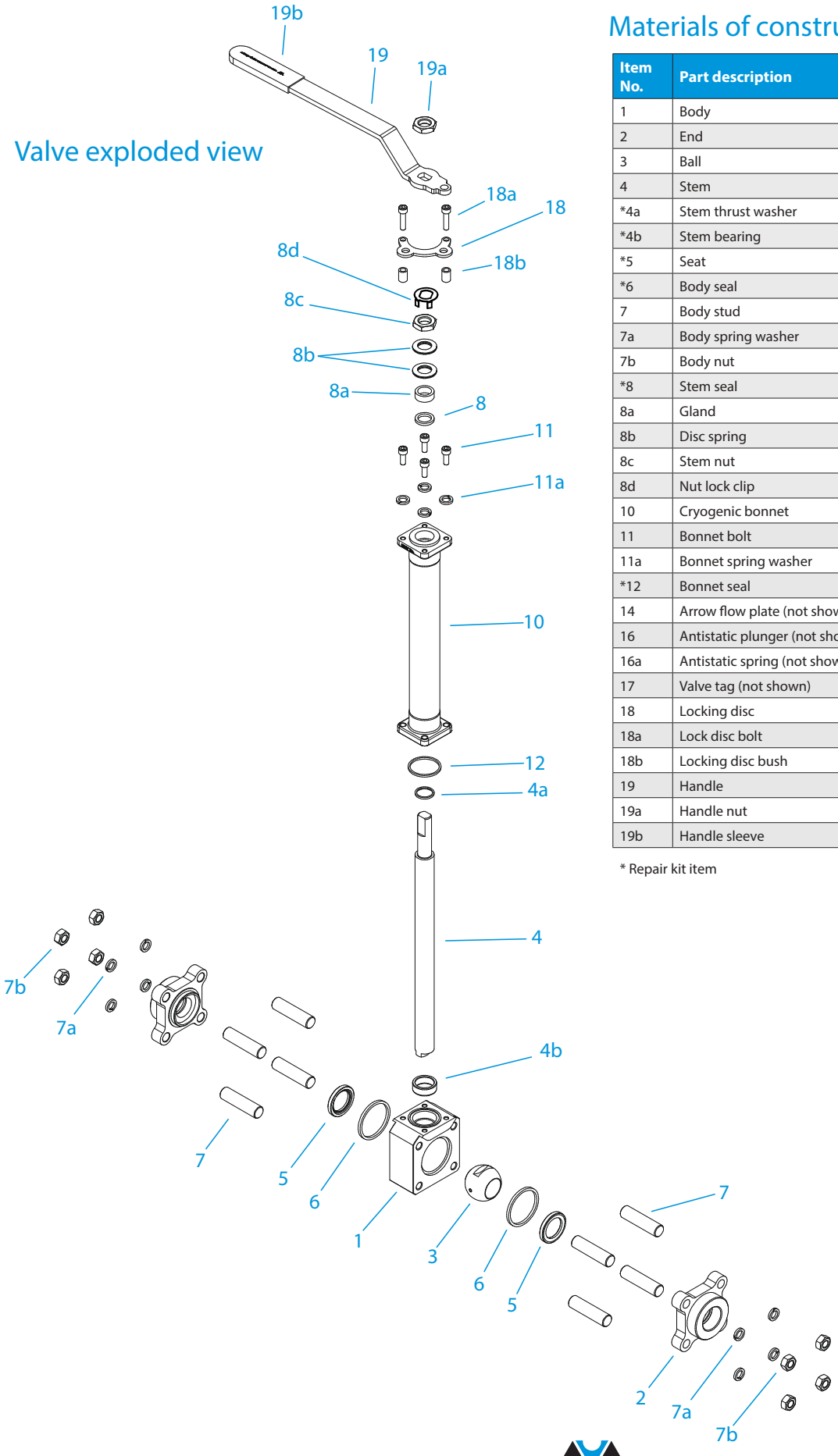


Dimensional data

Valve size		A	B	C	D	E	F	Trim number	Weight (kg / bs)	Kv / Cv
FB	RP									
DN15	DN20	13	70	303	26	30	150	10	2.20	24
1/2	3/4	0.51	2.76	11.93	1.02	1.18	5.91		4.85	28
DN20	DN25	19	90	310	32	58	175	12.7	3.40	54
3/4	1	0.75	3.54	12.20	1.26	2.28	6.89		7.50	62
DN25	DN32	25	100	315	37	58	175	16	4.00	97
1	1 1/4	0.98	3.94	12.40	1.46	2.28	6.89		8.82	112
DN32	DN40	32	120	320	40	72	185	19	6.00	163
1 1/4	1 1/2	1.26	4.72	12.60	1.57	2.83	7.28		13.23	189
DN40	DN50	38	145	323	49	72	300	19	7.20	236
1 1/2	2	1.50	5.71	12.72	1.93	2.83	7.28		15.87	273

(1) For top mounting dimensions and MAST values please refer to pages 16,17

Valve exploded view



Materials of construction

Item No.	Part description	Material specification
1	Body	ASTM A351 Gr CF8M, CF8
2	End	ASTM A351 Gr CF8M, CF8, CF3M, CF3
3	Ball	ASTM A351 Gr CF8M, CF8
4	Stem	ASTM A479 316, Nitronic XM-19
*4a	Stem thrust washer	CFT, PCTFE
*4b	Stem bearing	PTFE
*5	Seat	PCTFE, CFT
*6	Body seal	Graphite, PTFE
7	Body stud	ASTM A320 Gr B8M Class 2, Gr B8 Class2
7a	Body spring washer	SS304
7b	Body nut	ASTM A320 Gr 8M, Gr 8
*8	Stem seal	Graphite, PTFE
8a	Gland	SS304
8b	Disc spring	SS304
8c	Stem nut	ASTM A194 Gr 8
8d	Nut lock clip	SS304
10	Cryogenic bonnet	ASTM A351 Gr CF8M, CF8
11	Bonnet bolt	ASTM A320 Gr B8M Class 2, Gr B8 Class2
11a	Bonnet spring washer	SS304
*12	Bonnet seal	Graphite, PTFE
14	Arrow flow plate (not shown)	SS304
16	Antistatic plunger (not shown)	SS304
16a	Antistatic spring (not shown)	SS304
17	Valve tag (not shown)	SS304
18	Locking disc	SS304
18a	Lock disc bolt	SS304
18b	Locking disc bush	SS304
19	Handle	CS Zinc plated
19a	Handle nut	ASTM A194 Gr 8
19b	Handle sleeve	PVC

