



# SERIES S320/F520

Cryogenic Ball Valve

## **INTRODUCTION | S320**

### **Three-Piece Cryogenic Ball Valve**

The Series S320 is a three-piece cryogenic ball valve engineered for dependable performance in low-temperature environments. Featuring PCTFE seats, the valve is particularly suited for applications involving extreme temperatures, such as the use of liquid nitrogen in freezer systems. Its long stem design ensures that the valve packing stays heated, preventing freezing between the packing and stem, which could otherwise cause leakage and disrupt valve operation.

## **TECHNICAL SUMMARY**

SIZE RANGE	Full Port	1/4" to 2" ( DN8 to 50 )
	Reduced Port	1/2" to 2" ( DN15 to 50 )
PRESSURE RATING	1000 WOG	
END CONNECTIONS	Threaded, Butt Weld, Socket Weld, Flanged, Tube Butt Weld	
VALVE TYPE	Full / Reduced Port	
BODY & END CAP MATERIAL ( ASTM )	CF8M, CF3M	
BODY & END CAP MATERIAL ( EN )	1.4408, 1.4409	
SEAT MATERIAL	PCTFE	
HANDLE TYPE	Cast	
HANDLE MATERIAL	Cast - CF8, CF8M	
V-PORT OPTION	N/A	
WITH ANTI-STATIC DEVICE OPTION	Yes	
OPERATION	Pneumatic or Electric Actuated	
WITH ENCAPSULATED BOLTS DESIGN	Full Port	1/4" to 1-1/2" ( DN8 to 40 )
	Reduced Port	1/2" to 2" ( DN15 to 50 )

## **STANDARD OF COMPLIANCE**

MATERIAL CERTIFICATION	EN 10204-3.1
DESIGN	ASME B16.34 / EN12516-1 / EN 12516-3
THREADED END CONNECTIONS	NPT ASME B1.20.1 BSPP ISO 228-1 BSPT ISO 7-1 DIN 2999
SOCKET WELD END CONNECTIONS	ASME B16.11
BUTT WELD END CONNECTIONS	ASME B16.25
FLANGED END CONNECTIONS	EN 1092-1 PN16 / PN40 ASME B16.5 CLASS 150
PRESSURE TESTING	API 598
MOUNTING PAD	ISO 5211
FIRE SAFE	Design
MARKING	ISO 5209
CE APPROVAL	2014 / 68 / EU Module H
QUALITY ASSURANCE	ISO 9001:2015

\*Remark when required : CE, SIL 3, ATEX

## INTRODUCTION | F520

### Two-Piece Flanged Cryogenic Ball Valve

The Series F520 is a two-piece flange cryogenic ball valve engineered for dependable performance in low-temperature environments. Featuring PCTFE seats, the valve is particularly suited for applications involving extreme temperatures, such as the use of liquid nitrogen in freezer systems. Its long stem design ensures that the valve packing stays heated, preventing freezing between the packing and stem, which could otherwise cause leakage and disrupt valve operation.

## TECHNICAL SUMMARY

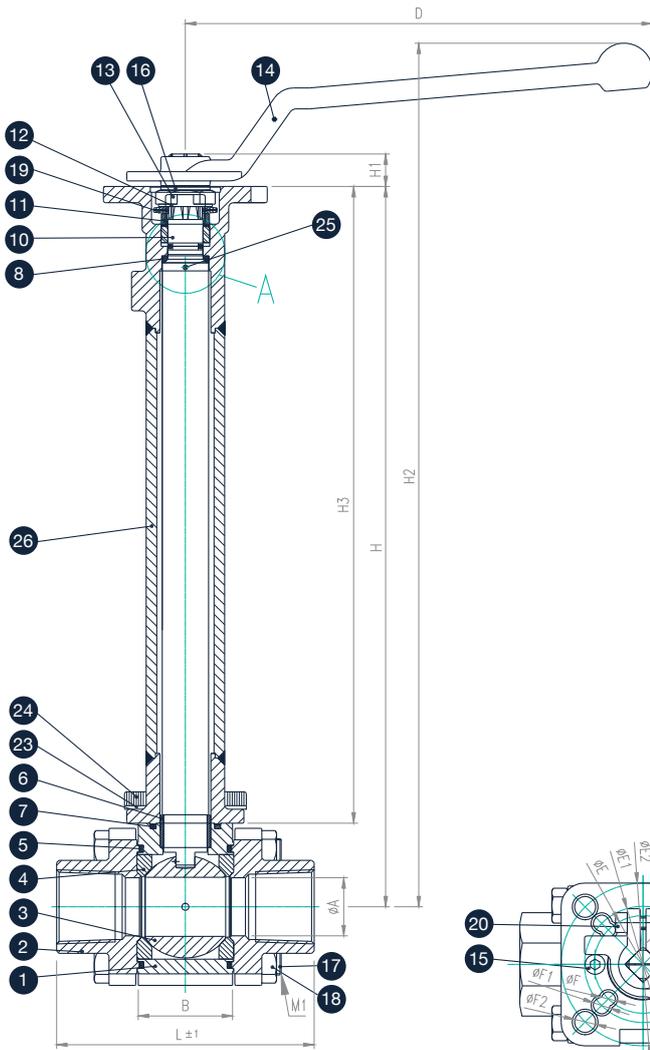
SIZE RANGE	Full Port 1/2" to 4" ( DN15 to 100 )
PRESSURE RATING	CLASS 150, PN16/40
BODY & END CAP MATERIAL ( ASTM )	CF8M, CF3M
BODY & END CAP MATERIAL ( EN )	1.4408, 1.4409
SEAT MATERIAL	PCTFE
HANDLE TYPE	Cast
HANDLE MATERIAL	Cast - CF8, CF8M
V-PORT OPTION	Yes
WITH ANTI-STATIC DEVICE OPTION	Yes
OPERATION	Pneumatic or Electric Actuated

## STANDARD OF COMPLIANCE

MATERIAL CERTIFICATION	EN 10204-3.1
DESIGN	ASME B16.34 / EN12516-1 / EN 12516-3
FLANGED END CONNECTIONS	ASME B16.5 CLASS 150 EN 1092-1 PN16 / PN40
PRESSURE TESTING	API 598
MOUNTING PAD	ISO 5211
FIRE SAFE	DESIGN
MARKING	ISO 5209
CE APPROVAL	2014 / 68 / EU Module H
QUALITY ASSURANCE	ISO 9001:2015

