

HYDROGEN

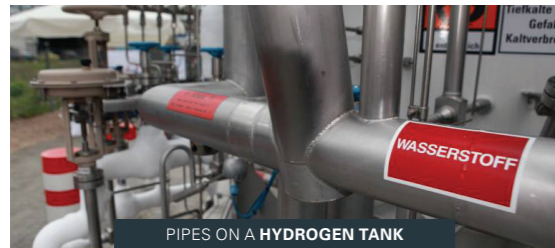
ENERGY GENERATION FOR THE FUTURE.

Customised **solutions**
for your business.





HYDROGEN FILLING STATION IN STUTTART



PIPES ON A HYDROGEN TANK



HYDROGEN RESEARCH CENTRE



HYDROGEN FUEL PUMPS



ELECTROLYSIS SYSTEM

HYDROGEN

Multiple energy source for the future

The industry for electricity generation is facing challenges to find green and sustainable resources and ways to produce electricity. And so are engineers and companies for sustainable and green mobility concepts.

The production of hydrogen is already possible by using fossil fuels. But recently innovative processes are becoming more common, like electrolysis. In this case water is split into hydrogen and oxygen. If the required electricity for this process comes from renewable sources, the hydrogen is defined as green. This process for gaining a power source of energy and a potential storage method for electricity (as the process can be reversed) makes it innovative in general and also for future mobility. One thing is clear: green energy is the future.

In this field Goetze is your partner regarding safety (valves). We assure the handling of hydrogen from the retrieval to the application – either in the electric part of the process or at the hydrogen filling station for vehicles. We protect filling processes, which are under high pressure or the storage of liquid hydrogen in tanks. This has a major impact on a safe handling and makes hydrogen appealing to human and nature in general.




SERIES 492


Atmospheric discharge safety valve

made of stainless steel,
angle-type with threaded connection

The Series 492 atmospheric discharge safety valve is used in the field of high-pressure compressors and process plants, high-pressure air systems and to protect refuelling systems. It convinces through its compactness and design. This an optionally be ordered with a gas-tight swivel outlet for guided blow-off or for connecting a discharge pipe. Due to its special technical construction and design the series covers a pressure range that has not been catered for up to now. The valve is particularly suitable for hydrogen, as the PAI seal guarantees a very high level of tightness even after repeated response. Tightness for helium 10-6 mbar l/s.

 **Temperatures**
from -60 °C to +200 °C

 **Pressures**
from 50 bar to 630 bar

 **Threaded connections**
from 1/4" to 3/4"



SERIES 2400

Safety valve


made of stainless steel,
angle-type with threaded connection

Cryogenic valves must meet special requirements to provide reliable protection, for example in tanks and filling systems for liquid gases.

The Series 2400 safety valve therefore got fully approved for vapours and gases as well as for liquids according to ISO 4126-1 and ASME Code Sec. VIII Div. 1. All components of the valve are specially cleaned during the production process and are thus oil- and grease free in accordance with DIN EN 12300. Because of this, every valve is suitable for use in systems using oxygen and is marked accordingly. The use of 1.4404 and 1.4408 high-grade stainless steels render the safety valves particularly resistant to extremely cold temperatures. For use with gases that are in contact with food an FDA-compliant sealing material is used. The valve setting and seat insert are separately sealable which makes unauthorised adjustments easily noticeable. Overpressure from 0,2 bar up to 70 bar is relieved safely with a consistently high level of performance.

 **Temperatures**
from -200 °C to +200 °C

 **Pressures**
from 0,2 bar to 70 bar

 **Threaded connections**
from 1/4" to 1 1/2"




SERIES 455

Flanged safety valve

made of stainless steel,
angle-type with flange connections

The protection of tanks and filling systems in the liquid gas sector often requires flanged terminations for installation in existing pipe systems. High pressures are reached and even cryogenic media are protected. For this reason, Goetze has paid special attention to the performance in all nominal sizes of the Series 455, which is unique in the field of flanged safety valves. The high capacity of the entire series from DN 15 up to DN 100 is unique in the sector of flanged safety valves. By using exclusively high-quality materials with outstanding media resistance and the option to protect the tightness towards the atmosphere on a high level with backpressure compensating bellows, this safety valve is suitable for nearly any applications. The set pressure ranges from 0,2 to 40 bar and by using special sealing material such as sealing; even very low temperatures of down to -270 °C can be achieved. Also extremely high temperatures can be applied up to a limit of 400 °C.

 **Temperatures**
from -270 °C to +400 °C

 **Pressures**
from 0,2 bar to 40 bar

 **Flange connections**
from DN 15 to DN 100



SERIES 420

Safety valve


made of stainless steel,
angle-type with threaded connection

For supporting the hydrogen production and electrolysis processes, reliable safety valves are required which can also handle low flow-volumes and pressures. Thanks to TÜV and European approvals, the miniature safety valve series 420 allow use in applications for neutral and non-neutral gaseous and liquid media.

The cutting ring threaded connections available as an option make this valve quick and easy to install for use in small pipelines.

 **Temperatures**
from -40 °C to +260 °C

 **Pressures**
from 0,5 bar to 50 bar

 **Threaded connections**
from 1/4" to 3/8"




SERIES 451

Safety valve


made of stainless steel,
angle-type with threaded connection

In processes with lower volumes and low pressures, such as hydrogen production or the electrolysis process, the protection must still be reliable. The advantages and applications of Series 451 made of high-grade stainless steel begin, where versions made of gunmetal are at their limits.

The flexibility of the various versions guarantee an optimal configuration for every application. In addition to the basic version the numerous sealing possibilities and materials, back-pressure compensating metal bellows and/or a gastight cap offer the necessary optional extras required to fulfill the highest safety requirements.

 **Temperatures**
from -60 °C to +400 °C

 **Pressures**
from 0,5 bar to 70 bar

 **Threaded connections**
from 1/2" to 2"

THE GOETZE KG

Individuality for more safety

The competence of Goetze KG Armaturen has been in demand for 70 years. Our wealth of experience is as broad and varied as our areas of application for our high-performance fittings. Our well thought-out family of products covers every industrial application: Liquids of all kinds, gases, technical vapours and steam. Goetze valves are used with temperatures ranging from -270 °C up to +400 °C and the greatest possible safety is a priority.

At any time, you can reach a competent contact partner as part of our in-house team at Goetze. Whether it is for the product selection, the configuration of the right valve, urgent requests, whether per telephone call or per mail, there is a personal multilingual consultant at your disposal. With over 400.000 valves per year „Made in Germany“, we are your competent partner for all matters relating to the handling of pressure.

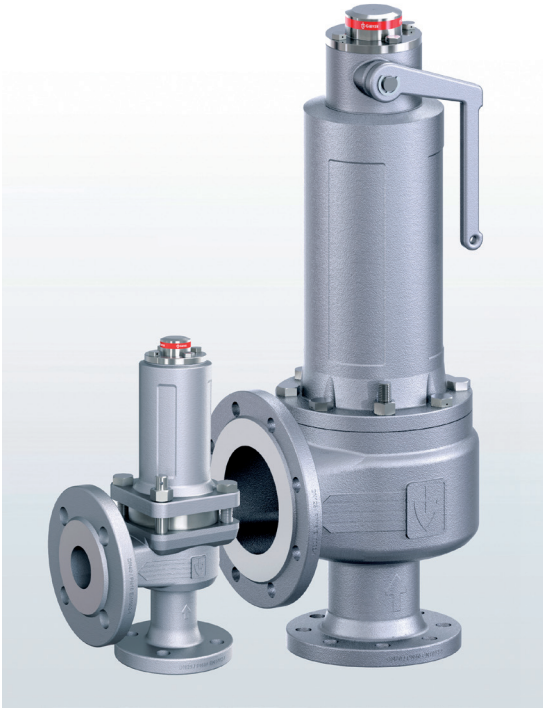


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→ **Series 455**



■ SUITABLE FOR

Liquids	neutral and non-neutral	
Air, gases and vapours	neutral and non-neutral	
Steam		

■ EXAMPLES OF USE

Full-lift safety valve for the protection of:

- pressure tanks and -systems for neutral / non-neutral vapours and gases
- Steam plants

Normal safety valve for the protection of:

- pressure tanks and -systems for neutral / non-neutral liquids

Please observe plant-specific regulations and use of appropriate valve version and sealing material.

- Chemical and petrochemical plants
- biogas plants
- industrial- and commercial boiler plants
- Production and processing of industrial gases
- shipbuilding industry and marine equipment
- secondary areas in the food-, beverage-, pharmaceutical- and cosmetics- industries

Safety valves are set and sealed at the factory.



■ MATERIAL



■ SPECIFICATION



DN 15 to DN 100 – 270°C to + 400°C
depending on version 0,2 – 40 bar

■ APPROVALS

TÜV-Type test approval 2094	D/G (full-lift), F (normal)
EC type examination	S/G, L,
TR ZU 032/2013 - TR ZU 010/2011	D/G (S/G), F (L)
Requirements	
PED 2014/68/EU DIN EN ISO 4126-1 AD 2000 Data sheet A2 VdTÜV Guideline SV 100	TRD 421 and DIN EN 12952-7 DIN EN 12953-8
Classification society	
Bureau Veritas American Bureau of Shipping Registro Italiano Navale	BV ABS RINA

■ MATERIALS

Component	Material	DIN EN	ASME
Body and spring housing	Stainless steel	1.4408	CF8M
Valve seat	Stainless steel	1.4404	316 L
Internal parts	Stainless steel	1.4404	316 L
Spring	Stainless steel	1.4310	302
Bellows (optional)	Stainless steel	1.4571	316 Ti

Series 455 ■ VALVE VERSION

t	gastight version of spring housing	for neutral and non-neutral media without counter pressure. The environment is protected from being affected by the medium.
b	with bellows, non-gastight version of spring housing (10mm bore)	Spring, moving parts and the environment are protected from being affected by the medium.
tb	gastight version with bellows	for neutral and non-neutral and particularly for flammable, toxic and environmentally hazardous media and/or counter pressure. Spring, moving parts and the environment are protected from being affected by the medium. Double gastight.

■ MEDIUM

GF	gaseous and liquid	Air, vapours, gases, steam and liquids
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■ TYPE OF LIFTING MECHANISM

L	Standard with lifting lever
O	without lifting device

■ AVAILABLE NOMINAL DIAMETERS AND CONNECTION SIZES

Nominal diameter DN	15	20	25	32	40	50	65	80	100
Inlet	15	20	25	32	40	50	65	80	100
Outlet	25	■							
	32		■						
	40			■					
	50				■				
	65					■			
	80						■		
	100							■	
	125								■
150									■

■ CONNECTION TYPE INLET / OUTLET FLANGE CONNECTIONS

FL / FL	Standard	Flange connection / flange connection	DIN EN 1092 / DIN EN 1092
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■ SEALS

MD	Metal-to-metal sealing	Flat seal	-270°C to +400°C
EPDM	Ethylene propylene diene	Elastomere moulded seal with metallic support	-40°C to +170°C
FKM	Fluorocarbon	Elastomere moulded seal with metallic support	-20°C to +200°C
FFKM	Perfluorinated rubber	Elastomere moulded seal with metallic support	-10°C to +260°C
PTFE	Polytetrafluoroethylene	Flat seal	-200°C to +225°C

Auxiliary seals are made of highly resistant, adhesive-free graphite/stainless steel foil. Top cap with O-rings in EPDM.

■ NOMINAL DIAMETERS, CONNECTIONS, INSTALLATION DIMENSIONS

Series 455: Connection, installation dimensions, ranges of adjustment										
Nominal diameter	DN	15	20	25	32	40	50	65	80	100
Connection DIN EN 1092-1	DN / PN	15 / 40	20 / 40	25 / 40	32 / 40	40 / 40	50 / 40	65 / 40	80 / 40	100 / 40
Outlet DIN EN 1092-1	DN1 / PN	25 / 16	32 / 16	40 / 16	50 / 16	65 / 16	80 / 16	100 / 16	125 / 16	150 / 16
Installation dimensions in mm	L	80	95	100	110	115	120	140	160	180
	h	90	85	105	115	140	150	170	195	220
	D	95	105	115	140	150	165	185	200	235
	K / nxd	65 / 4x14	75 / 4x14	85 / 4x14	100 / 4x18	110 / 4x18	125 / 4x18	145 / 8x18	160 / 8x18	168 / 8x22
	D1	115	140	150	165	185	200	220	250	285
	K1 / n1xd1	85 / 4x14	100 / 4x18	110 / 4x18	125 / 4x18	145 / 8x18	160 / 8x18	180 / 8x18	210 / 8x18	218 / 8x22
	H / H1 ¹	167 / 207	165 / 205	190 / 230	260 / 300	302 / 330	352 / 378	427 / 462	486 / 530	577 / 624
	H2 ² / H3 ³	206 / 246	204 / 244	229 / 269	321 / 361	363 / 391	413 / 439	497 / 532	556 / 600	647 / 694
	Lmax	75	85	95	120	130	160	205	215	255
	A02	1/4	1/4	1/4	1/4	1/2	1/2	1/2	1/2	1/2
	α_w / K_{dr} (F)	0,49	0,54	0,54	0,54	0,54	0,54	0,54	0,54	0,54
	α_w / K_{dr} (D/G) ⁴	0,72	0,74	0,74	0,74	0,74	0,74	0,74	0,74	0,74
	do	15,0	18,0	22,5	29,3	36,0	45,0	59,0	72,0	90,0
	Weight	kg	5,0	6,0	8,0	16,0	18,5	25,0	45,0	57,5
kg ¹		5,5	6,5	8,5	18,5	20,5	27,5	49,0	63,5	100,5
kg ²		5,5	6,5	8,5	18,0	20,5	27,0	48,5	61,0	95,0
kg ³		6,0	7,0	9,0	20,0	22,5	29,5	52,0	67,0	104,0
Range of adjustment	bar	0,2 - 40	0,2 - 40	0,2 - 40	0,2 - 40	0,2 - 40	0,2 - 40	0,2 - 40	0,2 - 40	0,2 - 40
Pressure range with bellows	bar	1,2 - 40	0,8 - 40	0,5 - 40	1,0 - 40	0,9 - 40	3,0 - 40	0,3 - 40	0,2 - 40	0,2 - 40
Maximum permissible counter pressure with bellows	ps < 5,0 bar	4,0	4,0	4,0	4,0	4,0	4,0	3,0 ⁵	3,0 ⁵	3,0 ⁵
	ps ≥ 5,0 bar	16,0	12,0	16,0	16,0	16,0	16,0	16,0	16,0	16,0

¹Values for the version with bellows

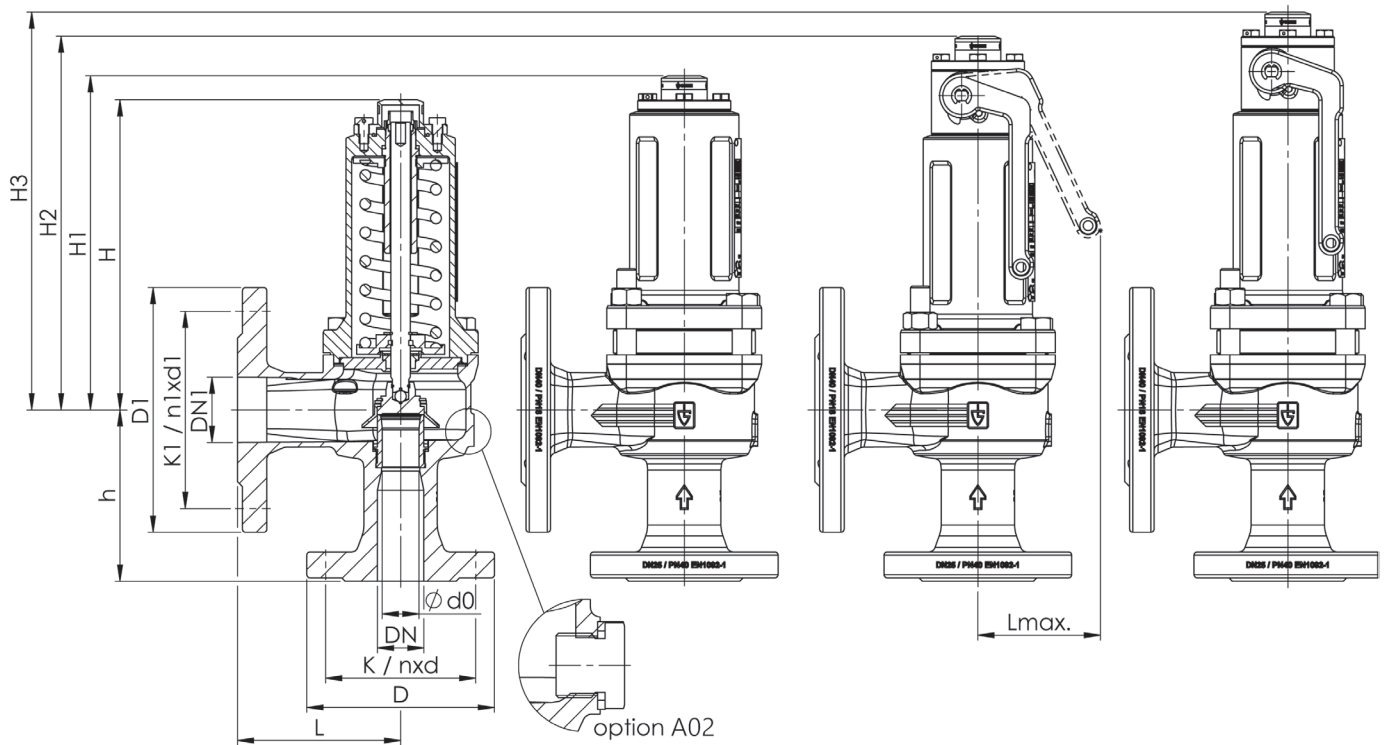
²Values for the version with lifting lever

³Values for the version with bellows and lifting lever

⁴Flow coefficients for blow-off pressures < 3,0 bar: Please refer to the Flow Coefficients Chart.

