

HAND REGULATING VALVES

CONTENTS

SPECIFICATIONS	29
HAND REGULATING VALVES COMPONENTS	30
HAND REGULATING VALVES FROM 10 TO 40 mm FOR WELDING, S CLASS.....	31
HAND REGULATING VALVES FROM 10 TO 40 mm FOR WELDING, M CLASS	32
HAND REGULATING VALVES FROM 10 TO 40 mm FOR BRAZING, B CLASS	33
HAND REGULATING VALVES FROM 10 TO 32 mm SOCKET WELDING, K CLASS	34
HAND REGULATING VALVES FROM 10 TO 40 mm FOR WELDING, H CLASS.....	35
APERTURE OF HAND REGULATING VALVES	36
COEFFICIENT DISCHARGE OF HAND REGULATING VALVES	37
REFRIGERATING CAPACITY OF HAND REGULATING VALVES.....	39

HAND-REGULATING VALVES

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

The nominal pressure rating is 25 bar, with the possible higher pressure PN 65 on request.

RFF hand-regulating 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 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.

RFF have redesigned the hand regulating valve Seat. The regulation of liquid flow is carried out by restricting the orifice size by the conical (cone) underneath the Seat. The new model has a new PTFE Seat which can be used to close the Regulating valve completely.

Hand regulating valves can be identified by a series of two grooves machined into the vertical bonnet surface. They are painted mauve in colour.

Hand-regulating valves have a normal maximum flow-rate which depends on their nominal diameters, but they can be fitted with special cones to give a higher-than-standard flow-rate.

The new Hand Regulating Valves can be described as straight through. Angle versions are possible for sizes DN 15, 25 and 40mm only. The angle valve dimensions are identical to the angle shut off valve sizes.

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 hand-regulating valves can be fitted with handwheels or caps.

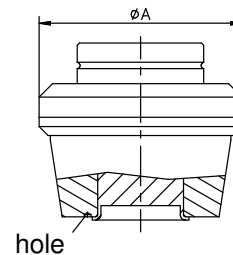
Branch connections on RFF hand-regulating valves can be :

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

Cones can be identified by holes on the under side of the seat.

		A	No. of holes
DN 10/15 Cone size	24 mm ²	18	1
	36 mm ²	18	2
	60 mm ²	18	3
DN 20/25 Cone size	40 mm ²	29	0
	56 mm ²	29	1
	110 mm ²	29	2
DN 32/40 Cone size	90 mm ²	45	0
	140 mm ²	45	1
	300 mm ²	45	2
	500 mm ²	45	3

