VALVES FROM 10 TO 450mm

CONTENTS

RFF valves can be supplied with a material certificate for body and bonnet which guarantees the impact strength at -50°C.

The material test for the straight branch connections for the valves 300 and 450 mm is certified to –46°C.

The nominal pressure rating is 25 bar. Valves are also available for higher pressure PN 40 or PN 65 (depending on diameter)

RFF valves are constructed of low temperature carbon steel with stainless steel spindles and sealed by two O-rings with a special oil filled groove which provides a complete gas tight seal.

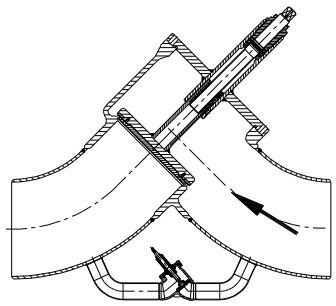
The PTFE seat provides positive shut-off with a minimum amount of force.

All valves should be closed by turning the spindle clockwise. The O-rings can be replaced when the spindle is back-seated fully. Maintenance of the O-rings can be carried out without shutting down the plant.

By using valves fitted with caps on installations using odourless refrigerant extra security is ensured. Gas refrigerant is contained under the cap which is manufactured with small hole drilled under the gasket. When the cap is unscrewed, any build-up of refrigerant gas inside the cap will escape through this hole and can be heard as a whistling noise. This is an indication that the O-rings in the gland nut have been damaged or are in poor condition.
All valves can be fitted with handwheels or caps.

To assist opening large diameter valves (150 mm to 450 mm) it may be necessary to fit a small by pass valves at or above the following differential pressures:

DN 150 P > 21 bar
DN 200 P > 14 bar
DN 250 P > 9 bar
DN 300 P > 6 bar
DN 350 P >4.5 bar
DN 400 P >3.5 bar
DN 450 P >3.5 bar



To size the by-pass valve, the seat diameter must be at least 10 % of the diameter of the large valve being by-passed. For such applications the large isolating valves should be installed upside down.

When designing the position of large shut off valves attention should be paid to the final plant pressure test.

If it is not possible to install the valve upside down. It is possible to use a higher closing torque than normal.

The table below indicates the approximate torque value to be used to seal the seat against a 25 bar test pressure.

DN	10 15	20 25	32 40	50	65	80	100	125	150	200	250	300	350	400
DaN.m	0.25	0.5	1	1.5	2	4	7.5	10	15	30	55	66	80	200

Branch connections for RFF valves can be :

for butt welding, "S" class (standard series)
for butt welding, "M" class (Din 2448)
for brazing, "B" class
socket welding, "K" class (fillet weld instead of full penetration weld)
butt welding class « H » thickness 2mm for stainless steel pipe

VALVES FROM 4 TO 250mm – HIGHER PRESSURE

RFF products are available for higher pressure systems PN 40 or PN 65 (depending on diameter).

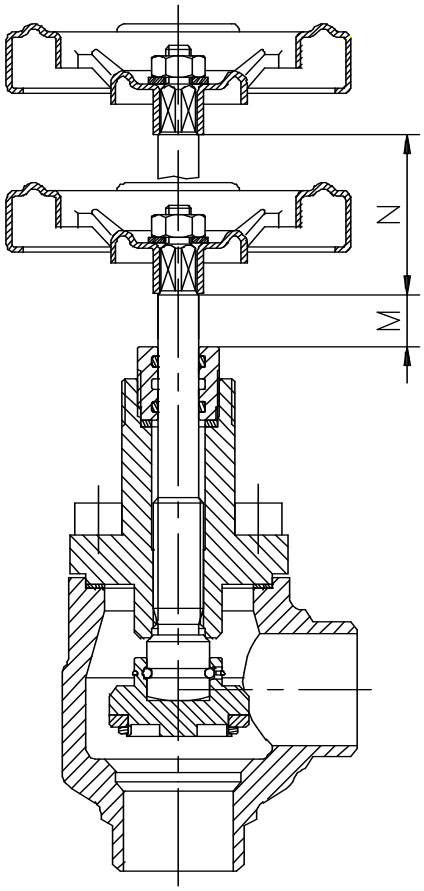
For more information see the special Higher pressure documentation.

VALVES FROM 10 TO 250 mm WITH EXTENDED SPINDLE

Although the standard spindle height is usually enough, RFF can supply handwheel valves with extended spindles for use on special low temperature applications (< -40°C)

Dimensions are the same as standard valve + dimension N.

