Double regulating and commissioning valves “Hydrocontrol VFC” cast iron, PN 16 “Hydrocontrol VFR” bronze, PN 16 “Hydrocontrol VFN” nodular cast iron, PN 25

Technical Information

Designation:

new	**old**
“Hydrocontrol VFC”	“Hydrocontrol F”
“Hydrocontrol VFR”	“Hydrocontrol FR”
“Hydrocontrol VFN”	“Hydrocontrol FS”

Application:

Oventrop double regulating and commissioning valves “Hydrocontrol VFC/VFR/VFN” are installed in the pipework of hot water central heating systems and cooling systems and serve to achieve a hydronic balance between the various circuits of the system.

The bronze double regulating and commissioning valves “Hydrocontrol VFR” may also be used for cold salt water (38°C max.) and domestic water.

The double regulating and commissioning valves may be installed in either the supply or the return pipe.

When installing the valves, it is to be observed that the direction of flow conforms to the arrow on the valve body and the valve is installed with a minimum of L = 3 x ∅ (3 x nominal pipe diameter) of straight pipe at the valve inlet and of L = 2 x ∅ (2 x nominal pipe diameter) of straight pipe at the valve outlet.

Advantages:

– the location of the functioning components on <u>one</u> level allows a simple assembly and easy operation
– only <u>one</u> valve for 5 functions:
  presetting
  measuring
  isolating
  filling
  draining
– low pressure loss (oblique pattern)
– infinitely adjustable presetting which can be read off in any position due to the moveable display, exact measurement of pressure loss and flow by using the pressure test points
– fill and drain ball valve with internal stop and pressure test point with O-ring seal between valve body and test point (no additional seals required)
– patented measuring channel led around the stem assembly to the test points ensures the best possible accuracy between the differential pressure measured at the pressure test point and the actual differential pressure of the valve

Function:

The balance is achieved by a presetting with memory position.

The calculated flow rate or pressure loss for each individual pipe can be preset centrally and be regulated precisely.

The required values of presetting can be obtained from the flow charts. All intermediate values are infinitely adjustable.

The selected presetting can be read off two scales (basic setting longitudinal scale and fine setting peripheral scale, see illustration presetting).

The presetting is reproducible by opening the valve until stop.

The flow charts are valid for the installation of the double regulating and commissioning valve in the supply or the return pipe provided the direction of flow conforms to the arrow on the valve body.

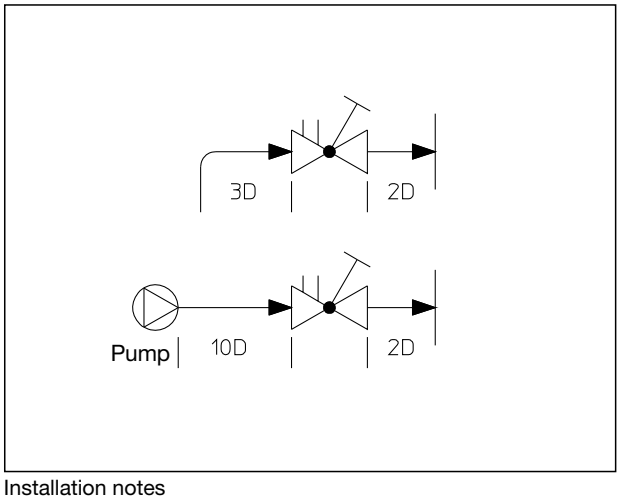
The Oventrop double regulating and commissioning valves have two threaded ports which are equipped with the pressure test points for measuring the differential pressure.

Installation, transport and storage:

- Protect against external forces (e.g. impacts, vibrations etc.)
- External components such as handwheels, pressure test points, actuators must not be misused for the absorption of external forces, e.g. as connection point for lever tools etc.
- Storage temperature -20°C up to +60°C

Double regulating and commissioning valve “Hydrocontrol VFC” (illustr. DN 65)

Double regulating and commissioning valve “Hydrocontrol VFR” (illustr. DN 65)



Installation notes

Double regulating and commissioning valves
DN 20 – DN 50
Measuring technic “classic”

Tender specification:

Oventrop double regulating and commissioning valves with secured infinitely adjustable presetting controllable at any time with the help of the flow limiting device.

Lengths according to DIN EN 558-1 basic series 1
(corresponds to ISO 5752 series 1)
All functioning components on one level, pressure test point and fill and drain ball valve interchangeable.

	“Hydrocontrol VFC”			“Hydrocontrol VFR”
	PN 16	PN 6	ANSI 150	PN 16
Size	Item no.	Item no.	Item no.	Item no.
DN 20	106 26 46	106 26 76	106 29 46	
DN 25	106 26 47	106 26 77	106 29 47	
DN 32	106 26 48	106 26 78	106 29 48	
DN 40	106 26 49	106 26 79	106 29 49	
DN 50	106 26 50	106 26 80	106 29 50	106 23 50

“Hydrocontrol VFC”
PN 16, -10°C to +150°C, PN 20 for cold water
Round flanges according to DIN EN 1092-2, PN 16
(corresponds to ISO 7005-2, PN 16)
PN 6, -10°C to +150°C
Round flanges according to DIN EN 1092-2, PN 6
(corresponds to ISO 7005-2, PN 6)
ANSI 150, -10°C to +150°C
Hole circle of the flanged connection according to ANSI 150
Valve body made of cast iron (GG 25 EN-GJL-250 according to DIN EN 1561), bonnet, stem and disc made of bronze/dezincification resistant brass. Disc with PTFE seal. Maintenance-free stem seal due to double EPDM O-ring.
With type approval certificate for shipbuilding (PN 16 and ANSI 150).

“Hydrocontrol VFR”
PN 16, -20°C to +150°C, PN 20 for cold water
Round flanges according to DIN EN 1092-2, PN 16
(corresponds to ISO 7005-2, PN 16)
Valve body, bonnet and disc made of bronze, stainless steel stem, disc with PTFE seal. Maintenance-free stem seal due to double EPDM O-ring.
With type approval certificate for shipbuilding.

Presetting DN 20 – DN 50:

1. The value of presetting of the valve is adjusted by turning the handwheel.
   a. The display of the basic setting is shown by the longitudinal scale together with the sliding indicator. Each turn of the handwheel is represented by a line on the longitudinal scale.
   b. The display of the fine setting is shown by the peripheral scale on the handwheel together with the marking. The subdivisions of the peripheral scale correspond to 1/10th of a turn of the handwheel.
2. The set value of presetting can be limited by turning the inner adjustment stem clockwise until it seats. This can be done by using the long end of a 3 mm Allen key.

Visibility/readability of the setting scales:

Depending on the installation position of the double regulating and commissioning valve, an improvement of the visibility/readability of the setting scales is obtained by twisting the scales. With the valve fully closed and the two setting scales on “0”, remove cover plug, undo screw and with a light tug pull the handwheel from the valve stem.
Next, without altering the presetting (still indicating “0”), adjust the position of the handwheel so that the indicator window is clearly visible. Finally refit the handwheel to the valve stem, tighten the screw and replace the cover plug.

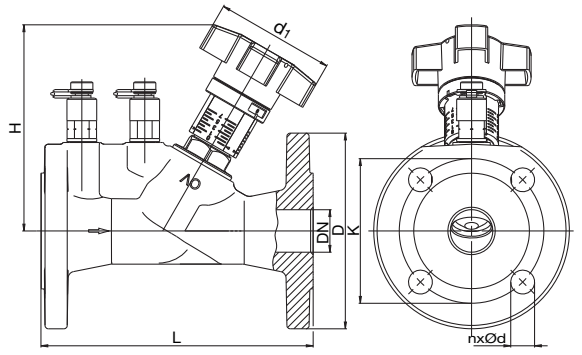
Protecting the presetting:

The sealing wire (accessory) may be fitted through the hole in the handwheel and a lead seal may be fitted.

Locking the handwheel:

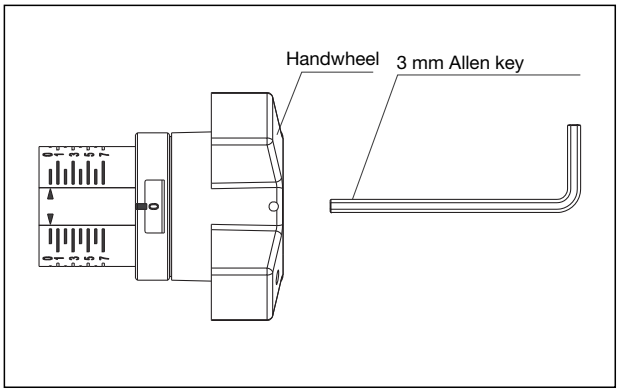
The handwheel can be locked in any position (1/10th of a turn). To do so, the existing cover plug is replaced by the cover plug of the locking set (accessory).
In addition, the locked handwheel can be secured by use of the sealing wire.

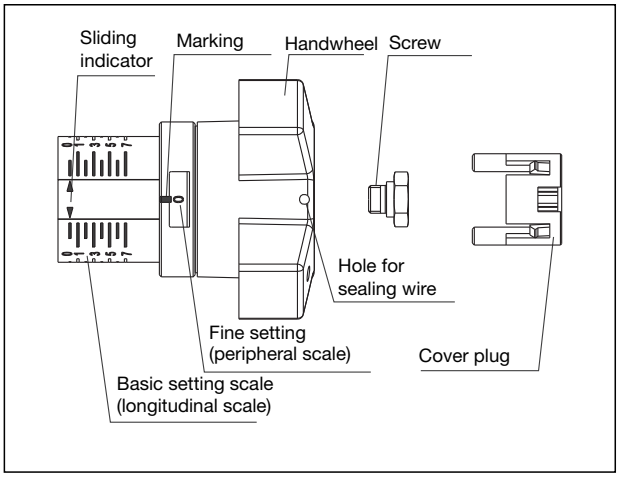
Dimensions:



“Hydrocontrol VFC/VFR”						
				PN 16		
DN	L	H	d_1	D	K	n x Ød
20	150	118	70	105	75	4 x 14
25	160	118	70	115	85	4 x 14
32	180	136	70	140	100	4 x 19
40	200	136	70	150	110	4 x 19
50	230	145	70	165	125	4 x 19

	“Hydrocontrol VFC”			“Hydrocontrol VFC”		
	PN 6			ANSI 150		
DN	D	K	n x Ød	D	K	n x Ød
20	90	65	4 x 11	99	70	4 x 16
25	100	75	4 x 11	108	79	4 x 16
32	120	90	4 x 14	118	89	4 x 16
40	130	100	4 x 14	127	98	4 x 16
50	140	110	4 x 14	153	121	4 x 19





Double regulating and commissioning valves
DN 65 – DN 150
Measuring technic “classic”

Tender specification:

Oventrop double regulating and commissioning valves with secured, infinitely adjustable presetting controllable at any time with the help of the flow limiting device.
Lengths according to DIN EN 558-1 basic series 1
(corresponds to ISO 5752 series 1)
All functioning components on one level, pressure test point and fill and drain ball valve interchangeable.

	“Hydrocontrol VFC”			“Hydro-control VFR”	“Hydro-control VFN”
Size	PN 16	PN 6	ANSI 150	PN 16	PN 25
	Item no.	Item no.	Item no.	Item no.	Item no.
DN 65	106 26 51	106 26 81	106 29 51	106 23 51	106 24 51
DN 80	106 26 52	106 26 82	106 29 52	106 23 52	106 24 52
DN 100	106 26 53	106 26 83	106 29 53	106 23 53	106 24 53
DN 125	106 26 54	106 26 84	106 29 54	106 23 54	106 24 54
DN 150	106 26 55	106 26 88	106 29 55	106 23 55	106 24 55

“Hydrocontrol VFC”
PN 16, -10°C to +150°C, PN 20 for cold water
Round flanges according to DIN EN 1092-2, PN 16
(corresponds to ISO 7005-2, PN 16)
PN 6, -10°C to +150 °C
Round flanges according to DIN EN 1092-2, PN 6
(corresponds to ISO 7005-2, PN 6)
ANSI 150, -10°C to +150 °C
Hole circle of the flanged connection according to ANSI 150
Valve body made of cast iron (GG 25 EN-GJL-250 according to DIN EN 1561), bonnet, stem and disc made of bronze/dezincification resistant brass. Disc with PTFE seal. Maintenance-free stem seal due to double EPDM O-ring.

“Hydrocontrol VFR”
PN 16, -20°C to +150°C, PN 20 for cold water
Round flanges according to DIN EN 1092-2, PN 16
(corresponds to ISO 7005-2, PN 16)
Valve body, bonnet and disc made of bronze, stainless steel stem, disc with PTFE seal. Maintenance-free stem seal due to double EPDM O-ring.

“Hydrocontrol VFN”
PN 25, -20°C to +150°C
Round flanges according to DIN EN 1092-2, PN 25
(corresponds to ISO 7005-2, PN 25)
Valve body made of nodular cast iron (GGG 50 EN-GJS-500-7 according to DIN EN 1563), bronze bonnet and disc, stem made of dezincification resistant brass. Disc with PTFE seal. Maintenance-free stem seal due to double EPDM O-ring.

Presetting DN 65 – DN 150:

1. The value of presetting of the valve is adjusted by turning the handwheel.
   a. The display of the basic setting is shown by the longitudinal scale together with the sliding indicator.
      Each turn of the handwheel is represented by a line on the longitudinal scale.
   b. The display of the fine setting is shown by the peripheral scale on the handwheel together with the marking.
      The subdivisions of the peripheral scale correspond to 1/10th of a turn of the handwheel.
2. The set value of presetting can be limited by turning the inner adjustment stem clockwise until it seats. This can be done by using the long end of a 4 mm Allen key.

Visibility/readability of the setting scales:

Depending on the installation position of the double regulating and commissioning valve, an improvement of the visibility/ readability of the setting scales is obtained by twisting the scales. With the valve fully closed and the two setting scales on “0”, remove cover plug, undo screw and with a light tug pull the handwheel from the valve stem.
Next, without altering the presetting (still indicating “0”), adjust the position of the handwheel so that the indicator window is clearly visible. Finally refit the handwheel to the valve stem, tighten the screw and replace the cover plug.