EX : DN 10/15 - 24mm²



HAND REGULATING VALVES

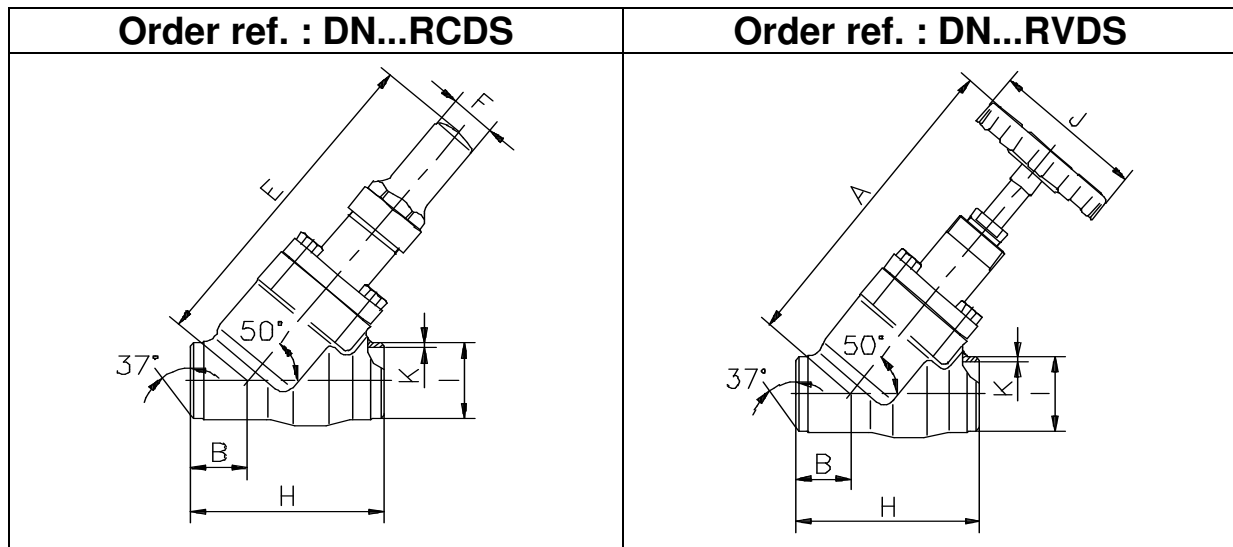
REFERENCES

D	...	R	x	x	x	Xxx
Steel range	DN	Regulating valve	V : with handwheel C : with cap	D : Straight E : Angle	Connections S : Butt welding ends - standard series M : Butt weldings end – Din 2448 B : Brazing ends K : Socket welding ends H : Butt welding Thickness 2 mm for stainless steel pipe	Cone : <u>DN 10/15</u> 024 : 24 mm ² usual cone DN 10 036 : 36 mm ² usual cone DN 15 060 : 60 mm ² <u>DN 20/25</u> 040 : 40 mm ² usual cone DN 20 056 : 56 mm ² usual cone DN 25 110 : 110 mm ² <u>DN 32/40</u> 090 : 90 mm ² usual cone DN 32 140 : 140 mm ² usual cone DN40 300 : 300 mm ² 500 : 500 mm ²

DN	BRANCH				BODY*	BONNET	DISC-SEAL	SETTING	HANDWHEEL	CAP	BODY GASKET
10	S	M	B	K	TStE355	TStE355	PTFE on steel	Conical seal	Bakelite	Steel	O-ring
15	S	M	B	K	TStE355	TStE355	PTFE on steel	Conical seal	Bakelite	Steel	O-ring
20	S	M	B	K	TStE355	TStE355	PTFE on steel	Conical seal	Bakelite	Steel	O-ring
25	S	M	B	K	TStE355	TStE355	PTFE on steel	Conical seal	Bakelite	Steel	O-ring
32	S	M	B	K	TStE355	TStE355	PTFE on steel	Conical seal	Sheet steel	Alu	O-ring + alu gasket
40	S	M	B	-	TStE355	TStE355	PTFE on steel	Conical seal	Sheet steel	Alu	O-ring + alu gasket

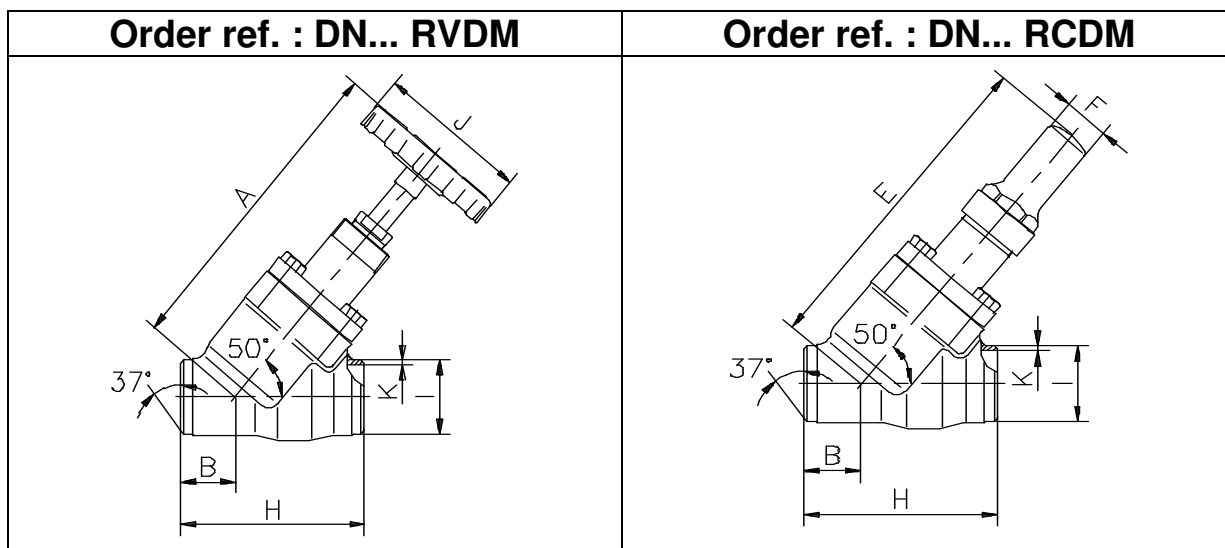
HAND REGULATING VALVES - 10 to 40mm "S" CLASS

