Cocon QTZ

Pressure independent control valve

PN 25 / PN 16, DN 10...32

Pressure independent control valve for dynamic hydronic balancing of heat exchangers, for example fan coils or cooling ceilings and distribution pipes in heating and cooling systems with closed circuits. The valve combination consists of an automatically operating flow controller and a control valve and can be equipped with an actuator or a manual regulating head. Installation in the supply or the return pipe.

Two-way valve, with secured, lead sealable, infinitely adjustable flow limitation. Direct setting in litres per hour. Readability of the set value independent of the handwheel position possible from the outside, even with an actuator fitted. Valves with blind plugs can be retrofitted with Classic measuring valves. All DN 15 and DN 20 valves are suitable for copper pipe. Maintenance-free spindle sealing.

Functions

- Pressure independent flow control
- Blockable and lead-sealable presetting visible from the outside
- With shutoff
- Optional connection of a measuring device for differential pressure measurement
- Optional for PN25 variants: Filling, venting, draining, flushing

Features

+ Up to 4,800 litres per hour and 6 bar differential pressure
+ Handwheel with direct setting in litres per hour
+ Different connection options

Product Details

Technical data

Valve

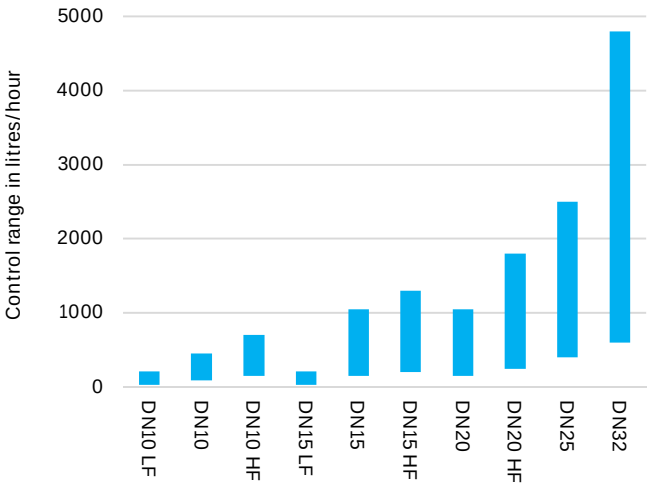
Nominal sizes	DN 10 to DN 32
Variants	With internal thread according to EN 10226 With external thread according to ISO 228 With coupling on the inlet side and internal thread on the outlet side
Operating temperature	-10 to 120 °C
Operating pressure	HF variants: max. 25 bar / PN 25 Other variants: max. 16 bar / PN 16
Medium	Heating and cooling water according to VDI 2035 or ÖNORM 5195 Water-glycol mixtures with a max. glycol content of 50% Not suitable for steam, oily and aggressive media
pH value	6.5 to 10
Seat tightness for shut off with handwheel[1]	DIN EN 12266-1 / ISO 5208-1

Actuator connection

Connection	M 30 x 1.5
Stroke	DN 10...20: 2.8 mm DN 10...20 HF: 4 mm DN 25...32: 4 mm
Closing dimension	11.8 mm
Lower stroke position	≤ 11.3 mm
Upper stroke position	≥ 14.6 mm (at 2.8 mm stroke) ≥ 15.8 mm (at 4 mm stroke)
Closing force	90 to 150 N
Leakage rate with permissible actuator	DIN EN 1349 / IEC 60534, class IV

Flow data

DN	PN	Control range [l/h]	Δp range [kPa]	Kvs value
10 LF[2]	16	30...210	20...400	0.5
10	16	90...450	20...400	1.1
10 HF[3]	25	150...700	13...600	1.7
15 LF	16	30...210	20...400	0.5
15	16	150...1050	20...400	1.8
15 HF	25	200...1300	16...600	2.1
20	16	150...1050	20...400	1.8
20 HF	25	250...1800	18...600	3.1
25	25	400...2500	20...600	4.1
32	25	600...4800	23...600	8.4