* Repair kit item

Cryogenic floating ball valve

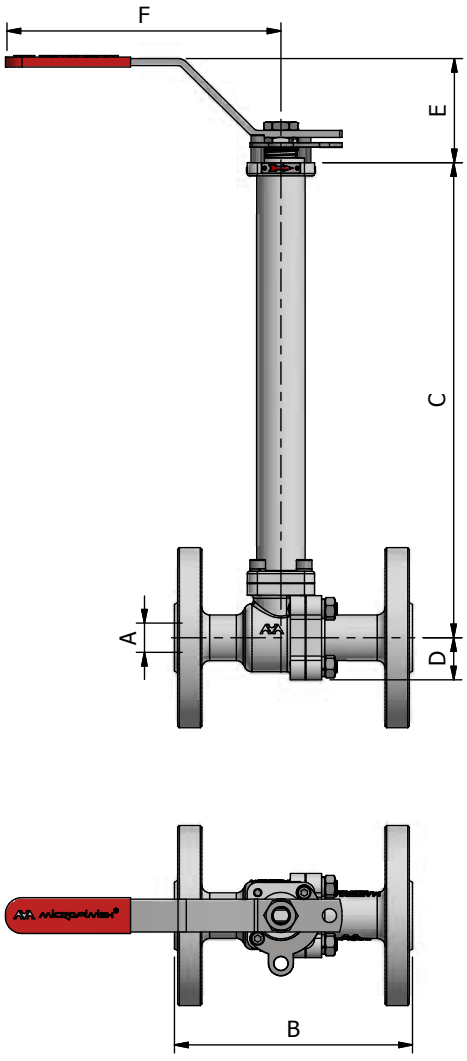
C84F2, C85F2, C87F2 Series
Full bore, two piece, flange class 150 / 300 / 600
NPS 1/2-2, DN15-DN50

Dimensional data

C84F2 - CLASS 150 FULL PORT TWO PIECE SERIES									
Valve size (DN/NPS)	A	B	C	D	E	F	Trim number	Weight (kg /lb)	Kv / Cv
DN15	13	108	295	24	30	150	10	1.60	24
1/2	0.51	4.25	11.61	0.94	1.18	5.91		3.53	28
DN20	19	117	330	27.5	58	175	12.7	2.35	54
3/4	0.75	4.61	12.99	1.08	2.28	6.89		5.18	62
DN25	25	127	304	31	58	175	12.7	3.12	97
1	0.98	5.00	11.97	1.22	2.28	6.89		6.88	112
DN32	32	140	316	38	72	185	19	4.70	163
1 1/4	1.26	5.51	12.44	1.50	2.83	7.28		10.36	189
DN40	38	165	323	46	72	185	19	5.90	236
1 1/2	1.50	6.50	12.72	1.81	2.83	7.28		13.01	273
DN50	50	178	355	56	72	307	22	10.00	419
2	1.97	7.01	13.98	2.20	2.83	12.09		22.05	484

C85F2 - CLASS 300 FULL PORT TWO PIECE SERIES									
Valve size (DN/NPS)	A	B	C	D	E	F	Trim number	Weight (kg /lb)	Kv / Cv
DN15	13	140	298	24	30	150	10	2.8	24
1/2	0.51	5.51	11.73	0.94	1.18	5.91		6.2	28
DN20	19	152	301	27.5	58	175	12.7	4.1	54
3/4	0.75	5.98	11.85	1.08	2.28	6.89		9.0	62
DN25	25	165	304	34.5	58	175	12.7	5.1	97
1	0.98	6.50	11.97	1.36	2.28	6.89		11.2	112
DN32	32	178	318	38	72	185	19	7.1	163
1 1/4	1.26	7.01	12.52	1.50	2.83	7.28		15.7	189
DN40	38	190	329	46	72	185	19	12.0	236
1 1/2	1.50	7.48	12.56	1.81	2.83	7.28		26.5	273
DN50	50	216	364	56	72	307	22	16.0	419
2	1.97	8.50	13.94	2.20	2.83	12.09		35.3	484

C87F2 - CLASS 600 FULL PORT TWO PIECE SERIES									
Valve size (DN/NPS)	A	B	C	D	E	F	Trim number	Weight (kg /lb)	Kv / Cv
DN15	13	165	304	28.5	30	150	10	3.2	24
1/2	0.51	6.50	11.97	1.12	1.18	5.91		7.1	28
DN20	19	190	304	41.5	58	175	12.7	5.0	54
3/4	0.75	7.48	11.97	1.63	2.28	6.89		11.0	62
DN25	25	216	308	47.5	58	175	16	6.5	97
1	0.98	8.50	12.13	1.87	2.28	6.89		14.3	112
DN32	32	229	320	40	72	185	19	9.8	163
1 1/4	1.26	9.00	12.60	1.57	2.83	7.28		21.6	189
DN40	38	241	333	62	72	300	19	14.0	236
1 1/2	1.50	9.49	13.11	2.44	2.83	7.28		30.9	273
DN50	50	292	372	76.5	100	550	22	23.0	419
2	1.97	11.50	14.65	3.01	3.94	21.65		50.7	484



