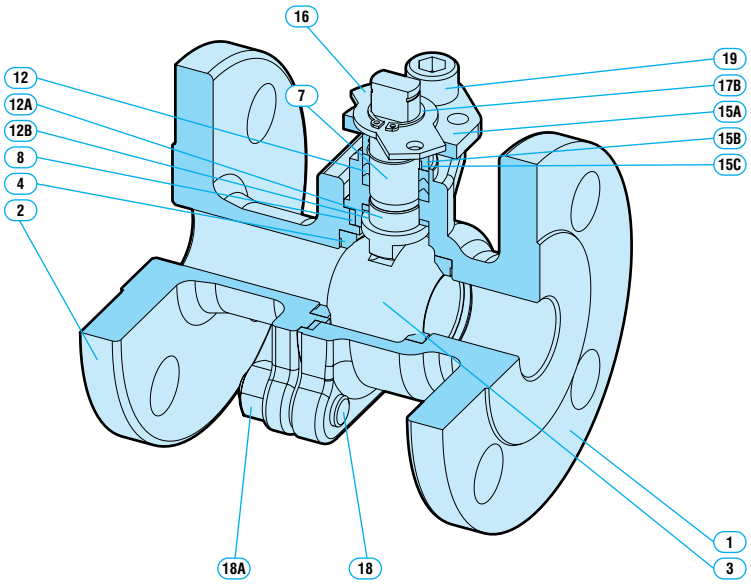
2-Way Ball Valve Structure and Features



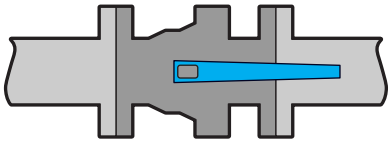
1	Body
2	Cap
3	Ball
4	Seat
7	Stem
8	Gasket
12	Packing
12A	Bearing
12B	Thrust Washer
15A	Gland Flange
15B	Gland
15C	Bearing
16	Travel Stop
17B	Retaining Ring
18	Stud Bolt
18A	Nut
19	Cap Screw

❶ Flow with Minimum Pressure Loss

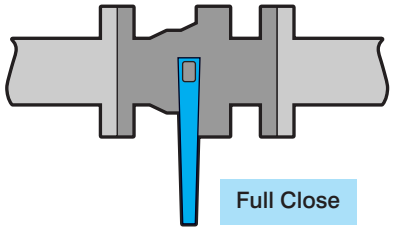
Pressure loss at full open is very small because flow path of valve is the same as piping and accordingly the flow resistance is very low.

❷ Easy Operation

Quarter turn from full open/close to full close/open can be easily done. Lever position indicates open or close position clearly.



Full Open



Full Close

❸ High Sealing Efficiency

Since resins such as PTFE are used for valve seat, sealing is superior and fluid can be stopped easily.

❹ Easy Attachment of Actuator

Various types of actuator can be mounted by Yoke and coupling.

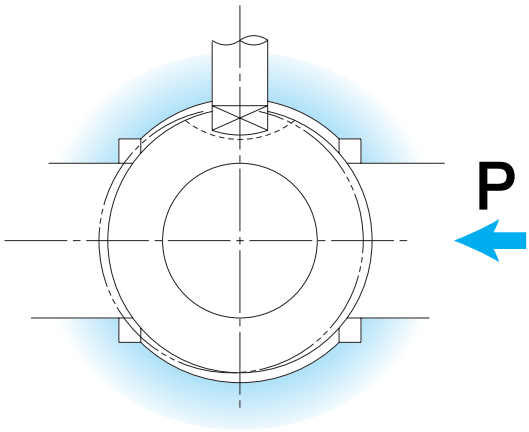
Pneumatically Operated Valve

Electrically Operated Valve

Sealing Mechanism

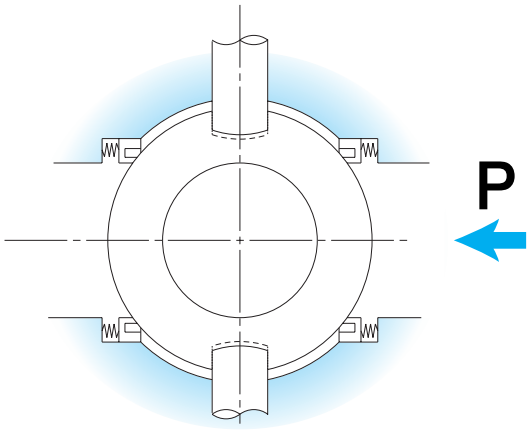
Floating Ball Type

Stem is only linked with ball at trench shaped slot at top of the ball. In this mechanism, self-sealing is secured by pushing ball against the outlet side seat by fluid pressure.
Floating Ball types are applicable for low pressure use (up to JIS 20K, CL300) and Smaller boar valves (up to DN200).



Trunnion Ball Type

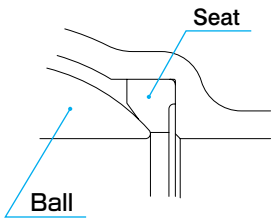
Both top and bottom of ball are supported by stem with trunnion. In this mechanism, sealing is secured by seat spring pressure and fluid pressure to rear side of inlet side seat. Since sealing is secured at inlet side only, the change of operation torque is smaller even if the change of fluid pressure is large.
Trunnion types are applicable for high pressure use (JIS 30K, CL600 or more) or large bore valves (DN250 or more).



