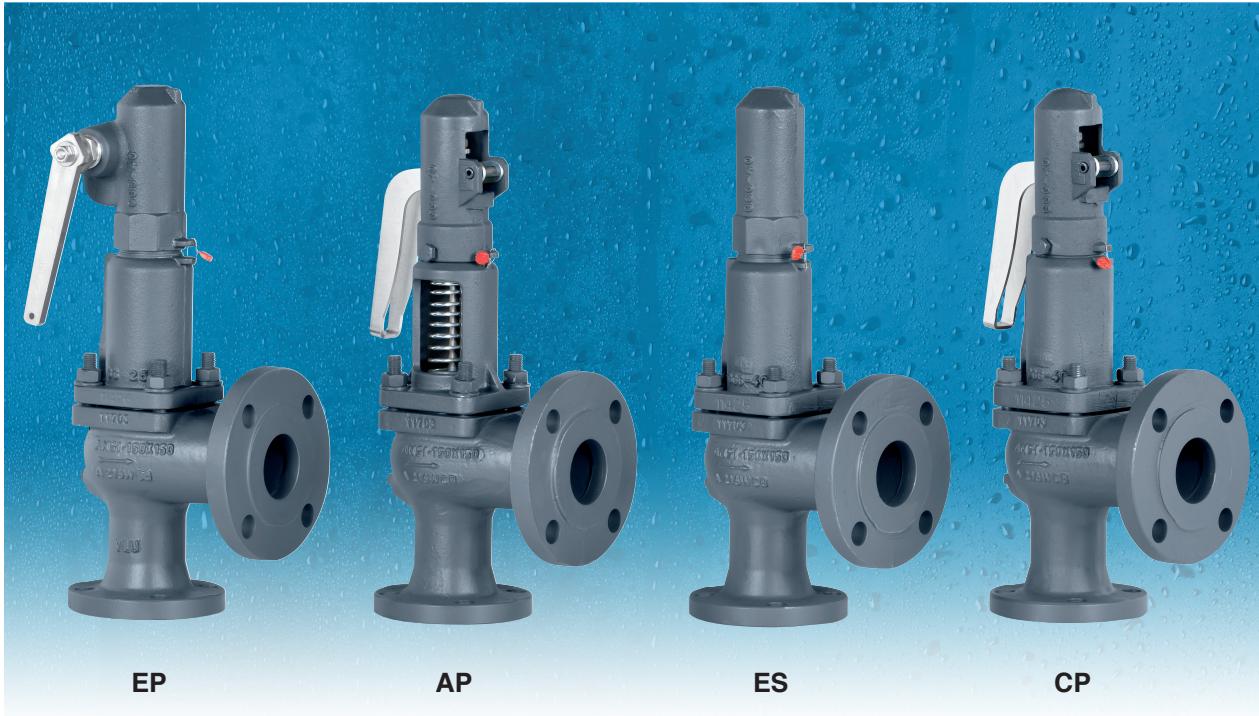


Full lift safety valve with spring loading.(AIT)

Model 486

VYC
ASME SI Units



The valve works as an automatic pressure releasing regulator activated by the static pressure existing at the entrance to the valve and is characterized by its ability to open instantly and totally.

Design in accordance with "ASME code section VIII".

Materials according ASME code section II and ASTM. Connections according ASME/ANSI B16.5-2009 standard. Center to face dimensions according API-526.

In accordance with the requirements of the pressure equipment directive 2014/68/EU.

EC valve verification certified by: TÜV Rheinland Industrie Service GmbH, Notified Body for Pressure Equipment ID-No. 0035

Type (Module B) EC examination report nº 33530455 certified by: TÜV Rheinland Ibérica ICT, S.A.

In compliance with the ATEX 2014/34/EU directive "Protective equipment and systems for use in potentially explosive atmospheres".

Other authorisations: ISCIR, ITI, NASTHOL, EAC,...etc..

