HydroControl V

Double regulating and commissioning valve PN 25/PN 16, DN 15...50

The HydroControl V is a double regulating and commissioning valve for the static hydronic balancing of pipelines in closed heating and cooling systems. It offers a measuring function over the valve seat.

The HydroControl V consists of a flow optimised Y-pattern body, a valve insert with double O-ring sealing, ergonomically designed handwheel, low pitch and sophisticated cone shaped plug as well as two HydroPort auxiliary valves. All functions are accessible from the top and include the following:

- Accurate flow regulation
- Reproducible, bockable and lead sealable presetting
- Pipeline shutoff
- Flow measurement connection
- Impulse tube connection
- Draining, filling and bleeding in front of and/or behind the valve seat

Features

+ Best in class flow range for easy sizing
+ All functions always included for easy selection
+ New HydroPort auxiliary valves for easy, quick and safe connection of accessories

Technical Data

Nominal sizes	DN 15...50
Versions	Internal threads according to EN 10226 Internal threads according to NPT External threads according toto ISO 228
Operating temperature	-20...+150 °C
Operating pressure	Internal thread versions: max. 25 bar / PN 25 External thread version: 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 %
Kvs values	DN 15: 3.9 DN 20: 6.9 DN 25: 11.0 DN 32: 20.8 DN 40: 28.7 DN 50: 42.9

Product Details

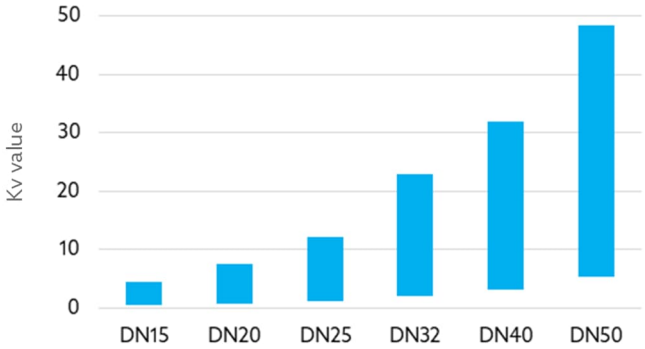
Functions

Flow Regulation

Flow regulation is done by limiting the valve lift and hence the opening between plug and seat. The lift is adjusted by turning the handwheel. The low pitch allows very precise setting. The plug position is shown on the front of the handwheel on a scale from 0 (closed) to 5.0 (fully open) in increments of 0.05. This value is the presetting value.

The HydroControl V has a linear characteristic and a wide flow range evenly graded over all nominal sizes.

As is typical for regulating valves, the control quality decreases the smaller the opening is between plug and seat. Therefore a presetting below 0.5 should be avoided with the HydroControl V.



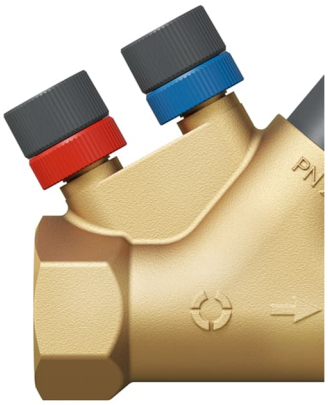
Presetting

- Reproducible: when the valve is closed, e.g. to shut off the pipeline, it can only be opened up to the set presetting value
- Blockable: the valve is blocked at the presetting position
- Lead sealable: the valve can be additionally lead sealed, e.g. with lead sealing wire (item no. 1089091)

Shutoff

Turning the handwheel clockwise until it stops shuts off the pipeline tightly. At shutoff position the presetting value is 0.0.

HydroPort



Every HydroControl V is equipped with two HydroPort auxiliary valves as standard. The HydroPort allows snap on connection of accessories. The HydroPort is opened by turning anticlockwise. A quarter turn is sufficient to measure the pressure, a full turn is sufficient to drain and fill.

DRAINING, FILLING AND BLEEDING

Draining, filling and bleeding is done with the HydroPort adapter (item no. 1069601). When the main valve is in the shut-off position, the system section upstream or downstream of the valve can be selectively filled or drained. If the entire system is to be filled or drained, both HydroPorts can be used with the main valve open to increase the capacity. One HydroPort adapter is required per HydroPort auxiliary valve.

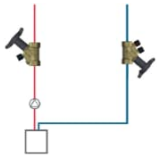
IMPULSE TUBE CONNECTION

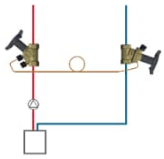
The HydroPort enables a quick, safe and secure connection of the impulse tube of a HydroControl D differential pressure regulator. Impulse tubes of other differential pressure regulators can be connected with the HydroPort adapter and suitable connection pieces.

CONNECTION OF AN OV-DMC 3

The measuring hoses of an OV-DMC 3 measuring device can be connected directly to the HydroPort.

Applications





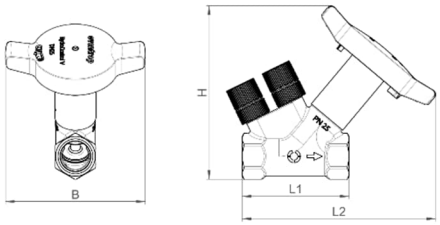
- Static balancing of main and distribution pipes in central heating and cooling systems. In such applications the HydroControl V is traditionally installed in the return pipe. Installation in the supply pipe is also possible without restrictions. A HydroControl A shutoff valve is sufficient as partner valve.
- As partner valve for a differential pressure regulator. For this application, the HydroControl usually has to be installed in the supply pipe, as most differential pressure regulators have to be installed in the return pipe. When using a HydroControl V as a partner valve for a HydroControl D differential pressure regulator, the actual flow can be measured with the OV-DMC 3 and limited if necessary.

