Cryo safety-valve TYPE SV18

description:

Cryo safety valves are used to protect a closed system against overpressure. suitable for cryogenic temperatures.

features:

- suitable for cryogenic liquified gases such as: LIN, LOX, LAr, CO2, LNG.
- optional with lever
- TUV-type test approval 2091 D/G, F
- EU type examination S/G, L
- **oilfree and greasefree**
- safety valves are set and sealed at the factory

connection:	temperature:	set pressure:
1/4", 3/8", 1/2", 3/4", 1", 1 1/4", 1 1/2", 2"	-200°C up to +200°C – depending on design	0,2 bar – 70,0 bar– depending on design

materials:

component	DIN EN	ASME
inlet body	stainless steel 1.4404	316 L
outlet body	gunmetal CC499K / brass CW617N	
internal parts	stainless steel 1.4404	316 L
spring	stainless steel 1.4310	302
seal	PTFE	

lifting mechanism / Type

without lifting mechanism -> gas-tight version of spring housing (for neutral and non-neutral media)
with lifting lever -> gas-tight version of spring housing (for neutral and non-neutral media)

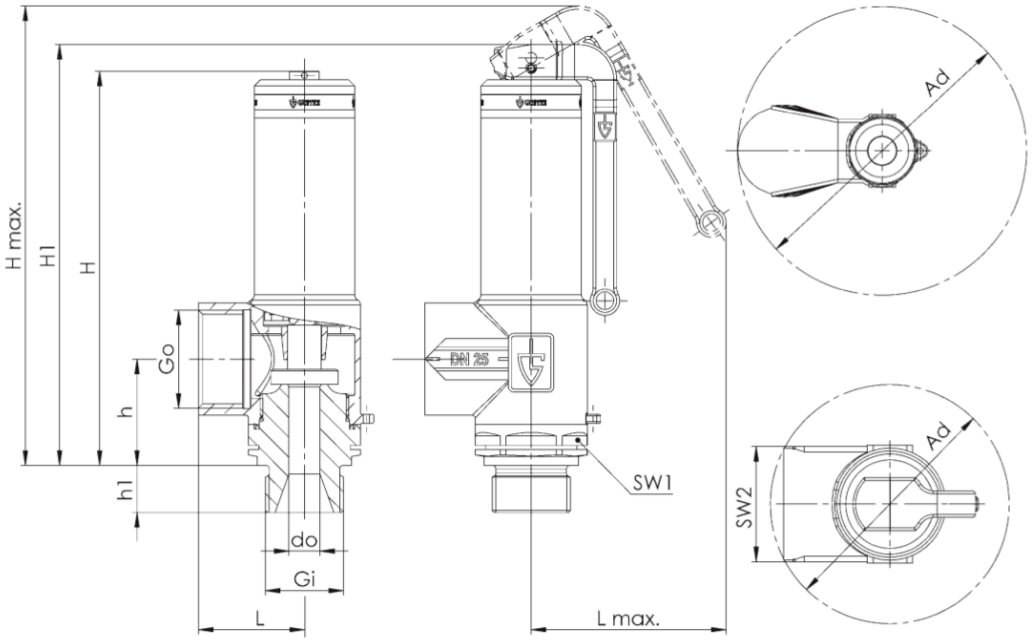
approvals:

AD 2000 sheet A2	DIN ISO 4126-1	DGR 2014/68/EU	DIN EN 13648-1

examples of use:

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

dimensions:



diameter DN	8	8	8	8	8	8	10	10	10	10	15	15	15	25	25	32	32	32
inlet Gi*	1/4"	3/8"	1/2"	1/4"	3/8"	1/2"	3/8"	1/2"	1/2"	3/4"	1/2"	3/4"	1"	1"	1 1/4"	1 1/4"	1 1/2"	2"
outlet Go*	3/8"			1/2"			1/2"		1"		1"			1 1/2"		2"		
h1	12		14	12		14	12	14	14	16	14	16	18	18	22	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			58			58		81		81			119		146		
Do	6,0			6,0			7,5		7,5		10,5			18,0		23,0		
α_w / K_{dr} (F)	0,52			0,52			0,52		0,49		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		
range of adjustment bar	0,2 – 70 bar			0,2 – 70 bar			0,2 – 70 bar		0,2 – 50 bar		0,2 – 50 bar			0,2 – 50 bar		0,2 – 50 bar		
range of adjustment ASME	40 – 1015 psi			40 – 1015 psi			40 – 1015 psi		40 – 725 psi		40 – 725 psi			40 –725 psi		40 – 725 psi		
weight kg	0,2			0,3			0,3		0,7		0,7			3,0		6,7		