Specifications

- 90° angular flow.
- Activated by direct action helicoid spring.
- Simplicity of construction ensuring minimum maintenance.
- Materials carefully selected for their resistance to corrosion. With the exception of washers and couplings, the valves are free of non-ferric materials.
- Internal body designed to offer favourable flow profile.
- Sealing surfaces treated and balanced, making them extremely tightness, even exceeding API-527 requirements.
- Great discharge capacity. For liquids typically used with openings similar to proportional safety valves.
- Equipped with draining screws for removing condensation.
- Auto-centering plug.
- Threaded shaft with lever positioner facilitating immediate manual action.
- Elevator, independent of the seal, designed facilitate sudden opening when the steam expands and, with any fluid, guarantees absolute opening and closing precision.
- All the valves are supplied sealed at the set pressure requested, simulating operational conditions, and are vigorously tested.
- All components are numbered, registered and checked. If requested in advance, material, casting, test and efficiency certificates will be enclosed with the valve, and the instruction manual, in accordance with P.E.D. 2014/68/EU.

IMPORTANT

Depending on demand:

- 1.- Blocking screw which facilitates hydrostatic testing of the container which to be protected.
- 2.- Rapid limiter to reduce the coefficient of discharge.
- 3.- Fluorelastomer (Viton) seals, Silicone's rubber, PTFE (Teflon)... etc., achieving leakage levels less than $0,3 \times 10^{-3} \text{ Pa cm}^3 \text{ seg.}$

The ranges of application allow certain flexibility although we recommend limiting them to:

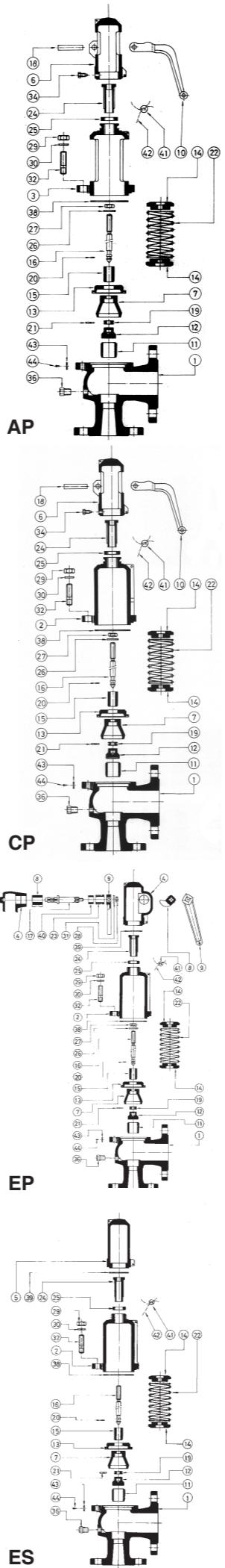
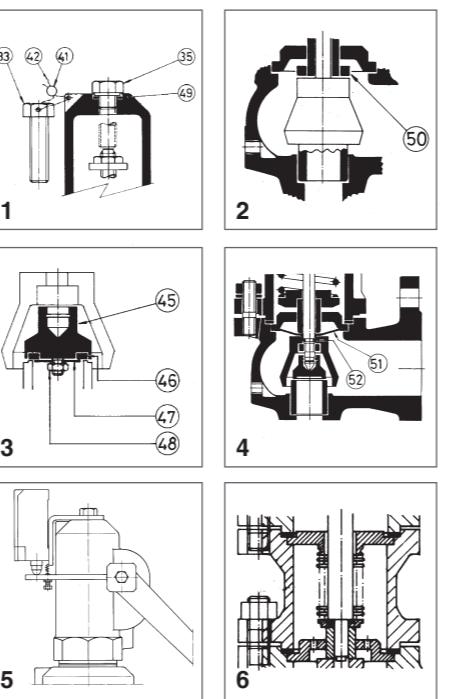
RANGE OF APPLICATION FOR THE SEALS				
FLUID	SET PRESSURE IN bar			
Saturated steam	0,2 1,8 4,0 4,8 7,0 30 40,0			
Liquids and gases	S V T			
SEALS	TEMPERATURE IN °C			
ACCORDING TO MANUFACTURERS				
MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	
Silicone's rubber	S -60	+200	-50	+115
Fluorelastomer (Viton)	V -40	+250	-30	+150
PTFE (Teflon)	T -265	+260	-80	+230 (1)