Design and Materials

Component	Material
Handwheel assembly	Polyamide plastic PA6
Body	Dezincification resistant brass CW602
Bonnet	Dezincification resistant brass CW602
Bonnet sealing	EPDM O-ring
Spindle	Dezincification resistant brass CW602
Spindle sealing	Double EPDM O-ring
Plug	Dezincification resistant brass CW602
Seat sealing	PTFE
HydroPort valves	Dezincification resistant brass CW602
HydroPort sealing	EPDM o-ring
Protection caps	Polyamide plastic PA6

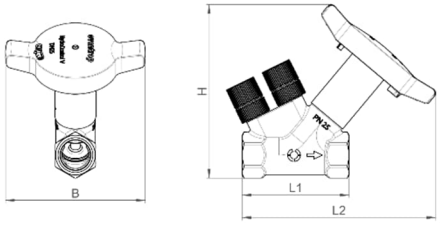
Dimensions

HydroControl V with internal threads according to EN 10226 (BSP)



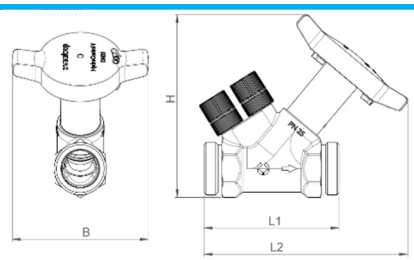
DN	Connection	B [mm]	L1 [mm]	L2 [mm]	H [mm]	Weight [kg]
15	Rp ½	109	72	142	129	0.57
20	Rp ¾	109	84	152	136	0.67
25	Rp 1	109	98	160	147	0.99
32	Rp 1 ¼	109	116	172	157	1.44
40	Rp 1 ½	109	124	177	164	1.80
50	Rp 2	109	155	195	184	3.10

HydroControl V with internal threads according to NPT



DN	Connection	B [mm]	L1 [mm]	L2 [mm]	H [mm]	Weight [kg]
15	½“	109	72	142	129	0.57
20	¾“	109	84	152	136	0.67
25	1“	109	98	160	147	0.99
32	1 ¼“	109	116	172	157	1.44
40	1 ½“	109	124	177	164	1.80
50	2“	109	155	195	184	3.10

HydroControl V with external threads according to ISO 228 (BSPP)



DN	Connection	B [mm]	L1 [mm]	L2 [mm]	H [mm]	Weight [kg]
15	G ¾	109	88	149	129	0.57
20	G 1	109	93	154	136	0.67
25	G 1 ¼	109	109	164	147	0.99
32	G 1 ½	109	134	182	157	1.44
40	G 1 ¾	109	144	187	164	1.80
50	G 2 ⅜	109	166	204	184	3.10

Installation

Calming sections of 3 x DN upstream and 2 x DN downstream of the valve should be provided.

The valve must be installed correctly in the flow direction which is indicated by an arrow on the body.

Selection

Item Numbers

DN	Kvs	Internal threads according to EN 10226		Internal threads according to NPT		External threads according to ISO 228	
		Connection size	Item no.	Connection size	Item no.	Connection size	Item no.
15	3.9	Rp ½	1062404	½”	1062904	G ¾	1062604
20	6.9	Rp ¾	1062406	¾”	1062906	G 1	1062606
25	11.0	Rp 1	1062408	1”	1062908	G 1 ¼	1062608
32	20.8	Rp 1 ¼	1062410	1 ¼”	1062910	G 1 ½	1062610
40	28.7	Rp 1 ½	1062412	1 ½”	1062912	G 1 ¾	1062612
50	42.9	Rp 2	1062416	2”	1062916	G 2 ⅜	1062616

Accessories

HydroPort adapter

Suitable for	Item no.
All nominal sizes	1069601

Thermal insulation shell

Suitable for	Item-No.
DN 15	1069610
DN 20	1069611
DN 25	1069612
DN 32	1069613
DN 40	1069614
DN 50	1069615

Wire seal kit

10-fold, consisting of seal and sealing wire

Suitable for	Item no.
All nominal sizes	1089091

Replacement insert

Suitable for	Item no.
DN 15	1069020
DN 20	1069021
DN 25	1069022
DN 32	1069023
DN 40	1069024
DN 50	1069025