Reference for Seat Selection

Seat Specifications and Features

Main Products;



NTF

Material: New-PTFE (NDV Standard) **Features:** Heat resistance, Chemical resistance, Anti-viscosity, Less abrasion, High temperature creep resistance.

•Color: White •Max. Working Temperature: 240°C (may change by working condition) •Applications: Cleaning solutions, Solvent, Viscous fluid

NCF

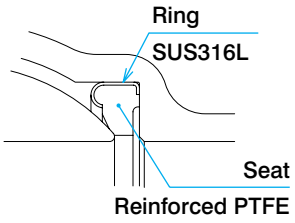
Material: Reinforced PTFE with Carbon Fiber **Features:** Superior in Less abrasion to PTFE

•Color: Black •Max. Working Temperature: 240°C (may change by working condition) •Applications: Sludge, Slurry, Powders

NGR

Material: Reinforced PTFE with Glass Fiber **Features:** Similar abrasion resistance as NCF.

•Color: White •Max. Working Temperature: 240°C (may change by working condition) •Applications: Food processing with fibers, where black color should be avoided.



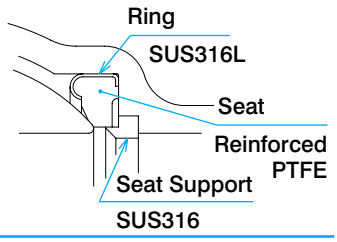
CFM (GRM)

Material: NCF (NGR) reinforced by outside metal ring (SUS316L Press molding)

Features:

Less seat damages at intermediate open position,
Less seat damages by jam or being pinched at high temperature,
Protection for seat damage or deformation by abnormal pressure rise

•Color: CFM Black (resin portion) / GRM White (resin portion) •Max. Working Temperature: 240°C (may change by working condition) •Applications: Steam, Sludge, Slurry, Powders



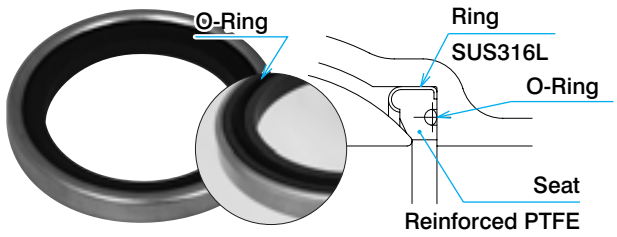
CFMR (GRMR)

Material: CFM (GRM) reinforced by inside metal ring

Features: Wider ranges of use than CFM (GRM)

Refer to page 11 for max working pressure and temperature range of use.

•Color: CFMR Black (resin portion) / GRMR White (resin portion) •Max. Working Temperature: 240°C (may change by working condition) •Applications: Steam, Sludge, Slurry, Powder

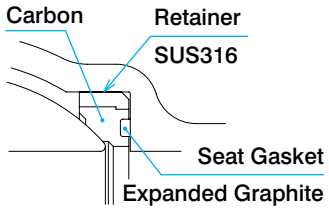


CFMO (GRMO)

Material: CFM (GRM) with O-ring in reverse.

Features: Inlet side sealing is expected for Floating Ball Valve.

•Color: CFMO Black (plastic portion) / GRMO White (plastic portion) •Size: DN40, 200 •Max. Working Temperature: 150°C (may change by working condition) •Applications: Sludge, Slurry



CB

Material: High temperature seat with thermal inserted Retainer (SUS316) outside impregnated Carbon graphite metal

Features: Rigidity is high and suitable for use of valve with intermediate open and flow control.

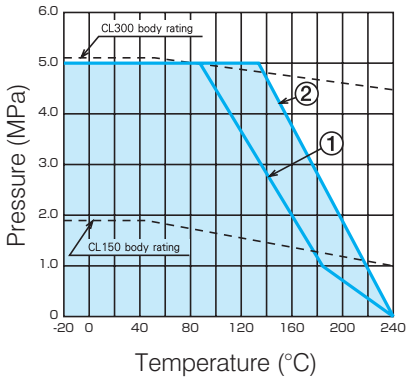
•Color: Black •Max. Working Temperature: 450°C (may change by working condition) •Applications: Steam, Heat transfer oil Tolerable seat leak volume; as per JIS B2003 rate B

Working Pressure and Temperature Range

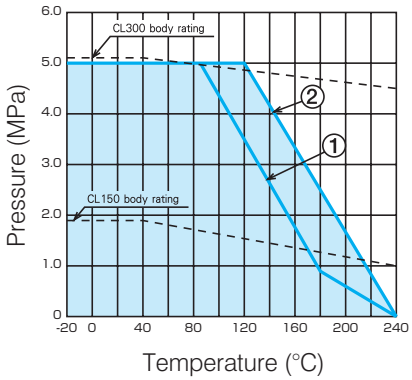
Valve Code: F100NB, E100JNC, E300NB-L2, EK100N (Trunnion type)

No.	Code	Mechanism
①	**NTF**	Floating Ball Type
	NCF, NGR, CFM	
②	**CFMR**	
③	**CFRS** (O-Ring: NBR)	Trunnion Ball Type
④	**CFRS** (O-Ring: FKM)	