STEEL



DIMENSIONS IN MILLIMETERS									
	DN	A *	B	E	F	H	I	J	K
3/8"	10	128	25	136	28	85	17.2	50	2.3
1/2"	15	128	25	136	28	85	21.3	50	2.6
3/4"	20	161	33	171	36	110	26.9	70	2.9
1"	25	161	33	171	36	110	33.7	70	3.6
1 1/4"	32	200	40	214	36	130	42.4	100	3.6
1 1/2"	40	200	40	214	36	130	48.3	100	3.6

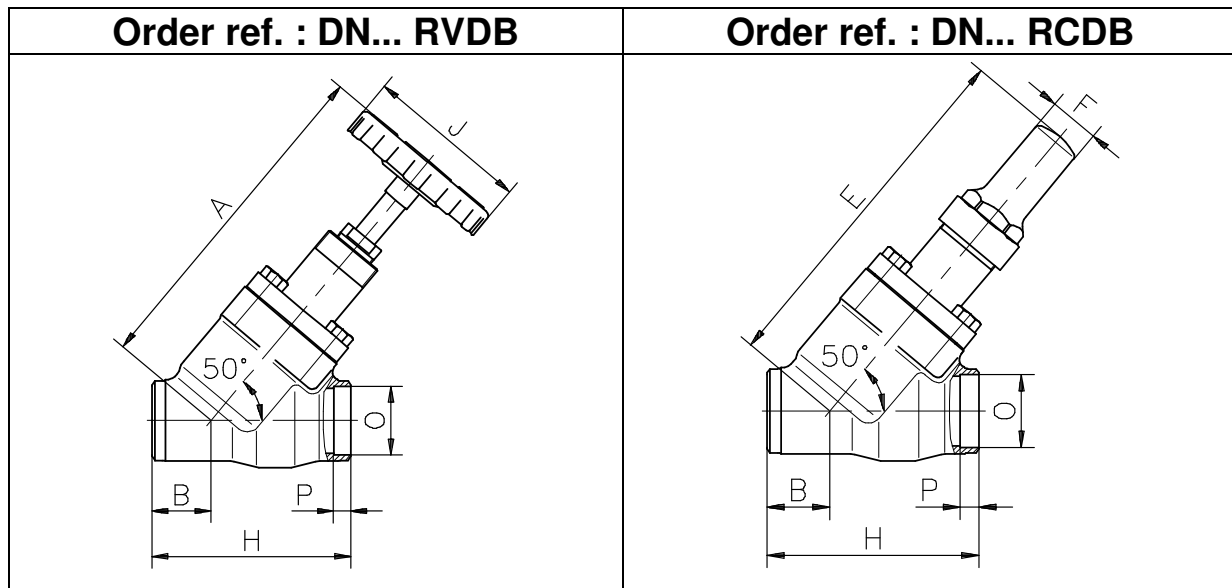
* Dimensions open valve



DIMENSION IN MILLIMETERS									
	DN	A *	B	E	F	H	I	J	K
3/8"	10	128	25	136	28	85	17.2	50	1.8
1/2"	15	128	25	136	28	85	21.3	50	2
3/4"	20	161	33	171	36	110	26.9	70	2.3
1"	25	161	33	171	36	110	33.7	70	2.6
1 1/4"	32	200	40	214	36	130	42.4	100	2.6
1 1/2"	40	200	40	214	36	130	48.3	100	2.6
* Dimensions open valve									