⁵valid for ps < 3,5 bar

■ MAIN DIMENSIONS, INSTALLATION DIMENSIONS



Series 455 ■ INDIVIDUAL SELECTION / VALVE CONFIGURATION

Series	Valve version	Medium	Lifting device	Nominal diameter DN	Connection type		Connection size		Seal	Options	Set pressure	Quantity
					Inlet	Outlet	Inlet	Outlet				
455	t	GF	L	50	FL	FL	50	80	MD	S62	10,0	1
455					FL	FL						
455					FL	FL						
455					FL	FL						

■ TECHNICAL FINISHES, VARIANTS, ACCESSORIES

S60	Pressure sensor connection M5 or G1/4 for monitoring the springhousing (only for valves with bellow)	<input type="checkbox"/>	A01	Gagging screw for tests of valve tightness and resistance to pressure with the fitted valve	<input type="checkbox"/>
S62	Inductive proximity sensor, assembled, for indication of valve position, including connection cable 5m	<input type="checkbox"/>	A02	Connection for condensate in the outlet body	<input type="checkbox"/>
		<input type="checkbox"/>	A07	Stroke limitation	<input type="checkbox"/>

■ PROPERTIES

GOX	Especially for gaseous O2 applications by employment of specific materials including oil- and grease free production process	<input type="checkbox"/>			<input type="checkbox"/>
P01	Oil- and grease-free production	<input type="checkbox"/>			<input type="checkbox"/>
		<input type="checkbox"/>			<input type="checkbox"/>

■ CERTIFICATES / APPROVALS

C01	Factory certificate acc. DIN EN 10204 2.2 (WKZ 2.2)	<input type="checkbox"/>	C06	ATEX evaluation acc. to 2014/34/EU	<input type="checkbox"/>
C02	Test certificate acc. DIN EN 10204 3.1 (WPZ 3.1)	<input type="checkbox"/>	C07	SIL evaluation relating to IEC 61508-2	<input type="checkbox"/>
C03	Material test certificate acc. DIN EN 10204 3.1 (MPZ 3.1) (pressure retaining part)	<input type="checkbox"/>	C09	Seat tightness test with helium, leak detection method under vacuum incl. Factory Inspection Certificate 3.1 acc. to DIN EN 10204	<input type="checkbox"/>
C04	TÜV/DEKRA individual inspection acc. EN 10204 3.2 (TÜV/DEKRA-APZ)	<input type="checkbox"/>	C10	Certificate of oil- and grease free production	<input type="checkbox"/>
C05	Sealing material Manufacturer certification (FDA, USP 3, 3-A,...), Please indicate description of certificate:	<input type="checkbox"/>	C11	Certification of the production process especially for gaseous oxygen applications by employment of specific materials	<input type="checkbox"/>

■ ADMISSIONS / ACCREDITATIONS

AA1	EC Type examination acc. to Directive 2014/68/EU	<input type="checkbox"/>	AK3	American Bureau of Shipping (ABS) type approval	<input type="checkbox"/>
AA2	TÜV component test acc. to VdTÜV specification sheet SV 100	<input type="checkbox"/>	AK4	Bureau Veritas (BV) type approval	<input type="checkbox"/>
AA4	EAC - certificate/declaration with passport for the valve and laser marking of the valve	<input type="checkbox"/>	AK6	Registro Italiano Navale (RINA) type approval	<input type="checkbox"/>
			AL	Individual inspection by notified body inspector – (body to be indicated):	<input type="checkbox"/>

■ ENQUIRY

Copy and send to: order@goetze-armaturen.de.

Order form easily to be found online under the section for each series.

Series 455: Blowing-off rates at 10% above set pressure																	
Nominal diameter DN		15			20			25			32			40			
		d ₀ = 15 mm			d ₀ = 18 mm			d ₀ = 22,5 mm			d ₀ = 29,3 mm			d ₀ = 36 mm			
Set pressure bar		I	II	III	I	II	III	I	II	III	I	II	III	I	II	III	
Air I	0,2	71,7	60,5	2,4	118,1	99,6	3,7	184,5	155,6	5,9	312,9	263,9	9,9	472,4	398,4	15,0	
	0,5	112,6	92,0	3,4	173,6	141,7	5,4	271,3	221,5	8,4	460,0	375,5	14,2	694,4	566,9	21,5	
	Nm ³ /h	1	167,1	140,0	4,6	249,9	209,4	7,3	390,5	327,2	11,4	662,3	554,8	19,3	999,8	837,5	29,2
Steam II	1,5	225,2	187,1	5,6	329,3	273,6	9,0	514,6	427,5	14,0	872,6	725,0	23,7	1317,3	1094,5	35,8	
	2	278,0	229,4	6,5	404,6	333,9	10,4	632,2	521,8	16,2	1072,1	884,8	27,4	1618,5	1335,7	41,4	
	kg/h ¹⁾	2,5	325,9	267,4	7,3	479,7	393,7	11,6	749,5	615,1	18,1	1271,1	1043,1	30,7	1918,8	1574,7	46,3
Water III	3	373,8	305,3	8,0	553,2	451,8	12,7	864,4	705,9	19,8	1465,8	1197,1	33,6	2212,8	1807,2	50,8	
	m ³ /h	3,5	421,7	343,0	8,6	624,2	507,6	13,7	975,3	793,1	21,4	1653,9	1344,9	36,3	2496,7	2030,3	54,9
	4	469,7	380,5	9,2	695,2	563,2	14,7	1086,3	880,0	22,9	1842,1	1492,3	38,9	2780,8	2252,8	58,7	
	4,5	517,8	418,0	9,8	766,3	618,6	15,6	1197,3	966,6	24,3	2030,4	1639,2	41,2	3065,1	2474,6	62,2	
	5	565,8	455,4	10,3	837,4	674,0	16,4	1308,4	1053,1	25,6	2218,8	1785,8	43,5	3349,6	2695,9	65,6	
	5,5	613,9	492,7	10,8	908,6	729,2	17,2	1419,7	1139,3	26,9	2407,4	1932,0	45,6	3634,3	2916,7	68,8	
	6	662,0	529,9	11,3	979,8	784,2	18,0	1530,9	1225,3	28,1	2596,1	2077,9	47,6	3919,2	3136,8	71,9	
	6,5	710,2	567,1	11,8	1051,1	839,3	18,7	1642,3	1311,4	29,2	2785,0	2223,8	49,6	4204,3	3357,2	74,8	
	7	758,4	604,3	12,2	1122,4	894,3	19,4	1753,7	1397,4	30,3	2973,9	2369,6	51,4	4489,6	3577,2	77,7	
	7,5	806,6	641,4	12,7	1193,8	949,2	20,1	1865,2	1483,1	31,4	3163,1	2515,1	53,2	4775,0	3796,9	80,4	
	8	854,8	678,4	13,1	1265,2	1004,0	20,8	1976,8	1568,8	32,4	3352,3	2660,3	55,0	5060,7	4016,0	83,0	
	8,5	903,2	715,4	13,5	1336,7	1058,7	21,4	2088,5	1654,3	33,4	3541,7	2805,3	56,7	5346,7	4235,0	85,6	
	9	951,5	752,3	13,9	1408,2	1113,4	22,0	2200,3	1739,7	34,4	3731,2	2950,2	58,3	5632,7	4453,7	88,1	
	9,5	999,8	789,3	14,3	1479,8	1168,2	22,6	2312,1	1825,2	35,3	3920,9	3095,2	59,9	5919,1	4672,6	90,5	
	10	1048,2	826,2	14,6	1551,4	1222,8	23,2	2424,0	1910,6	36,3	4110,6	3240,0	61,5	6205,5	4891,1	92,8	
	11	1145,1	900,1	15,3	1694,8	1332,1	24,3	2648,1	2081,4	38,0	4490,6	3529,7	64,5	6779,1	5328,5	97,4	
	12	1242,2	973,8	16,0	1838,4	1441,2	25,4	2872,5	2251,8	39,7	4871,1	3818,6	67,4	7353,6	5764,7	101,7	
13	1339,3	1047,3	16,7	1982,2	1550,0	26,5	3097,2	2421,9	41,4	5252,2	4107,0	70,1	7928,9	6200,0	105,9		
14	1436,7	1121,1	17,3	2126,3	1659,3	27,5	3322,3	2592,6	42,9	5633,8	4396,5	72,8	8505,0	6637,0	109,9		
15	1534,1	1194,9	17,9	2270,5	1768,4	28,4	3547,6	2763,2	44,4	6016,0	4685,7	75,3	9081,9	7073,7	113,7		
16	1631,7	1268,3	18,5	2414,9	1877,1	29,4	3773,2	2933,0	45,9	6398,6	4973,7	77,8	9659,5	7508,4	117,5		
17	1729,4	1342,0	19,1	2559,5	1986,2	30,3	3999,3	3103,4	47,3	6781,9	5262,7	80,2	10238,2	7944,8	121,1		
18	1827,3	1415,8	19,6	2704,3	2095,4	31,1	4225,5	3274,1	48,7	7165,6	5552,2	82,5	10817,4	8381,7	124,6		
19	1925,3	1489,6	20,2	2849,4	2204,6	32,0	4452,2	3444,7	50,0	7549,9	5841,4	84,8	11397,6	8818,3	128,0		
20	2023,4	1563,3	20,7	2994,7	2313,7	32,8	4679,2	3615,2	51,3	7934,9	6130,7	87,0	11978,8	9255,0	131,3		
21	2121,7	1637,2	21,2	3140,1	2423,0	33,6	4906,5	3786,0	52,6	8320,3	6420,2	89,1	12560,6	9692,1	134,6		
22	2220,2	1711,0	21,7	3285,8	2532,3	34,4	5134,1	3956,8	53,8	8706,4	6709,8	91,2	13143,4	10129,3	137,7		
23	2318,8	1785,0	22,2	3431,8	2641,8	35,2	5362,1	4127,9	55,0	9093,0	7000,0	93,3	13727,0	10567,3	140,8		
24	2417,5	1859,1	22,7	3577,8	2751,4	36,0	5590,4	4299,1	56,2	9480,1	7290,4	95,3	14311,4	11005,8	143,9		
25	2516,3	1933,1	23,1	3724,1	2861,0	36,7	5819,0	4470,4	57,4	9867,7	7580,8	97,3	14896,5	11444,1	146,8		
26	2615,3	2007,3	23,6	3870,7	2970,8	37,4	6048,0	4641,8	58,5	10256,1	7871,5	99,2	15482,9	11883,0	149,8		
27	2714,5	2081,5	24,0	4017,5	3080,6	38,2	6277,3	4813,5	59,6	10644,9	8162,7	101,1	16069,9	12322,6	152,6		
28	2813,8	2155,9	24,5	4164,4	3190,7	38,9	6506,9	4985,5	60,7	11034,3	8454,3	102,9	16657,7	12762,8	155,4		
29	2913,2	2230,3	24,9	4311,6	3300,9	39,5	6736,8	5157,6	61,8	11424,2	8746,2	104,8	17246,3	13203,4	158,2		
30	3012,8	2304,8	25,3	4458,9	3411,1	40,2	6967,1	5329,9	62,8	11814,6	9038,3	106,6	17835,7	13644,4	160,9		
32	3212,4	2454,3	26,2	4754,4	3632,3	41,5	7428,7	5675,5	64,9	12597,5	9624,4	110,1	19017,5	14529,3	166,1		
34	3412,6	2604,0	27,0	5050,6	3853,9	42,8	7891,6	6021,7	66,9	13382,4	10211,5	113,4	20202,5	15415,5	171,3		
36	3613,4	2754,2	27,8	5347,8	4076,2	44,1	8356,0	6369,1	68,8	14169,9	10800,6	116,7	21391,3	16304,9	176,2		
38	3814,8	2904,9	28,5	5645,8	4299,2	45,3	8821,6	6717,5	70,7	14959,6	11391,5	119,9	22583,4	17196,9	181,1		
40	4016,7	3056,1	29,3	5944,7	4523,0	46,4	9288,6	7067,1	72,6	15751,5	11984,3	123,1	23778,9	18091,9	185,8		

¹⁾Please observe the pressure-/temperature rating

CONTINUATION - Series 455: Blowing-off rates at 10% above set pressure													
Nominal diameter DN		50			65			80			100		
		d ₀ = 45 mm			d ₀ = 59 mm			d ₀ = 72 mm			d ₀ = 90 mm		
Set pressure bar		I	II	III	I	II	III	I	II	III	I	II	III
Air I Nm ³ /h	0,2	738,1	622,5	23,4	1268,7	1070,0	40,3	1889,4	1593,5	60,0	2952,2	2489,9	93,7
	0,5	1085,0	885,8	33,5	1865,1	1522,8	57,6	2777,6	2267,7	85,8	4340,0	3543,3	134,1
	1	1562,2	1308,6	45,6	2685,4	2249,6	78,4	3999,1	3350,1	116,8	6248,6	5234,6	182,5
Steam II kg/h ¹⁾	1,5	2058,3	1710,2	56,0	3538,2	2939,8	96,2	5269,1	4378,0	143,3	8233,0	6840,7	224,0
	2	2528,9	2087,1	64,7	4347,2	3587,7	111,2	6473,9	5342,9	165,7	10115,5	8348,3	258,9
	2,5	2998,2	2460,4	72,4	5153,9	4229,5	124,5	7675,3	6298,7	185,3	11992,7	9841,7	289,6
Water III m ³ /h	3	3457,5	2823,7	79,3	5943,5	4854,0	136,4	8851,2	7228,7	203,1	13830,0	11294,9	317,4
	3,5	3901,1	3172,3	85,7	6706,0	5453,2	147,4	9986,8	8121,1	219,5	15604,4	12689,2	342,9
	4	4345,0	3520,0	91,7	7469,1	6050,9	157,6	11123,2	9011,1	234,7	17380,1	14079,9	366,6
	4,5	4789,2	3866,5	97,2	8232,8	6646,6	167,2	12260,5	9898,2	248,9	19157,0	15466,0	389,0
	5	5233,8	4212,3	102,5	8997,0	7241,0	176,2	13398,5	10783,6	262,4	20935,2	16849,3	410,0
	5,5	5678,6	4557,3	107,5	9761,6	7834,1	184,8	14537,3	11666,7	275,3	22714,5	18229,2	430,1
	6	6123,7	4901,3	112,3	10526,8	8425,4	193,1	15676,8	12547,4	287,5	24495,0	19605,3	449,3
	6,5	6569,2	5245,6	116,9	11292,5	9017,2	201,0	16817,1	13428,7	299,3	26276,7	20982,4	467,7
	7	7014,9	5589,5	121,3	12058,8	9608,3	208,6	17958,2	14309,0	310,6	28059,7	22357,8	485,3
	7,5	7461,0	5932,6	125,6	12825,5	10198,2	215,9	19100,1	15187,4	321,5	29843,9	23730,4	502,4
	8	7907,3	6275,0	129,7	13592,7	10786,8	223,0	20242,7	16064,0	332,1	31629,2	25100,1	518,9
	8,5	8354,2	6617,2	133,7	14360,9	11375,0	229,9	21386,7	16940,0	342,3	33416,7	26468,7	534,9
	9	8801,1	6958,9	137,6	15129,2	11962,4	236,5	22530,8	17814,8	352,3	35204,4	27835,6	550,4
	9,5	9248,6	7300,9	141,4	15898,4	12550,4	243,0	23676,3	18690,4	361,9	36994,3	29203,8	565,5
	10	9696,1	7642,4	145,1	16667,7	13137,4	249,4	24821,9	19564,6	371,4	38784,3	30569,6	580,2
	11	10592,3	8325,8	152,1	18208,3	14312,1	261,5	27116,2	21314,0	389,5	42369,1	33303,1	608,6
	12	11490,0	9007,4	158,9	19751,5	15483,8	273,2	29414,4	23058,8	406,8	45960,1	36029,4	635,7
	13	12388,9	9687,5	165,4	21296,7	16653,0	284,4	31715,6	24800,1	423,5	49555,7	38750,1	661,7
	14	13289,1	10370,4	171,7	22844,1	17826,8	295,1	34020,0	26548,1	439,5	53156,3	41481,5	686,7
	15	14190,4	11052,7	177,7	24393,5	18999,7	305,5	36327,5	28294,8	454,9	56761,7	44210,7	710,8
	16	15093,0	11731,9	183,5	25945,0	20167,3	315,5	38638,0	30033,7	469,8	60371,9	46927,6	734,1
	17	15997,2	12413,7	189,2	27499,3	21339,3	325,2	40952,7	31779,0	484,3	63988,6	49654,7	756,7
	18	16902,1	13096,4	194,7	29055,0	22512,9	334,6	43269,5	33526,8	498,4	67608,5	52385,6	778,7
	19	17808,7	13778,6	200,0	30613,3	23685,7	343,8	45590,2	35273,3	512,0	71234,7	55114,6	800,0
	20	18716,9	14460,9	205,2	32174,5	24858,5	352,8	47915,2	37020,0	525,3	74867,4	57843,7	820,8
	21	19625,9	15143,9	210,3	33737,1	26032,6	361,5	50242,2	38768,4	538,3	78503,5	60575,7	841,1
	22	20536,5	15827,1	215,2	35302,6	27206,9	370,0	52573,5	40517,3	551,0	82146,1	63308,3	860,9
	23	21448,5	16511,4	220,1	36870,2	28383,4	378,3	54908,1	42269,3	563,4	85794,0	66045,8	880,3
	24	22361,5	17196,5	224,8	38439,7	29561,1	386,4	57245,5	44023,1	575,5	89446,1	68786,1	899,2
	25	23275,8	17881,4	229,4	40011,4	30738,4	394,4	59586,1	45776,4	587,4	93103,3	71525,7	917,8
	26	24192,0	18567,3	234,0	41586,3	31917,3	402,2	61931,4	47532,2	599,0	96767,8	74269,0	936,0
	27	25109,2	19254,0	238,5	43163,0	33097,9	409,9	64279,5	49290,3	610,4	100436,6	77016,2	953,8
	28	26027,7	19941,9	242,8	44741,9	34280,3	417,4	66630,8	51051,2	621,6	104110,6	79767,4	971,3
	29	26947,3	20630,4	247,1	46322,8	35463,8	424,8	68985,1	52813,7	632,6	107789,3	82521,4	988,5
30	27868,3	21319,4	251,4	47905,9	36648,3	432,1	71342,7	54577,7	643,5	111473,0	85277,6	1005,4	
32	29714,9	22702,1	259,6	51080,3	39025,1	446,3	76070,2	58117,3	664,6	118859,7	90808,2	1038,4	
34	31566,3	24086,7	267,6	54262,9	41405,3	460,0	80809,8	61661,9	685,0	126265,4	96346,8	1070,4	
36	33424,0	25476,4	275,4	57456,2	43794,3	473,3	85565,3	65219,6	704,9	133695,8	101905,6	1101,4	
38	35286,5	26870,1	282,9	60657,9	46190,1	486,3	90333,4	68787,6	724,2	141145,9	107480,6	1131,6	
40	37154,5	28268,5	290,3	63869,1	48593,9	498,9	95115,5	72367,4	743,0	148618,0	113074,1	1161,0	