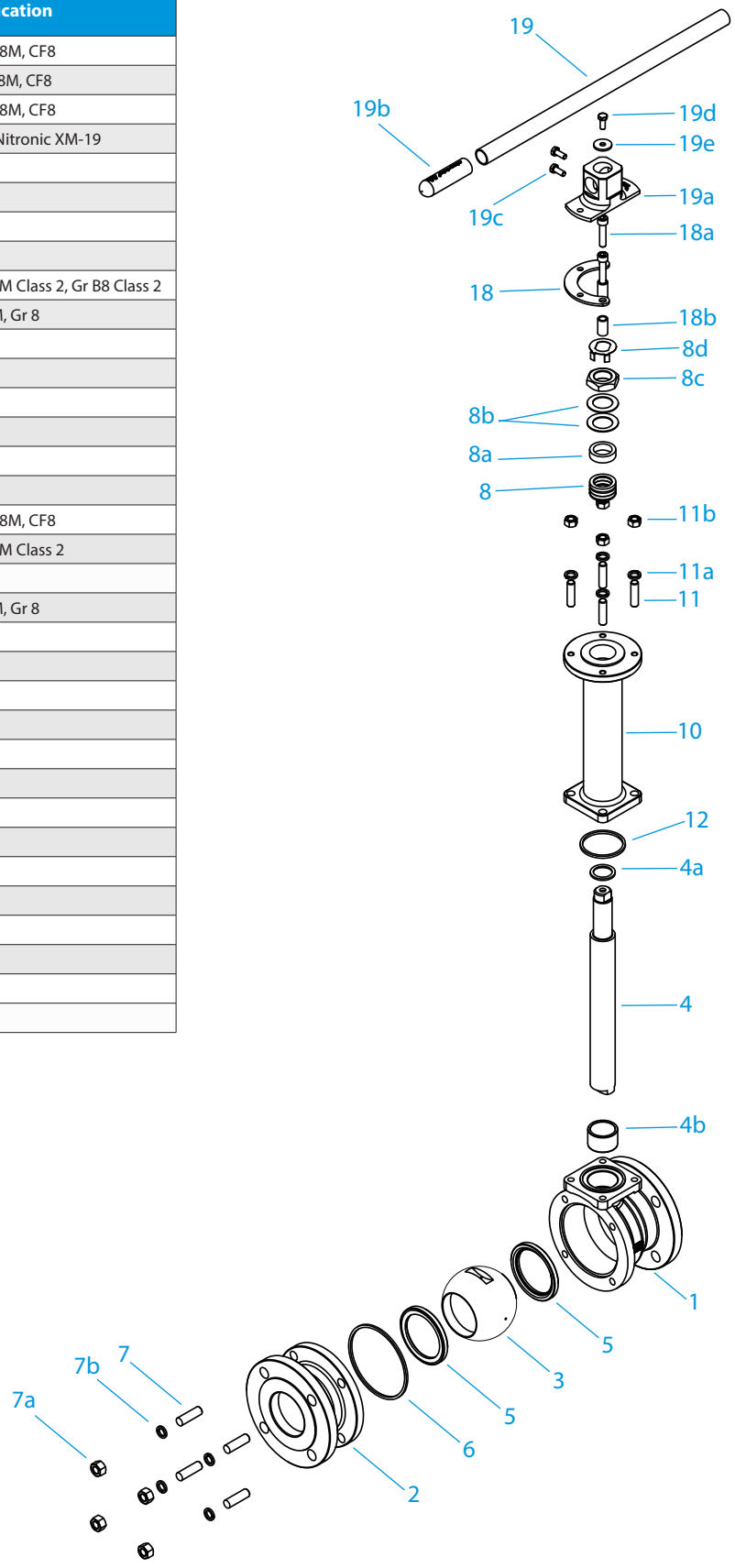
(1) For top mounting dimensions and MAST values please refer to pages 16,17

Materials of construction

Item No.	Part description	Material specification
1	Body	ASTM A351 Gr CF8M, CF8
2	End	ASTM A351 Gr CF8M, CF8
3	Ball	ASTM A351 Gr CF8M, CF8
4	Stem	ASTM A479 316, Nitronic XM-19
*4a	Stem thrust washer	CFT, PCTFE
*4b	Stem bearing	PTFE
*5	Seat	PCTFE, CFT
*6	Body seal	Graphite, PTFE
7	Body stud	ASTM A320 Gr B8M Class 2, Gr B8 Class 2
7a	Body nut	ASTM A320 Gr 8M, Gr 8
7b	Body spring washer	SS304
*8	Stem seal	Graphite, PTFE
8a	Gland	SS304 / CF8
8b	Disc spring	SS304
8c	Stem nut	SS304
8d	Nut lock clip	SS304
10	Cryogenic bonnet	ASTM A351 Gr CF8M, CF8
11	Bonnet bolt	ASTM A320 Gr B8M Class 2
11a	Bonnet spring washer	SS304
11b	Bonnet nut	ASTM A320 Gr 8M, Gr 8
*12	Bonnet seal	Graphite, PTFE
14	Arrow flow plate (not shown)	SS304
16	Antistatic plunger (not shown)	SS316
16a	Antistatic spring (not shown)	SS316
17	Valve tag (not shown)	SS304
18	Lock disc	SS304
18a	Lock disc bolt	SS304
18b	lock disc bushing	SS304
19	Handle	CS Zinc plated
19a	Handle adaptor	CS epoxy painted
19b	Handle sleeve	PVC
19c	Adaptor bolt	CS Zinc plated
19d	Handle bolt	CS Zinc plated
19e	Handle bolt washer	CS Zinc plated

* Repair kit item

Valve exploded view



Cryogenic floating ball valve

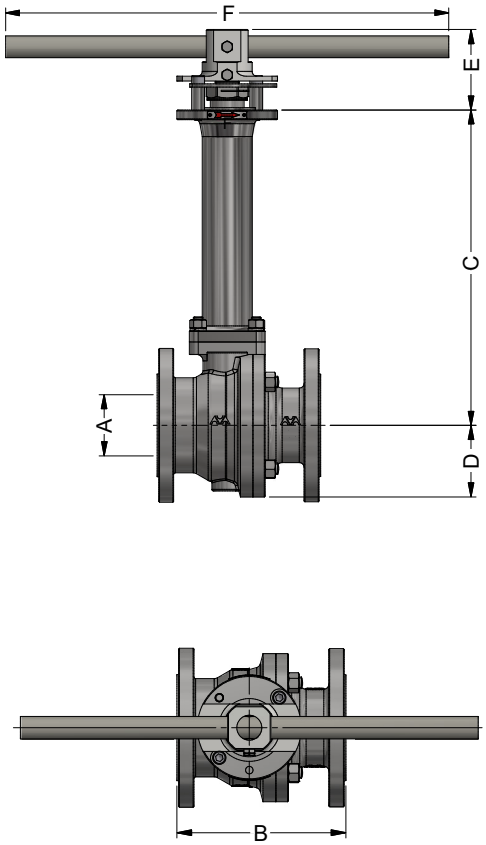
C84F2, C85F2, C87F2 Series
Full bore, two pieces, flange class 150 / 300 / 600
NPS 2 1/2-10, DN65-DN250

Dimensional data

C84F2 - CLASS 150 FULL PORT TWO PIECE SERIES										
Valve size (DN/NPS)	A	B		C	D	E	F	Trim number	Weight (kg /lb)	Kv / Cv
		Short Ptn.	Long Ptn.							
DN65	65	190	-	368	79	100	550	30	16	727
2 1/2"	2.56	7.48	-	14.49	3.11	3.94	21.65		35	841
DN80	76	203	-	390	89	100	550	30	21	1023
3	2.99	7.99	-	15.35	3.50	3.94	21.65		46	1183
DN100	100	229	-	409	110	100	550	40	33	1900
4	3.94	9.02	-	16.10	4.33	3.94	21.65		73	2196
DN150	152	267	394	449	148	131	700	48	76	4357
6	5.98	10.51	15.51	17.68	5.83	5.16	27.56		168	5036
DN200	203	292	457	497	187	-	-	60	97	8043
8	7.99	11.50	17.99	19.57	7.36	-	-		214	9298
DN250	252	330	533	564	228	-	-	68	148	12863
10	9.92	12.99	20.98	22.20	8.98	-	-		326	14869