[1] The sole, permanent and unattended shut off of the valve against the atmosphere is not permissible. In this case, provide an additional shutoff cap / plug

[2] LF = low flow = low flow range

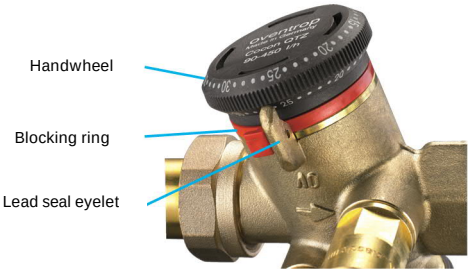
[3] HF = high flow = high flow range

Functions

Setting of the flow rate

The desired flow rate is set with the handwheel. The nominal value setting is secured against unintentional setting by engaging the handwheel and the additional retractable blocking ring which can be fixed with sealing wire (item no. 1089091). Partial load operation can be controlled by means of a screw-on actuator or temperature controller.

The scale on the handwheel is in litres per hour, so that the required flow rate can be set directly. The handwheel is accessible at all times. The setting can be read off and adjusted if necessary, even with the actuator mounted.



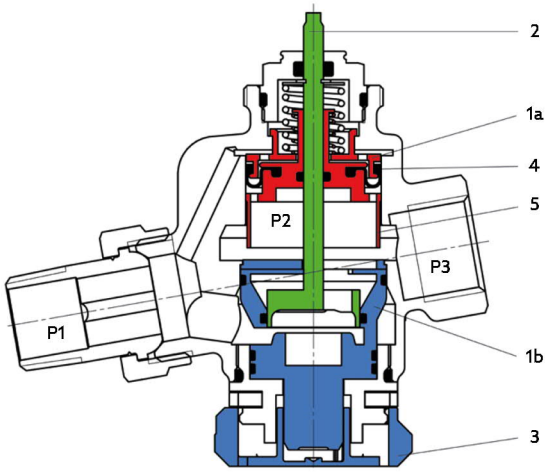
Flow control

The section through a Cocon QTZ PN 25 shows the valve components:

- 1a is the diaphragm unit
- 1b is the nominal value unit
- 2 is the regulating unit
- 3 is the handwheel for setting the nominal value
- 4 is the diaphragm
- 5 is the regulating sleeve

and the three pressure ranges:

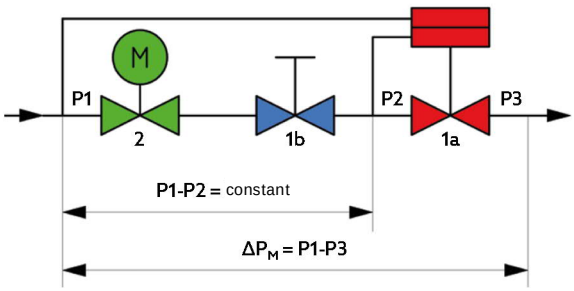
- P1 is the inlet pressure
- P2 is the working pressure acting in the diaphragm unit
- P3 is the outlet pressure



HOW IT WORKS

The differential pressure P2-P3 is controlled by the Cocon QTZ through the integrated diaphragm unit (1a) to a constant value both via the regulating unit (2) controlled by the actuator and via the nominal value unit (1b) adjustable to a maximum flow value.

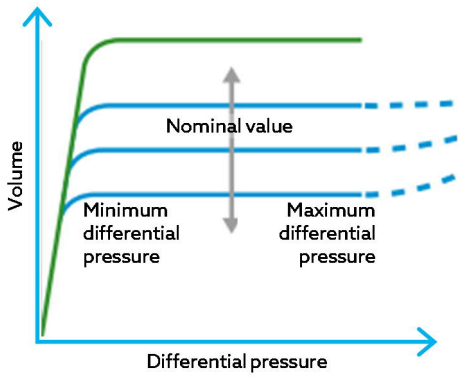
The differential pressure P1-P2 is kept constant even if the differential pressures P1-P3 fluctuate greatly, e.g. when system parts are switched on or off. This means that the valve authority is 100 % (a = 1). Even in partial load operation with steady control, e.g. in combination with 0...10 V actuators, the valve authority of the Cocon QTZ is 100 % within the effective valve stroke (a = 1).