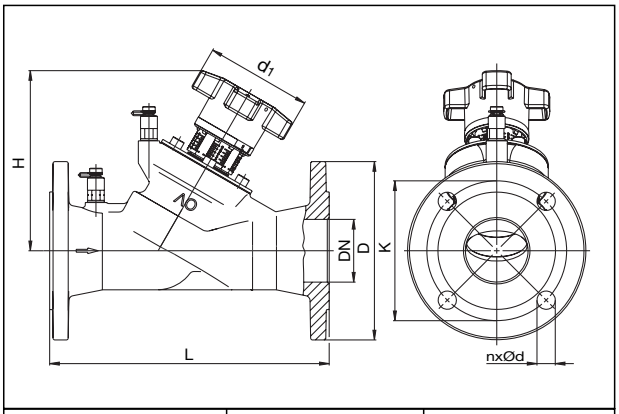
Protecting the setting:

A sealing wire may be fitted through the hole in the handwheel and a lead seal may be fitted.

Locking the handwheel:

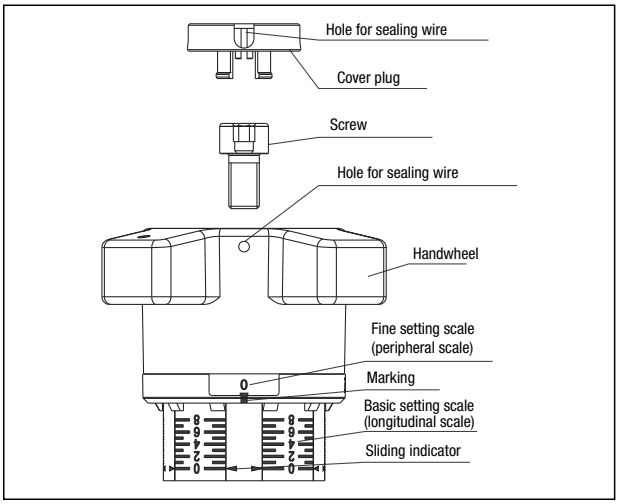
The handwheel can be locked in any position (1/10th of a turn). Fit the enclosed clip in the cut-out in the handwheel below the holes between the guides, making sure it locates into the sliding indicator (see sketch). The clip can now be sealed as illustrated. It is essential that the sealing wire is fitted tightly.

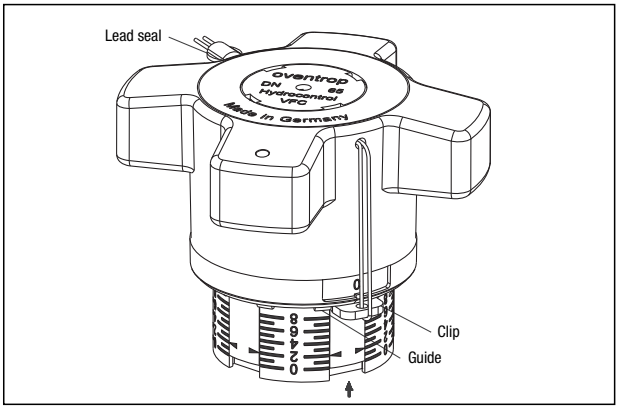
Dimensions:



“Hydrocontrol VFC/ VFR/VFN”				“Hydrocontrol VFC” PN 16			“Hydrocontrol VFC” PN 6		
DN	L	H	d_1	D	K	n x Ød	D	K	n x Ød
65	290	188	110	185	145	4 x 19	160	130	4 x 14
80	310	203	110	200	160	8 x 19	190	150	4 x 19
100	350	240	160	220	180	8 x 19	210	170	4 x 19
125	400	283	160	250	210	8 x 19	240	200	8 x 19
150	480	285	160	285	240	8 x 23	265	225	8 x 19

	“Hydrocontrol VFC” ANSI 150			“Hydrocontrol VFR” PN 16			“Hydrocontrol VFN” PN 25		
DN	D	K	n x Ød	D	K	n x Ød	D	K	n x Ød
65	185	140	4 x 19	185	145	4 x 19	185	145	8 x 19
80	200	152	4 x 19	200	160	8 x 19	200	160	8 x 19
100	220	191	8 x 19	220	180	8 x 19	235	190	8 x 23
125	250	216	8 x 22	250	210	8 x 19	270	220	8 x 28
150	285	241	8 x 22	285	240	8 x 23	300	250	8 x 28





Double regulating and commissioning valves
DN 200 – DN 350
Measuring technic “classic”

Tender specification:

Oventrop double regulating and commissioning valves with secured, infinitely adjustable presetting controllable at any time with the help of the flow limiting device.

Lengths according to DIN EN 558-1 basic series 1
(corresponds to ISO 5752 series 1)
All functioning components on one level, pressure test point and fill and drain ball valve interchangeable.

	“Hydrocontrol VFC”			“Hydro-control VFR”	“Hydro-control VFN”
Size	PN 16 Item no.	PN 6 Item no.	ANSI 150 Item no.	PN 16 Item no.	PN 25 Item no.
DN 200	106 26 56	106 26 86	106 29 56	106 23 56	106 24 56
DN 250	106 26 57		106 29 57		106 24 57
DN 300	106 26 58		106 29 58		106 24 58
DN 350	106 26 59				
DN 400	106 26 60				

“Hydrocontrol VFC”
PN 16, -10°C to +150°C, PN 20 for cold water
Round flanges according to DIN EN 1092-2, PN 16
(corresponds to ISO 7005-2, PN 16)
PN 6, -10°C to +150°C
Round flanges according to DIN EN 1092-2, PN 6
(corresponds to ISO 7005-2, PN 6)
ANSI 150, -10°C to +150°C
Hole circle of the flanged connection according to ANSI 150

Valve body (DN 200-DN 300 made of cast iron GG 25, EN-GJL-250 according to DIN EN 1561; DN 350 and DN 400 made of nodular cast iron GGG50, EN-GJS-500-7 according to DIN EN 1563), bonnet (DN 200-DN 300 made of nodular cast iron GGG 40, EN-GJS-400-15 according to DIN EN 1563; DN 350 and DN 400 made of nodular cast iron GGG50, EN-GJS-500-7 according to DIN EN 1563), bronze disc, stem made of dezincification resistant brass. Disc with PTFE or EPDM seal. Maintenance-free stem seal due to double EPDM O-ring.

“Hydrocontrol VFR”
PN 16, -20°C to +150°C, PN 20 for cold water
Round flanges according to DIN EN 1092-2, PN 16
(corresponds to ISO 7005-2, PN 16)
Valve body, bonnet and disc made of bronze, stainless steel stem. Disc with PTFE seal. Maintenance-free stem seal due to double EPDM O-ring.
With type approval certificate for shipbuilding.

“Hydrocontrol VFN”
PN 25, -20°C to +150°C
Round flanges according to DIN EN 1092-2, PN 25
(corresponds to ISO 7005-2, PN 25)
Valve body made of nodular cast iron (GGG 50/EN-GJS-500-7 according to DIN EN 1563), bonnet made of nodular cast iron (GGG 40/EN-GJS-400-15 according to DIN EN 1563). Bronze disc, stem made of dezincification resistant brass. Disc with PTFE seal. Maintenance-free stem seal due to double EPDM O-ring.

Presetting DN 200 – DN 400:

1. The value of presetting of the valve is adjusted by turning the handwheel.
   a. The complete turns of the handwheel are shown by the outer display.
   b. 1/10th of a turn of the handwheel is shown by the outer display.
2. Remover cover plug by introducing a screwdriver in the slot and gently prising it off.
3. The set value of presetting can be limited by turning the inner adjustment stem clockwise until it seats. This can be done by using a 10 mm screwdriver.
4. Refit the cover plug.

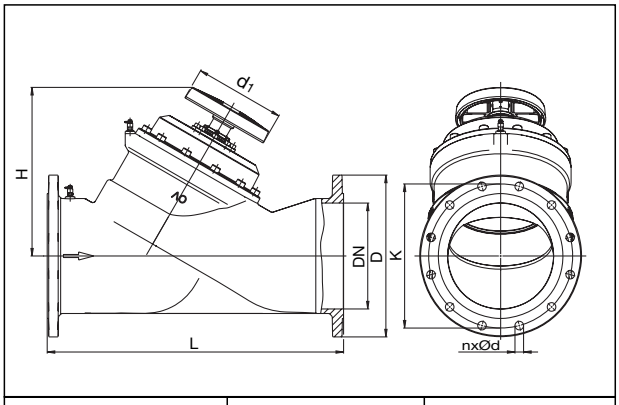
Protecting the setting:

A sealing wire may be fitted through the hole in the handwheel and a lead seal may be fitted.

Locking the handwheel:

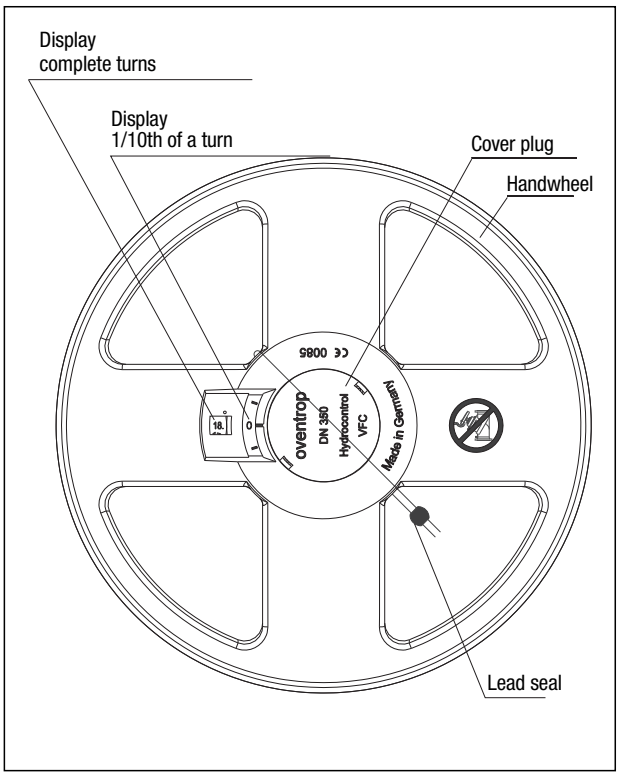
The handwheel can be locked in any position (1/10th of a turn) by removing the existing cover plug and replacing it with a special one. The sealing wire is then fitted through the hole in the handwheel and a lead seal is fitted.

Dimensions:

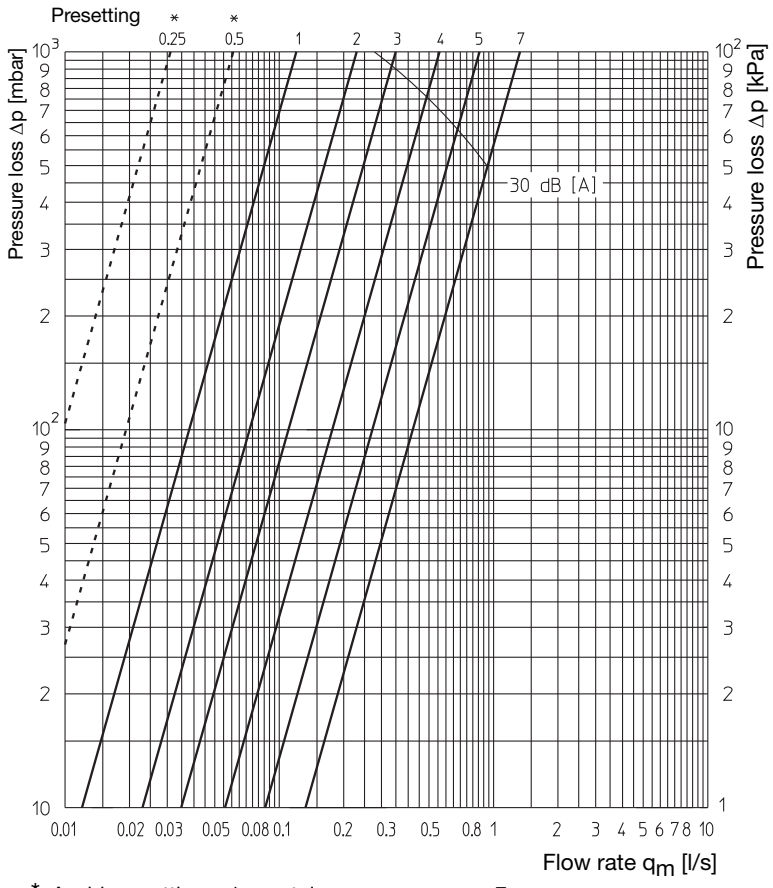


“Hydrocontrol VFC/ VFR/VFN”				“Hydrocontrol VFC” PN 16			“Hydrocontrol VFC” PN 6		
DN	L	H	d_1	D	K	n x Ød	D	K	n x Ød
200	600	467	300	340	295	12 x 23	320	280	8 x 19
250	730	480	300	405	355	12 x 28			
300	850	515	300	460	410	12 x 28			
350	980	560	300	520	470	16 x 28			
400	1100	655	300	580	525	16 x 31			

	“Hydrocontrol VFC” ANSI 150			“Hydrocontrol VFR” PN 16			“Hydrocontrol VFN” PN 25		
DN	D	K	n x Ød	D	K	n x Ød	D	K	n x Ød
200	340	298	8 x 22	340	295	12 x 23	360	310	12 x 28
250	405	362	12 x 25				425	370	12 x 31
300	485	432	12 x 25				485	430	16 x 31
350	535	476	12 x 28						



DN 20

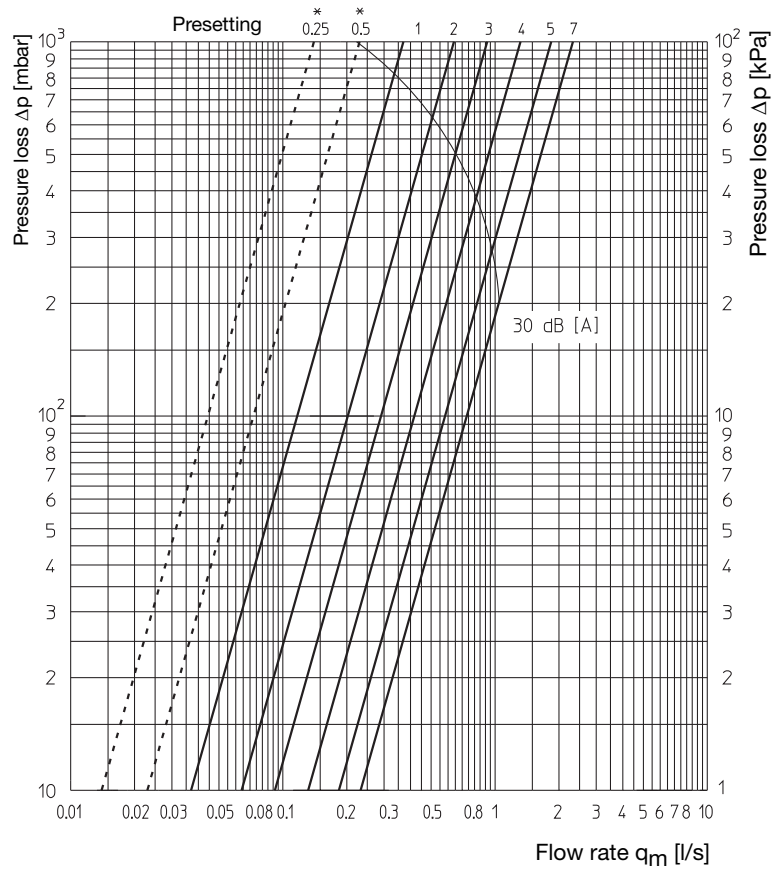


* Avoid presetting < 1, see tolerance curve page 7.