Sizing

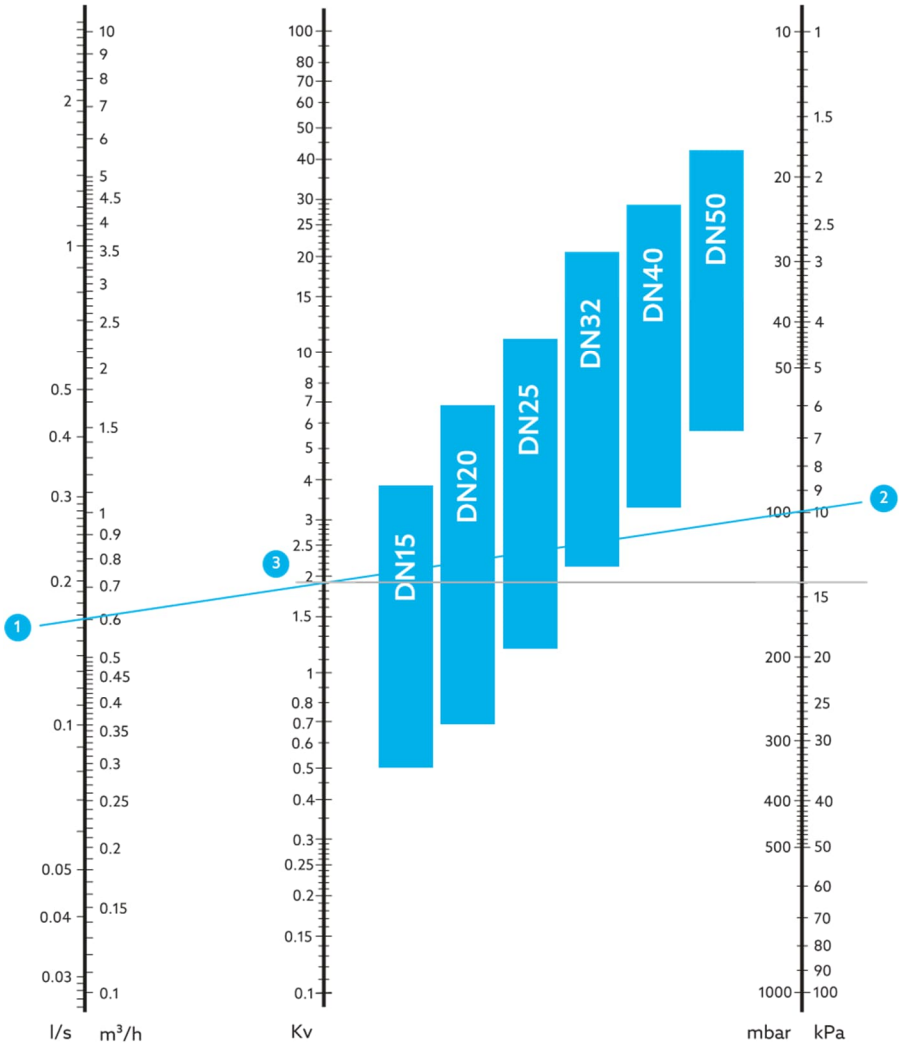
This data sheet offers you various options to size your HydroControl V:

- Use the alignment chart below for a quick sizing across all nominal sizes.
- Use the Kv value tables and the flow charts on the following pages for an accurate determination of the presetting value.
- At the end of the data sheet you will find information on the exact Kv value calculation taking into account the medium temperature. Furthermore, you will find information on the approximate calculation of corrected flow values when using glycol mixtures.

Alignment Chart

The alignment chart allows you to graphically determine the Kv value. Draw a line and place it so that it crosses the desired flow rate (1) on the left scale and the available differential pressure (2) on the right scale - in the example below it is the blue line that crosses the respective scales at 0.6 m³/h and 10 kPa. Now you can read off the Kv value (3) from the middle scale, in this case 1.9.

If you draw a line from the Kv value scale to the right (in the example below, the grey line), you will immediately see which nominal sizes come into question for the required flow rate. For a Kv value of 1.9, DN 15 to DN 25 are possible. Since control and regulating valves are reluctant to operate at the lower end of their capacity, you should preferably use DN 15 or DN 20 in this case.

