

PILOT OPERATED PRESSURE REDUCING VALVES PRV57

DESCRIPTION

The ADCA PRV57 pilot operated pressure reducing valves are designed for use with steam, compressed air, nitrogen and other gases compatible with the construction materials.

The PRV57 can be installed in pressure reducing stations throughout all industries, and provide sensitive and accurate control even when inlet pressure fluctuations or relevant flow variations occur.

MAIN FEATURES

Precise control of downstream pressures from 0,07 bar to 17 bar.

Robust steel or stainless steel construction.

Suitable for dead end conditions.

Guided piston and valve stem.

Hardened plug.

OPTIONS:

Soft sealing.
 Low pressure top.
 Dome loaded version.
 Bottom cover drain connection.
 Stellite plug and seat.
 Internal sensing line.

USE:

Saturated steam, compressed air and other gases compatible with the construction (except oxygen).

AVAILABLE

MODELS:

PRV57, PRV57E – steel versions for steam.
 PRV57i, PRV57iE – stainless steel versions for steam (only available from DN 15 to DN 50).
 PRV57G, PRV57GE – steel versions for compressed air and gases.
 PRV57Gi, PRV57GiE – stainless steel versions for compressed air and gases.
 Suffix "E": Version with solenoid valve for remote closure.
 PRS: All models above are available with an extra sustaining valve pilot, e.g. PRS57G (see Fig. 8).

SIZES:

DN 15 to DN 100.

CONNECTIONS:

Flanged EN 1092-1 PN 16 or PN 40.
 Standard PN 16 DN 65 flanges are supplied with 4 holes. 8 holes, according to EN 1092-1, on request.

INSTALLATION:

Horizontal installation, see IMI – Installation and maintenance instructions.
 In steam applications, a "Y" strainer, humidity separator and steam trap should be installed upstream of the valve.



CE MARKING – GROUP 2 (PED – European Directive)		
PN 16	PN 40	Category
DN 15 to 50	DN 15 to 32	SEP
DN 65 to 100	DN 40 to 100	1 (CE Marked)

BODY LIMITING CONDITIONS *		
PN 16 ALLOWABLE PRESSURE	PN 40 ALLOWABLE PRESSURE	RELATED TEMPERATURE
16 bar	40 bar	- 10 / 50 °C
13,3 bar	33,3 bar	200 °C
12,1 bar	30,4 bar	250 °C
11 bar	27,6 bar	300 °C

Minimum working temperature: -10 °C.

* Ratings according to EN 1092-1:2018.

LIMITING CONDITIONS

Valve model	PRV57		PRS57		PRV57E / PRS57E	
Body design conditions	PN 16	PN 40	PN 16	PN 40	PN 16	PN 40
Maximum upstream pressure (steam)	13 bar	28 bar	13 bar	17 bar	10 bar	10 bar
Maximum upstream pressure	16 bar	31 bar	16 bar	17 bar	10 bar	10 bar
Maximum downstream pressure	13 bar	17 bar	16 bar	17 bar	10 bar	10 bar
Minimum downstream pressure *	0,35	0,35	0,35	0,35	0,35	0,35
Maximum operating temperature	250 °C	250 °C	250 °C	250 °C	180 °C	180 °C
Maximum reducing ratio	See capacity tables					
Rangeability	10:1	10:1	10:1	10:1	10:1	10:1
Maximum hydraulic factory valve body test	24 bar	60 bar	24 bar	60 bar	24 bar	60 bar

* 0,07 bar with low pressure top (limited to 7 bar maximum inlet pressure).

Remark: Pressure and temperature limiting conditions may change if "G" version for compressed air and gases is chosen or soft sealing/piston rings are used.

