

→ Series 2480



■ 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
EU 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
DGR 2014/68/EU	FDA 21 CFR 178.3570
DIN EN 13648-1	NSF-H1
ASME-Code Sec. VIII Div. 1	KGS AA 319
UK PESR 2016 No. 1105	

Classification society

Bureau Veritas	BV
American Bureau of Shipping	ABS
Registro Italiano Navale	RINA



■ MATERIAL



■ SPECIFICATION



1/4" – 2"



– 200°C to + 200°C



0,2 – 70 bar

■ MATERIALS

Component	Material	DIN EN	ASME
Inlet body	Stainless steel	1.4404	316 L
Outlet body	Gunmetal / Brass	CC499K/CW617N	CC499K/CW617N
Internal parts	Stainless steel	1.4404	316 L
Spring	Stainless steel	1.4310	302
Seal	PTFE	PTFE	PTFE

s	non-gastight version of spring housing	for neutral media. Not suitable for oxygen. Outlet z only available as version s.
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

L	with lifting lever
0	without lifting device

■ AVAILABLE NOMINAL DIAMETERS AND CONNECTION SIZES

Nominal diameter DN	8			10			15			25		32		
Inlet	1/4" (8)	3/8" (10)	1/2" (15)	3/8" (10)	1/2" (15)	3/4" (20)	1/2" (15)	3/4" (20)	1" (25)	1" (25)	1 1/4" (32)	1 1/4" (32)	1 1/2" (40)	2" (50)
3/8" (10)	■	■	■											
1/2" (15)	■	■	■	■	■									
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
NPT-m / NPT-f		Male thread NPT / Female thread NPT	ANSI B1.20.1 / ANSI B1.20.1
NPT-f / NPT-f		Female thread NPT / Female thread NPT	ANSI B1.20.1 / ANSI B1.20.1
With insect protection:			
m/z		Male thread BSP-P / Insect protection screen	DIN EN ISO 228-1 / –
f/z		Female thread BSP-P / Insect protection screen	DIN EN ISO 228-1 / –
NPT-m/z		Male thread NPT / Insect protection screen	ANSI B1.20.1 / –

■ SEALS

PTFE	Polytetrafluoroethylene	O-ring with FDA Approval	–200°C to +200°C
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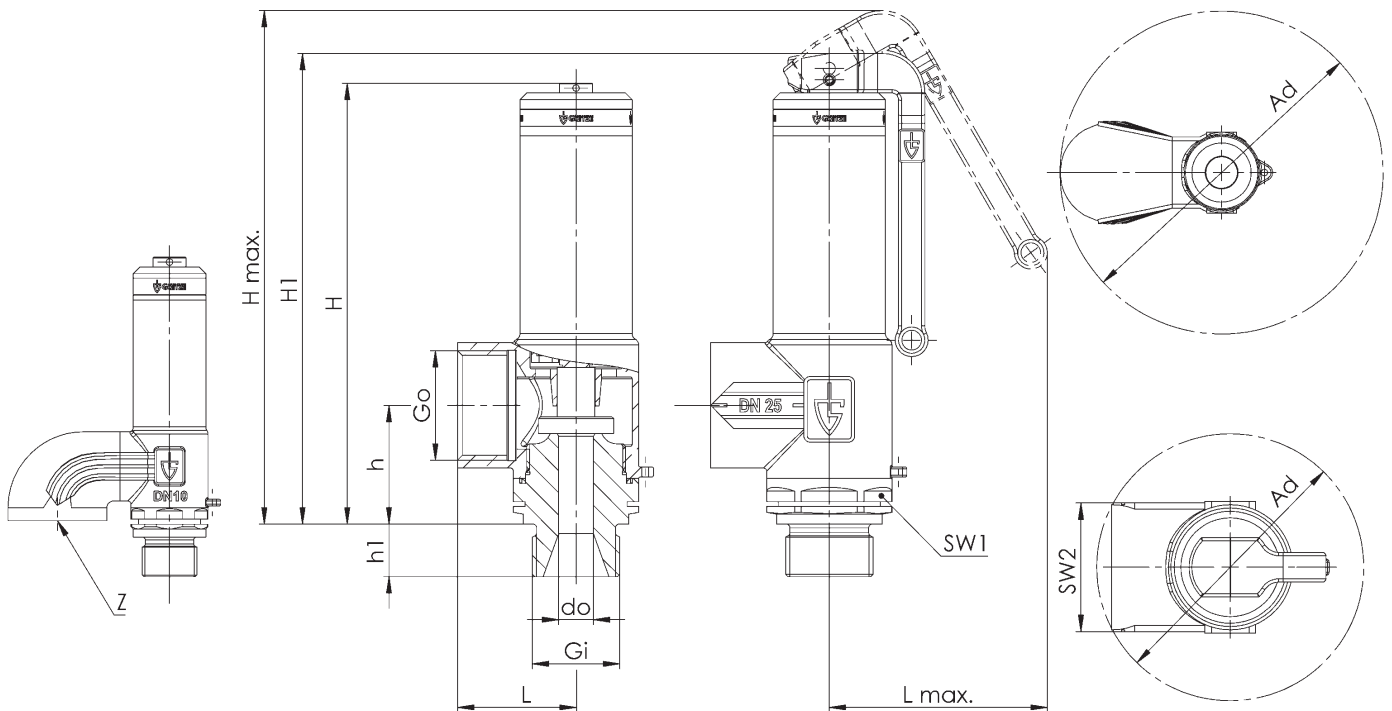
■ NOMINAL DIAMETERS, CONNECTIONS, INSTALLATION DIMENSIONS