¹⁾Please observe the pressure-/temperature rating

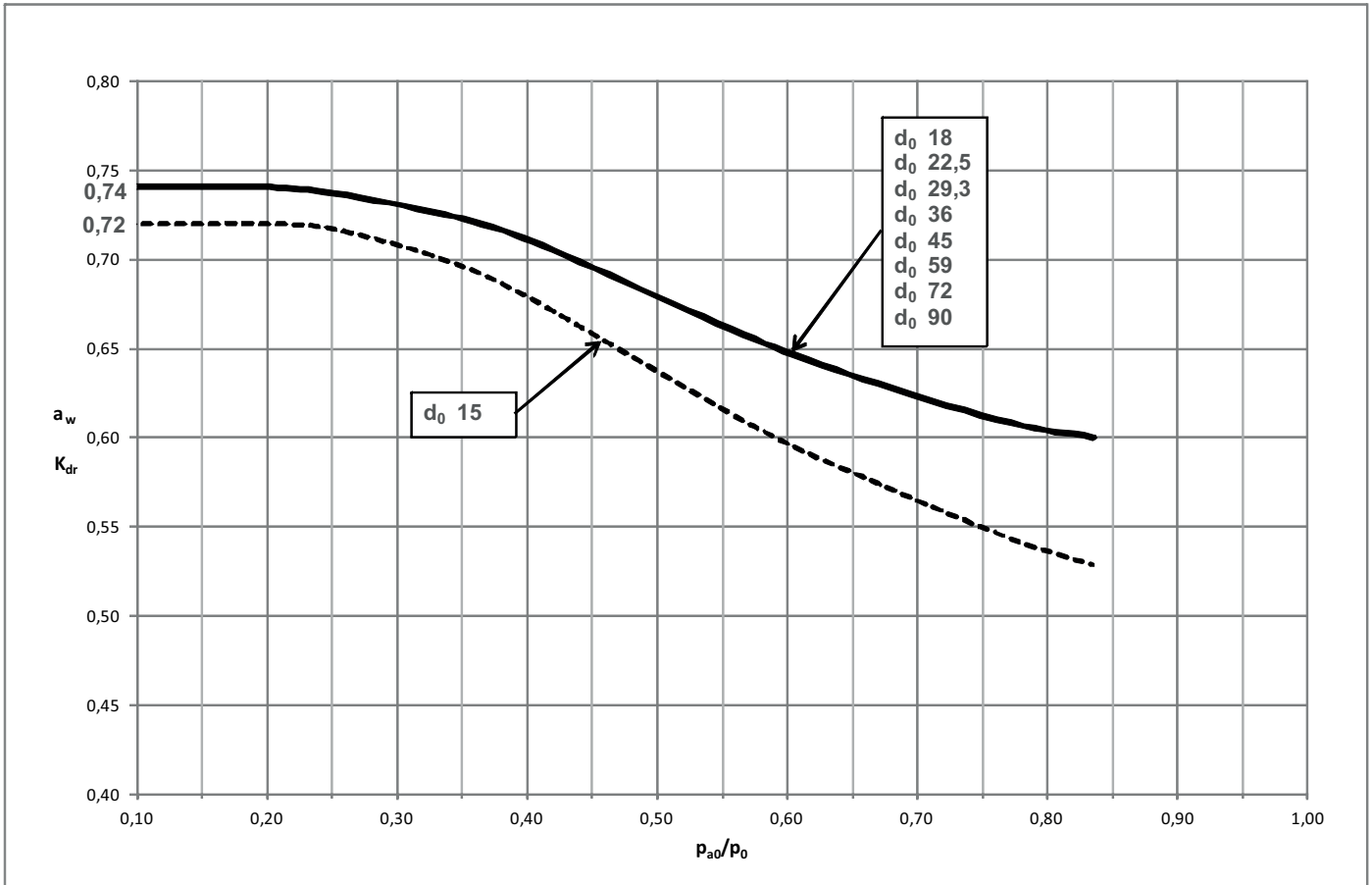
Series 455: Blowing-off rates at 5% above set pressure											
Nominal diameter DN		15		20		25		32		40	
		d ₀ = 15 mm		d ₀ = 18 mm		d ₀ = 22,5 mm		d ₀ = 29,3 mm		d ₀ = 36 mm	
Set pressure bar		I	II	I	II	I	II	I	II	I	II
Air I	0,2	71,7	60,5	118,1	99,6	184,5	155,6	312,9	263,9	472,4	398,4
	0,5	112,6	92,0	173,6	141,7	271,3	221,5	460,0	375,5	694,4	566,9
	1	167,1	140,0	250,0	209,4	390,5	327,2	662,3	554,8	999,8	837,5
Nm ³ /h	1,5	220,3	183,2	322,5	268,1	503,9	419,0	854,6	710,5	1290,1	1072,6
	2	269,3	222,5	391,2	323,2	611,2	505,0	1036,5	856,3	1564,7	1292,7
	2,5	315,0	258,8	462,5	380,0	722,7	593,8	1225,5	1006,9	1850,1	1520,1
Steam II	3	360,7	295,0	533,9	436,5	834,2	682,1	1414,7	1156,7	2135,6	1746,2
	3,5	406,5	331,0	601,6	489,8	940,1	765,4	1594,2	1297,9	2406,6	1959,4
	4	452,3	366,9	669,4	543,0	1046,0	848,4	1773,8	1438,8	2677,8	2172,0
kg/h ¹⁾	4,5	498,2	402,7	737,3	596,0	1152,0	931,2	1953,6	1579,2	2949,2	2383,9
	5	544,0	438,4	805,2	648,9	1258,1	1013,8	2133,5	1719,2	3220,8	2595,4
	5,5	589,9	474,1	873,1	701,6	1364,3	1096,3	2313,5	1859,0	3492,5	2806,4
	6	635,9	509,6	941,1	754,2	1470,5	1178,4	2493,6	1998,4	3764,5	3016,8
	6,5	681,9	545,1	1009,2	806,8	1576,8	1260,5	2673,9	2137,6	4036,6	3227,0
	7	727,9	580,6	1077,2	859,3	1683,2	1342,7	2854,3	2276,9	4308,9	3437,3
	7,5	773,9	616,1	1145,4	911,8	1789,6	1424,7	3034,8	2415,9	4581,5	3647,1
	8	820,0	651,5	1213,5	964,2	1896,2	1506,5	3215,5	2554,8	4854,2	3856,7
	8,5	866,1	686,8	1281,8	1016,4	2002,8	1588,2	3396,3	2693,2	5127,1	4065,7
	9	912,2	722,1	1350,0	1068,7	2109,5	1669,8	3577,2	2831,7	5400,2	4274,8
	9,5	958,4	757,3	1418,4	1120,9	2216,2	1751,4	3758,2	2969,9	5673,5	4483,5
	10	1004,6	792,7	1486,7	1173,1	2323,0	1833,0	3939,4	3108,4	5947,0	4692,5
	11	1097,0	863,2	1623,6	1277,5	2536,9	1996,1	4302,1	3384,9	6494,5	5110,0
	12	1189,7	933,6	1760,7	1381,8	2751,1	2159,0	4665,3	3661,2	7042,9	5527,0
	13	1282,4	1003,8	1898,0	1485,7	2965,6	2321,3	5029,1	3936,5	7592,0	5942,6
	14	1375,3	1074,1	2035,5	1589,7	3180,4	2483,9	5393,3	4212,2	8141,9	6358,9
	15	1468,4	1144,6	2173,2	1694,0	3395,6	2646,9	5758,1	4488,6	8692,6	6776,1
	16	1561,5	1215,0	2311,0	1798,1	3611,0	2809,6	6123,4	4764,5	9244,1	7192,6
	17	1654,8	1285,0	2449,1	1901,7	3826,7	2971,5	6489,3	5038,9	9796,4	7606,9
	18	1748,2	1355,5	2587,4	2006,1	4042,8	3134,5	6855,7	5315,5	10349,5	8024,3
	19	1841,8	1425,9	2725,8	2110,3	4259,1	3297,3	7222,5	5591,6	10903,3	8441,2
	20	1935,5	1496,3	2864,5	2214,5	4475,8	3460,2	7590,0	5867,7	11458,1	8858,0
	21	2029,3	1566,7	3003,4	2318,7	4692,8	3623,0	7957,9	6143,8	12013,5	9274,9
	22	2123,3	1637,2	3142,5	2423,0	4910,1	3786,0	8326,4	6420,2	12569,8	9692,1
	23	2217,4	1707,7	3281,7	2527,4	5127,7	3949,0	8695,5	6696,6	13127,0	10109,4
	24	2311,6	1778,3	3421,2	2631,9	5345,6	4112,3	9065,0	6973,5	13684,7	10527,4
	25	2406,0	1849,0	3560,9	2736,5	5563,9	4275,8	9435,2	7250,8	14243,6	10946,1
	26	2500,5	1919,6	3700,8	2841,1	5782,5	4439,2	9805,8	7527,9	14803,1	11364,3
	27	2595,2	1990,4	3840,9	2945,8	6001,4	4602,8	10177,0	7805,4	15363,5	11783,3
	28	2690,0	2061,3	3981,2	3050,7	6220,6	4766,7	10548,8	8083,2	15924,7	12202,6
	29	2784,9	2132,2	4121,7	3155,7	6440,1	4930,7	10921,0	8361,5	16486,6	12622,7
	30	2880,0	2203,2	4262,3	3260,8	6659,9	5095,0	11293,7	8640,0	17049,3	13043,2
	32	3070,5	2345,5	4544,3	3471,3	7100,5	5423,9	12041,0	9197,8	18177,4	13885,2
	34	3261,6	2488,2	4827,2	3682,5	7542,5	5754,0	12790,4	9757,5	19308,8	14730,2
	36	3453,3	2631,3	5110,9	3894,3	7985,8	6084,8	13542,1	10318,5	20443,6	15577,1
	38	3645,5	2774,7	5395,4	4106,6	8430,3	6416,6	14295,9	10881,1	21581,4	16426,4
	40	3836,8	2918,6	5678,4	4319,5	8872,5	6749,3	15045,8	11445,3	22713,6	17278,2

¹⁾Please observe the pressure-/temperature rating

CONTINUATION - Series 455: Blowing-off rates at 5% above set pressure									
Nominal diameter DN		50		65		80		100	
		d ₀ = 45 mm		d ₀ = 59 mm		d ₀ = 72 mm		d ₀ = 90 mm	
Set pressure bar		I	II	I	II	I	II	I	II
Air I	0,2	738,1	622,5	1268,7	1070,0	1889,5	1593,5	2952,3	2489,9
	0,5	1085,0	885,8	1865,2	1522,8	2777,7	2267,7	4340,1	3543,3
Nm ³ /h	1	1562,2	1308,6	2685,4	2249,6	3999,2	3350,1	6248,8	5234,6
	1,5	2015,8	1675,9	3465,2	2880,9	5160,4	4290,3	8063,1	6703,6
Steam II	2	2444,8	2019,9	4202,6	3472,1	6258,6	5170,8	9779,1	8079,4
	2,5	2890,8	2375,1	4969,3	4082,9	7400,5	6080,3	11563,2	9500,5
kg/h ¹⁾	3	3336,9	2728,4	5736,1	4690,2	8542,4	6984,8	13347,5	10913,7
	3,5	3760,3	3061,5	6464,0	5262,8	9626,4	7837,5	15041,2	12246,1
	4	4184,1	3393,7	7192,4	5833,9	10711,2	8688,0	16736,2	13575,0
	4,5	4608,1	3724,9	7921,4	6403,2	11796,8	9535,8	18432,5	14899,6
	5	5032,4	4055,3	8650,8	6971,1	12883,0	10381,6	20129,7	16221,3
	5,5	5457,0	4385,0	9380,7	7537,9	13970,0	11225,6	21828,1	17540,0
	6	5882,0	4713,7	10111,2	8103,0	15057,8	12067,2	23527,8	18854,9
	6,5	6307,2	5042,2	10842,1	8667,6	16146,4	12908,0	25228,8	20168,8
	7	6732,7	5370,8	11573,6	9232,4	17235,8	13749,2	26930,9	21483,1
	7,5	7158,5	5698,6	12305,6	9796,0	18325,9	14588,4	28634,2	22794,4
	8	7584,6	6026,1	13038,1	10359,0	19416,7	15426,9	30338,5	24104,5
	8,5	8011,1	6352,6	13771,1	10920,3	20508,3	16262,8	32044,2	25410,6
	9	8437,8	6679,4	14504,7	11481,9	21600,8	17099,2	33751,2	26717,5
	9,5	8864,9	7005,4	15238,9	12042,4	22694,1	17933,9	35459,6	28021,7
	10	9292,1	7332,0	15973,3	12603,8	23787,9	18770,0	37168,6	29328,1
	11	10147,7	7984,4	17444,0	13725,3	25978,1	20440,1	40590,7	31937,6
	12	11004,5	8635,9	18917,0	14845,3	28171,6	22108,0	44018,2	34543,8
	13	11862,5	9285,3	20391,8	15961,6	30368,0	23770,4	47450,0	37141,3
	14	12721,7	9935,8	21868,8	17079,7	32567,6	25435,6	50886,9	39743,1
	15	13582,3	10587,7	23348,1	18200,4	34770,6	27104,5	54329,0	42350,8
	16	14443,9	11238,4	24829,2	19318,9	36976,3	28770,3	57775,4	44953,6
	17	15306,9	11885,8	26312,7	20431,9	39185,6	30427,7	61227,6	47543,3
	18	16171,1	12538,0	27798,3	21553,1	41397,9	32097,4	64684,3	50152,2
	19	17036,4	13189,4	29285,8	22672,7	43613,2	33764,8	68145,6	52757,4
	20	17903,2	13840,6	30775,9	23792,2	45832,2	35432,0	71612,9	55362,5
	21	18771,1	14492,0	32267,7	24911,9	48053,9	37099,5	75084,2	57968,0
	22	19640,3	15143,9	33762,0	26032,6	50279,3	38768,4	78561,4	60575,7
	23	20510,9	15796,0	35258,4	27153,5	52507,8	40437,7	82043,5	63183,9
	24	21382,4	16449,1	36756,6	28276,2	54739,0	42109,7	85529,6	65796,4
	25	22255,7	17103,2	38257,8	29400,6	56974,6	43784,2	89022,8	68412,8
	26	23129,9	17756,8	39760,5	30524,1	59212,5	45457,3	92519,5	71027,0
	27	24005,5	18411,3	41265,7	31649,3	61454,1	47133,0	96022,0	73645,3
	28	24882,4	19066,6	42773,1	32775,7	63698,9	48810,5	99529,5	76266,4
	29	25760,4	19722,9	44282,4	33904,0	65946,5	50490,7	103041,4	78891,8
	30	26639,6	20380,0	45793,8	35033,4	68197,3	52172,7	106558,3	81519,8
	32	28402,2	21695,6	48823,7	37295,1	72709,6	55540,8	113608,7	86782,5
	34	30170,0	23015,9	51862,6	39564,6	77235,1	58920,6	120679,9	92063,5
	36	31943,1	24339,2	54910,5	41839,4	81774,2	62308,4	127772,2	97356,9
	38	33721,0	25666,2	57966,8	44120,6	86325,8	65705,5	134884,1	102664,9
	40	35490,0	26997,1	61007,7	46408,4	90854,4	69112,6	141960,0	107988,5

¹⁾Please observe the pressure-/temperature rating

Coefficient of discharge α_w i.e. K_{dr} as a function of the relation between the pressures p_{a0}/p_0 of vapours and gases



$$\frac{p_{a0}}{p_0} = \frac{\text{counter pressure bar(a)}}{\text{blow-off pressure bar(a)}} \quad p_{atm} = \text{ambient i.e. atmospheric pressure} = 1,01325 \text{ bar(a)}$$

Example to determine the coefficient of discharge α_w i.e. K_{dr} in relation to the set-pressure p_{set}

Set-pressure	Blow-off pressure
p_{set} bar(g)	p_0 bar(a)
≤ 1	$p_{set} + p_{atm} + 0,1 \text{ bar}$
> 1	$p_{set} \times 1,1 + p_{atm}$

For DN50 ($d_0=45 \text{ mm}$), safety valve set at $= 0,3 \text{ bar(g)}$ and blowing-off into the environment the blow-off pressure is determined as follows:

Set-pressure	0,3	bar(g)
+ Atmospheric pressure	1,01325	bar(a)
+ permissible overpressure	0,1	bar(g)
~ Blow-off pressure	1,41	bar(a)

Consequently:

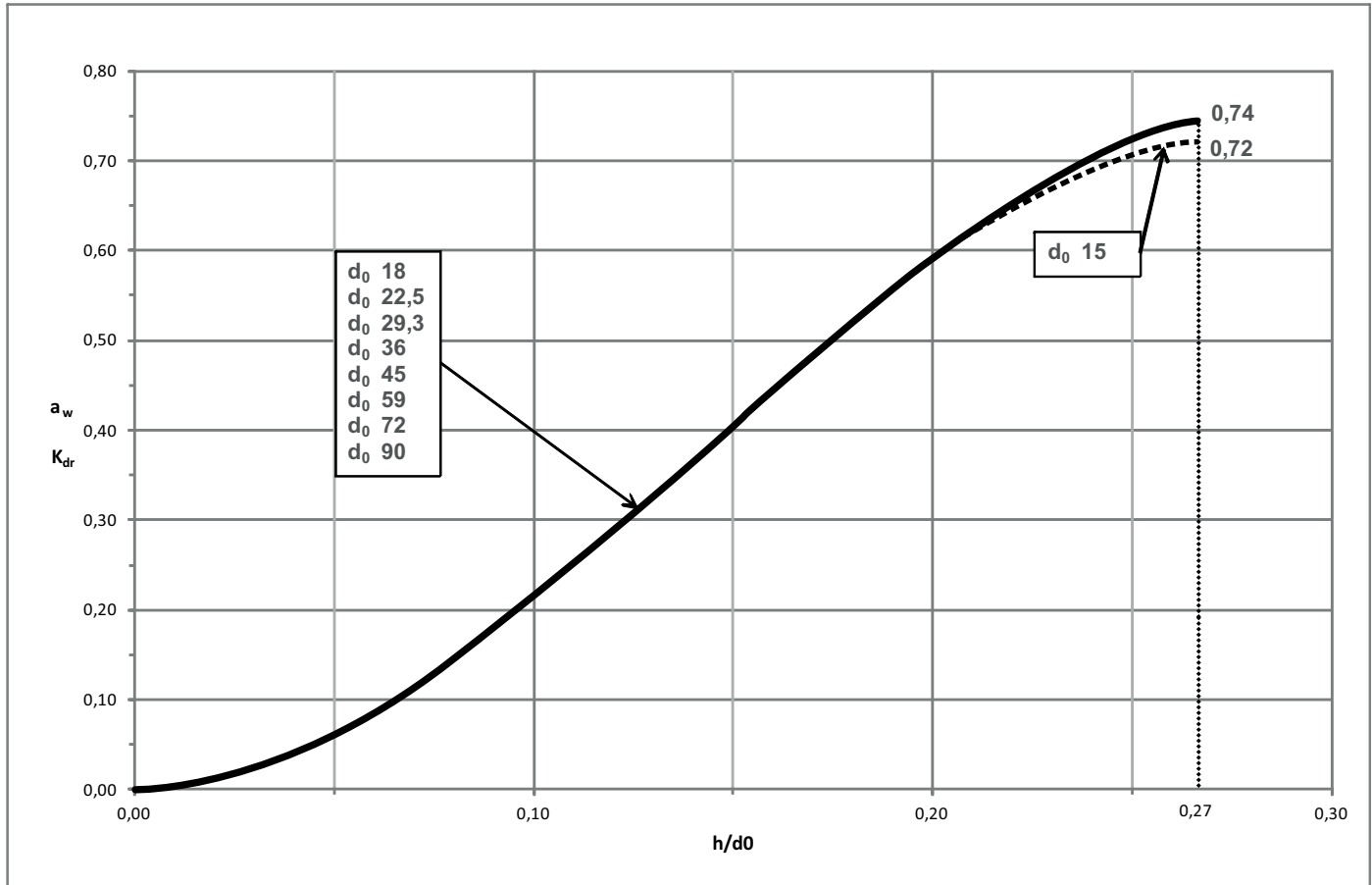
$$\frac{p_{a0}}{p_0} = \frac{1,01325 \text{ bar(a)}}{1,41 \text{ bar(a)}} = 0,72 \quad \text{and extracted from the chart} \quad \alpha_w \text{ i.e. } K_{dr} = 0,62$$