When placing an order, Please add TL in the end of the RFF standard reference
For example : VDS => VDS**TL**



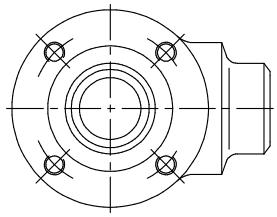
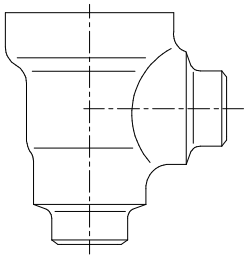
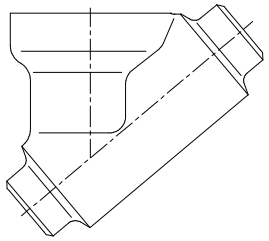
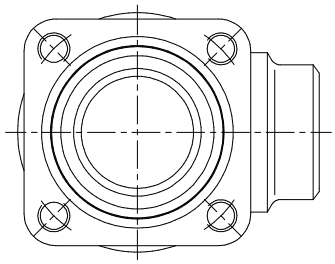
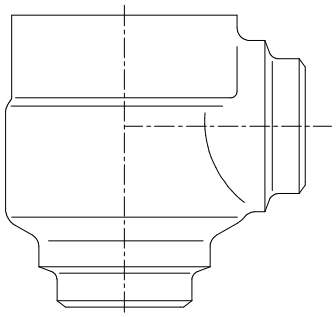
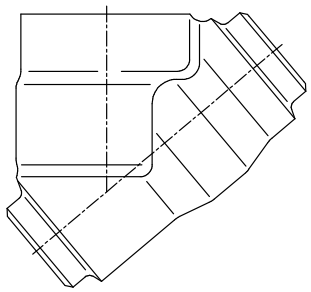
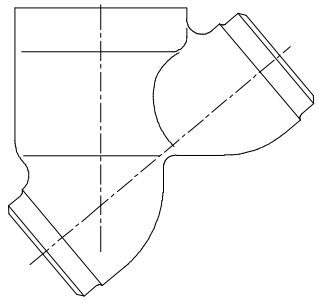
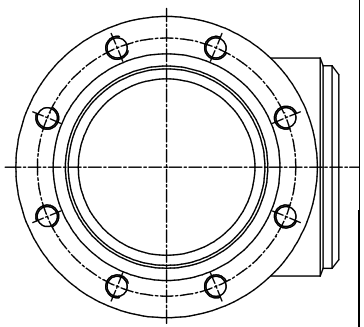
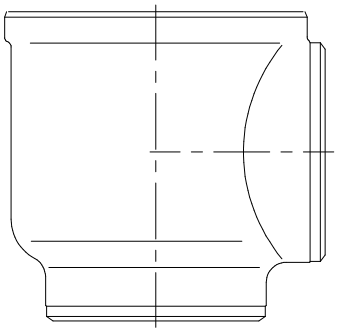
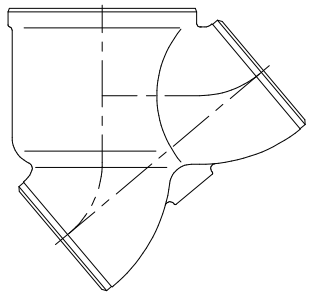
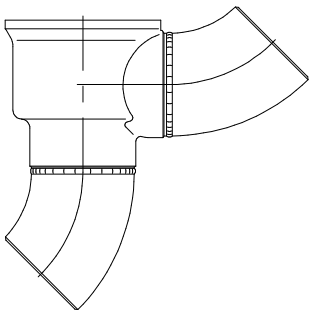
	Dimensions in millimeters with valve open	
DN	M	N
10/15	20	40
20/25	28	40
32/40	24	50
50	33	60
65	32	70
80	43	80
100	51	80
125	108	80
150	108	80
200	185	70
250	219	70

M : Open (standard spindle)

N : Extended (special spindle)

The dimensions stated in the table indicate the length of standard spindles when open (M). (N) indicates extension length.
RFF use the term "TL" to indicate the special extended spindle.

RFF VALVE BODY PROFILES

		PLAN VIEW	ANGLE BODIES	STRAIGHT BODIES
DN 10 up to 25	Round upper flange		Drop forged body 	Drop forged body 
DN 32 up to 100	Square upper flange		Drop forged body 	Drop forged body DN 32 up to 65  Cast steel body DN 80 up to 100 
DN 125 up to 450	Round upper flange		Cast steel body 	Cast steel body With short cast elbows DN 125 up to 250  Cast steel body With welded elbows DN 300 up to 450 