Pre-setting	k_V-values	Zeta-values	Pre-setting	k_V-values	Zeta-values
0.25	0.11	25698			
0.5	0.22	6424			
0.75	0.33	2855			
1.	0.42	1763	5.	3.09	33
1.1	0.48	1350	5.1	3.19	31
1.2	0.52	1150	5.2	3.30	29
1.3	0.55	1028	5.3	3.41	27
1.4	0.59	893	5.4	3.52	25
1.5	0.63	783	5.5	3.63	24
1.6	0.67	693	5.6	3.74	22
1.7	0.70	635	5.7	3.84	21
1.8	0.75	553	5.8	3.95	20
1.9	0.79	498	5.9	4.06	19
2.	0.83	451	6.	4.17	18
2.1	0.87	411	6.1	4.27	17
2.2	0.91	375	6.2	4.35	16
2.3	0.95	345	6.3	4.43	16
2.4	0.99	317	6.4	4.50	15
2.5	1.04	287	6.5	4.56	15
2.6	1.08	267	6.6	4.61	15
2.7	1.12	248	6.7	4.66	14
2.8	1.16	231	6.8	4.70	14
2.9	1.20	216	6.9	4.74	14
3.	1.25	199	7.	4.77	14
3.1	1.30	184			
3.2	1.35	171			
3.3	1.41	156			
3.4	1.47	144			
3.5	1.54	131			
3.6	1.61	120			
3.7	1.70	108			
3.8	1.79	97			
3.9	1.89	87			
4.	2.00	78			
4.1	2.11	70			
4.2	2.22	63			
4.3	2.33	57			
4.4	2.43	53			
4.5	2.54	48			
4.6	2.65	44			
4.7	2.76	41			
4.8	2.87	38			
4.9	2.98	35			

Zeta values related to the inner pipe diameter according to DIN EN 10 220 (21 mm)

DN 25

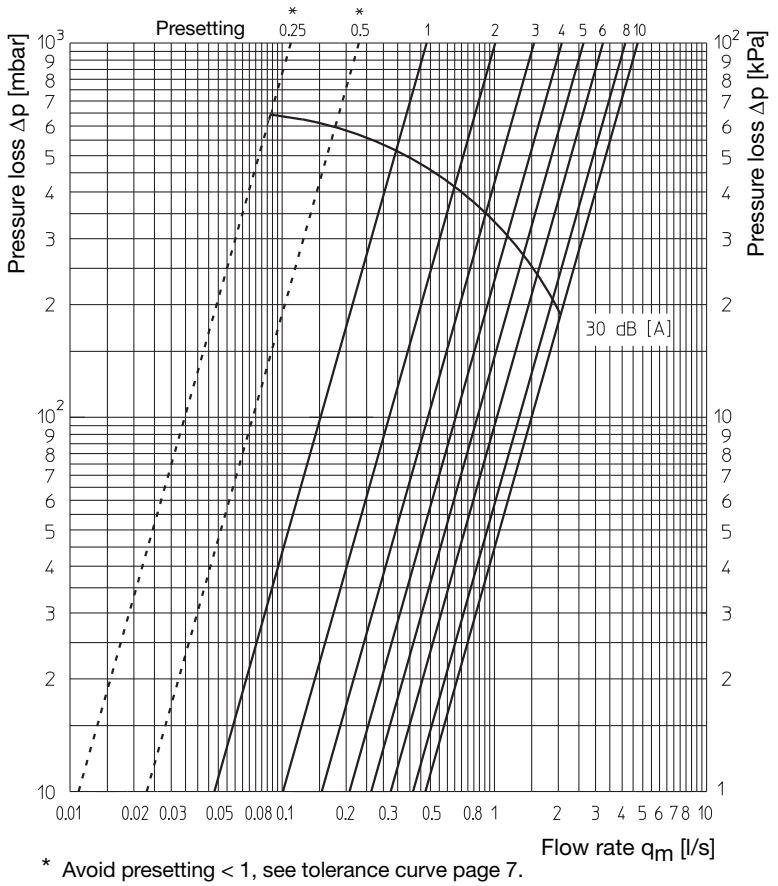


* Avoid presetting < 1, see tolerance curve page 7.

Pre-setting	k_V-values	Zeta-values	Pre-setting	k_V-values	Zeta-values
0.25	0.51	2325			
0.5	0.83	878			
0.75	1.08	519			
1.	1.33	342	5.	6.64	14
1.1	1.43	296	5.1	6.85	13
1.2	1.53	258	5.2	7.03	12
1.3	1.63	228	5.3	7.18	12
1.4	1.73	202	5.4	7.32	11
1.5	1.83	181	5.5	7.44	11
1.6	1.94	161	5.6	7.55	11
1.7	2.04	145	5.7	7.65	10
1.8	2.14	132	5.8	7.74	10
1.9	2.24	121	5.9	7.82	10
2.	2.34	110	6.	7.90	9.9
2.1	2.44	102	6.1	7.97	9.5
2.2	2.53	94	6.2	8.03	9.4
2.3	2.63	87	6.3	8.09	9.2
2.4	2.73	81	6.4	8.15	9.1
2.5	2.83	76	6.5	8.20	9.0
2.6	2.93	70	6.6	8.24	8.9
2.7	3.03	66	6.7	8.28	8.8
2.8	3.12	62	6.8	8.32	8.7
2.9	3.22	58	6.9	8.35	8.7
3.	3.32	55	7.	8.38	8.6
3.1	3.45	51			
3.2	3.58	47			
3.3	3.70	44			
3.4	3.84	41			
3.5	3.98	38			
3.6	4.13	35			
3.7	4.27	33			
3.8	4.42	31			
3.9	4.58	29			
4.	4.74	27			
4.1	4.90	25			
4.2	5.07	24			
4.3	5.24	22			
4.4	5.42	21			
4.5	5.60	19			
4.6	5.80	18			
4.7	6.00	17			
4.8	6.20	16			
4.9	6.42	15			

Zeta values related to the inner pipe diameter according to DIN EN 10 220 (24.8 mm)

DN 32

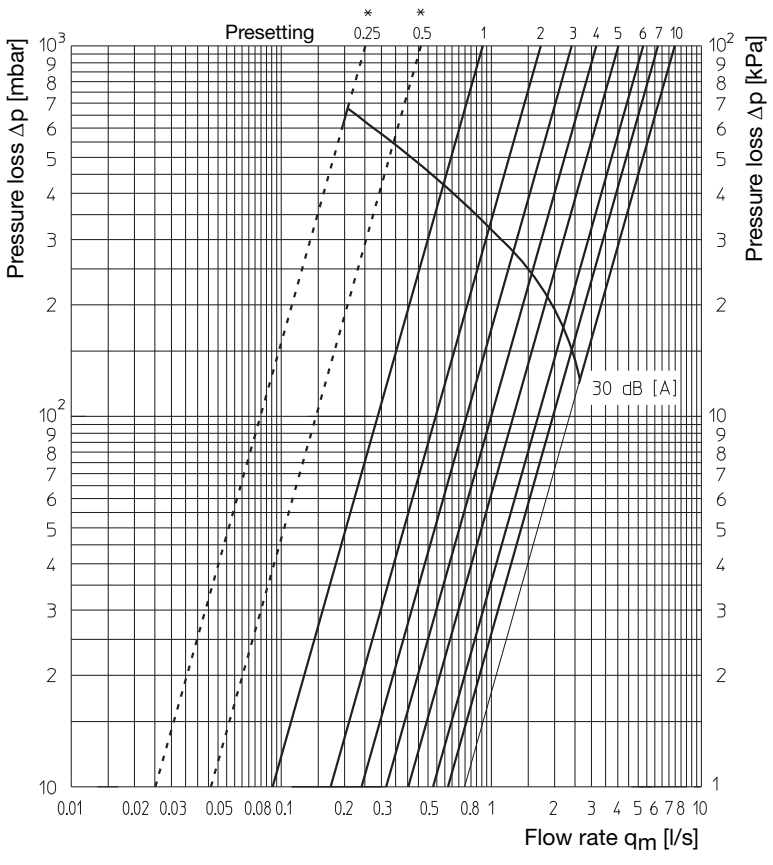


* Avoid presetting < 1, see tolerance curve page 7.

Pre-setting	k_V-values	Zeta-values	Pre-setting	k_V-values	Zeta-values
			5.	9.45	21
			5.1	9.68	20
			5.2	9.92	19
			5.3	10.15	18
			5.4	10.35	17
			5.5	10.60	16
			5.6	10.83	16
0.25	0.40	11566	5.7	11.05	15
0.5	0.83	2686	5.8	11.27	15
0.75	1.25	1184	5.9	11.48	14
1.	1.73	618	6.	11.70	14
1.1	1.92	502	6.1	11.96	13
1.2	2.11	416	6.2	12.20	12
1.3	2.30	350	6.3	12.41	12
1.4	2.49	298	6.4	12.62	12
1.5	2.68	258	6.5	12.81	11
1.6	2.87	225	6.6	13.00	11
1.7	3.06	198	6.7	13.17	11
1.8	3.25	175	6.8	13.33	10
1.9	3.44	156	6.9	13.49	10
2.	3.63	140	7.	13.65	9.9
2.1	3.82	127	7.1	13.78	9.7
2.2	4.01	115	7.2	13.92	9.6
2.3	4.20	105	7.3	14.06	9.4
2.4	4.39	96	7.4	14.18	9.2
2.5	4.58	88	7.5	14.30	9.0
2.6	4.77	81	7.6	14.42	8.9
2.7	4.96	75	7.7	14.54	8.8
2.8	5.15	70	7.8	14.65	8.6
2.9	5.34	65	7.9	14.76	8.5
3.	5.53	61	8.	14.86	8.4
3.1	5.73	56	8.1	14.97	8.3
3.2	5.92	53	8.2	15.10	8.1
3.3	6.12	49	8.3	15.20	8.0
3.4	6.31	46	8.4	15.31	7.9
3.5	6.51	44	8.5	15.42	7.8
3.6	6.71	41	8.6	15.53	7.7
3.7	6.90	39	8.7	15.64	7.6
3.8	7.10	37	8.8	15.75	7.5
3.9	7.30	35	8.9	15.86	7.4
4.	7.46	33	9.	15.97	7.3
4.1	7.69	31	9.1	16.08	7.2
4.2	7.88	30	9.2	16.20	7.1
4.3	8.08	28	9.3	16.30	7.0
4.4	8.27	27	9.4	16.41	6.9
4.5	8.47	26	9.5	16.53	6.8
4.6	8.67	25	9.6	16.64	6.7
4.7	8.86	24	9.7	16.75	6.6
4.8	9.06	23	9.8	16.86	6.5
4.9	9.25	22	9.9	16.97	6.4
			10.	17.08	6.3

Zeta values related to the inner pipe diameter according to DIN EN 10 220 (32.8 mm)

DN 40

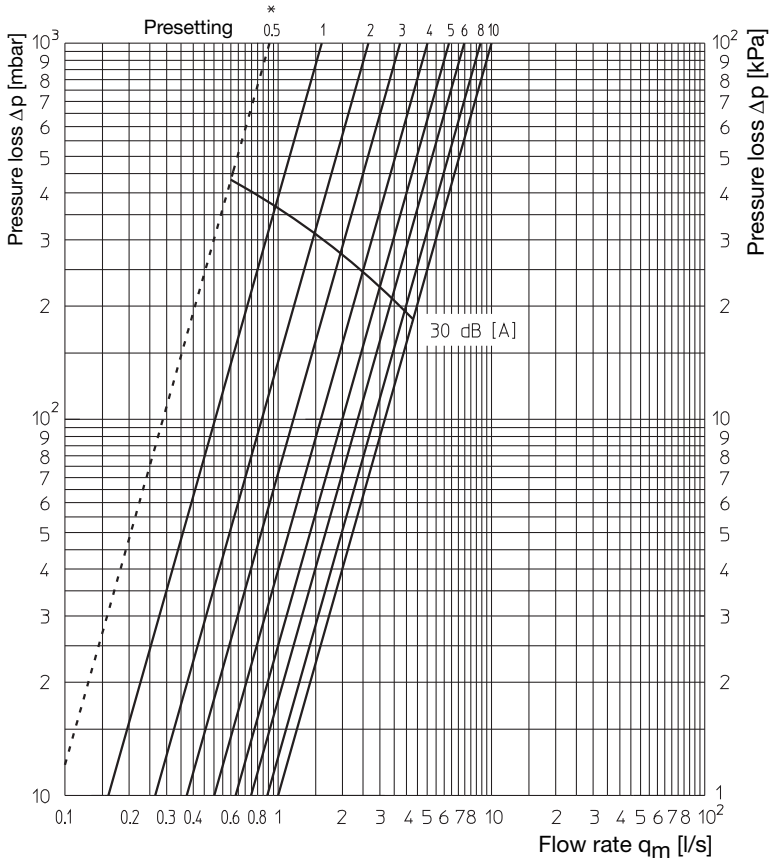


* Avoid presetting < 1, see tolerance curve page 7.