(1) For temperatures exceeding 230°C apply metallic seal only

- 4.- Fluorelastomer (Viton) membrane and O-ring isolating the rotating or sliding parts from the working fluid.
- 5.- Electrical contact indicating open/closed.
- 6.- Balance bellows to:
 - Protect the spring from atmospheric influences.
 - Ensure outside of valve body is totally tightness.
 - Level out external or self-generated back pressure.
- 7.- Possibility of manufacture in other types of material, for special operating conditions (high temperatures, fluids, etc.).
- 8.- Totally free of oil and grease, to work with oxygen, avoiding possible fire risks (UV-Oxygen-VBG 62).
- 9.- Special springs for critical temperatures.

Nº. PIECE	PIECE	MATERIAL	
		CAST STEEL	STAINLESS STEEL
1	Body	Cast steel (ASTM A216 - WCB)	Stainless steel (ASTM A 351 - CF8M)
2	Closed bell	Nodular iron (ASTM A536 65 - 45 - 12)	Stainless steel (ASTM A 351 - CF8M)
3	Open bell	Cast steel (ASTM A 216 - WCB)	Stainless steel (ASTM A 351 - CF8M)
4, 5, 6	Hood	Nodular iron (ASTM A 536 65 - 45 - 12)	Stainless steel (ASTM A 351 - CF8M)
7	Elevator	Nodular iron (ASTM A 536 65 - 45 - 12) (1)	Stainless steel (ASTM A 351 - CF8M) (7)
8	Cam	Carbon steel (ASTM A 570 - 36) (6)	Carbon steel (ASTM A 570 - 36)
9, 10	Lever	Carbon steel (ASTM A 570 - 36)	Stainless steel (AISI 304)
11	Seating	Stainless steel (AISI 420)	Stainless steel (AISI 630)
12	Plug	Stainless steel (AISI 420)	Stainless steel (AISI 630)
13	Lead	Stainless steel (AISI 420) (4)	Stainless steel (AISI 316) (5)
14	Spring press	Carbon steel (AISI 1045)	Stainless steel (AISI 303)
15	Separator	Stainless steel (AISI 420)	Stainless steel (AISI 316)
16	Rod	Stainless steel (AISI 420)	Stainless steel (AISI 316)
17	Lever shaft	Carbon steel (AISI 1045)	Stainless steel (AISI 303)
18	Gudgeon	Carbon steel (AISI 1070)	Stainless steel (AISI 301)
19	Ring	Stainless steel (AISI 420)	Stainless steel (AISI 316)
20, 21	Safety ring	Stainless steel (AISI 301)	Stainless steel (AISI 301)
22	Spring	Vanadium chrome steel (AISI 6150) (2)	Stainless steel (AISI 301) (3)
23	Gland	Carbon steel (AISI 1045)	Stainless steel (AISI 303)
24	Hollow screw	Stainless steel (AISI 303)	Stainless steel (AISI 303)
25	Hollow screw nut	Stainless steel (AISI 303)	Stainless steel (AISI 303)
26	Buffer nut	Stainless steel (AISI 303)	Stainless steel (AISI 303)
27	Rod check nut	Carbon steel (AISI 1015)	Stainless steel (AISI 316)
28, 29, 48	Nut	Carbon steel (AISI 1015)	Stainless steel (AISI 316)
30, 31	Washer	Carbon steel (AISI 1015)	Stainless steel (AISI 316)
32	Stud	Carbon steel (AISI 1035)	Stainless steel (AISI 316)
33, 34, 35	Screw	Carbon steel (AISI 1045)	Stainless steel (AISI 316)
36	Cap	Carbon steel (AISI 1035)	Stainless steel (AISI 316)
38	Coupling	Graphite	PTFE (Teflon)
39	Coupling	PTFE (Teflon)	PTFE (Teflon)
40	Seal	Graphite	PTFE (Teflon)
41	Seal	Plastic	Plastic
42	Sealing wire	Sealing wire	Sealing wire
43	Characteristic plate	Stainless steel (AISI 304)	Stainless steel (AISI 304)
45	Plug	Stainless steel (AISI 316)	Stainless steel (AISI 316)
46	Sealing disk	PTFE (Teflon)	PTFE (Teflon)
		Silicone's rubber	Silicone's rubber
		Fluorelastomer (Viton)	Fluorelastomer (Viton)
47	Washer	Stainless steel (AISI 316)	Stainless steel (AISI 316)
49	Coupling	Copper	PTFE (Teflon)
50	Limiter	Stainless steel (AISI 420)	Stainless steel (AISI 316)
51	Membrane	Fluorelastomer (Viton)	Fluorelastomer (Viton)
52	O-ring	Fluorelastomer (Viton)	Fluorelastomer (Viton)
NPS ₁ x NPS ₂		1" x 2" to 8" x 10"	
Class		150 lbs	
OPERATING CONDITIONS	PRESSURE IN bar	16,90 13,80 12,10 10,20 8,40 6,50 4,60	15,64 13,70 10,20 4,60
MAX. TEMP. IN °C	120 200 250 300 350 400 450	120 200 300 450	
MIN. TEMP. IN °C	-29	-29	
Class		300 lbs	
OPERATING CONDITIONS	PRESSURE IN bar	40 40 40 39,80 37,60 34,70 23	40 35,70 31,60 28,80
MAX. TEMP. IN °C	120 200 250 300 350 400 450	120 200 300 450	
MIN. TEMP. IN °C	-29	-29	