CONTROL AND DESIGN

Due to the constant differential pressure via the regulating unit (2) and nominal value unit (1b), the set nominal value does not change even with changing system pressures as long as the valve is in the specified differential pressure range. The upper limit is 4 bar for valves PN 16 and 6 bar for valves PN 25. The lower limit depends on the nominal value. Higher nominal values usually require a slightly higher minimum differential pressure.

When sizing, it is therefore important to ensure that there is sufficient differential pressure at the valve besides the appropriate flow range. Furthermore, pressure independent control valves, like most other control valves, work best in the upper setting range.



Shut off

The pipework or the downstream consumer is shut off during operation by means of a corresponding control of the actuator. Before mounting the actuator, the pipework can be shut off using the supplied protection cap. The sole, permanent and unattended shut off of the valve against the atmosphere is not permissible. In this case, provide an additional shutoff cap / plug.

Measurement

The Cocon QTZ is optionally available with two Classic measuring valves to measure the differential pressure P1-P3. In this way it can be checked whether there is sufficient differential pressure to reach the set nominal value. The measurement can be carried out with commercially available differential pressure measuring devices, for example the Oventrop OV-DMC 3. The characteristic lines of all Cocon valves are stored in the OV-DMC 3, so that a measurement indicates whether the valve is operating within the control range.

For correct measurement, the valve must be set to the nominal value and opened. (Unscrew the protection cap or move the actuator to the open position.) As soon as the measured differential pressure is equal to or greater than the minimum differential pressure indicated in the charts from page 10 onwards, the valve operates within the control range.

Furthermore, the differential pressure measurement allows the optimisation of the pump setting. For this purpose, the delivery head of the pump is reduced until the hydraulically most unfavourable valves still operate within the control range.

Attention: Due to their design, the measured differential pressure is not identical to the actual differential pressure P1-P3 for the variants DN 10 LF, DN 15 LF (both 30 to 210 l/h), DN 10 (90 to 450 l/h) and DN 15 (150 to 1050 l/h). See chart on page 11.

FLUSHING, FILLING, BLEEDING, DRAINING

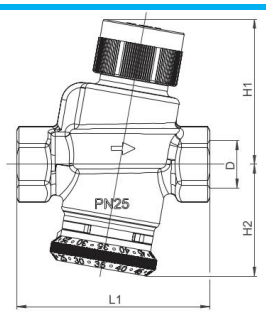
The Cocon QTZ in PN 25 version enables flushing, filling, bleeding and draining of system sections even in mounted condition. For this purpose, fill and drain ball valves (item no. 1060191) are fitted to the measuring connections of the valve. The measuring valves or blind plugs can only be replaced with the fill and drain ball valves in a depressurised state. A measurement is also possible with the fill and drain ball valves if the Oventrop OV-DMC 3 measuring device is used, as the necessary connection fittings are enclosed with the measuring device.

Materials

Component	Material
Handwheel	Plastic
Blocking ring	Plastic
Body	Dezincification resistant brass
O-rings	EPDM
Spindle	Stainless steel
Regulating sleeve	Plastic
Diaphragm	EPDM
Measuring valves / blind plugs	Brass
Protection cap	Plastic