CONSTRUCTION-BILL OF MATERIAL

SERIES S320-10  
1/4"~ 2"



NO.	Parts	Material	Qty
1	Body	CF8M	* 1
2	End cap	CF8M	* 2
3	Ball	SS316 / CF8M	* 1
4	Seat	PCTFE	2
5	Joint Gasket	GRAPHITE	2
6	Stem Bearing	PTFE	1
7	Joint Gasket	GRAPHITE	1
8	Thrust Washer	TFM1600	1
9	Gland Packing	GRAPHITE	1
9.1	Gland Packing	25% GLASS FIBER FILED+PTFE	1
10	Stem	17-4PH	* 1
11	Gland Bush	SS304	1
12	Stop Washer	SS304	1
13	Stem Nut	SS304	1
14	Handle	CF8	1
15	Stop Pin	SS304	1
16	Stem Washer	SS304	1
17	Bolt	SS304	* 4
18	Bolt Nut	SS304	* 4
19	Belleville Washer	SS301	2
20	Screw	SS304	1
21	Nut	SS304	1
22	O-Ring	VITON	1
23	Screw Washer	SS304	* 4
24	Screw	SS304	* 4
25	Anti-static Device	SS316	* 2
26	Extended Bonnet	CF8M	* 1

\* Cryogenic Treatment before Assembly

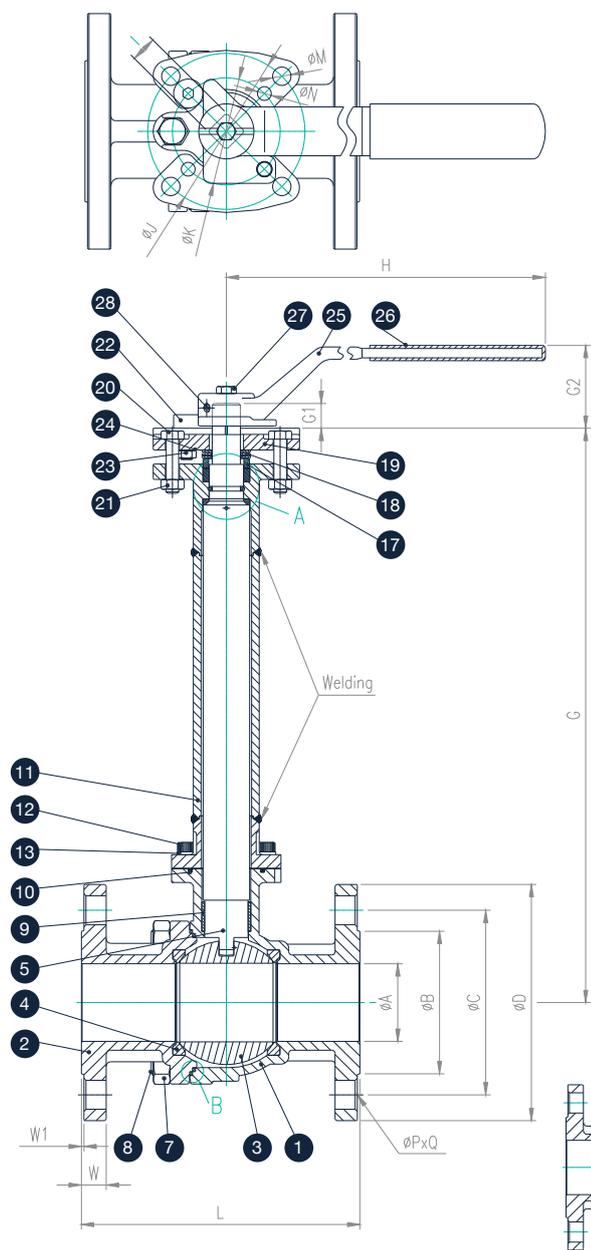


DIMENSIONS(mm)

SIZE	øA		B		D		øE		øE1		øE2		øF		øF1		øF2		G		H		H1		H2		H3		L		M1		ISO5211		
	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F		
1/4"	11.5	-	24.5	-	160	-	36	-	42	-	50	-	6.5	-	-	-	7	-	9	-	300	-	9	-	345.5	-	271	-	75	-	M6	-	F03/ F04/F05	-	-
3/8"	12.6	-	24.5	-	160	-	36	-	42	-	50	-	6.5	-	-	-	7	-	9	-	304	-	9	-	345.5	-	271	-	75	-	M6	-	F03/ F04/F05	-	-
1/2"	15	12.6	24.5	24.5	160	160	36	36	42	42	50	50	6.5	6.5	-	-	7	7	9	9	300	304	9	9	345.5	345.5	271	271	72.5	75	M6	M6	F03/ F04/F05	F03/ F04/F05	F03/ F04/F05
3/4"	20	15	31.4	24.5	160	160	36	36	42	42	50	50	6.5	6.5	-	-	7	7	9	9	304	300	9	9	349.5	345.5	271	271	85.4	72.5	M8	M6	F03/ F04/F05	F03/ F04/F05	F03/ F04/F05
1"	25	20	41.3	31.4	200	160	42	36	50	42	70	50	6	6.5	7	-	9	7	11	9	310	304	11	9	370	349.5	274	271	105.3	85.4	M8	M8	F04/ F05/F07	F04/ F05/F07	F03/ F04/F05
1-1/4"	32	25	48.4	41.3	200	200	42	42	50	50	70	70	6	6	7	7	9	9	11	11	314	310	11	11	374	370	274	274	111	105.3	M10	M8	F04/ F05/F07	F04/ F05/F07	F03/ F04/F05
1-1/2"	38	32	56.3	48.4	250	200	50	42	70	50	-	70	7.5	6	9	7	-	9	14	11	328.8	314	14	11	397.8	374	282	274	127.3	111	M10	M10	F05/F07	F04/ F05/F07	F03/ F04/F05
2"	50	38	71.4	56.3	250	250	50	50	70	70	-	-	7.5	7.5	9	9	-	-	14	14	353.3	328.8	14	14	422.3	397.8	282	282	145	127.3	M12	M10	F05/F07	F05/F07	F03/ F04/F05

