HydroControl VGC

Double regulating and commissioning valve with roll grooves PN 25, DN 65...300

The HydroControl VGC is a double regulating and commissioning valve with roll grooves for the static hydronic balancing of pipelines in closed heating and cooling systems. It offers a measuring function across the valve seat.

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

- Accurate flow regulation
- Reproducible, blockable and lead sealable infinitely adjustable presetting
- Pipeline shutoff
- Flow measurement connection
- Optional filling, bleeding and draining
- Optional connection of the impulse tube of a differential pressure regulator

Features

+ Complete portfolio up to nominal size DN 300
+ With roll grooves, suitable for couplings of the systems Victaulic, Grinnell or similar systems
+ Pressure rating PN 25

Technical data

	HydroControl VGC
Nominal sizes	DN 65...300 73.0...323.9 mm
Operating temperature	-10...150°C
Operating pressure	Max. 25 bar
Medium	Heating and cooling water according to VDI 2035 or ÖNORM 5195 Water-glycol mixtures with a max. glycol content of 50 %
Kvs values	98...1,600
Storage temperature	-20...+60 °C

Product Details

Functions

Flow regulation

Flow regulation is done by limiting the valve lift and hence the opening between plug and seat. The low pitch allows very precise setting. The plug position is displayed on a scale on the handwheel. This value is the presetting value.

The HydroControl has an almost linear characteristic line 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. Very small presettings are therefore not recommended for the HydroControl and are generally not specified.

Presetting

- Infinitely: all intermediate values are adjustable
- Reproducible: when the valve is closed, it can only be opened up to the set presetting value
- Blockable: Valves up to and including DN 50 can be blocked at the presetting position, i.e. locked against opening or closing. The blocking set item no. 1060180 is required for this (see chapter Accessories, further on)
- Lead sealable: the valve can be additionally lead sealed, e.g. with the wire seal kit item no. 1089091 (see chapter Accessories)

Shutoff

Turning the handwheel clockwise until it stops shuts off the pipeline tightly.

Flow determination

Each HydroControl VGC is equipped with two Classic measuring valves in order to be able to measure the differential pressure and thus determine the flow rate. The Oventrop OV-DMC 3 measuring device contains the required measuring needles and the characteristic lines of all HydroControl VGC are stored as standard.

Due to the patented measuring arrangement (measuring chamber is routed around the valve insert to the measuring connection), the pressure difference measured at the measuring valves almost matches the actual pressure difference of the valve.

FILLING, DRAINING AND BLEEDING

For filling, draining and bleeding, one or both Classic measuring valves can be replaced with fill and drain ball valves. For replacement, the valve must be depressurised. To ensure tightness, use the fill and drain ball valve item no. 1060191 (see chapter Accessories).

A flow determination can still be carried out, as the necessary adapters for connection to fill and drain ball valves are included with the OV-DMC 3 measuring device.

IMPULSE TUBE CONNECTION

To connect an impulse tube, one of the measuring valves must also be replaced with a fill and drain ball valve. The impulse tube of the differential pressure regulator is connected to the hose connection of the fill and drain ball valve. Flow determination by the HydroControl VGC is then only possible with a separate measuring adapter item no. 1060299 (see chapter Accessories).

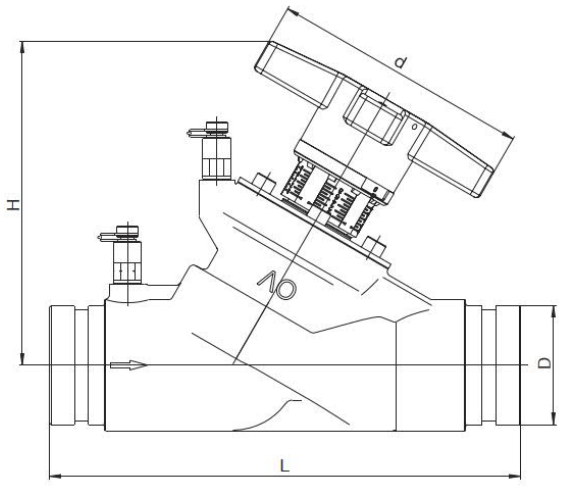
CONNECTION OF AN OV-DMC 3

The measuring hoses of an OV-DMC 3 measuring device can be connected to the Classic measuring valves with needle adapters. The needle adapters are supplied with the OV-DMC 3.

Materials

Component	Nominal size	Material
Handwheel assembly	All	Polyamide plasticPA6
Body	All	Cast iron EN-GJL-250 according to EN 1561 (GG-25)
Bonnet	DN 65...150	Bronze CC491K (Rg5)
	DN 200...300	Nodular cast iron EN-GJS-400-15 according to EN 1563 (GGG-40)
Bonnet sealing	All	2 x EPDM O-ring
Spindle	All	Dezincification resistant brass CW602
Spindle sealing	All	2 x EPDM O-ring
Plug	All	Bronze CC491K (Rg5)
Seat sealing	All	PTFE
Measuring valves	All	Dezincification resistant brass CW602

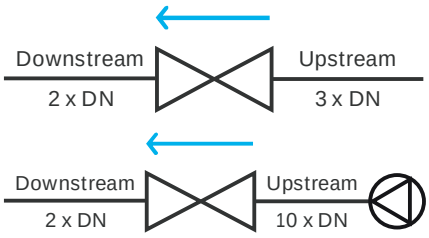
Dimensions and Item Numbers



DN	Inch	Kvs	D [mm]	L [mm]	H [mm]	d [mm]	Item no.
65	2½	98	73.0	290	200	160	1063051
			76.1				1064051
80	3	122	88.9	310	215	160	1063052
100	4	201	114.3	350	244	160	1063053
125	5	293	141.3	400	289	160	1063054
			139.7				1064054
150	6	404	168.3	480	293	160	1063055
			165.1				1064055
200	8	815	219.1	600	467	300	1063056
250	10	1200	273.0	730	480	300	1063057
300	12	1600	323.9	850	515	300	1063058

All specifications in mm.

Installation



- Calming sections of 3 x DN upstream and 2 x DN downstream of the valve should be provided.
- When installing directly downstream of a pump, a calming section of 10 x DN should be provided.
- The valve must be installed correctly in the flow direction which is indicated by an arrow on the body.

Accessories

Thermal insulation shell

Made of polyurethane rigid foam with polystyrene shell. For heating and cooling systems. Operating temperature -10 to 130 °C. Building material class B2 according to DIN 4102. Meets the requirements of Appendix 8 to Sections 69 and 71(1) line ee) of the German Building Energy Act (GEG). Cold insulation: Min. medium temperature 6 °C, shells have to be bonded hermetically. Restricted diffusion tightness at low medium temperature and at high ambient temperature and/or air humidity.