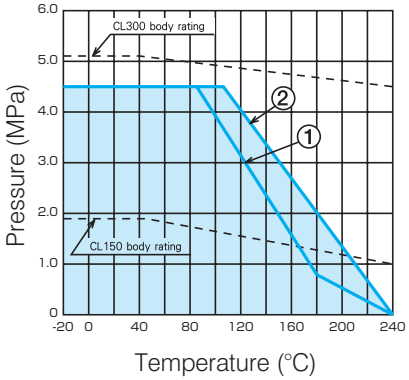
DN15 to 25



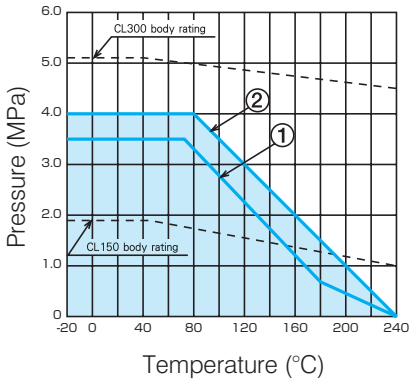
DN40 to 65



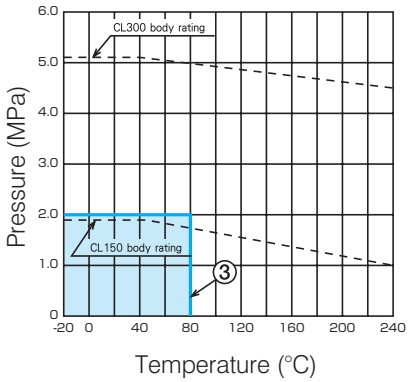
DN80 to 100



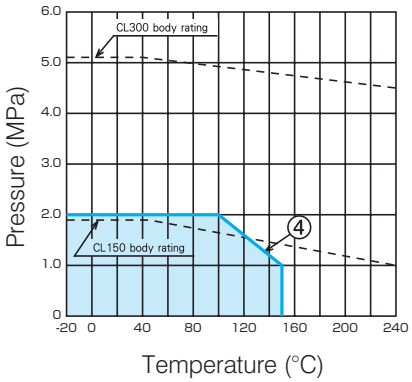
DN125 to 200



DN250 to 350 (Trunnion type)



DN250 to 350 (Trunnion type)



Cv Value: F100NB

Size (DN)	15	20	25	40	50	65	80	100	125	150	200
Cv	22	44	85	240	430	740	1200	2100	3400	5000	9700

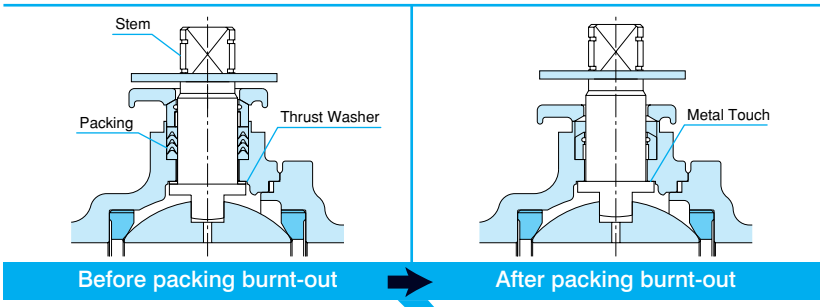
1-1 Fire Safe Ball Valve: F100NB

Structure and Features

Fire Safe type mechanism is to minimize fluid leakage by producing metal shut-off when seal parts such as seats and packings are burned out by fire.

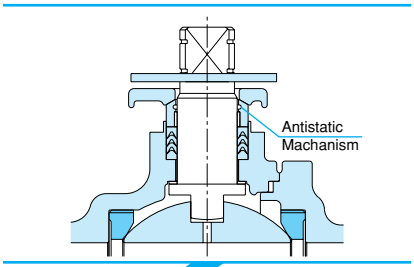
Gland Packing

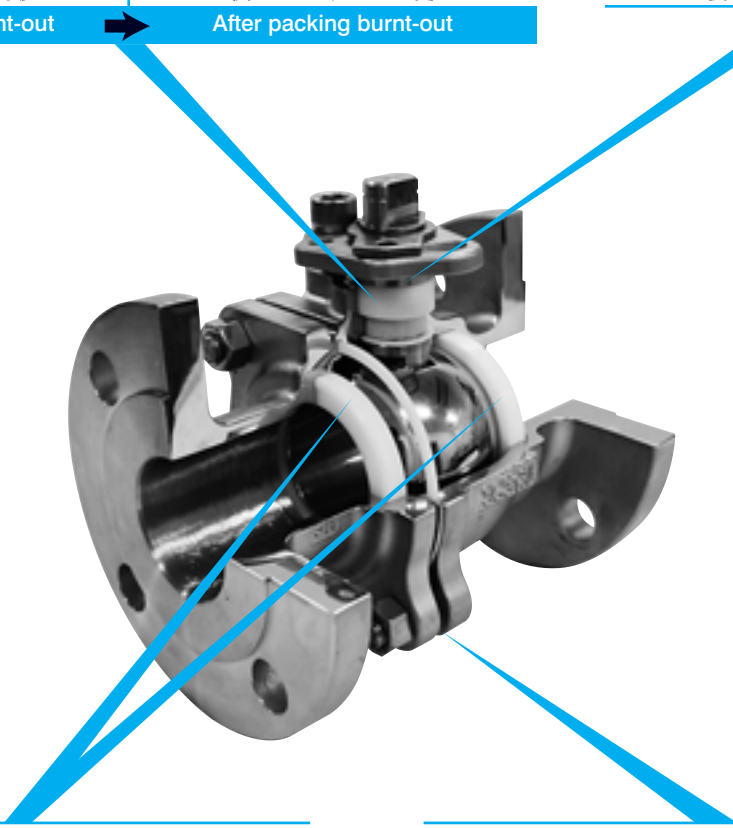
A collar provided on a stem prevents the stem from popping out due to fluid pressure. Also, in the event that the gland packing is burned out by fire, the stem flange adheres outside of the valve. (Stem Guard Mechanism)