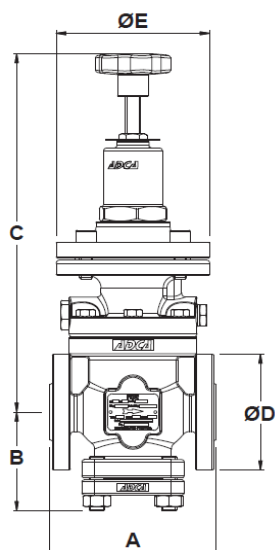


Fig. 1 - Valve with standard diaphragm

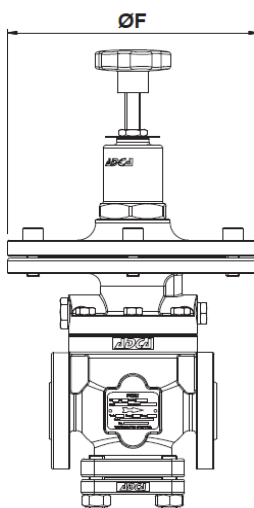


Fig. 2 - Valve with low pressure top

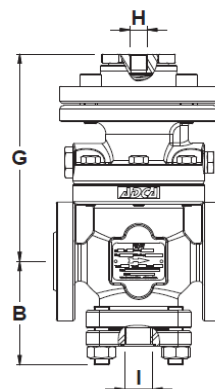


Fig. 3 - Dome loaded valve

DIMENSIONS (mm)

SIZE	A	B	C	D	E	F	G	H	I *	WEIGHT (kg) **
DN 15	130	88	294	95	120	195	166	1/4"	1/2"	10,5
DN 20	150	88	294	105	120	195	166	1/4"	1/2"	16
DN 25	160	88	294	115	120	195	166	1/4"	1/2"	17
DN 32	180	102	306	140	120	195	178	1/4"	1/2"	20
DN 40	200	108	314	150	120	195	186	1/4"	1/2"	24
DN 50	230	118	351	165	120	195	223	1/4"	1/2"	31
DN 65 ***	290	147	377	185	120	195	249	1/4"	1/2"	48
DN 80	310	152	392	200	120	195	264	1/4"	1/2"	53
DN 100	350	168	422	235	120	195	294	1/4"	1/2"	72

* Optional drain connection for steam trapping. This drain connection does not replace the humidity separator, but can be useful if, e.g., the valve stops operating for large periods of time (see Fig. 6).

** Approximated values, consult manufacturer for certified weights.

*** Standard PN 16 DN 65 flanges are supplied with 4 holes. 8 holes, according to EN 1092-1/-2, on request.

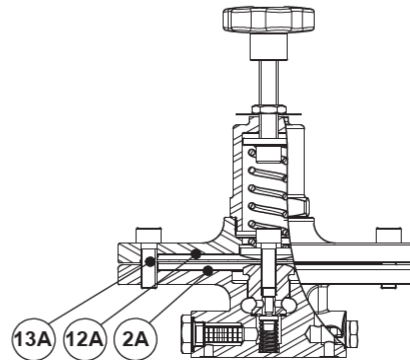
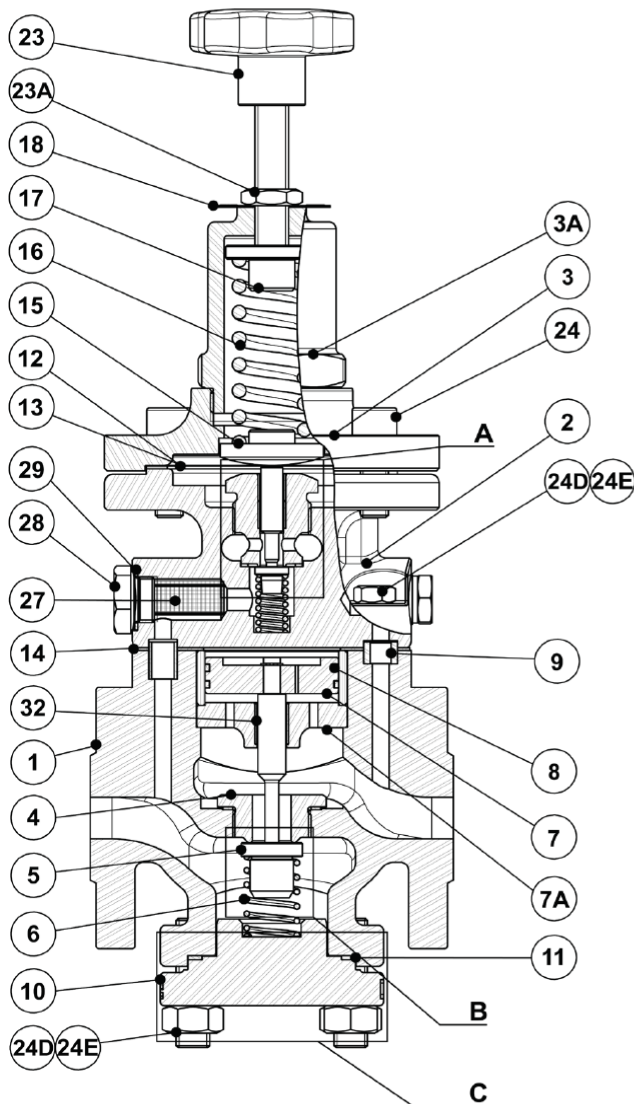
Remarks: Connections H and I are threaded ISO 7 Rp. Others on request.

