

Downstream pressure controlled regulator without auxiliary power, Model T 8

The high pressure reducing valve, Model T8, is especially suitable for superheated steam. The pressure reduction occurs by throttling the free cross section between the seat and cone.

The values given in the following mass flow table for saturated steam have been calculated for the upstream pressure side. The downstream pressure side should be dimensioned such that a velocity of 40 m/s is obtained in the following pipe (mass flow table for saturated steam, steam flow per DN in kg/h at 40 m/s). If the mass flow table (saturated steam) is to be used for superheated steam, then the weight of superheated steam present (kg/h) must be multiplied with the factor :

$$\sqrt{\frac{V_H}{V_S}} \text{ (Table, page 4)}$$

(See following table for absolute figures.)

The stated figures in the mass flow table for saturated steam assume critical flow of the steam in the seat cross section.

$$\text{high pressure} / \text{low pressure} = 1.7319 / 1 \text{ (bar}_{\text{abs}})$$

or

$$\text{low pressure} \leq 0.5774 \times \text{high pressure}$$

We would like to point out that the thermal content of the steam is theoretically retained due to the throttling in the pressure reducing valve. Saturated steam can become superheated steam due to pressure reduction. However, saturated steam can also become wet steam.

With upstream pressure > 32 bar saturated steam can become wet steam on reduction.

With upstream pressure < 32 bar saturated steam becomes superheated steam on reduction.

(See saturation curve in the Mollier graph.)

The Model T8 is a single seat valve which regulates proportionally. The reduction ratio of high pressure to low pressure = 10 : 1 (bar_{abs}) should not be exceeded.

With larger reduction ratios a pressure reducing valve Model T6 or T7 should follow the high pressure reducing valve Model T8.

Operating instructions :

Normally, a strainer should be fitted to the upstream pressure pipe.

Dirt between the seat and cone impairs pressure reduction because with steam there is only a narrow gap between the seat and cone.

Also, secure closing of the valve cone at zero load is no longer ensured. A shut-off valve must be fitted for this purpose on the upstream pressure side.

Important :

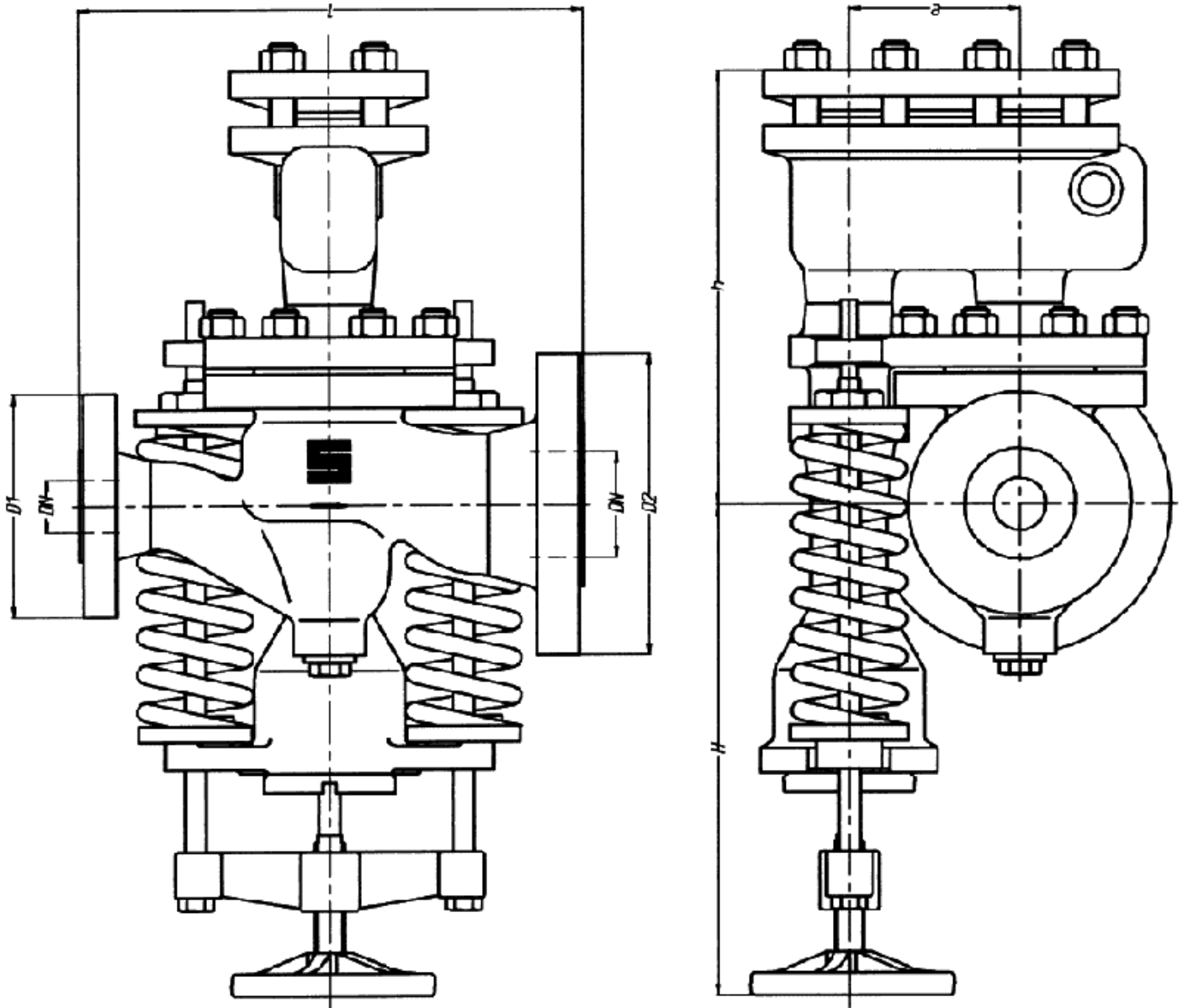
It is essential to fit a safety valve, which has an actuating pressure slightly above the set reduced pressure, on the reduced pressure side.