	Suitable for	Item no.
	DN 65	1062586
	DN 80	1062587
	DN 100	1062588
	DN 125	1062589
	DN 150	1062590

Spindle extension 35 mm

For valve insulation with commercially available insulation material. Not to be used in combination with the Oventrop thermal insulation shells.

	Suitable for	Item no.
	DN 65...150	1688297

Measuring valve extension

	Suitable for	Item no.
	for all nominal sizes 80 mm	1060295
	for all nominal sizes 40 mm	1688295

Wire seal kit

10-fold, consisting of seal and sealing wire.

	Suitable for	Item no.
	All nominal sizes	1089091

Identification ring

10-fold, for riser identification, can be clipped onto the handwheel.

	Colour	Item no.
	Blue	1069650
	Red	1069651

Fill and drain ball valve

	Suitable for	Item no.
	All nominal sizes	1060191

Measuring adapter, 2-fold

	Suitable for	Item no.
	All nominal sizes	1060299

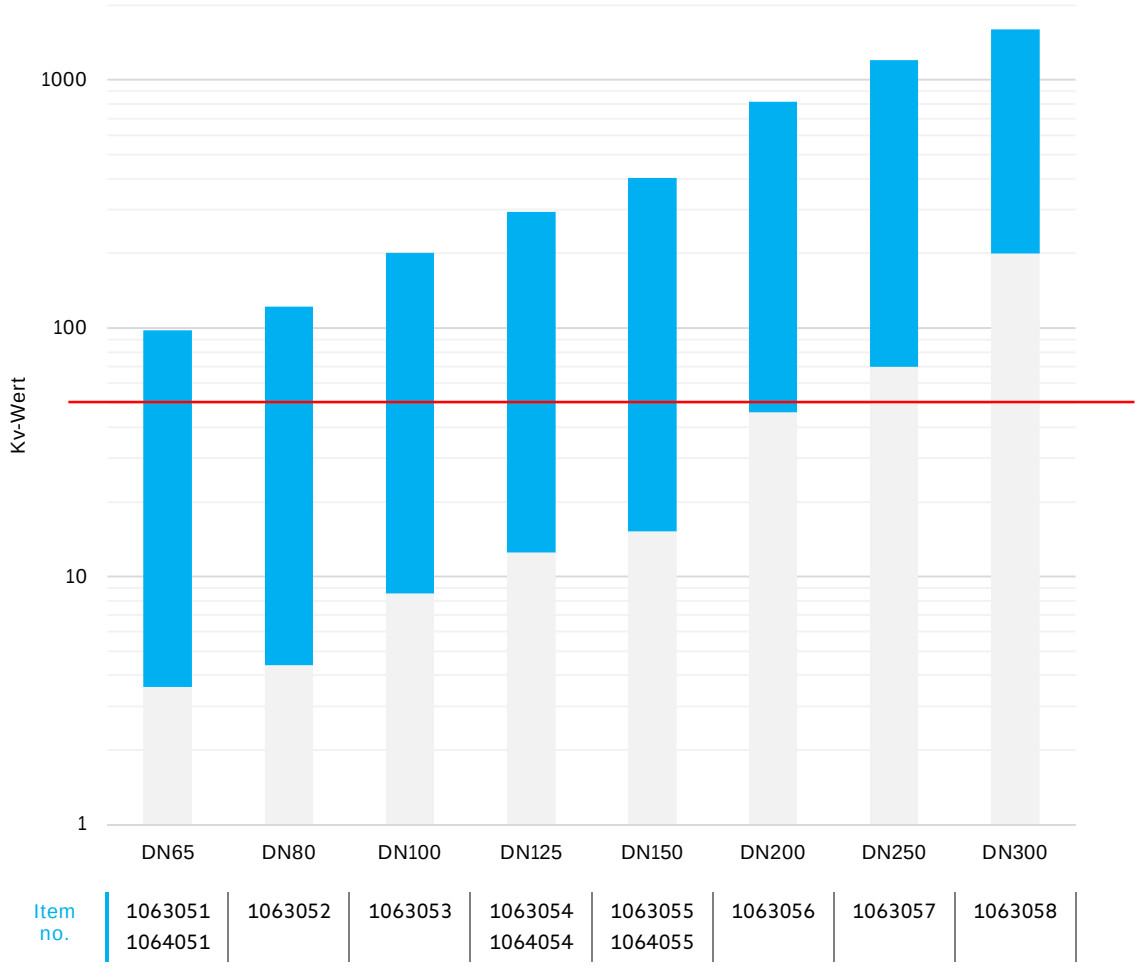
Sizing

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

- Use the alignment chart below for a quick sizing across all nominal sizes.
- Use the Kv value tables and flow charts in the “Flow data” section 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 a quick, graphic determination of the nominal sizes that come into question by drawing a horizontal line from the Kv value in the left scale to the right. If the line crosses the blue area, the corresponding nominal size fits. In the case below, the suitable nominal sizes for a Kv value of 50 are sought (red line). All nominal sizes up to and including DN 200 fit. (However, in this case you should avoid the DN 200 nominal size, as regulating valves generally do not like to be operated in the lower range). The item numbers are listed below the alignment chart.



Flow Data DN 65 to DN 150

Kv Values DN65

Pre-decimal point	Decimal point presetting									
	.0	**.1**	**.2**	**.3**	**.4**	**.5**	**.6**	**.7**	**.8**	**.9**
1	3.60	4.12	4.49	4.86	5.23	5.60	6.43	7.29	8.17	9.07
2	10.00	10.95	11.91	12.92	13.94	15.00	16.66	18.38	20.14	21.95
3	24.00	25.73	27.70	29.74	31.84	34.00	35.93	37.84	39.74	41.63
4	43.50	45.36	47.20	49.03	50.85	52.00	54.45	56.23	58.00	59.74
5	61.00	63.21	64.93	66.63	68.32	70.00	71.69	73.33	74.93	76.48
6	78.00	79.48	80.91	82.31	83.67	85.00	86.12	87.20	88.23	89.23
7	90.00	91.13	92.02	92.89	93.71	94.50	95.27	96.00	96.70	97.36
8	98.00									