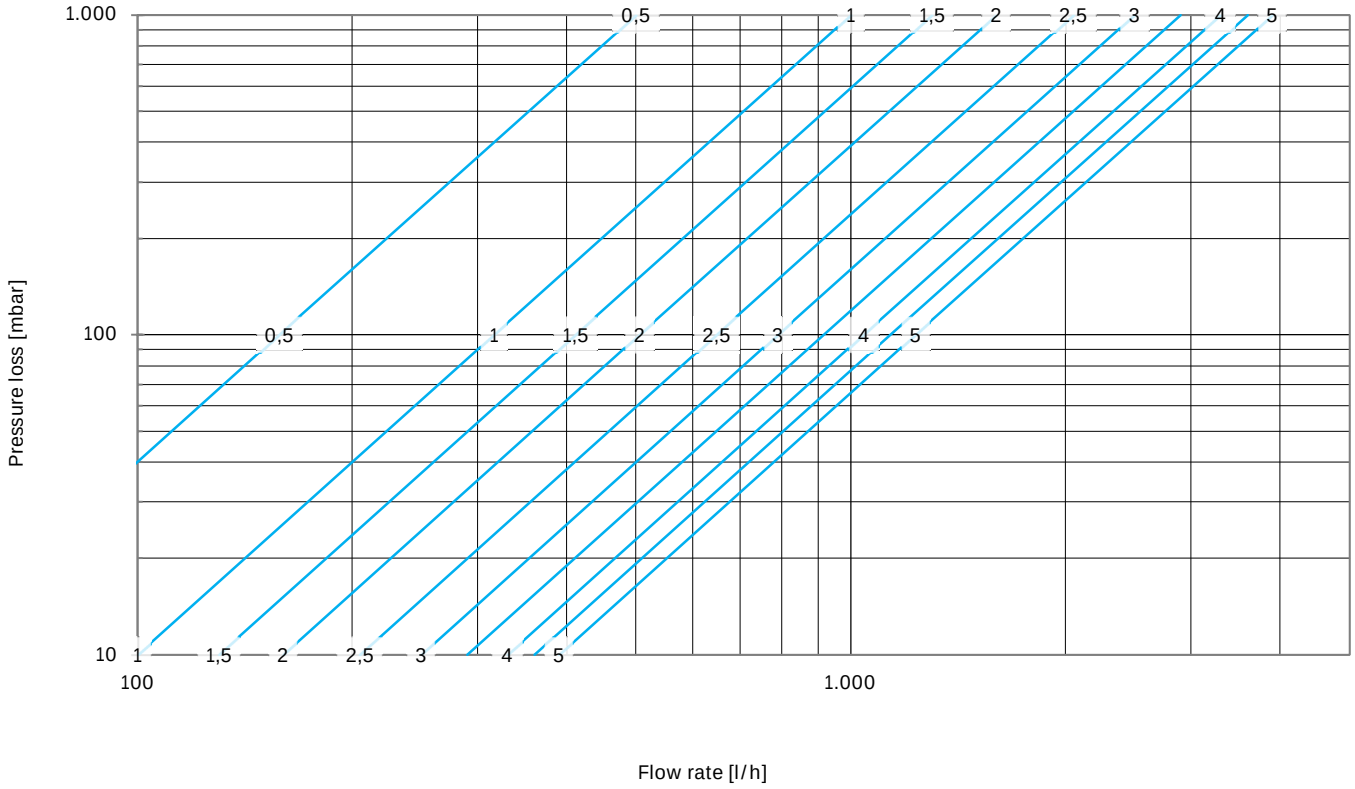


Kv Values

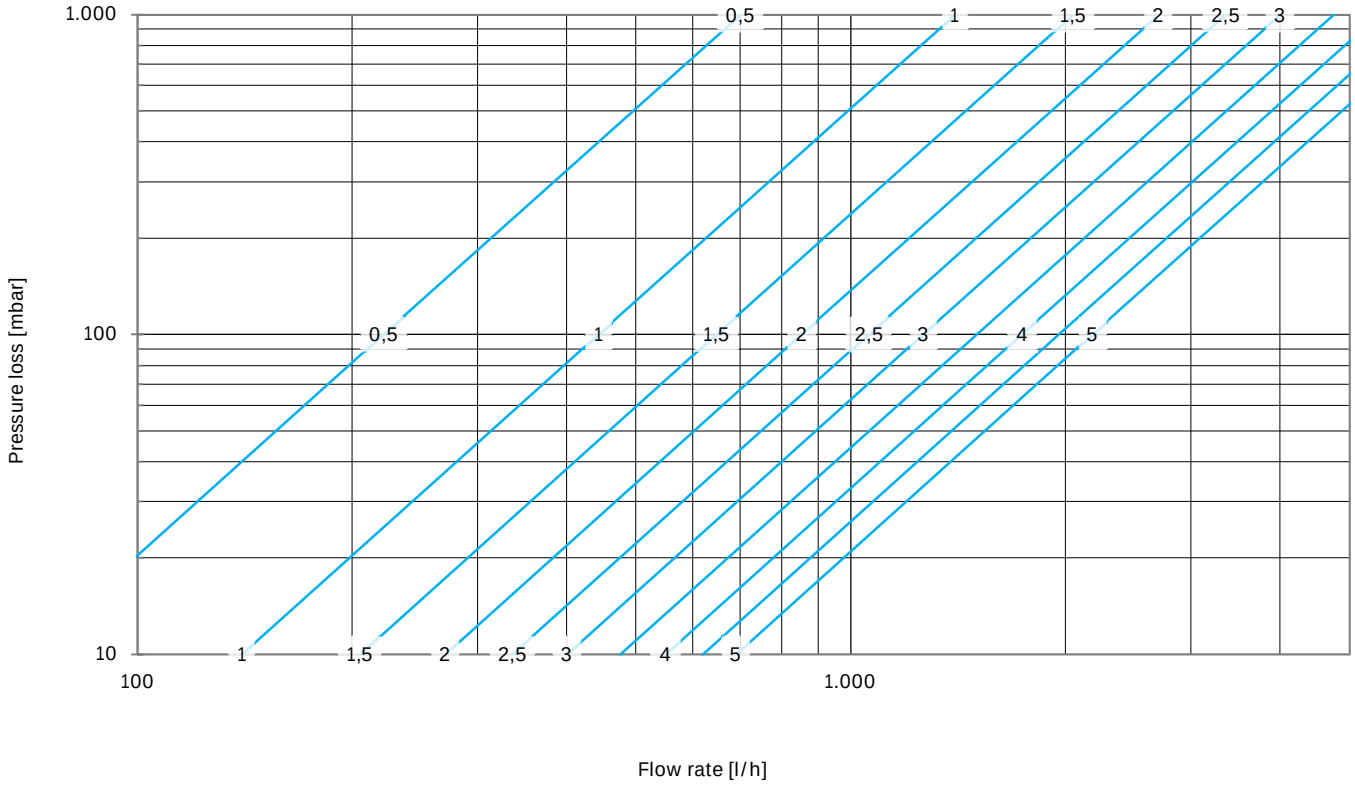
V	DN 15	DN 20	DN 25	DN 32	DN 40	DN 50
0.0	0	0	0	0	0	0
0.1	0.10	0.14	0.24	0.43	0.65	1.09
0.2	0.20	0.28	0.48	0.86	1.30	2.18
0.3	0.30	0.42	0.72	1.29	1.95	3.27
0.4	0.40	0.56	0.96	1.72	2.60	4.36
0.5	0.50	0.70	1.20	2.15	3.25	5.45
0.6	0.60	0.84	1.44	2.58	3.90	6.54
0.7	0.70	0.98	1.68	3.01	4.55	7.63
0.8	0.80	1.12	1.92	3.44	5.20	8.72
0.9	0.90	1.26	2.16	3.87	5.85	9.81
1.0	**1.0**	**1.4**	**2.4**	**4.3**	**6.5**	**10.9**
1.1	1.06	1.53	2.61	4.67	6.98	11.69
1.2	1.12	1.66	2.82	5.04	7.46	12.48
1.3	1.18	1.79	3.03	5.41	7.94	13.27
1.4	1.24	1.92	3.24	5.78	8.42	14.06
1.5	1.30	2.05	3.45	6.15	8.90	14.85
1.6	1.36	2.18	3.66	6.52	9.38	15.64
1.7	1.42	2.31	3.87	6.89	9.86	16.43
1.8	1.48	2.44	4.08	7.26	10.34	17.22
1.9	1.54	2.57	4.29	7.63	10.82	18.01
2.0	**1.6**	**2.7**	**4.5**	**8.0**	**11.3**	**18.8**
2.1	1.69	2.83	4.70	8.37	11.81	19.53
2.2	1.78	2.96	4.90	8.74	12.32	20.26
2.3	1.87	3.09	5.10	9.11	12.83	20.99
2.4	1.96	3.22	5.30	9.48	13.34	21.72