*Thread / Connection acc. to DIN EN ISO 228 BSP-P
**Flow coefficients for blow-off pressures <3,0 bar: Please refer to the flow coefficients chart

installation and assembly:

Spring safety valves must be installed vertically to the spring cover that is located above or horizontally while taking the direction of flow into account. To guarantee perfect function of the valves, they must be mounted so that no unauthorized static, dynamic or thermal loads can take effect. If direct or indirect danger to persons or the environment may be caused by the medium discharging through the housing, suitable protective measures must be taken.

supply line

Supply line supports for safety valves should be as short as possible and are to be designed so that no higher pressure losses greater than max. 3% of the response pressure can occur at full valve load.

condensation drainage line

In the event of possible condensate formation the pipes or the valves themselves (in flanged version) must be fitted at their lowest point with a continuously operating condensate discharge device. Please make sure that the condensation or escaping media is safely drained away. The body, lines and sound absorbers must be protected against freezing.

blowing-off line/ counterpressure

The safety valves blow off line must be designed to ensure that the required mass flow can be discharged depressurized when blowing off.

operation:

The working pressure of the installation should be at least 5% below the closing pressure of the safety valve. In this way, the valve can satisfactorily close again after blowing off. In the event of minor leaks, which may be caused by contamination between the sealing surfaces, the valve can be made to blow off through lifting, for cleaining purposes. If this does not remove the leak, the sealing surface is probably damaged and this can only be repaired at our factory or by authorized specialists. The activation of ventilation occurs either through an activation thread or through the spring cover, depending on the design by turning anti-clockwise (then, the activation thread must be turned back to stop) or by actuating the activation lever on the upper part of the valve.

lifting for maintenance purposes:

In the case of safety valves with a lifting device it is recommended, and in certain plant-specific cases even stipulated that the valves from time to time must be made to blow-off by lifting the seal off the seat, in order to assure the correct functioning of the safety valve. This ist why they can be opened at an operating pressure of ≥ 85% of the response pressure. The lifting device is not to be operated when in a pressure-free state. Safety valves represent the last point of protection for the vessel or system. They should be capable of preventing unauthorized excess pressure when all other upstream regulation, control and monitoring devices fail. To ensure these functional characteristics safety valves require regular and recurring maintenance. The maintenance intervals for these fittings are to be specified by the operator according to the conditions of use.

article number:

type	lifting mechanism	connection	diameter	seal	size (inlet x outlet)
SV14	0 – without **1 – with lifting lever**	**0 – male thread BSP-P / female thread BSP-P**	**1 – DN8** 2 – DN10 3 – DN15 5 – DN25 6 – DN32	**3 – PTFE**	01 – 1/4" x 3/8" 01.1 – 1/4" x 1/2" **02 – 3/8"x 1/2"** 02.1 – 3/8"x 3/8" 03.1 – 1/2"x 1/2" 03.2 – 1/2" x 3/8" 03.3 – 1/2" x 1" 04 – 3/4"x 1" 05 – 1" x 1 1/2" 05.1 – 1" x 1" 06 – 1 1/4" x 1 1/2" 06.1 – 1 1/4" x 2" 07 – 1 1/2" x 2" 08 – 2" x 2"

example no. SV18101302:

SV18	**1**	**0**	**1**	**03**	**02**

article number: SV18101302
Cryo safety valve made of stainless steel
internal parts stainless steel
lifting mechanism: lever
connection: male thread
diameter: DN8
seal: PTFE
size: inlet: 3/8" x outlet: 1/2"