Antistatic Mechanism

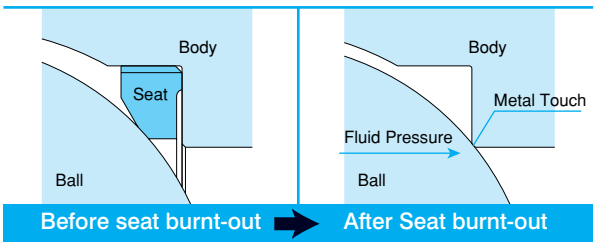
An Antistatic Mechanism is provided to prevent the accumulation of static electricity (produced by friction between the ball and seat) at Ball, Seat and Stem.





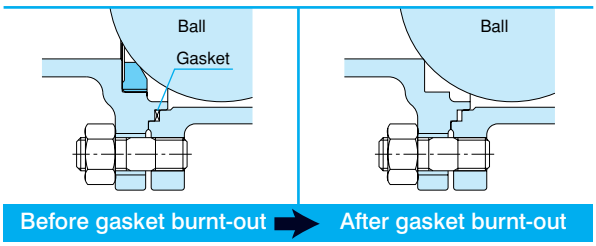
Seat

In the event that the seat is burned out by fire, the ball will come to rest firmly against metal seat, minimizing flud leakage.



Gasket

The seals for the body and flange joints have a double-layer sealing mechanism made up of gasket and a metal-to-metal contact, which prevents leakage at the body joint in the event that the gasket is burned out by fire.



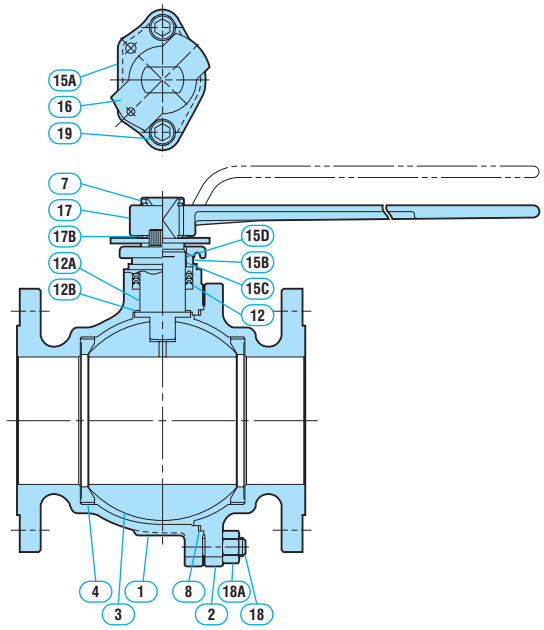
Specification

F100NB | Full Port | Floating Ball Valve

Nominal Size	DN15 to 200
Face to Face Dimension	Complied with ISO5752
Connection	Flanged type JIS10K, 20K (*1) Class (ASME, JPI) 150,300 (*2)
Body Material	FCD400, SCS13A (CF8), SCS14A (CF8M),SCS16A (CF3M)
Ball Material	SCS13A (SUS304), SCS14A (SUS316), SCS16A (SUS316L)
Seat Material	NTF, NCF, NGR, CFM, CFMR, CFMO (refer to page 10)
Operation Type	Lever, Gear, Pneumatical, Electrical
Paint (body)	Rust prevention paint (excluding stainless steel)

*1: JIS B2220 *2: ASME B16.5

Parts and Materials



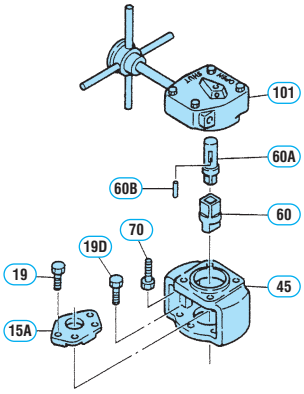
Parts		Material			
		F104NB	F107NB	F112NB	F113NB
1	Body	FCD400	SCS13A	SCS14A	SCS16A
2	Cap	FCD400	SCS13A	SCS14A	SCS16A
3	Ball	SCS13A or SUS304	SCS13A or SUS304	SCS14A or SUS316	SCS16A or SUS316L
4	Seat	NTF, NCF, etc.			
7	Stem	SUS304	SUS304	SUS316	SUS316L
8	Gasket	New-PTFE			
12	Packing	New-PTFE			
12A	Bearing	New-PTFE			
12B	Thrust Washer	New-PTFE			
15A	Gland Flange	SCS13A			
15B	Gland	SUS304			
15C	Stem Bearing	New-PTFE			
15D	Wire Spring	SUS304			
16	Travel Stop	SUS304			
17	Lever	SCPH2 (DN15/100), SCPH2 & STK490 (DN125/200)			
17B	Retaining Ring	SUS304			
18	Stud Bolt	SNB7	SUS304	SUS304	SUS304
18A	Nut	S45C	SUS303	SUS303	SUS303
19	Cap Screw	SUS304			
20	Set Screw	SUS304 (DN125 to 200 for lever)			

Applicable Class (DN15 to 200)

Body Material	Class			
	JIS10K	CL150	JIS20K	CL300
FCD400	○	○	—	—
SCS13A	○	○	○	○
SCS14A	○	—	—	—
SCS16A	○	○	○	○

Gear Operation

Gear operation types are available for DN100 or bigger one.