REGULATING RANGES

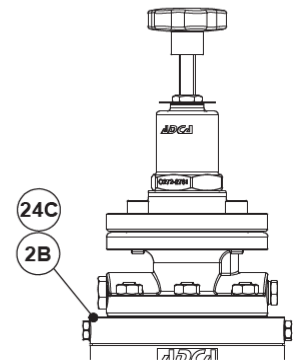
SPRING COLOUR	GREEN w/ 1 diaphragm	BLUE w/ 1 diaphragm	RED w/ 2 diaphragms	BLACK w/ 2 diaphragms
Regulating range	0,07 to 0,5 bar * 0,35 to 2 bar	1,5 to 5,5 bar	3,5 to 8,5 bar	7 to 17 bar

* With low pressure top.

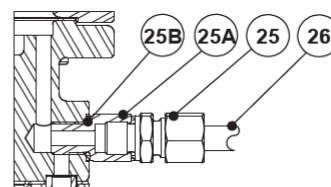
MATERIALS



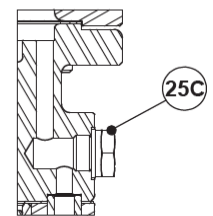
Low pressure top



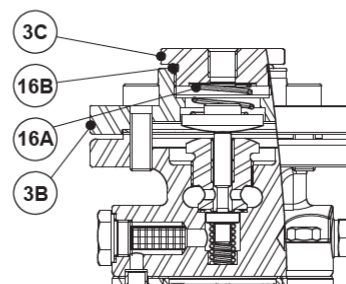
Adapting flange
 (DN 50 and above)



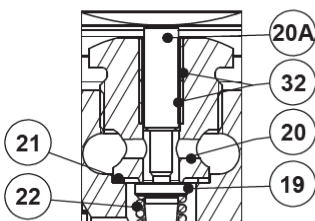
Standard version
 External balanced



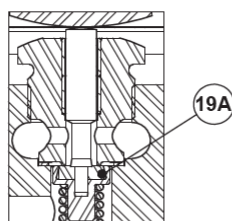
Optional version
 Internal balanced



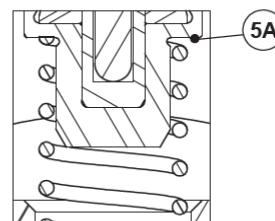
Dome loaded top



Detail A
 Pilot valve



Detail A
 Pilot valve (soft)



Detail B
 Main valve (soft)