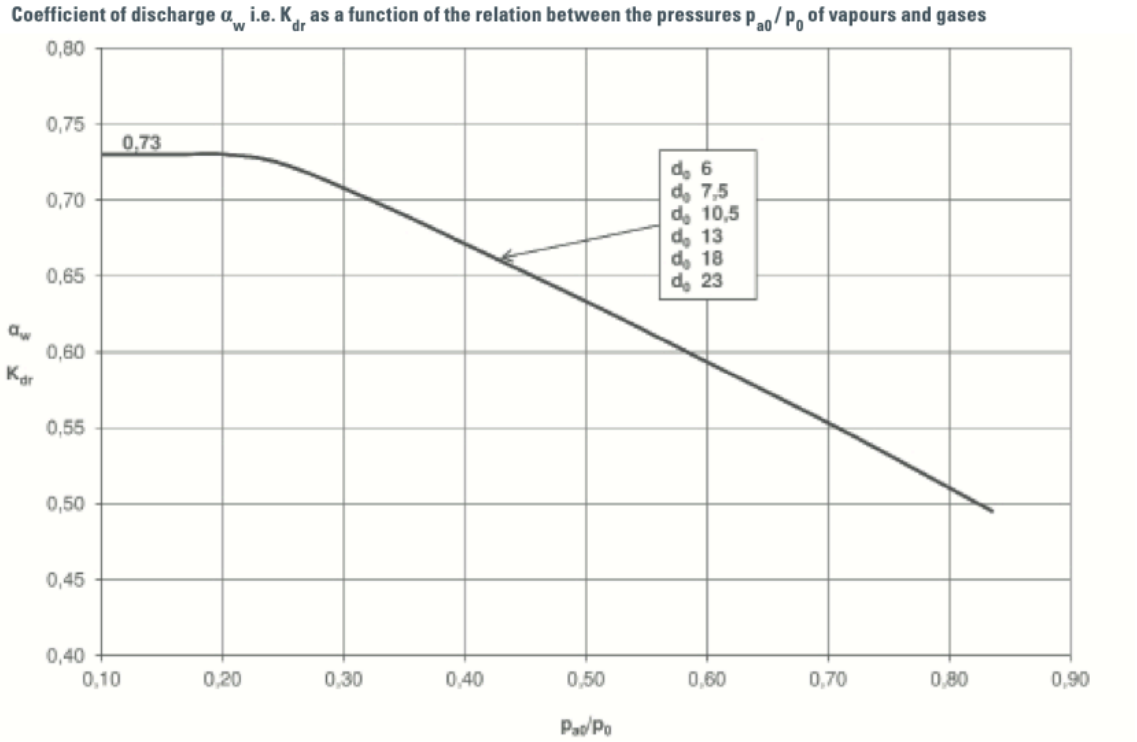
Image similar, subject change without notice.

capacity table according to ISO 4126-1/ AD2000 A2: blowing-off rates at 10% above set pressure