2.5	2.05	3.35	5.50	9.85	13.85	22.45
2.6	2.14	3.48	5.70	10.22	14.36	23.18
2.7	2.23	3.61	5.90	10.59	14.87	23.91
2.8	2.32	3.74	6.10	10.96	15.38	24.64
2.9	2.41	3.87	6.30	11.33	15.89	25.37
3.0	**2.5**	**4.0**	**6.5**	**11.7**	**16.4**	**26.1**
3.1	2.58	4.15	6.70	12.15	17.00	26.91
3.2	2.66	4.30	6.90	12.60	17.60	27.72
3.3	2.74	4.45	7.10	13.05	18.20	28.53
3.4	2.82	4.60	7.30	13.50	18.80	29.34
3.5	2.90	4.75	7.50	13.95	19.40	30.15
3.6	2.98	4.90	7.70	14.40	20.00	30.96
3.7	3.06	5.05	7.90	14.85	20.60	31.77
3.8	3.14	5.20	8.10	15.30	21.20	32.58
3.9	3.22	5.35	8.30	15.75	21.80	33.39
4.0	**3.3**	**5.5**	**8.5**	**16.2**	**22.4**	**34.2**
4.1	3.36	5.64	8.75	16.66	23.03	35.07
4.2	3.42	5.78	9.00	17.12	23.66	35.94
4.3	3.48	5.92	9.25	17.58	24.29	36.81
4.4	3.54	6.06	9.50	18.04	24.92	37.68
4.5	3.60	6.20	9.75	18.50	25.55	38.55
4.6	3.66	6.34	10.00	18.96	26.18	39.42
4.7	3.72	6.48	10.25	19.42	26.81	40.29
4.8	3.78	6.62	10.50	19.88	27.44	41.16
4.9	3.84	6.76	10.75	20.34	28.07	42.03
5.0 (Kvs)	**3.9**	**6.9**	**11.0**	**20.8**	**28.7**	**42.9**

