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# BALL VALVE

The RFF Ball valves have been designed for refrigeration installations using ammonia, CO2 or halocarbon refrigerants listed on page 4.

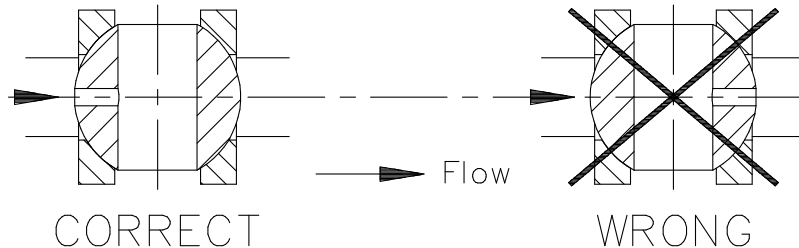
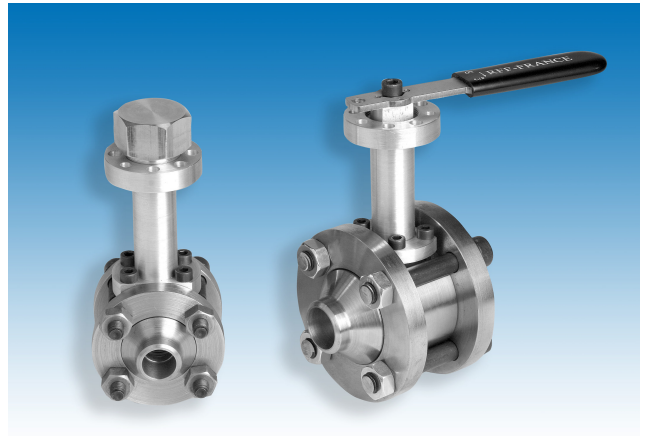
The following sizes are available in steel or stainless steel :  
DN 10 to DN 80 Full bore flow  
DN 20 to DN 100 Reduced bore flow

The full bore ball valve has a lower pressure drop and higher Cv value than the reduced bore ball valve.

The simple three piece body design is easy to install without the need for special torque tools. Efficient insulation is possible due to extended Valve head with ISO flange.

The construction of the ball gas tight seals incorporates two special glass fibre reinforced PTFE rings.

A vent hole is drilled in the ball to avoid trapped liquid and possible damage by hydraulic expansion when the valve is closed. The vent hole is situated on the upstream side of the ball. The valve has only one direction of flow as indicated by an arrow stamped on the valve body.



The valve has two spindle seals, one under the spindle thread and one above the spindle thread.

The lower end of the valve spindle is sealed tight by a PTFE seat held in place by a compressed spring. This allows the replacement of the spindle "O" ring while the plant is on line.

The top spindle seal incorporates the proven standard RFF design using two "O" rings with a lubricating, non freezing oil, reservoir between them.

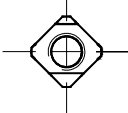
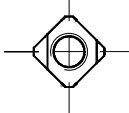
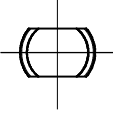
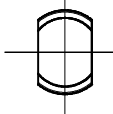

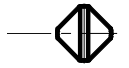
The ball valve is supplied with a seal cap fitted with a rubber "O" ring. The cap has an internal groove for venting gas to ensure safe removal at atmospheric pressure.

For all applications using odourless refrigerants, installation with the cap is recommended, to keep the spindle clean and to stop unauthorised use.

For installations with other refrigerants, including ammonia, a lever is available for opening and closing.

The ISO flange is available for fitting other makes of actuators. RFF can also supply suitable electrical or pneumatic actuators with the valves.

It's necessary to identify the correct position of the additional small machined flats at the top of the valve spindle.

	open	closed
DN 10/15/20 (with lever, cap or ISO flange) : Small flats parallel to the pipework indicates - open		
DN 25 to 80 (with lever or cap) Flats parallel to the pipework indicates - open		
DN 25 to 80 (with ISO flange) Slot parallel to the pipework indicates - open		

## **APPROVAL**

RFF products have obtained the approval of the pressure equipment directive 97/23/CE. RFF company has obtained the certification EN ISO 9001 : 2000.

## **OPERATING CONDITIONS**

The application of Ball valves are only limited by the "O" ring specification. The "O" rings are manufactured from chloroprene synthetic rubber elastomer which has a design range from -50 °C to +150°C. The "O" rings are compatible with the following refrigerant and lubricating oils :

- Refrigerants :
  - C290      - C316      - C318      - R13b1      - R22      - R32
  - R114b2   - R123      - R124      - R125      - R134      - R134a
  - R141b    - R142b    - R143a    - R152a    - R404a    - R407
  - R407c    - R507      - R717(NH3)    - R744(CO2) - Alkali
- Lubricants :
  - Mineral oils, except those with naphthalene base (ASTM 2 et 3)
  - Lubricants with ester silicate base.