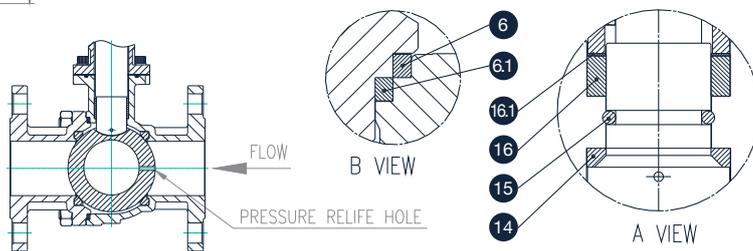
CONSTRUCTION-BILL OF MATERIAL

ASME CLASS 150  
SERIES F520-10  
1/2"~ 2-1/2"



NO.	Parts	Material	Qty
1	Body	CF8M	* 1
2	End cap	CF8M	* 1
3	Ball	SS316 / CF8M	* 1
4	Seat	PCTFE	2
5	Stem	17-4PH	* 1
6	Joint Gasket	PTFE	1
6.1	Joint Gasket	GRAPHITE	1
7	Bolt	SS304	* &
8	Bolt nut	SS304	* &
9	Stem Bearing	PTFE	1
10	Joint Gasket	GRAPHITE	1
11	Extended Bonnet	CF8M	* 1
12	Screw	SS304	* 4
13	Screw Washer	SS304	* 4
14	Thrust Washer	TFM1600	1
15	O-Ring	VITON	1
16	Gland Packing	GRAPHITE	1
16.1	Gland Packing	25% GLASS FIBER FILED+PTFE	1
17	Gland Bush	SS304	1
18	Belleville Washer	SS301	3
19	Gland	CF8	1
20	Gland Bolt	SS304	2
21	Gland Nut	SS304	2
22	Stop Pin	SS304	1
23	Pin Nut	SS304	1
24	Washer	SS304	1
25	Handle	CF8	1
26	Handle Cover	VINYL	1
27	Handle Bolt	SS304	1
28	Handle Screw	SS304	1

\* Cryogenic Treatment before Assembly  
For 1-1/2"~ 2" (4pcs of balts and bolt nuts) , For 2-1/2" (6pcs of balts and bolt nuts)

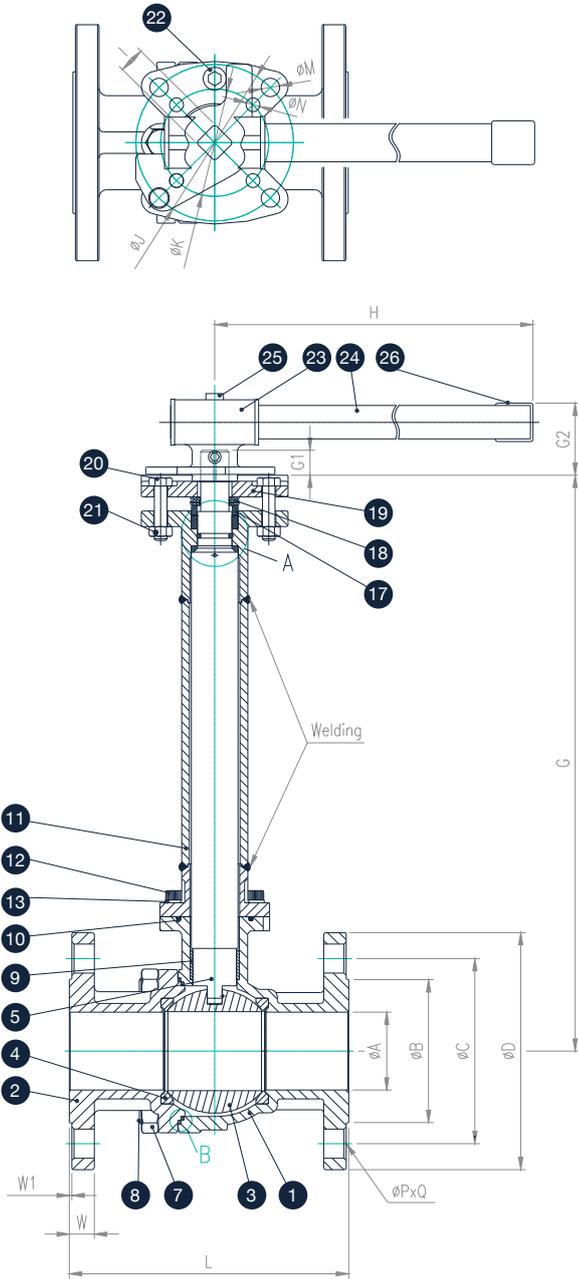


DIMENSIONS(mm)

SIZE	øA	øB	øC	øD	W	W1	L	G	G1	G2	H	I	øJ	øK	øM	øN	øP	Q	ISO5211
1/2"	15	35.1	60.5	88.9	11.2	1.6	108.3	310	10	35.5	161.5	9	50	42	7	6.5	16	4	FOR F04 / F05
3/4"	20	42.9	69.9	98.6	11.2	1.6	117.3	317.5	10	35.5	161.5	9	50	42	7	6.5	16	4	FOR F04 / F05
1"	25	50.8	79.2	108	11.2	1.6	127.1	330	12	42.2	213.7	11	70	50	9	7.5	16	4	FOR F05 / F07
1-1/4"	32	63.5	88.9	117.3	12.7	1.6	139.7	335.2	12	42.2	213.7	11	70	50	9	7.5	16	4	FOR F05 / F07
1-1/2"	38	73.2	98.6	126	14.3	1.6	165.1	362.3	16	53.5	262	14	70	50	9	7.5	16	4	FOR F05 / F07
2"	50	91.9	120.7	152.4	15.9	1.6	178.3	370.4	16	53.5	262	14	70	50	9	7.5	19	4	FOR F05 / F07
2-1/2"	65	104.6	139.7	177.8	17.6	1.6	190	397.2	19	53.5	262	17	102	70	12	10	19	4	FOR F07 / F10