Pre-setting	k_V-values	Zeta-values	Pre-setting	k_V-values	Zeta-values
			5.	14.51	23
			5.1	14.91	22
			5.2	15.32	21
			5.3	15.75	20
			5.4	16.14	19
			5.5	16.62	18
			5.6	17.10	17
0.25	0.89	6162	5.7	17.58	16
0.5	1.67	1750	5.8	18.07	15
0.75	2.49	787	5.9	18.59	14
1.	3.27	456	6.	19.13	13
1.1	3.58	381	6.1	19.53	13
1.2	3.85	329	6.2	19.90	12
1.3	4.18	279	6.3	20.25	12
1.4	4.48	243	6.4	20.59	12
1.5	4.77	215	6.5	20.90	11
1.6	5.06	191	6.6	21.21	11
1.7	5.35	171	6.7	21.50	11
1.8	5.64	153	6.8	21.74	10
1.9	5.92	139	6.9	22.04	10
2.	6.20	127	7.	22.30	9.8
2.1	6.43	118	7.1	22.55	9.6
2.2	6.67	110	7.2	22.79	9.4
2.3	6.90	103	7.3	23.03	9.2
2.4	7.15	95	7.4	23.26	9.0
2.5	7.39	89	7.5	23.47	8.9
2.6	7.64	84	7.6	23.70	8.7
2.7	7.89	78	7.7	23.91	8.5
2.8	8.14	74	7.8	24.11	8.4
2.9	8.39	69	7.9	24.31	8.3
3.	8.69	65	8.	24.51	8.1
3.1	8.91	61	8.1	24.64	8.0
3.2	9.17	58	8.2	24.78	7.9
3.3	9.43	55	8.3	24.90	7.9
3.4	9.69	52	8.4	25.03	7.8
3.5	9.97	49	8.5	25.16	7.7
3.6	10.25	46	8.6	25.29	7.6
3.7	10.52	44	8.7	25.41	7.6
3.8	10.80	42	8.8	25.53	7.5
3.9	11.09	40	8.9	25.65	7.4
4.	11.38	38	9.	25.77	7.3
4.1	11.67	36	9.1	25.89	7.3
4.2	11.97	34	9.2	26.00	7.2
4.3	12.27	32	9.3	26.12	7.2
4.4	12.58	31	9.4	26.23	7.1
4.5	12.89	29	9.5	26.34	7.0
4.6	13.20	28	9.6	26.45	7.0
4.7	13.52	27	9.7	26.56	6.9
4.8	13.84	25	9.8	26.67	6.9
4.9	14.17	24	9.9	26.77	6.8
			10.	26.88	6.8

Zeta values related to the inner pipe diameter according to DIN EN 10 220 (41.8 mm)

DN 50

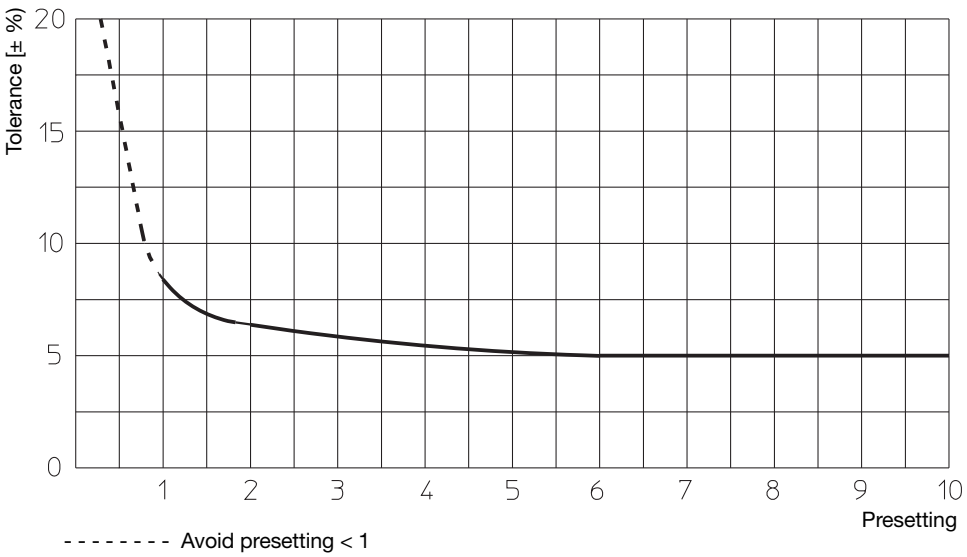


* Avoid presetting < 1, see tolerance curve page 7.

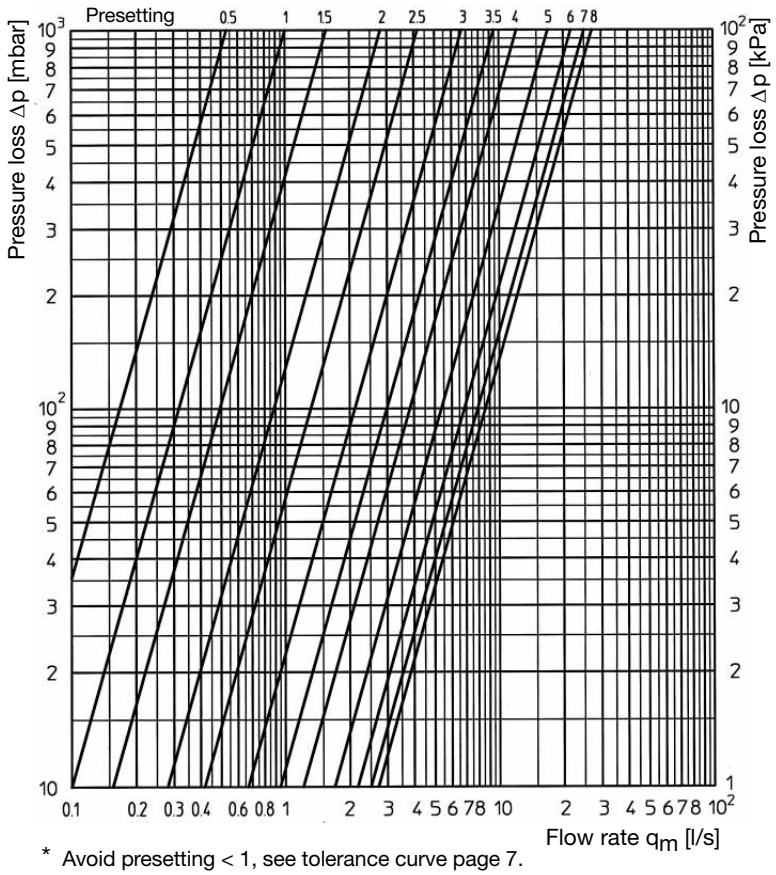
Pre-setting	k_V-values	Zeta-values	Pre-setting	k_V-values	Zeta-values
			5.	22.70	24
			5.1	23.12	24
			5.2	23.54	23
			5.3	23.95	22
			5.4	24.37	21
			5.5	24.80	21
			5.6	25.21	20
			5.7	25.63	19
0.5	3.29	1166	5.8	26.04	19
0.75	4.76	557	5.9	26.46	18
1.	5.76	380	6.	26.88	17
1.1	6.10	339	6.1	27.18	17
1.2	6.41	307	6.2	27.48	17
1.3	6.70	281	6.3	27.75	16
1.4	6.98	259	6.4	28.06	16
1.5	7.24	241	6.5	28.31	16
1.6	7.66	215	6.6	28.61	16
1.7	8.20	188	6.7	28.88	15
1.8	8.66	168	6.8	29.15	15
1.9	9.10	152	6.9	29.41	15
2.	9.55	138	7.	29.68	14
2.1	9.96	127	7.1	29.91	14
2.2	10.38	117	7.2	30.15	14
2.3	10.78	109	7.3	30.40	14
2.4	11.18	101	7.4	30.64	13
2.5	11.57	94	7.5	30.88	13
2.6	11.95	88	7.6	31.11	13
2.7	12.33	83	7.7	31.33	13
2.8	12.69	78	7.8	31.57	13
2.9	13.06	74	7.9	31.79	12
3.	13.41	70	8.	32.00	12
3.1	13.87	66	8.1	32.22	12
3.2	14.32	62	8.2	32.44	12
3.3	14.78	58	8.3	32.65	12
3.4	15.25	54	8.4	32.86	12
3.5	15.56	52	8.5	33.06	12
3.6	16.20	48	8.6	33.27	11
3.7	16.67	45	8.7	33.47	11
3.8	17.14	43	8.8	33.67	11
3.9	17.60	41	8.9	33.87	11
4.	18.34	39	9.	34.06	11
4.1	18.52	37	9.1	34.25	11
4.2	19.01	35	9.2	34.44	11
4.3	19.48	33	9.3	34.69	10
4.4	19.95	32	9.4	34.82	10
4.5	20.55	30	9.5	35.00	10
4.6	20.89	29	9.6	35.20	10
4.7	21.36	28	9.7	35.40	10
4.8	21.83	27	9.8	35.60	10
4.9	22.30	25	9.9	35.80	10
			10.	36.00	9.7

Zeta values related to the inner pipe diameter according to DIN EN 10 220 (53 mm)

Flow tolerances depending on the presetting for DN 20 – DN 50



DN 65

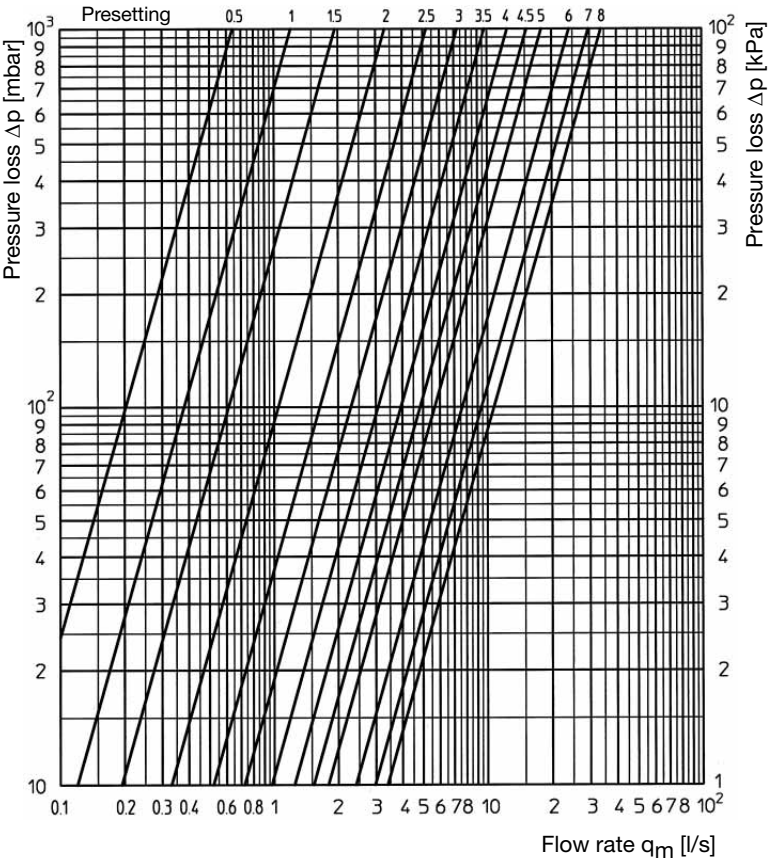


* Avoid presetting < 1, see tolerance curve page 7.