## **WARNING :**

It is important that you are aware that by using additives or exceeding the operating conditions may cause the "O" rings to fail.

For all other types of refrigerants (or lubricants), a check is necessary to ensure their compatibility with our standard O-ring material, or if necessary, to offer you alternative O-rings more suitable for the specific conditions of your applications.

Our standard O-rings are not compatible with :

- Aromatic hydrocarbons (benzene)
- Chlorinated hydrocarbons (trichlorethylene)
- Polar solvents (ketone, ester, ether, acetone)

# STEEL BALL VALVE

Valve flange connections are available to the following :

- Butt welding Class "S" (ASTM Pipe Schedule "standard")
- Butt welding Class "M" (DIN 2448)
- Butt welding Class "H" thickness 2 mm for stainless steel pipe
- Brazing Class "B" (ANSI B.16.22)

## MATERIALS:

DN		Bodies, Flanges and Valve head	Disc-Seal	Lever	Cap	Flange sealing gaskets
Full	Red					
10		TStE355 or A350LF2 Valve head : Aluminium	Stainless s.ball /seat PTFE+25%V	Stainl.S 304	Aluminium	O-ring
15	20	TStE355 or A350LF2 Valve head : Aluminium	Stainless s.ball /seat PTFE+25%V	Stainl.S 304	Aluminium	O-ring
20	25	TStE355 or A350LF2 Valve head Aluminium	Stainless s.ball /seat PTFE+25%V	Stainl.S 304	Aluminium	O-ring
25	32	TStE355 or A350LF2	Stainless s.ball /seat PTFE+25%V	Stainl.S 304	Steel	O-ring
32	40	TStE355 or A350LF2	Stainless s.ball /seat PTFE+25%V	Stainl.S 304	Steel	O-ring
40	50	TStE355 or A350LF2	Stainless s.ball /seat PTFE+25%V	Stainl.S 304	Steel	O-ring
50	65	TStE355 or A350LF2	Stainless s.ball /seat PTFE+25%V	Stainl.S 304	Steel	O-ring
65	80	TStE355 or A350LF2	Stainless s.ball /seat PTFE+25%V	Stainl.S 304	Steel	O-ring
80	100	TStE355 or A350LF2	Stainless s.ball /seat PTFE+25%V	Stainl.S 304	Steel	O-ring

The valve body, subjected to pressure, is manufactured from low temperature impact tested steel. The valves can be supplied with material certificates to EN 10204.3.1.B. when specified on order.

## REFERENCES RFF :

D XXX	X	X	D	X	X	X	X
D+DN	X : Full bore flow Y : Reduced bore flow	V lever C cap N ISO flange P pneumatic actuator normal closed Q pneumatic actuator normal open L Electric actuator	Straight	S welding "S" M welding "M" H welding "H" B brazing "B"	For Pneumatic actuator B pilot valve 220 VAC A pilot valve 24 VDC C pilot valve 24 VAC D pilot valve 48 VAC P 4-20mA positioning pilot E Pilot valve 220 VAC ADF H Pneumatic pilot valve  For Electric actuator R Safety block V lever RV safety block + lever	For Pneumatic actuator F limit switch G limit switch ATEX	P PN 40 P65 PN 65  For motorised ball valve : PA : PN 40 ΔP 25 bar PB : PN 40 ΔP 40 bar  P65A : PN 65 ΔP 25 bar P65B : PN 65 ΔP 40 bar P65C : PN 65 ΔP 65 bar

**For Electric actuator, site voltage and frequency to be confirmed at time of order.**

## **Ball valve with higher pressure**

The standard nominal pressure of the RFF ball valve is 25 bar. It's also possible to supply the steel range with nominal pressure PN 40 or PN 65, depending on diameters.

The higher pressure ball valves PN 40 and PN 65 are constructed the same way as the PN25 ball valve only the pressure tests are different.

	PN 25	PN 40	PN 65
Strength test	37.5 bar	60 bar	97.5 bar
Sealing test	25 bar	40 bar	65 bar



If pressure testing is above 25 bar, special hand lever is necessary.  
When this is required please specify with order.