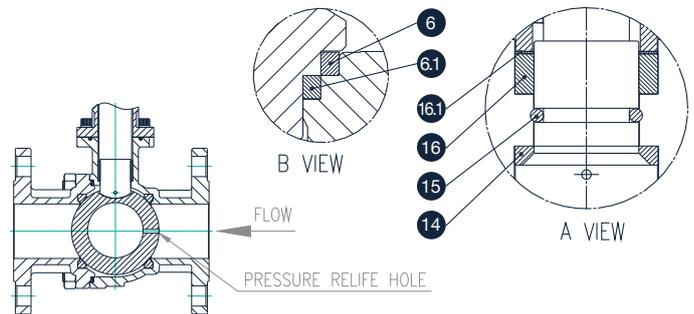
CONSTRUCTION-BILL OF MATERIAL

ASME CLASS 150  
SERIES F520-10  
3"~ 4"



NO.	Parts	Material	Qty
1	Body	CF8M	* 1
2	End cap	CF8M	* 1
3	Ball	CF8M	* 1
4	Seat	PCTFE	2
5	Stem	17-4PH	* 1
6	Joint Gasket	PTFE	1
6.1	Joint Gasket	GRAPHITE	1
7	Bolt	SS304	* 8
8	Bolt nut	SS304	* 8
9	Stem Bearing	PTFE	1
10	Joint Gasket	GRAPHITE	1
11	Extended Bonnet	CF8M	* 1
12	Screw	SS304	* 4
13	Screw Washer	SS304	* 4
14	Thrust Washer	TFM1600	1
15	O-Ring	VITON	1
16	Gland Packing	GRAPHITE	1
16.1	Gland Packing	25% GLASS FIBER FILED+PTFE	1
17	Gland Bush	SS304	1
18	Belleville Washer	SS301	3
19	Gland	CF8	1
20	Gland Bolt	SS304	2
21	Gland Nut	SS304	2
22	Stop Pin	SS304	1
23	Handle-A	SS304	1
24	Handle-B	SS304	1
25	Handle Bolt	SS304	2
26	Handle Cover	VINYL	1

\* Cryogenic Treatment before Assembly

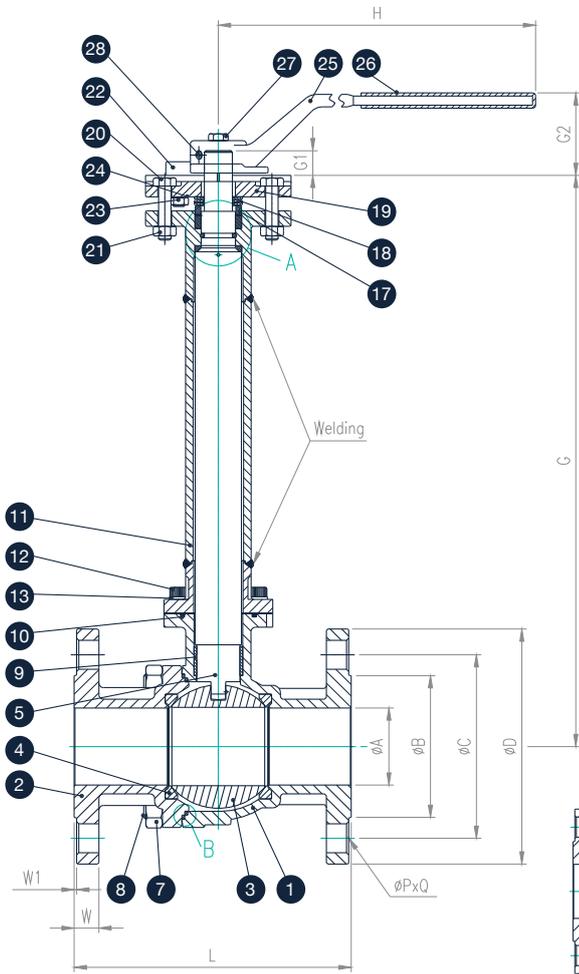
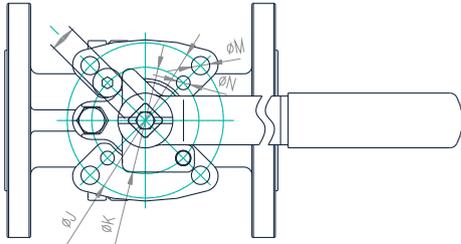


DIMENSIONS(mm)

SIZE	øA	øB	øC	øD	W	W1	L F4	G	G1	G2	H	I	øJ	øK	øM	øN	øP	Q	ISO5211
3"	80	127	152.4	190.5	19	1.6	203.5	407.4	24	46.2	365	22	125	102	14	12	19	4	FOR F10 / F12
4"	100	157.2	190.5	228.6	23.9	1.6	228.5	422.4	24	46.2	365	22	125	102	14	12	19	8	FOR F10 / F12

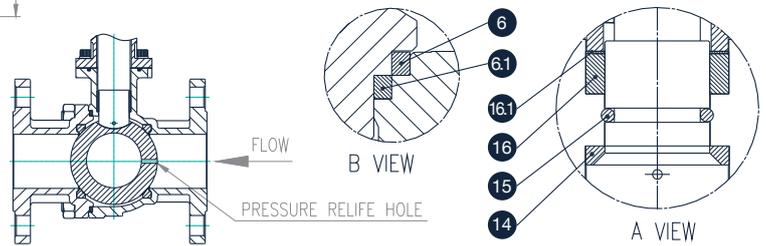
CONSTRUCTION-BILL OF MATERIAL

DIN PN16  
SERIES F520-40  
1/2" ~ 2-1/2"



NO.	Parts	Material	Qty
1	Body	1.4408	* 1
2	End cap	1.4408	* 1
3	Ball	SS316 / 1.4408	* 1
4	Seat	PCTFE	2
5	Stem	17-4PH	* 1
6	Joint Gasket	PTFE	1
6.1	Joint Gasket	GRAPHITE	1
7	Bolt	SS304	* &
8	Bolt nut	SS304	* &
9	Stem Bearing	PTFE	1
10	Joint Gasket	GRAPHITE	1
11	Extended Bonnet	CF8M	* 1
12	Screw	SS304	* 4
13	Screw Washer	SS304	* 4
14	Thrust Washer	TFM1600	1
15	O-Ring	VITON	1
16	Gland Packing	GRAPHITE	1
16.1	Gland Packing	25% GLASS FIBER FILED+PTFE	1
17	Gland Bush	SS304	1
18	Belleville Washer	SS301	3
19	Gland	CF8M	1
20	Gland Bolt	SS304	2
21	Gland Nut	SS304	2
22	Stop Pin	SS304	1
23	Pin Nut	SS304	1
24	Washer	SS304	1
25	Handle	CF8M	1
26	Handle Cover	VINYL	1
27	Handle Bolt	SS304	1
28	Handle Screw	SS304	1