Series 2480: Connection, installation dimensions, ranges of adjustment																			
Nominal diameter	DN	8				10				15			25		32				
Connection DIN EN ISO 228	Gi	1/4" (8)	3/8" (10)	1/2" (15)	1/4" (8)	3/8" (10)	1/2" (15)	3/8" (10)	1/2" (15)	1/2" (15)	3/4" (20)	1/2" (15)	3/4" (20)	1" (25)	1" (25)	1-1/4" (32)	11/4" (32)	11/2" (40)	2" (50)
Outlet DIN EN ISO 228	Go	3/8" (10)		1/2" (15)		1/2" (15)		1" (25)		1" (25)			1-1/2" (40)		2" (50)				
Installation dimensions in mm	h1	12	14	12	14	12	14	14	16	14	16	18	18	22	20	20	20		
	h	22		26		26		36		36			56		66				
	L	21		26		26		36		36			53		66				
	Lmax	43		47		47		66		66			85		122				
	H	85		99		99		134		134			215		276				
	H1	91		107		107		144		144			203		264				
	Hmax	99		116		116		156		156			230		300				
	SW1	22		27		27		34		34			50		55				
	SW2	22		26		26		39		39			56		70				
	Ad	47 / 98 ²		58		58		81		81			119		146				
	$\alpha_w / K_{dr} (F)$	0,52		0,52		0,52		0,49		0,52			0,52		0,52				
	$\alpha_w / K_{dr} (D/G)^1$	0,73		0,73		0,73		0,73		0,73			0,73		0,73				
	d _o	6,0		6,0		7,5		7,5		10,5			18,0		23,0				
Weight	kg	0,2		0,3		0,3		0,7		0,7			3,0		6,7				
Range of adjustment	bar	0,2 - 70		0,2 - 70		0,2 - 70		0,2 - 50		0,2 - 50			0,2 - 50		0,2 - 50				
Range of adjustment ASME	psi	40 - 1015		40 - 1015		40 - 1015		40 - 725		40 - 725			40 - 725		40 - 725				
Outlet with insect protection screen	Z	- / Yes		-		-		-		-			-		-				

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

²Diameter for body with insect protection screen

■ 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			
2480	t	GF	0	15	m	f	20	25	PTFE	6,0	2
2480	t	GF									
2480	t	GF									
2480	t	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"/>	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"/>	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"/>
AA11	UK Type examination acc. to Directive UK PESR 2016 No. 1105	<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