Pre-setting	k_V-values	Zeta-values	Pre-setting	k_V-values	Zeta-values
0.5	1.90	10817			
1.	3.60	3013	5.	61.00	10.5
1.1	4.12	2300	5.1	63.21	9.8
1.2	4.49	1937	5.2	64.93	9.3
1.3	4.86	1653	5.3	66.63	8.8
1.4	5.23	1428	5.4	68.32	8.4
1.5	5.60	1245	5.5	70.00	8.0
1.6	6.43	945	5.6	71.69	7.6
1.7	7.29	735	5.7	73.33	7.3
1.8	8.17	585	5.8	74.93	7.0
1.9	9.07	475	5.9	76.48	6.7
2.	10.00	391	6.	78.00	6.4
2.1	10.95	326	6.1	79.48	6.2
2.2	11.91	275	6.2	80.91	6.0
2.3	12.92	234	6.3	82.31	5.8
2.4	13.94	201	6.4	83.67	5.6
2.5	15.00	174	6.5	85.00	5.4
2.6	16.66	141	6.6	86.12	5.3
2.7	18.38	116	6.7	87.20	5.1
2.8	20.14	96	6.8	88.23	5.0
2.9	21.95	81	6.9	89.23	4.9
3.	24.00	68	7.	90.00	4.8
3.1	25.73	59	7.1	91.13	4.7
3.2	27.70	51	7.2	92.02	4.6
3.3	29.74	44	7.3	92.89	4.5
3.4	31.84	39	7.4	93.71	4.4
3.5	34.00	34	7.5	94.50	4.3
3.6	35.93	30	7.6	95.27	4.3
3.7	37.84	27	7.7	96.00	4.2
3.8	39.74	25	7.8	96.70	4.2
3.9	41.63	23	7.9	97.36	4.1
4.	43.50	21	8.	98.00	4.0
4.1	45.36	19			
4.2	47.20	18			
4.3	49.03	16			
4.4	50.85	15			
4.5	52.00	14			
4.6	54.45	13			
4.7	56.23	12			
4.8	58.00	11.6			
4.9	59.74	10.9			

Zeta values related to the inner pipe diameter according to DIN EN 10 220 (70.3 mm)

DN 80

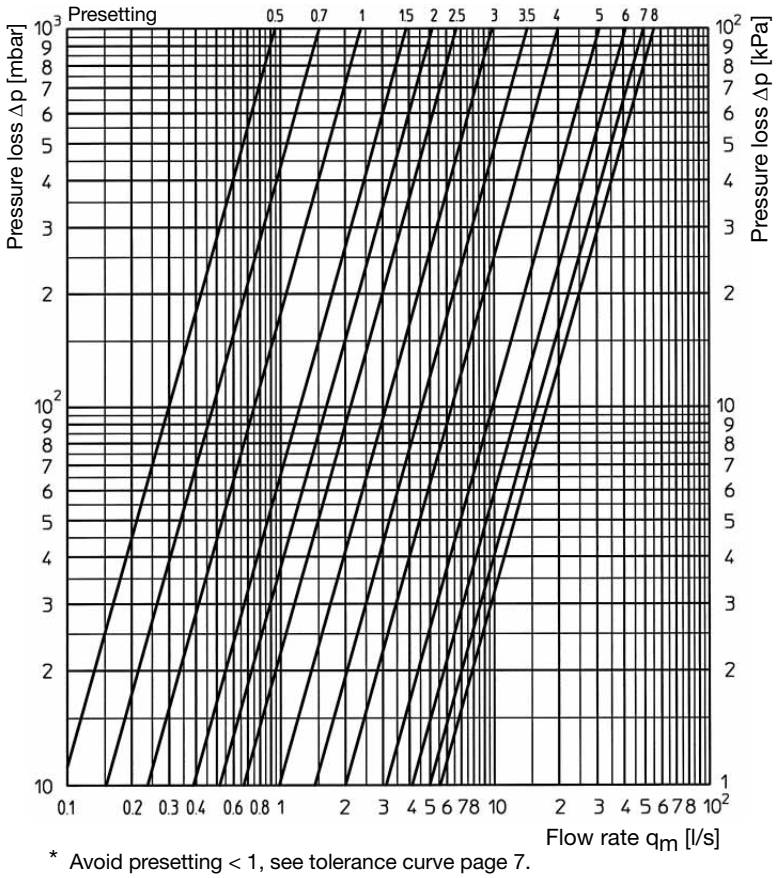


* Avoid presetting < 1, see tolerance curve page 7.

Pre-setting	k_V-values	Zeta-values	Pre-setting	k_V-values	Zeta-values
0.5	2.30	14001			
1.	4.40	3826	5.	64.60	18.0
1.1	4.74	3297	5.1	66.98	16.5
1.2	5.17	2771	5.2	69.32	15.4
1.3	5.67	2304	5.3	71.63	14.4
1.4	6.28	1878	5.4	73.90	13.5
1.5	7.00	1512	5.5	75.45	13.0
1.6	7.89	1190	5.6	78.37	12.1
1.7	8.82	952	5.7	80.56	11.4
1.8	9.78	774	5.8	82.72	10.8
1.9	10.79	636	5.9	84.85	10.3
2.	11.85	527	6.	87.00	9.8
2.1	12.95	442	6.1	89.04	9.3
2.2	14.11	372	6.2	91.00	8.9
2.3	15.33	315	6.3	93.13	8.5
2.4	16.61	268	6.4	95.14	8.2
2.5	18.65	213	6.5	97.55	7.8
2.6	19.39	197	6.6	99.10	7.5
2.7	20.90	170	6.7	101.04	7.3
2.8	22.51	146	6.8	102.96	7.0
2.9	24.24	126	6.9	104.87	6.7
3.	26.10	109	7.	106.75	6.5
3.1	27.85	95	7.1	108.39	6.3
3.2	29.61	84	7.2	110.00	6.1
3.3	31.39	75	7.3	111.60	5.9
3.4	33.19	67	7.4	113.00	5.8
3.5	35.00	60	7.5	114.50	5.6
3.6	36.83	55	7.6	116.13	5.5
3.7	38.68	50	7.7	117.78	5.3
3.8	40.55	45	7.8	119.27	5.2
3.9	42.43	41	7.9	120.74	5.1
4.	44.75	37	8.	122.20	5.0
4.1	46.27	35			
4.2	48.21	32			
4.3	50.19	29			
4.4	52.18	27			
4.5	55.20	24			
4.6	56.22	23			
4.7	58.28	22			
4.8	60.36	20			
4.9	62.47	19			

Zeta values related to the inner pipe diameter according to DIN EN 10 220 (82.5 mm)

DN 100

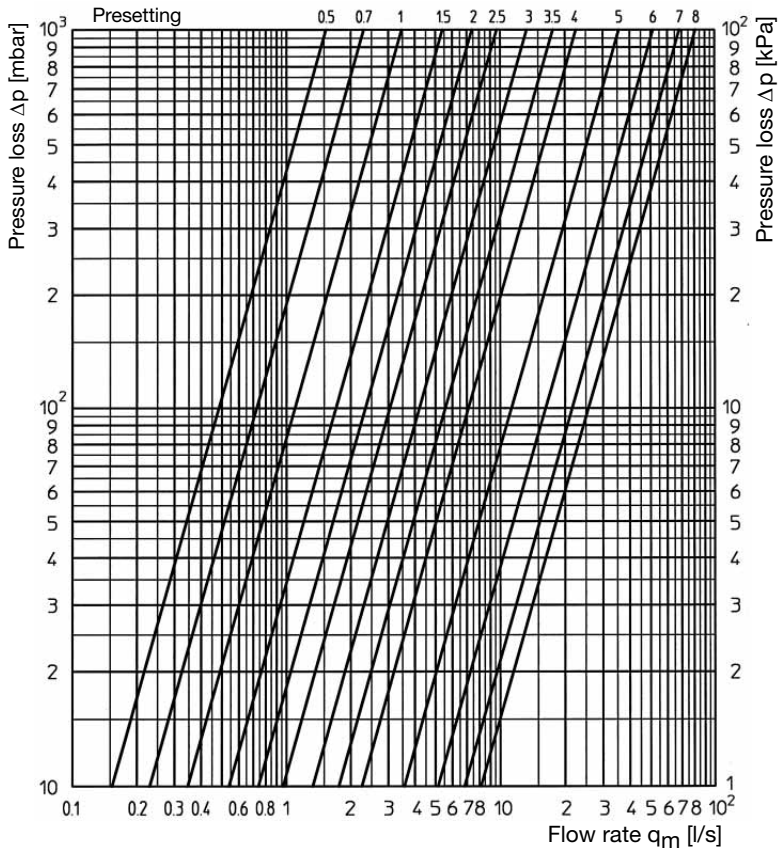


* Avoid presetting < 1, see tolerance curve page 7.

Pre-setting	k_V-values	Zeta-values	Pre-setting	k_V-values	Zeta-values
0.5	3.40	14279			
0.7	5.46	5537			
1.	8.55	2258	5.	112.00	13
1.1	9.58	1799	5.1	117.46	12
1.2	10.61	1466	5.2	121.17	11
1.3	11.64	1218	5.3	124.79	10.6
1.4	12.67	1028	5.4	127.52	10.2
1.5	14.00	842	5.5	132.00	9.5
1.6	14.73	761	5.6	135.16	9.0
1.7	15.76	665	5.7	138.47	8.6
1.8	16.79	586	5.8	141.71	8.2
1.9	17.82	520	5.9	144.89	7.9
2.	18.50	482	6.	148.00	7.5
2.1	19.88	418	6.1	151.94	7.1
2.2	20.91	378	6.2	155.63	6.8
2.3	21.94	343	6.3	159.10	6.5
2.4	22.97	313	6.4	162.38	6.3
2.5	24.00	287	6.5	164.03	6.1
2.6	26.00	244	6.6	168.44	5.8
2.7	28.13	209	6.7	171.26	5.6
2.8	30.40	179	6.8	173.95	5.5
2.9	32.81	153	6.9	176.53	5.3
3.	35.40	132	7.	179.01	5.2
3.1	38.18	113	7.1	181.37	5.0
3.2	41.17	97	7.2	183.65	4.9
3.3	44.44	84	7.3	185.85	4.8
3.4	48.02	72	7.4	187.96	4.7
3.5	52.00	61	7.5	190.04	4.6
3.6	55.93	53	7.6	192.37	4.5
3.7	59.89	46	7.7	194.66	4.4
3.8	63.89	40	7.8	196.85	4.3
3.9	67.92	36	7.9	198.96	4.2
4.	72.00	32	8.	201.00	4.1
4.1	76.11	29			
4.2	80.27	26			
4.3	84.47	23			
4.4	88.71	21			
4.5	93.00	19			
4.6	97.37	17			
4.7	101.62	16			
4.8	105.74	15			
4.9	109.75	14			

Zeta values related to the inner pipe diameter according to DIN EN 10 220 (100.8 mm)

DN 125

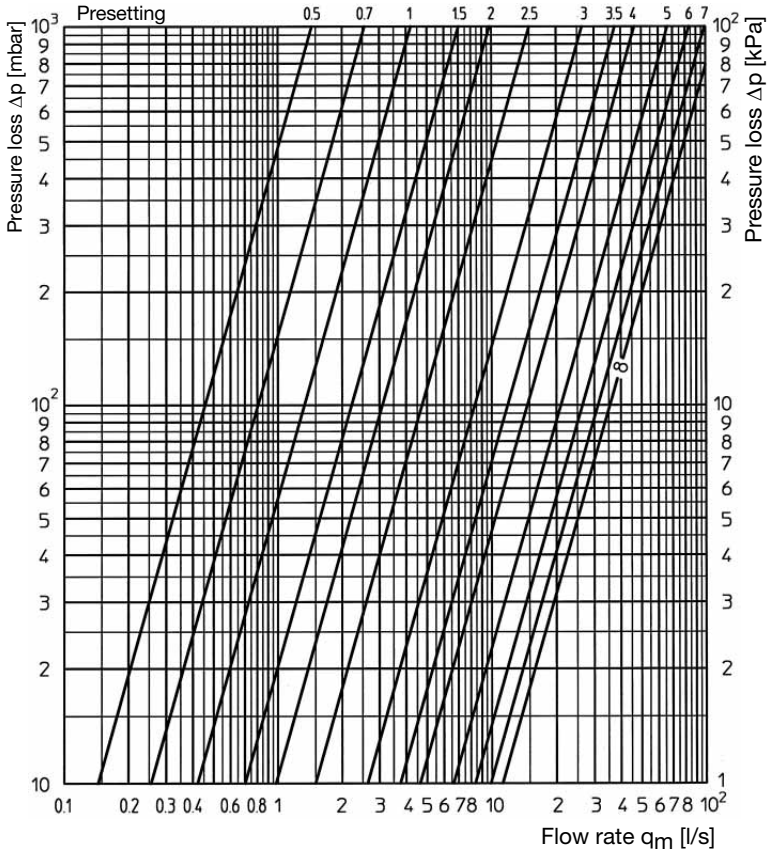


* Avoid presetting < 1, see tolerance curve page 7.

Pre-setting	k_V-values	Zeta-values	Pre-setting	k_V-values	Zeta-values
0.5	5.50	12904			
0.7	8.28	5694			
1.	12.45	2518	5.	128.25	24
1.1	13.84	2038	5.1	133.77	22
1.2	15.23	1683	5.2	139.54	20
1.3	16.62	1413	5.3	145.60	18
1.4	18.01	1203	5.4	151.96	17
1.5	19.40	1037	5.5	158.70	15
1.6	20.94	890	5.6	164.10	14
1.7	22.47	773	5.7	169.60	13.5
1.8	24.01	677	5.8	175.21	12.7
1.9	25.54	598	5.9	180.94	11.9
2.	26.60	552	6.	185.30	11.4
2.1	28.61	477	6.1	192.75	10.5
2.2	30.15	429	6.2	198.85	9.9
2.3	31.68	389	6.3	205.10	9.3
2.4	33.22	354	6.4	211.50	8.7
2.5	34.75	323	6.5	218.05	8.2
2.6	37.18	282	6.6	223.37	7.8
2.7	39.69	248	6.7	228.64	7.5
2.8	42.29	218	6.8	233.89	7.1
2.9	44.97	193	6.9	239.03	6.8
3.	47.75	171	7.	244.15	6.5
3.1	50.63	152	7.1	249.23	6.3
3.2	53.62	136	7.2	254.26	6.0
3.3	56.73	121	7.3	259.25	5.8
3.4	60.00	108	7.4	264.19	5.6
3.5	63.35	97	7.5	268.15	5.4
3.6	66.62	88	7.6	273.95	5.2
3.7	70.00	80	7.7	278.77	5.0
3.8	73.53	72	7.8	283.55	4.9
3.9	77.21	65	7.9	287.96	4.7
4.	81.05	59	8.	293.00	4.5
4.1	85.07	54			
4.2	89.30	49			
4.3	93.77	44			
4.4	98.50	40			
4.5	103.55	36			
4.6	108.16	33			
4.7	112.92	31			
4.8	117.84	28			
4.9	122.95	26			

Zeta values related to the inner pipe diameter according to DIN EN 10 220 (125 mm)

DN 150

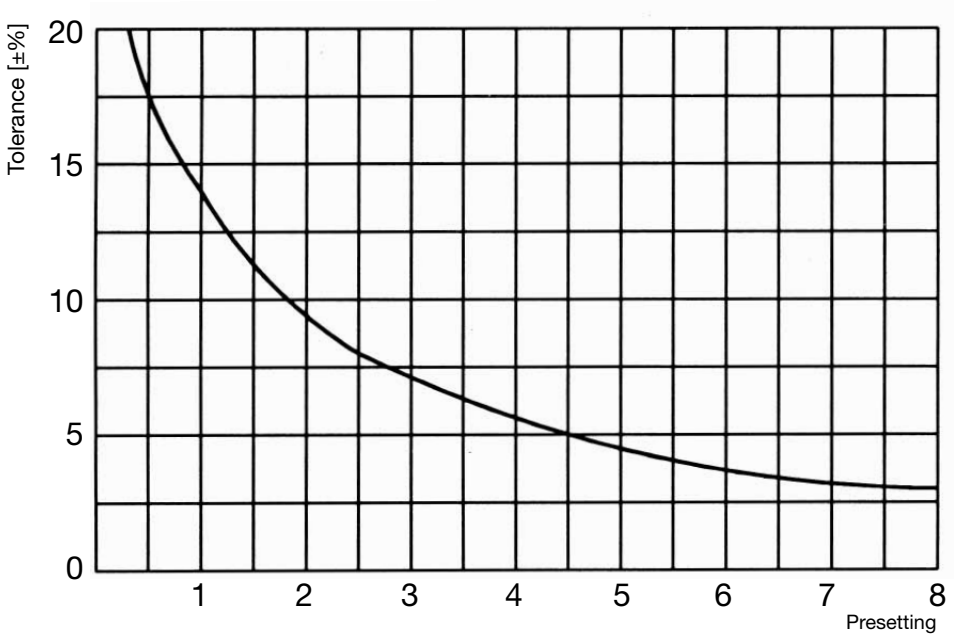


* Avoid presetting < 1, see tolerance curve page 7.