Detail C
 Optional version with plug

MATERIALS

POS. N°	DESIGNATION	PRV57	PRV57i
1	Valve body	A216 WCB / 1.0619	A351 CF8M / 1.4408
2	Pilot valve body	A351 CF8 / 1.4308	A351 CF8 / 1.4308
2A	Low pressure pilot valve body	A351 CF8 / 1.4308	A351 CF8 / 1.4308
2B	Adapting flange	C45E / 1.1191	AISI 316L / 1.4404
3	Top cover	A351 CF8 / 1.4308	A351 CF8 / 1.4308
3A	Spring cover	A351 CF8 / 1.4308	A351 CF8 / 1.4308
3B	Top cover	C45E / 1.1191	AISI 316 / 1.4401
3C	Cover nut	C45E / 1.1191	AISI 316 / 1.4401
4	* Main valve seat	AISI 316 / 1.4401	AISI 316 / 1.4401
5	* Main valve plug	Hardened st. steel	Hardened st. steel
5A	* Main valve plug (soft)	AISI 316 w/ PTFE/GR; Rulon	AISI 316 w/ PTFE/GR; Rulon
6	* Main valve spring	AISI 302 / 1.4300	AISI 302 / 1.4300
7	* Piston	Bronze B62 / ASTM B148.97	Bronze B62 / ASTM B148.97
7A	Piston guide	AISI 316 / 1.4401	AISI 316 / 1.4401
8	* Piston Rings	Bronze / FKM / EPDM / NBR	Bronze / FKM / EPDM / NBR
9	Piston liner	AISI 304L / 1.4306	AISI 304L / 1.4306
10	Bottom cover	A216 WCB / 1.0619	A351 CF8M / 1.4408
11	* Bottom cover gasket	Stainless steel / Graphite	Stainless steel / Graphite
12	* Diaphragm	AISI 301 / 1.4310	AISI 301 / 1.4310
12A	* Low pressure diaphragm	AISI 301 / 1.4310	AISI 301 / 1.4310
13	* Diaphragm gasket	Stainless steel / Graphite	Stainless steel / Graphite
13A	* Low press. diaphragm gasket	Stainless steel / Graphite	Stainless steel / Graphite
14	* Pilot valve gasket	Stainless steel / Graphite	Stainless steel / Graphite
15	Lower spring carrier	Brass	Brass
16	* Adjustment spring	Steel	Steel
16A	Diaphragm spring	Stainless steel	Stainless steel
16B	O-ring	Viton	Viton
17	Top spring carrier	Brass	Brass
18	Spring ID plate	Aluminium	Aluminium
19	* Pilot valve plug	AISI 316 / 1.4401	AISI 316 / 1.4401
19A	* Pilot valve plug (soft)	PTFE/GR; Rulon, etc.	PTFE/GR; Rulon, etc.
20	* Pilot valve seat	AISI 316 / 1.4401	AISI 316 / 1.4401
20A	Pushrod	AISI 316 / 1.4401	AISI 316 / 1.4401
21	* Pilot valve gasket	Copper	Copper
22	* Pilot valve spring	AISI 302 / 1.4300	AISI 302 / 1.4300
23	Handwheel	Plastic / Stainless steel	Plastic / Stainless steel
23A	Locknut	AISI 304 / 1.4301	AISI 304 / 1.4301
24	Bolts	Steel 10.9	Stainless steel A2
24C	Bolts	Steel 10.9	Stainless steel A2
24D	Studs	34CrNiMo / 1.6582	AISI 316 / 1.4401
24E	Nuts	Steel 8.8	Stainless steel A2
25	Compression fitting	Plated carbon steel	Stainless steel
25A	Adapter	AISI 304 / 1.4301	AISI 304 / 1.4301
25B	Plug	AISI 304 / 1.4301	AISI 304 / 1.4301
25C	Gasket	Copper	Copper
26	Sensing pipe	Copper	Stainless steel
27	* Pilot valve strainer	AISI 304 / 1.4301	AISI 304 / 1.4301
28	Strainer nut	AISI 304 / 1.4301	AISI 304 / 1.4301
29	Gasket	Copper	Copper
30	Plug	AISI 316 / 1.4401	AISI 316 / 1.4401
31	Gasket	Copper	Copper
32	Plain bearing	Bronze / steel	Bronze / steel

* Available spare parts.