Units:

bar(a) $\hat{=}$ absolute pressure - pressure in relation to absolute vacuum (zero), e.g. $p_{atm} = 1,01325 \text{ bar(a)}$

bar(g) $\hat{=}$ overpressure - pressure above i.e. in relation to $p_{atm} = 1,01325 \text{ bar(a)}$

Coefficient of discharge α_w i.e. K_{dr} as a function of the ratio of stroke / flow diameter h/d_0 of vapours and gases

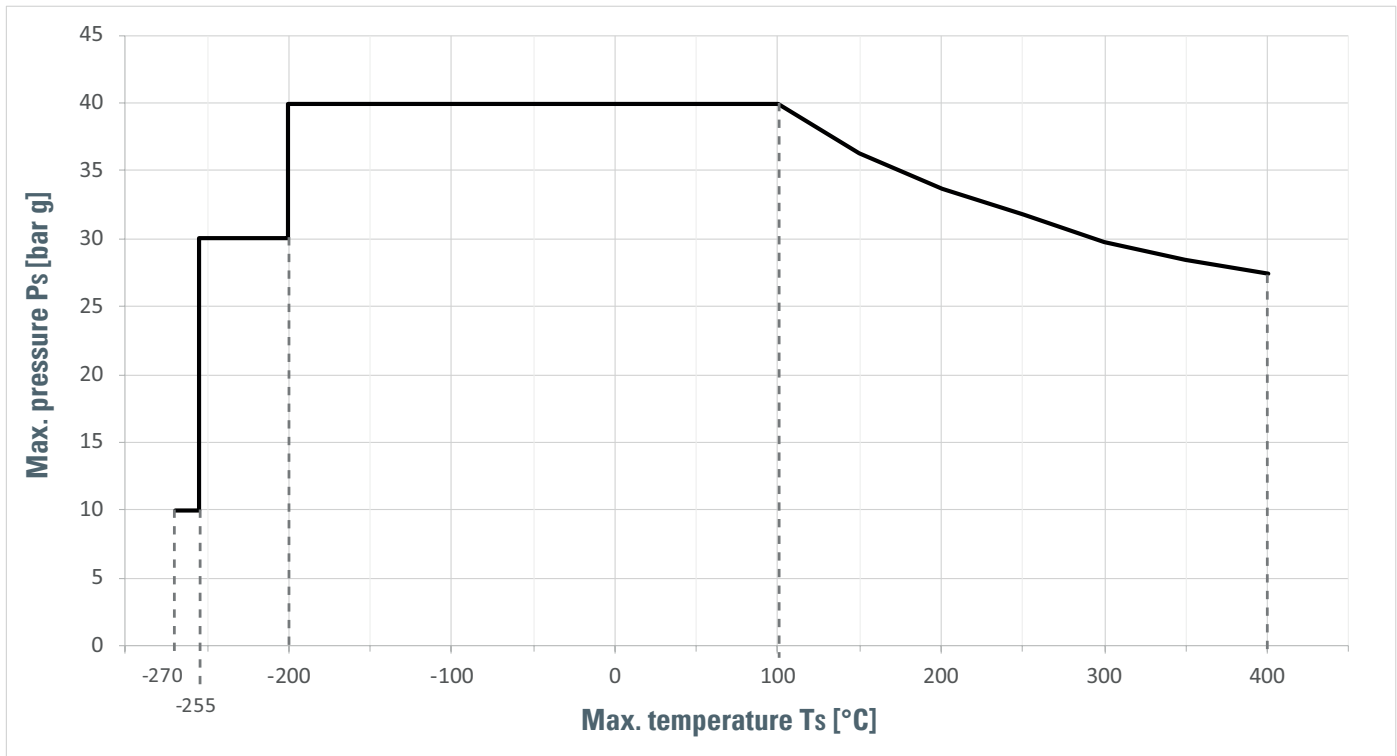


If the capacity of the respective nominal diameter is too high, the minimum necessary stroke can be determined with the required coefficient of discharge α_w bzw. K_{dr} .

The required discharge coefficient α_w / K_{dr} must be specified to determine the necessary stroke limitation.

Pressure-/ temperature rating

PN 40 | Material: 1.4408



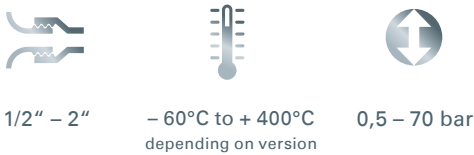
→ Series 451



■ MATERIAL



■ SPECIFICATION



■ SUITABLE FOR

Liquids	neutral and non-neutral	
Air, gases and vapours	neutral and non-neutral	
Steam		

■ EXAMPLES OF USE

For the protection of:

- pressure tanks and -systems for neutral / non-neutral vapours, gases and liquids
- steam boilers and steam plants
- bulk transport vehicles for liquid, granular and dusty goods.¹

Please observe plant-specific regulations and use of appropriate valve version and sealing material.

- chemical plants, biogas plants
- process equipment construction and medical technology (sterilizers, autoclaves)
- secondary areas in the food-, beverage-, pharmaceutical- and cosmetics-industries

Safety valves are set and sealed at the factory.

■ APPROVALS

TÜV-Type test approval 666, 684	D/G, F, F/K/S ¹
EC type examination	S/G, L, F/K/S ¹
ASME	S, G, L
CRN	G
TSG ZF001-2006	D/G (S/G), F (L), F/K/S ¹
KGS	G
TR ZU 032/2013 - TR ZU 010/2011	D/G (S/G), F (L), F/K/S ¹
Requirements	
AD 2000 Data sheet A2	PED 2014/68/EU
TRD 421	ASME-Code Sec. VIII Div. 1
TRB 801 No. 22 and No. 23 ¹	KGS AA 319
DIN EN ISO 4126-1	

■ Classification society

DNVGL	DNVGL
Lloyd's Register EMEA	LR EMEA
American Bureau of Shipping	ABS
Bureau Veritas	BV
Russian Maritime Register of Shipping	RMS

■ MATERIALS

Component	Material	DIN EN	ASME
Inlet body	Stainless steel	1.4404	316 L
Outlet body	Stainless steel	1.4408	CF8M
Internal parts	Stainless steel	1.4404	316 L
Spring	Stainless steel	1.4310	302
Bellows (optional)	Stainless steel	1.4571	316 Ti

¹only for versions with bellows

s	Standard, non-gastight version of the spring housing	for neutral media without counter pressure.
b	with bellows	for neutral and non-neutral media and/or counter pressure up to 4 bar. Spring, moving parts and the environment are protected from being affected by the medium.
t	gastight version of spring housing	for neutral and non-neutral media without counter pressure. The environment is protected from being affected by the medium. Only available without lifting device. This version is not available for inlet / outlet 15/15 and 20/20!
tb	gastight version with bellows	for neutral and non-neutral an particularly for flammable, toxic and environmentally hazardous media and/or counter pressure up to 4 bar. Spring, moving parts and the environment are protected from being affected by the medium. Double gastight.

■ MEDIUM

G	gaseous	Air, vapours, gases and - depending on safety valve version and seal - also for steam
F	liquid	The temperature of the medium under atmospheric pressure must not reach boiling point
GF	gaseous and liquid	Air, vapours, gases, liquids and - depending on safety valve version and seal - also for steam -Not in combination with ASME Approval-

■ TYPE OF LIFTING MECHANISM

K	Standard with twist-type lifting mechanism
L	Lifting lever
O	without lifting device, standard for gastight versions

■ AVAILABLE NOMINAL DIAMETERS AND CONNECTION SIZES

Nominal diameter DN	15	20	25	32		
Inlet	1/2" (15)	3/4" (20)	1" (25)	1 1/4" (32)	1 1/2" (40)	2" (50)
Outlet	1/2" (15)	■				
	3/4" (20)		■*			
	1" (25)	■				
	1 1/4" (32)		■			
	1 1/2" (40)			■		
2" (50)				■	■	■

*20/20: from 20 bar upwards, only available as either „b“ or „tb“ version

■ TYPE OF CONNECTION INLET / OUTLET THREADED CONNECTIONS

f / f	Standard	Female thread BSP-P / Female thread BSP-P	DIN EN ISO 228-1 / DIN EN ISO 228-1
NPT-m/NPT-f		Male thread NPT-m / Female thread NPT-f	ANSI B 1.20.1
m / f		Male thread BSP-P / Female thread BSP-P	DIN EN ISO 228-1 / DIN EN ISO 228-1
BSP-Tm / f		Male thread BSP-T / Female thread BSP-P	DIN EN 10226, ISO 7-1 / DIN EN ISO 228-1

■ SEALS

NBR	Nitrile rubber	Elastomere moulded seal with metallic support up to 25 bar	-30°C to +130°C
EPDM	Ethylene propylene diene	Elastomere moulded seal with metallic support up to 25 bar	-40°C to +170°C
FKM	Fluorcarbon	Elastomere moulded seal with metallic support up to 25 bar	-20°C to +200°C
PTFE	Polytetrafluoroethylene	Flat seal up to 25 bar	-60°C to +225°C
PTFE+Kohle	Polytetrafluoroethylene + carbon	Flat seal from 25 bar	-60°C to +225°C
FFKM	Perfluorinated rubber	Elastomere moulded seal with metallic support up to 25 bar	-10°C to +260°C
MD	Metal-to-metal sealing	Flat seal	-60°C to +400°C

■ NOMINAL DIAMETERS, CONNECTIONS, INSTALLATION DIMENSIONS

Series 451: Connection, installation dimensions, ranges of adjustment											
Nominal diameter	DN	DN15			DN20		DN25	DN32			
Connection DIN EN ISO 228	G	1/2" (15)	1" (25)	1" (25)	3/4" (20)	1 1/4" (32)	1" (25)	1 1/4" (32)	1 1/2" (40)	2" (50)	
Outlet DIN EN ISO 228	G1	1/2" (15)	1" (25)	1" (25)	3/4" (20)	1 1/4" (32)	1 1/2" (40)	2" (50)	2" (50)	2" (50)	
Installation dimensions in mm	L	34	40	40	42	43	50	61	61	61	
	Lmax	65	65	65	91	91	92	92	92	92	
	H / H1	79 / 79	77 / 77	131 / 131	137 / 137	138 / 138	178 / 178	241 / 263	241 / 263	241 / 263	
	H 1 / H1	93 / 93	91 / 91	149 / 149	154 / 154	158 / 158	192 / 192	264 / 286	264 / 286	264 / 286	
	H2 / H21	79 / 79	77 / 77	131 / 131	138 / 138	139 / 139	175 / 175	241 / 263	241 / 263	241 / 263	
	Hmax / Hmax1	105 / 105	103 / 103	164 / 164	169 / 169	173 / 173	207 / 207	277 / 299	277 / 299	277 / 299	
	h	28	30	30	31	39	45	55	69	74	
	h1	15	15	15	16	16	18	20	23	25	
	SW1	30	30	30	36	36	46	55	55	70	
	SW2	-	40	40	32	50	58	70	70	70	
	do	15,8	15,8	15,8	15,8	18	23	30,3	30,3	30,3	
	Coefficients of flow ISO 4126-1	αw /Kdr (F)	0,24	0,3 ²	0,3 ²	0,38	0,54	0,54	0,54	0,54	0,54
		αw /Kdr (D/G) ¹	0,33	0,33	0,33	0,52	0,6	0,56	0,56	0,56	0,56
Coefficients of flow ASME-Code Sec. VIII Div. 1	αw /Kdr (F)	-/-	2,47 ⁴	2,47 ⁴	-/-	0,492	0,492	0,492	0,492	0,492	
	αw /Kdr (D/G)	-/-	3,046 ⁴	3,046 ⁴	-/-	0,659	0,659	0,659	0,659	0,659	
Weight	kg	0,4	0,4	0,8	1	1,0	1,8	4,0	4,0	4,0	
Range of adjustment	bar	0,5 ² -25	0,5 ² -25	25,1-70	0,5 ² -70	0,5-70	0,5-70	0,5-70	0,5-70	0,5-70	
Range of adjustment ASME	psi	-	15-363	363-1015	-	15-1015	15-1015	15-1015	15-1015	15-1015	

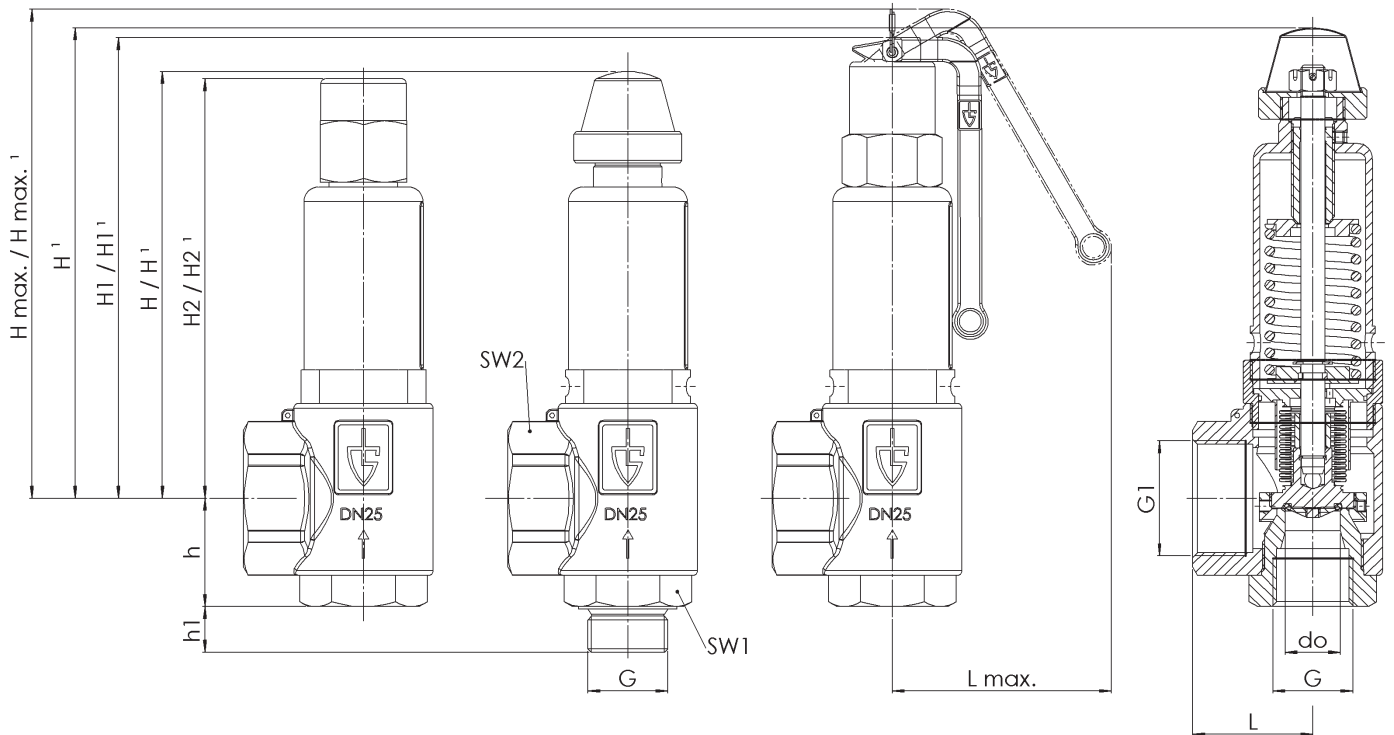
¹Dimension for the version with bellows.

²Version with bellows only available from 1 bar. Flow coefficients with bellows is 0,24.

³Flow coefficients for blow-off pressures > 3,0 bar.

⁴Rated slope value for D/G in scfm/psia; for F in gpm/root(psid) psid = differential pressure before and after the valve.

■ MAIN DIMENSIONS, INSTALLATION DIMENSIONS



Series	Valve version	Medium	Lifting device	Nominal diameter DN	Connection type		Connection size		Seal	Set pressure	Quantity
					Inlet	Outlet	Inlet	Outlet			
451	<i>b</i>	<i>F</i>	<i>L</i>	<i>15</i>	<i>m</i>	<i>f</i>	<i>15</i>	<i>25</i>	<i>EPDM</i>	<i>15,0</i>	<i>2</i>
451											
451											
451											

■ TECHNICAL FINISHES, VARIANTS, ACCESSORIES

S18	Inlet area in hygienic finish by means of a flat seal (despite of an o-ring fixed by a nut)	<input type="checkbox"/>
S60	Pressure sensor connection M5 or G1/4 for monitoring the springhousing (only for valves with bellow)	<input type="checkbox"/>
S62	Inductive proximity sensor, fitted, for indication of valve position, including connection cable 5m	<input type="checkbox"/>

■ PROPERTIES

GOX	Especially for gaseous O2 applications by employment of specific materials including oil- and grease free production process	<input type="checkbox"/>	<input type="checkbox"/>
P01	Oil- and grease-free production	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>

■ CERTIFICATES / APPROVALS

C01	Factory certificate acc. DIN EN 10204 2.2 (WKZ 2.2)	<input type="checkbox"/>	C06	ATEX evaluation acc. to 2014/34/EU	<input type="checkbox"/>
C02	Test certificate acc. DIN EN 10204 3.1 (WPZ 3.1)	<input type="checkbox"/>	C07	SIL evaluation relating to IEC 61508-2	<input type="checkbox"/>
C03	Material test certificate acc. DIN EN 10204 3.1 (MPZ 3.1) (pressure retaining part)	<input type="checkbox"/>	C09	Seat tightness test with helium, leak detection method under vacuum incl. Factory Inspection Certificate 3.1 acc. to DIN EN 10204	<input type="checkbox"/>
C04	TÜV/DEKRA individual inspection acc. EN 10204 3.2 (TÜV/DEKRA-APZ)	<input type="checkbox"/>	C10	Certificate of oil- and grease free production	<input type="checkbox"/>
C05	Sealing material Manufacturer certification (FDA, USP 3, 3-A,...), Please indicate description of certificate:	<input type="checkbox"/>	C11	Certification of the production process especially for gaseous oxygen applications by employment of specific materials	<input type="checkbox"/>

■ ADMISSIONS / ACCREDITATIONS

AA1	EC Type examination acc. to Directive 2014/68/EU	<input type="checkbox"/>	AK1	DNV-GL (DNVGL) type approval	<input type="checkbox"/>
AA2	TÜV component test acc. to VdTÜV specification sheet SV 100	<input type="checkbox"/>	AK2	Lloyd's Register (LR) type approval	<input type="checkbox"/>
AA3	Certification acc. to ASME Boiler and Pressure Vessel Code, Section VIII.Div 1 (ASME) ¹	<input type="checkbox"/>	AK3	American Bureau of Shipping (ABS) type approval	<input type="checkbox"/>
AA4	EAC - certificate/declaration with passport for the valve and laser marking of the valve	<input type="checkbox"/>	AK4	Bureau Veritas (BV) type approval	<input type="checkbox"/>
AA5	Manufacture License of Special Equipment People's Republic of China (ML)	<input type="checkbox"/>	AK5	Russian Maritime Register of Shipping (RMRS) type approval	<input type="checkbox"/>
AA6	Certification acc. to. Korean Gas Safety Corporation (KGS) ^{2,3}	<input type="checkbox"/>	AK6	Registro Italiano Navale (RINA) type approval	<input type="checkbox"/>
AA7	Registration according to Canadian Registration Number (CRN) ⁴	<input type="checkbox"/>	AL	Individual inspection by notified body inspector – (body to be indicated):	<input type="checkbox"/>

¹ASME not for gases in combination with liquids | ²KGS only for gases | ³KGS from 10 bar and only in combination with ASME | ⁴CRN only in combination with ASME

■ ENQUIRY

Copy and send to: order@goetze-armaturen.de.