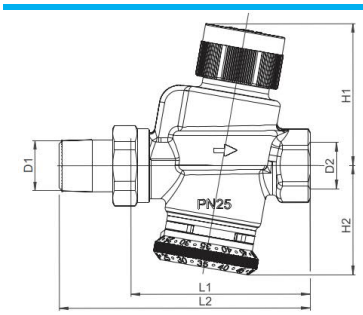
Dimensions

Cocon QTZ with internal threads according to EN 10226



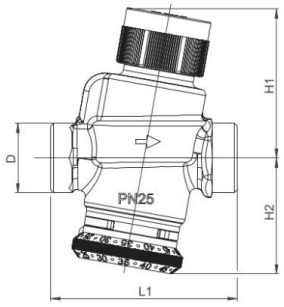
DN	D2	L1 [mm]	H1 [mm]	H2 [mm]	Weight [kg]
15	Rp ½	74.5	52	48	0.5
15 HF	Rp ½	76	57	44	0.6
20	Rp ¾	78	52	48	0.6
20 HF	Rp ¾	91	63.8	48.5	1.1
25	Rp 1	101	61.8	50.5	1.3
32	Rp 1¼	130	71.4	70.3	2.4

Cocon QTZ with coupling and internal thread



DN	D1	D2	L1 [mm]	L2 [mm]	H1 [mm]	H2 [mm]	Weight [kg]
15	R ½	Rp ½	70	98.5	52	48	0,6
15 HF	R ½	Rp ½	72	100.8	57	44	0,7
20	R ¾	Rp ¾	74	106	52	48	0,7
20 HF	R ¾	Rp ¾	91	122.7	63.8	48.8	1.2
25	R 1	Rp 1	101	136	61.8	50.5	1.5
32	R 1¼	Rp 1¼	129	169.9	71.4	70.3	2.7

Cocon QTZ with external threads according to ISO 228



DN	D	L1 [mm]	H1 [mm]	H2 [mm]	Weight [kg]
10	G ½	60	54	46	0.5
10 HF	G ½	71	57	44	0.6
15	G ¾	66	52	48	0.5
15 HF	G ¾	71	57	44	0.6
20	G 1	74	52	48	0.6
20 HF	G 1	91	64	49	1.1
25	G 1 ¼	103	62	51	1.3
32	G 1 ¾	129	72	71	2.4

Item Numbers

DN	PN	Control range [l/h]	Coupling and internal thread		External threads		Internal threads	
			Measuring valves	Blind plugs	Measuring valves	Blind plugs	Measuring valves	Blind plugs
10 LF	16	30...210			1146063	1145563		
10	16	90...450			1146163	1145663		
10 HF	25	150...700			1143263	1143663		
15 LF	16	30...210	1146004	1145504	1146064	1145564	1148504	1147504
15	16	150...1050	1146204	1145704	1146264	1145764	1148704	1147704
15 HF	25	200...1300	1143304	1143704	1143364	1143764	1149404	1147404
20	16	150...1050	1146006	1145506	1146066	1145566	1148506	1147506
20 HF	25	250...1800	1143206	1143606	1143266	1143666	1149306	1147306
25	25	400...2500	1143208	1143608	1143268	1143668	1149308	1147308
32	25	600...4800	1143210	1143610	1143270	1143670	1149310	1147310

Actuators

Aktor M electromotive actuators

Version	Item no.
230 V AC	
Three point	1012729
Two point, with short operating time	1012710
24 V AC	
Two/three point, 0...10V	1012725
0...10V	1012726
0...10V	1012717
Two point, with short operating time	1012711
Modbus RTU	1012745
KNX	1012746

Aktor T electrothermal actuators, two point

Version	Item no.
230 V AC	
NC, cable 1 m	1012415
NC, cable 2 m	1012452
NC, cable 5 m	1012455
NC, cable 10 m	1012459
NC, auxiliary switch	1012435
NO, cable 1 m	1012425
24 V AC	
NC, cable 1 m	1012416
NC, cable 2 m	1012442
NO, cable 1 m	1012426
120 V AC	
NC, cable 1 m	1012420

Aktor T electrothermal actuators, 0...10V

Version	Item no.
24 V AC	
NC, cable 1 m	1012953

Connections

Ofix compression fitting

	Suitable for	Size	Item no.
	DN 15	G ½ x 12	1027153
	DN 15	G ½ x 15	1027155
	DN 20	G ¾ x 18	1027157
	DN 20	G ¾ x 22	1027158