DESIGN TEMPERATURE : -50°C/+150°C
DESIGN PRESSURE : 25 bar

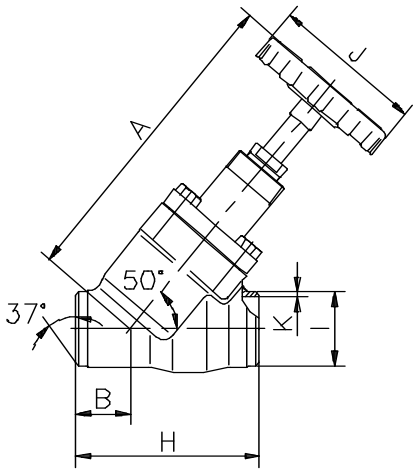
VALVES FROM 10 TO 450 mm

DN	BRANCH					BODY**	BONNET**	DISC-SEAL	HANDWEEL	CAP	BODY GASKET
10	S	M	H	B	K	TStE355	TStE355	PTFE on steel	Bakelite	Steel	O-ring
15	S	M	H	B	K	TStE355	TStE355	PTFE on steel	Bakelite	Steel	O-ring
20	S	M	H	B	K	TStE355	TStE355	PTFE on steel	Bakelite	Steel	O-ring
25	S	M	H	B	K	TStE355	TStE355	PTFE on steel	Bakelite	Steel	O-ring
32	S	M	H	B	K	TStE355	TStE355	PTFE on steel	Sheet steel	Steel	Flat gasket
40	S	M	H	B	-	TStE355	TStE355	PTFE on steel	Sheet steel	Steel	Flat gasket
50	S	M	H	B	-	TStE355	TStE355	PTFE on steel	Sheet steel	Aluminium	Flat gasket
65	S	M	H	B	-	TStE355	TStE355	PTFE on steel	Sheet steel	Aluminium	Flat gasket
80	S	M	H	B	-	GS21Mn5	TStE355	PTFE on steel	Sheet steel	Aluminium	Flat gasket
100	S	M	H	B	-	GS21Mn5	TStE355	PTFE on steel	Sheet steel	Aluminium	Flat gasket
125	S	M	H	-	-	GS21Mn5	TStE355	PTFE on steel	Sheet steel	Aluminium	Flat gasket
150	S	M	H	-	-	GS21Mn5	TStE355	PTFE on steel	Sheet steel	Aluminium	Flat gasket
200	S	M	H	-	-	GS21Mn5	P355NL2+S355NLH	PTFE on steel	Sheet steel	Aluminium	O-ring
250	S	M	H	-	-	GS21Mn5	P355NL2+S355NLH	PTFE on steel	Sheet steel	Aluminium	O-ring
300	S	M	H	-	-	GS21Mn5*	P355NL2+S355NLH	PTFE on steel	Sheet steel	Aluminium	O-ring
350	S	M	H	-	-	GS21Mn5*	P355NL2+S355NLH	PTFE on steel	Sheet steel	Aluminium	O-ring
400	S	M	H	-	-	GS21Mn5	P355NL2+S355NLH	PTFE on steel	Sheet steel	Steel	O-ring
450	S	M	H			GS21Mn5	P355NL2+S355NLH	PTFE on steel	Sheet steel	Steel	O-ring

S Butt welding ends – standard series
M Butt welding ends – Din 2448
H Butt welding Thickness 2mm pour stainless steel pipe.
B Brazing ends
K Socket welding ends
* For straight bodies, 2 branch connections are welded on the angle body.

VALVES FROM 10 TO 450 mm FOR BUTT WELDING "S"

Order ref. : DN… VDS



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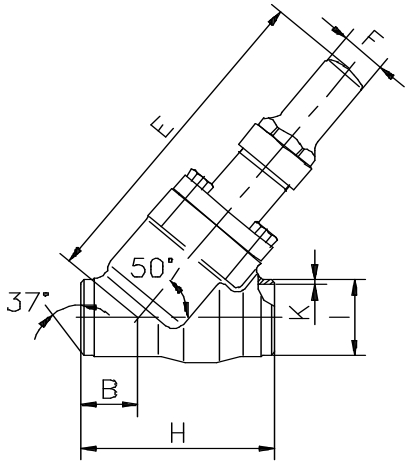

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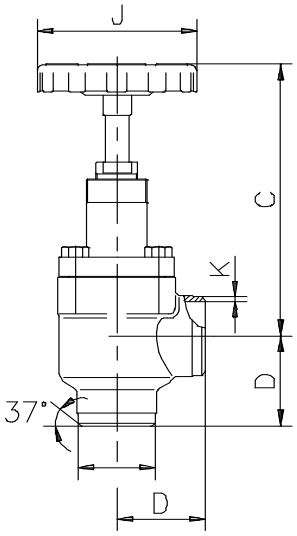

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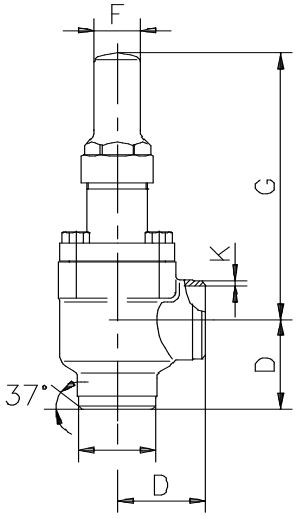
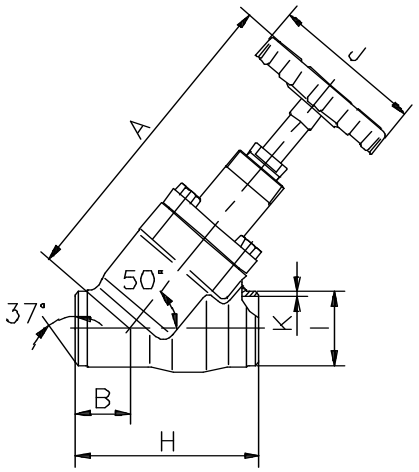