MATERIALS		
POS.	DESIGNATION	MATERIAL
100	Sensing pipe	Copper or stainless steel
101	Compressed air supply	Copper or stainless steel
102	P10 air filter regulator	Polycarbonate
103	Solenoid valve	Brass or stainless steel
104	ADCA IS100 filter	AISI 316 / 1.4401
105	ADCA PS7 pressure sustaining valve	Carbon steel or stainless steel
106	Drain connection	Copper or stainless steel

PRV57 standard – for steam, compressed air or gases (Fig. 4)

The high pressure upstream gas enters the main valve and the pilot valve. Compression of the regulating spring over the diaphragm causes the pilot valve to open, admitting regulated pressure to the piston chamber. The force exerted by the regulated pressure on top of the piston pushes it down which, in turn, opens the main valve. The downstream pressure is then transmitted through the sensing line, acting below the diaphragm.

Any downstream pressure increase deflects the diaphragm, and the pilot valve closes, thus shutting off regulated gas to the piston which, in turn, closes the main valve. When the desired downstream pressure is achieved, the valve opens again, repeating the process.

The external sensing pipe (100) must always be connected unless the valve is supplied with internal sensing line. It should be fitted in the downstream pipe at a distance of, at least, 1 meter or 15 pipe diameters, whichever is greater, from the valve and other fittings. A spool piece can be supplied to house the sensing pipe.

Warning: Internal sensing is not recommended when:

- The reduced pressure is below 50% of the inlet pressure (mandatory for pressure reductions greater than 10:1);
- Instability of reduced pressure occurs;
- When a low pressure top assembly is fitted;
- In systems with difficult outlet pipe work conditions.

PRV57 Dome loaded (Fig. 5)

The loading force is exerted on the pilot valve diaphragm by an external gas signal rather than by the regulating spring. This feature allows remote adjusting of the downstream set point pressure using a relieving gas pressure regulator or an I/P converter. Allows faster response to pressure changes and maintains outlet pressure more accurately under flowing conditions, when compared to the standard spring loaded version, minimizing droop.

The loading control pressure is approximately the same as the required outlet pressure ($\pm 0,2$ bar).

PRV57 with drain connection (Fig. 6)

The optional drain connection is specially recommended for steam applications where it is not possible to install a humidity separator close to the valve, when the valve is under no-flow static condition during large periods of time or for system cleaning during start up.