Kv Values DN 80

Pre-decimal point	Decimal point presetting									
	.0	**.1**	**.2**	**.3**	**.4**	**.5**	**.6**	**.7**	**.8**	**.9**
1	4.40	4.74	5.17	5.67	6.28	7.00	7.89	8.82	9.78	10.79
2	11.85	12.95	14.11	15.33	16.61	18.65	19.39	20.90	22.51	24.24
3	26.10	27.85	29.61	31.39	33.19	35.00	36.83	38.68	40.55	42.43
4	44.75	46.27	48.21	50.19	52.18	55.20	56.22	58.28	60.36	62.47
5	64.60	66.98	69.32	71.63	73.90	75.45	78.37	80.56	82.72	84.85
6	87.00	89.04	91.00	93.13	95.14	97.55	99.10	101.04	102.96	104.87
7	106.75	108.39	110.00	111.60	113.00	114.50	116.13	117.78	119.27	120.74
8	122.20									

Kv Values DN 100

Pre-decimal point	Decimal point presetting									
	.0	**.1**	**.2**	**.3**	**.4**	**.5**	**.6**	**.7**	**.8**	**.9**
1	8.55	9.58	10.61	11.64	12.67	14.00	14.73	15.76	16.79	17.82
2	18.50	19.88	20.91	21.94	22.97	24.00	26.00	28.13	30.40	32.81
3	35.40	38.18	41.17	44.44	48.02	52.00	55.93	59.89	63.89	67.92
4	72.00	76.11	80.27	84.47	88.71	93.00	97.37	101.62	105.74	109.75
5	112.00	117.46	121.17	124.79	127.52	132.00	135.16	138.47	141.71	144.89
6	148.00	151.94	155.63	159.10	162.38	164.03	168.44	171.26	173.95	176.53
7	179.01	181.37	183.65	185.85	187.96	190.04	192.37	194.66	196.85	198.96
8	201.00									

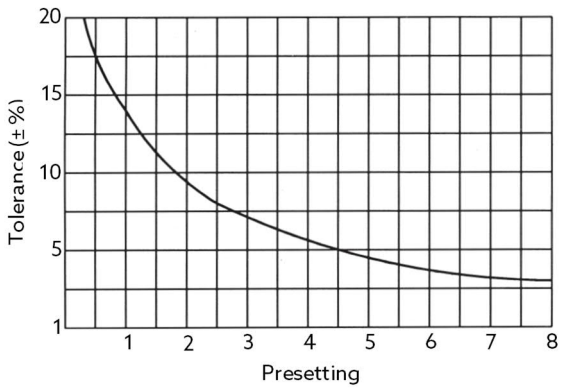
Kv Values DN 125

Pre-decimal point	Decimal point presetting									
	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
1	12.45	13.84	15.23	16.62	18.01	19.40	20.94	22.47	24.01	25.54
2	26.60	28.61	30.15	31.36	33.22	34.75	37.18	39.69	42.29	44.97
3	47.75	50.63	53.62	56.73	60.00	63.35	66.62	70.00	73.53	77.21
4	81.05	85.05	89.30	93.77	98.50	103.55	108.16	112.92	117.84	122.95
5	128.25	133.77	139.54	145.60	151.96	158.70	164.10	169.60	175.21	180.94
6	185.30	192.75	198.85	205.10	211.50	218.05	223.37	228.64	233.89	239.03
7	244.15	249.23	254.26	259.25	264.19	268.15	273.95	278.77	283.55	287.96
8	293.00									

Kv Values DN 150

Pre-decimal point	Decimal point presetting									
	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
1	15.22	17.22	19.23	21.23	23.24	25.26	27.24	29.50	31.25	33.26
2	35.26	37.13	39.41	42.30	46.25	53.92	61.00	68.55	76.64	85.40
3	95.02	105.51	114.45	122.36	129.52	135.45	142.21	147.41	153.33	160.00
4	167.12	174.48	181.76	189.05	196.34	203.65	210.78	217.79	224.14	231.46
5	238.91	244.72	251.20	257.60	263.90	272.40	276.24	282.30	288.27	294.17
6	300.40	305.76	311.45	317.08	322.07	326.70	333.58	338.34	344.29	349.56
7	355.60	360.00	365.06	370.13	375.15	382.00	385.04	389.34	394.20	399.54
8	404.30									

Tolerance Curve DN 65 to DN 150



Flow Data DN 200 to DN 300

Kv Values DN 200

Pre-decimal point	Decimal point presetting									
	.0	**.1**	**.2**	**.3**	**.4**	**.5**	**.6**	**.7**	**.8**	**.9**
2	45.9	51.6	54.2	55.8	59.4	62.0	66.4	70.8	75.2	79.8
3	84.0	90.0	96.0	102.0	108.0	114.0	121.0	128.6	136.2	143.6
4	151.0	162.0	173.0	184.0	195.0	206.0	216.8	227.6	238.4	249.2
5	260.3	271.9	283.8	295.6	307.5	320.0	332.0	344.8	357.6	370.3
6	383.0	396.0	409.0	422.0	435.0	447.8	460.0	472.6	484.8	497.2
7	509.5	519.4	529.3	539.2	549.1	559.0	571.0	582.5	594.2	606.0
8	618.0	626.8	634.8	643.2	651.6	660.0	672.8	665.2	693.7	711.6
9	724.5	731.4	738.2	744.9	751.7	758.5	760.6	762.7	764.8	766.9
10	769.0	771.2	773.4	775.6	778.0	780.0	782.0	784.0	786.0	788.0
11	790.0	792.2	794.6	796.8	799.1	801.4	804.0	806.6	809.2	812.0
12	814.5									

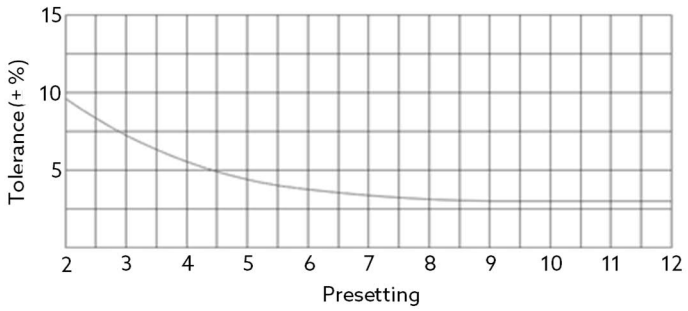
Kv Values DN 250

Pre-decimal point	Decimal point presetting									
	.0	**.1**	**.2**	**.3**	**.4**	**.5**	**.6**	**.7**	**.8**	**.9**
2	70	72.5	75.5	79	82	85	89.5	94	99	104.5
3	110	117	123.5	130.5	139	150	155	164	174	184
4	195	208	221	236	252	270	287	304	321	338
5	356	373	390	407	423	440	457	473	490	506
6	522	539	555	571	587	607	619	635	651	666
7	682	698	714	729	745	760	778	795	811	826
8	840	850	860	870	880	890	899	907	916	925
9	933	942	952	961	970	980	989	998	1008	1018
10	1028	1038	1048	1059	1071	1080	1088	1096	1104	1112
11	1120	1128	1136	1144	1152	11160	1168	1176	1184	1192
12	1200									