	DIMENSIONS IN MILLIMETERS											
	DN	A *	B	C*	D	E	F	G	H	I	J	K
3/8"	10	128	25	112	39	136	28	112	85	17.2	50	2.3
½"	15	128	25	112	39	136	28	112	85	21.3	50	2.6
¾"	20	161	33	136	46	171	36	146	110	26.9	70	2.9
1"	25	161	33	136	46	171	36	146	110	33.7	70	3.6
1 ¼"	32	200	40	159	57	214	36	161	130	42.4	100	3.6
1 ½"	40	200	40	159	57	214	36	161	130	48.3	100	3.6
2"	50	247	41	209	69	257	36	206	152	60.3	125	4
2 ½"	65#	305	49	235	85	308	41	237	186	76.1	175	5
3"	80	360	54	273	85	368	50	281	238	88.9	200	5.6
4"	100	397	58	299	105	396	50	299	275	114.4	200	6.3
5"	125	545	66	427	120	558	48	442	308	139.7	250	7.1
6"	150	569	71	435	135	584	48	450	344	168.3	250	7.1
8"	200	833	88	655	170	869	56	691	427	219.1	400	8
10"	250	946	106	723	215	945	56	722	527	273	400	9.3
12"	300	1020	190	560	270	1096	50	636	1030	323.9	500	9.5
14"	350	1110	221	620	270	1183	50	693	1140	355.6	500	9.5
16"	400	1385	253	801	328	1409	79	825	1330	406.4	700	9.7
18"	450	1515	285	864	363	1526	79	877	1486	457	700	9.7