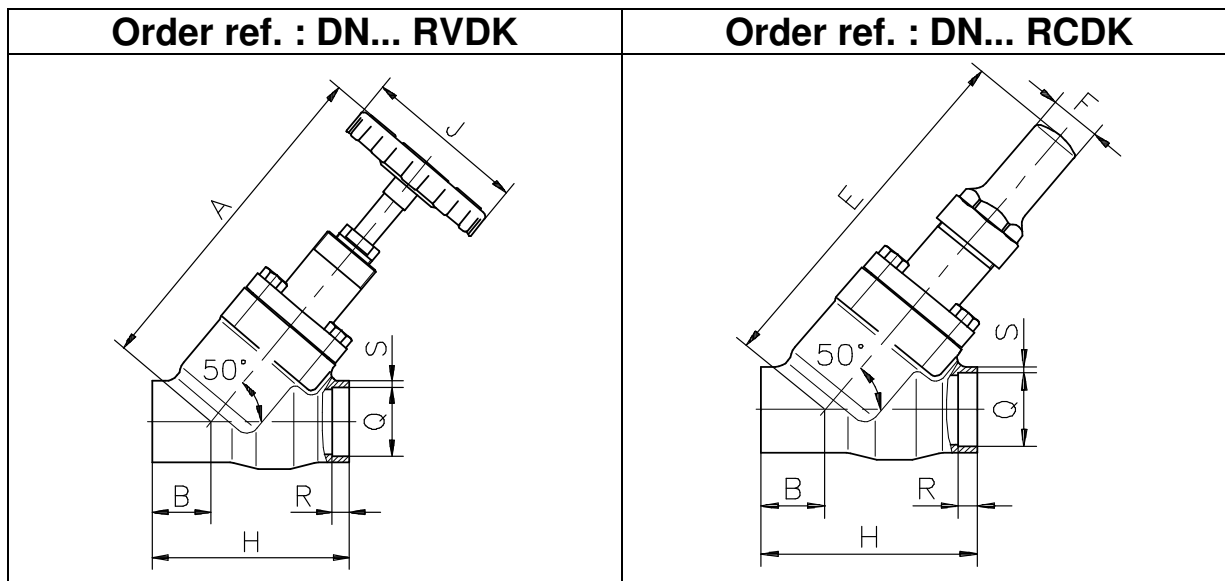
HAND REGULATING VALVES - 10 to 40 mm "B" CLASS

STEEL



DIMENSIONS IN MILIMETRES									
	DN	A *	B	E	F	H	J	O	P
1/2"	10	128	25	136	28	85	50	12.9	12
5/8"	15	128	25	136	28	85	50	16.1	15.5
7/8"	20	161	33	171	36	110	70	22.4	20
1 1/8"	25	161	33	171	36	110	70	28.8	20
1 3/8"	32	200	40	214	36	130	100	35.2	22
1 5/8"	40	200	40	214	36	130	100	41.5	22