C85F2 - CLASS 300 FULL PORT TWO PIECE SERIES										
Valve size (DN/NPS)	A	B		C	D	E	F	Trim number	Weight (kg /lb)	Kv / Cv
		Short Ptn.	Long Ptn.							
DN65	65	241	-	384	89	100	550	30	22	727
2 1/2"	2.56	9.49	-	15.43	3.50	3.94	21.65		49	841
DN80	76	282	-	407	108	100	550	30	31	1023
3	2.99	11.10	-	16.02	4.25	3.94	21.65		68	1183
DN100	100	305	-	410	108	100	550	40	52	1900
4	3.94	12.01	-	16.14	4.25	3.94	21.65		115	2196
DN150	152	403	-	482	174	-	-	48	106	4357
6	5.98	15.87	-	18.98	6.85	-	-		234	5036
DN200	203	419	502	523	202	-	-	60	172	8043
8	7.99	16.50	19.76	20.59	7.95	-	-		379	9298
DN250	252	457	568	598	242	-	-	68	275	12863
10	9.92	17.99	22.36	23.54	9.53	-	-		606	14869

C87F2 - CLASS 600 FULL PORT 2 PCS SERIES									
Valve size (DN/NPS)	A	B	C	D		F	Trim number	Weight (kg /lb)	Kv / Cv
		Long Ptn.							
DN65	65	330	392	88.5	100	550	22	32	727
2 1/2"	2.56	12.99	15.43	3.48	3.94	21.65		71	841
DN80	76	356	409	98.5	-	-	30	58	1023
3	2.99	14.02	16.10	3.88	-	-		128	1183
DN100	102	432	432	120	-	-	30	80	1900
4	4.02	17.01	17.01	4.72	-	-		176	2196
DN150	150	559	501	192	-	-	48	184	4243
6	5.91	22.01	19.72	7.56	-	-		406	4904
DN200	201	660	552	223	-	-	60	290	7885
8	7.91	25.98	21.73	8.73	-	-		639	9116
DN250	252	787	622	2.68	-	-	68	476	12863
10	9.92	30.98	24.49	10.55	-	-		1049	14869



(1) For top mounting dimensions and MAST values please refer to pages 16,17

Installation direction

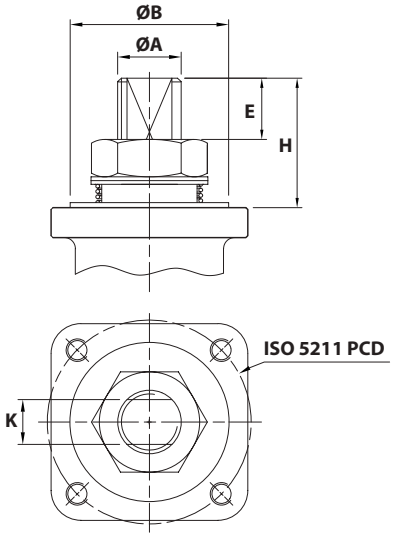
Every **Microfinish** cryogenic valve includes an arrow plate attached to the valve body and to the bonnet top side. The arrow indicates the valve orientation for correct installation with the High Pressure (HP) side at its tail and the Low Pressure (LP) side at the arrow head.

The arrow direction does not always indicate the normal direction of cryogen flow; on the contrary in most applications the valve should be installed with the arrow pointing in the opposite to the normal direction of cryogen flow. To clarify this issue, the high pressure side should be specified when the flow stops and the valve is in its closed position; Although it may seem trivial, **Microfinish** has found this to be a very common error in industry which causes double the work, a waste of raw materials, and even a safety concern.

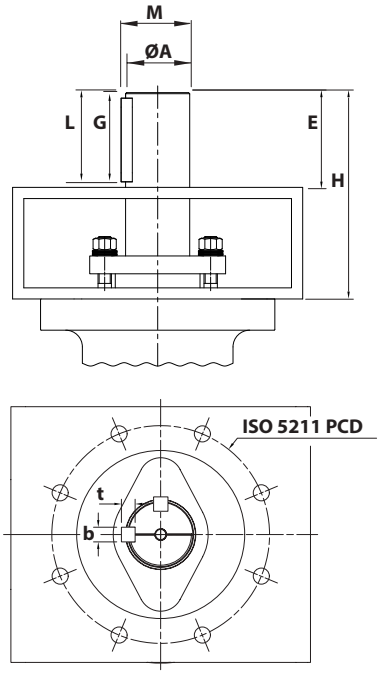
Cryogenic bonnet inclination

The function of the bonnet of a cryogenic valve is to allow proper heat transfer, and a steep temperature gradient along the bonnet's length between cryogenic temperatures as low as -196°C / -320°F at the valve center line, and a temperature of around -10°C / 14°F at the cryogenic ISO top pad. This feature allows the soft parts of the valve gland packing to remain flexible above the glass transition point. According to the BS 6364 standard a 10 inch (250 mm) cryogenic bonnet shall be installed in the vertical position or inclined up to 45° from the vertical axis. For confined spaces and systems characterized by high vibration **Microfinish** offers a 6 inch (150 mm) bonnet, not compliant with BS 6364. A cryogenic valve with 6 inch bonnet shall be installed only in the vertical position.

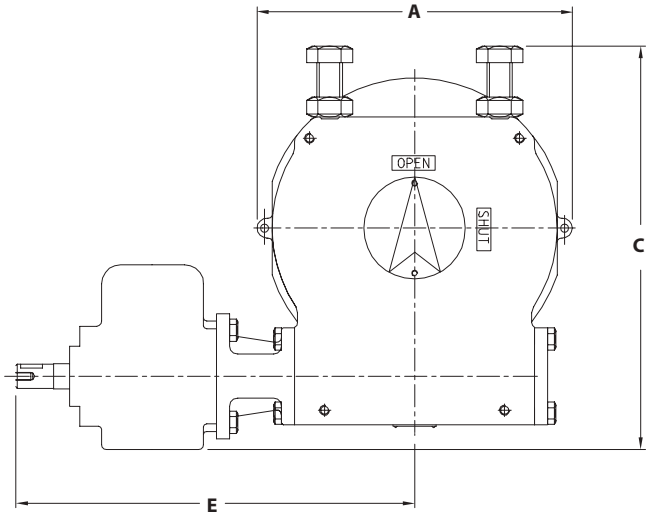
Top mounting dimensions and Maximum Allowable Stem Torque (MAST)