Order form easily to be found online under the section for each series.

Series 451: Blowing-off rates at 10% above set pressure											
Nominal diameter DN	15				20						
	Bellows				do = 15,8		do = 18				
Set pressure bar	I	II	III without	III with	I	II	III	I	II	III	
0,5	56**	42**	2,3**	1,9**	64**	48**	2,9**	127	96	5,4	
1	87	69	3,1	2,5	120	96	4,0	189	151	7,3	
Air I	1,5	113	90	3,8	3,1	166	132	4,9	252	200	9,0
Nm³/h	2	141	111	4,4	3,6	205	161	5,6	316	249	10,4
2,5	165	129	5,0	4,0	250	196	6,3	383	300	11,6	
Steam II	3	189	148	5,4	4,4	298	233	6,9	447	349	12,7
kg/h	3,5	214	166	5,9	4,7	336	262	7,4	504	392	13,7
4	238	184	6,3	5,0	375	291	8,0	561	435	14,7	
Water III	4,5	262	203	6,7	5,3	413	319	8,4	618	478	15,6
m³/h	5	286	221	7,0	5,6	451	348	8,9	675	521	16,4
5,5	310	239	7,4	5,9	489	377	9,3	732	564	17,2	
6	335	257	7,7	6,2	527	406	9,7	790	608	18,0	
6,5	359	275	8,0	6,4	565	434	10,1	847	650	18,7	
7	383	293	8,3	6,6	604	462	10,5	904	692	19,4	
7,5	407	311	8,6	6,9	642	491	10,9	961	735	20,1	
8	431	329	8,9	7,1	680	519	11,3	1018	777	20,8	
8,5	456	347	9,2	7,3	718	547	11,6	1075	820	21,4	
9	480	365	9,4	7,5	756	576	11,9	1132	862	22,0	
9,5	504	383	9,7	7,7	794	604	12,3	1190	905	22,6	
10	528	401	9,9	7,9	833	632	12,6	1247	947	23,2	
11	577	437	10,4	8,3	909	688	13,2	1361	1031	24,3	
12	625	472	10,9	8,7	985	744	13,8	1475	1115	25,4	
13	674	508	11,3	9,1	1061	801	14,3	1590	1199	26,5	
14	722	544	11,8	9,4	1138	857	14,9	1704	1284	27,5	
15	770	580	12,2	9,7	1214	914	15,4	1818	1368	28,4	
16	819	616	12,6	10,1	1290	970	15,9	1932	1453	29,4	
17	867	650	13,0	10,4	1367	1025	16,4	2047	1535	30,3	
18	916	686	13,3	10,7	1443	1081	16,9	2161	1619	31,1	
19	964	721	13,7	11,0	1519	1137	17,3	2275	1703	32,0	
20	1013	757	14,0	11,2	1596	1193	17,8	2390	1787	32,8	
21	1061	793	14,4	11,5	1672	1250	18,2	2504	1872	33,6	
22	1109	829	14,7	11,8	1748	1306	18,7	2618	1956	34,4	
23	1158	865	15,1	12,1	1825	1363	19,1	2732	2040	35,2	
24	1206	900	15,4	12,3	1901	1419	19,5	2847	2125	35,9	
25	1255	936	15,7	12,6	1977	1475	19,9	2961	2209	36,7	
26	1303	972*	16,0	12,8	2054	1532	20,3	3075	2294*	37,4	
27	1352	1008*	16,3	13,1	2130	1589	20,7	3190	2379*	38,1	
28	1400	1044*	16,6	13,3	2206	1646	21,1	3304	2465*	38,8	
29	1449	1081*	16,9	13,5	2283	1703	21,4	3418	2550*	39,5	
30	1497	1114*	17,2	13,8	2359	1755	21,8	3532	2628*	40,2	
32	1594	1186*	17,8	14,2	2511	1869	22,5	3761	2799*	41,5	
34	1691	1258*	18,3	14,7	2664	1982	23,2	3990	2969*	42,8	
36	1788	1330*	18,8	15,1	2817	2096	23,9	4218	3139*	44,0	
38	1884	1402*	19,4	15,5	2969	2209	24,5	4447	3309*	45,2	
40	1981	1474*	19,9	15,9	3122	2323	25,2	4675	3479*	46,4	
42	2078	1547*	20,4	16,3	3275	2437	25,8	4904	3650*	47,6	
44	2175	1619*	20,8	16,7	3427	2551	26,4	5132	3821*	48,7	
46	2272	1692*	21,3	17,0	3580	2666	27,0	5361	3992*	49,8	
48	2369	1764*	21,8	17,4	3732	2780	27,6	5589	4163*	50,8	
50	2466	1837*	22,2	17,8	3885	2895	28,1	5818	4335*	51,9	
52	2562	1910*	22,7	18,1	4038	3009	28,7	6047	4506*	52,9	
54	2659	1984*	23,1	18,5	4190	3126	29,2	6275	4681*	53,9	
56	2756	2061*	23,5	18,8	4343	3248	29,8	6504	4868*	54,9	
58	2853	2136*	23,9	19,1	4496	3366	30,3	6732	5040*	55,9	
60	2950	2209*	24,3	19,5	4648	3481	30,8	6961	5213*	56,8	
62	3047	2282*	24,7	19,8	4801	3596	31,3	7189	5385*	57,8	
64	3144	2355*	25,1	20,1	4954	3711	31,8	7418	5558*	58,7	
66	3240	2428*	25,5	20,4	5106	3827	32,3	7647	5730*	59,6	
68	3337	2502*	25,9	20,7	5259	3943	32,8	7875	5905*	60,5	
70	3434	2578*	26,3	21,0	5411	4062	33,3	8104	6082*	61,4	

*) only possible with metal-to-metal sealing

**) Version with bellows only available from 1 bar

CONTINUATION - Series 451: Blowing-off rates at 10% above set pressure							
Nominal diameter DN		25			32		
Set pressure bar		I	II	III	I	II	III
Air I Nm ³ /h	0,5	199	150	8,8	353	266	15,4
	1	291	232	12,0	515	411	20,8
	1,5	390	309	14,7	683	542	25,5
	2	489	385	16,9	832	656	29,4
	2,5	583	457	18,9	1012	793	32,9
Steam II kg/h	3	681	532	20,8	1182	924	36,0
	3,5	768	597	22,4	1333	1036	38,9
Water III m ³ /h	4	855	663	24,0	1484	1151	41,6
	4,5	942	729	25,4	1635	1265	44,1
	5	1029	794	26,8	1786	1378	46,5
	5,5	1116	860	28,1	1937	1492	48,8
	6	1203	926	29,3	2088	1607	50,9
	6,5	1290	990	30,5	2239	1719	53,0
	7	1377	1054	31,7	2390	1830	55,0
	7,5	1464	1119	32,8	2542	1943	56,9
	8	1552	1184	33,9	2693	2056	58,8
	8,5	1639	1249	34,9	2844	2168	60,6
	9	1726	1314	35,9	2995	2281	62,4
	9,5	1813	1379	36,9	3146	2392	64,1
	10	1900	1443	37,9	3297	2504	65,8
	11	2074	1571	39,7	3599	2727	69,0
	12	2248	1699	41,5	3902	2948	72,0
	13	2422	1827	43,2	4204	3172	75,0
	14	2596	1957	44,8	4506	3396	77,8
	15	2771	2085	46,4	4808	3618	80,5
	16	2945	2214	47,9	5111	3842	83,2
	17	3119	2339	49,4	5413	4059	85,7
	18	3293	2467	50,8	5715	4281	88,2
	19	3467	2594	52,2	6017	4503	90,6
	20	3641	2723	53,6	6320	4726	93,0
	21	3816	2852	54,9	6622	4950	95,3
	22	3990	2981	56,2	6924	5173	97,5
23	4164	3109	57,5	7226	5396	99,7	
24	4338	3238	58,7	7529	5619	101,9	
25	4512	3366	59,9	7831	5842	104,0	
26	4686	3496*	61,1	8133	6067*	106,0	
27	4860	3626*	62,3	8435	6293*	108,0	
28	5035	3756*	63,4	8738	6518*	110,0	
29	5209	3886*	64,5	9040	6744*	112,0	
30	5383	4005*	65,6	9342	6951*	113,9	
32	5731	4265*	67,8	9947	7401*	117,6	
34	6080	4524*	69,9	10551	7851*	121,2	
36	6428	4783*	71,9	11156	8301*	124,8	
38	6776	5042*	73,9	11760	8751*	128,2	
40	7124	5301*	75,8	12365	9200*	131,5	
42	7473	5562*	77,6	12969	9653*	134,8	
44	7821	5823*	79,5	13574	10105*	137,9	
46	8169	6083*	81,3	14178	10558*	141,0	
48	8518	6344*	83,0	14783	11011*	144,1	
50	8866	6606*	84,7	15387	11464*	147,0	
52	9214	6867*	86,4	15992	11917*	149,9	
54	9563	7134*	88,0	16596	12380*	152,8	
56	9911	7412*	89,7	17200	12864*	155,6	
58	10259	7681*	91,2	17805	13330*	158,4	
60	10608	7943*	92,8	18409	13786*	161,1	
62	10956	8206*	94,3	19014	14242*	163,7	
64	11304	8469*	95,8	19618	14699*	166,3	
66	11652	8732*	97,3	20223	15155*	168,9	
68	12001	8998*	98,8	20827	15616*	171,5	
70	12349	9269*	100,2	21432	16086*	174,0	

*) only possible with metal-to-metal sealing
 **) Version with bellows only available from 1 bar

Series 451: Blowing-off rates at 10% above set pressure													
Nominal diameter DN		15			20			25			32		
		d0 = 0,622 inch (15,8 mm)			d0 = 0,709 inch (18 mm)			d0 = 0,906 inch (23 mm)			d0 = 1,193 inch (30,3 mm)		
Set pressure psi(g)		I	II	III	I	II	III	I	II	III	I	II	III
Air I	15	80,8	226,9	12,9	155,9	437,7	31,2	254,5	714,7	51,0	441,8	1240,4	88,5
	30	117,9	331,0	17,5	227,4	638,5	42,3	371,3	1042,5	69,1	644,4	1809,3	119,9
SCFM	40	145,1	407,4	20,2	279,9	785,8	48,8	456,9	1282,9	79,8	793,0	2226,6	138,4
	50	172,3	483,7	22,6	332,3	933,0	54,6	542,6	1523,4	89,2	941,6	2643,8	154,8
Steam II	60	199,5	560,1	24,7	384,7	1080,3	59,8	628,2	1763,8	97,7	1090,2	3061,1	169,5
	70	226,7	636,4	26,7	437,2	1227,5	64,6	713,8	2004,2	105,5	1238,8	3478,3	183,1
	87	272,9	766,2	29,8	526,3	1477,8	72,0	859,4	2412,9	117,6	1491,5	4187,6	204,1
Water III	90	281,1	789,1	30,3	542,1	1522,0	73,3	885,1	2485,0	119,6	1536,1	4312,8	207,6
	100	308,3	865,4	31,9	594,5	1669,3	77,2	970,7	2725,4	126,1	1684,7	4730,1	218,9
GPM	110	335,5	941,8	33,5	647,0	1816,5	81,0	1056,3	2965,9	132,3	1833,3	5147,3	229,5
	120	362,6	1018,1	35,0	699,4	1963,8	84,6	1141,9	3206,3	138,1	1981,9	5564,6	239,7
	130	389,8	1094,4	36,4	751,9	2111,0	88,1	1227,6	3446,7	143,8	2130,5	5981,8	249,5
	140	417,0	1170,8	37,8	804,3	2258,3	91,4	1313,2	3687,1	149,2	2279,1	6399,0	259,0
	150	444,2	1247,1	39,1	856,7	2405,5	94,6	1398,8	3927,5	154,4	2427,7	6816,3	268,0
	160	471,4	1323,5	40,4	909,2	2552,8	97,7	1484,5	4167,9	159,5	2576,3	7233,5	276,8
	170	498,6	1399,8	41,7	961,6	2700,0	100,7	1570,1	4408,4	164,4	2724,9	7650,8	285,4
	180	525,8	1476,1	42,9	1014,1	2847,3	103,6	1655,7	4648,8	169,2	2873,5	8068,0	293,6
	190	553,0	1552,5	44,0	1066,5	2994,5	106,5	1741,3	4889,2	173,8	3022,1	8485,3	301,7
	200	580,2	1628,8	45,2	1119,0	3141,8	109,2	1827,0	5129,6	178,3	3170,7	8902,5	309,5
	210	607,4	1705,2	46,3	1171,4	3289,0	111,9	1912,6	5370,0	182,7	3319,3	9319,8	317,2
	220	634,6	1781,5	47,4	1223,9	3436,3	114,6	1998,2	5610,4	187,0	3467,9	9737,0	324,6
	230	661,8	1857,8	48,4	1276,3	3583,5	117,1	2083,8	5850,9	191,2	3616,5	10154,3	331,9
	240	688,9	1934,2	49,5	1328,7	3730,8	119,7	2169,5	6091,3	195,4	3765,1	10571,5	339,1
	250	716,1	2010,5	50,5	1381,2	3878,0	122,1	2255,1	6331,7	199,4	3913,8	10988,8	346,0
	260	743,3	2086,9	51,5	1433,6	4025,3	124,5	2340,7	6572,1	203,3	4062,4	11406,0	352,9
	270	770,5	2163,2	52,5	1486,1	4172,5	126,9	2426,3	6812,5	207,2	4211,0	11823,3	359,6
	280	797,7	2239,5	53,5	1538,5	4319,8	129,2	2512,0	7052,9	211,0	4359,6	12240,5	366,2
	290	824,9	2315,9	54,4	1591,0	4467,0	131,5	2597,6	7293,3	214,8	4508,2	12657,8	372,7
	300	852,1	2392,2	55,3	1643,4	4614,3	133,8	2683,2	7533,8	218,4	4656,8	13075,0	379,1
	320	906,5	2544,9	57,1	1748,3	4908,8	138,2	2854,5	8014,6	225,6	4954,0	13909,5	391,5
	340	960,9	2697,6	58,9	1853,2	5203,2	142,4	3025,7	8495,4	232,5	5251,2	14744,0	403,6
	360	1015,3	2850,3	60,6	1958,1	5497,7	146,5	3197,0	8976,3	239,3	5548,4	15578,5	415,3
	380	1069,6	3002,9	62,3	2063,0	5792,2	150,6	3368,2	9457,1	245,8	5845,6	16413,0	426,6
	400	1124,0	3155,6	63,9	2167,9	6086,7	154,5	3539,5	9937,9	252,2	6142,8	17247,5	437,7
	420	1178,4	3308,3	65,5	2272,7	6381,2	158,3	3710,7	10418,8	258,4	6440,1	18082,0	448,5
	440	1232,8	3461,0	67,0	2377,6	6675,7	162,0	3882,0	10899,6	264,5	6737,3	18916,5	459,1
	460	1287,2	3613,7	68,5	2482,5	6970,2	165,7	4053,2	11380,4	270,5	7034,5	19750,9	469,4
	480	1341,6	3766,3	70,0	2587,4	7264,7	169,2	4224,5	11861,3	276,3	7331,7	20585,4	479,5
	500	1395,9	3919,0	71,4	2692,3	7559,2	172,7	4395,8	12342,1	282,0	7628,9	21419,9	489,4
	550	1531,9	4300,7	74,9	2954,5	8295,5	181,1	4823,9	13544,2	295,7	8371,9	23506,2	513,3
	600	1667,9	4682,4	78,3	3216,7	9031,7	189,2	5252,0	14746,2	308,9	9115,0	25592,4	536,1
	650	1803,8	5064,1	81,4	3479,0	9768,0	196,9	5680,1	15948,3	321,5	9858,0	27678,6	558,0
	700	1939,8	5445,8	84,5	3741,2	10504,2	204,3	6108,3	17150,4	333,6	10601,0	29764,9	579,0
	750	2075,7	5827,5	87,5	4003,4	11240,5	211,5	6536,4	18352,5	345,4	11344,1	31851,1	599,4
	800	2211,7	6209,2	90,4	4265,6	11976,7	218,5	6964,5	19554,6	356,7	12087,1	33937,3	619,0
	850	2347,7	6590,9	93,1	4527,8	12713,0	225,2	7392,7	20756,6	367,7	12830,1	36023,6	638,1
	900	2483,6	6972,6	95,8	4790,1	13449,2	231,7	7820,8	21958,7	378,3	13573,2	38109,8	656,6
	950	2619,6	7354,3	98,5	5052,3	14185,4	238,1	8248,9	23160,8	388,7	14316,2	40196,0	674,6
	1015	2796,3	7850,5	101,8	5393,2	15142,6	246,1	8805,5	24723,5	401,8	15282,1	42908,1	697,3

→ Series 420



■ MATERIAL



■ SPECIFICATION



1/4" – 3/8"



– 40°C to + 260°C
depending on version



0,5 – 50 bar
depending on version

■ SUITABLE FOR

Liquids	neutral and non-neutral	
Air, gases and vapours	neutral and non-neutral	
Steam		

■ EXAMPLES OF USE

For the protection of:

- pressure tanks and -systems for neutral / non-neutral vapours, gases and liquids
- steam boilers and steam plants

Please observe plant-specific regulations and use of appropriate valve version and sealing material.