(1) 1" x 2" in stainless steel (ASTM A351 CF8M).
 (2) Spring steel (ASTM A228) for wire spring Ø < 10 mm. Maximum temperature EP, ES and CP 250°C / AP 400°C.
 (3) Vanadium chrome steel (AISI 6150) for wire spring Ø > 10 mm.
 (4) 8" x 10" in Stainless steel (ASTM A743 CA4OF).
 (5) 8" x 10" in Stainless steel (ASTM A351 CF8M).
 (6) 1" x 2" to 4" x 6" L in Stainless steel (AISI 304).
 (7) 1 1/2" x 2" to 4" x 6" L in Stainless steel (AISI 316).



Full lift safety valve with spring loading (AIT) model 486 - AP and CP.

1. Disassembly and assembly.

1.1 Disassembly.

- To replace the spring (22) or clean any of the internal components of the valve, proceed in the following manner:
 A - Withdraw the clip (18), using a punching tool, until the lever (10) comes free.
 B - Loosen the screws (34) and take the cap (6) off.
 C - Holding the spindle (16) steady, loosen the hollow screw nut (25) and the hollow screw (24) until you note a releasing of the spring (22).
 D - Mark on the spindle (16) the position of the spindle lock-nut (27) and the adjusting nut (26). Loosen them and remove them.
 E - Unscrew the nuts (29) and remove them, together with the studs (32) and their washers (30).
 F - Lift the cover (3) or (2) and you will have access to all of the components.

1.2 Assembly.

- A - Place the safety-ring (20) on the spindle (16) and press it against the gasket (12).
 B - In the spindle channel (16) connect the ring (19) and fix it to the security-ring (21). Introduce the elevator (7) into the upper part of the spindle (16) and press this against the previously described pieces.
 C - Enter the guide (13), the separator (15), the spring-press (14), the spring (22), the spring-press (14) through the upper part of the spindle (16) and press this against the previously described pieces.
 D - Replace the assembly (38) and the cover (3) or (2).
 E - Place the washers (30) on the studs (32) and make up the nuts (29) diagonally, checking the correct alignment of the cover (3) or (2).
 F - Adjust the firing pressure with the hollow screw (24) and fix the adjustment position with the hollow screw nut (25).
 G - Turn the spindle lock-nut (27) and the adjusting nut (26) to the position marked (see 1.1.D) and make up against each other.
 H - Introduce the cap (6) and tighten the screws (34).
 I - Place the lever (10) and fix it with the fastener (18).

2. Adjusting the firing pressure.

- A - Proceed according to points 1.1.A, 1.1.B, 1.1.C.
 B - Proceed according to points 1.2.F, 1.2.H, 1.2.I.

Full lift safety valve with spring loading (AIT) model 486 - EP.