## **Possible DN and PN – Temperature range**

DN		PN25	PN 40	PN 65
Full bore	Reduced bore			
10		X	X	X
15	20	X	X	X
20	25	X	X	X
25	32	X	X	X
32	40	X	X	X
40	50	X	X	X
50	65	X	X	X
65	80	X	X	X
80	100	X	X	
Temperature range		-50°C / + 150°C		-50°C /+110°C

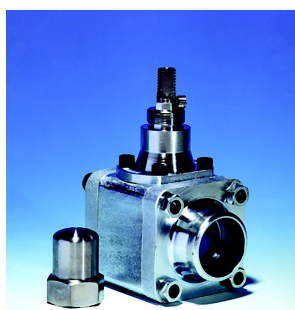
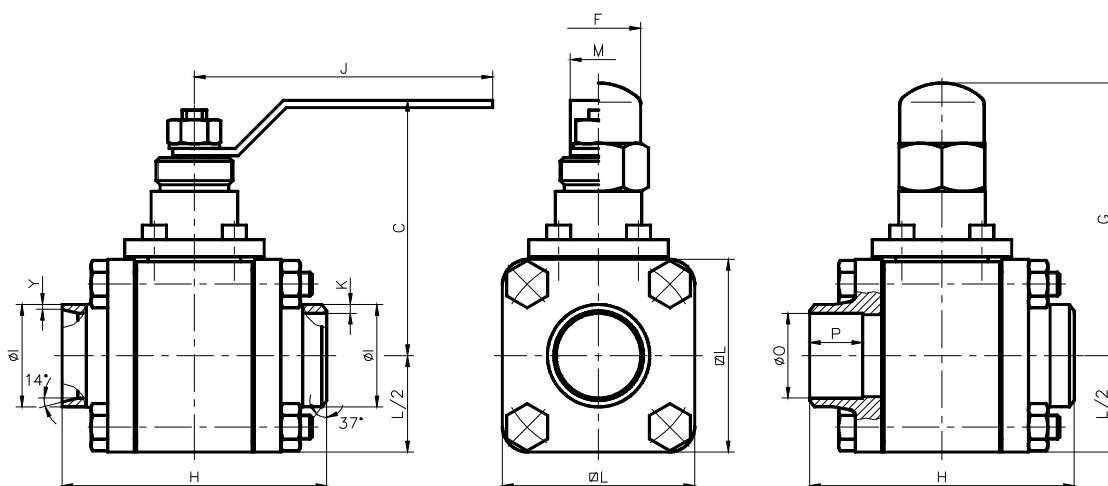
## **PN 40, PN 65 Identification**

To assist easy identification of the different ball valves design pressures different colour nameplates are used.

	PN 25	PN 40	PN 65
DN 10 to 25	White paper label	Red paper label	Yellow paper label
DN 32 to 100	Aluminium nameplate	Red aluminium nameplate	Yellow aluminium nameplate

# BALL VALVE with FULL BORE FLOW

## With lever, with cap PN 25



General dimensions							
DN	C	F	G	H	J	L	M
10	104	37	112	73	135	64	20
15	104	37	112	73	135	64	20
20	109	37	117	93	135	88	20
25	99	35	106	102	127	65	22
32	106	35	113	110	127	80	22
40	138	35	139	127	200	90	27
50	148	35	149	154	200	110	27
65	190	47	197	186	354	130	39
80	200	47	207	212	354	150	39

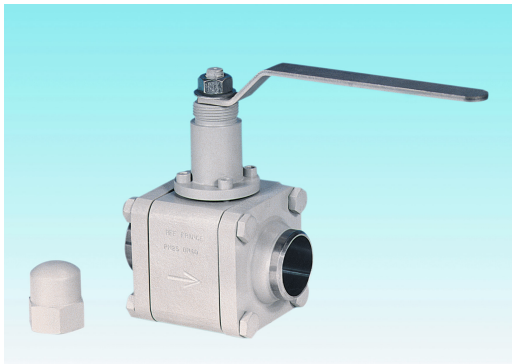
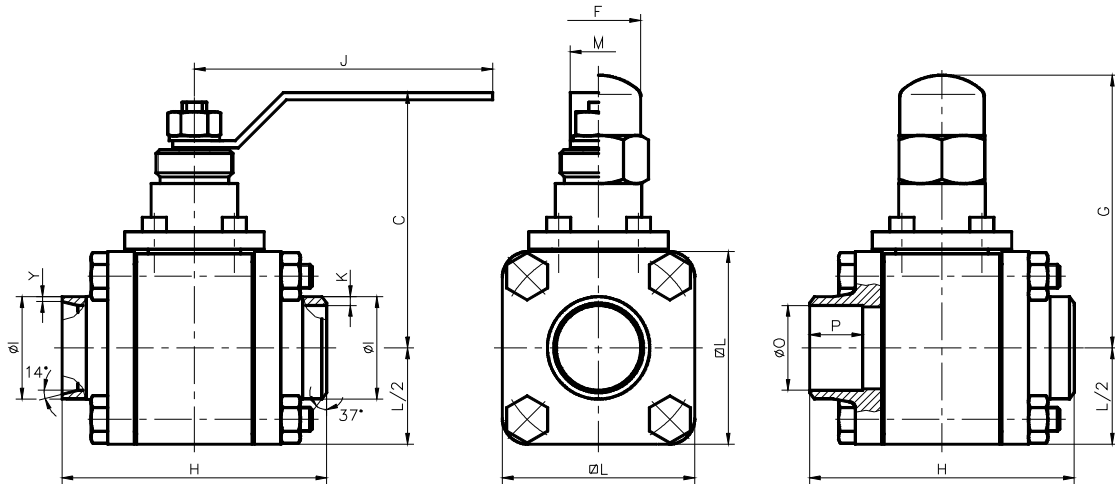
For welding «S» class					For welding «M» class					
	DN	I	K	Ref		DN	I	K	Ref	
	3/8"	10	17.2	2.3	D010X.DS	3/8"	10	17.2	1.8	S010X.DM
	1/2"	15	21.3	2.6	D015X.DS	1/2"	15	21.3	2	S015X.DM
	3/4"	20	26.9	2.9	D020X.DS	3/4"	20	26.9	2.3	S020X.DM
	1"	25	33.7	3.6	D025X.DS	1"	25	33.7	2.6	S025X.DM
	1"1/4	32	42.4	3.6	D032X.DS	1"1/4	32	42.4	2.6	S032X.DM
	1"1/2	40	48.3	3.6	D040X.DS	1"1/2	40	48.3	2.6	S040X.DM
	2"	50	60.3	4	D050X.DS	2"	50	60.3	2.9	S050X.DM
	2"1/2	65	76.1	5	D065X.DS	2"1/2	65	76.1	2.9	S065X.DM
	3"	80	88.9	5.6	D080X.DS	3"	80	88.9	3.2	S080X.DM