Parts for Gear

15A	Gland Flange	SCS13A
19	Cap Screw	SUS304
19D	Set Screw	SWCH
45	Yoke	FCD450
60	Joint	SCS13
60A	Joint	S25C
60B	Key	S45C
70	Cap Screw	SWCH
101	Gear Unit	—

Optional items

Lever Lock Mechanism, Square Shank, Open-Close indicator, Limit Switch, etc.

Valve Codes

Valve Code for F100NB

F 1 0 7 N B - N T F - 0 5 0 - J 1 0 K R F

1 ✻ 2 3 4

F100NB (Fire Safe Type Ball Valve)

1 Body Material

04	FCD400
07	SCS13A
12	SCS14A
13	SCS16A

2 Seat Material (Refer to Page 10)

NTF, NCF, NGR, CFM, CFMR

3 Nominal Size (DN or A)

Conforming to ISO6708 and JIS B2001

4 Connection

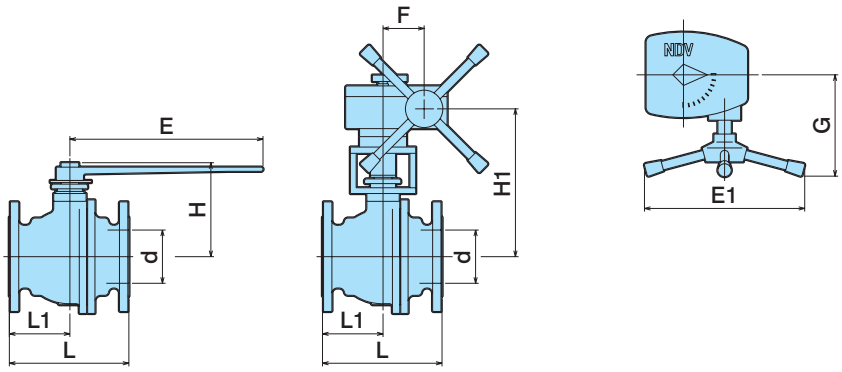
J10KRF	JIS 10KRF
J20KRF	JIS 20KRF
A150RF	ASME CL150
A300RF	ASME CL300

✻ Improvement Identification Code

None	Original Design
N	First Improvement
NB	Second Improvement
NC	Third Improvement
ND	Fourth Improvement

Dimension

F100NB (Full Port)



Unit: mm

Nominal size DN	d	L		L1		H	E		Lever Operated Valve H1		Gear Operated Valve G		F		E1		Mass (Approx. kg) Lever Operated		Gear Operated	
		10K CL150	20K CL300	10K CL150	20K CL300		10K CL150	20K CL300	10K CL150	20K CL300	10K CL150	20K CL300	10K CL150	20K CL300	10K CL150	20K CL300	10K CL150	20K CL300	10K CL150	20K CL300
15	13	108	140	45	63	80	130	130	—	—	—	—	—	—	—	—	1.9	2.3	—	—
20	19	117	152	50	70	85			—	—	—	—	—	—	—	—	2.5	3.0	—	—
25	25	127	165	51	71	100	160	160	—	—	—	—	—	—	—	—	4.0	4.7	—	—
40	38	165	190	70.5	76.5	115	230	230	—	—	—	—	—	—	—	—	6.5	7.3	—	—
50	51	178	216	80.5	86	120			—	—	—	—	—	—	—	—	8.5	10.1	—	—
65	64	190	241	87	103	135	350	350	—	—	—	—	—	—	—	—	13.5	17.0	—	—
80	76	203	283	97	124	145			—	—	—	—	—	—	—	—	16.5	23.0	—	—
100	102	229	305	116	135	180	450	450	280	285	165	190	62.5	77	240	300	27.0	38.5	41.0	57.5
125	127	356	381	148	158	260	650	800	342	342	190	230	77	90.5	300	460	46.0	59.0	73.0	92.0
150	152	394	403	173	178	280			362	362							61.0	75.0	88.0	108.0
200	203	457	502	207	235	350	800	1100	425	446	230	260	90.5	121	460		98.0	123.0	135.0	174.0

1-2 High Pressure / Large Bore Valve: E(K)100S

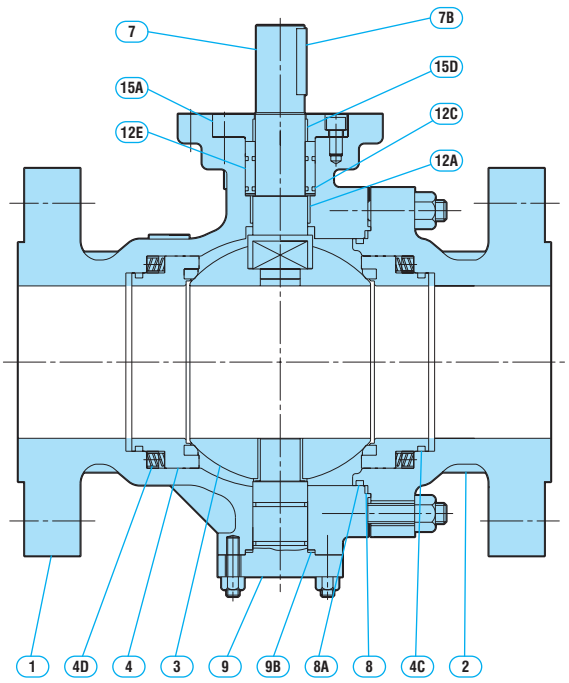
Structure and Features

Trunnion Type Ball Valve is mainly used for high pressure fluid with sludge in addition to the other general use.
High pressure valve: JIS30K(CL600) or more.
Large Boar valve: DN250 or more.