1. Disassembly and assembly.

1.1 Disassembly.

- To replace the spring (22), or clean any of the internal components of the valve, proceed in the following manner:
 A - Move the lever (9) in direction C as far as the constructive catcher.
 B - Unscrew the cap (4) and remove.
 C - Holding the spindle (16) steady, loosen the hollow screw nut (25) and the hollow screw (24) until you note a releasing of the spring (22).
 D - Mark on the spindle (16) the position of the spindle lock-nut (27) and the adjusting nut (26). Loosen them and remove them.
 E - Unscrew the nuts (29) and remove them, together with the studs (32) and their washers (30).
 F - Lift the cover (2) and you will have access to all of the components.

1.2 Assembly.

- A - Place the safety-ring (20) on the spindle (16) and press it against the gasket (12).
 B - In the spindle channel (16) connect the ring (19) and fix it to the security-ring (21). Introduce the elevator (7) into the upper part of the spindle (16) and press this against the previously described pieces.
 C - Enter the guide (13), the separator (15), the spring-press (14), the spring (22), the spring-press (14) through the upper part of the spindle (16) in a correlative manner.
 D - Replace the assembly (38) and the cover (2).
 E - Place the washers (30) on the studs (32) and make up the nuts (29) diagonally, checking the correct alignment of the cover (2).
 F - Adjust the firing pressure with the hollow screw (24) and fix the adjustment position with the hollow screw nut (25).
 G - Turn the spindle lock-nut (27) and the adjusting nut (26) to the position marked (see 1.1.D) and make up against each other.
 H - Change the coupling (39) and lightly tighten the cap (4). Move the lever (9) towards position A as far as the constructive catcher. Definitely tighten the cap (4).

2. Adjusting the firing pressure.

- A - Proceed according to points 1.1.A, 1.1.B, 1.1.C.
 B - Proceed according to points 1.2.F, 1.2.H.

Full lift safety valve with spring loading (AIT) model 486 - ES.

1. Disassembly and assembly.

1.1 Disassembly.

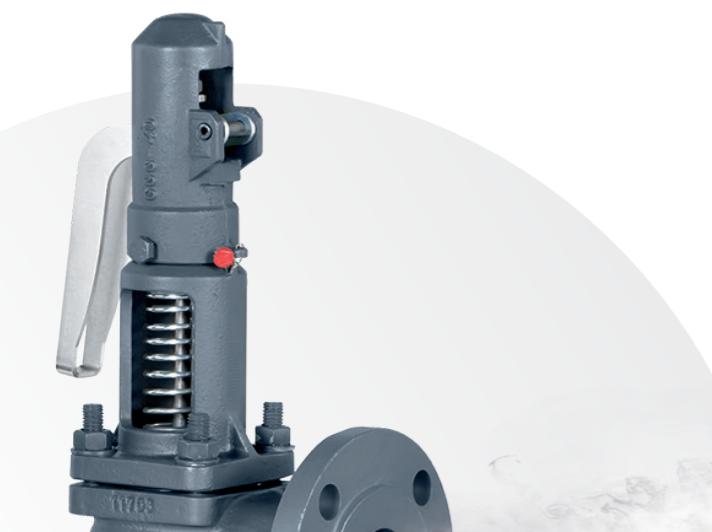
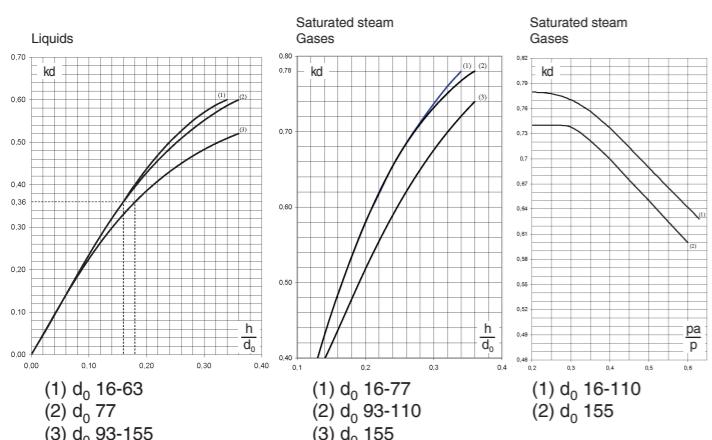
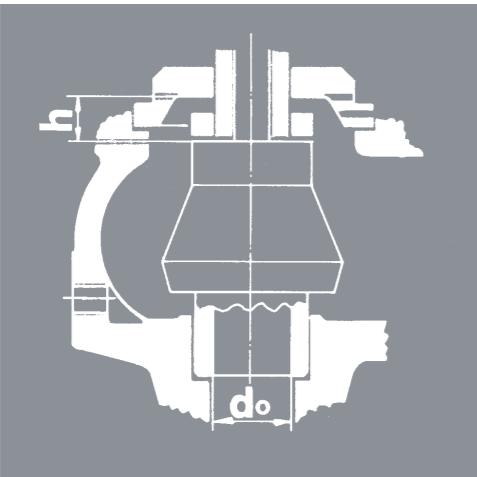
- To replace the spring (22), or clean any of the internal components of the valve, proceed in the following manner:
 A - Unscrew the cap (5) and remove.
 B - Holding the spindle (16) steady, loosen the hollow screw nut (25) and the hollow screw (24) until you note a releasing of the spring (22).
 C - Unscrew the nuts (29) and remove them, together with the studs (32) and their washers (30).
 F - Lift the cover (2) and you will have access to all of the components.