Flow Charts

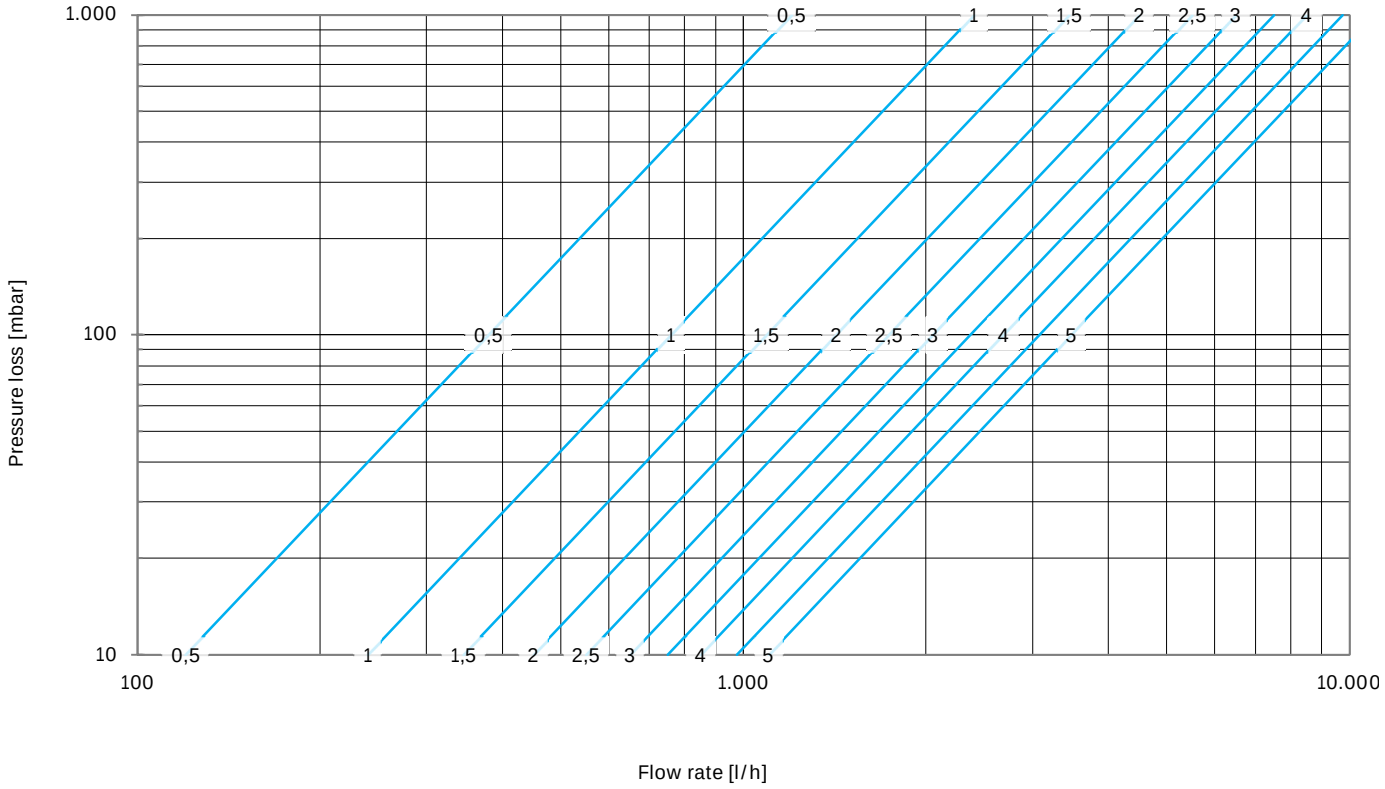
DN 15



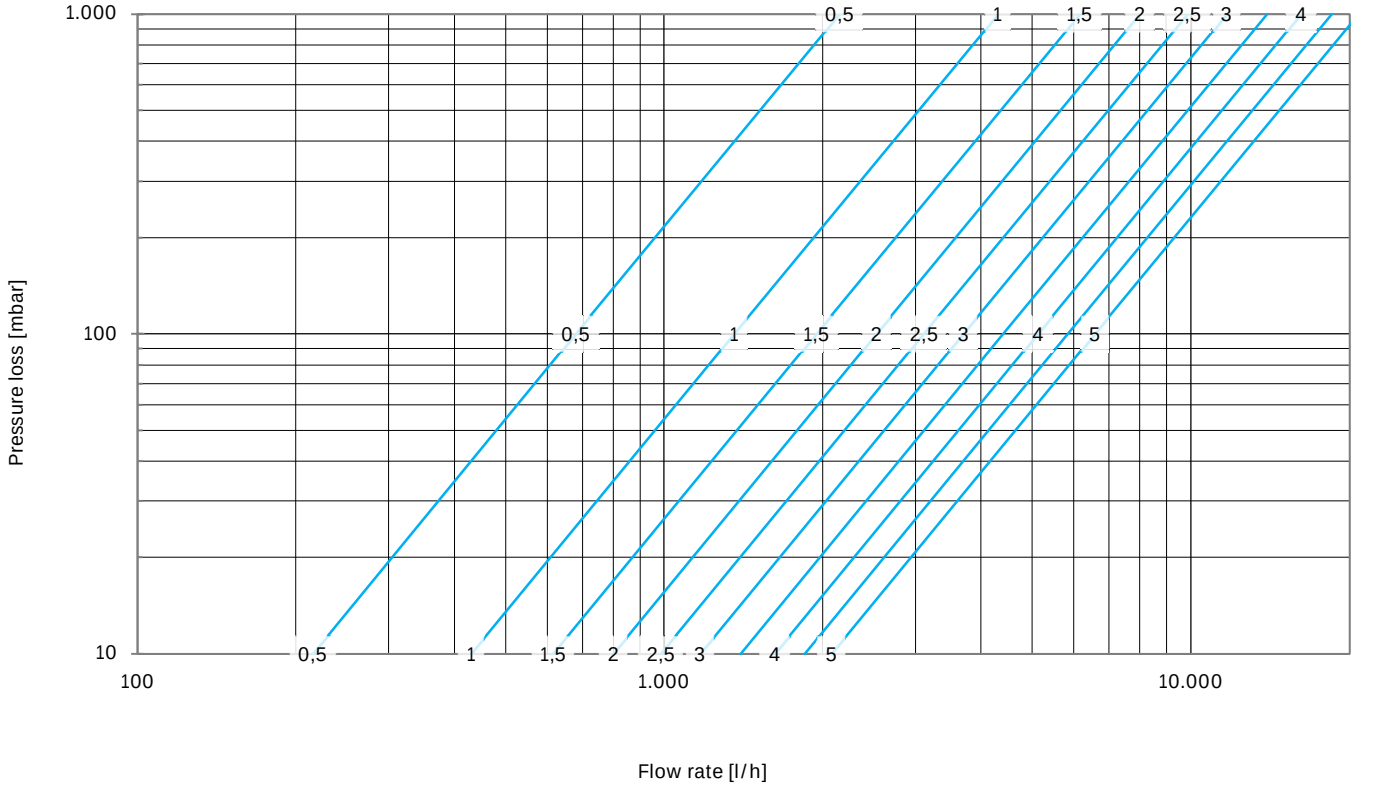
DN 20