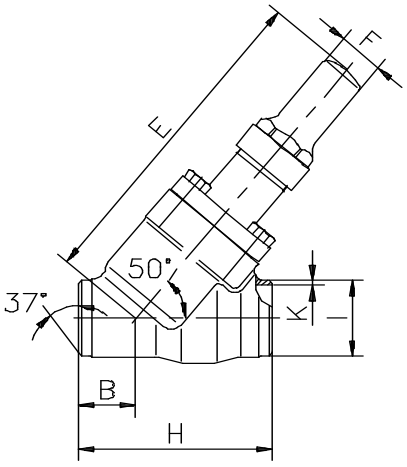
* Dimensions open valve

ND 65 : Ref S065*VDUSA, S065*CDUSA, S065*VEUSA or S065*CEUSA ⇒ I =73 , K = 5.2

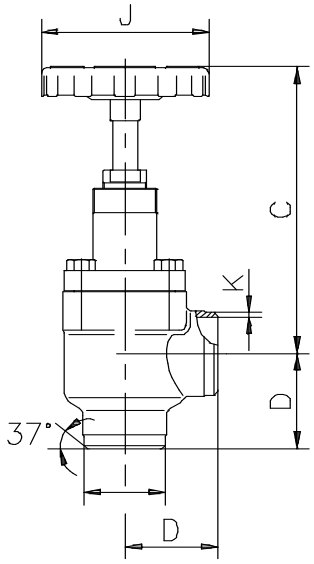
Order ref. : DN... VDM



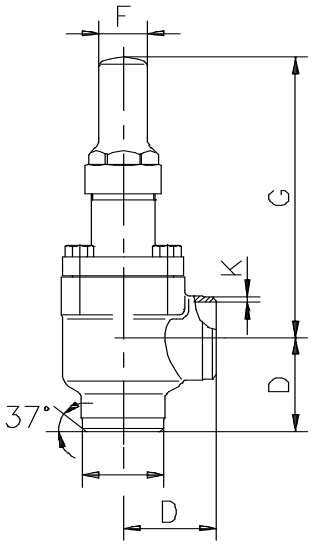
Order ref. : DN... CDM



Order ref. : DN... VEM



Order ref. : DN... CEM

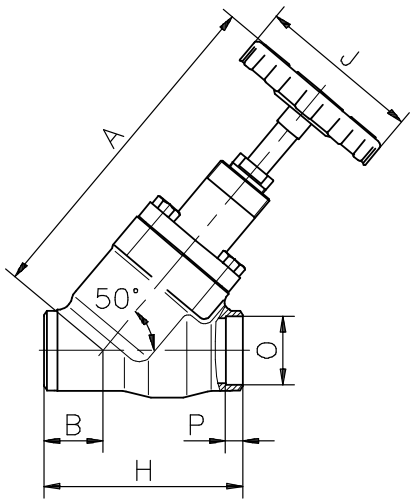


	DIMENSIONS IN MILLIMETRES											
	DN	A *	B	C*	D	E	F	G	H	I	J	K
3/8"	10	128	25	112	39	136	28	112	85	17.2	50	1.8
1/2"	15	128	25	112	39	136	28	112	85	21.3	50	2
3/4"	20	161	33	136	46	171	36	146	110	26.9	70	2.3
1"	25	161	33	136	46	171	36	146	110	33.7	70	2.6
1 1/4"	32	200	40	159	57	214	36	161	130	42.4	100	2.6
1 1/2"	40	200	40	159	57	214	36	161	130	48.3	100	2.6
2"	50	247	41	209	69	257	36	206	152	60.3	125	2.9
2 1/2"	65	305	49	235	85	308	41	237	186	76.1	175	2.9
3"	80	360	54	273	85	368	50	281	238	88.9	200	3.2
4"	100	397	58	299	105	396	50	299	275	114.4	200	3.6
5"	125	545	66	427	120	558	48	442	308	139.7	250	4.5
6"	150	569	71	435	135	584	48	450	344	168.3	250	4.5
8"	200	833	88	655	170	869	56	691	427	219.1	400	6.3
10"	250	946	106	723	215	945	56	722	527	273	400	6.3
12"	300	1020	190	560	270	1096	50	636	1030	323.9	500	7.1
14"	350	1110	221	620	270	1183	50	693	1140	355.6	500	8
16"	400	1385	253	801	328	1409	79	825	1330	406.4	700	9.7
18"	450	1515	285	864	363	1526	79	877	1486	457	700	9.7

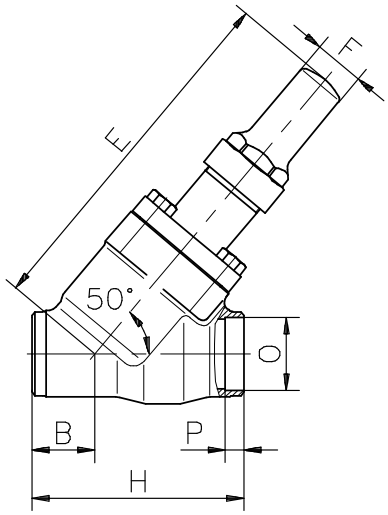
* Dimensions open valve

VALVES FROM 10 TO 100 mm FOR BRAZING "B"