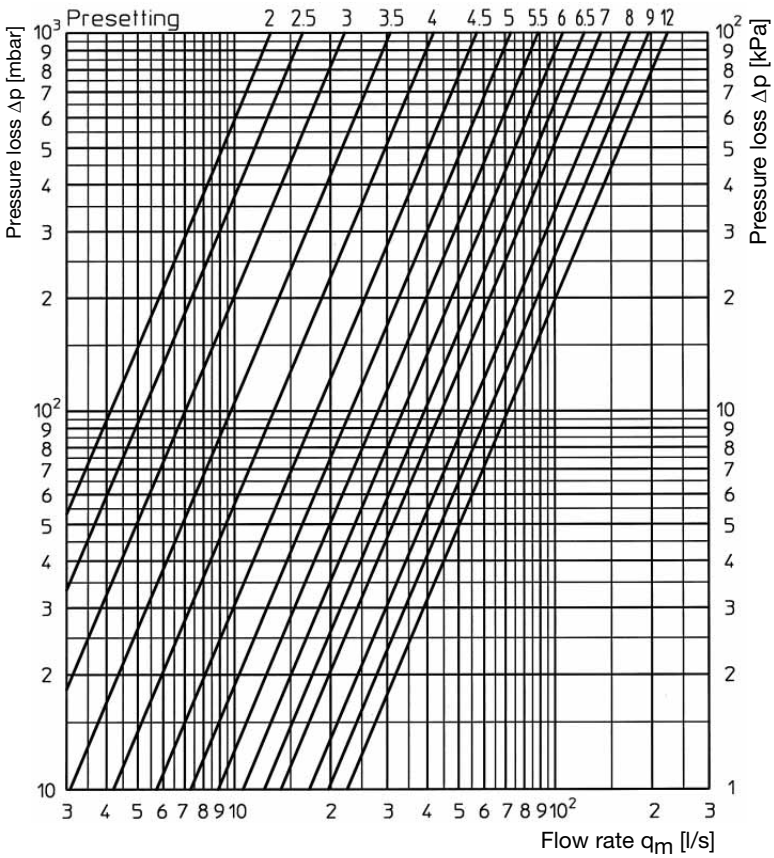
Pre-setting	k_V-values	Zeta-values	Pre-setting	k_V-values	Zeta-values
0.5	5.20	29934			
0.7	9.21	9542			
1.	15.22	3494	5.	238.91	14.0
1.1	17.22	2730	5.1	244.72	13.5
1.2	19.23	2189	5.2	251.20	12.8
1.3	21.23	1796	5.3	257.60	12.2
1.4	23.24	1499	5.4	263.90	11.6
1.5	25.26	1269	5.5	272.40	10.9
1.6	27.24	1091	5.6	276.24	10.6
1.7	29.50	930	5.7	282.30	10.2
1.8	31.25	829	5.8	288.27	9.7
1.9	33.26	732	5.9	294.17	9.4
2.	35.26	651	6.	300.40	9.0
2.1	37.13	587	6.1	305.76	8.8
2.2	39.41	521	6.2	311.45	8.4
2.3	42.30	452	6.3	317.08	8.1
2.4	46.25	378	6.4	322.07	7.8
2.5	53.92	278	6.5	326.70	7.6
2.6	61.00	218	6.6	333.58	7.3
2.7	68.55	172	6.7	338.34	7.1
2.8	76.64	138	6.8	344.29	6.8
2.9	85.40	111	6.9	349.56	6.6
3.	95.02	90	7.	355.60	6.4
3.1	105.51	73	7.1	360.00	6.2
3.2	114.45	62	7.2	365.06	6.1
3.3	122.36	54	7.3	370.13	5.9
3.4	129.52	48	7.4	375.15	5.8
3.5	135.45	44	7.5	382.00	5.6
3.6	142.21	40	7.6	385.04	5.5
3.7	147.41	37	7.7	389.33	5.3
3.8	153.33	34	7.8	394.20	5.2
3.9	160.00	32	7.9	399.54	5.1
4.	167.12	29	8.	404.30	5.0
4.1	174.48	27			
4.2	181.76	25			
4.3	189.05	23			
4.4	196.34	21			
4.5	203.65	20			
4.6	210.78	18			
4.7	217.79	17			
4.8	224.14	16			
4.9	231.46	15			

Zeta values related to the inner pipe diameter according to DIN EN 10 220 (150 mm)

Flow tolerances depending on the presetting for DN 65 - DN 150



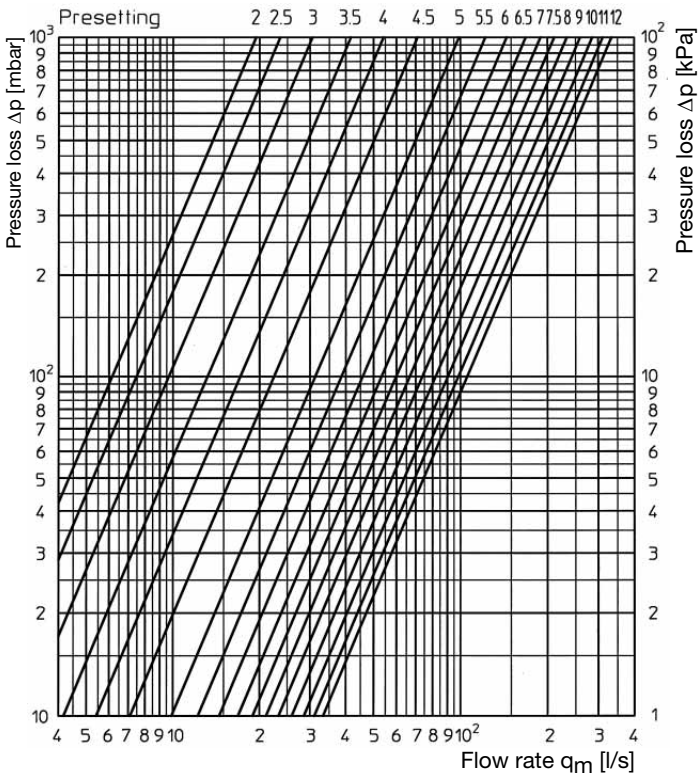
DN 200



Pre-setting	k_V-values	Zeta-values	Pre-setting	k_V-values	Zeta-values
2.0	48.9	1191	7.0	509.5	11
2.1	51.6	1070	7.1	519.4	11
2.2	54.2	969	7.2	529.3	10
2.3	56.8	883	7.3	539.2	10
2.4	59.4	807	7.4	549.1	9
2.5	62.0	741	7.5	559.0	9
2.6	66.4	646	7.6	571.0	9
2.7	70.8	568	7.7	582.5	8
2.8	75.2	504	7.8	594.2	8
2.9	79.6	449	7.9	606.0	8
3.0	84.0	404	8.0	618.0	7
3.1	90.0	352	8.1	626.8	7
3.2	96.0	309	8.2	634.8	7
3.3	102.0	274	8.3	634.2	7
3.4	108.0	244	8.4	651.6	7
3.5	114.0	219	8.5	660.0	7
3.6	121.0	195	8.6	672.8	6
3.7	128.8	172	8.7	685.2	6
3.8	136.2	154	8.8	698.7	6
3.9	143.6	138	8.9	711.6	6
4.0	151.0	125	9.0	724.5	6
4.1	162.0	109	9.1	731.4	5
4.2	173.0	95	9.2	738.2	5
4.3	184.0	84	9.3	744.9	5
4.4	195.0	75	9.4	751.7	5
4.5	206.0	67	9.5	758.5	5
4.6	216.8	61	9.6	760.6	5
4.7	227.6	55	9.7	762.7	5
4.8	238.4	50	9.8	764.8	5
4.9	249.2	46	9.9	766.9	5
5.0	260.3	41	10.0	769.0	5
5.1	271.9	38	10.1	771.2	5
5.2	283.8	35	10.2	773.4	5
5.3	295.6	33	10.3	775.6	5
5.4	307.5	30	10.4	778.0	5
5.5	320.0	28	10.5	780.0	5
5.6	332.0	26	10.6	782.0	5
5.7	344.8	24	10.7	784.0	5
5.8	357.6	22	10.8	786.0	5
5.9	370.3	21	10.9	788.0	5
6.0	383.0	19	11.0	790.0	5
6.1	396.0	18	11.1	792.2	5
6.2	409.0	17	11.2	794.5	5
6.3	422.0	16	11.3	796.8	5
6.4	435.0	15	11.4	799.1	4
6.5	447.8	14	11.5	801.4	4
6.6	460.0	13	11.6	804.0	4
6.7	472.5	13	11.7	806.6	4
6.8	484.8	12	11.8	809.2	4
6.9	497.2	12	11.9	812.0	4
			12.0	814.5	4

Zeta values related to the inner pipe diameter according to DIN EN 10 220 (207.3 mm)

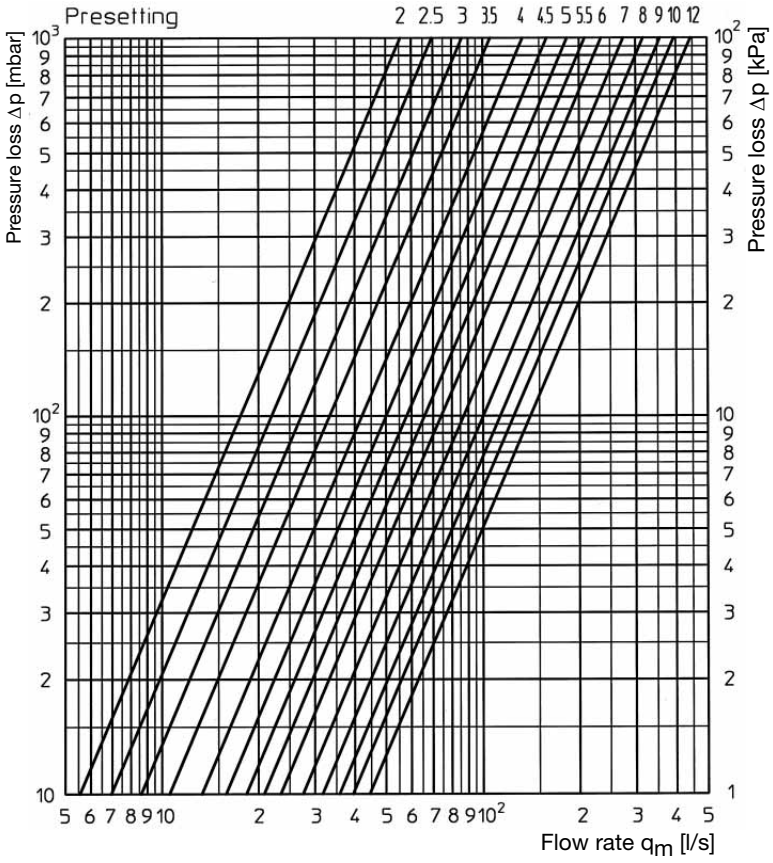
DN 250



Pre-setting	kv-values	Zeta-values	Pre-setting	kv-values	Zeta-values
2.0	70.0	1318	7.0	682.0	14
2.1	72.5	1229	7.1	698.0	13
2.2	75.5	1133	7.2	714.0	13
2.3	79.0	1035	7.3	729.0	12
2.4	82.0	961	7.4	745.0	12
2.5	85.0	894	7.5	760.0	11
2.6	89.5	806	7.6	778.0	11
2.7	94.0	731	7.7	795.0	10
2.8	99.0	659	7.8	811.0	10
2.9	104.5	592	7.9	826.0	10
3.0	110.0	534	8.0	840.0	9
3.1	117.0	472	8.1	850.0	9
3.2	123.5	424	8.2	860.0	9
3.3	130.5	379	8.3	870.0	8
3.4	139.0	334	8.4	880.0	8
3.5	150.0	287	8.5	890.0	8
3.6	155.0	269	8.6	899.0	8
3.7	164.0	240	8.7	907.0	8
3.8	174.0	213	8.8	916.0	8
3.9	184.0	191	8.9	925.0	8
4.0	195.0	170	9.0	933.0	7
4.1	208.0	149	9.1	942.0	7
4.2	221.0	132	9.2	952.0	7
4.3	236.0	116	9.3	961.0	7
4.4	252.0	102	9.4	970.0	7
4.5	270.0	89	9.5	980.0	7
4.6	287.0	78	9.6	989.0	7
4.7	304.0	70	9.7	998.0	6
4.8	321.0	63	9.8	1008.0	6
4.9	338.0	57	9.9	1018.0	6
5.0	356.0	51	10.0	1028.0	6
5.1	373.0	46	10.1	1038.0	6
5.2	390.0	42	10.2	1048.0	6
5.3	407.0	39	10.3	1059.0	6
5.4	423.0	36	10.4	1071.0	6
5.5	440.0	33	10.5	1080.0	6
5.6	457.0	31	10.6	1088.0	5
5.7	473.0	29	10.7	1096.0	5
5.8	490.0	27	10.8	1104.0	5
5.9	506.0	25	10.9	1112.0	5
6.0	522.0	24	11.0	1120.0	5
6.1	539.0	22	11.1	1128.0	5
6.2	555.0	21	11.2	1136.0	5
6.3	571.0	20	11.3	1144.0	5
6.4	587.0	19	11.4	1152.0	5
6.5	607.0	18	11.5	1160.0	5
6.6	619.0	17	11.6	1168.0	5
6.7	635.0	16	11.7	1176.0	5
6.8	651.0	15	11.8	1184.0	5
6.9	666.0	15	11.9	1192.0	4
			12.0	1200.0	4