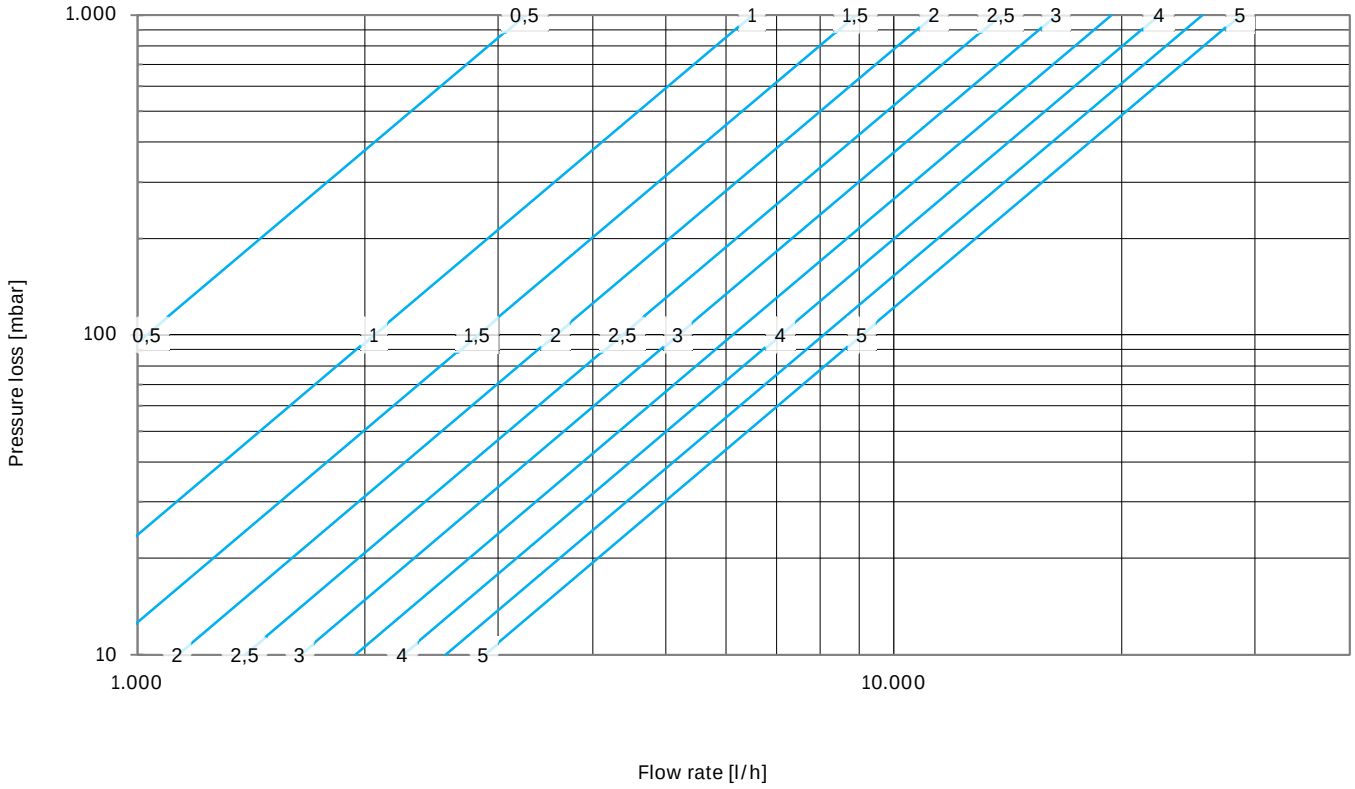
DN 25


1.000
100
10
Pressure loss [mbar]
0,5
1
1,5
2
2,5
3
4
5
100
1.000
10.000
Flow rate [l/h]