Connection set with internally threaded tailpipes

	Suitable for	Size	Item no.
	DN 15	Rp ½	1141292
	DN 20	Rp ¾	1141293
	DN 25	Rp 1	1141294
	DN 32	Rp 1 ¼	1141295

Connection set with externally threaded tailpipes

	Suitable for	Size	Item no.
	DN 10	R ⅜	1140281
	DN 15	R ½	1140282
	DN 20	R ¾	1140284
	DN 25	R 1	1140285
	DN 32	R 1 ¼	1140286

Accessories

Thermal insulation shell

	Suitable for	Item no.
	DN 10 HF and DN 15 HF	1149120
	DN 15 and DN 20	1149104
	DN 20 HF and DN 25	1149121
	DN 32	1149122

Adapter rotary movement

Is installed between Cocon QTZ and a rotary actuator and converts the rotary movement of the actuator into a stroke.

	Suitable for	Item no.
	all sizes	1149095

Adapter with spindle

Is required if Cocon QTZ valves are to be equipped with thermal insulation shells and actuators. Extension = 25 mm

	Suitable for	Item no.
	all sizes	1149190

Sizing

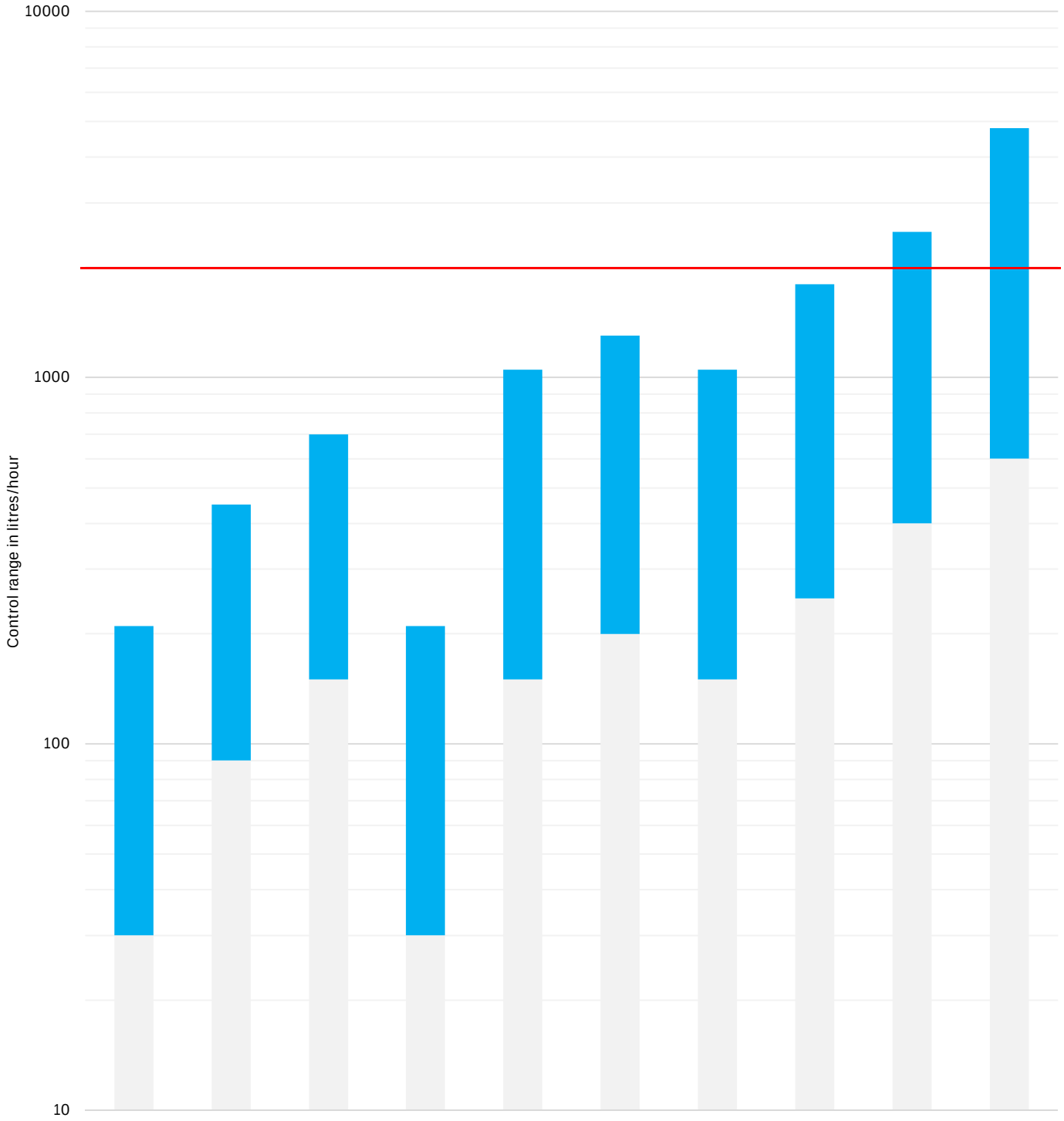
Alignment chart

The alignment chart enables a quick determination of suitable valves. The Y-axis has a scale in litres per hour. To improve readability, it is logarithmic. To determine suitable valves, find the scale value on the Y-axis and draw a horizontal line to the right. If it overlaps with the blue flow range, the valve is suitable.

In the example below (red line), a valve with a flow rate of 2,000 litres per hour is sought. Valves DN 25 and DN 32 can be used.