Kv Values DN 300

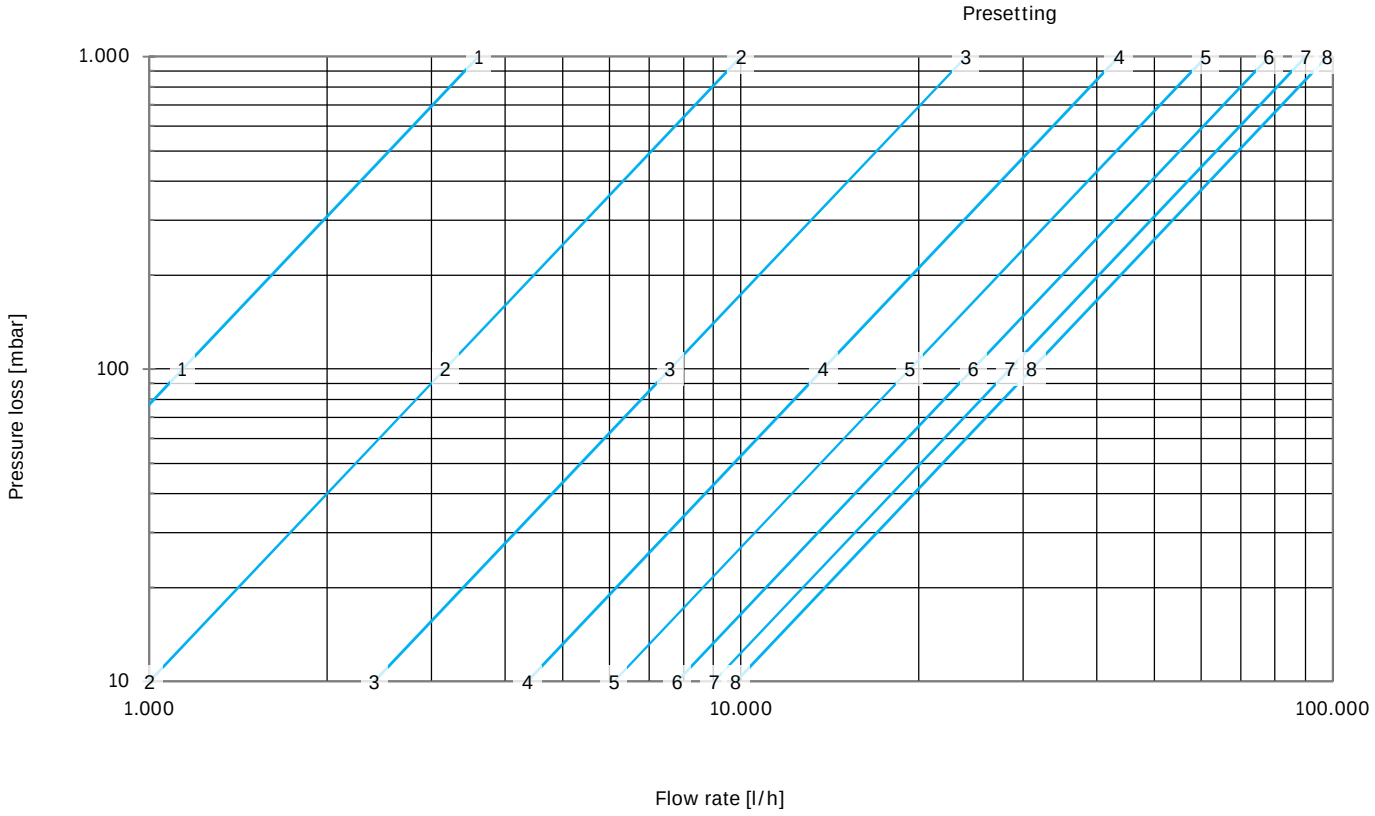
Pre-decimal point	Decimal point presetting									
	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
2	200	210	220	230	240	250	261	273	285	297
3	310	323	336	350	365	380	401	421	441	461
4	480	499	517	535	553	570	588	606	624	642
5	660	678	696	714	732	750	771	791	810	828
6	845	861	877	892	906	920	933	947	961	975
7	990	1005	1020	1036	1053	1070	1084	1098	1112	1126
8	1140	1154	1168	1182	1196	1210	1228	1245	1261	1276
9	1290	1303	1316	1328	1339	1350	1365	1379	1393	1407
10	1420	1433	1446	1457	1468	1480	1490	1500	1510	1520
11	1530	1539	1547	1555	1563	1570	1577	1583	1589	1595
12	1600									