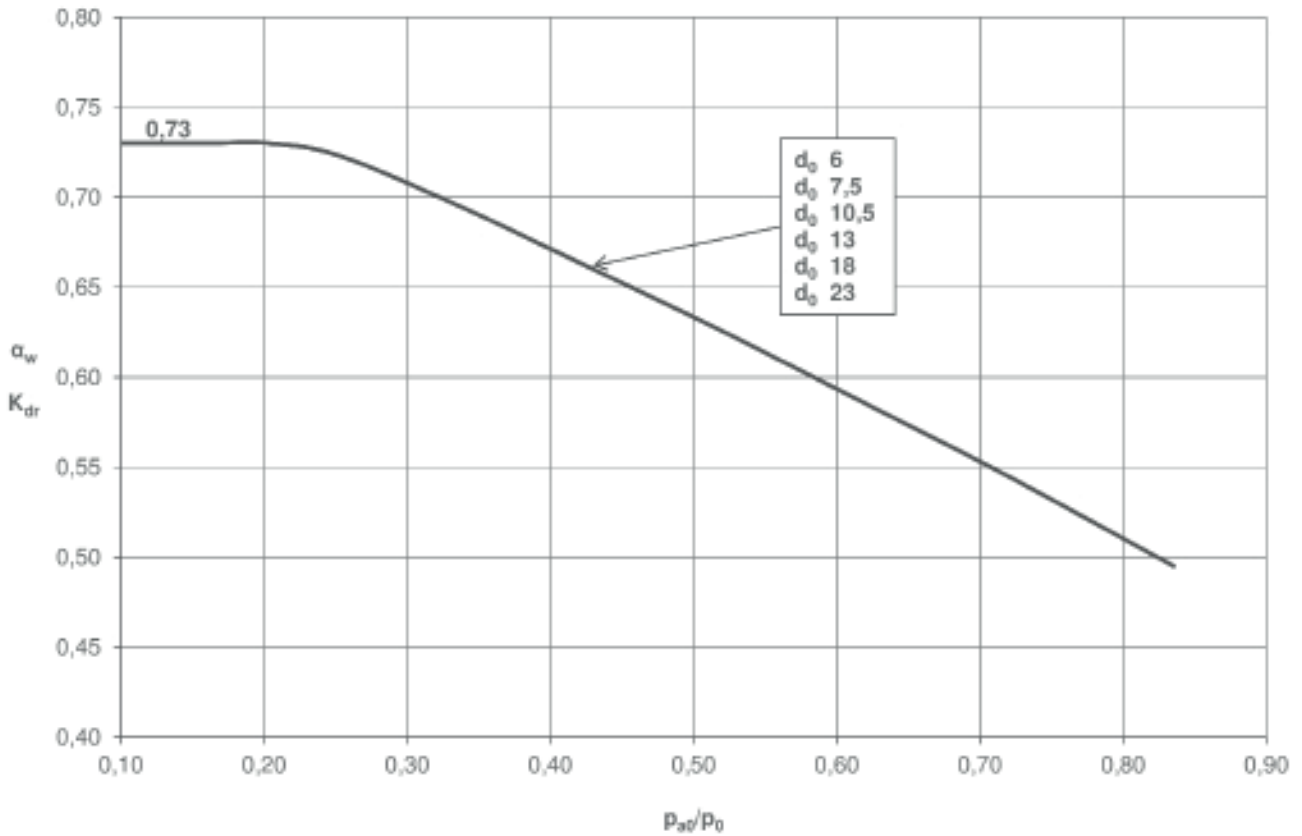
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Series 2480: Blowing-off rates at 10% above set pressure							
Nominal diameter DN		8		10		15	
flow diameter		d0 = 6 mm		d0 = 7,5 mm		d0 = 10,5 mm	
Set pressure bar		I	II	I	II	I	II
Air I Nm³/h	0,2	11,1	0,4	17,3	0,6	33,9	1,2
	0,5	17,4	0,6	27,2	0,9	53,3	1,8
	1	25,8	0,8	40,3	1,2	79,0	2,4
	1,5	34,5	1,0	54,0	1,5	105,8	2,9
	2	43,2	1,1	67,5	1,7	132,2	3,4
	2,5	51,7	1,2	80,8	1,9	158,4	3,8
	3	60,1	1,4	93,9	2,1	184,1	4,2
	3,5	68,1	1,5	106,5	2,3	208,7	4,5
	4	76,0	1,6	118,8	2,5	232,8	4,8
	4,5	83,8	1,7	130,9	2,6	256,5	5,1
5	91,5	1,8	143,0	2,7	280,2	5,4	
5,5	99,2	1,8	155,1	2,9	303,9	5,6	
6	107,0	1,9	167,1	3,0	327,6	5,9	
6,5	114,7	2,0	179,2	3,1	351,3	6,1	
7	122,5	2,1	191,3	3,2	375,0	6,4	
7,5	130,2	2,2	203,4	3,4	398,7	6,6	
8	137,9	2,2	215,5	3,5	422,4	6,8	
8,5	145,7	2,3	227,6	3,6	446,2	7,0	
9	153,4	2,4	239,7	3,7	469,9	7,2	
9,5	161,2	2,4	251,8	3,8	493,6	7,4	
10	168,9	2,5	263,9	3,9	517,3	7,6	
11	184,4	2,6	288,1	4,1	564,7	8,0	
12	199,9	2,7	312,3	4,3	612,1	8,3	
13	215,4	2,8	336,5	4,4	659,5	8,7	
14	230,8	2,9	360,7	4,6	707,0	9,0	
15	246,3	3,0	384,9	4,8	754,4	9,3	