□ Without O-ring design available

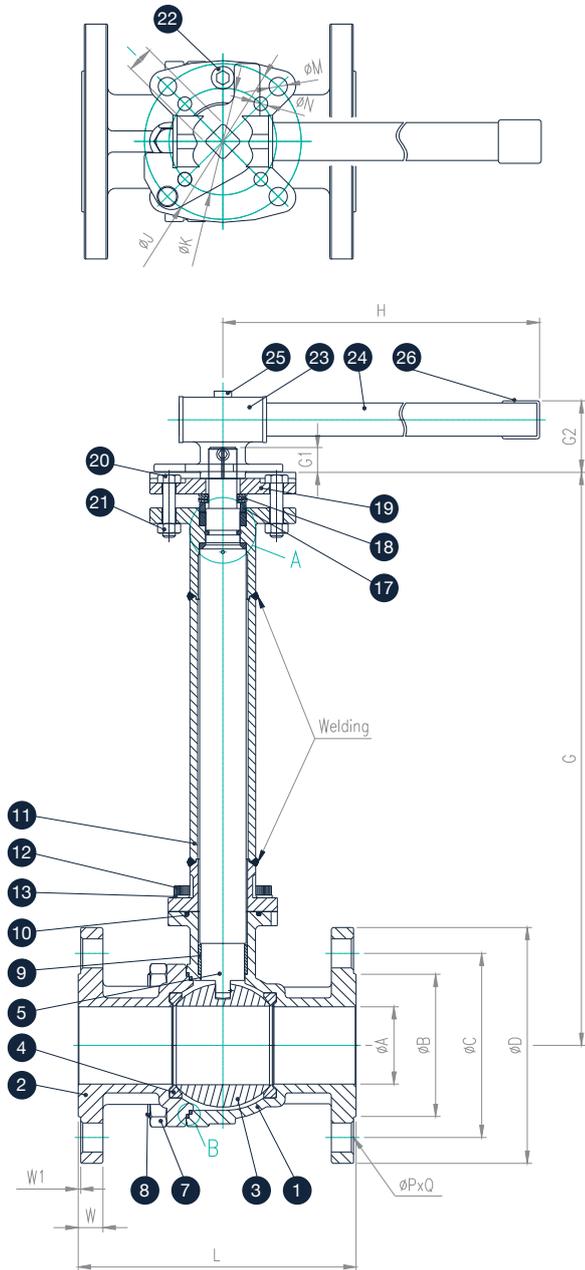


DIMENSIONS(mm)

SIZE	øA	øB	øC	øD	W	W1	L F1	G	G1	G2	H	I	øJ	øK	øM	øN	øP	Q	ISO5211
1/2"	15	45	65	95	16	2	115	310	10	35.5	161.5	9	50	42	7	6.5	14	4	FOR F04 / F05
3/4"	20	58	75	105	18	2	120	317.5	10	25.5	161.5	9	50	42	7	6.5	14	4	FOR F04 / F05
1"	25	68	85	115	18	2	125	330	12	42.2	213.7	11	70	50	9	7.5	14	4	FOR F05 / F07
1-1/4"	32	78	100	140	18	2	130	335.2	12	42.2	213.7	11	70	50	9	7.5	18	4	FOR F05 / F07
1-1/2"	38	88	110	150	16	3	140	362.3	16	53.5	262	14	70	50	9	7.5	18	4	FOR F05 / F07
2"	50	102	125	165	18	3	150	370.4	16	53.5	262	14	70	50	9	7.5	18	4	FOR F05 / F07
2-1/2"	65	122	145	185	18	3	170	397.2	19	53.5	262	17	102	70	12	10	18	4	FOR F07 / F10

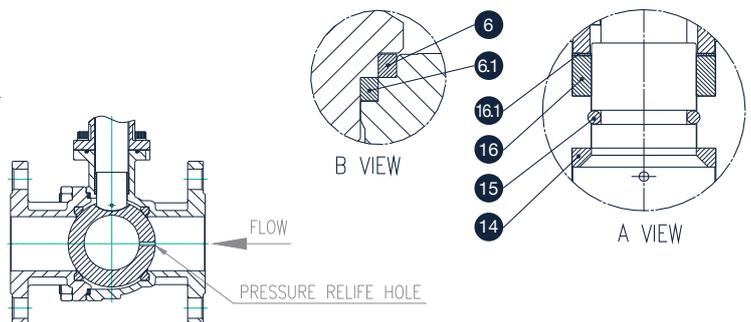
CONSTRUCTION-BILL OF MATERIAL

DIN PN16  
SERIES F520-40  
3" ~ 4"



NO.	Parts	Material	Qty
1	Body	1.4408	* 1
2	End cap	1.4408	* 1
3	Ball	1.4408	* 1
4	Seat	PCTFE	2
5	Stem	17-4PH	* 1
6	Joint Gasket	PTFE	1
6.1	Joint Gasket	GRAPHITE	1
7	Bolt	SS316	* 8
8	Bolt nut	SS316	* 8
9	Stem Bearing	PTFE	1
10	Joint Gasket	GRAPHITE	1
11	Extended Bonnet	CF8M	* 1
12	Screw	SS316	* 4
13	Screw Washer	SS316	* 4
14	Thrust Washer	TFM1600	1
15	O-Ring	VITON	1
16	Gland Packing	GRAPHITE	1
16.1	Gland Packing	25% GLASS FIBER FILED+PTFE	1
17	Gland Bush	SS316	1
18	Belleville Washer	SS301	3
19	Gland	CF8M	1
20	Gland Bolt	SS316	2
21	Gland Nut	SS316	2
22	Stop Pin	SS316	1
23	Handle-A	SS316	1
24	Handle-B	SS316	1
25	Handle Bolt	SS316	2
26	Handle Cover	VINYL	1