media: 1 = air Nm3/h
2 = water m3/h

DN	8		10		15		25		32	
flow diameter	d0 = 6,0 mm		d0 = 7,5 mm		d0 = 10,5 mm		d0 = 18,0 mm		d0 = 23,0 mm	
set pressure in bar	1	2	1	2	1	2	1	2	1	2
0,2	11,1	0,4	17,3	0,6	33,9	1,2	99,5	3,6	162,5	5,9
0,5	17,4	0,6	27,2	0,9	53,3	1,8	156,7	5,2	255,8	8,4
1,0	25,8	0,8	40,3	1,2	79,0	2,4	232,2	7,0	379,2	11,5
1,5	34,5	1,0	54,0	1,5	105,8	2,9	310,8	8,6	507,5	14,1
2,0	43,2	1,1	67,5	1,7	132,2	3,4	388,6	10,0	634,4	16,3
2,5	51,7	1,2	80,8	1,9	158,4	3,8	465,4	11,2	759,8	18,2
3,0	60,1	1,4	93,9	2,1	184,1	4,2	540,9	12,2	883,2	20,0
3,5	68,1	1,5	106,5	2,3	208,7	4,5	613,3	13,2	1001,4	21,6
4,0	76,0	1,6	118,8	2,5	232,8	4,8	684,1	14,1	1116,9	13,1
4,5	83,8	1,7	130,9	2,6	256,5	5,1	753,8	15,0	1230,7	24,5
5,0	91,5	1,8	143,0	2,7	280,2	5,4	823,4	15,8	1344,4	25,8
5,5	99,2	1,8	155,1	2,9	303,9	5,6	893,1	16,6	1458,2	27,0
6,0	107,0	1,9	167,1	3,0	327,6	5,9	962,8	17,3	1571,9	28,3
6,5	114,7	2,0	179,2	3,1	351,3	6,1	1032,5	18,0	1685,7	29,4
7,0	122,5	2,1	191,3	3,2	375,0	6,4	1102,1	18,7	1799,5	30,5
7,5	130,2	2,2	203,4	3,4	398,7	6,6	1171,8	19,4	1913,2	31,6
8,0	137,9	2,2	215,5	3,5	422,4	6,8	1241,5	20,0	2027,0	32,6
8,5	145,7	2,3	227,6	3,6	446,2	7,0	1311,2	20,6	2140,7	33,6
9,0	153,4	2,4	239,7	3,7	469,9	7,2	1380,8	21,2	2254,5	34,6
9,5	161,2	2,4	251,8	3,8	493,6	7,4	1450,5	21,8	2368,3	35,6
10,0	168,9	2,5	263,9	3,9	517,3	7,6	1520,2	22,4	2482,0	36,5
11,0	184,4	2,6	288,1	4,1	564,7	8,0	1659,5	23,4	2709,5	38,3
12,0	199,9	2,7	312,3	4,3	612,1	8,3	1798,9	24,5	2937,1	40,0
13,0	215,4	2,8	336,5	4,4	659,5	8,7	1938,2	25,5	3164,6	41,6
14,0	230,8	2,9	360,7	4,6	707,0	9,0	2077,6	26,4	3392,1	43,2
15,0	246,3	3,0	384,9	4,8	754,4	9,3	2216,9	27,4	3619,6	44,7
16,0	261,8	3,1	409,1	4,9	801,8	9,6	2356,3	28,3	3847,1	46,2
17,0	277,3	3,2	433,3	5,1	849,2	9,9	2495,6	29,1	4074,6	47,6
18,0	292,8	3,3	457,5	5,2	896,6	10,2	2635,0	30,0	4302,2	49,0
19,0	308,3	3,4	481,7	5,4	944,0	10,5	2774,3	30,8	4529,7	50,3
20,0	323,7	3,5	505,8	5,5	991,5	10,8	2913,7	31,6	4757,2	51,6
21,0	339,2	3,6	530,0	5,6	1038,9	11,0	3053,0	32,4	4984,7	52,9
22,0	354,7	3,7	554,2	5,8	1086,3	11,3	3192,4	33,2	5212,2	54,1
23,0	370,2	3,8	578,4	5,9	1133,7	11,5	3331,7	33,9	5439,8	55,4
24,0	385,7	3,8	602,6	6,0	1181,1	11,8	3471,1	34,6	5667,3	56,6
25,0	401,2	3,9	626,8	6,1	1228,5	12,0	3610,4	35,4	5894,8	57,7
26,0	416,6	4,0	651,0	6,3	1276,0	12,3	3749,8	36,1	6122,3	58,9
27,0	432,1	4,1	675,2	6,4	1323,4	12,5	3889,1	36,7	6349,8	60,0
28,0	447,6	4,2	699,4	6,5	1370,8	12,7	4028,5	37,4	6577,3	61,1
29,0	463,1	4,2	723,6	6,6	1418,2	13,0	4167,8	38,1	6804,9	62,2
30,0	478,6	4,3	747,8	6,7	1465,6	13,2	4307,2	38,7	7032,4	63,2
32,0	509,5	4,4	796,2	6,9	1560,5	13,6	4585,9	40,0	7487,4	65,3
34,0	540,5	4,6	844,5	7,2	1655,3	14,0	4864,6	41,2	7942,4	67,3
36,0	571,5	4,7	892,9	7,4	1750,1	14,4	5143,3	42,4	8397,5	69,3
38,0	602,4	4,8	941,3	7,6	1845,0	14,8	5422,0	43,6	8852,5	71,2
40,0	633,4	5,0	989,7	7,8	1939,8	15,2	5700,7	44,7	9307,6	73,0
42,0	664,4	5,1	1038,1	8,0	2034,6	15,6	5979,4	45,8	9762,6	74,8
44,0	695,3	5,2	1086,5	8,1	2129,5	16,0	6258,1	46,9	10217,6	76,6
46,0	726,3	5,3	1134,9	8,3	2224,3	16,3	6536,8	48,0	10672,7	78,3
48,0	757,3	5,4	1183,2	8,5	2319,1	16,7	6815,5	49,0	11127,7	80,0
50,0	788,2	5,6	1231,6	8,7	2414,0	17,0	7094,2	50,0	11582,7	81,6
52,0	819,2	5,7	1280,0	8,9						
54,0	850,2	5,8	1328,4	9,0						
56,0	881,1	5,9	1376,8	9,2						
58,0	912,1	6,0	1425,2	9,3						
60,0	943,1	6,1	1473,6	9,5						
62,0	974,0	6,2	1521,9	9,7						
64,0	1005,0	6,3	1570,3	9,8						
66,0	1036,0	6,4	1618,7	10,0						
68,0	1066,9	6,5	1667,1	10,1						
70,0	1097,9	6,6	1715,5	10,3						

flow coefficients chart:



$\frac{p_{a0}}{p_0} = \frac{\text{counter pressure bar (a)}}{\text{blow-off pressure bar (a)}}$ p_{atm}= ambient i.e. atmospheric pressure= 1,01325 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}	p_0 bar (a)
≤1	p_{set} + p_{atm}+0,1 bar
≥1	p_{set} x 1,1 + p_{atm}

For a safety valve set at =0,3bar (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)
+ 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 and extracted from the chart α_w bzw. K_{dr}=0,55

units:
bar(a) ≙ absolute pressure – pressure in relation to absolute vacuum (zero), e.g. p_{atm}=1,01325 bar (a)
bar(g) ≙ overpressure – pressure above i.e. in relation to p_{atm}=1,01325 bar(a)

capacity table according to ASME: blowing-off rates at 10% above set pressure

medium:1 = air SCFM
2 = water GPM*

***for DN8 & DN10 due to small nominal diameter, certification acc. ASME Code Sec. VIII Div. 1 not possibile**

DN	8		10		15		25		32	
flow diameter	d0 = 0,2362 inch (6,0 mm)		d0 = 0,2953 inch (7,5 mm)		d0 = 0,4134 inch (10,5 mm)		d0 = 0,7087 inch (18 mm)		d0 = 0,9055 inch (23 mm)	
set pressure in psi (g)	1	2	1	2	1	2	1	2	1	2
40	38	-	59	-	115	19	333	56	544	92
50	45	-	70	-	137	22	402	63	657	103
60	52	-	81	-	159	24	466	69	761	113
70	59	-	92	-	180	26	529	75	864	122
87	71	-	111	-	202	27	593	80	968	131
90	73	-	114	-	223	29	656	85	1072	139
100	80	-	125	-	245	31	720	90	1175	146
110	87	-	136	-	267	32	783	94	1279	153
120	94	-	147	-	288	33	847	98	1383	160
130	101	-	158	-	310	35	910	102	1486	167
140	108	-	169	-	331	36	974	106	1590	173
150	115	-	180	-	353	37	1037	110	1694	179
160	122	-	191	-	375	39	1101	113	1798	185
170	129	-	202	-	396	40	1164	117	1901	191
180	136	-	213	-	418	41	1228	120	2005	196
190	143	-	224	-	439	42	1291	124	2109	202
200	151	-	235	-	461	43	1355	127	2212	207
210	158	-	246	-	483	44	1418	130	2316	212
220	165	-	257	-	504	45	1482	133	2420	217
230	172	-	268	-	526	46	1546	136	2523	222
240	179	-	279	-	548	47	1609	139	2627	227
250	186	-	290	-	569	48	1673	142	2731	231
260	193	-	301	-	591	49	1736	145	2834	236
270	200	-	312	-	612	50	1800	147	2938	240
280	207	-	323	-	634	51	1863	150	3042	245
290	214	-	334	-	656	52	1927	153	3145	249
300	221	-	345	-	677	53	1990	155	3249	253
320	235	-	368	-	720	55	2117	160	3457	262
340	249	-	390	-	764	56	2244	165	3664	270
360	263	-	412	-	807	58	2371	170	3871	278
380	278	-	434	-	850	59	2498	175	4079	285
400	292	-	456	-	893	61	2625	179	4286	293
420	306	-	478	-	936	63	2752	184	4493	300
440	320	-	500	-	980	64	2879	188	4701	307
460	334	-	522	-	1023	65	3006	192	4908	314
480	348	-	544	-	1066	67	3133	196	5116	321
500	362	-	566	-	1109	68	3260	200	5323	327
550	398	-	621	-	1217	72	3578	210	5841	343
600	433	-	676	-	1325	75	3895	220	6360	358
650	468	-	731	-	1434	78	4213	229	6878	373
700	503	-	787	-	1542	81	4530	237	7397	387
725	521	-	814	-	1596	82	4689	241	7656	394
750	539	-	842	-						
800	574	-	897	-						
850	609	-	952	-						
900	644	-	1007	-						
950	680	-	1062	-						
1015	726	-	1134	-						