Nominal Size	DN15 to 500, (DN15 to 50: Floating Ball Type)
Body Material	SCPH2 (WCB), SCS13A (CF8), SCS14A (CF8), SCS16A (CF3M)
Seat Material	PTFE, Reinforced PTFE
Connection	Flange JIS10K, 20K, 30K, 40K, 63K (*1) Class (ASME, JPI) 150, 300, 600, 900 (*2)
Operation Type	Gear (DN50 or more of JIS40K, CL600) Pneumatical, Electrical

*1: JIS B2220 *2: ASME B16.5

Parts and Materials (Reference)

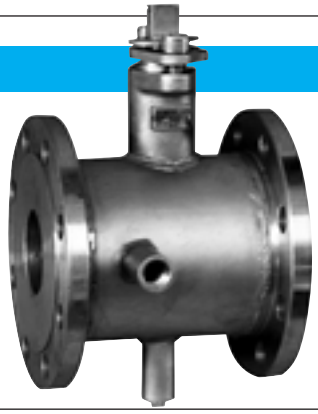


Parts		Material			
1	Body	SCPH2	SCS13A	SCS14A	SCS16A
2	Cap	SCPH2	SCS13A	SCS14A	SCS16A
3	Ball	SCS13A		SCS14A	SCS16A
4	Seat	Carbon Reinforced PTFE			
4C	O-Ring	NBR	FKM		
4D	Spring	SUS304WPB	Inconel X-750		
7	Stem	SUS304		SUS316	SUS316L
7B	Key	S45C-H			
8	Gasket	SUS304 & Expanded Graphite		SUS316 & Expanded Graphite	
8A	O-Ring	NBR	FKM		
9	Trunnion	SCS13A		SCS14A	SCS16A
9B	Gasket	SUS304 & Expanded Graphite		SUS316 & Expanded Graphite	
12A	Bearing	SPCC *	SUS316 & PTFE		
12C	O-Ring	NBR	FKM		
12E	Sleeve	SUS304		SUS316	SUS316L
15A	Gland	S20C	SUS304		
15D	Bearing	SPCC *			

* SPCC (Galvanized) & PTFE coating

For further technical details and specifications, Please contact NDV or local representative.

1-3 Jacketed Ball Valve: E100JNC



Structure and Features

Jacketed Ball Valve contains a jacket that covers the body. The valve has space for flow media such as hot water, steam or water for heating or cooling the fluid and is suitable for high viscous or easily frozen fluid.

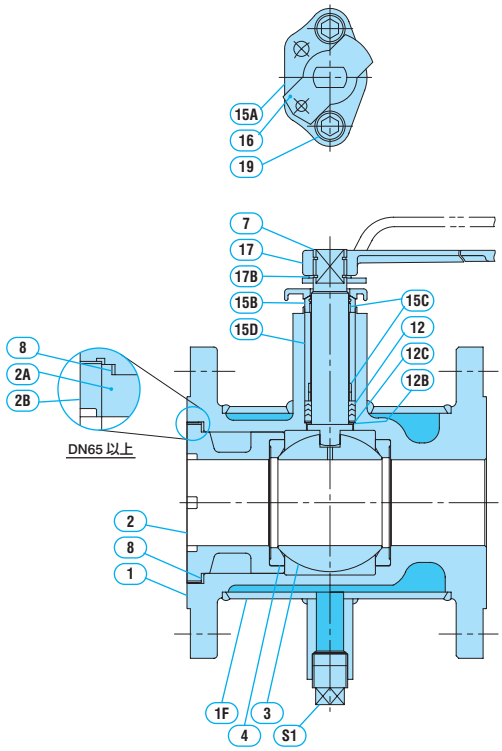
Specification

E100JNC type | Full Port | Floating Ball Valve

Nominal Size	DN15 to 200	
Connection	Flange JIS10K, 20K (*1) Class (ASME,JPI) 150,300 (*2)	
Body Material	SCS14 (CF8M), SCS16A (CF3M) •Flange is oversized (refer to Dimension of E100JNC at page 17) •JIS20K, CL300 are available up to DN100.	
Ball Material	SCS14A (SUS316), SCS16A (SUS316L)	
Seat Material	NTF, NCF, NGR, CFM, CFMR, CFMO (refer to page 10)	
Operation Type	Lever, Gear, Pneumatical, Electrical	
Jacket	Max. Pressure	1.0MPa
	Max. Temperature	250°C
	Connection	2-Rp (Parallel pipe thread)
	Discharge (Lower Plug)	1-Rp (Parallel pipe thread)

The other special specifications are available upon request.
*1: JIS B2220 *2: ASME B16.5