For brazing «B» class					For welding «H» class					
	DN	O	P	Ref		DN	I	Y	Ref	
	1/2"	10	12.9	12	D010X.DB	3/8"	10	17.2	2	S010X.DH
	5/8"	15	16.9	15.5	D015X.DB	1/2"	15	21.3	2	S015X.DH
	7/8"	20	22.4	20	D020X.DB	3/4"	20	26.9	2	S020X.DH
	1"1/8	25	28.8	20	D025X.DB	1"	25	33.7	2	S025X.DH
	1"3/8	32	35.2	22	D032X.DB	1"1/4	32	42.4	2	S032X.DH
	1"5/8	40	41.5	22	D040X.DB	1"1/2	40	48.3	2	S040X.DH
	2"1/8	50	54.3	25	D050X.DB	2"	50	60.3	2	S050X.DH
	2"5/8	65	66.9	25	D065X.DB	2"1/2	65	76.1	2	S065X.DH
	3"1/8	80	79.6	30	D080X.DB	3"	80	88.9	2	S080X.DH

# BALL VALVE with FULL BORE FLOW

## With lever, with cap

**PN 40**



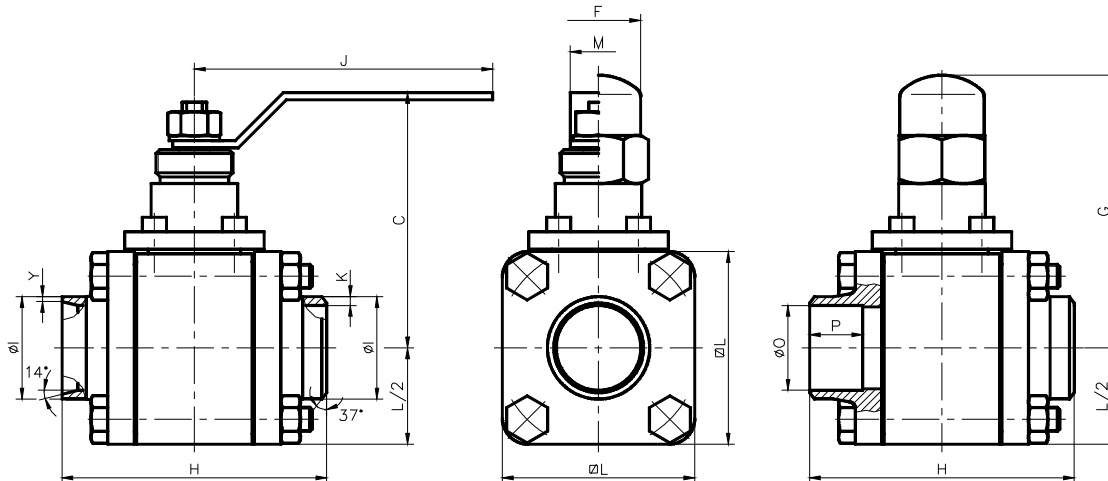
General dimensions							
DN	C	F	G	H	J	L	M
10	104	37	112	73	135	64	20
15	104	37	112	73	135	64	20
20	109	37	117	93	135	88	20
25	99	35	106	102	127	65	22
32	106	35	113	110	127	80	22
40	138	35	139	127	200	90	27
50	148	35	149	154	200	110	27
65	190	47	197	186	354	130	39
80	200	47	207	212	354	150	39