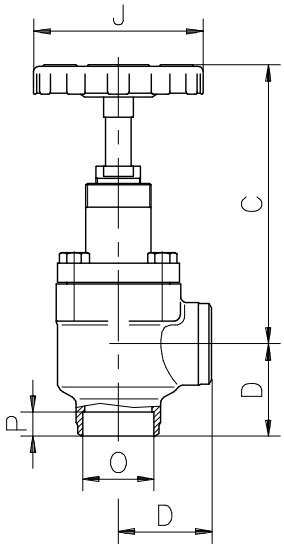
Order ref. : DN... VDB



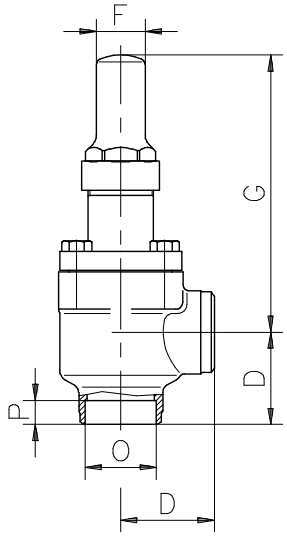
Order ref. : DN... CDB



Order ref. : DN... VEB



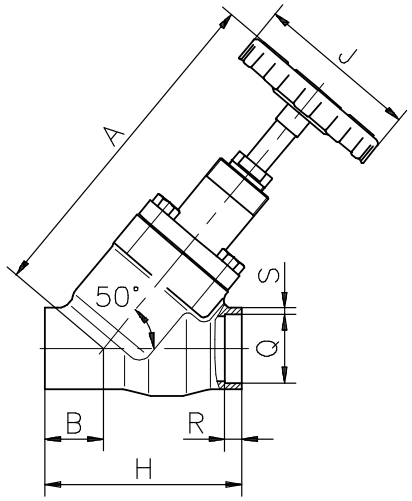
Order ref. : DN... CEB



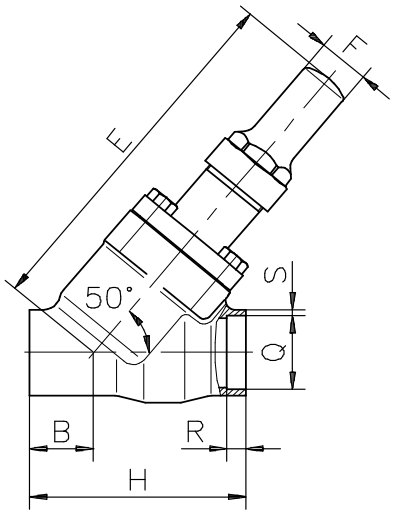
	DIMENSIONS IN MILLIMETERS											
	DN	A *	B	C*	D	E	F	G	H	J	O	P
1/2"	10	128	25	112	39	136	28	112	85	50	12.9	12
5/8"	15	128	25	112	39	136	28	112	85	50	16.1	15.5
7/8"	20	161	33	136	46	171	36	146	110	70	22.4	20
1 1/8"	25	161	33	136	46	171	36	146	110	70	28.8	20
1 3/8"	32	200	40	159	57	214	36	161	130	100	35.2	22
1 5/8"	40	200	40	159	57	214	36	161	130	100	41.5	22
2 1/8"	50	247	41	209	69	257	36	206	152	125	54.3	25
2 5/8"	65	305	49	235	85	308	41	237	186	175	66.9	25
3 1/8"	80	360	54	273	85	368	50	281	238	200	79.6	30
4 1/8"	100	397	58	299	105	396	50	299	275	200	105	30
	* Dimensions open valve											

VALVES FROM 10 TO 32 mm SOCKET WELDING "K"

Order ref. : DN... VDK



Order ref. : DN... CDK



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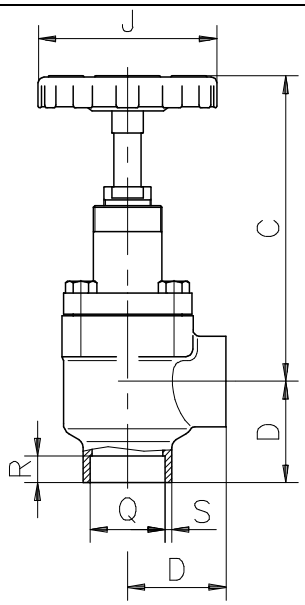
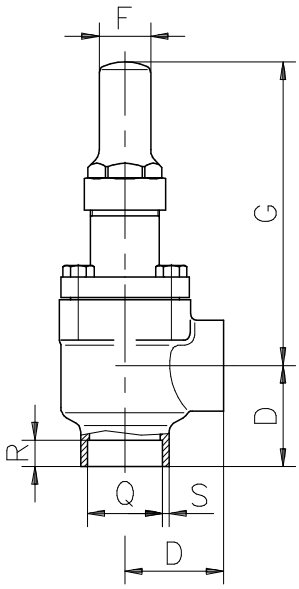


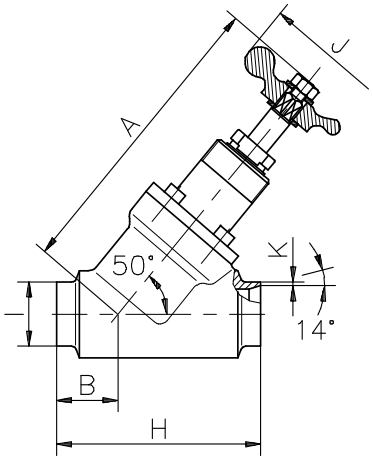
Order ref. : DN... CEK



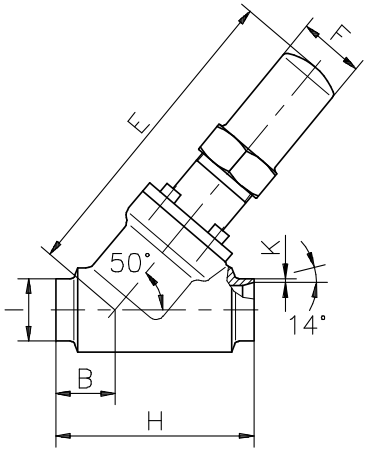
	DIMENSIONS IN MILLIMETERS												
	DN	A *	B	C*	D	E	F	G	H	J	Q	R	S
3/8"	10	128	25	112	39	136	28	112	85	50	17.5	10	7.2
1/2"	15	128	25	112	39	136	28	112	85	50	21.9	10	5.1
3/4"	20	161	33	136	46	171	36	146	110	70	27.4	13	9.3
1"	25	161	33	136	46	171	36	146	110	70	34.1	13	5.9
1 1/4"	32	200	40	159	57	214	36	161	130	100	42.9	13	5.3
	* Dimensions open valve												

VALVES FROM 10 TO 450 mm FOR BUTT WELDING "H"

Order ref : DN… VDH



Order ref : DN… CDH



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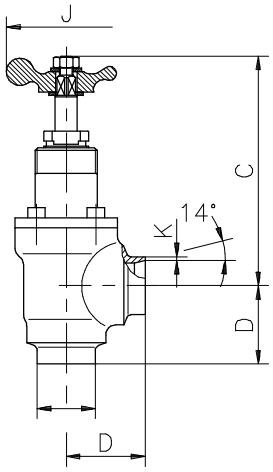