* Dimensions open valve

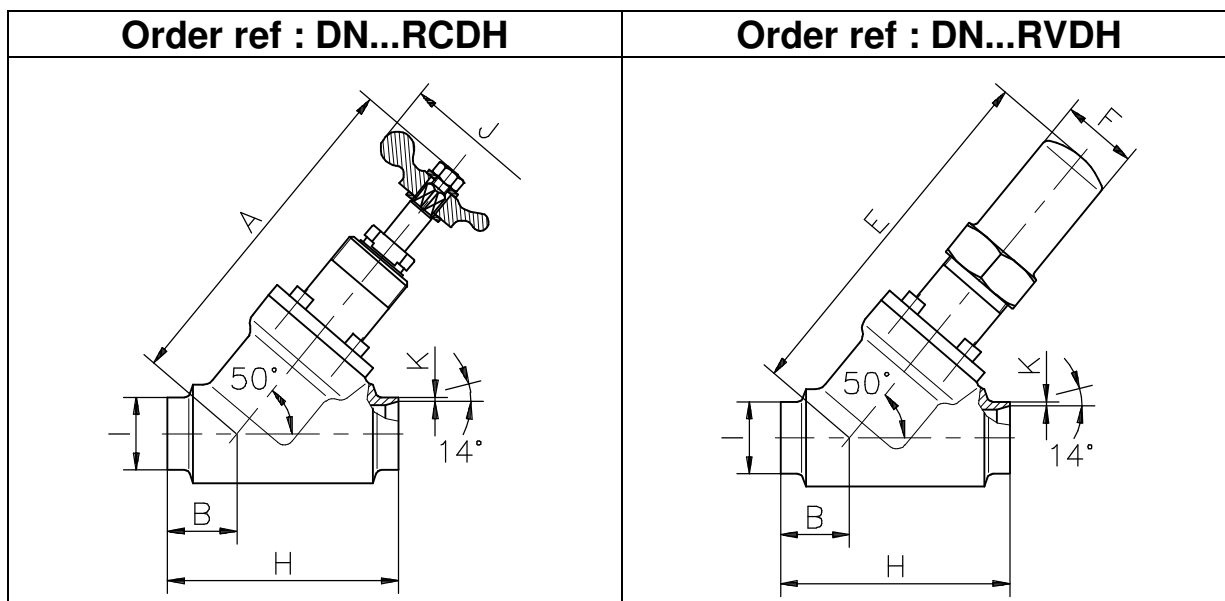


DIMENSIONS IN MILIMETRES										
	DN	A *	B	E	F	H	J	Q	R	S
3/8"	10	128	25	136	28	85	50	17.5	10	7.2
1/2"	15	128	25	136	28	85	50	21.9	10	5.1
3/4"	20	161	33	171	36	110	70	27.4	13	9.3
1"	25	161	33	171	36	110	70	34.1	13	5.9
1 1/4"	32	200	40	214	36	130	100	42.9	13	5.3

* Dimensions valve open

HAND REGULATING VALVES - 10 to 40mm "H" CLASS

STEEL

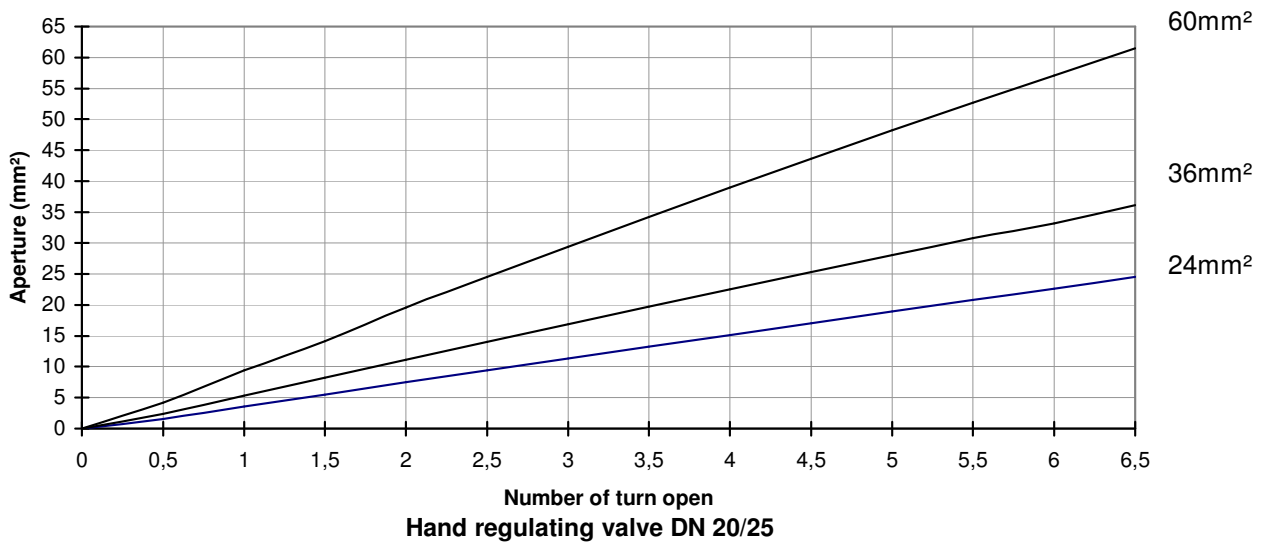


DIMENSIONS IN MILIMETERS									
	DN	A *	B	E	F	H	I	J	K
3/8"	10	128	25	136	28	85	17.2	50	2
1/2"	15	128	25	136	28	85	21.3	50	2
3/4"	20	161	33	171	36	110	26.9	70	2
1"	25	161	33	171	36	110	33.7	70	2
1 1/4"	32	200	40	214	36	130	42.4	100	2
1 1/2"	40	200	40	214	36	130	48.3	100	2