The safety valve should be dimensioned such that the volume given by the quantity on the upstream pressure side and by the reduction can be passed. (Take into account overheating for the volume on the reduced pressure side.)

Mounting direction :

The pressure reducing valve must be installed horizontally so that the arrow cast on the valve housing points to the reduced pressure side. The medium must enter from below the cone. With the Model T 8 it must be ensured that the housing which contains the control plunger **must not be thermally insulated**, because otherwise no condensate can form on the control plunger with the O-ring. The control housing must, for the above reasons, be installed suspended and pointing downwards.

Model T8



DN	Flanges admission side *				Flanges exit side *				L	H	h	a
	D ₁	k ₁	z ₁	i ₁	D ₂	k ₂	z ₂	i ₂				
20/40	130	90	4	18	170	125	4	23	300	350	205	105
25/50	140	100	4	18	195	145	4	27	300	350	205	105
32/65	155	110	4	23	220	170	8	27	380	400	335	130
40/80	170	125	4	23	230	180	8	27	380	400	335	130
50/100	195	145	4	27	265	210	8	30	500	450	415	155
65/100	220	170	8	27	265	210	8	30	500	450	415	155
80/125	230	180	8	27	315	250	8	33	500	450	415	155
100/150	265	210	8	30	355	290	12	33	500	450	415	155