\* Without O-ring design available

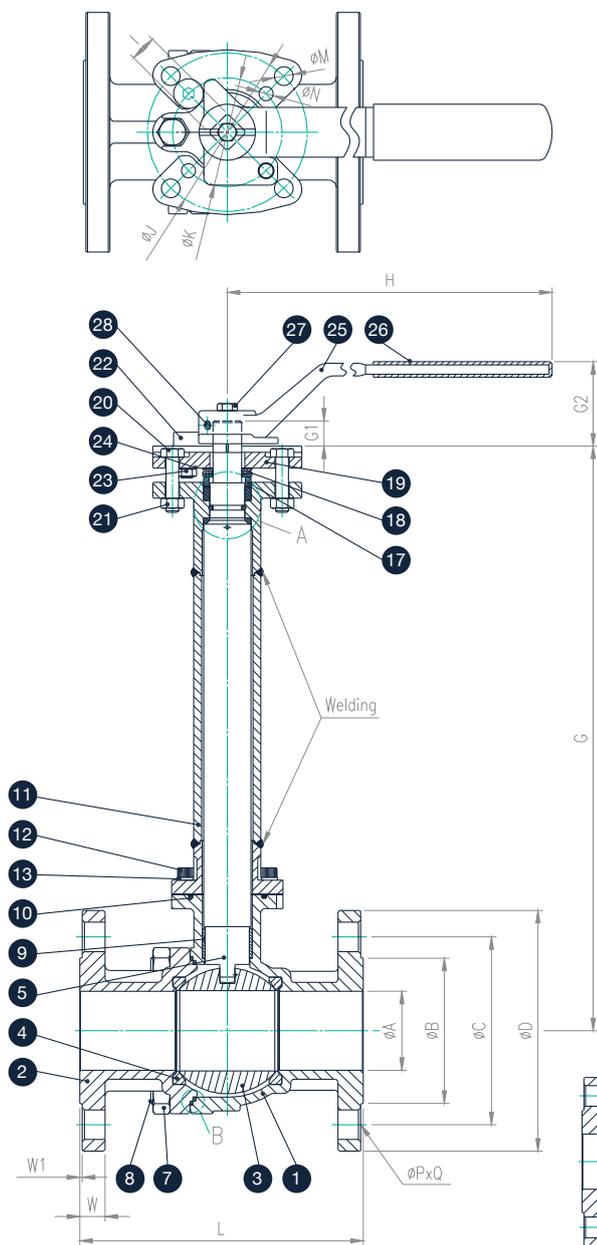


DIMENSIONS(mm)

SIZE	øA	øB	øC	øD	W	W1	L F4	G	G1	G2	H	I	øJ	øK	øM	øN	øP	Q	ISO5211
3"	80	138	160	200	20	3	180	407.4	24	46.2	365	22	125	102	14	12	18	8	FOR F10 / F12
4"	100	158	180	220	20	3	190	422.4	24	46.2	365	22	125	102	14	12	18	8	FOR F10 / F12

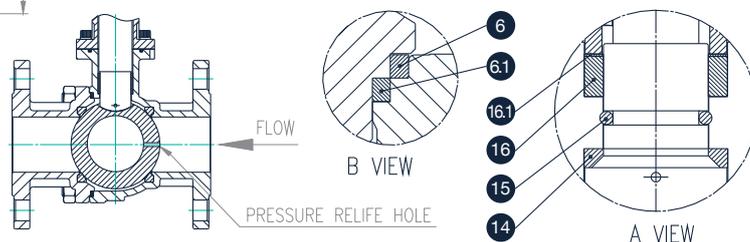
CONSTRUCTION-BILL OF MATERIAL

DIN PN40  
SERIES F520-60  
1/2"~ 2-1/2"



NO.	Parts	Material	Qty
1	Body	1.4408	* 1
2	End cap	1.4408	* 1
3	Ball	SS316	* 1
4	Seat	PCTFE	2
5	Stem	17-4PH	* 1
6	Joint Gasket	PTFE	1
6.1	Joint Gasket	GRAPHITE	1
7	Bolt	SS304	* &
8	Bolt nut	SS304	* &
9	Stem Bearing	PTFE	1
10	Joint Gasket	GRAPHITE	1
11	Extended Bonnet	CF8M	* 1
12	Screw	SS304	* 4
13	Screw Washer	SS304	* 4
14	Thrust Washer	TFM1600	1
15	O-Ring	VITON	1
16	Gland Packing	GRAPHITE	1
16.1	Gland Packing	25% GLASS FIBER FILED+PTFE	1
17	Gland Bush	SS304	1
18	Belleville Washer	SS301	3
19	Gland	CF8	1
20	Gland Bolt	SS304	2
21	Gland Nut	SS304	2
22	Stop Pin	SS304	1
23	Pin Nut	SS304	1
24	Washer	SS304	1
25	Handle	CF8	1
26	Handle Cover	VINYL	1
27	Handle Bolt	SS304	1
28	Handle Screw	SS304	1

\* Cryogenic Treatment before Assembly  
For 1-1/2"~ 2" (4pcs of balls and bolt nuts) , For 2-1/2" (6pcs of balls and bolt nuts)