For welding «S» class					For welding «M» class					
	DN	I	K	Ref		DN	I	K	Ref	
	3/8"	10	17.2	2.3	D010X.DSP	3/8"	10	17.2	1.8	S010X.DMP
	1/2"	15	21.3	2.6	D015X.DSP	1/2"	15	21.3	2	S015X.DMP
	3/4"	20	26.9	2.9	D020X.DSP	3/4"	20	26.9	2.3	S020X.DMP
	1"	25	33.7	3.6	D025X.DSP	1"	25	33.7	2.6	S025X.DMP
	1"1/4	32	42.4	3.6	D032X.DSP	1"1/4	32	42.4	2.6	S032X.DMP
	1"1/2	40	48.3	3.6	D040X.DSP	1"1/2	40	48.3	2.6	S040X.DMP
	2"	50	60.3	4	D050X.DSP	2"	50	60.3	2.9	S050X.DMP
	2"1/2	65	76.1	5	D065X.DSP	2"1/2	65	76.1	2.9	S065X.DMP
	3"	80	88.9	5.6	D080X.DSP	3"	80	88.9	3.2	S080X.DMP

For brazing «B» class					For welding «H» class					
	DN	O	P	Ref		DN	I	Y	Ref	
	1/2"	10	12.9	12	D010X.DBP	3/8"	10	17.2	2	S010X.DHP
	5/8"	15	16.9	15.5	D015X.DBP	1/2"	15	21.3	2	S015X.DHP
	7/8"	20	22.4	20	D020X.DBP	3/4"	20	26.9	2	S020X.DHP
	1"1/8	25	28.8	20	D025X.DBP	1"	25	33.7	2	S025X.DHP
	1"3/8	32	35.2	22	D032X.DBP	1"1/4	32	42.4	2	S032X.DHP
	1"5/8	40	41.5	22	D040X.DBP	1"1/2	40	48.3	2	S040X.DHP
	2"1/8	50	54.3	25	D050X.DBP	2"	50	60.3	2	S050X.DHP
	2"5/8	65	66.9	25	D065X.DBP	2"1/2	65	76.1	2	S065X.DHP
	3"1/8	80	79.6	30	D080X.DBP	3"	80	88.9	2	S080X.DHP

# BALL VALVE with FULL BORE FLOW

## With lever, with cap **PN 65**



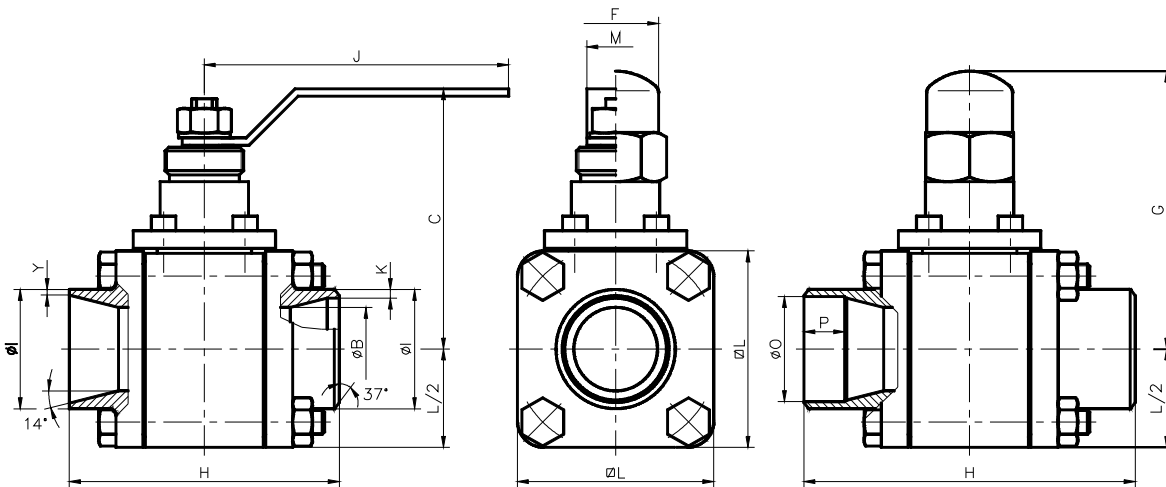
General dimensions							
DN	C	F	G	H	J	L	M
10	104	37	112	73	135	64	20
15	104	37	112	73	135	64	20
20	109	37	117	93	135	88	20
25	99	35	106	102	127	65	22
32	106	35	113	110	127	80	22
40	138	35	139	127	200	90	27
50	148	35	149	154	200	110	27
65	190	47	197	186	354	130	39