16	261,8	3,1	409,1	4,9	801,8	9,6	
17	277,3	3,2	433,3	5,1	849,2	9,9	
18	292,8	3,3	457,5	5,2	896,6	10,2	
19	308,3	3,4	481,7	5,4	944,0	10,5	
20	323,7	3,5	505,8	5,5	991,5	10,8	
21	339,2	3,6	530,0	5,6	1038,9	11,0	
22	354,7	3,7	554,2	5,8	1086,3	11,3	
23	370,2	3,8	578,4	5,9	1133,7	11,5	
24	385,7	3,8	602,6	6,0	1181,1	11,8	
25	401,2	3,9	626,8	6,1	1228,5	12,0	
26	416,6	4,0	651,0	6,3	1276,0	12,3	
27	432,1	4,1	675,2	6,4	1323,4	12,5	
28	447,6	4,2	699,4	6,5	1370,8	12,7	
29	463,1	4,2	723,6	6,6	1418,2	13,0	
30	478,6	4,3	747,8	6,7	1465,6	13,2	
32	509,5	4,4	796,2	6,9	1560,5	13,6	
34	540,5	4,6	844,5	7,2	1655,3	14,0	
36	571,5	4,7	892,9	7,4	1750,1	14,4	
38	602,4	4,8	941,3	7,6	1845,0	14,8	
40	633,4	5,0	989,7	7,8	1939,8	15,2	
42	664,4	5,1	1038,1	8,0	2034,6	15,6	
44	695,3	5,2	1086,5	8,1	2129,5	16,0	
46	726,3	5,3	1134,9	8,3	2224,3	16,3	
48	757,3	5,4	1183,2	8,5	2319,1	16,7	
50	788,2	5,6	1231,6	8,7	2414,0	17,0	
52	819,2	5,7	1280,0	8,9			
54	850,2	5,8	1328,4	9,0			
56	881,1	5,9	1376,8	9,2			
58	912,1	6,0	1425,2	9,3			
60	943,1	6,1	1473,6	9,5			
62	974,0	6,2	1521,9	9,7			
64	1005,0	6,3	1570,3	9,8			
66	1036,0	6,4	1618,7	10,0			
68	1066,9	6,5	1667,1	10,1			
70	1097,9	6,6	1715,5	10,3			