Dimensions in mm

* Flanges DIN PN 100/160

Mass flow table for saturated steam, Model T 8

**Quantity of steam per DN in 1000 kg/h,
Upstream pressure side**

p [bar _{abs}]	Saturation temp. [°C]	DN							
		20	25	32	40	50	65	80	
19	208.8	0.60	0.94	1.54	2.40	3.75	6.34	9.60	
22	216.2	0.70	1.09	1.79	2.80	4.38	7.39	11.20	
24	220.8	0.76	1.19	1.95	3.04	4.75	8.03	12.16	
30	232.8	0.95	1.48	2.43	3.80	5.94	10.03	15.20	
35	241.4	1.11	1.73	2.84	4.44	6.94	11.72	17.76	
37	244.7	1.17	1.83	3.00	4.68	7.31	12.36	18.72	
39	247.7	1.23	1.92	3.15	4.92	7.69	12.99	19.68	
41	250.6	1.30	2.03	3.33	5.20	8.13	13.73	20.80	
48	260.1	1.53	2.39	3.92	6.12	9.56	16.16	24.48	
57	270.9	1.83	2.86	4.68	7.32	11.44	19.33	29.28	
59	273.1	1.90	2.97	4.86	7.60	11.88	20.07	30.40	
62	276.4	2.00	3.13	5.12	8.00	12.50	21.13	32.00	
65	279.5	2.10	3.28	5.38	8.40	13.13	22.18	33.60	
75	289.1	2.42	3.78	6.20	9.68	15.13	25.56	38.72	
88	300.3	2.90	4.53	7.42	11.60	18.13	30.63	46.40	
92	303.5	3.04	4.75	7.78	12.16	19.00	32.11	48.64	
96	306.5	3.19	4.98	8.17	12.76	19.94	33.69	51.04	
101	310.4	3.35	5.23	8.58	13.40	20.94	35.38	53.60	
119	317.3	4.07	6.36	10.42	16.28	25.44	42.99	65.12	
140	335.1	4.90	7.66	12.54	19.60	30.63	51.76	78.40	
147	338.9	5.23	8.17	13.39	20.92	32.69	55.24	83.68	
153	342.0	5.50	8.59	14.08	22.00	34.38	58.09	88.00	
160	345.7	5.80	9.06	14.85	23.20	36.25	61.26	92.80	
Kv		3.2	5.0	7.9	13	20	34	51	

Downstream pressure side

Use 40 m/s
mass flow table

Before using the tables referring to saturated steam, the weight of the superheated steam (kg/h) must be multiplied with the following factors :

$$\sqrt{\frac{V_H}{V_S}}$$

V_H = spec. superheated steam volume

V_S = spec. saturated steam volume

Superheat temperature °C

bar	°C	120	160	170	180	200	220	240	260	280	300	320	350	400	450	500			
2			1,04	1,05	1,07	1,09	1,11	1,14	1,16	1,18	1,20	1,22	1,25	1,30	1,35	1,40			
4			1,03	1,03	1,04	1,07	1,09	1,12	1,14	1,16	1,18	1,20	1,24	1,29	1,34	1,39			
5				1,02	1,03	1,06	1,08	1,11	1,13	1,15	1,17	1,19	1,23	1,28	1,33	1,38			
7		DIN PN16			1,02	1,04	1,07	1,09	1,12	1,14	1,16	1,18	1,22	1,26	1,31	1,36			
10		GG 20				1,03	1,06	1,08	1,10	1,13	1,15	1,17	1,21	1,25	1,30	1,35			
13						1,03	1,05	1,07	1,09	1,11	1,14	1,16	1,20	1,24	1,29	1,34			
16							1,04	1,06	1,08	1,10	1,14	1,17	1,19	1,24	1,29	1,34			
20		DIN PN40					1,01	1,04	1,07	1,10	1,12	1,14	1,18	1,23	1,28	1,33			
25		GS-C25						1,03	1,06	1,09	1,11	1,13	1,17	1,22	1,27	1,32			
32								1,01	1,04	1,07	1,10	1,13	1,16	1,22	1,27	1,32			
40									1,02	1,06	1,11	1,12	1,16	1,22	1,27	1,32			
50		DIN PN100								1,03	1,07	1,10	1,15	1,22	1,27	1,32			
64		GS-17CrMo55									1,03	1,07	1,12	1,21	1,26	1,31			
80												1,01	1,06	1,12	1,21	1,26	1,31		
100													1,03	1,11	1,21	1,28	1,35		
120		DIN PN160												1,10	1,22	1,30	1,38		
140		GS-17CrMo55													1,07	1,22	1,32	1,42	
160																1,05	1,24	1,35	1,46