Tolerance Curve DN 200 to DN 300

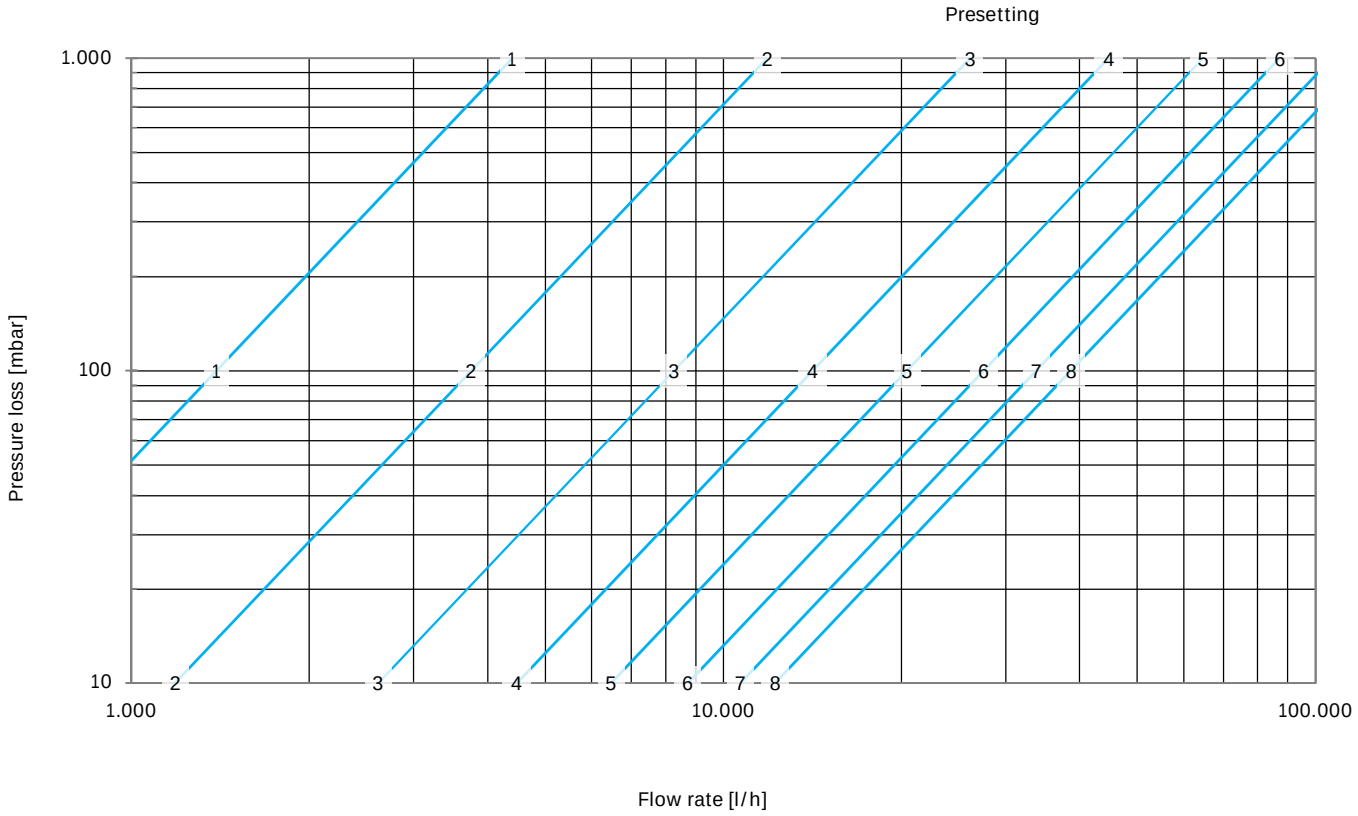


Flow Charts

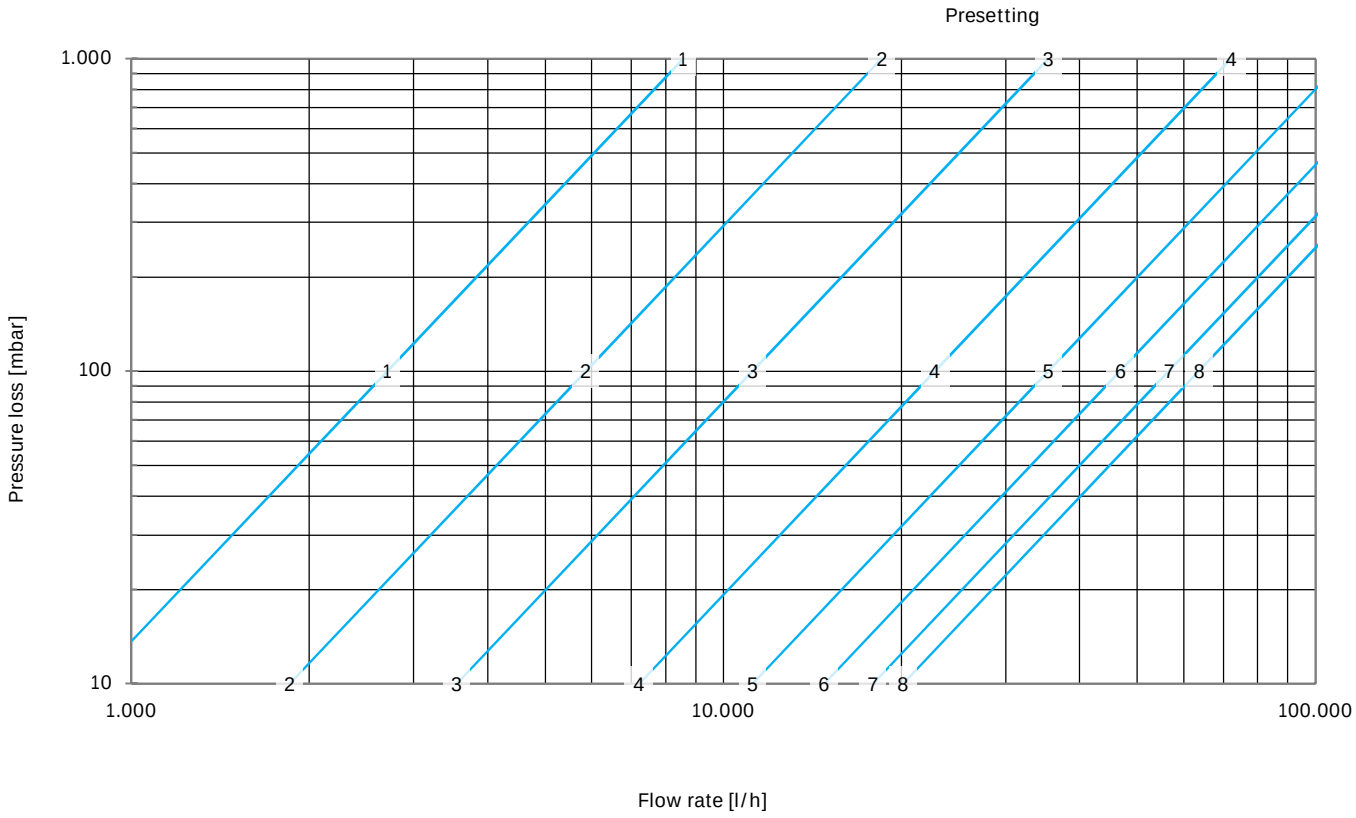
DN 65



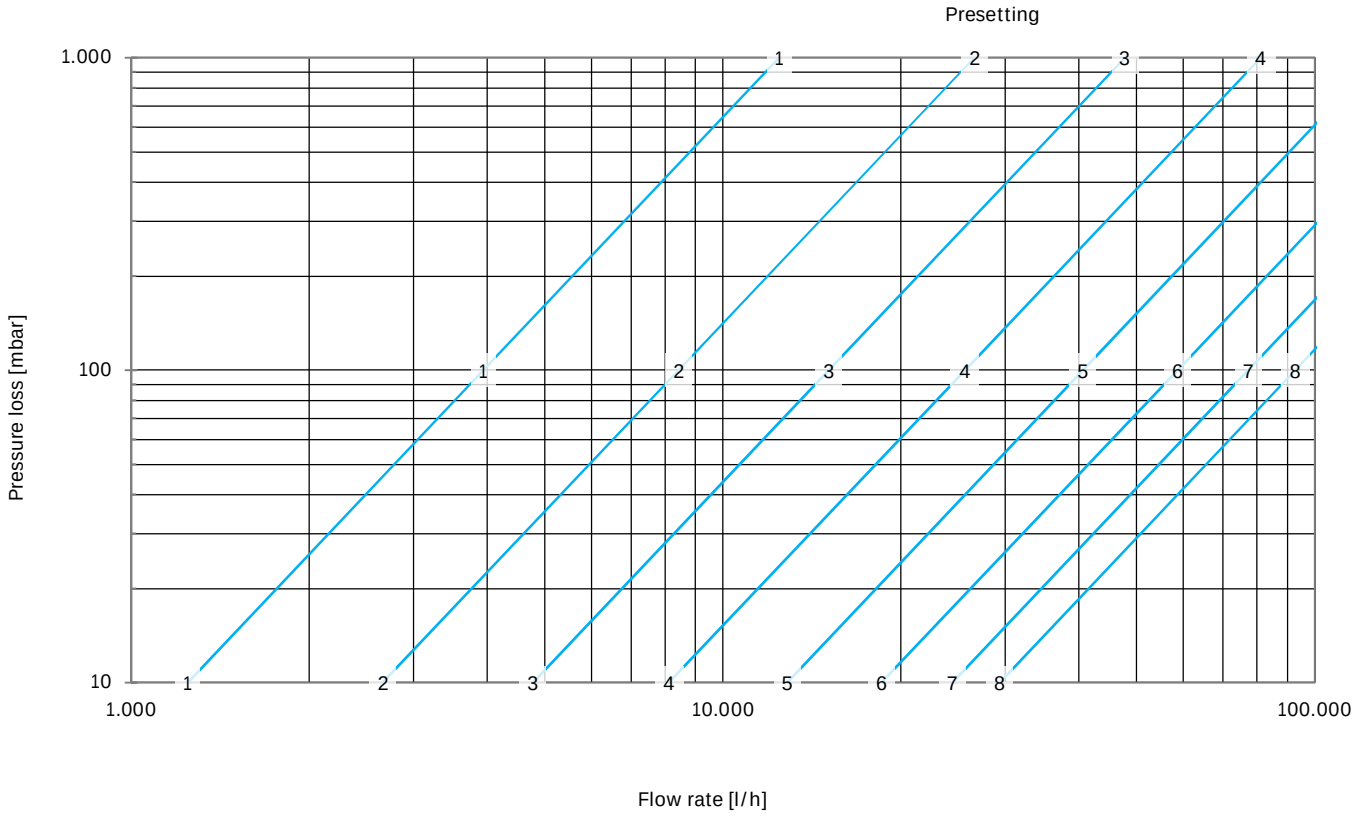