Trunnion Trim 22 - 48
Floating ball valve Trim 10 - 48



Trunnion Trim 60-105
Floating ball valve - Trim 60, 68



Gearbox top view

Cryogenic trunnion mounted ball valve - top mounting dimensions and MAST values

Trim number	ISO 5211 PCD	Unit	ØA	E	G	H	K	L	M	b	t	Unit	M.A.S.T. SS316	M.A.S.T. XM-19
22	F07	mm	M20X2P	15	--	50	14	--	--	--	--	N-m	144	202
		Inch		0.591	--	1.969	0.551	--	--	--	--	lbf-in.	1275	1784
30	F10	mm	24.5	25	--	58	19	--	--	--	--	N-m	361	505
		Inch	0.965	0.984	--	2.283	0.748	--	--	--	--	lbf-in.	3195	4473
40	F12	mm	35.5	33	--	70	27	--	--	--	--	N-m	1065	1491
		Inch	1.398	1.299	--	2.756	1.063	--	--	--	--	lbf-in.	9426	13196
48	F14	mm	42	41	--	84	32	--	--	--	--	N-m	1768	2475
		Inch	1.635	1.614	--	3.307	1.259	--	--	--	--	lbf-in.	15646	21903
60	F16	mm	57.5	85	75	185	--	80	61.5	16	10	N-m	4830	6565
		Inch	2.264	3.346	2.953	7.283	--	3.150	2.421	0.630	0.394	lbf-in.	42749	58102
68	F25	mm	65.0	85	75	195	--	80	69	18	11	N-m	6896	9654
		Inch	2.559	3.346	2.953	7.677	--	3.150	2.717	0.709	0.433	lbf-in.	61035	85449
82	F25	mm	80	85	75	195	--	80	85	22	14	N-m	12641	17697
		Inch	3.150	3.346	2.953	7.677	--	3.150	3.346	0.866	0.551	lbf-in.	111882	156635
90	F30	mm	85	130	120	260	--	125	90	22	14	N-m	15483	24416
		Inch	3.346	5.118	4.724	10.236	--	4.921	3.543	0.866	0.551	lbf-in.	137036	216100
105	F35	mm	100	135	125	285	--	1 30	106	28	16	N-m	25797	39871
		Inch	3.937	5.315	4.921	11.220	--	5.118	4.173	1.102	0.630	lbf-in.	228323	352885

Cryogenic floating ball valve - top mounting dimensions and MAST values

Trim number	ISO 5211	Unit	ØA	ØB	E	K	H	Unit	M.A.S.T. SS316	M.A.S.T. XM-19
10	F03	mm	M10X1.5P	25	7	7	11	N-m	15	21
		inch		0.984	0.276	0.276	0.433	lbf-in.	133	186
12.7	F04	mm	M12X1.75P	30	11	8	17	N-m	24	34
		inch		1.181	0.433	0.315	0.669	lbf-in.	212	297
16	F04	mm	M16X2P	30	11.5	11	30	N.m	83	116
		inch		1.181	0.452	0.433	1.181	lbf-in	735	1027
19	F05	mm	M18X1.5P	35.0	14	14	35	N-m	119	167
		inch		1.378	0.551	0.551	1.378	lbf-in.	1053	1475
22	F07	mm	M20X2P	55.0	15	14	50	N-m	135	189
		inch		2.165	0.591	0.551	1.969	lbf-in.	1195	1673
30	F10	mm	27.2	70.0	25	19	58	N-m	419	587
		inch	1.071	2.756	33	0.748	2.283	lbf-in.	3708	5192
40	F12	mm	35.5	85	33	27	70	N-m	1065	1491
		inch	1.398	3.346	1.299	1.063	2.756	lbf-in.	9426	13196
48	F14	mm	42	100	41	32	84	N-m	1768	2475
		inch	1.653	3.937	1.614	1.259	3.307	lbf-in.	15646	21903
60, 68	Use cryogenic trunnion mounted ball valve - top mounting dimensions and MAST values									

Gearbox dimensions and selection

Trim number	Unit	A	C	E	Gear height	Shaft diameter	Hand wheel diameter	Drive bore diameter	Weight (kg / lb.)	Maximum input torque (Nm / lbf-in)	Maximum output torque (Nm / lbf-in)	ISO 5211 PCD
30	mm	88	116	153	62	16	250	30	3.20	44	440	F10
	Inch	3.465	4.567	6.024	2.441	0.630	9.843	1.181	7.05	389	3894	
40	mm	127	158	199	79	20	450	35.5	8.00	89	981	F12
	Inch	5.000	6.220	7.835	3.110	0.787	17.717	1.398	17.64	789	8683	
48	mm	230	249	254	107	20	550	43.5	22.00	202	3236	F14
	Inch	9.055	9.803	10.000	4.213	0.787	21.654	1.713	48.50	1790	28641	
60	mm	265	288	256	114	20	600	57.5	34.00	98	4905	F16
	Inch	10.433	11.339	10.079	4.488	0.787	23.622	2.264	74.96	868	43413	
68	mm	280	320	253	136	20	650	65	46.00	106	6379	F25
	Inch	11.024	12.598	9.961	5.354	0.787	25.591	2.559	101.41	941	56459	
82	mm	345	425	407	175	24	650	80	95.00	147	14715	F25
	Inch	13.583	16.732	16.024	6.890	0.945	25.591	3.150	209.44	1302	130239	
90	mm	345	425	407	175	24	650	85	95.00	147	14715	F30
	Inch	13.583	16.732	16.024	6.890	0.945	25.591	3.346	209.44	1302	130239	
105	mm	484	547	508	197	24	750	100	210.00	164	34335	F35
	Inch	19.055	21.535	20.000	7.756	0.945	29.528	3.937	462.97	1447	303891	

Build your cryogenic valve code

Trunnion mounted ball valve for cryogenic service

BV 12" DN300 CT87F2-445462HDG-FRCG

BV	12" DN300	CT	87	F2	-	4	4	5	4	6	2	H
Type	Size	Model	Class	Port size / Construction		Body / End	Ball	Stem	Seat retainer	Seat insert	Seat construction	Stem seal

D	G	-	F	R	C	G	-	00	0	-	000
Seat seal[8]	Body seal		Features	End connection	Bonnet	Operator		Special testing	Special construction or assembly		Trim metal treatment

Type	
BV	**2"-48"**

Size
DN50-DN1200

Model	
C	**Cryogenic -200°C ≤ T ≤ +150°C -320°F ≤ T ≤ +300°F**
F	Deep cryogenic -269°C ≤ T ≤ +150°C -452°F ≤ T ≤ +300°F
M	Metal seats
T	**Trunnion mounted**

Class	
84	**#150**
85	**#300**
87	**#600**
89	#900
90	#1500
91	#2500

Port size / Construction	
F2	**Full / two piece**
F3	Full / three piece
R2	Reduced / two piece
R3	Reduced / three piece