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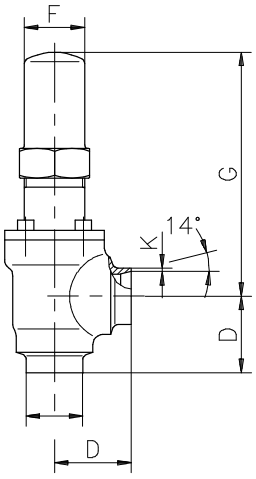


	DIMENSIONS IN MILLIMETERS											
	DN	A *	B	C*	D	E	F	G	H	I	J	K
3/8"	10	128	25	112	39	136	28	112	85	17.2	50	2
½"	15	128	25	112	39	136	28	112	85	21.3	50	2
¾"	20	161	33	136	46	171	36	146	110	26.9	70	2
1"	25	161	33	136	46	171	36	146	110	33.7	70	2
1 ¼"	32	200	40	159	57	214	36	161	130	42.4	100	2
1 ½"	40	200	40	159	57	214	36	161	130	48.3	100	2
2"	50	247	41	209	69	257	36	206	152	60.3	125	2
2 ½"	65	305	49	235	85	308	41	237	186	76.1	175	2
3"	80	360	54	273	85	368	50	281	238	88.9	200	2
4"	100	397	58	299	105	396	50	299	275	114.4	200	2
5"	125	545	66	427	120	558	48	442	308	139.7	250	2
6"	150	569	71	435	135	584	48	450	344	168.3	250	2
8"	200	833	88	655	170	869	56	691	427	219.1	400	2
10"	250	946	106	723	215	945	56	722	527	273	400	2
12"	300	1020	190	560	270	1096	50	636	1030	323.9	500	2
14"	350	1110	221	620	270	1183	50	693	1140	355.6	500	2
16"	400	1385	253	801	328	1409	79	825	1330	406.4	700	2
18"	450	1515	285	864	363	1526	79	877	1486	457	700	2

* Dimensions open valve

COEFFICIENT OF DISCHARGE OF VALVES FROM 10 TO 450 mm

Valve Coefficient k_V : This expresses the water volumetric flow-rate (cubic metre per hour : m^3/h) flowing through the valve, which creates a pressure loss of one bar.

1) With density (liquid) :

$$K_v = Q\sqrt{\frac{d}{\Delta P}} \quad \Rightarrow : \quad Q = K_v\sqrt{\frac{\Delta P}{d}} \quad \text{and} \quad \Delta P = \frac{Q^2 . d}{k_v{}^2}$$

where :
- Q : volumetric flow - m^3/h
- ΔP : Pressure loss - bar
- d : refrigerant density - kg/dm^3

2) With specific volume (gas if $P_o \rangle \frac{P_i}{2}$, $\Delta P \langle \frac{P_i}{2}$)

$$K_v = \frac{Q}{31.62\sqrt{v.\Delta P}} \quad \Rightarrow : \quad Q = 31.62K_v\sqrt{v.\Delta P} \quad \text{and} \quad \Delta P = \frac{Q^2}{1000.K_v{}^2.v}$$

with :
- Q : volumetric flow - m^3/h
- P : pressure loss - bar
- v : specific volume at T_i and P_i - m^3/Kg
- P_i and T_i : inlet temperature (°C) and pressure (b.a.)
- P_o : outlet pressure (b.a.)

ANGLES VALVES		STRAIGHT VALVES	
DN	Kv	DN	Kv
10	5.17	10	4.4
15	6.46	15	8.88
20	17.24	20	15.86
25	20.25	25	16.46
32	36.2	32	29.91
40	43.1	40	46.72
50	71.55	50	76
65	120.7	65	112
80	176.7	80	168.1
100	267.2	100	258.6
125	517.2	125	480.2
150	706.9	150	662.1
200	1237	200	1157.8
250	2112	250	1952.6
300	3017	300	2794
350	3846.5	350	3538.8
400	4878	400	4487
450	6235	450	5736.2

STAINLESS STEEL VALVES FROM 10 TO 25 mm

RFF valves can be supplied with a material certificate for body and bonnet which guarantees the impact strength at -50°C.

RFF valves are constructed of Stainless steel shell X4CrNi 18-10 (1.4301) EN10088-3. Internal parts are similar to standard steel valves. They are sealed by two O-rings with a special oil filled groove which provides a complete gas tight seal.

The nominal pressure rating is 25 bar with temperature range from -50°C up to +150°C. Valves with higher pressure PN 65 is available on request with temperature range from -50°C up to +110°C.

The PTFE seat provides positive shut-off with a minimum amount of force.