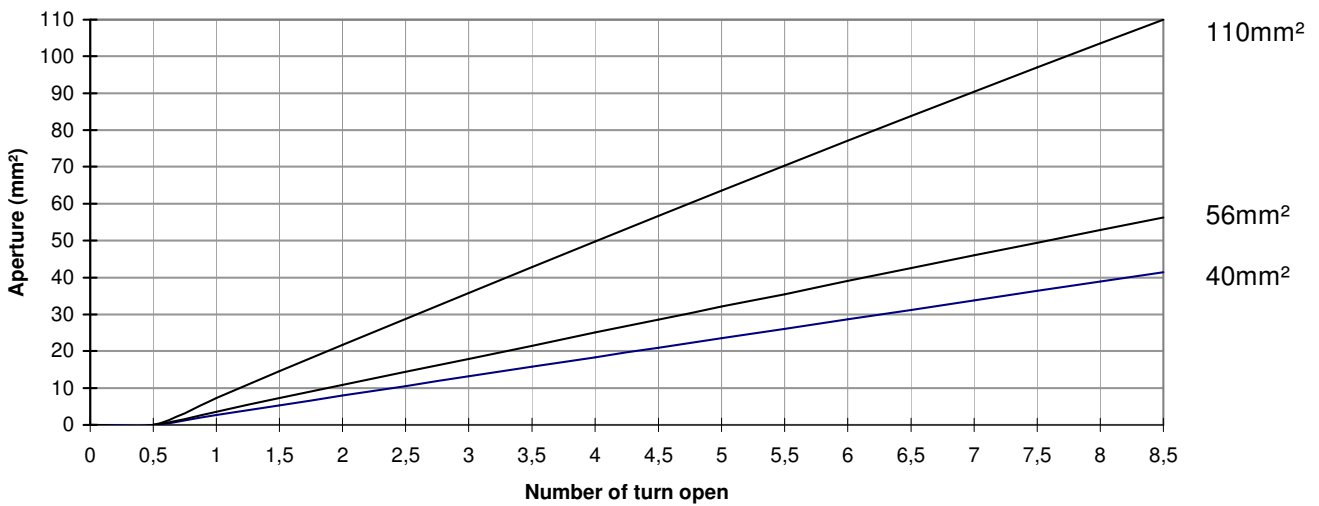
* Dimensions open valve

APERTURE OF HAND REGULATING VALVES from 10 to 40 mm

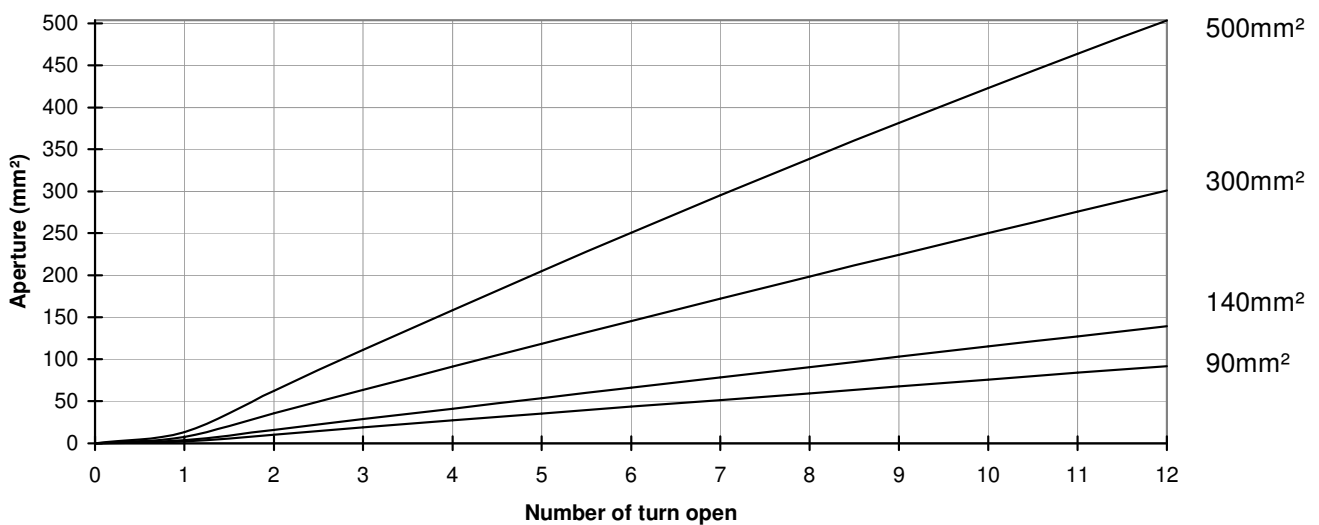
Hand regulating valve DN 10/15



Hand regulating valve DN 20/25



Hand regulating valve DN 32/40



COEFFICIENT DISCHARGE OF HAND REGULATING VALVES

OPERATION FOR LIQUID INLET / LIQUID OUTLET :

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

That is :

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

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

FULL OPENING										
DN 10/15 cone size			DN 20/25 cone size			DN 32/40 cone size				
	24 mm^2 (1)	36 mm^2	60 mm^2	40 mm^2 (2)	56 mm^2	110 mm^2	90 mm^2 (3)	140 mm^2	300 mm^2	500 mm^2
Kv	1.35	1.86	2.52	2.09	2.79	4.61	4.78	7.03	12.94	19.03

(1) with DN 10 only
(2) with DN 20 only
(3) with DN 32 only

COEFFICIENT DISCHARGE OF HAND-REGULATING VALVES

OPERATION FOR LIQUID INLET / LIQUID-GAS MIXTURE OUTLET (FLASHING)

Values of the flow-rate coefficient F_L , which make it possible to calculate the "critical" flow-rate when "flashing" occurs :

$$K_v = \frac{Q}{F_L} \sqrt{\frac{d}{p_e - F_F \cdot p_s}} \Rightarrow Q = F_L \cdot K_v \sqrt{\frac{P_e - F_F \cdot P_s}{d}} \quad F_F = 0.96 - 0.28 \sqrt{\frac{p_s}{p_c}}$$

with :

avec

Q : liquid flow in m³/h (inlet)

d : liquid refrigerant density in Kg/dm³ (inlet)

p_i : inlet absolute pressure in bar

p_o : vapour absolute pressure in bar at the fluid temperature concerned (outlet)

p_c : critical absolute pressure in bar

F_L, K_v : see table

		F _L	K _v
DN 10/15 Cone size	24 mm ² (1)	0.85	1.35
	36 mm ²	0.89	1.86
	60 mm ²	0.9 < F _L < 1	2.52
DN 20/25 Cone size	40 mm ² (2)	0.85	2.09
	56 mm ²	0.89	2.79
	110 mm ²	0.9 < F _L < 1	4.61