The item number of the desired variant can be read directly from the table below:

- ET-M = External threads with measuring valves
- ET-B = External threads with blind plugs
- IT-M = Internal threads with measuring valves
- IT-B = Internal threads with blind plugs
- C-M = Coupling / internal thread with measuring valves
- C-B = Coupling / internal thread with blind plugs

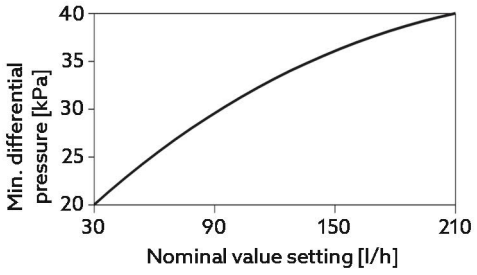


Variant	DN 10 LF	DN 10	DN 10 HF	DN 15 LF	DN 15	DN 15 HF	DN 20	DN 20 HF	DN 25	DN 32
C-M				1146004	1146204	1143304	1146006	1143206	1143208	1143210
C-B				1145504	1145704	1143704	1145506	1143606	1143608	1143610
ET-M	1146063	1146163	1143263	1146064	1146264	1143364	1146066	1143266	1143268	1143270
ET-B	1145563	1145663	1143663	1145564	1145764	1143764	1145566	1143666	1143668	1143670
IT-M				1148504	1148704	1149404	1148506	1149306	1149308	1149310
IT-B				1147504	1147704	1147404	1147506	1147306	1147308	1147310

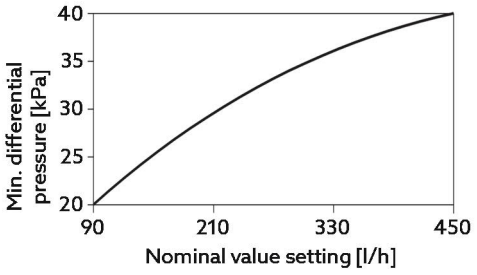
Minimum differential pressure p1...p3

For valves with integrated flow control, the required minimum differential pressure changes depending on the nominal value setting. The minimum required differential pressure p1 to p3 across the valve can be taken from the charts below. The charts take into account the mathematical correlation that applies here.