Parts and Materials



Parts		Material	
		E112JNC	E113JNC
1	Body	SCS14A	SCS16A
1F	Jacket	SUS304TP or SUS304	
2	Insert	SCS14A	SCS16A
2A	Insert	SCS14A	SCS16A
2B	Insert Ring (DN65–200)	SCS14A	SCS16A
3	Ball	SCS14A or SUS316	SCS16A or SUS316L
4	Seat	NTF, NCF, CFM, etc.	
7	Stem	SUS316	SUS316L
8	Gasket	PTFE	
12	Packing	Reinforced PTFE	
12B	Thrust Washer	New-PTFE	
12C	Washer	SUS316	SUS316L
15A	Gland Flange	SCS13A	
15B	Gland	SUS304	
15C	Bearing	New-PTFE	
15D	Spacer	SUS304	
16	Travel Stop	SUS304	
17	Lever	SCPH2 (DN15 to 100)	
		SCPH2 & STK490 (DN125 to 200)	
17B	Retaining Ring	SUS304	
19	Cap Screw	SUS304	
S1	Plug	SUS304	

Valve Codes

Valve Code for E100JNC

E 1 1 2 J N C - N T F - 0 5 0 - J 1 0 K R F

1 ✻ 2 3 4

E100JNC (Jacketed Ball Valve)

1 Body Material

12	SCS14A
13	SCS16A

2 Seat Material (Refer to Page 10)

NTF, NCF, NGR, CFM, CFMR

3 Nominal Size (DN or A)

Conforming to ISO6708 and JIS B2001

4 Connection

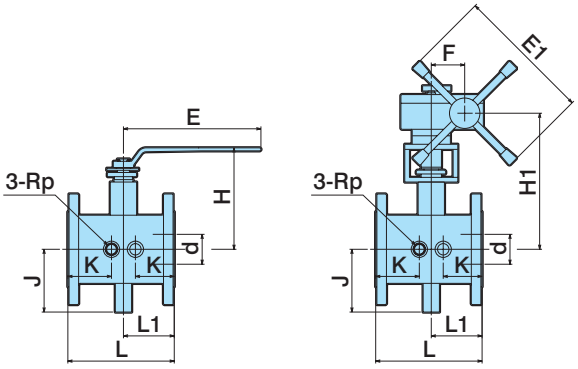
J10KRF	JIS 10KRF
J20KRF	JIS 20KRF
A150RF	ASME CL150
A300RF	ASME CL300

✻ Improvement Identification Code

None	Original Design
N	First Improvement
NB	Second Improvement
NC	Third Improvement
ND	Fourth Improvement

Dimension

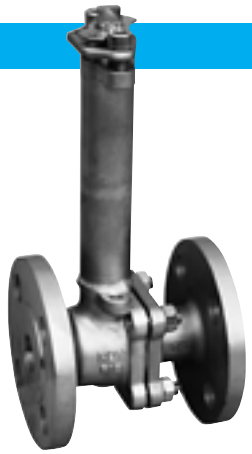
E100JNC



Unit: mm

Nominal size DN	d	L	L1	K	J	Rp	Lever Operated Valve H	Lever Operated Valve E	Gear Operated Valve H1	Gear Operated Valve E1	Gear Operated Valve F	Connection Flange size DN	Mass (Approx. kg) Lever 10K CL150	Mass (Approx. kg) Gear 10K CL150
15	13	108	54	54	78	1/2	130	130	—	—	—	40	5.2	—
20	19	117	58.5	58.5			134		—	—	—		5.5	—
25	25	127	63.5	63.5	86		142	160	—	—	—	50	6.8	—
40	38	165	82.5	60	99		160	230	—	—	—	65	11.2	—
50	51	178	93	65	105		169		—	—	—	80	13.3	—
65	64	190	100		118		188	350	—	—	—	100	20.0	—
80	76	203	108	70	131		199		—	—	—	125	27.0	—
100	102	229	119	75	148		210	450	314	240	62.5	150	43.0	57.0
125	127	267	152	80	176	3/4	302	650	387	300	77	200	67.0	94.0
150	152	292		85	202		322		407			250	98.0	125.0
200	203	330	165	90	243		390	800	471	460	90.5	350	162.0	199.0

1-4 Extended Gland Ball Valve



Structure and Features

Extended Gland is designed for valve with insulation material or valve used for high or low temperature fluid which causes valve deterioration.
Since the stem is extended, operation (open/close), as well as additional screw tightening for gland packing, is easy.