1.2 Assembly.

- A - Place the safety-ring (20) on the spindle (16) and press it against the gasket (12).
 B - In the spindle channel (16) connect the ring (19) and fix it to the security-ring (21). Introduce the elevator (7) into the upper part of the spindle (16) and press this against the previously described pieces.
 C - Enter the guide (13), the separator (15), the spring-press (14), the spring (22), the spring-press (14) through the upper part of the spindle (16) in a correlative manner.
 D - Replace the washers (38) and the cover (2).
 E - Place the washers (30) on the studs (32) and make up the nuts (29) diagonally, checking the correct alignment of the cover (2).
 F - Adjust the firing pressure with the hollow screw (24) and fix the adjustment position with the hollow screw nut (25).
 G - Change the coupling (39) and tighten the cap (5).
 2. Adjusting the firing pressure.
 A - Proceed according to points 1.1.A, 1.1.B.
 B - Proceed according to points 1.2.F, 1.2.G.

NPS ₁ x NPS ₂	1"x 2"	1 1/2" x 2"	1 1/2"x2 1/2"	1 1/2"X3"(2"X3")	2'X3"(3"X4")	3"X4"(4"X6")	4" x 6"	4" x 6"	6" x 8"	8" x 10"
API Orifice Letter	D - E	F	G	H	J	L	N	P	Q	T
do	16	20	25	32	40	50	63	77	110	155
Ao = $\frac{\pi \cdot d_0^2}{4}$	201	314	491	804	1257	1964	3117	4657	9503	18870
H	367	412	436	498	545	665	745	810	1070	1200
h ₁	112	129	129	148	148	191	191	191	247	331
L ₁	114	121 (152)*	121 (152)*	124	124 (181)*	165 (181)*	209,5	229 (254)*	241	279
L ₂	105	124	124	130	136,5 (184)*	155,5 (179)*	197	181 (225)*	240	276
R	1/4"	1/4"	1/4"	1/4"	1/4"	3/8"	3/8"	3/8"	3/8"	3/8"
Whitworth gas-tight cylindrical female thread ISO 228/1 (DIN-259)										
INTAKE FLANGE										
CLASS 150 lbs ASME/ANSI B16.5										
CLASS 300 lbs ASME/ANSI B16.5										
CLASS 150 lbs ASME/ANSI B16.5										
WEIGHT IN KGS.										
CODE										
CAST STEEL 2002-486,										
STAINLESS STEEL 2002-486,										
150 lb										
300 lb										
150 lb										
300 lb										
81020D 51020D 8104D 5104D										
81021D 51021D 81041D 51041D										
81022D 51022D 81042D 51042D										
81023D 51023D 81043D 51043D										
81122F 51122F 81241F 51241F										
811221F 511221F 812411F 512411F										
811222G 511222G 81242G 51242G										
811223G 511223G 81243G 51243G										
811223H 511223H 81243H 51243H										
811222H 511222H 81242H 51242H										
811221H 511221H 81241H 51241H										
81222G 51222G 81242G 51242G										
81222H 51222H 82042H 52042H										
812221H 512221H 82041H 52041H										
812222H 512222H 82042H 52042H										
812223H 512223H 82043H 52043H										
812223J 512223J 82043J 52043J										
812224H 512224H 82044H 52044H										
812225H 512225H 82045H 52045H										
812226H 512226H 82046H 52046H										
812227H 512227H 82047H 52047H										
812228H 512228H 82048H 52048H										
812229H 512229H 82049H 52049H										
81222AH 51222AH 8204AH 5204AH										
81222BH 51222BH 8204BH 5204BH										
81222CH 51222CH 8204CH 5204CH										
81222DH 51222DH 8204DH 5204DH										
81222EH 51222EH 8204EH 5204EH										
81222FH 51222FH 8204FH 5204FH										
81222GH 51222GH 8204GH 5204GH										
81222HH 51222HH 8204HH 5204HH										
81222IH 51222IH 8204IH 5204IH										
81222JH 51222JH 8204JH 5204JH										
81222KH 51222KH 8204KH 5204KH										
81222LH 51222LH 8204LH 5204LH										