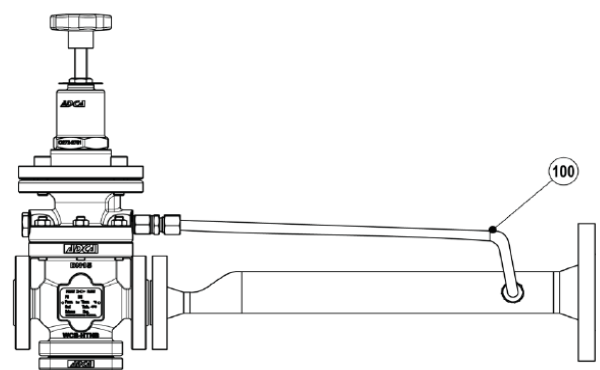


Fig. 4

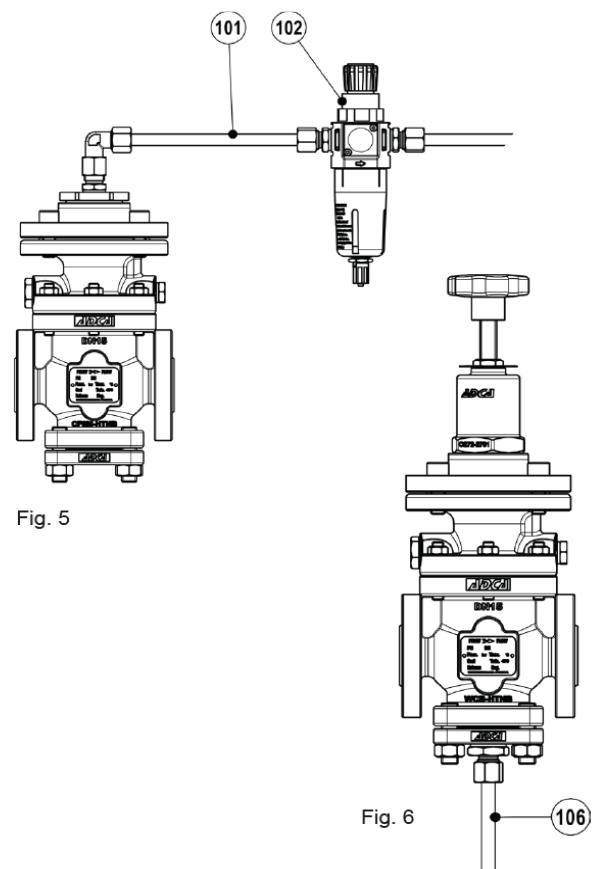


Fig. 5

Fig. 6

PRV57E with solenoid valve for electric remote control (Fig. 7)

The PRV57E operates like the standard valve, but it allows remote closure, by means of a switch or timer. When the solenoid valve (103) closes, the pressure signal to the pilot valve is interrupted, causing the main valve to close.

TECHNICAL DATA (SOLENOID VALVE)	
Body material	Brass or stainless steel
Maximum operating pressure	10 bar
Maximum operating temperature	180 °C
Level of protection	IP 65
Rated voltage	230 V AC $\pm 10\%$, 24 V DC $\pm 10\%$ *
Power consumption	12 V A $\pm 10\%$ (AC) , 12 W $\pm 10\%$ (DC)

* Others on request.

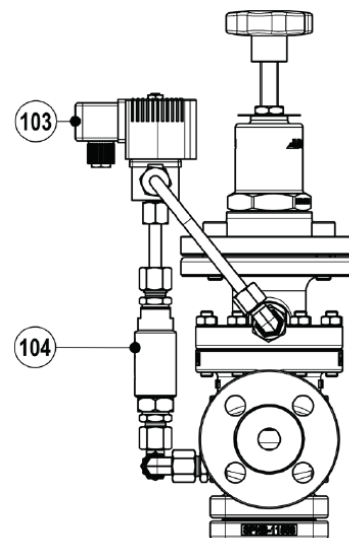


Fig. 7

PRS57 pressure reducing and sustaining valve (Fig. 8)

The PRS57 is a derivative of the PRV57 and consists in a combination between a pressure reducing valve and a pressure sustaining valve. While the pilot fitted on the main valve body controls downstream pressure, a secondary pilot valve (105), in this case a pressure sustaining valve, fitted on the side of the PRV controls the upstream pressure. The pressure sustaining valve is closed until the established set pressure is reached and so is the main valve, since there is no flow feeding its pilot. As soon as the set pressure is reached, the pressure sustaining valve opens, allowing flow to the PRV's pilot valve which, in turn, opens the main valve.