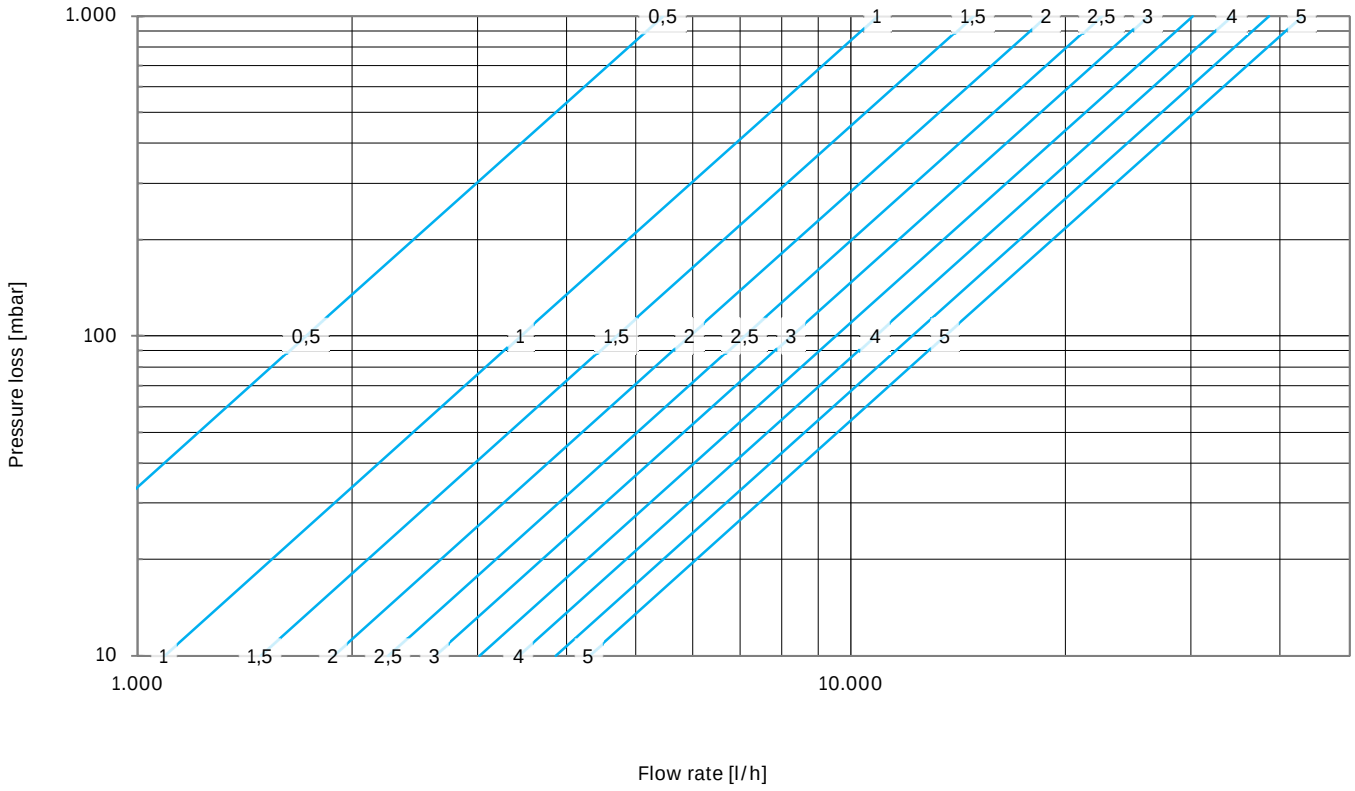
DN 32


1.000
100
10
Pressure loss [mbar]
0,5
1
1,5
2
2,5
3
4
5
100
1.000
10.000
Flow rate [l/h]

DN 40



DN 50



Kv Value Calculation

The flow coefficient Kv is the volume of water in m³ that flows through an opening within one hour with a pressure loss of 1 bar. For control and regulating valves, this opening is typically the gap between the valve seat and the valve plug. The required Kv value can be easily calculated with the Kv formula:

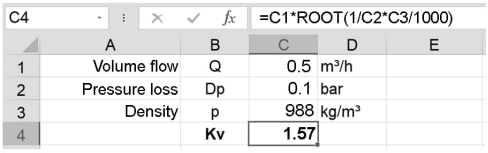
$$Kv = Q \times \sqrt{\frac{1\ bar}{\Delta P} \times \frac{\rho}{1000 \frac{kg}{m^3}}}$$

- Q is the volume flow in m³/h
- ΔP is the pressure loss in bar
- ρ is the density in kg/m³ — water with a temperature of 4 °C has a density of 1,000 kg/m³. At 50 °C water has a density of 988 kg/m³, at 70°C of 978 kg/m³ and at 100°C of 958 kg/m³

For use with Excel or other spreadsheets, the formula is:

=Q*ROOT((1/DP)*(p/1000))

The objects in semibold cyan are to be replaced by values or cell references. Brackets have been added for easier mapping.



For an accurate Kv value calculation, you need the water temperature so that you can look up the density and enter the value into the formula. If a less precise calculation is sufficient, the formula can be simplified by shortening the second fraction by setting the density to 1,000 kg/m³ - which only applies to a water temperature of 4 °C, as mentioned above. The error in a Kv value calculated in this way is approx. 1 % for water with a temperature of e.g. 70 °C (density 978 kg/m³).

To be calculated	Formula	Spreadsheet formula
Kv value (simplified)	$Kv = Q \times \sqrt{\frac{1\ bar}{\Delta P}}$	=Q*ROOT(1/DP)

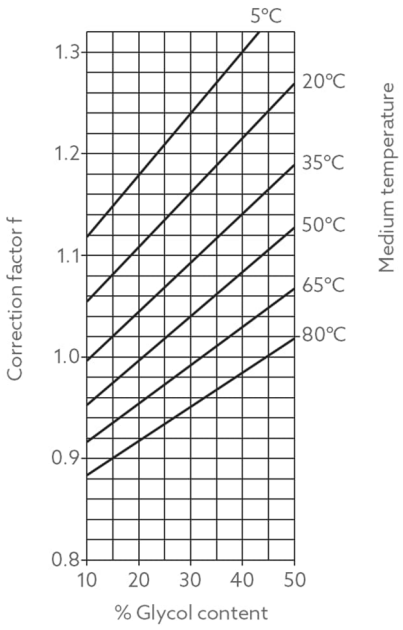
Correction Factors

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.

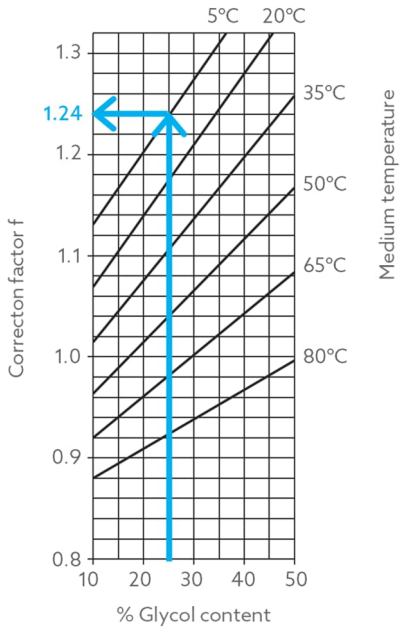
The flow data in this data sheet are based on the properties of water without additives. A quick, but only approximate calculation of the changed flow values when using glycol mixtures is made with the correction factor f, which can be used to recalculate the Kv value or the required pressure loss:

To be calculated	Formula	Spreadsheet formula
Kv value (corrected)	$Kv_{(corr)} = Kv \times \frac{1}{\sqrt{f}}$	Kv*(1/(ROOT(f)))
Pressure loss (corrected)	$\Delta P_{(corr)} = \Delta P \times f$	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 medium temperature of 5 °C result in a factor of 1.24 with the following impacts:

- If the original Kv value was 10, it is now reduced to just short of 9
- If the original flow rate was 10 m³/h, it is now reduced to just short of 9 m³/h (at the same differential pressure)
- If the original differential pressure was 10 kPa, it must now be increased to 12.4 kPa to ensure the same flow rate

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Oventrop GmbH & Co. KG • Paul-Oventrop-Strasse 1 • 59939 Olsberg • Germany
T +49 2962 820 • mail@oventrop.com • www.oventrop.com