Zeta values related to the inner pipe diameter according to DIN EN 10 220 (254.4 mm)

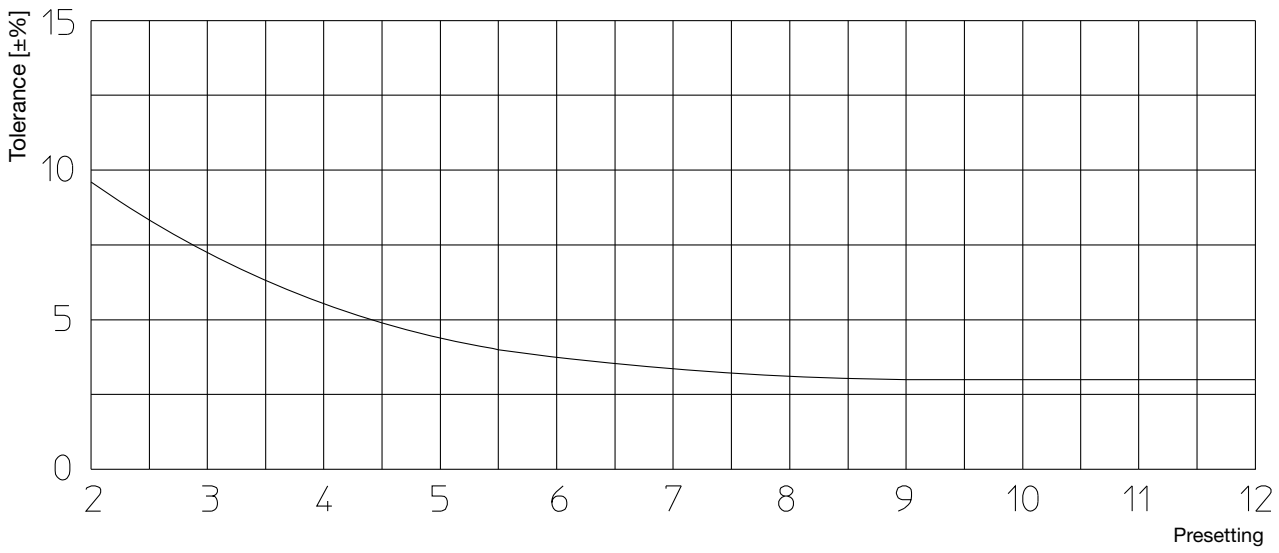
DN 300



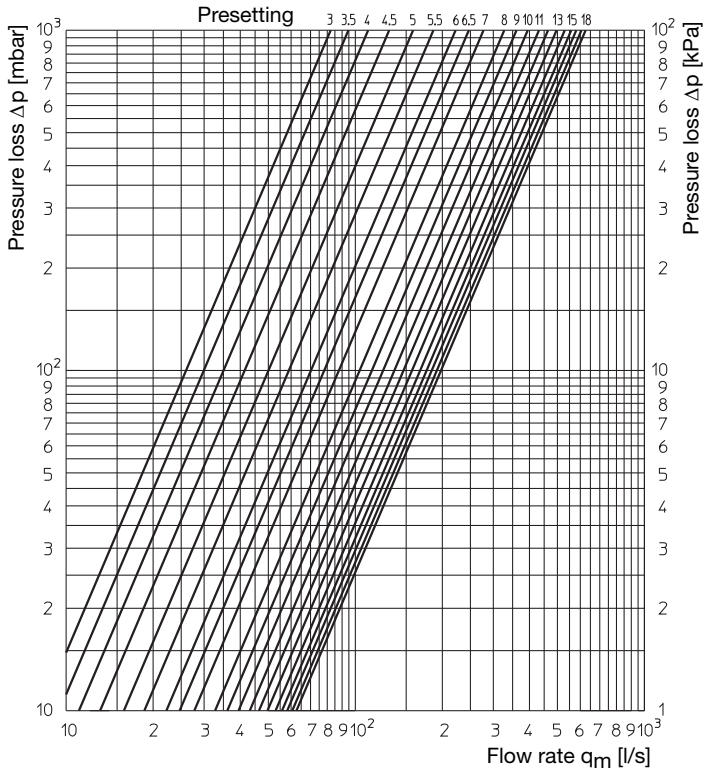
Pre-setting	kv-values	Zeta-values		Pre-setting	kv-values	Zeta-values
2.0	200.0	325		7.0	990.0	13
2.1	210.0	295		7.1	1005.0	13
2.2	220.0	269		7.2	1020.0	12
2.3	230.0	246		7.3	1036.0	12
2.4	240.0	226		7.4	1053.0	12
2.5	250.0	208		7.5	1070.0	11
2.6	261.0	191		7.6	1084.0	11
2.7	273.0	174		7.7	1098.0	11
2.8	285.0	160		7.8	1112.0	11
2.9	297.0	147		7.9	1126.0	10
3.0	310.0	135		8.0	1140.0	10
3.1	323.0	125		8.1	1154.0	10
3.2	336.0	115		8.2	1168.0	10
3.3	350.0	106		8.3	1182.0	9
3.4	365.0	98		8.4	1196.0	9
3.5	380.0	90		8.5	1210.0	9
3.6	401.0	81		8.6	1228.0	9
3.7	421.0	73		8.7	1245.0	8
3.8	441.0	67		8.8	1261.0	8
3.9	461.0	61		8.9	1276.0	8
4.0	480.0	56		9.0	1290.0	8
4.1	499.0	52		9.1	1303.0	8
4.2	517.0	49		9.2	1316.0	8
4.3	535.0	45		9.3	1328.0	7
4.4	553.0	43		9.4	1339.0	7
4.5	570.0	40		9.5	1350.0	7
4.6	588.0	38		9.6	1365.0	7
4.7	606.0	35		9.7	1379.0	7
4.8	624.0	33		9.8	1393.0	7
4.9	642.0	32		9.9	1407.0	7
5.0	660.0	30		10.0	1420.0	6
5.1	678.0	28		10.1	1433.0	6
5.2	696.0	27		10.2	1446.0	6
5.3	714.0	26		10.3	1457.0	6
5.4	732.0	24		10.4	1468.0	6
5.5	750.0	23		10.5	1480.0	6
5.6	771.0	22		10.6	1490.0	6
5.7	791.0	21		10.7	1500.0	6
5.8	810.0	20		10.8	1510.0	6
5.9	828.0	19		10.9	1520.0	6
6.0	845.0	18		11.0	1530.0	6
6.1	861.0	18		11.1	1539.0	5
6.2	877.0	17		11.2	1547.0	5
6.3	892.0	16		11.3	1555.0	5
6.4	906.0	16		11.4	1563.0	5
6.5	920.0	15		11.5	1570.0	5
6.6	933.0	15		11.6	1577.0	5
6.7	947.0	14		11.7	1583.0	5
6.8	961.0	14		11.8	1589.0	5
6.9	975.0	14		11.9	1595.0	5
				12.0	1600.0	5

Zeta values related to the inner pipe diameter according to DIN EN 10 220 (300 mm)

Flow tolerances depending on the presetting for DN 200 - DN 300



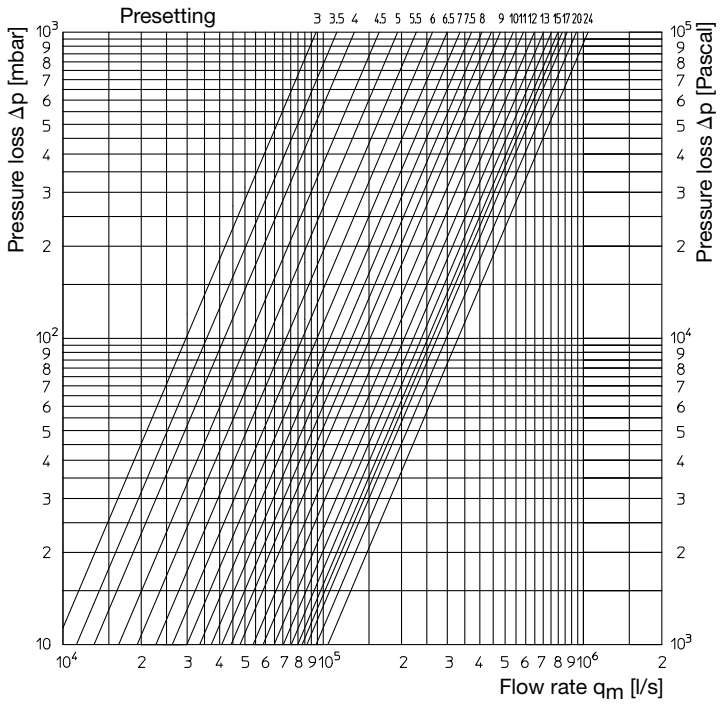
DN 350



Pre-setting	kv-values	Zeta-values		Pre-setting	kv-values	Zeta-values
3.0	290	275				
3.1	299	259		11.1	1571	9
3.2	308	244		11.2	1582	9
3.3	318	229		11.3	1593	9
3.4	328	215		11.4	1604	9
3.5	340	200		11.5	1615	9
3.6	350	189		11.6	1626	9
3.7	361	178		11.7	1637	9
3.8	374	165		11.8	1648	9
3.9	387	155		11.9	1659	8
4.0	400	145		12.0	1670	8
4.1	414	135		12.1	1682	8
4.2	429	126		12.2	1694	8
4.3	445	117		12.3	1706	8
4.4	462	108		12.4	1718	8
4.5	480	100		12.5	1730	8
4.6	499	93		12.6	1742	8
4.7	518	86		12.7	1754	8
4.8	537	80		12.8	1766	7
4.9	556	75		12.9	1778	7
5.0	575	70		13.0	1790	7
5.1	588	67		13.1	1802	7
5.2	615	61		13.2	1814	7
5.3	635	57		13.3	1826	7
5.4	655	54		13.4	1838	7
5.5	675	51		13.5	1850	7
5.6	696	48		13.6	1862	7
5.7	716	45		13.7	1874	7
5.8	737	43		13.8	1886	7
5.9	758	40		13.9	1898	6
6.0	800	36		14.0	1910	6
6.1	818	35		14.1	1920	6
6.2	836	33		14.2	1930	6
6.3	854	33		14.3	1940	6
6.4	872	30		14.4	1950	6
6.5	890	29		14.5	1960	6
6.6	912	28		14.6	1970	6
6.7	934	27		14.7	1980	6
6.8	956	25		14.8	1990	6
6.9	978	24		14.9	2000	6
7.0	1000	23		15.0	2010	6
7.1	1018	22		15.1	2019	6
7.2	1036	22		15.2	2028	6
7.3	1054	21		15.3	2037	6
7.4	1072	20		15.4	2046	6
7.5	1090	19		15.5	2055	5
7.6	1108	19		15.6	2064	5
7.7	1126	18		15.7	2073	5
7.8	1144	18		15.8	2082	5
7.9	1162	17		15.9	2091	5
8.0	1180	17		16.0	2100	5
8.1	1192	16		16.1	2108	5
8.2	1204	16		16.2	2116	5
8.3	1216	16		16.3	2124	5
8.4	1228	15		16.4	2132	5
8.5	1240	15		16.5	2140	5
8.6	1252	15		16.6	2148	5
8.7	1264	14		16.7	2156	5
8.8	1276	14		16.8	2164	5
8.9	1288	14		16.9	2172	5
9.0	1300	14		17.0	2180	5
9.1	1312	13		17.1	2187	5
9.2	1324	13		17.2	2194	5
9.3	1336	13		17.3	2201	5
9.4	1348	13		17.4	2208	5
9.5	1360	13		17.5	2215	5
9.6	1372	12		17.6	2222	5
9.7	1384	12		17.7	2229	5
9.8	1396	12		17.8	2236	5
9.9	1408	12		17.9	2243	5
10.0	1420	11		18.0	2250	5
10.1	1434	11				
10.2	1448	11				
10.3	1462	11				
10.4	1476	11				
10.5	1490	10				
10.6	1504	10				
10.7	1518	10				
10.8	1532	10				
10.9	1546	10				
11.0	1560	10				

Zeta values related to the inner pipe diameter according to DIN EN 10 220 (350 mm)