COEFFICIENT OF DISCHARGE										
NPS ₁ x NPS ₂	1"x 2"	1 1/2" x 2"	1 1/2" x 2 1/2"	1 1/2" x 3"(2"x3")	2"x 3"	3"x 4"	4"x 6"	4"x 6"	6"x 8"	8"x10"
API Orifice Letter	D-E	F	G	H	J	L	N	P	Q	T
do	16	20	25	32	40	50	63	77	110	155
h	7,00	9,00	12,00	12,00	18,00	18,00	20,00	29,00	36,80	56,15
h1	2,60	3,20	04,00	05,20	06,50	08,00	10,00	12,50	19,80	27,90
h/do	0,44	0,45	00,48	00,38	00,45	00,36	00,32	0,38	0,33	0,36
h1/do (1)	0,16	0,16	00,16	00,16	00,16	00,16	00,16	0,16	0,18	0,18
COEFFICIENT OF DISCHARGE	SATURATED STEAM GASES	0,78			0,74					
kd	LIQUIDS	0,60			0,52					
	LIQUIDS WITH RAPID LIMITER (1)	0,36								



NPS ₁ x NPS ₂	1"x 2"	1 1/2" x 2"	1 1/2" x 2 1/2"
API Orifice Letter	D-E	F	G
do	16	20	25
h	7,00	9,00	12,00

Ao= $\frac{\pi \cdot do^2}{4}$

201

314

491

I - Saturated steam in kg/h.

II - Air at 0°C and 1,013 bar in [Nm³/h].

III - Water at 20°C in l/h.

SET PRESSURE IN bar	I	II	III	I	II	III	I	II	III
1,0	181	242	6721	274	365	10165	442	590	16417
1,5	222	297	7999	336	449	12098	543	724	19540
2,0	263	351	9100	398	532	13763	643	859	22229
2,5	309	412	10174	467	623	15387	754	1006	24853
3,0	354	472	11145	535	714	16856	865	1154	27225
3,5	399	533	12038	604	806	18207	975	1301	29406
4,0	444	593	12869	672	897	19464	1086	1449	31436
4,5	490	654	13650	741	988	20644	1196	1596	33343
5,0	535	714	14388	809	1080	21761	1307	1744	35147
6,0	626	835	15761	946	1263	23838	1528	2039	38502
7,0	716	956	17024	1083	1445	25748	1749	2334	41586
8,0	807	1076	18200	1220	1628	27526	1970	2630	44458
9,0	897	1197	19304	1357	1811	29196	2192	2925	47155
10,0	988	1318	20348	1494	1994	30775	2413	3220	49705
12,0	1169	1560	22290	1768	2359	33712	2855	3810	54449
14,0	1350	1801	24076	2042	2724	36413	3297	4400	58812
16,0	1531	2043	25738	2315	3090	38927	3740	4991	62873
18,0	1712	2285	27299	2589	3455	41289	4182	5581	66687
20,0	1893	2526	28776	2863	3821	43522	4624	6171	70294
22,0	2074	2768	30181	3137	4186	45646	5067	6762	73725
24,0	2255	3010	31523	3411	4552	47676	5509	7352	77003
26,0	2436	3251	32810	3685	4917	49623	5952	7942	80147
28,0	2617	3493	34048	3959	5283	51496	6394	8533	83173
30,0	2799	3735	35243	4233	5648	53303	6836	9123	86092
32,0	2980	3976	36399	4506	6014	55052	9713	88916	
34,0	4218	37519		6379	56746		10303	91652	
36,0	4460	36607		6745	58391		10894	94309	
38,0	4701	39665		7110	59991		11484	96893	
40,0	4943	40696		7476	61550		12074	99411	