- chemical plants, biogas plants
- process technology
- desalination plants
- process equipment construction and medical technology
- shipbuilding industry and marine equipment
- secondary areas in the food-, beverage-, pharmaceutical- and cosmetics-industries
- offshore-applications
- general applications with screwed pipe connections

Safety valves are set and sealed at the factory.

■ APPROVALS

TÜV-Type test approval 2069	D/G, F, F/K/S ¹
EC type examination	S/G, L, F/K/S ¹
TR ZU 032/2013 - TR ZU 010/2011	D/G (S/G), F (L), F/K/S ¹
Requirements	
AD 2000 Data sheet A2	DIN EN ISO 4126-1
TRD 421	PED 2014/68/EU
TRB 801 No. 22 and No. 23 ¹	

Classification society

DNVGL	DNVGL
Lloyd's Register EMEA	LR EMEA
American Bureau of Shipping	ABS
Bureau Veritas	BV
Russian Maritime Register of Shipping	RS
Registro Italiano Navale	RINA

■ MATERIALS

Component	Material	DIN EN	ASME
Inlet body	Stainless steel	1.4404	316 L
Outlet body	Stainless steel	1.4404	316 L
Internal parts	Stainless steel	1.4404	316 L
Spring	Stainless steel	1.4310	302
Metallic bellows (optional)	Stainless steel	1.4571	316 Ti
PTFE-bellows (optional)	PTFE	PTFE	PTFE

¹only for versions with bellows

t	gastight version of spring housing	for neutral and non-neutral media without counter pressure. The environment is protected from being affected by the medium. 0,5 to 1,5 bar gastight version (without bellows).
tb	gastight version with bellows	for neutral and non-neutral media. spring and moving parts as the environment are protected from being affected by the medium. Version of bellows depending on set pressure: DN8: 1,6 to 12 bar PTFE bellows; 12,1 to 50 bar stainless steel bellows DN10: 1,6 to 12 bar PTFE bellows; 12,1 to 50 bar stainless steel bellows

■ MEDIUM

GF	gaseous and liquid	Air, vapours, gases, liquids and - depending on seal - also for steam Only for steam boilers <10l
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■ TYPE OF LIFTING MECHANISM

L	Lifting lever
0	without lifting device

■ AVAILABLE NOMINAL DIAMETERS AND CONNECTION SIZES

Nominal diameter DN		8			10		
Inlet		1/4" (8)	KV (8mm)	KV (10mm)	3/8" (10)	KV (10mm)	KV (12mm)
Outlet	3/8" (10)	■	■	■	■	■	■
	KV (12mm)	■	■	■	■	■	■

■ TYPE OF CONNECTION INLET / OUTLET THREADED CONNECTIONS

m / f	Standard	Male thread BSP-P / Female thread BSP-P	DIN EN ISO 228-1 / DIN EN ISO 228-1
SV / f		Cutting ring threaded connection / female thread BSP-P	EN ISO 8434-1 / DIN EN ISO 228-1
KV / KV		Screw compression fitting / Screw compression fitting	EN ISO 8434-1 / EN ISO 8434-1

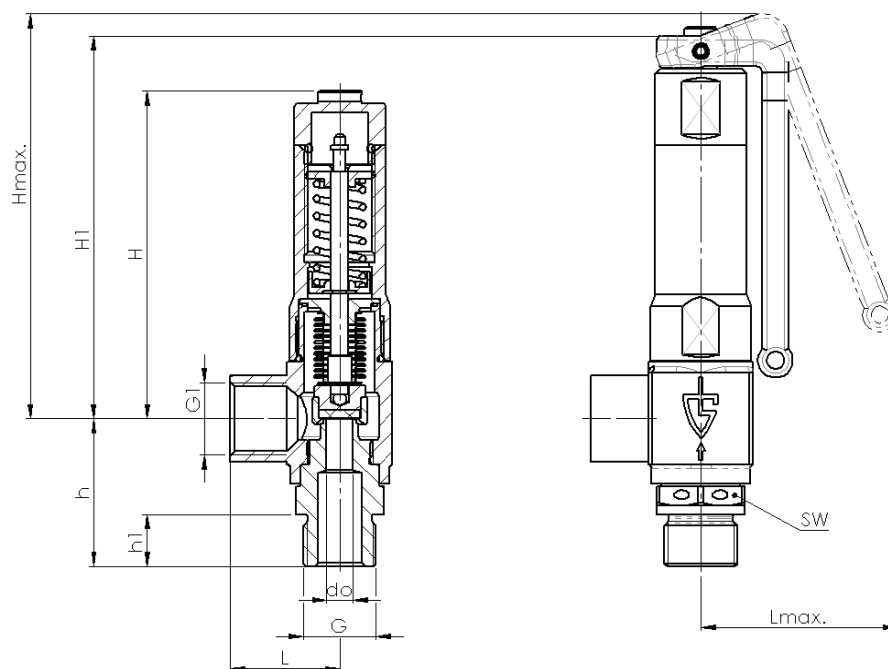
■ SEALS

EPDM	Ethylene propylene diene	Elastomere moulded seal	-40°C to +170°C
FKM	Fluorcarbon	Elastomere moulded seal	-20°C to +200°C
FFKM	Perfluorinated rubber	Elastomere moulded seal	-10°C to +260°C
PTFE	Polytetrafluoroethylene	Flat seal	-40°C to +225°C

■ NOMINAL DIAMETERS, CONNECTIONS, INSTALLATION DIMENSIONS

Series 420: Connection, installation dimensions, ranges of adjustment				
Nominal diameter	DN	8		10
Connection DIN EN ISO 228	G	1/4" (8)		3/8" (10)
Outlet DIN EN ISO 228	G1	3/8" (10)		3/8" (10)
Installation dimensions in mm	L	25		25
	Lmax	45		45
	H	75		75
	H1	87		87
	Hmax	93		93
	h	34		34
	h1	12		12
	SW	20		20
Weight	kg	0,3 / 0,4		0,25 / 0,35
	bar	0,5-50		0,5-50

■ MAIN DIMENSIONS, INSTALLATION DIMENSIONS



Series 420 ■ INDIVIDUAL SELECTION / VALVE CONFIGURATION

Series	Valve version	Medium	Lifting device	Nominal diameter DN	Connection type		Connection size		Seal	Options	Set pressure	Quantity
					Inlet	Outlet	Inlet	Outlet				
420	tb	GF	L	8	m	f	8	10	FFKM		5,5	2
420	t	GF	O	10	SV	f	10mm	10	EPDM		1,0	1
420		GF										
420		GF										

■ PROPERTIES

GOX	Especially for gaseous O2 applications by employment of specific materials including oil- and grease free production process	<input type="checkbox"/>	<input type="checkbox"/>
P01	Oil- and grease-free production	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>

■ CERTIFICATES / APPROVALS

C01	Factory certificate acc. DIN EN 10204 2.2 (WKZ 2.2)	<input type="checkbox"/>	C06	ATEX evaluation acc. to 2014/34/EU	<input type="checkbox"/>
C02	Test certificate acc. DIN EN 10204 3.1 (WPZ 3.1)	<input type="checkbox"/>	C07	SIL evaluation relating to IEC 61508-2	<input type="checkbox"/>
C03	Material test certificate acc. DIN EN 10204 3.1 (MPZ 3.1) (pressure retaining part)	<input type="checkbox"/>	C09	Seat tightness test with helium, leak detection method under vacuum incl. Factory Inspection Certificate 3.1 acc. to DIN EN 10204	<input type="checkbox"/>
C04	TÜV/DEKRA individual inspection acc. EN 10204 3.2 (TÜV/DEKRA-APZ)	<input type="checkbox"/>	C10	Certificate of oil- and grease free production	<input type="checkbox"/>
C05	Sealing material Manufacturer certification (FDA, USP 3, 3-A,...), Please indicate description of certificate: _____	<input type="checkbox"/>	C11	Certification of the production process especially for gaseous oxygen applications by employment of specific materials	<input type="checkbox"/>

■ ADMISSIONS / ACCREDITATIONS

AA1	EC Type examination acc. to Directive 2014/68/EU	<input type="checkbox"/>	AK1	DNV-GL (DNVGL) type approval	<input type="checkbox"/>
AA2	TÜV component test acc. to VdTÜV specification sheet SV 100	<input type="checkbox"/>	AK2	Lloyd's Register (LR) type approval	<input type="checkbox"/>
AA4	EAC - certificate/declaration with passport for the valve and laser marking of the valve	<input type="checkbox"/>	AK3	American Bureau of Shipping (ABS) type approval	<input type="checkbox"/>
		<input type="checkbox"/>	AK4	Bureau Veritas (BV) type approval	<input type="checkbox"/>
		<input type="checkbox"/>	AK5	Russian Maritime Register of Shipping (RMRS) type approval	<input type="checkbox"/>
		<input type="checkbox"/>	AK6	Registro Italiano Navale (RINA) type approval	<input type="checkbox"/>
		<input type="checkbox"/>	AL	Individual inspection by notified body inspector – (body to be indicated): _____	<input type="checkbox"/>

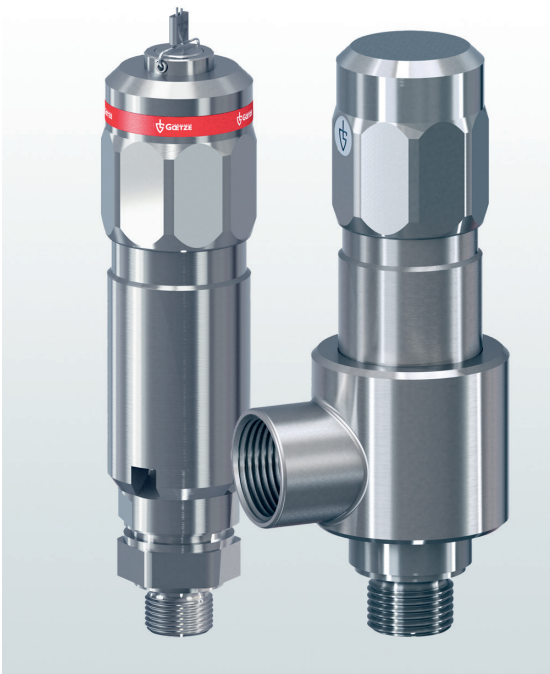
■ ENQUIRY

Copy and send to: order@goetze-armaturen.de.

Order form easily to be found online under the section for each series.

Series 420: Blowing-off rates at 10% above set pressure							
Nominal diameter DN		DN8			DN10		
Set pressure bar		I	II	III	I	II	III
Air I Nm ³ /h	0,50	10	8	0,39	15	12	0,46
	1,00	16	13	0,53	23	18	0,62
	1,50	21	17	0,65	30	23	0,76
Steam II kg/h	2,00	28	22	0,75	38	30	0,88
	2,50	32	25	0,84	45	35	0,98
	3,00	37	29	0,92	52	41	1,07
Water III m ³ /h	3,50	42	33	0,99	59	46	1,16
	4,00	47	36	1,06	65	51	1,24
	4,50	52	40	1,12	72	56	1,31
	5,00	56	43	1,18	79	61	1,38
	5,50	61	47	1,24	85	66	1,45
	6,00	66	51	1,29	92	71	1,52
	6,50	71	54	1,35	99	76	1,58
	7,00	75	58	1,40	105	81	1,64
	7,50	80	61	1,45	112	86	1,70
	8,00	85	65	1,49	119	91	1,75
	8,50	90	68	1,54	125	96	1,80
	9,00	94	72	1,59	132	101	1,86
	9,50	99	75	1,63	139	106	1,91
	10,00	104	79	1,67	145	110	1,96
	11,00	113	86	1,75	159	120	2,05
	12,00	123	93	1,83	172	130	2,14
	13,00	132	100	1,91	185	140	2,23
	14,00	142	107	1,98	199	150	2,32
	15,00	151	114	2,05	212	160	2,40
	16,00	161	121	2,11	225	169	2,48
	17,00	171	128	2,18	239	179	2,55
	18,00	180	135	2,24	252	189	2,63
	19,00	190	142	2,30	265	199	2,70
	20,00	199	149	2,36	279	208	2,77
	21,00	209	156	2,42	292	218	2,84
	22,00	218	163	2,48	305	228	2,90
	23,00	228	170	2,53	319	238	2,97
24,00	237	177	2,59	332	248	3,03	
25,00	247	184	2,64	345	258	3,09	
26,00	256	191	2,69	359	268	3,16	
27,00	266	198	2,75	372	278	3,22	
28,00	275	205	2,80	385	287	3,28	
29,00	285	212	2,85	399	297	3,33	
30,00	294	219	2,89	412	307	3,39	
32,00	313	233	2,99	439	326	3,50	
34,00	332	247	3,08	465	346	3,61	
36,00	351	262	3,17	492	366	3,71	
38,00	370	276	3,26	519	386	3,82	
40,00	390	290	3,34	545	406	3,91	
42,00	409	304	3,42	572	426	4,01	
44,00	428	318	3,50	599	446	4,11	
46,00	447	333	3,58	625	466	4,20	
48,00	466	347	3,66	652	486	4,29	
50,00	485	361	3,74	679	506	4,38	

→ **Series 492**



■ SUITABLE FOR

Air, gases and vapours	neutral and non-neutral	
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■ EXAMPLES OF USE

For the protection of:
 - pressure tanks and
 - pressure systems
 for air and other neutral and non-neutral gases.
 Please observe plant-specific regulations and use of appropriate valve version and sealing material.

- high-pressure compressors
- pressure tanks
- pressure cylinder pack
- CNG-applications

Safety valves are set and sealed at the factory.

■ APPROVALS

TÜV Type test approval 2076	D/G
EC type examination	S/G
ASME	G
CRN	G
TSG ZF001-2006	D/G (S/G)
KGS	G
TR ZU 032/2013 - TR ZU 010/2011	D/G (S/G)
Requirements	
AD 2000 Data sheet A2 DIN EN ISO 4126-1 PED 2014/68/EU	ASME-Code Sec. VIII Div. 1 KGS AA 319

Classification society

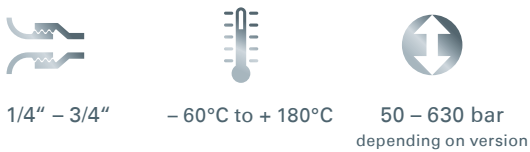
DNVGL	DNVGL
Lloyd's Register EMEA	LR EMEA
Bureau Veritas	BV
Russian Maritime Register of Shipping	RS



■ MATERIAL



■ SPECIFICATION



■ MATERIALS

Component	Material	DIN EN	ASME
Inlet body	Stainless steel	1.4404	316 L
Outlet body	Stainless steel	1.4404	316 L
Internal parts	Stainless steel	1.4404	316 L
Spring	Spring steel	VDSiCr	

Series 492 ■ VALVE VERSION

s	Standard	cylindrical form, atmospheric discharge, for air and similar neutral, non-toxic and non-flammable gases that can be freely discharged into the atmosphere.
t	gastight version of spring housing	for neutral and non-neutral media, not counter pressure compensated. The environment is protected from being affected by the medium. Only available for version with angled body and without lifting device.

■ MEDIUM

G	gaseous	Air and similar neutral and non-neutral gases
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■ TYPE OF LIFTING MECHANISM

K	Standard with twist-type lifting mechanism
O	without lifting device

■ AVAILABLE NOMINAL DIAMETERS AND CONNECTION SIZES

Nominal diameter DN		10				15		
Inlet		1/4" (8)	3/8" (10)	1/2" (15)	3/4" (20)	3/8" (10)	1/2" (15)	3/4" (20)
Outlet	Atmospheric discharge via outlet apertures	■	■	■	■	■	■	■
	1/2" (15)	■	■	■	■	■	■	■
	3/4" (20)	■	■	■	■	■	■	■
	1" (25)	■	■	■	■	■	■	■

■ TYPE OF CONNECTION INLET / OUTLET THREADED CONNECTIONS

m / -	Standard	Male thread BSP-P / -	DIN EN ISO 228-1 / -
m / f	with positionable angled body	Male thread BSP-P / Female thread BSP-P	DIN EN ISO 228-1 / DIN EN ISO 228-1

■ SEALS

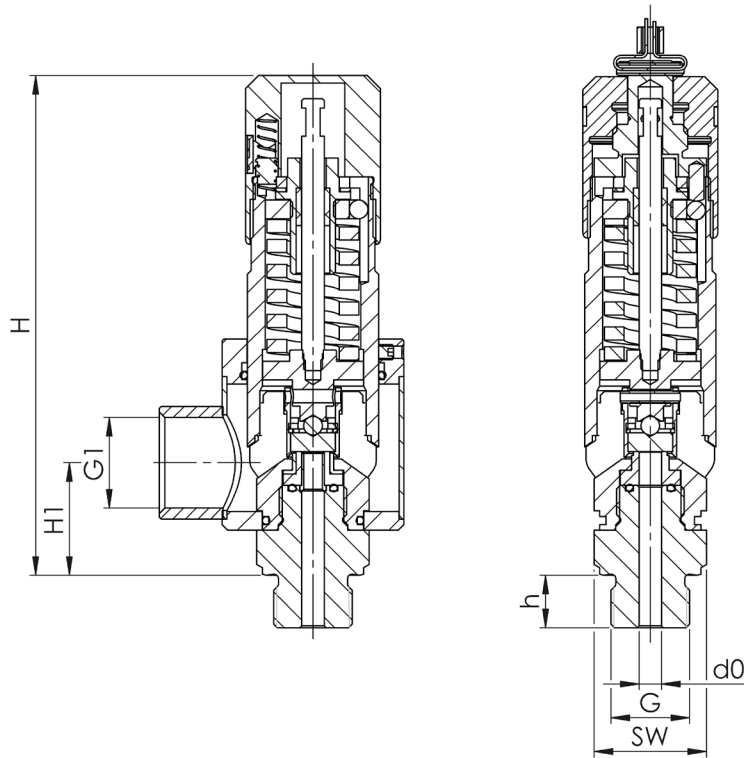
MD / PAI	Metal-to-metal sealing / Polyamidimide	Flat seal 50 – 630 bar	-60°C to +180°C
-----------------	--	------------------------	-----------------

■ NOMINAL DIAMETERS, CONNECTIONS, INSTALLATION DIMENSIONS

Series 492: Connection, installation dimensions, ranges of adjustment								
Nominal diameter	DN	10					15	
Connection DIN EN ISO 228	G	1/4" (8)	3/8" (10)	1/2" (15)	3/4" (20)	3/8" (10)	1/2" (15)	3/4" (20)
	G1'	1/2" (15)	1/2" (15)	1/2" (15)	1/2" (15)	1/2" (15)	1/2" (15)	1/2" (15)
		3/4" (20)	3/4" (20)	3/4" (20)	3/4" (20)	3/4" (20)	3/4" (20)	3/4" (20)
		1" (25)	1" (25)	1" (25)	1" (25)	1" (25)	1" (25)	1" (25)
Installation dimensions in mm	H	133	133	133	133	134	134	134
	H1'	ca. 28	ca. 28	ca. 28	ca. 28	ca. 30	ca. 30	ca. 30
	h	12	12	15	16	12	15	16
	SW	27	27	27	27	30	30	30
	d0	6	6	6	6	9	9	9
Weight	kg	0,74	0,74	0,74	0,74	0,86	0,87	0,92
Range of adjustment	bar	50-500	50-630	50-630	50-630	50-250	50-250	50-250
Range of adjustment ASME	psi	725-7250	725-9135	725-9135	725-9135	725-3625	725-3625	725-3625