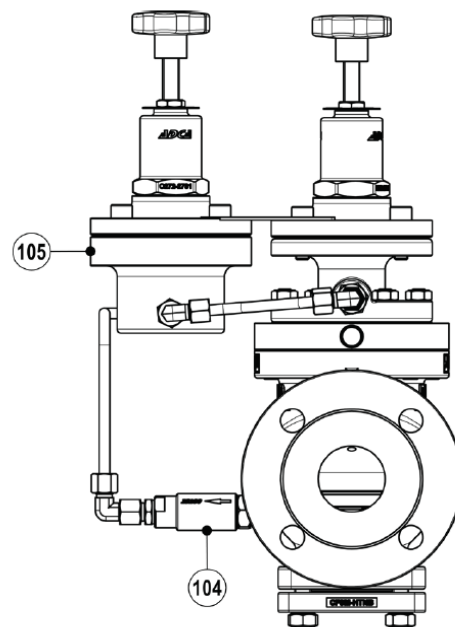


Fig. 8

CAPACITY TABLE

INLET (bar)	OUTLET (bar)	SATURATED STEAM (kg/h)									COMPRESSED AIR (Nm³/h – 0 °C – 1,013 bar)								
		DN 15	DN 20	DN 25	DN 32	DN 40	DN 50	DN 65	DN 80	DN 100	DN 15	DN 20	DN 25	DN 32	DN 40	DN 50	DN 65	DN 80	DN 100
0,7	0,35	40	75	125	190	280	480	–	–	–	15	31	50	70	111	191	–	–	–
1	0,4	45	95	160	240	355	620	–	–	–	16	33	51	79	113	194	–	–	–
	0,6	40	83	140	210	308	535	–	–	–	27	55	90	138	199	343	–	–	–
2	0,4 - 1	75	150	250	380	545	960	1490	1880	3390	60	122	201	307	444	763	1490	1880	3390
	1,2	65	138	230	345	515	900	1335	1685	3022	54	109	180	276	399	686	1335	1685	3022
	1,6	50	105	175	265	393	685	–	–	–	45	91	150	230	333	572	–	–	–
3	0,4 - 1,5	100	200	335	510	750	1310	1980	2475	4358	120	240	300	460	666	1150	1980	2475	4358
	2	85	170	290	450	660	1155	1732	2175	3962	105	210	251	384	555	1050	1732	2175	3962
	2,2	80	165	277	416	613	1050	1585	1981	3616	48	93	152	232	334	570	1585	1981	3616
	2,6	60	127	203	315	467	818	–	–	–	45	61	101	154	223	384	–	–	–
4	0,4 - 2	125	250	420	630	920	1580	2530	3170	5696	150	238	499	739	1089	1825	2530	3170	5696
	2,5	114	225	385	580	850	1465	2328	2923	5249	135	208	449	568	978	1635	2328	2923	5249
	3,2	92	183	309	482	708	1205	1735	2179	3913	119	177	398	492	867	1444	1735	2179	3913
	3,6	68	137	237	353	536	932	–	–	–	60	124	202	154	444	763	–	–	–
5	0,4 - 2	150	310	512	755	1114	1895	3022	3765	6733	180	360	505	768	1110	1908	3022	3765	6733
	3	144	295	488	743	1095	1835	2869	3615	6486	165	330	556	691	997	1716	2869	3615	6486
	4	115	225	373	578	846	1430	2130	2675	4852	151	298	404	613	885	1526	2130	2675	4852
	4,2	105	213	343	525	770	1342	–	–	–	136	285	383	582	840	1449	–	–	–
6	0,4 - 3	175	355	602	919	1358	2298	3566	4453	8021	210	468	696	1046	1523	2580	3566	4453	8021
	4	159	314	538	827	1217	2142	3219	4012	7229	195	437	646	969	1412	2389	3219	4012	7229
	5	119	250	411	637	941	1644	2276	2870	5150	150	345	494	738	1079	1817	2276	2870	5150
	5,2	109	217	360	568	839	1465	–	–	–	135	315	443	664	968	1627	–	–	–
7	0,4 - 3,5	197	410	670	1005	1540	2644	3959	4952	8911	240	480	804	1200	1740	2989	3959	4952	8911
	5	178	358	587	908	1345	2306	3513	4405	7921	210	421	701	1046	1524	2640	3513	4405	7921
	6	132	271	452	688	1027	1773	2764	3022	5416	150	301	499	756	1104	1829	2764	3022	5416
	6,2	122	251	416	635	934	1618	–	–	–	105	211	349	529	773	1280	–	–	–
8	0,4 - 4	225	471	778	1169	1759	3043	4605	5745	10398	270	546	798	1353	1746	3411	4605	5745	10398
	5	221	339	730	1118	1659	2884	4305	5395	9704	265	516	747	1276	1635	3220	4305	5395	9704
	6	192	385	639	976	1451	2513	3761	4704	8467	225	449	710	1125	1635	2762	3761	4704	8467
	7	146	293	481	732	1085	1887	2727	3168	5695	180	361	600	892	1296	2184	2727	3168	5695
	7,2	137	274	453	692	1011	1782	–	–	–	156	312	540	768	1128	1978	–	–	–