For welding «S» class					For welding «M» class					
	DN	I	K	Ref		DN	I	K	Ref	
	3/8"	10	17.2	2.3	D010X.DSP65	3/8"	10	17.2	1.8	S010X.DMP65
	1/2"	15	21.3	2.6	D015X.DSP65	1/2"	15	21.3	2	S015X.DMP65
	3/4"	20	26.9	2.9	D020X.DSP65	3/4"	20	26.9	2.3	S020X.DMP65
	1"	25	33.7	3.6	D025X.DSP65	1"	25	33.7	2.6	S025X.DMP65
	1"1/4	32	42.4	3.6	D032X.DSP65	1"1/4	32	42.4	2.6	S032X.DMP65
	1"1/2	40	48.3	3.6	D040X.DSP65	1"1/2	40	48.3	2.6	S040X.DMP65
	2"	50	60.3	4	D050X.DSP65	2"	50	60.3	2.9	S050X.DMP65
	2"1/2	65	76.1	5	D065X.DSP65	2"1/2	65	76.1	2.9	S065X.DMP65

For brazing «B» class					For welding «H» class					
	DN	O	P	Ref		DN	I	Y	Ref	
	1/2"	10	12.9	12	D010X.DBP65	3/8"	10	17.2	2	S010X.DHP65
	5/8"	15	16.9	15.5	D015X.DBP65	1/2"	15	21.3	2	S015X.DHP65
	7/8"	20	22.4	20	D020X.DBP65	3/4"	20	26.9	2	S020X.DHP65
	1"1/8	25	28.8	20	D025X.DBP65	1"	25	33.7	2	S025X.DHP65
	1"3/8	32	35.2	22	D032X.DBP65	1"1/4	32	42.4	2	S032X.DHP65
	1"5/8	40	41.5	22	D040X.DBP65	1"1/2	40	48.3	2	S040X.DHP65
	2"1/8	50	54.3	25	D050X.DBP65	2"	50	60.3	2	S050X.DHP65
	2"5/8	65	66.9	25	D065X.DBP65	2"1/2	65	76.1	2	S065X.DHP65

# BALL VALVE with REDUCED BORE FLOW

## With lever, with cap PN 25



General dimensions							
DN	B	C	F	G	J	L	M
20	15	104	37	73	135	64	20
25	21	109	37	93	135	88	20
32	26.5	99	35	106	127	65	22
40	35	106	35	113	127	80	22
50	41.5	138	35	139	200	90	27
65	52.5	148	35	149	200	110	27
80	66	190	47	197	354	130	39
100	78	200	47	207	354	150	39

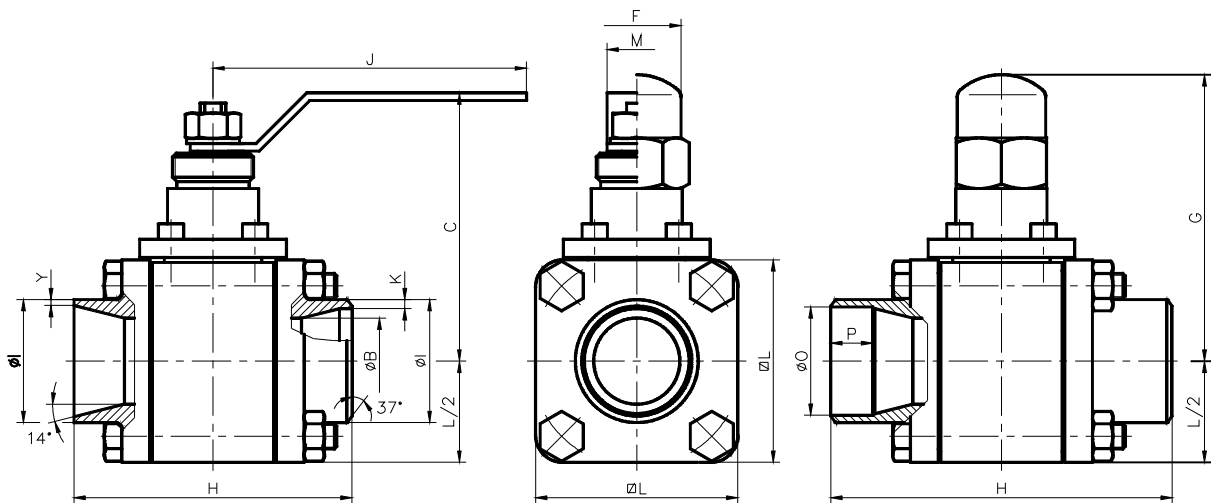
For welding «S» class						For welding «M» class					
	DN	H	I	K	Ref		DN	H	I	K	Ref
3/4"	20	73	26.9	2.9	D020Y.DS	3/4"	20	88	26.9	2.3	S020Y.DM
1"	25	93	33.7	3.6	D025Y.DS	1"	25	100	33.7	2.6	S025Y.DM
1 1/4"	32	136	42.4	3.6	D032Y.DS	1 1/4"	32	102	42.4	2.6	S032Y.DM
1 1/2"	40	144	48.3	3.6	D040Y.DS	1 1/2"	40	110	48.3	2.6	S040Y.DM
2"	50	127	60.3	4	D050Y.DS	2"	50	167	60.3	2.9	S050Y.DM
2 1/2"	65	154	76.1	5	D065Y.DS	2 1/2"	65	154	76.1	2.9	S065Y.DM
3"	80	186	88.9	5.6	D080Y.DS	3"	80	186	88.9	3.2	S080Y.DM
4"	100	212	114.4	6.3	D100Y.DS	4"	100	212	114.4	3.6	S100Y.DM