Calculated discharge capacities at set pressure +10% overpressure.

Discharge capacities at 2 bar and below are calculated at set pressure +0,2 bar of overpressure.

1 1/2"x3"(2"x3")	2"x 3"(3"x4")	3"x 4"(4"x6")	4"x 6"	4"x 6"	6"x 8"	8"x10"
H	J	L	N	P	Q	T
32	40	50	63	77	110	155
804	1257	1964	3117	4657	9503	18870

For other, not so dense liquids, other than water at 20°C apply:

$$V_L = \sqrt{\frac{Q_A}{Q_L}} \cdot V_A \quad V_A = V_L \cdot \sqrt{\frac{Q_L}{Q_A}}$$

V_A = Water flow according to table.

V_L = Liquid flow.

Q_A = Water density at 20°C.

(Q_A = 998 Kg/m³)

Q_L = Liquid density.

I	II	III	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III
724	967	26883	1132	1511	42029	1769	2361	65668	2808	3747	104220	4195	5599	155712	8561	11425	275377	16128	21523	546814
889	1186	31997	1390	1855	50025	2171	2898	78161	3446	4599	124047	5149	6871	185334	10507					

FACT LIST FOR SAFETY VALVE CALCULS				Customer: Theme: Leaf: Of:																			
Calculus according to ASME code section VIII Div.1																							
1	Consultation / Bid / Order																						
2	Position N°.																						
3	N°. of units																						
4	Regulation																						
5	SERVICE CONDITIONS																						
6										Fluid													
7										Calculation temperature °C													
8										State at moment of dischar. l = liquid, s = steam, g = gas		<input type="checkbox"/> l		<input type="checkbox"/> s		<input type="checkbox"/> g		<input type="checkbox"/> l		<input type="checkbox"/> s		<input type="checkbox"/> g	
9										Molecular mass kg/kmol													
10										Adiabatic exponent æ Compressibility coe. Z													
11										Density at moment of discharge kg/m³													
12										Coefficients ψ max χ													
13										Viscosity cSt cPs													
14										Working pressure abs. bar													
15										Set pressure abs. bar													
16										External back pressure abs. constant variable bar													
17										Rated pressure abs. bar													
18										Discharge capacity Required: kg/h, Nm³/h, l/h													
19										Possible: 1) Kg/h, Nm³/h, l/h													
20										Opening: Full lift / Normal / Progressive													
21										Manufacturer type													
22										Materials		Body											
23	Seat																						
24	Plug																						
25	Spring																						
26	Joint																						
27	Manual discharge action		yes / no																				
28	Cover		Closed / Open																				
29	Bellows		yes / no																				
30	Body with drainage		yes / no																				
31	Diameter of narrowest flow do		mm																				
32	Section of narrowest flow Ao		Necessary Ao		mm²																		
33			Chosen Ao		mm²																		
34	CONNECTIONS		Allowed discharge coefficient		αd																		
35			Input / Output		Flange		mm																
36					Thread		inch																
37					Welding (soldering) ends																		
38			Class																				
			Shape of joint surfaces (ASME/ANSI B16.5-2009)																				
39	OBSERVA-TIONS		Unit weight		approx. Kg																		
40																							
41																							
42																							
43	ACCEP-TANCE		Certificate according to EN-10204 2.2																				
44			Certificate according to EN-10204 3.2																				
45																							
Date:																							
Department:																							
Name:																							