Body / End	
2	CF8
4	**CF8M**

Ball	
2	CF8 - 304
4	**CF8M - 316**

Stem	
5	**Nitronic 50 (XM19)**

Seat retainer	
2	CF8 - 304
4	**CF8M - 316**

Seat insert	
3	**CFT (CF PTFE)**
6	**PCTFE**
0[6]	Metal seat

Seat construction	
0	DBB
2[2]	**DIB-2**

Stem seal	
G	**Graphite rings**
H	**Graphite Cup-n-Cone**
S[4]	PTFE Cup-n-Cone
T[4]	PTFE Rings

Seat seal	
D	**Lip seal**
G	Graphite

Body seal	
G	Graphite
T[5]	PTFE

Features	
0	Non-Fire Safe
1	Non-Fire Safe NACE MR0175 / MR0103
F	Fire Safe to API 607/ ISO10497
G	Fire Safe to API 607/ ISO10497 and NACE MR0175 / MR0103

End connection	
A	NPT
B	BSPT
C	Socket-Weld-End (SWE)
L	BW Sch. 40S
M	BW Sch. 80
N	BW Sch. 160
R	**RF Flange**
S	Flat face flange
T	RTJ flange
U[5]	Extended-pups BW Sch. 10
V[5]	Extended-pups BW Sch. 40S
W[5]	Extended-pups BW Sch. 80
X[5]	Extended-pups BW Sch. 160
Y[5]	Extended-pups BW Sch. XXX

Bonnet	
C	**Cryogenic bonnet BS6364 (10 inch / 250 MM)**
D	Cryogenic bonnet BS6364 Cold box

Operator	
B	Bare stem
C	Lever
D	Pneumatic actuator and manual override
E	Electric actuator
G	**Gear**
K	Lockable gear
L	Lockable lever
P	Pneumatic actuator
S	Pneumatic actuator and partial stroke unit

Special testing			
0	**None**	**0**	**None**
1	Positive Material Identification (PMI)	3	Impact test @ -49°C /-56°F
2	Radiographic Test (RT)	4	Impact test @ -101°C /-150°F
3	Ultrasonic Test (UT)	5	Impact test @ -196°C /-320°F
4	Die Penetrat (DP)	F	BS6364 Cryogenic Test (CT)
5	Magnetic Particles (MP) test		

Special construction or assembly	
0	Vent & drain ports tapped and plugged; No sealant injection point;
S	No sealant; No drain; No vent

Trim metal treatment			
Ball		**Seat**	**Stem**
0	**None**		
E	ENP 25 micron		
F	ENP 50 micron		
N	ENP 75 micron		
H	Nitrid hardening		
S	Stellite		
T	Tungsten carbide (HVOF)		
C	Chromium carbide (HVOF)		

Floating ball valve for cryogenic service

BV 2" DN50 C87R3-4452GG-FACL

BV	2" DN50	C	87	R3	-	4	4	5	2	G	G	-
Type	Size	Model	Class	Port size / Construction		Body / End	Ball	Stem	Seat	Stem seal	Body seal	

F	A	C	L	-	00		R	-	000
Features	End connection	Bonnet	Operator		Special testing		Special construction or assembly		Trim metal treatment

Type	Size
BV	**1/2"-10" DN15-DN250**

Model	
C	**Cryogenic -200°C ≤ T ≤ +150°C -320°F ≤ T ≤ +300°F**
F	Deep cryogenic -269°C ≤ T ≤ +150°C -452°F ≤ T ≤ +300°F
M	Metal seats

Class	
84	**#150**
85	**#300**
87	**#600**
89	#900
90	#1500
91	#2500

Port size / Construction	
R1	Reduced / one piece
R2	Reduced / two piece
R3	**Reduced / three piece**
F1	Full / one piece
F2	**Full / two piece**
F3	Full / three piece

Body / End	
2	CF8
4	**CF8M**
A(1)	CF8M / CF3M
B(1)	CF8 / CF3

Ball	
2	CF8 - 304
4	**CF8M - 316**

Stem	
2	SS 304
4	**SS 316**
5	**Nitronic (XM19)**

Seat	
3	**CFT (CF PTFE)**
6	**PCTFE**
Z	SS 316 - CF8M

Stem seal	
G	Graphite rings
H	Graphite Cup-n-Cone
S(4)	PTFE Cup-n-Cone
T(4)	PTFE Rings

Body seal	
G(3)	Graphite
T(4)	PTFE

Features	
0	Non-Fire Safe
1	Non-Fire Safe NACE MR0175 / MR0103
F	Fire safe to API 607/ISO10497
G	Fire safe to API 607/ISO10497 and NACE MR0175 / MR0103
U	Fire safe to API 6FA
W	Fire safe to API 6FA and NACE MR0175 / MR0103

End connection	
A	**NPT**
B	BSPT
C	Socket-Weld-End (SWE)
E	SWE x NPT
F	SWE x BSPT
G	BW Sch. 40S x NPT
H	BW Sch. 40S x BSPT
K	BW Sch. 10
L	BW Sch. 40S
M	BW Sch. 80
N	BW Sch. 160
R	**RF Flange**
S	Flat face flange
T	RTJ flange
U(5)	Extended-pups BW Sch. 10
V(5)	Extended-pups BW Sch. 40S
W(5)	Extended-pups BW Sch. 80
X(5)	Extended-pups BW Sch. 160
Y(5)	Extended-pups BW Sch. XXX
Z(5)	Extended-pups SW

Bonnet	
C	**Cryogenic bonnet BS6364 (10 inch / 250 mm)**
D	Cryogenic bonnet BS6364 Cold box
6	Cryogenic bonnet 6 inch / 150 mm

Operator	
B	Bare stem
C	Lever
D	Pneumatic actuator and manual override
E	Electric actuator
G	Gear
K	Lockable gear
L	Lockable lever
M	Dead man handle (spring/return)
P	Pneumatic actuator
S	Pneumatic actuator and partial stroke unit
V	Lockable oval handle

Special testing			
0	None	0	None
1	Positive Material Identification (PMI)	3	Impact test @ -49°C /-56°F
2	Radiographic Test (RT)	4	Impact test @ -101°C /-150°F
3	Ultrasonic Test (UT)	5	Impact test @ -196°C /-320°F
4	Die Penetrat (DP)	F	BS6364 Cryogenic Test (CT)
5	Magnetic Particles (MP) test		

Special construction or assembly	
R	Relief hole in upstream ball sphere

Trim metal treatment		
Ball	**Seat**	**Stem**
0	**None**	
E	ENP 25 micron	
F	ENP 50 micron	
N	ENP 75 micron	
H	Nitrid hardening	
S	Stellite	
T	Tungsten carbide (HVOF)	
C	Chromium carbide (HVOF)	

(1) Default combination for Stainless steel, 3 piece design and welded ends.
(2) DIB-2 is Microfinish default construction for cryogenic trunnion mounted ball valve.
(3) Graphite body seal shall be selected for fire safe valve.
(4) Do not use for fire safe valve.
(5) Default pup ends is 2 times DN or 100 mm /4 inch (the longest between the two).
(6) Metal seat material is defined by the seat retainer material.
Note 1: In some applications the available options are limited to specific sizes.
Note 2: Cryogenic valves are cleaned for oxygen service by default.
Note 3: The gland material by default is identical to body material as a minimum.
Note 4: Bold mark font indicates standard price list, short delivery items.