For brazing «B» class						For welding «H» class					
	DN	H	O	P	Ref		DN	H	I	Y	Ref
7/8"	20	88	22.4	20	D020Y.DB	3/4"	20	73	26.9	2	S020Y.DH
1 1/8"	25	100	28.8	20	D025Y.DB	1"	25	93	33.7	2	S025Y.DH
1 3/8"	32	136	35.2	22	D032Y.DB	1 1/4"	32	102	42.4	2	S032Y.DH
1 5/8"	40	144	41.5	22	D040Y.DB	1 1/2"	40	110	48.3	2	S040Y.DH
2 1/8"	50	167	54.3	25	D050Y.DB	2"	50	127	60.3	2	S050Y.DH
2 5/8"	65	194	66.9	25	D065Y.DB	2 1/2"	65	154	76.1	2	S065Y.DH
3 1/8"	80	236	79.6	30	D080Y.DB	3"	80	186	88.9	2	S080Y.DH
4 1/8"	100	262	105	30	D100Y.DB	4"	100	212	114.4	2	S100Y.DH

# BALL VALVE with REDUCED BORE FLOW

## With lever, with cap

**PN 40**



**General dimensions**

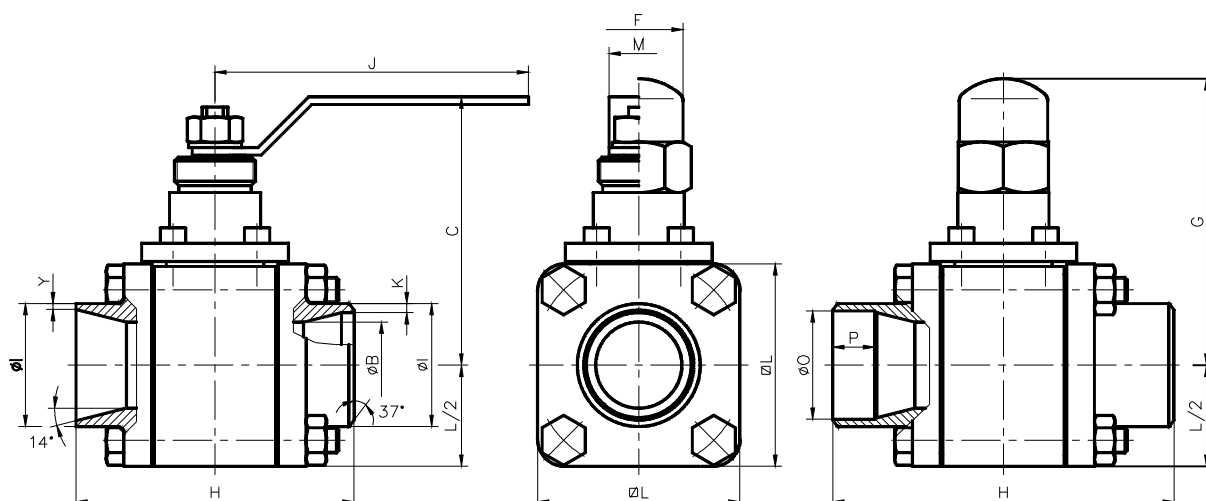
DN	B	C	F	G	J	L	M
20	15	104	37	73	135	64	20
25	21	109	37	93	135	88	20
32	26.5	99	35	106	127	65	22
40	35	106	35	113	127	80	22
50	41.5	138	35	139	200	90	27
65	52.5	148	35	149	200	110	27
80	66	190	47	197	354	130	39
100	78	200	47	207	354	150	39