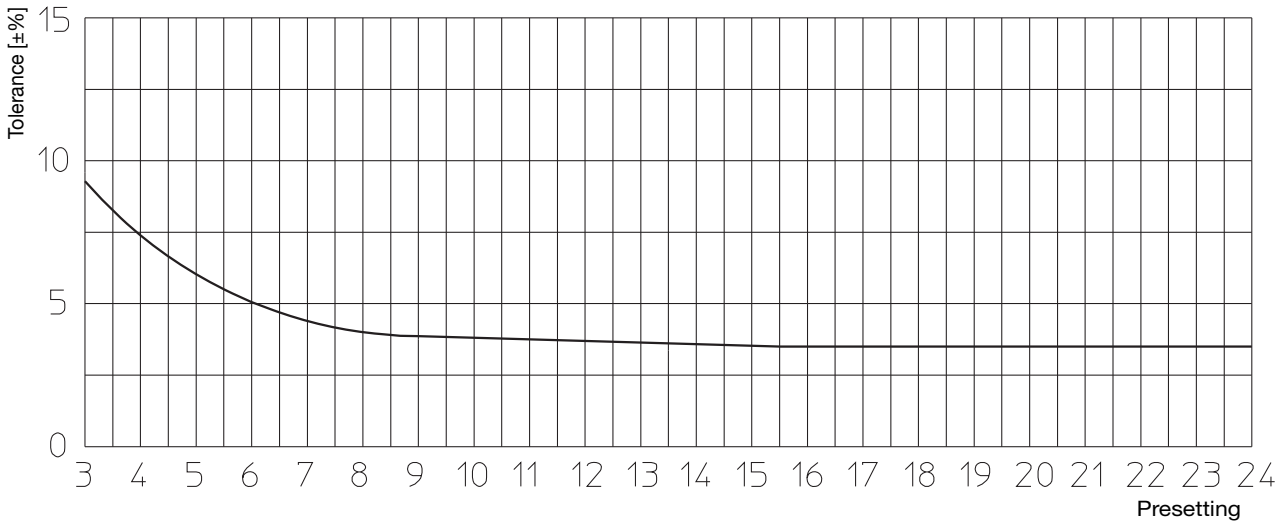
DN 400



Pre-setting	kv-values	Zeta-values		Pre-setting	kv-values	Zeta-values
3.0	338	308		14.1	2729	5
3.1	352	284		14.2	2746	5
3.2	365	265		14.3	2762	5
3.3	379	245		14.4	2779	5
3.4	392	229		14.5	2796	5
3.5	406	214		14.6	2813	4
3.6	420	200		14.7	2830	4
3.7	433	188		14.8	2846	4
3.8	447	176		14.9	2863	4
3.9	460	167		15.0	2880	4
4.0	474	157		15.1	2891	4
4.1	497	143		15.2	2901	4
4.2	520	130		15.3	2912	4
4.3	544	119		15.4	2922	4
4.4	567	110		15.5	2933	4
4.5	590	101		15.6	2944	4
4.6	611	94		15.7	2954	4
4.7	632	88		15.8	2965	4
4.8	653	83		15.9	2975	4
4.9	674	78		16.0	2986	4
5.0	695	73		16.1	2999	4
5.1	720	68		16.2	3012	4
5.2	745	63		16.3	3025	4
5.3	770	59		16.4	3038	4
5.4	795	56		16.5	3051	4
5.5	820	52		16.6	3064	4
5.6	845	49		16.7	3076	4
5.7	870	47		16.8	3089	4
5.8	895	44		16.9	3102	4
5.9	920	42		17.0	3115	4
6.0	945	39		17.1	3126	4
6.1	972	37		17.2	3137	4
6.2	998	35		17.3	3148	4
6.3	1025	34		17.4	3159	4
6.4	1051	32		17.5	3170	4
6.5	1078	30		17.6	3182	3
6.6	1104	29		17.7	3193	3
6.7	1131	28		17.8	3204	3
6.8	1157	26		17.9	3215	3
6.9	1184	25		18.0	3226	3
7.0	1210	24		18.1	3235	3
7.1	1235	23		18.2	3245	3
7.2	1261	22		18.3	3254	3
7.3	1286	21		18.4	3264	3
7.4	1312	20		18.5	3273	3
7.5	1337	20		18.6	3282	3
7.6	1362	19		18.7	3292	3
7.7	1387	18		18.8	3301	3
7.8	1413	18		18.9	3311	3
7.9	1438	17		19.0	3320	3
8.0	1463	16		19.1	3329	3
8.1	1489	16		19.2	3338	3
8.2	1515	15		19.3	3347	3
8.3	1540	15		19.4	3356	3
8.4	1566	14		19.5	3365	3
8.5	1592	14		19.6	3374	3
8.6	1617	13		19.7	3383	3
8.7	1645	13		19.8	3392	3
8.8	1672	13		19.9	3401	3
8.9	1698	12		20.0	3410	3
9.0	1725	12		20.1	3418	3
9.1	1746	12		20.2	3426	3
9.2	1767	11		20.3	3434	3
9.3	1788	11		20.4	3442	3
9.4	1809	11		20.5	3450	3
9.5	1830	11		20.6	3458	3
9.6	1852	10		20.7	3466	3
9.7	1873	10		20.8	3474	3
9.8	1894	10		20.9	3482	3
9.9	1915	10		21.0	3490	3
10.0	1936	9		21.1	3500	3
10.1	1954	9		21.2	3510	3
10.2	1972	9		21.3	3520	3
10.3	1990	9		21.4	3530	3
10.4	2008	9		21.5	3540	3
10.5	2026	9		21.6	3550	3
10.6	2044	8		21.7	3560	3
10.7	2062	8		21.8	3570	3
10.8	2080	8		21.9	3580	3
10.9	2098	8		22.0	3590	3
11.0	2116	8		22.1	3599	3
11.1	2137	8		22.2	3608	3
11.2	2158	8		22.3	3617	3
11.3	2180	7		22.4	3626	3
11.4	2201	7		22.5	3635	3
11.5	2222	7		22.6	3644	3
11.6	2243	7		22.7	3653	3
11.7	2264	7		22.8	3662	3
11.8	2286	7		22.9	3671	3
11.9	2307	7		23.0	3680	3
12.0	2328	7		23.1	3687	3
12.1	2348	6		23.2	3694	3
12.2	2368	6		23.3	3701	3
12.3	2388	6		23.4	3708	3
12.4	2408	6		23.5	3715	3
12.5	2428	6		23.6	3722	3
12.6	2449	6		23.7	3729	3
12.7	2469	6		23.8	3736	3
12.8	2489	6		23.9	3743	3
12.9	2509	6		24.0	3750	3
13.0	2529	6				
13.1	2547	5				
13.2	2566	5				
13.3	2584	5				
13.4	2602	5				
13.5	2621	5				
13.6	2639	5				
13.7	2657	5				
13.8	2675	5				
13.9	2694	5				
14.0	2712	5				

Zeta values related to the inner pipe diameter according to DIN EN 10 220 (400 mm)

Flow tolerances depending on the presetting for DN 350 and DN 400



Insulation shells DN 20 – DN 150

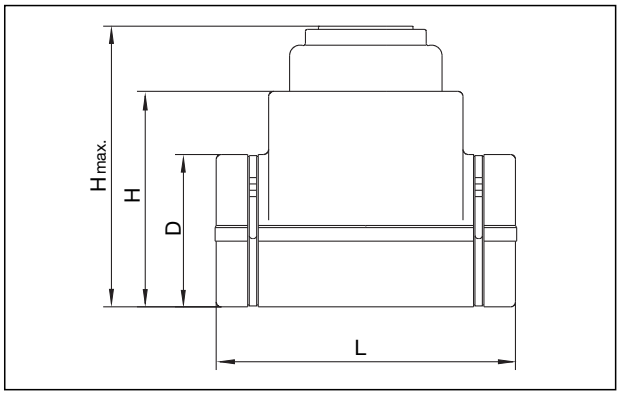
Tender specification:
The insulation shells have a CFC-free inner core made of polyurethane foam with a 1.5 mm plastic coat.
It consists of two double shells which are tightened by two metal straps.
For heating and cooling systems.
Building material class B2 according to DIN 4102.
Operating temperature t_s: -20°C to +130°C.

Size	Item no.
DN 20	106 25 81
DN 25	106 25 82
DN 32	106 25 83
DN 40	106 25 84
DN 50	106 25 85
DN 65	106 25 86
DN 80	106 25 87
DN 100	106 25 88
DN 125	106 25 89
DN 150	106 25 90

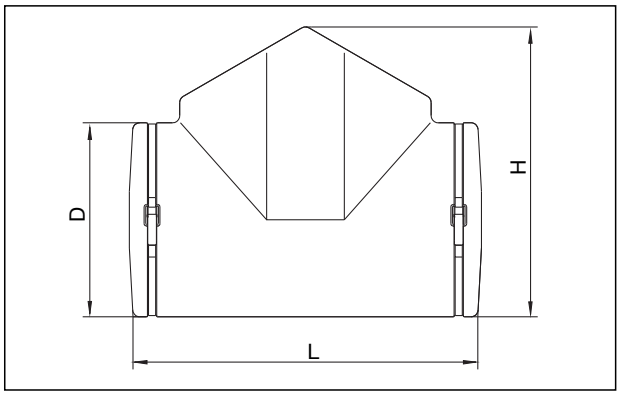
Accessories sets DN 20 – DN 400:

Set no. 1 = 1 fill and drain ball valve	106 01 91
Measuring adapter	106 02 98
Extension for accessories sets (80 mm)	106 02 95
Extension for accessories sets (40 mm)	168 82 96
Stem extension (DN 20 to DN 50, 35 mm)	168 82 97
Stem extension (DN 65 to DN 150, 35 mm)	168 82 97
Lead sealing set (10-fold) (DN 20-DN 50)	108 90 91
Locking set (1-fold) (DN 20-DN 50)	106 01 80

DN 20 – DN 50



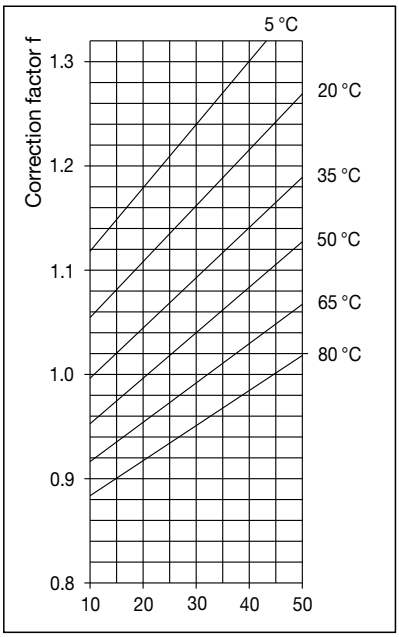
DN 65 – DN 150



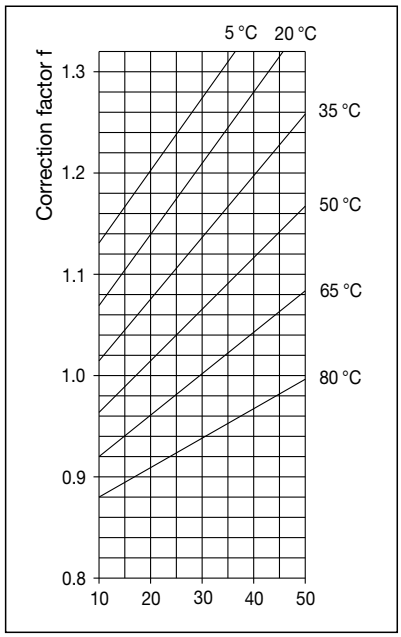
DN	L	D	$H_{max.}$	H	Item no.
20	270	145	280	190	106 25 81
25	270	155	280	190	106 25 82
32	310	180	310	220	106 25 83
40	330	200	340	230	106 25 84
50	400	220	370	270	106 25 85
65	480	270	–	405	106 25 86
80	515	300	–	430	106 25 87
100	595	350	–	500	106 25 88
125	660	385	–	573	106 25 89
150	740	415	–	598	106 25 90

Correction factor for mixtures of water and glycol:

When antifreeze liquids are added to the heating water, the pressure loss given in the chart must be multiplied by the correction factor f.



Weight proportion of ethylene glycol [%]



Weight proportion of propylene glycol [%]

Measurement and regulation

Oventrop measuring system “OV-DMC 2” with memory and microprocessor

featuring numerous functions and a wide range of applications:

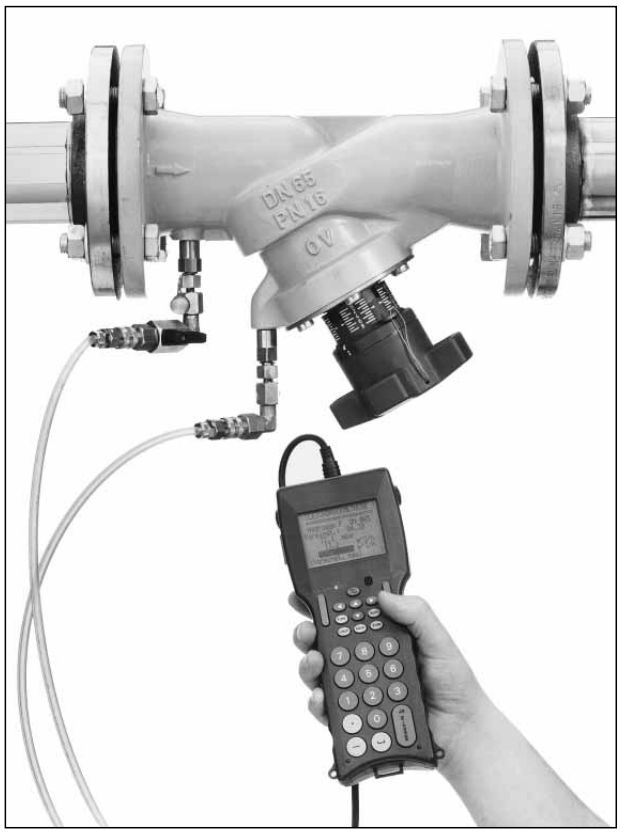
- flow rate indication (in l/s, m³/h and gal/min.)
- differential pressure measurement (indication in mbar, Pa or kPa)
- temperature measurement (indication °C or °F)
- presetting Arriving at the value of presetting based on the measured differential pressure, the given flow rate and the valve size.

The characteristic lines of all Oventrop double regulating and commissioning valves are memorised in the “OV-DMC 2”.

With the use of a respective kv value, it is possible to carry out all measurements on valves of other manufacturers.

For practical use of the “OV-DMC 2”, special operating instructions are available.

Oventrop measuring system “OV-DMPC”
consisting of a differential pressure transmitter “DMPC-sensor” with USB interface and software including extensive accessories. The measuring system is connected to commercial computers (not included in the delivery).



Flow-meter “OV-DMC 2”, item no. 106 91 77
with “Hydrocontrol VFC/VFR/VFN”

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Subject to technical modification without notice.

Product group 3
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