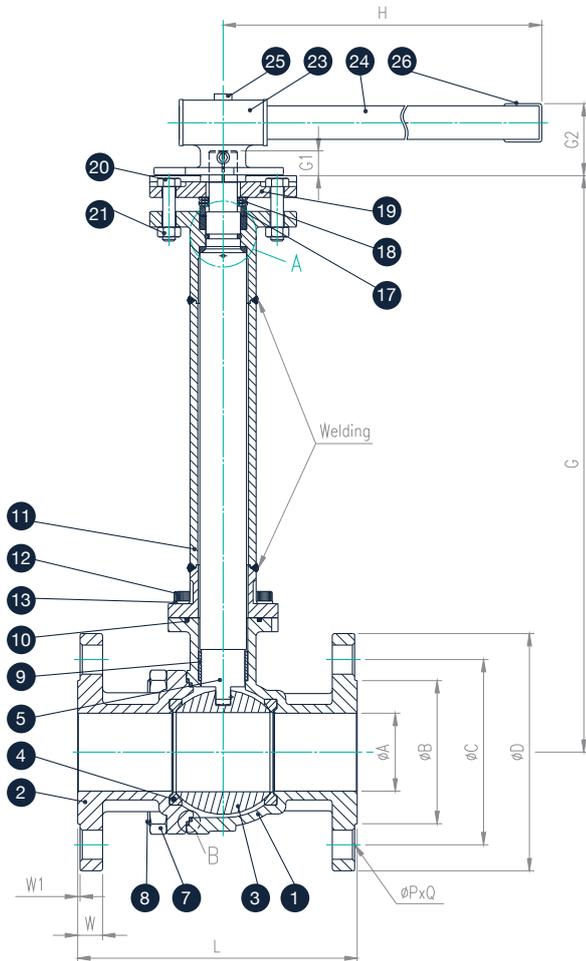
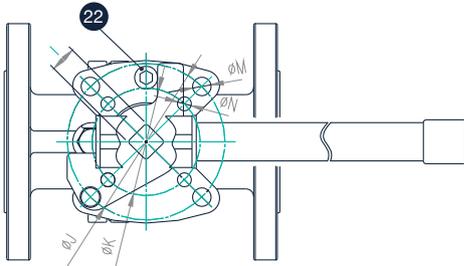


DIMENSIONS(mm)

SIZE	øA	øB	øC	øD	W	W1	L		G	G1	G2	H	I	øJ	øK	øM	øN	øP	Q	ISO5211
							F4	F1												
1/2"	15	45	65	95	16	2	115	130	310	10	35.5	161.5	9	50	42	7	6.5	14	4	FOR F04 / F05
3/4"	20	58	75	105	18	2	120	150	317.5	10	25.5	161.5	9	50	42	7	6.5	14	4	FOR F04 / F05
1"	25	68	85	115	18	2	125	160	330	12	42.2	213.7	11	70	50	9	7.5	14	4	FOR F05 / F07
1-1/4"	32	78	100	140	18	2	130	180	335.2	12	42.2	213.7	11	70	50	9	7.5	18	4	FOR F05 / F07
1-1/2"	38	88	110	150	18	3	140	200	362.3	16	53.5	262	14	70	50	9	7.5	18	4	FOR F05 / F07
2"	50	102	125	165	20	3	150	230	370.4	16	53.5	262	14	70	50	9	7.5	18	4	FOR F05 / F07
2-1/2"	65	122	145	185	22	3	170	290	397.2	19	53.5	262	17	102	70	12	10	18	8	FOR F07 / F10

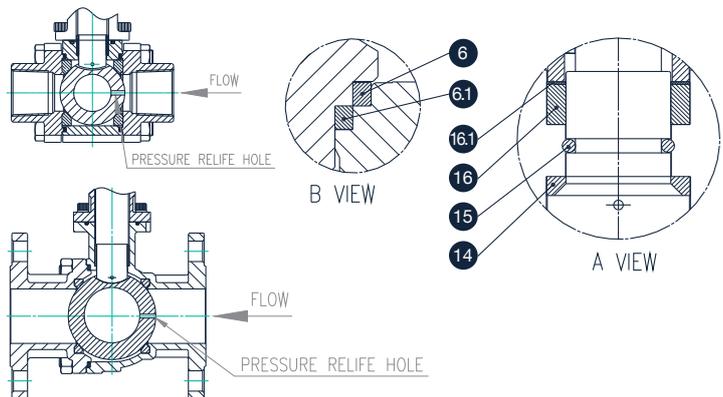
CONSTRUCTION-BILL OF MATERIAL

DIN PN40  
SERIES F520-60  
3"~ 4"



NO.	Parts	Material	Qty
1	Body	1.4408	* 1
2	End cap	1.4408	* 1
3	Ball	SS316	* 1
4	Seat	PCTFE	2
5	Stem	17-4PH	* 1
6	Joint Gasket	PTFE	1
6.1	Joint Gasket	GRAPHITE	1
7	Bolt	SS304	* 8
8	Bolt nut	SS304	* 8
9	Stem Bearing	PTFE	1
10	Joint Gasket	GRAPHITE	1
11	Extended Bonnet	CF8M	* 1
12	Screw	SS304	* 4
13	Screw Washer	SS304	* 4
14	Thrust Washer	TFM1600	1
15	O-Ring	VITON	1
16	Gland Packing	GRAPHITE	1
16.1	Gland Packing	25% GLASS FIBER FILED+PTFE	1
17	Gland Bush	SS304	1
18	Belleville Washer	SS301	3
19	Gland	CF8	1
20	Gland Bolt	SS304	2
21	Gland Nut	SS304	2
22	Stop Pin	SS304	1
23	Handle-A	SS304	1
24	Handle-B	SS304	1
25	Handle Bolt	SS304	2
26	Handle Cover	VINYL	1

\* Cryogenic Treatment before Assembly



DIMENSIONS(mm)

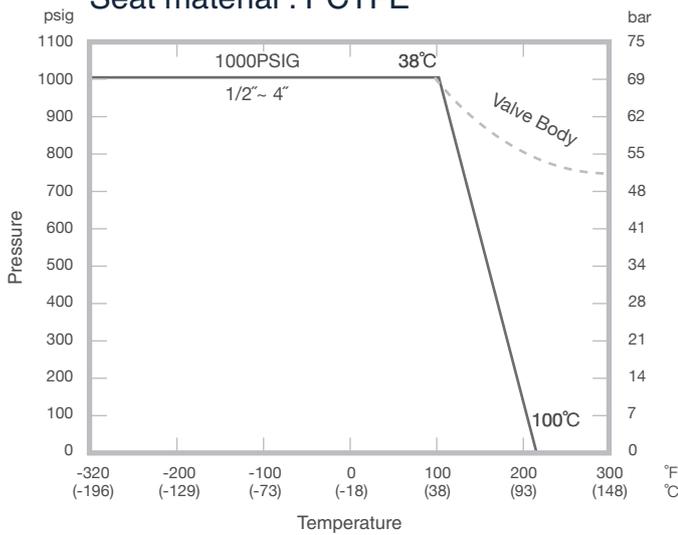
SIZE	øA	øB	øC	øD	W	W1	L		G	G1	G2	H	I	øJ	øK	øM	øN	øP	Q	ISO5211
							F4	F1												
3"	76	138	160	200	24	3	180	310	407.4	24	46.2	365	22	125	102	14	12	18	8	FOR F10 / F12
4"	100	162.6	190	235	24	3	190	350	422.4	24	46.2	365	22	125	102	14	12	22	8	FOR F10 / F12