DN 32/40 Cone size	90 mm ² (3)	0.85	4.78
	140 mm ²	0.89	7.03
	300 mm ²	0.9 < F _L < 1	12.94
	500 mm ²	0.9 < F _L < 1	19.03

(1) with DN 10 only

(2) with DN 20 only

(3) with DN 32 only

Following tables give you an estimate of refrigerating capacity (KW) for fully opened hand-regulating valves with principal refrigerants (calculated values without undercooling). P(KW) x 3600 = P(Kj/h).

When selecting a hand-regulating valve, a 30 % minimum margin is recommended, not include in the tables.

STAINLESS STEEL REGULATING VALVES FROM 10 TO 25

STAINLESS

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

RFF hand-regulating valves are constructed of Stainless steel shell CrNi18-10 (1.4301) EN 10088-3. 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 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.

RFF have redesigned the hand regulating valve Seat. The regulation of liquid flow is carried out by restricting the orifice size by the conical (cone) underneath the Seat. The new model has a new PTFE Seat which can be used to close the Regulating valve completely.

Hand regulating valves can be identified by a series of two grooves machined into the vertical bonnet surface.

Hand-regulating valves have a normal maximum flow-rate which depends on their nominal diameters, but they can be fitted with special cones to give a higher-than-standard flow-rate.

The new Hand Regulating Valves can be described as straight through. Angle versions are possible for sizes DN 15 and 25mm only. The angle valve dimensions are identical to the angle shut off valve sizes.

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 hand-regulating valves can be fitted with bakelite handwheel or aluminium caps.