Mass flow table for saturated steam, Model T 8												
Quantity of steam per DN in kg/h at 40 m/s ; Downstream pressure side												
p [bar]	DN											
	15	20	25	32	40	50	65	80	100	125	150	200
0.1	16	29	45	73	115	179	303	460	715	1120	1610	2870
0.2	18	31	48	79	124	194	328	498	775	1215	1750	3110
0.3	19	34	52	85	134	209	353	535	835	1310	1880	3350
0.4	20	36	56	92	144	224	380	575	895	1405	2020	3590
0.5	22	39	60	99	154	239	405	615	955	1500	2170	3820
0.6	23	41	64	105	163	254	430	650	1015	1590	2290	4060
0.7	24	43	68	110	173	269	455	690	1075	1680	2420	4300
0.8	26	46	72	116	182	284	480	725	1135	1770	2550	4540
0.9	27	48	75	122	191	299	505	765	1195	1660	2680	4780
1.0	28	50	78	128	200	314	530	800	1250	1950	2820	5020
1.2	31	55	86	140	219	343	580	880	1360	2140	3080	5500
1.4	34	60	93	152	238	372	625	950	1480	2320	3350	5950
1.6	36	65	100	164	257	401	675	1025	1600	2500	3600	6420
1.8	39	69	107	176	275	430	725	1100	1720	2680	3850	6890
2.0	42	74	115	188	294	460	775	1180	1840	2870	4125	7360
2.5	48	84	132	217	338	530	890	1355	2120	3300	4750	8450
3.0	54	96	150	246	385	600	1010	1540	2400	3750	5400	9650
3.5	60	108	168	275	430	670	1130	1720	2680	4200	6050	10700
4.0	67	119	185	305	475	740	1250	1900	2960	4650	6650	11800
4.5	73	130	202	335	520	810	1370	2080	3240	5075	7300	13050
5.0	79	141	220	365	565	880	1490	2250	3520	5500	7900	14100
5.5	85	152	237	395	605	950	1600	2430	3800	5925	8500	15150
6.0	92	163	254	420	655	1020	1720	2610	4080	6350	9125	16300
6.5	98	174	271	445	695	1085	1840	2790	4360	6775	9750	17400
7.0	104	185	288	475	740	1160	1960	2970	4640	7200	10375	18500
7.5	110	196	305	500	785	1220	2070	3140	4900	7650	11000	19600
8.0	117	207	323	530	830	1290	2180	3320	5180	8100	11625	20700
8.5	123	218	341	560	875	1365	2300	3500	5450	8550	12250	21800
9.0	129	229	358	585	915	1430	2410	3670	5720	8975	12875	22900
9.5	135	240	375	615	960	1500	2530	3840	6000	9400	13500	24000
10.0	141	252	392	645	1000	1570	2650	4020	6270	9825	14125	25100
11.0	154	273	427	700	1090	1710	2880	4380	6800	10700	15300	27300
12.0	166	294	461	750	1180	1840	3100	4730	7300	11550	16500	29400
13.0	178	316	495	810	1270	1980	3340	5080	7850	12400	17750	31600
14.0	190	338	530	870	1355	2120	3570	5400	8400	13200	19000	33800
15.0	202	360	565	925	1440	2250	3800	5750	8950	14100	20300	36000
16.0	215	382	600	980	1530	2390	4030	6100	9550	15000	21600	38200
17.0	227	404	630	1020	1620	2530	4270	6450	10100	15900	22800	40400
18.0	240	427	665	1090	1710	2670	4500	6800	10650	16750	24000	42600
19.0	252	450	700	1145	1790	2800	4740	7150	11200	17600	25200	44800
20.0	263	473	730	1200	1870	2930	4950	7500	11750	18400	26500	47000
22.0	288	510	800	1310	2050	3200	5400	8200	12800	20000	28800	51000
24.0	312	555	870	1420	2220	3470	5850	8900	13900	21700	31200	55200
26.0	337	600	940	1530	2400	3750	6300	9600	15000	23400	33700	60400
28.0	362	645	1010	1650	2580	4020	6800	10300	16100	25100	36200	64600
30.0	387	690	1080	1770	2750	4300	7250	11000	17200	26900	38700	68800
32.0	413	735	1150	1890	2950	4600	7750	11800	18300	28800	41300	73500