**TECHNICAL DATA | Breakaway torque / Cv and Kv values / Weight**

Size	Torque		Cv values	Kv values (M <sup>3</sup> /h)	Weight (Kg)
	N.m	lbs.in			S320
1/4"	13	115	8	7	2.1
3/8"	13	115	8	7	2.1
1/2"	17	151	15	13	2.1
3/4"	22	195	40	34	2.6
1"	34	301	70	60	3.8
1-1/4"	43	381	110	94	4.7
1-1/2"	60	532	250	213	7.4
2"	68	603	430	366	10

**TECHNICAL DATA | Pressure - Temperature diagram | 1/4" ~ 2"**

Series S320  
Seat material : PCTFE

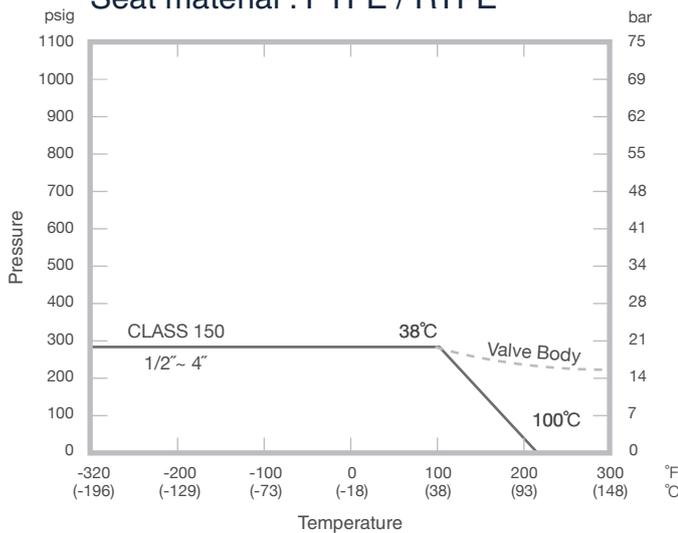


**TECHNICAL DATA | Breakaway torque / Cv and Kv values / Weight**

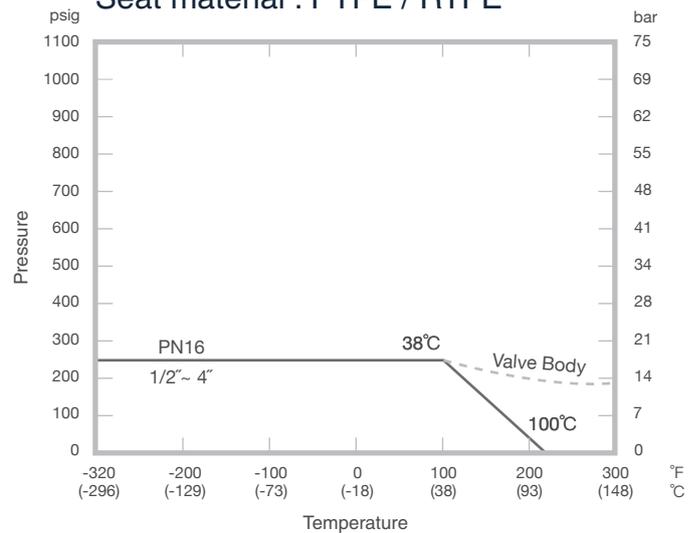
Size	Torque		Cv values	Kv values (M <sup>3</sup> /h)	Weight (Kg)		
	N.m	lbs.in			F520-10	F520-40	F520-60
1/2"	22	195	15	13	3.1	3.6	3.6
3/4"	22	195	40	34	3.6	4.6	4.6
1"	30	266	70	60	5.4	6.4	6.4
1-1/4"	60	532	110	94	6.3	7.9	7.9
1-1/2"	102	904	250	213	10.1	11.4	11.4
2"	186	1648	430	366	13.1	13.3	14.0
2-1/2"	192	1701	700	595	19.8	19.6	20.7
3"	370	3278	1100	935	28	29.1	29.1
4"	455	4031	2000	1700	39.9	38.9	38.9

**TECHNICAL DATA | Pressure - Temperature diagram | 1/2" ~ 4"**

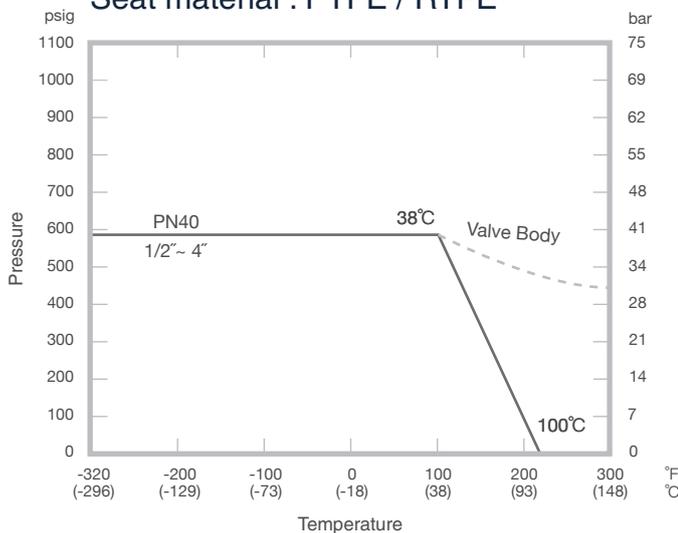
**Series F520-10**  
Seat material : PTFE / RTFE



**Series F520-40**  
Seat material : PTFE / RTFE



**Series F520-60**  
Seat material : PTFE / RTFE



## **OPTIONAL ACCESSORIES**

### **| Handle Options**



S.S Investment Casting Handle

### **| Accessories**



Actuator



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TAWD has dedicated over 30 years to  
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