*only for the version with positionable angled body and according to choice of outlet connection size

■ MAIN DIMENSIONS, INSTALLATION DIMENSIONS



Series	Valve version	Medium	Lifting device	Nominal diameter DN	Connection type		Connection size		Seal	Options	Set pressure	Quantity
					Inlet	Outlet	Inlet	Outlet				
492	s	G	K	10	m	–	8	–	MD / PAI		70,0	5
492	t	G	O	15	m	f	15	20	MD / PAI		300	2
492		G			m				MD / PAI			
492		G			m				MD / PAI			

■ PROPERTIES

GOX	Especially for gaseous O2 applications by employment of specific materials including oil- and grease free production process	<input type="checkbox"/>	<input type="checkbox"/>
P01	Oil- and grease-free production	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>

■ CERTIFICATES / APPROVALS

C01	Factory certificate acc. DIN EN 10204 2.2 (WKZ 2.2)	<input type="checkbox"/>	C06	ATEX evaluation acc. to 2014/34/EU	<input type="checkbox"/>
C02	Test certificate acc. DIN EN 10204 3.1 (WPZ 3.1)	<input type="checkbox"/>	C07	SIL evaluation relating to IEC 61508-2	<input type="checkbox"/>
C03	Material test certificate acc. DIN EN 10204 3.1 (MPZ 3.1) (pressure retaining part)	<input type="checkbox"/>	C09	Seat tightness test with helium, leak detection method under vacuum incl. Factory Inspection Certificate 3.1 acc. to DIN EN 10204	<input type="checkbox"/>
C04	TÜV/DEKRA individual inspection acc. EN 10204 3.2 (TÜV/DEKRA-APZ)	<input type="checkbox"/>	C10	Certificate of oil- and grease free production	<input type="checkbox"/>
C05	Manufacturer certification (FDA, USP 3, 3-A, ...), Please indicate description of certificate:	<input type="checkbox"/>	C11	Certification of the production process especially for gaseous oxygen applications by employment of specific materials	<input type="checkbox"/>

■ ADMISSIONS / ACCREDITATIONS

AA1	EC Type examination acc. to Directive 2014/68/EU	<input type="checkbox"/>	AK1	DNV-GL (DNVGL) type approval	<input type="checkbox"/>
AA2	TÜV component test acc. to VdTÜV specification sheet SV 100	<input type="checkbox"/>	AK2	Lloyd's Register (LR) type approval	<input type="checkbox"/>
AA3	Certification acc. to ASME Boiler and Pressure Vessel Code, Section VIII.Div 1 (ASME)	<input type="checkbox"/>	AK3	American Bureau of Shipping (ABS) type approval	<input type="checkbox"/>
AA4	EAC - certificate/declaration with passport for the valve and laser marking of the valve	<input type="checkbox"/>	AK4	Bureau Veritas (BV) type approval	<input type="checkbox"/>
AA5	Manufacture License of Special Equipment People's Republic of China (ML)	<input type="checkbox"/>	AK5	Russian Maritime Register of Shipping (RMRS) type approval	<input type="checkbox"/>
AA6	Certification acc. to. Korean Gas Safety Corporation (KGS) ³	<input type="checkbox"/>	AK6	Registro Italiano Navale (RINA) type approval	<input type="checkbox"/>
AA7	Registration according to Canadian Registration Number (CRN) ⁴	<input type="checkbox"/>	AL	Individual inspection by notified body inspector – (body to be indicated):	<input type="checkbox"/>

³KGS only in combination with ASME | ⁴CRN only in combination with ASME

■ ENQUIRY

Copy and send to: order@goetze-armaturen.de.

Order form easily to be found online under the section for each series.

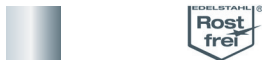
Series 492: Blowing-off rates at 10% above set pressure			
Nominal diameter DN		10	15
Set pressure bar			
Air Nm ³ /h	50	787	1867
	60	941	2233
	70	1095	2600
	80	1250	2967
	90	1404	3333
	100	1559	3700
	110	1713	4067
	120	1868	4433
	130	2022	4800
	140	2177	5167
	150	2331	5533
	160	2486	5900
	170	2640	6266
	180	2795	6633
	190	2949	7000
	200	3104	7366
	210	3258	7733
	220	3413	8100
	230	3567	8466
	240	3722	8833
	250	3876	9200
	260	4031	
	270	4185	
	280	4340	
	290	4494	
	300	4649	
	310	4803	
	320	4958	
	330	5112	
	340	5267	
	350	5421	
	360	5576	
	370	5730	
	380	5885	
390	6039		
400	6194		
410	6348		
420	6503		
430	6657		
440	6812		
450	6966		
460	7121		
470	7275		
480	7430		
490	7584		
500	7739		
510	7893		
520	8048		
530	8202		
540	8357		
550	8511		
560	8666		
570	8820		
580	8975		
590	9129		
600	9284		
610	9438		
620	9593		
630	9747		

Series 492: Blowing-off rates at 10% above set pressure			
	Nominal diameter DN Set pressure psi(g)	10	15
Air SCFM	725	497	1092
	750	562	1234
	775	580	1275
	800	599	1315
	850	635	1396
	900	672	1477
	950	709	1558
	1000	746	1639
	1100	819	1800
	1200	893	1962
	1300	967	2124
	1400	1040	2285
	1500	1114	2447
	1600	1187	2609
	1700	1261	2771
	1800	1334	2932
	1900	1408	3094
	2000	1482	3256
	2100	1555	3417
	2200	1629	3579
	2300	1702	3741
	2400	1776	3902
	2500	1850	4064
	2600	1923	4226
	2700	1997	4388
	2800	2070	4549
	2900	2144	4711
	3000	2218	4873
	3100	2291	5034
	3200	2365	5196
	3300	2438	5358
	3400	2512	5519
	3500	2585	5681
	3600	2659	5843
	3625	2677	5883
	3700	2733	
	3900	2880	
	4000	2953	
	4200	3101	
	4400	3248	
4600	3395		
4800	3542		
5000	3689		
5200	3837		
5400	3984		
5600	4131		
5800	4278		
6000	4425		
6200	4572		
6400	4720		
6600	4867		
6800	5014		
7000	5161		
7200	5308		
7400	5455		
7600	5603		
7800	5750		
8000	5897		
8200	6044		
8400	6191		
8600	6339		
8800	6486		
9000	6633		
9135	6732		

→ Series 2400



■ MATERIAL



■ SPECIFICATION



1/4" – 1 1/2"



– 200°C to + 200°C



0,2 – 70 bar

■ SUITABLE FOR

Liquids	neutral and non-neutral	
Air, gases and vapours	neutral and non-neutral	

■ EXAMPLES OF USE

Full-lift safety valve for the protection of:

- Containers and pipelines for the storage and transport of cryogenic liquified gases such as LIN, LOX, LAr, CO₂, LNG.

- Tunnel freezer plants
- Dry ice blasting plants
- Cryogenic plant construction
- Liquid nitrogen dosing
- Cryogenic milling process
- Cryogenic machining
- Ground freezing plants
- Gases used in medical equipment
- Plants for cryogenic gases which come into contact with foodstuffs

Safety valves are set and sealed at the factory and are oil- and grease-free as standard.

■ APPROVALS

TÜV-Type test approval 2091	D/G, F
EC type examination	S/G, L
ASME	G, L
CRN	G, L
TSG ZF001-2006	D/G (S/G), F (L)
KGS	G
TR ZU 032/2013 - TR ZU 010/2011	D/G (S/G), F (L)

Requirements

AD 2000 Data sheet A2	TPED 2010/35/EU, ADR/RID 2015
DIN EN ISO 4126-1	FDA 21 CFR 177.1550
PED 2014/68/EU	FDA 21 CFR 178.3570
DIN EN 13648-1	NSF-H1
ASME-Code Sec. VIII Div. 1	KGS AA 319

Classification society

Bureau Veritas	BV
American Bureau of Shipping	ABS
Russian Maritime Register of Shipping	RS

■ MATERIALS

Component	Material	DIN EN	ASME
Inlet body	Stainless steel	1.4404	316 L
Outlet body	Stainless steel	1.4408	CF8M
Internal parts	Stainless steel	1.4404	316 L
Spring	Stainless steel	1.4310	302
Seal	PTFE	PTFE	PTFE

Series 2400 ■ VALVE VERSION

s	non-gastight version of spring housing	for neutral media. Not suitable for oxygen.
t	gastight version of spring housing	for neutral and non-neutral media. The environment is protected from being affected by the medium.

■ MEDIUM

GF	gaseous and liquid	Cryogenic liquified gases, vapours and liquids, for oxygen max. 40bar/ max. 60°C
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■ TYPE OF LIFTING MECHANISM

K	Standard with twist-type lifting mechanism, non-gastight version (not for DN25 and DN32). Not suitable for oxygen.	
L	with lifting lever	
O	without lifting device, standard for gastight versions	

■ AVAILABLE NOMINAL DIAMETERS AND CONNECTION SIZES

Nominal diameter DN		8			10		15		20		25		32	
Inlet		1/4" (8)	3/8" (10)	1/2" (15)	3/8" (10)	1/2" (15)	1/2" (15)	3/4" (20)	3/4" (20)	1" (25)	1" (25)	1-1/4" (32)	1-1/4" (32)	1-1/2" (40)
Outlet	3/8" (10)	■	■											
	1/2" (15)	■	■	■	■	■								
	3/4" (20)						■	■						
	1" (25)								■	■				
	1 1/2" (40)										■	■		
	2" (50)												■	■

■ TYPE OF CONNECTION INLET / OUTLET THREADED CONNECTIONS

m / f	Standard	Male thread BSP-P / Female thread BSP-P	DIN EN ISO 228-1 / DIN EN ISO 228-1
f / f		Female thread BSP-P / Female thread BSP-P	DIN EN ISO 228-1 / DIN EN ISO 228-1
NPT-m / f		Male thread NPT / Female thread BSP-P	ANSI B1.20.1 / DIN EN ISO 228-1

■ SEALS

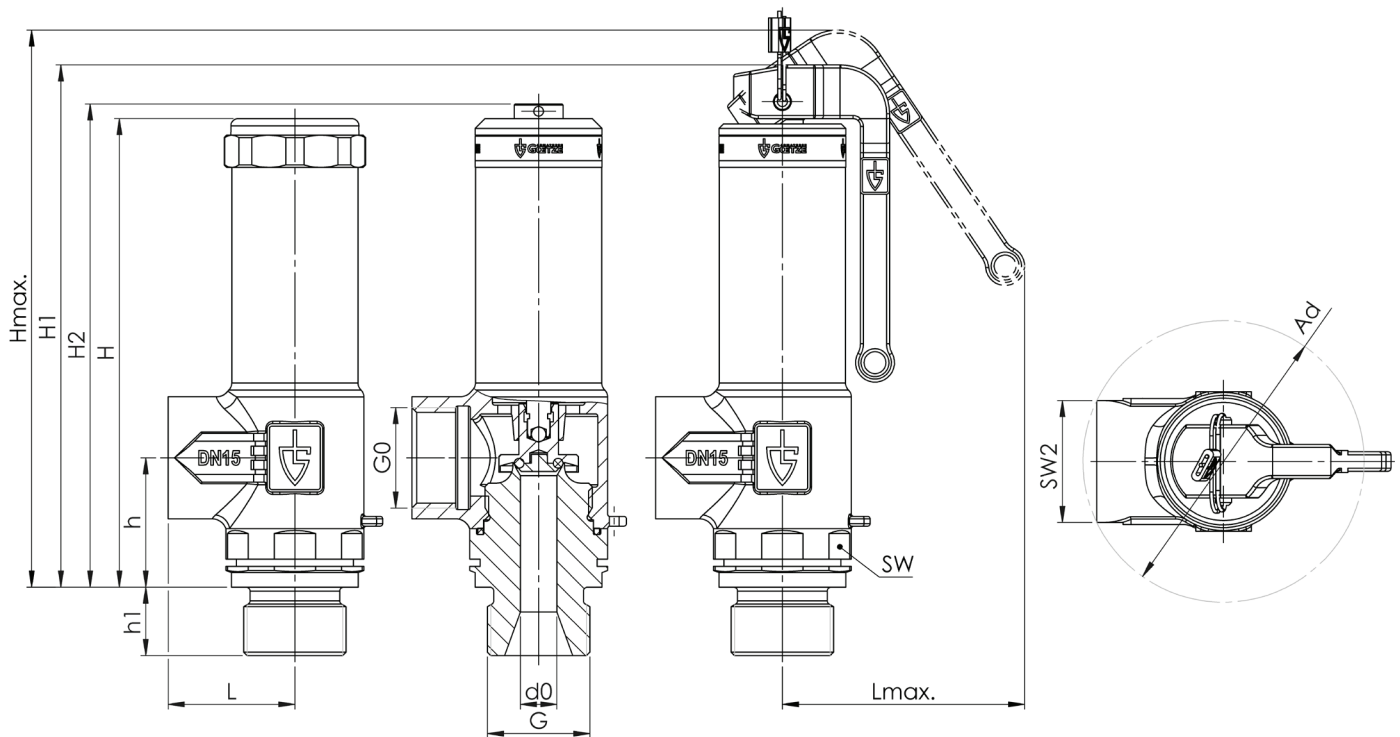
PTFE	Polytetrafluoroethylene	O-ring with FDA Approval	-200°C to +200°C
PTFE+Kohle	Polytetrafluoroethylene + carbon	O-ring	-200°C to +200°C

■ NOMINAL DIAMETERS, CONNECTIONS, INSTALLATION DIMENSIONS

Series 2400: Connection, installation dimensions, ranges of adjustment																											
Nominal diameter	DN	8				10				15		20		25		32											
Connection DIN EN ISO 228	Gi	1/4" (8)	3/8" (10)	1/4" (8)	3/8" (10)	1/2" (15)	3/8" (10)	1/2" (15)	1/2" (15)	3/4" (20)	3/4" (20)	1" (25)	1" (25)	1-1/4" (32)	1-1/4" (32)	1-1/2" (40)	1-1/2" (40)										
Outlet DIN EN ISO 228	Go	3/8" (10)	3/8" (10)	1/2" (15)	1/2" (15)	1/2" (15)	1/2" (15)	1/2" (15)	3/4" (20)	3/4" (20)	1" (25)	1" (25)	1-1/2" (40)	1-1/2" (40)	2" (50)	2" (50)	2" (50)										
Installation dimensions in mm	h1	12		12		14		12		14		14		16		16		18		18		22		20		20	
	h	22		26		26		26		31		31		39		39		56		56		66		66		66	
	L	21		26		26		26		31		31		38		38		53		53		66		66		66	
	Lmax	43		47		47		47		66		66		86		86		85		85		122		122		122	
	H	82		96		96		96		130		130		173		173		-		-		-		-		-	
	H1	91		107		107		107		144		144		185		185		215		215		276		276		276	
	H2	85		99		99		99		134		134		172		172		203		203		264		264		264	
	Hmax	99		116		116		116		156		156		201		201		230		230		300		300		300	
	SW1	22		27		27		27		34		34		41		41		50		50		55		55		55	
	SW2	22		26		26		26		32		32		39		39		56		56		70		70		70	
	Ad	47		58		58		58		69		69		85		85		120		120		150		150		150	
	α_w / K_{dr} (F)		0,52		0,52		0,52		0,52		0,52		0,52		0,52		0,52		0,52		0,52		0,52		0,52		0,52
	α_w / K_{dr} (D/G)'		0,73		0,73		0,73		0,73		0,73		0,73		0,73		0,73		0,73		0,73		0,73		0,73		0,73
	d ₀		6,0		6,0		7,5		7,5		10,5		10,5		13,0		13,0		18,0		18,0		23,0		23,0		23,0
	Weight	kg	0,2		0,4		0,4		0,4		0,7		0,7		1,3		1,3		2,8		2,8		6,4		6,4		6,4
Range of adjustment	bar	0,2 - 70		0,2-70		0,2 - 70		0,2 - 70		0,2 - 70		0,2 - 70		0,2 - 70		0,2 - 70		0,2 - 50		0,2 - 50		0,2 - 50		0,2 - 50		0,2 - 50	
Range of adjustment ASME	psi	40 - 1015		40 - 1015		40 - 1015		40 - 1015		40 - 1015		40 - 1015		40 - 1015		40 - 1015		40 - 725		40 - 725		40 - 725		40 - 725		40 - 725	

¹Flow coefficients for blow-off pressures < 3,0 bar: Please refer to the Flow Coefficients Chart.