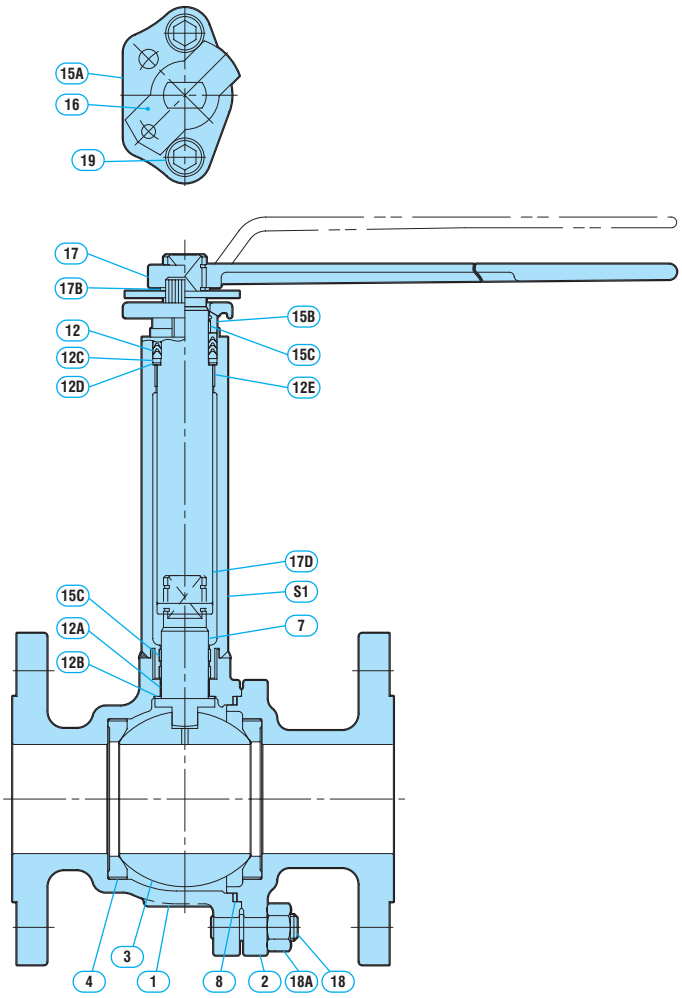
Specification

FEX100NB | Full Port | Floating Ball

Nominal Size	DN15 to 150
Face to Face dimension	Conforming to ISO 5752
Connection	Flange JIS10K, 20K (*1), Class (ASME,JPI) 150,300 (*2)
Body Material	SCS13A (CF8), SCS14A (CF8M), SCS16A (CF3M)
Ball Material	SCS13A (SUS304), SCS14 (SUS316), SCS16A (SUS316L)
Seat Material	NTF, NCF, CFM, CFMR, CFMO (refer to page 10)
Operation Type	Lever, Gear, Pneumatical, Electrical

Note: Above specification is for fire safe type ball valve F100NB
Extended Gland for other types are available upon request.
*1: JIS B2220 *2: ASME B16.5

Parts and Materials



Parts		Material		
		FEX107NB	FEX112NB	FEX113NB
1	Body	SCS13A	SCS14A	SCS16A
2	Cap	SCS13A	SCS14A	SCS16A
3	Ball	SCS13A or SUS304	SCS14A or SUS316	SCS16A or SUS316L
4	Seat	NTF, NCF, etc.		
7	Stem	SUS304	SUS316	SUS316L
8	Gasket	New-PTFE		
12	Packing	New-PTFE		
12A	Bearing	New-PTFE		
12B	Thrust Washer	New-PTFE		
12C	Washer	SUS316		SUS316L
12D	Thrust Washer	New-PTFE		
12E	Bearing	New-PTFE		
15A	Gland Flange	SCS13A		
15B	Gland	SUS304		
16	Travel Stop	SUS304		
17	Lever	SCPH2		
17B	Retaining Ring	SUS304		
17D	Extended Rod	SUS304	SUS316	SUS316L
18	Stud Bolt	SUS304		
18A	Nut	SUS304		
19	Cap Screw	SUS304		
S1	Extended Gland	SCS13A or SUS304	SCS14A or SUS316	SCS16A or SUS316L

Valve Codes

Valve Code for FEX100NB

FEX107NB-NTF-050-J10KRF

1 ✻ 2 3 4

FEX100NB (Extended Gland Ball Valve)

1 Body Material

07	SCS13A
12	SCS14A
13	SCS16A

2 Seat Material (Refer to Page 10)

NTF, NCF, NGR, CFM, CFMR

3 Nominal Size (DN or A)

Conforming to ISO6708 and JIS B2001

4 Connection

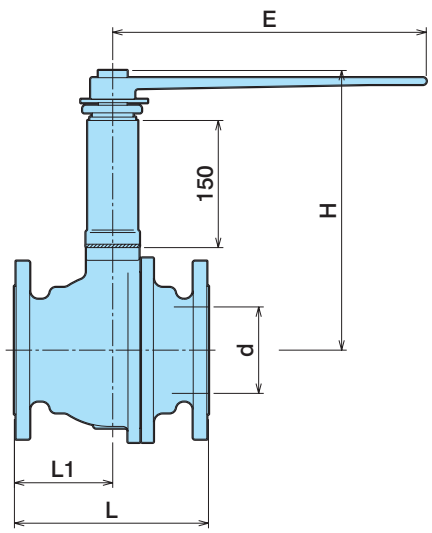
J10KRF	JIS 10KRF
J20KRF	JIS 20KRF
A150RF	ASME CL150
A300RF	ASME CL300

✻ Improvement Identification Code

None	Original Design
N	First Improvement
NB	Second Improvement
NC	Third Improvement
ND	Fourth Improvement

Dimension

FEX100NB



Unit: mm

Nominal size DN	d	L		L1		H	E		Mass (Approx. kg)	
		10K CL150	20K CL300	10K CL150	20K CL300		10K CL150	20K CL300	10K CL150	20K CL300
15	13	108	140	45	63	230	130	130	2.6	3.1
20	19	117	152	50	70	235			3.1	3.7
25	25	127	165	51	71	250	160	160	5.0	5.8
40	38	165	190	70.5	76.5	265	230	230	8.2	9.3
50	51	178	216	80.5	86	270			10.0	11.9
65	64	190	241	87	103	285	350	350	16.0	20.0
80	76	203	283	97	124	295			19.0	26.0
100	102	229	305	116	135	330	450	450	30.0	42.0
125	127	356	381	148	158	410	650	800	53.0	66.8
150	152	394	403	173	178	430			67.0	81.8