For welding «S» class						For welding «M» class					
	DN	H	I	K	Ref		DN	H	I	K	Ref
3/4"	20	73	26.9	2.9	D020Y.DSP	3/4"	20	88	26.9	2.3	S020Y.DMP
1"	25	93	33.7	3.6	D025Y.DSP	1"	25	100	33.7	2.6	S025Y.DMP
1 1/4"	32	136	42.4	3.6	D032Y.DSP	1 1/4"	32	102	42.4	2.6	S032Y.DMP
1 1/2"	40	144	48.3	3.6	D040Y.DSP	1 1/2"	40	110	48.3	2.6	S040Y.DMP
2"	50	127	60.3	4	D050Y.DSP	2"	50	167	60.3	2.9	S050Y.DMP
2 1/2"	65	154	76.1	5	D065Y.DSP	2 1/2"	65	154	76.1	2.9	S065Y.DMP
3"	80	186	88.9	5.6	D080Y.DSP	3"	80	186	88.9	3.2	S080Y.DMP
4"	100	212	114.4	6.3	D100Y.DSP	4"	100	212	114.4	3.6	S100Y.DMP

For brazing «B» class						For welding «H» class					
	DN	H	O	P	Ref		DN	H	I	Y	Ref
7/8"	20	88	22.4	20	D020Y.DBP	3/4"	20	73	26.9	2	S020Y.DHP
1 1/8"	25	100	28.8	20	D025Y.DBP	1"	25	93	33.7	2	S025Y.DHP
1 3/8"	32	136	35.2	22	D032Y.DBP	1 1/4"	32	102	42.4	2	S032Y.DHP
1 5/8"	40	144	41.5	22	D040Y.DBP	1 1/2"	40	110	48.3	2	S040Y.DHP
2 1/8"	50	167	54.3	25	D050Y.DBP	2"	50	127	60.3	2	S050Y.DHP
2 5/8"	65	194	66.9	25	D065Y.DBP	2 1/2"	65	154	76.1	2	S065Y.DHP
3 1/8"	80	236	79.6	30	D080Y.DBP	3"	80	186	88.9	2	S080Y.DHP
4 1/8"	100	262	105	30	D100Y.DBP	4"	100	212	114.4	2	S100Y.DHP

# BALL VALVE with REDUCED BORE FLOW

## With lever, with cap **PN 65**



General dimensions							
DN	B	C	F	G	J	L	M
20	15	104	37	73	135	64	20
25	21	109	37	93	135	88	20
32	26.5	99	35	106	127	65	22
40	35	106	35	113	127	80	22
50	41.5	138	35	139	200	90	27
65	52.5	148	35	149	200	110	27
80	66	190	47	197	354	130	39

For welding «S» class						For welding «M» class					
	DN	H	I	K	Ref		DN	H	I	K	Ref
3/4"	20	73	26.9	2.9	D020Y.DSP65	3/4"	20	88	26.9	2.3	S020Y.DMP65
1"	25	93	33.7	3.6	D025Y.DSP65	1"	25	100	33.7	2.6	S025Y.DMP65
1 1/4"	32	136	42.4	3.6	D032Y.DSP65	1 1/4"	32	102	42.4	2.6	S032Y.DMP65
1 1/2"	40	144	48.3	3.6	D040Y.DSP65	1 1/2"	40	110	48.3	2.6	S040Y.DMP65
2"	50	127	60.3	4	D050Y.DSP65	2"	50	167	60.3	2.9	S050Y.DMP65
2 1/2"	65	154	76.1	5	D065Y.DSP65	2 1/2"	65	154	76.1	2.9	S065Y.DMP65
3"	80	186	88.9	5.6	D080Y.DSP65	3"	80	186	88.9	3.2	S080Y.DMP65

For brazing «B» class						For welding «H» class					
	DN	H	O	P	Ref		DN	H	I	Y	Ref
7/8"	20	88	22.4	20	D020Y.DBP65	3/4"	20	73	26.9	2	S020Y.DHP65
1 1/8"	25	100	28.8	20	D025Y.DBP65	1"	25	93	33.7	2	S025Y.DHP65
1 3/8"	32	136	35.2	22	D032Y.DBP65	1 1/4"	32	102	42.4	2	S032Y.DHP65
1 5/8"	40	144	41.5	22	D040Y.DBP65	1 1/2"	40	110	48.3	2	S040Y.DHP65
P2 1/8"	50	167	54.3	25	D050Y.DBP65	2"	50	127	60.3	2	S050Y.DHP65
2 5/8"	65	194	66.9	25	D065Y.DBP65	2 1/2"	65	154	76.1	2	S065Y.DHP65
3 1/8"	80	236	79.6	30	D080Y.DBP65	3"	80	186	88.9	2	S080Y.DHP65