MICROFINISH VALVES

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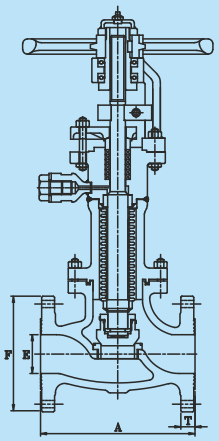
BELLOWS SEALED GLOBE VALVES

SERIES 23D CLASS 150 & 300
Ends: Flanged and Welding ends

FEATURES

- ·5000 cycle bellows design
- ·Low closing torque at high temperature
- ·Hydraulic, pneumatic, and helium test on all valves
- ·Gear, pneumatic, or automated operation
- ·Temperature range -196 °C to 540 °C
- ·Design standard BS 5352, BS 1873



Dimensions are in mm

SIZE	A		E		F		T	
RATING	150#	300#	150#	300#	150#	300#	150#	300#
15	108	152	15	15	89.0	95.0	11.5	15
20	117	178	19	19	98.0	117.0	13.0	16
25	127	203	25	25	108.0	124.0	11.5	18
32	140	216	32	32	117.0	133.0	13.0	20
40	165	229	38	38	127.0	156.0	14.5	21
50	203	267	50	50	152.0	165.0	16.0	23
80	216	292	65	65	178.0	191.0	17.5	26
100	241	318	76	76	190.5	210.0	19.5	29
125	292	356	102	102	229.0	254.0	24.0	32
150	406	444	152	152	279.0	318.0	25.5	37
200	495	559	203	203	343.0	381.0	29.0	42
250	622	622	254	254	406.0	445.0	30.5	48
300	698	711	305	305	483.0	521.0	32.0	51

Materials of construction

Body, Bonnet, Yoke	Casting: WCB, CF8M, CF8 Forging: A105, F304, F316 Other material on request.
Seat ring, Disc plug	Casting: CF8, CF8M Bar: 304, 316,
Spindle	410, 316,304
Bellow	316Ti, Hast-C, Inconel
Gland	Casting: CF8, CF8M Bar: 304, 316,
Body seal	PTFE, spiral wound gasket with filler
Gland packing	PTFE, Grafoil

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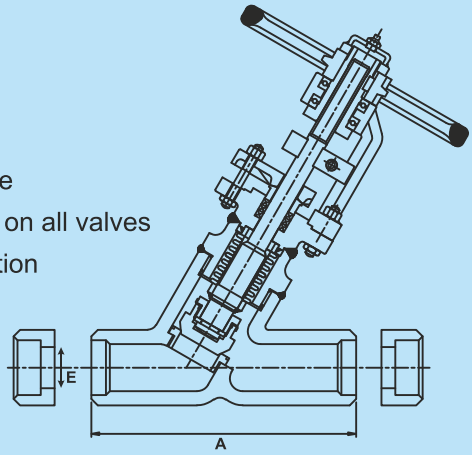
MICROFINISH
Pumps • Valves • Automation

BELLOWS SEALED GLOBE VALVES

SERIES 22D CLASS 800
Ends: Screwed, welding ends

FEATURES

- 5000 cycle bellows design
- Low closing torque at high temperature
- Hydraulic, pneumatic, and helium test on all valves
- Gear, pneumatic, or automated operation
- Temperature range -196 °C to 540 °C
- Design standard BS 5352, BS 1873



Dimensions are in mm

SIZE	A	E
15	95	9.5
20	95	12.0
25	127	17.5
32	127	22.5
40	140	29.5

Materials of construction

Body, Bonnet, Yoke	A105, F304, F316 Other material on request.
Seat ring, Disc plug	304, 316
Spindle	410, 316, 304
Bellow	316Ti, Hast-C, Inconel
Gland	304, 316
Body seal	PTFE, spiral wound gasket with filler
Gland packing	PTFE, Grafoil

MICROFINISH VALVES PVT. LTD
B 161-162, Industrial Estate, Gokul Road, Hubli - 580 030. Karnataka, India
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METAL SEATED BALL VALVES

ENGINEERED FOR CRITICAL APPLICATIONS

TÜV CERT ISO 9001 : 2000 04100 1994 0477-E3 RWTÜV

6D0301

CE 0045

MICROFINISH

Pumps • Valves • Automation

INTRODUCTION TO THE COMPANY

THE MICROFINISH WAY

Microfinish group is a privately owned and managed organization specializing in industrial valves and pumps for energy, process, and natural resource industries.The guiding principles of Microfinish are:

- Personal commitment to our customers
- Top quality in everything we do
- Best available technology for all our products and services

INTRODUCTION

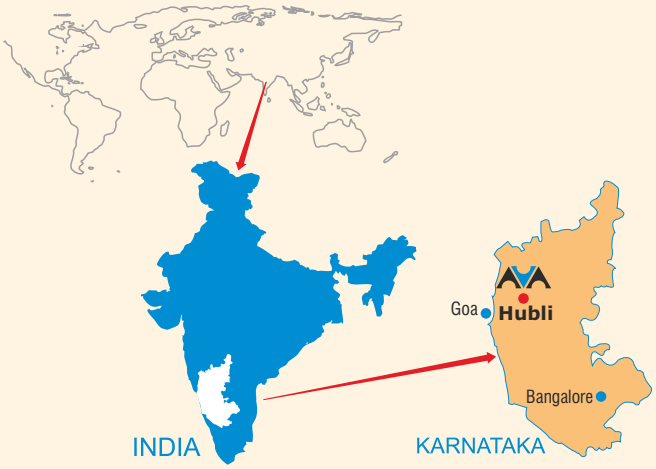
Microfinish group was established in 1971 to manufacture ball valves, bellows sealed globe valves, globe valves for chlorine service, gate, globe check valves, and knife edge gate valves. Other valves and pumps were added to the product range in later years. For the last 35 years we have designed, developed, and supplied our products to:

- Oil and gas facilities, hydrocarbon processing refineries, and petrochemical plants
- Fossil fuel, nuclear, and co-generation power plants
- Fertilizer, chemical, and pharmaceutical industries
- Food and beverage plants
- Mining, minerals processing, and steel sectors
- Pulp and paper mills

We are recognized as a quality manufacturer of reliable valves and pumps for industry. Our wealth of experience has enabled Microfinish to become a prominent supplier of ball valves throughout the world, and of chemical process pumps in India.