DN 80



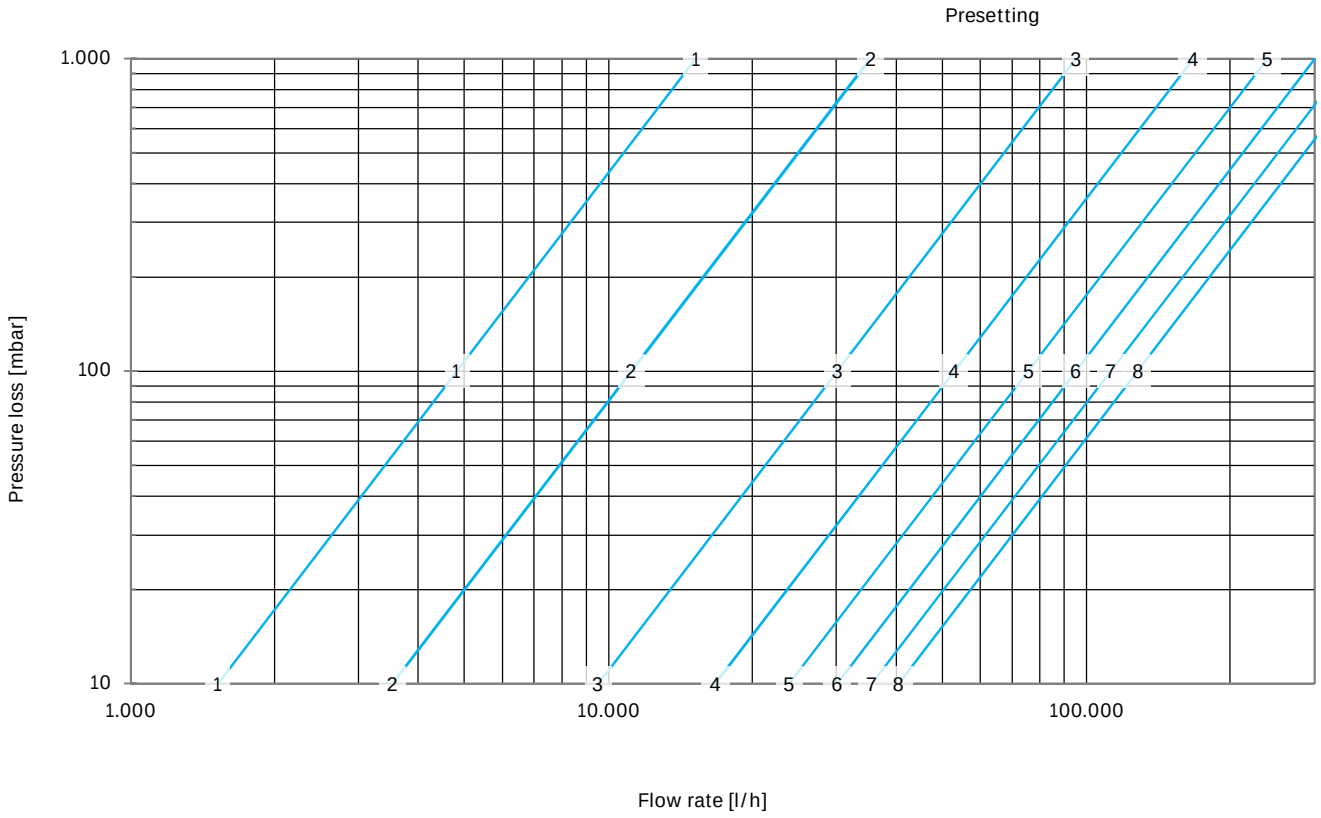
DN 100


Presetting
1.000
100
10
Pressure loss [mbar]
1
2
3
4
5
6
7
8
1.000
10.000
100.000
Flow rate [l/h]