■ MAIN DIMENSIONS, INSTALLATION DIMENSIONS



Series 2400 ■ INDIVIDUAL SELECTION / VALVE CONFIGURATION

Series	Valve version	Medium	Lifting device	Nominal diameter DN	Connection type		Connection size		Seal	Set pressure	Quantity
					Inlet	Outlet	Inlet	Outlet			
2400	s	GF	K	20	m	f	20	25	PTFE	6,0	2
2400		GF									
2400		GF									
2400		GF									

■ CERTIFICATES / APPROVALS

C01	Factory certificate acc. DIN EN 10204 2.2 (WKZ 2.2)	<input type="checkbox"/>	C06	ATEX evaluation acc. to 2014/34/EU	<input type="checkbox"/>
C02	Test certificate acc. DIN EN 10204 3.1 (WPZ 3.1)	<input type="checkbox"/>	C07	SIL evaluation relating to IEC 61508-2	<input type="checkbox"/>
C03	Material test certificate acc. DIN EN 10204 3.1 (MPZ 3.1) (pressure retaining part)	<input type="checkbox"/>	C09	Seat tightness test with helium, leak detection method under vacuum incl. Factory Inspection Certificate 3.1 acc. to DIN EN 10204	<input type="checkbox"/>
C04	TÜV/DEKRA individual inspection acc. EN 10204 3.2 (TÜV/DEKRA-APZ)	<input type="checkbox"/>	C10	Certificate of oil- and grease free production	<input type="checkbox"/>
C05	Sealing material Manufacturer certification (FDA, USP 3, 3-A,...), Please indicate description of certificate:	<input type="checkbox"/>			<input type="checkbox"/>

■ ADMISSIONS / ACCREDITATIONS

AA1	EC Type examination acc. to Directive 2014/68/EU	<input type="checkbox"/>	AK2	Lloyd's Register (LR) type approval	<input type="checkbox"/>
AA2	TÜV component test acc. to VdTÜV specification sheet SV 100	<input type="checkbox"/>	AK3	American Bureau of Shipping (ABS) type approval	<input type="checkbox"/>
AA3	Certification acc. to ASME Boiler and Pressure Vessel Code, Section VIII.Div 1 (ASME) ¹	<input type="checkbox"/>	AK4	Bureau Veritas (BV) type approval	<input type="checkbox"/>
AA4	EAC - certificate/declaration with passport for the valve and laser marking of the valve	<input type="checkbox"/>	AK6	Registro Italiano Navale (RINA) type approval	<input type="checkbox"/>
AA5	Manufacture License of Special Equipment People's Republic of China (ML)	<input type="checkbox"/>	AL	Individual inspection by notified body inspector – (body to be indicated):	<input type="checkbox"/>
AA6	Certification acc. to Korean Gas Safety Corporation (KGS) ³	<input type="checkbox"/>			<input type="checkbox"/>
AA7	Registration according to Canadian Registration Number (CRN) ⁴	<input type="checkbox"/>			<input type="checkbox"/>

¹ASME not for gases in combination with liquids | ²KGS only for gases | ³KGS only in combination with ASME | ⁴CRN only in combination with ASME

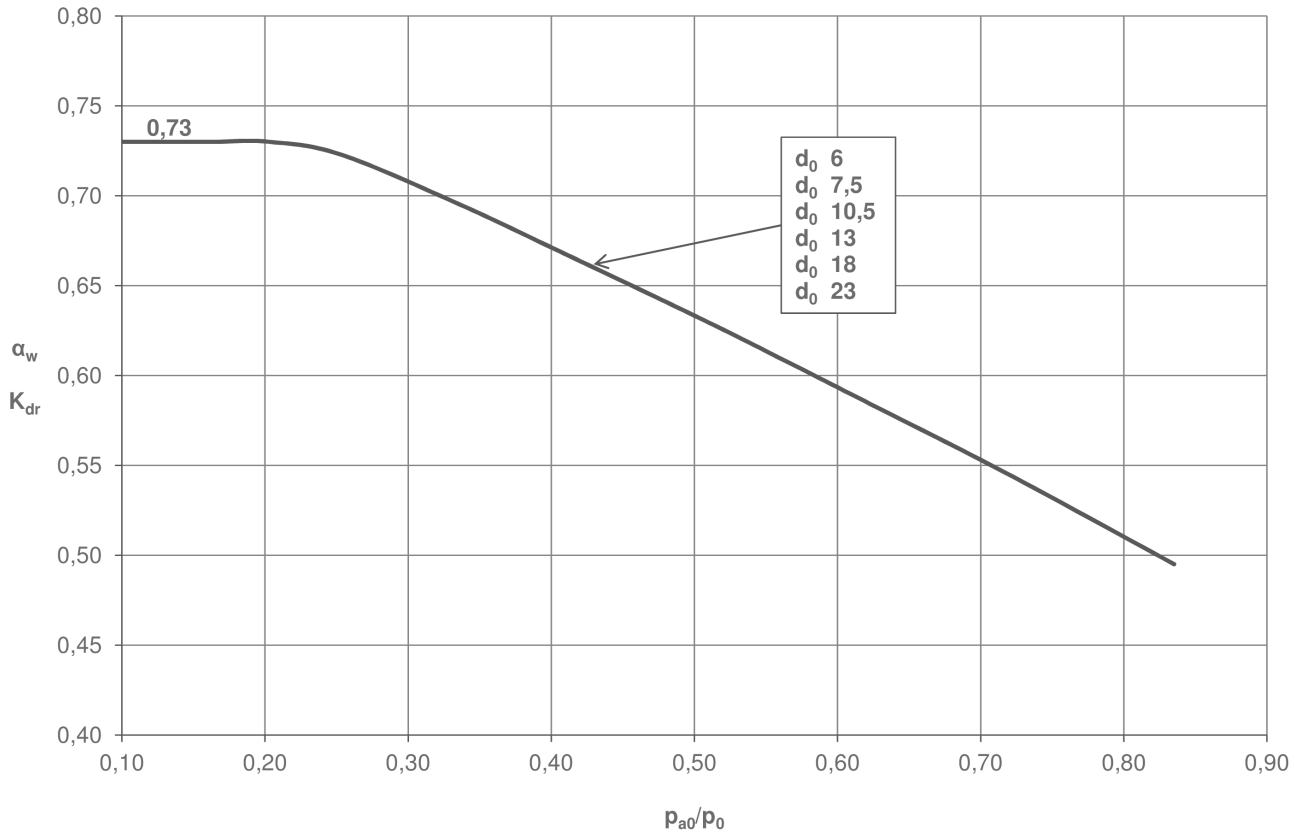
■ ENQUIRY

Copy and send to: order@goetze-armaturen.de.

Order form easily to be found online under the section for each series.

Series 2400: Blowing-off rates at 10% above set pressure														
Nominal diameter DN		8		10		15		20		25		32		
flow diameter		d0 = 6 mm		d0 = 7,5 mm		d0 = 10,5 mm		d0 = 13 mm		d0 = 18 mm		d0 = 23 mm		
Set pressure bar		I	II	I	II	I	II	I	II	I	II	I	II	
Air I	0,2	11,1	0,4	17,3	0,6	33,9	1,2	51,9	1,9	99,5	3,6	162,5	5,9	
	0,5	17,4	0,6	27,2	0,9	53,3	1,8	81,7	2,7	156,7	5,2	255,8	8,4	
	1	25,8	0,8	40,3	1,2	79,0	2,4	121,1	3,7	232,2	7,0	379,2	11,5	
	Nm ² /h	1,5	34,5	1,0	54,0	1,5	105,8	2,9	162,1	4,5	310,8	8,6	507,5	14,1
		2	43,2	1,1	67,5	1,7	132,2	3,4	202,7	5,2	388,6	10,0	634,4	16,3
Water II	2,5	51,7	1,2	80,8	1,9	158,4	3,8	242,7	5,8	465,4	11,2	759,8	18,2	
	m ³ /h	3	60,1	1,4	93,9	2,1	184,1	4,2	282,1	6,4	540,9	12,2	883,2	20,0
	3,5	68,1	1,5	106,5	2,3	208,7	4,5	319,9	6,9	613,3	13,2	1001,4	21,6	
	4	76,0	1,6	118,8	2,5	232,8	4,8	356,8	7,4	684,1	14,1	1116,9	23,1	
	4,5	83,8	1,7	130,9	2,6	256,5	5,1	393,2	7,8	753,8	15,0	1230,7	24,5	
	5	91,5	1,8	143,0	2,7	280,2	5,4	429,5	8,2	823,4	15,8	1344,4	25,8	
	5,5	99,2	1,8	155,1	2,9	303,9	5,6	465,8	8,6	893,1	16,6	1458,2	27,0	
	6	107,0	1,9	167,1	3,0	327,6	5,9	502,2	9,0	962,8	17,3	1571,9	28,3	
	6,5	114,7	2,0	179,2	3,1	351,3	6,1	538,5	9,4	1032,5	18,0	1685,7	29,4	
	7	122,5	2,1	191,3	3,2	375,0	6,4	574,9	9,8	1102,1	18,7	1799,5	30,5	
	7,5	130,2	2,2	203,4	3,4	398,7	6,6	611,2	10,1	1171,8	19,4	1913,2	31,6	
	8	137,9	2,2	215,5	3,5	422,4	6,8	647,6	10,4	1241,5	20,0	2027,0	32,6	
	8,5	145,7	2,3	227,6	3,6	446,2	7,0	683,9	10,7	1311,2	20,6	2140,7	33,6	
	9	153,4	2,4	239,7	3,7	469,9	7,2	720,2	11,1	1380,8	21,2	2254,5	34,6	
	9,5	161,2	2,4	251,8	3,8	493,6	7,4	756,6	11,4	1450,5	21,8	2368,3	35,6	
	10	168,9	2,5	263,9	3,9	517,3	7,6	792,9	11,7	1520,2	22,4	2482,0	36,5	
	11	184,4	2,6	288,1	4,1	564,7	8,0	865,6	12,2	1659,5	23,4	2709,5	38,3	
	12	199,9	2,7	312,3	4,3	612,1	8,3	938,3	12,8	1798,9	24,5	2937,1	40,0	
	13	215,4	2,8	336,5	4,4	659,5	8,7	1011,0	13,3	1938,2	25,5	3164,6	41,6	
	14	230,8	2,9	360,7	4,6	707,0	9,0	1083,7	13,8	2077,6	26,4	3392,1	43,2	
	15	246,3	3,0	384,9	4,8	754,4	9,3	1156,4	14,3	2216,9	27,4	3619,6	44,7	
	16	261,8	3,1	409,1	4,9	801,8	9,6	1229,0	14,7	2356,3	28,3	3847,1	46,2	
	17	277,3	3,2	433,3	5,1	849,2	9,9	1301,7	15,2	2495,6	29,1	4074,6	47,6	
	18	292,8	3,3	457,5	5,2	896,6	10,2	1374,4	15,6	2635,0	30,0	4302,2	49,0	
	19	308,3	3,4	481,7	5,4	944,0	10,5	1447,1	16,1	2774,3	30,8	4529,7	50,3	
	20	323,7	3,5	505,8	5,5	991,5	10,8	1519,8	16,5	2913,7	31,6	4757,2	51,6	
	21	339,2	3,6	530,0	5,6	1038,9	11,0	1592,5	16,9	3053,0	32,4	4984,7	52,9	
	22	354,7	3,7	554,2	5,8	1086,3	11,3	1665,2	17,3	3192,4	33,2	5212,2	54,1	
	23	370,2	3,8	578,4	5,9	1133,7	11,5	1737,8	17,7	3331,7	33,9	5439,8	55,4	
	24	385,7	3,8	602,6	6,0	1181,1	11,8	1810,5	18,1	3471,1	34,6	5667,3	56,6	
	25	401,2	3,9	626,8	6,1	1228,5	12,0	1883,2	18,4	3610,4	35,4	5894,8	57,7	
	26	416,6	4,0	651,0	6,3	1276,0	12,3	1955,9	18,8	3749,8	36,1	6122,3	58,9	
	27	432,1	4,1	675,2	6,4	1323,4	12,5	2028,6	19,2	3889,1	36,7	6349,8	60,0	
	28	447,6	4,2	699,4	6,5	1370,8	12,7	2101,3	19,5	4028,5	37,4	6577,3	61,1	
	29	463,1	4,2	723,6	6,6	1418,2	13,0	2174,0	19,9	4167,8	38,1	6804,9	62,2	
	30	478,6	4,3	747,8	6,7	1465,6	13,2	2246,6	20,2	4307,2	38,7	7032,4	63,2	
	32	509,5	4,4	796,2	6,9	1560,5	13,6	2392,0	20,9	4585,9	40,0	7487,4	65,3	
	34	540,5	4,6	844,5	7,2	1655,3	14,0	2537,4	21,5	4864,6	41,2	7942,4	67,3	
	36	571,5	4,7	892,9	7,4	1750,1	14,4	2682,8	22,1	5143,3	42,4	8397,5	69,3	
	38	602,4	4,8	941,3	7,6	1845,0	14,8	2828,1	22,7	5422,0	43,6	8852,5	71,2	
	40	633,4	5,0	989,7	7,8	1939,8	15,2	2973,5	23,3	5700,7	44,7	9307,6	73,0	
	42	664,4	5,1	1038,1	8,0	2034,6	15,6	3118,9	23,9	5979,4	45,8	9762,6	74,8	
	44	695,3	5,2	1086,5	8,1	2129,5	16,0	3264,2	24,5	6258,1	46,9	10217,6	76,6	
	46	726,3	5,3	1134,9	8,3	2224,3	16,3	3409,6	25,0	6536,8	48,0	10672,7	78,3	
	48	757,3	5,4	1183,2	8,5	2319,1	16,7	3555,0	25,6	6815,5	49,0	11127,7	80,0	
	50	788,2	5,6	1231,6	8,7	2414,0	17,0	3700,3	26,1	7094,2	50,0	11582,7	81,6	
	52	819,2	5,7	1280,0	8,9	2508,8	17,4	3845,7	26,6					
	54	850,2	5,8	1328,4	9,0	2603,7	17,7	3991,1	27,1					
	56	881,1	5,9	1376,8	9,2	2698,5	18,0	4136,5	27,6					
	58	912,1	6,0	1425,2	9,3	2793,3	18,3	4281,8	28,1					
	60	943,1	6,1	1473,6	9,5	2888,2	18,6	4427,2	28,6					
	62	974,0	6,2	1521,9	9,7	2983,0	18,9	4572,6	29,0					
	64	1005,0	6,3	1570,3	9,8	3077,8	19,2	4717,9	29,5					
	66	1036,0	6,4	1618,7	10,0	3172,7	19,5	4863,3	30,0					
	68	1066,9	6,5	1667,1	10,1	3267,5	19,8	5008,7	30,4					
	70	1097,9	6,6	1715,5	10,3	3362,3	20,1	5154,1	30,9					

Coefficient of discharge α_w i.e. K_{dr} as a function of the relation between the pressures p_{a0}/p_0 of vapours and gases



$$\frac{p_{a0}}{p_0} = \frac{\text{counter pressure bar(a)}}{\text{blow-off pressure bar(a)}} \quad p_{atm} = \text{ambient i.e. atmospheric pressure} = 1,01325 \text{ bar(a)}$$

Example to determine the coefficient of discharge α_w i.e. K_{dr} in relation to the set-pressure p_{set}

Set-pressure	Blow-off pressure
p_{set} bar(g)	p_0 bar(a)
≤ 1	$p_{set} + p_{atm} + 0,1$ bar
> 1	$p_{set} \times 1,1 + p_{atm}$

For a safety valve set at = 0,3bar(g) and blowing-off into the enviroment the blow-off pressure is determined as follows:

Set-pressure	0,3	bar(g)
+ Atmospheric pressure	1,01325	bar(a)
+ permissable overpressure	0,1	bar(g)
~ Blow-off pressure	1,41	bar(a)

Consequently:

$$\frac{p_{a0}}{p_0} = \frac{1,01325 \text{ bar(a)}}{1,41 \text{ bar(a)}} = 0,72 \quad \text{and extracted from the chart } \alpha_w \text{ i.e. } K_{dr} = 0,55$$

Units:

bar(a) \triangleq absolute pressure - pressure in relation to absolute vacuum (zero), e.g. $p_{atm} = 1,01325 \text{ bar(a)}$
 bar(g) \triangleq overpressure - pressure above i.e. in relation to $p_{atm} = 1,01325 \text{ bar(a)}$

Series 2400: Blowing-off rates at 10% above set pressure							
Nominal diameter DN		8		10		15	
flow diameter		d0 = 0,2362 inch (6,0 mm)		d0 = 0,2953 inch (7,5 mm)		d0 = 0,4134 inch (10,5 mm)	
Set pressure bar psi(g)		I	II	I	II	I	II
Air I	40	38	Due to nominal size < DN15 (1/2"), certification according to ASME Code Sec. VIII Div. 1 not possible	59	Due to nominal size < DN15 (1/2"), certification according to ASME Code Sec. VIII Div. 1 not possible	115	19
	50	45		70		137	22
SCFM	60	52		81		159	24
	70	59		92		180	26
Water II	87	71		111		217	28
	GPM	90		73		114	223
		100		80		125	245
	110	87		136		267	32
	120	94		147		288	33
	130	101		158		310	35
	140	108	169	331	36		
	150	115	180	353	37		
	160	122	191	375	39		
	170	129	202	396	40		
	180	136	213	418	41		
	190	143	224	439	42		
	200	151	235	461	43		
	210	158	246	483	44		
	220	165	257	504	45		
	230	172	268	526	46		
	240	179	279	548	47		
	250	186	290	569	48		
	260	193	301	591	49		
	270	200	312	612	50		
	280	207	323	634	51		
	290	214	334	656	52		
	300	221	345	677	53		
	320	235	368	720	55		
	340	249	390	764	56		
	360	263	412	807	58		
	380	278	434	850	59		
	400	292	456	893	61		
	420	306	478	936	63		
	440	320	500	980	64		
	460	334	522	1023	65		
	480	348	544	1066	67		
	500	362	566	1109	68		
	550	398	621	1217	72		
	600	433	676	1325	75		
	650	468	731	1434	78		
	700	503	787	1542	81		
	725	521	814	1596	82		
	750	539	842	1650	84		
	800	574	897	1758	86		
	850	609	952	1866	89		
	900	644	1007	1974	92		
	950	680	1062	2082	94		
	1015	726	1134	2222	97		

CONTINUATION -Series 2400: Blowing-off rates at 10% above set pressure

Nominal diameter DN		20		25		32	
°flow diameter		d0 = 0,5118 inch (13,0 mm)		d0 = 0,7087 inch (18,0 mm)		d0 = 0,9055 inch (23,0 mm)	
Set pressure bar psi(g)		I	II	I	II	I	II
Air I	40	177	30	339	57	553	93
	50	210	33	402	63	657	103
SCFM	60	243	36	466	69	761	113
	70	276	39	529	75	864	122
Water II	87	332	44	637	84	1041	137
	90	342	44	656	85	1072	139
GPM	100	376	47	720	90	1175	146
	110	409	49	783	94	1279	153
	120	442	51	847	98	1383	160
	130	475	53	910	102	1486	167
	140	508	55	974	106	1590	173
	150	541	57	1037	110	1694	179
	160	574	59	1101	113	1798	185
	170	607	61	1164	117	1901	191
	180	641	63	1228	120	2005	196
	190	674	64	1291	124	2109	202
	200	707	66	1355	127	2212	207
	210	740	68	1418	130	2316	212
	220	773	69	1482	133	2420	217
	230	806	71	1546	136	2523	222
	240	839	72	1609	139	2627	227
	250	872	74	1673	142	2731	231
	260	906	75	1736	145	2834	236
	270	939	77	1800	147	2938	240
	280	972	78	1863	150	3042	245
	290	1005	80	1927	153	3145	249
	300	1038	81	1990	155	3249	253
	320	1104	84	2117	160	3457	262
	340	1171	86	2244	165	3664	270
	360	1237	89	2371	170	3871	278
	380	1303	91	2498	175	4079	285
	400	1369	94	2625	179	4286	293
	420	1436	96	2752	184	4493	300
	440	1502	98	2879	188	4701	307
	460	1568	100	3006	192	4908	314
	480	1634	102	3133	196	5116	321
	500	1701	105	3260	200	5323	327
	550	1866	110	3578	210	5841	343
	600	2032	115	3895	220	6360	358
	650	2197	119	4213	229	6878	373
	700	2363	124	4530	237	7397	387
	725	2446	126	4689	241	7656	394
	750	2529	128				
	800	2694	132				
	850	2860	136				
	900	3026	140				
	950	3191	144				
	1015	3406	149				