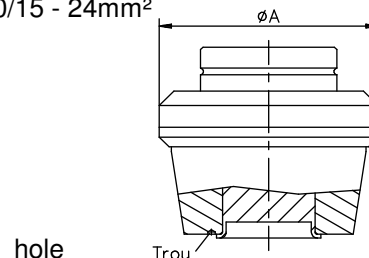
Branch connections on RFF hand-regulating valves can be :

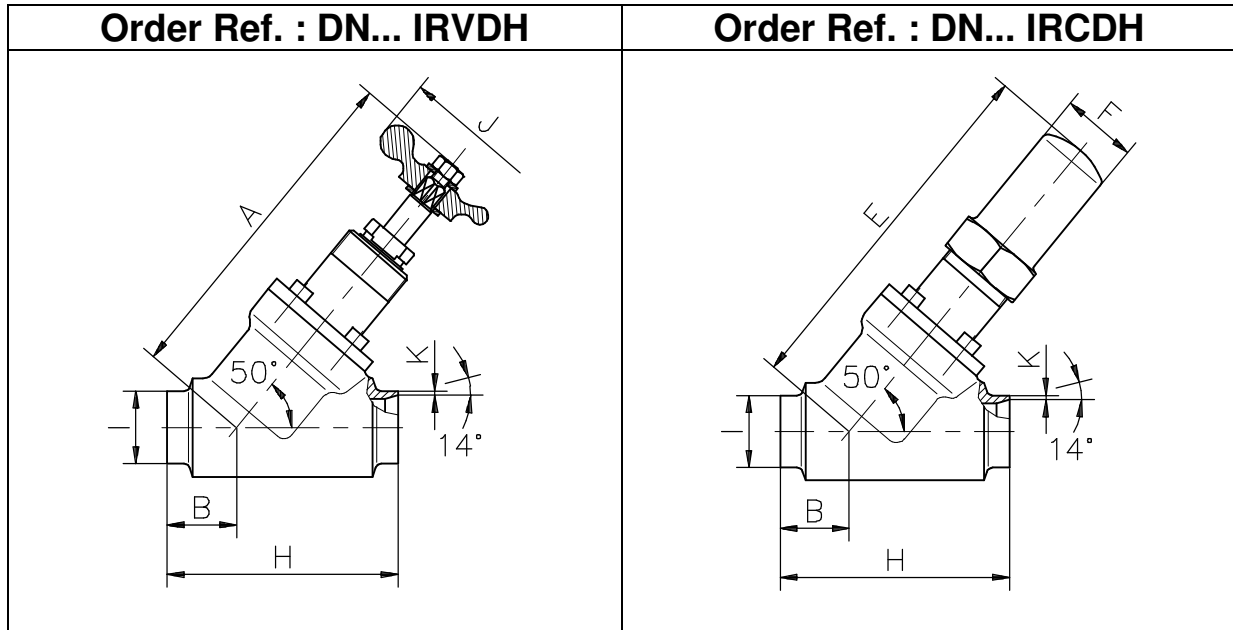
for butt welding, "H" class (Thickness 2mm for stainless steel pipe)

Cones can be identified by holes on the under side of the seat.

EX : DN 10/15 - 24mm²

		A	No. of holes
DN 10/15 Cone size	24 mm ²	18	1
	36 mm ²	18	2
	60 mm ²	18	3
DN 20/25 Cone size	40 mm ²	29	0
	56 mm ²	29	1
	110 mm ²	29	2





DIMENSIONS IN MILIMETRES									
	DN	A *	B	E	F	H	I	J	K
3/8"	10	128	25	136	28	85	17.2	50	2
1/2"	15	128	25	136	28	85	21.3	50	2
3/4"	20	161	33	171	36	110	26.9	70	2
1"	25	161	33	171	36	110	33.7	70	2

* Dimensions valve open

REFERENCES						
I	...	R	x	x	x	xxx
Stainless steel range	DN	Regulating valve	V : with handwheel C : with cap	D : Straight E : Angle	<u>Connections</u> H : Butt welding Thickness 2 mm for stainless steel pipe	<u>Cone :</u> <u>DN 10/15</u> 024 : 24 mm ² usual cone DN 10 036 : 36 mm ² usual cone DN 15 060 : 60 mm ² <u>DN 20/25</u> 040 : 40 mm ² usual cone DN 20 056 : 56 mm ² usual cone DN 25 110 : 110 mm ²