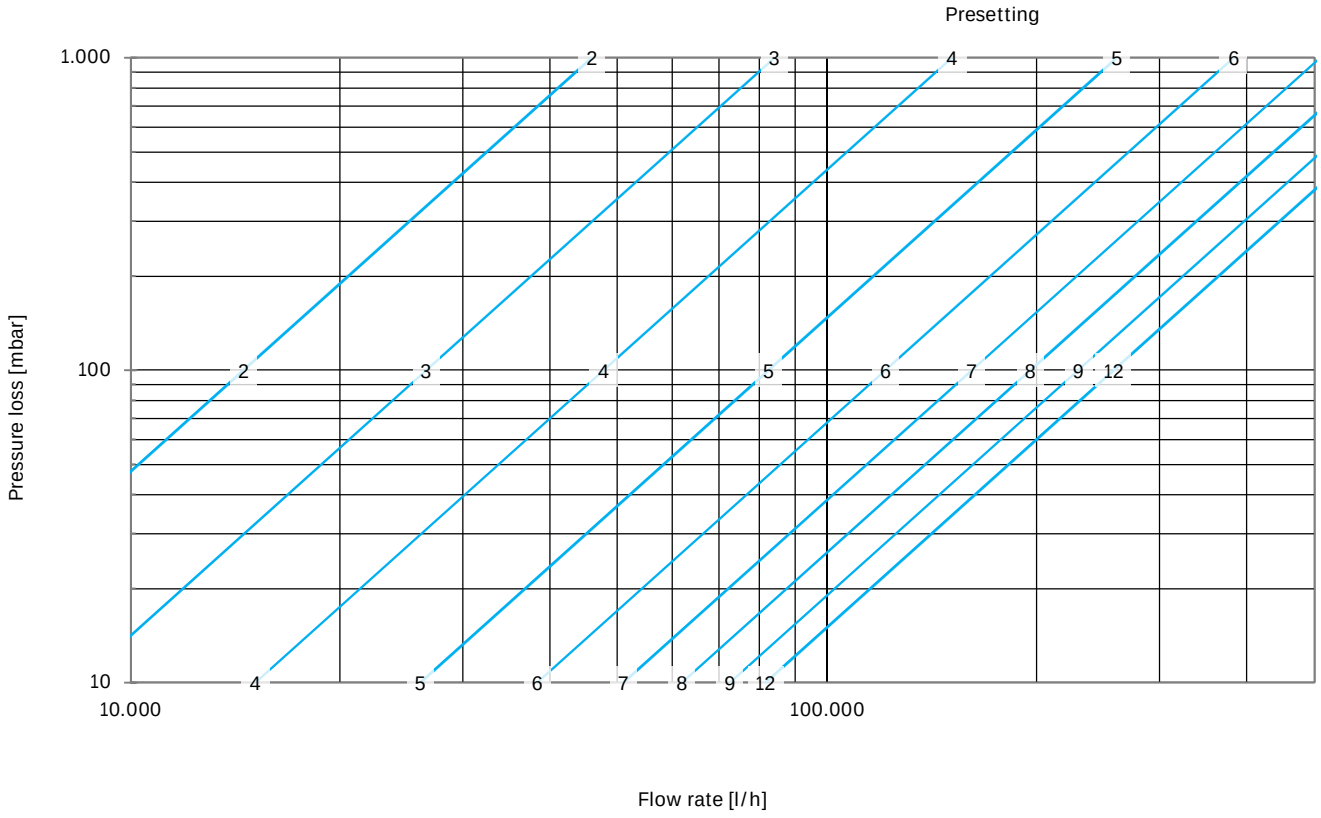
DN 125


Presetting
1.000
100
10
Pressure loss [mbar]
1
2
3
4
5
6
7
8
1.000
10.000
100.000
Flow rate [l/h]