All valves should be closed by turning the spindle clockwise. The O-rings can be replaced when the spindle is back-seated fully. Maintenance of the O-rings can be carried out without shutting down the plant.

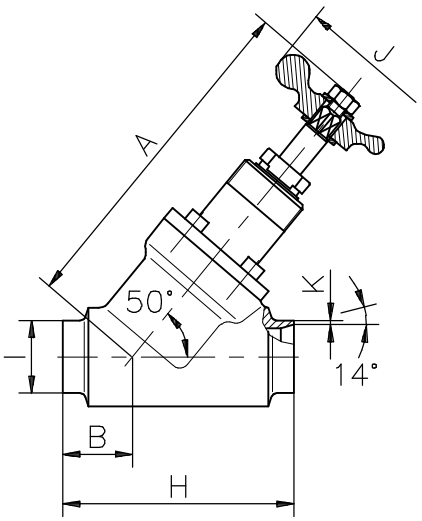
By using valves fitted with caps on installations using odourless refrigerant extra security is ensured. Gas refrigerant is contained under the cap which is manufactured with small hole drilled under the gasket. When the cap is unscrewed, any build-up of refrigerant gas inside the cap will escape through this hole and can be heard as a whistling noise. This is an indication that the O-rings in the gland nut have been damaged or are in poor condition.
All valves can be fitted with bakelite handwheels or aluminium caps.

Branch connections for RFF valves can be :
for butt welding, "H" class
(thickness 2mm for stainless steel pipe)

REFERENCES					
I	**...**	*****	**x**	**x**	**x**
Stainless steel range	DN	Stop valve	V : with handwheel C : with cap	D : Straight E : Angle	Connections H : Butt welding Thickness 2 mm for stainless steel pipe

VALVES FROM 10 TO 25 mm FOR STAINLESS STEEL PIPE

Order Ref. : DN... IVDH



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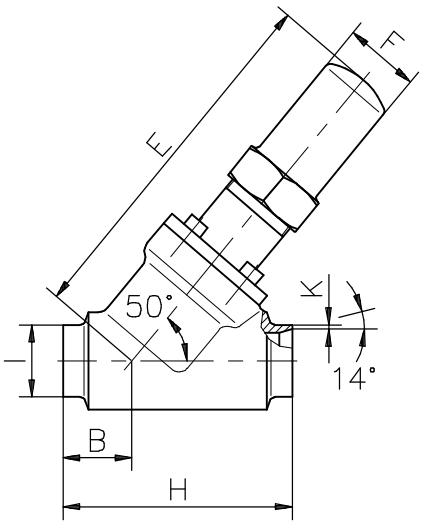

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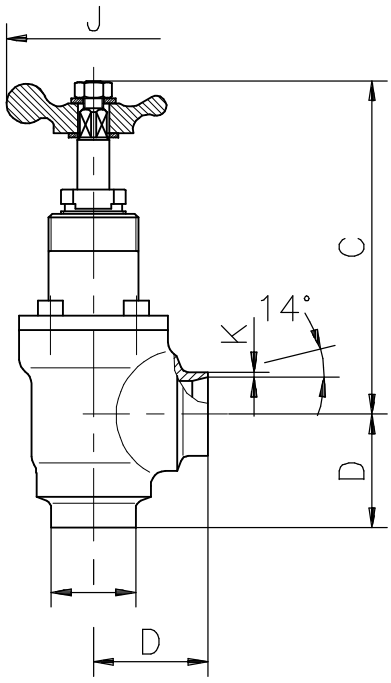

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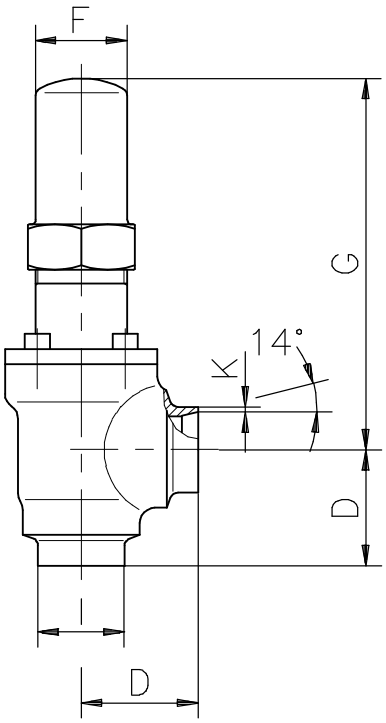

	DIMENSIONS IN MILIMETRES											
	DN	A *	B	C*	D	E	F	G	H	I	J	K
3/8"	10	128	25	112	39	136	28	112	85	17.2	50	2
1/2"	15	128	25	112	39	136	28	112	85	21.3	50	2
3/4"	20	161	33	136	46	171	36	146	110	26.9	70	2
1"	25	161	33	136	46	171	36	146	110	33.7	70	2
	* Dimensions valve open											