9	0,4 - 5	251	518	856	1325	1923	3358	5051	6334	11387	301	612	1011	1507	2244	3789	5051	6334	11387
	6	241	500	788	1222	1766	3095	4653	5794	10396	270	553	910	1359	1980	3474	4653	5794	10396
	7	206	398	679	1068	1559	2676	4060	5051	8961	240	492	816	1230	1798	2970	4060	5051	8961
	8	156	314	514	794	1142	2053	2671	3319	5991	180	360	598	903	1288	2247	2671	3319	5991
	8,2	145	292	483	741	1090	1888	–	–	–	165	329	547	826	1176	2056	–	–	–
10	0,4 - 5	275	561	944	1468	2127	3718	5592	7031	12377	330	659	1116	1692	2412	4173	5592	7031	12377
	6	272	551	917	1419	2074	3619	5443	6830	12270	314	628	1065	1615	2301	3983	5443	6830	12270
	7	252	508	838	1268	1871	3249	4951	6187	10891	288	599	1004	1503	2202	3810	4951	6187	10891
	8	213	431	722	1118	1659	2831	4108	5149	9209	240	492	806	1212	1770	3022	4108	5149	9209
	9	163	333	548	843	1244	2152	2721	3466	6190	192	360	658	898	1350	2280	2721	3466	6190
	9,2	150	298	493	756	1143	1929	–	–	–	181	342	628	852	1283	2165	–	–	–
12	1 - 6	330	680	1124	1732	2541	4407	6631	8216	14850	390	792	1300	1978	2844	4917	6631	8216	14850
	8	311	629	1023	1575	2332	4034	6090	7573	13862	360	732	1219	1827	2622	4497	6090	7573	13862
	10	265	533	812	1271	1867	3202	4503	5592	9903	270	553	910	1359	1980	3474	4503	5592	9903
	11	175	364	568	924	1350	2359	2920	3612	6536	210	468	696	1046	1523	2580	2920	3612	6536
15	1 - 8	408	839	1373	2138	3118	5403	8164	10393	18317	480	972	1602	2427	3564	6072	8164	10393	18317
	12	339	656	1068	1629	2441	4250	6385	7986	14356	375	762	1272	1923	2784	4692	6385	7986	14356
	14	199	401	662	1017	1503	2619	2968	3661	6438	255	528	889	1332	1896	3398	2968	3661	6438
17	1 - 9	425	863	1460	2178	3165	5343	9204	11360	20290	540	912	1819	2737	3984	6618	9204	11360	20290
	15	347	709	1190	1816	2694	4712	5870	7363	14855	315	708	1179	1764	2520	4418	5870	7363	14855
	16	207	416	717	1217	1608	2824	3598	4312	6330	255	528	889	1332	1896	3398	3598	4312	6330
20	1 - 12 (2 - 12)*	541	4062	1774	2746	4001	6971	10390	13363	23765	615	1254	2379	3153	4578	7911	10390	13363	23765
	15	459	931	1552	2335	3476	6184	9156	11382	20298	534	900	1799	2707	3940	6738	9156	11382	20298
	17	391	648	988	1748	2840	4698	6098	7628	9476	450	901	1497	2246	3336	5796	6098	7628	9476
25	2,5 - 12 (6 - 12)*	685	1337	2191	3360	4971	8392	12870	15845	29200	780	1590	2689	3982	5790	9902	12870	15845	29200
	15	680	1320	2183	3356	4877	8284	12690	15710	29010	756	1530	2548	3828	5616	9600	12690	15710	29010
	17	641	1256	2084	3156	4670	7866	12370	14860	27720	720	1464	2412	3707	5130	9123	12370	14860	27720
28	5 - 15 (6 - 15)*	781	1521	3355	3864	5611	9862	14870	18380	33164	870	1770	2910	4430	6390	10950	14870	18380	33164
	17	763	1471	3259	3768	5506	9652	14340	17770	32665	840	1724	2820	4320	6180	10680	14340	17770	32665

* Minimum outlet pressures for the sizes DN 65 to DN 100.