CONTINUATION - Series 2480: Blowing-off rates at 10% above set pressure

Nominal diameter DN flow diameter	25 d0 = 18 mm		32 d0 = 23 mm	
	I	II	I	II
Set pressure bar				
0,2	99,5	3,6	162,5	5,9
0,5	156,7	5,2	255,8	8,4
1	232,2	7,0	379,2	11,5
Air I Nm³/h	1,5	310,8	8,6	507,5
	2	388,6	10,0	634,4
Water II m³/h	2,5	465,4	11,2	759,8
	3	540,9	12,2	883,2
	3,5	613,3	13,2	1001,4
	4	684,1	14,1	1116,9
	4,5	753,8	15,0	1230,7
	5	823,4	15,8	1344,4
	5,5	893,1	16,6	1458,2
	6	962,8	17,3	1571,9
	6,5	1032,5	18,0	1685,7
	7	1102,1	18,7	1799,5
	7,5	1171,8	19,4	1913,2
	8	1241,5	20,0	2027,0
	8,5	1311,2	20,6	2140,7
	9	1380,8	21,2	2254,5
	9,5	1450,5	21,8	2368,3
	10	1520,2	22,4	2482,0
	11	1659,5	23,4	2709,5
	12	1798,9	24,5	2937,1
	13	1938,2	25,5	3164,6
	14	2077,6	26,4	3392,1
	15	2216,9	27,4	3619,6
	16	2356,3	28,3	3847,1
	17	2495,6	29,1	4074,6
	18	2635,0	30,0	4302,2
	19	2774,3	30,8	4529,7
	20	2913,7	31,6	4757,2
	21	3053,0	32,4	4984,7
	22	3192,4	33,2	5212,2
	23	3331,7	33,9	5439,8
	24	3471,1	34,6	5667,3
	25	3610,4	35,4	5894,8
	26	3749,8	36,1	6122,3
	27	3889,1	36,7	6349,8
	28	4028,5	37,4	6577,3
	29	4167,8	38,1	6804,9
	30	4307,2	38,7	7032,4
	32	4585,9	40,0	7487,4
	34	4864,6	41,2	7942,4
	36	5143,3	42,4	8397,5
	38	5422,0	43,6	8852,5
	40	5700,7	44,7	9307,6
	42	5979,4	45,8	9762,6
	44	6258,1	46,9	10217,6
	46	6536,8	48,0	10672,7
	48	6815,5	49,0	11127,7
	50	7094,2	50,0	11582,7
	52			
	54			
	56			
	58			
	60			
	62			
	64			
	66			
	68			
	70			

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 2480: 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 small nominal diameter, certification according to ASME Code Sec. VIII Div. 1 not possible	59	Due to small nominal diameter, certification according to ASME Code Sec. VIII Div. 1 not possible	115	19
	50	45		70		22	
SCFM	60	52	Due to small nominal diameter, certification according to ASME Code Sec. VIII Div. 1 not possible	81	Due to small nominal diameter, certification according to ASME Code Sec. VIII Div. 1 not possible	159	24
	70	59		92		26	
Water II	87	71	Due to small nominal diameter, certification according to ASME Code Sec. VIII Div. 1 not possible	111	Due to small nominal diameter, certification according to ASME Code Sec. VIII Div. 1 not possible	202	27
	GPM	90		73		114	223
	100	80		125		245	31
	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			
	800	574		897			
	850	609		952			
	900	644		1007			
	950	680		1062			
	1015	726		1134			

CONTINUATION - Series 2480: Blowing-off rates at 10% above set pressure					
Nominal diameter DN		25		32	
flow diameter		d0 = 0,7087 inch (18 mm)		d0 = 0,9055 inch (23 mm)	
Set pressure bar psi(g)		I	II	I	II
Air I	40	333	56	544	92
	50	402	63	657	103
SCFM	60	466	69	761	113
	70	529	75	864	122
Water II	87	593	80	968	131
	90	656	85	1072	139
GPM	100	720	90	1175	146
	110	783	94	1279	153
	120	847	98	1383	160
	130	910	102	1486	167
	140	974	106	1590	173
	150	1037	110	1694	179
	160	1101	113	1798	185
	170	1164	117	1901	191
	180	1228	120	2005	196
	190	1291	124	2109	202
	200	1355	127	2212	207
	210	1418	130	2316	212
	220	1482	133	2420	217
	230	1546	136	2523	222
	240	1609	139	2627	227
	250	1673	142	2731	231
	260	1736	145	2834	236
	270	1800	147	2938	240
	280	1863	150	3042	245
	290	1927	153	3145	249
	300	1990	155	3249	253
	320	2117	160	3457	262
	340	2244	165	3664	270
	360	2371	170	3871	278
	380	2498	175	4079	285
	400	2625	179	4286	293
	420	2752	184	4493	300
	440	2879	188	4701	307
	460	3006	192	4908	314
	480	3133	196	5116	321
	500	3260	200	5323	327
	550	3578	210	5841	343
	600	3895	220	6360	358
	650	4213	229	6878	373
	700	4530	237	7397	387
	725	4689	241	7656	394
	750				
	800				
	850				
	900				
	950				
	1015				