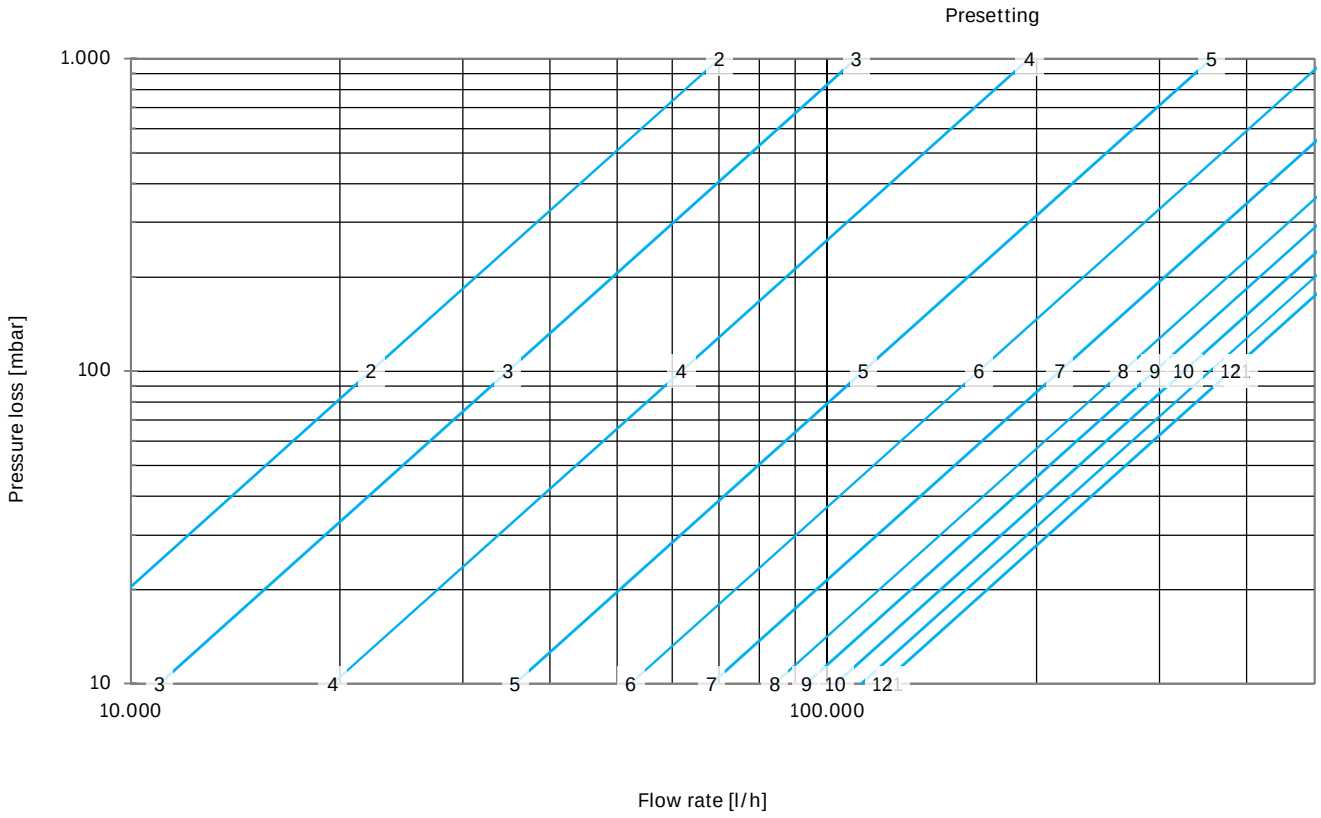
DN 150



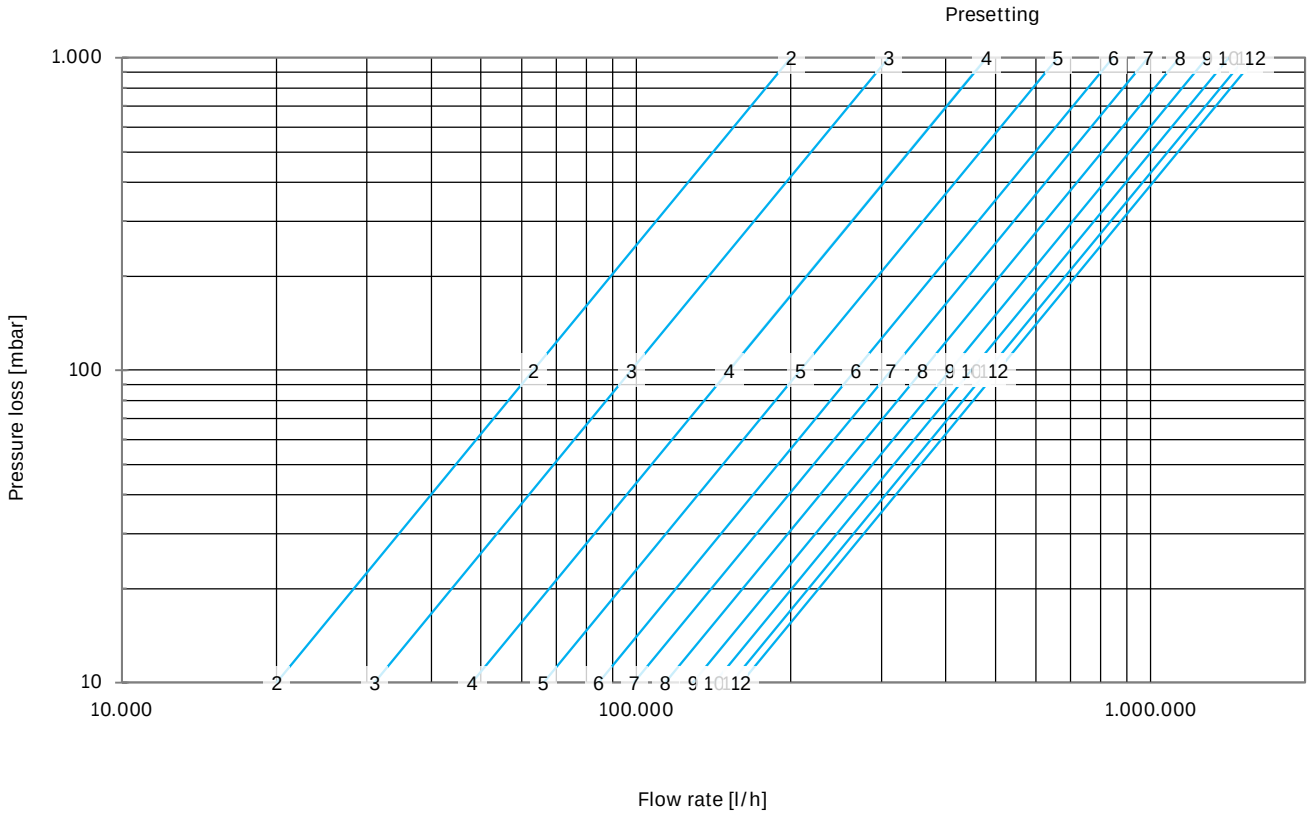
DN 200



DN 250


Presetting
1.000
100
10
Pressure loss [mbar]
2
3
4
5
6
7
8
9
10
12
10.000
100.000
Flow rate [l/h]

DN 300


Presetting
1.000
100
10
Pressure loss [mbar]
2
3
4
5
6
7
8
9
10
12
10.000
100.000
1.000.000
Flow rate [l/h]

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:

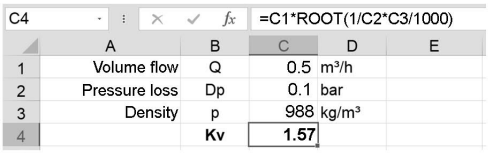
$$Kv = Q \times \sqrt{\frac{1\ bar}{\Delta P} \times \frac{\rho}{1000 \frac{kg}{m^3}}}$$

- 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)

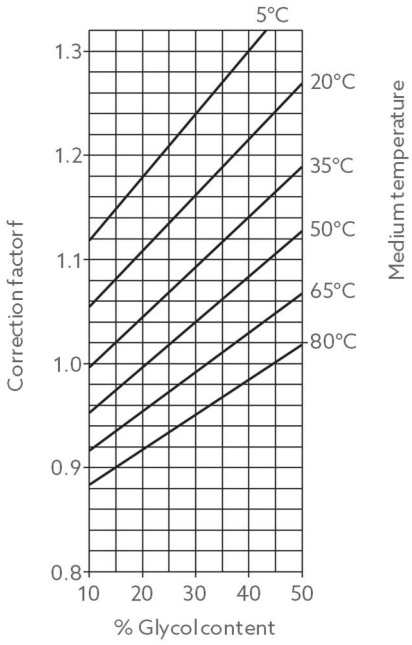
Correction Factors

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.

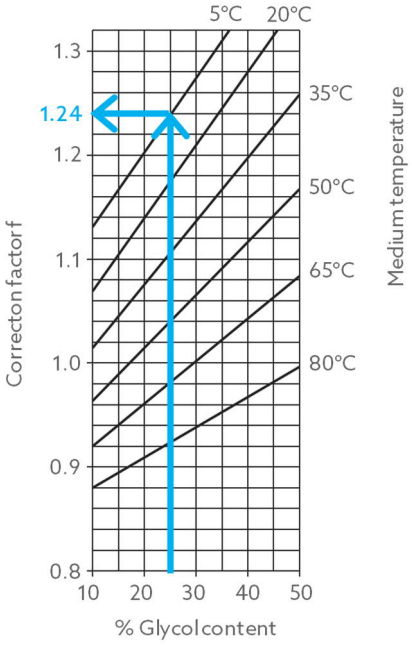
The flow data in this data sheet are based on the properties of water without additives. A quick, but only approximate calculation of the changed flow values when using glycol mixtures is made with the correction factor f, which can be used to recalculate the Kv value or the required pressure loss:

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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