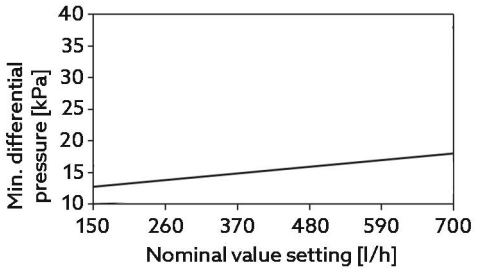
DN 10



DN 10 LF

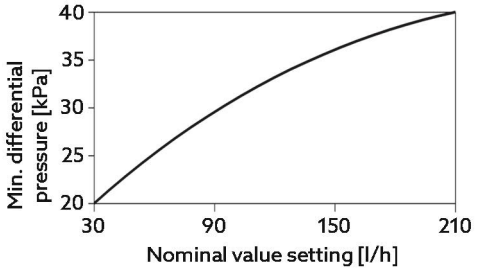


DN 10

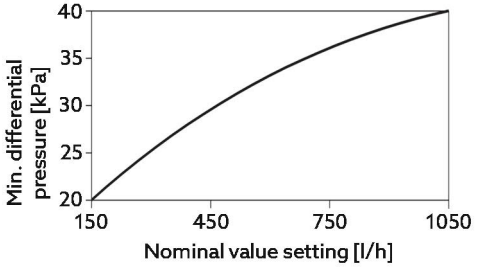


DN 10 HF

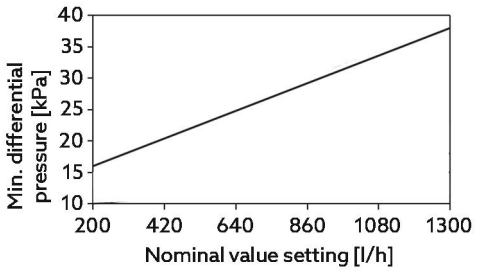
DN 15



DN 15 LF

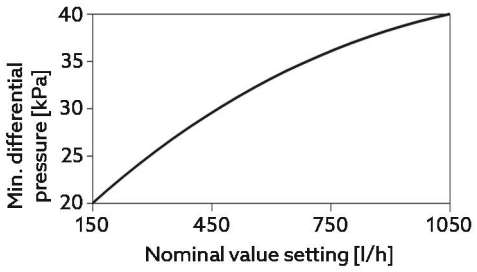


DN 15

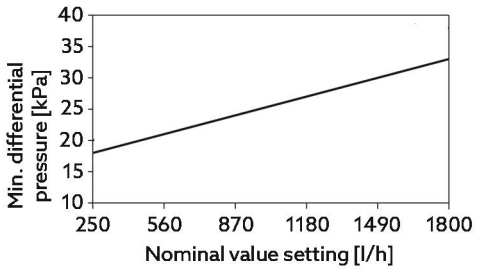


DN 15 HF

DN 20

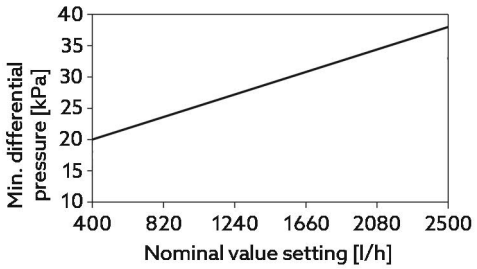


DN 20

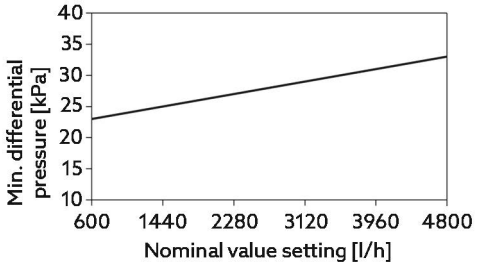


DN 20 HF

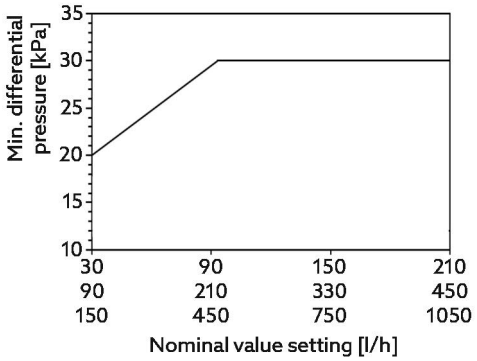
DN 25



DN 32



Measured differential pressure



For the variants DN 10 LF, DN 15 LF (both 30 to 210 l/h), DN 10 (90 to 450 l/h) and DN 15 (150 to 1050 l/h) the measured differential pressure is not identical to the actual differential pressure P1-P3.

With these variants, the measured differential pressure must be evaluated using the chart opposite: if the measured value can be classified on or above the line, sufficient differential pressure is available.

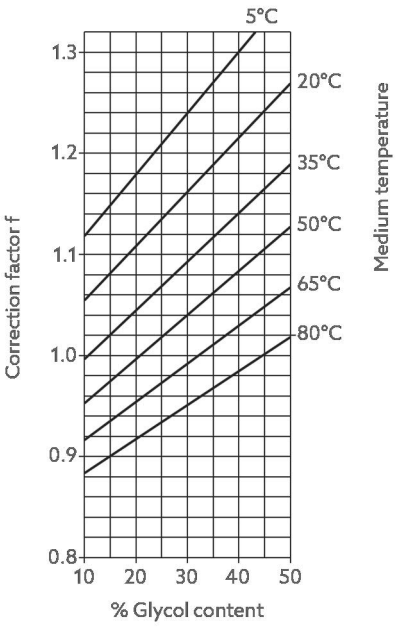
Correction factors

Additives change the viscosity of water and thus its flow properties. Manufacturers of additives often provide calculation aids that take into account the changed properties of the medium when using their products.

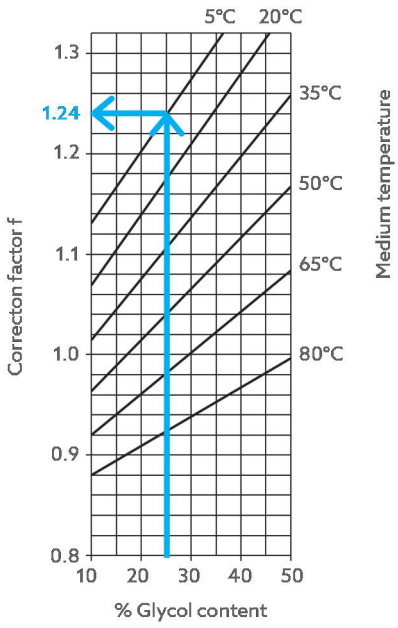
The flow data in this data sheet are based on the properties of water without additives. A quick, but only approximate calculation of the changed flow values when using glycol mixtures is made with the correction factor f, which can be used to recalculate the Kv value or the required pressure loss:

To be recalculated	Formula	Spreadsheet formula
Volume flow (valve setting)	$Q_{(corr)} = Q \times \frac{1}{\sqrt{f}}$	Q*(1/(ROOT(f)))
Pressure loss	$\Delta p_{(corr)} = \Delta p \times f$	Dp*f

The correction factor can be read in the following two charts at the intersection of the values for media temperature and glycol content.



Correction factor f for ethylene glycol



Correction factor f for propylene glycol

Example:

A glycol content of 25 % and a media temperature of 5 °C result in a factor of 1.24 with the following effects:

- A flow rate of 10 m³/h is reduced to just under 9 m³/h with the same differential pressure
- A differential pressure of 10 kPa must be increased to 12.4 kPa to ensure the same flow rate

Therefore, either a correspondingly higher setting must be selected on the valve or, if necessary, more differential pressure must be made available to ensure the required performance.

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