Industrial technology is progressing at a remarkable rate, so we have established a research and development department equipped with modern test facilities.

Our manufacturing facilities are located in separate and well laid-out buildings with ample scope for future expansion. The industrial estate in Hubli is one of the biggest and fastest developing manufacturing zones in the state of Karnataka. The city of Hubli is well served by air, rail, and road connections; it is situated on the national highway NH 4 between Mumbai and Bangalore.



PRODUCTS

We manufacture the following products in various materials including carbon steel, stainless steel, duplex, and high nickel alloys.

- Ball valves in floating and trunnion mounted designs with cast and forged bodies, including three way and jacketed configurations, and special versions for cryogenic and high temperature services
- Bellows sealed globe valves
- Globe valves for chlorine service
- Butterfly valves
- Knife edge gate valves
- Gate, globe, and check valves in forged and cast versions
- Chemical process pumps in standard and specialty configurations
- Sanitary and slurry pumps

Microfinish is committed to total quality. Stringent and efficient quality assurance and control systems have been implemented in accordance with ISO 9001: 2000.

In 1994 our organization was the first in India to receive the prestigious ISO 9001 certificate (1994 edition) from RWTÜV in Germany. Microfinish ball valves have also had API 6D certification since February 1999 and PED certification since 2002.

In 1988 the International Labor Organization in Geneva gave Microfinish an award for good working conditions and environment as a result of the hard work of every employee and the commitment of management.

IN-HOUSE FACILITIES FOR QUALIFICATION TESTS

- Fire safe
- High temperature with superheated steam
- Low temperature for cryogenic valves
- Life cycle
- Fugitive emissions
- Pump performance and NPSH
- Noise and vibration

METAL SEATED BALL VALVES

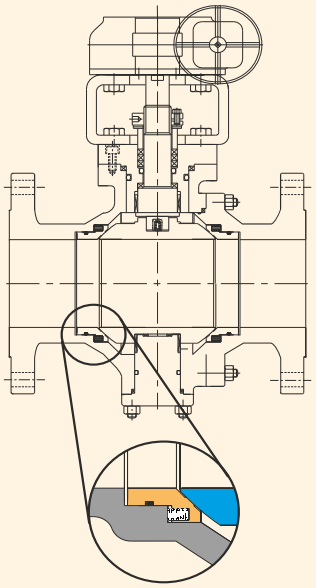
- Floating and trunnion mounted designs
- Reduced bore and full bore configurations

FEATURES

- Finely machined and lapped balls and seats
- ENP or hard coated balls and seats
- Temperature capability to 540°C (1004°F)
- Scraper seat as standard
- Fire-safe design
- Blowout proof stem
- Live loaded molded graphite gland packing

BENEFITS

- Bubble tight shut off up to API 598
- Low emissions
- Long maintenance free life



INDUSTRIAL SECTORS

- Oil and gas facilities, hydrocarbon processing, and petrochemical plants
- Fossil fuel, nuclear, and combined cycle power plants
- Fertilizer, chemical, and pharmaceutical industries
- Mining, minerals processing, and steel sectors
- Pulp and paper mills

APPLICATIONS

- High temperature steam in power plants, refineries, and other plants
- Natural gas production platforms and distribution networks
- Ash handling equipment for boilers
- Digester discharge and black liquor in pulp mills
- Slurries
- Molten sulphur

TECHNOLOGY

- Microfinish uses advanced software for 2-D and 3-D design

- Finite element analysis
- Simulated pressure - temperature analysis

- Microfinish research and development facilities include high temperature test loop to 480 ^{0}C (896 ^{0}F) at 15 bar pressure

TECHNICAL SPECIFICATIONS

PRODUCT RANGE

SERIES	SIZES- mm	SERIES	SIZES- mm	BORE	PRESSURE CLASS	END CONNECTIONS
TWO PIECE CONSTRUCTION		THREE PIECE CONSTRUCTION				
		M81R3, M81F3	15-50	RB, FB	600, 800	SE, SWE, WE
M84R2, M84F2	15-250			RB, FB	150	FE, WE
M85R2, M85F2	15-250			RB, FB	300	FE, WE
M87R2, M87F2	15-100			RB, FB	600	FE, WE
M89R2, M89F2	15-80	M89R3, M89F3	15-50	RB, FB	900	SE, SWE, WE, FE
M90R2, M90F2	15-50	M90R3, M90F3	15-50	RB, FB	1500	SE, SWE, WE, FE
M91R2, M91F2	15-25	M91R3, M91F3	15-25	RB, FB	2500	SE, SWE, WE, FE
TM84R2, TM84F2	50-900	TM84R3,TM84F3	50-900	RB, FB	150	FE, WE
TM85R2, TM85F2	50-900	TM85R3,TM85F3	50-900	RB, FB	300	FE, WE
TM87R2, TM87F2	50-900	TM87R3,TM87F3	50-900	RB, FB	600	FE, WE
TM89R2, TM89F2	25-600	TM89R3,TM89F3	25-600	RB, FB	900	FE, WE
TM90R2, TM90F2	25-400	TM90R3,TM90F3	25-400	RB, FB	1500	FE, WE
TM91R2, TM91F2	25-300	TM91R3,TM91F3	25-300	RB, FB	2500	FE, WE

RB = Reduced bore. FB = Full bore. SE = Screwed ends. SWE = Socket weld ends. WE = Welding ends. FE = Flanged ends.

STANDARD SPECIFICATIONS

- Design standard: API 6D, API 608, ASME B 16.34, BS EN ISO 17292
- Testing standard: API 6D, API 598, BS EN 12266, ISO 5208, ASME B 16.34
- Leak tightness: ISO 5208 Rate A, B, C, ANSI/FCI 70-2 Class V, VI
- Fire safe testing: API 6FA
- Temperature range: -196 °C (-321 °F) to + 540 °C (1004°F)
- Material test certificate: EN 10204 3.1
- Materials:
  - Body : A105, LF2, F304, F316, WCB, LCB, CF8, and CF8M
  - Ball : CA15,CF8, CF8M, A105, LF2, F304, and F316
  - Ball coating: ENP
  - Stem: 4140, 410, 17-4PH, and Inconel
  - Seats: heat treated or coated to suit service conditions
  - Springs: Inconel X 750

OPTIONAL SPECIFICATIONS

- Bonnet extension
- High temperature design above 540°C (1004°F)
- Cryogenic designs
- Degreasing
- Ball coatings: Stellite, carbide, or nickel boron
- Special alloys and other materials to suit service conditions
- Special test certificates: EN 10204 3.2

SALES OFFICES

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