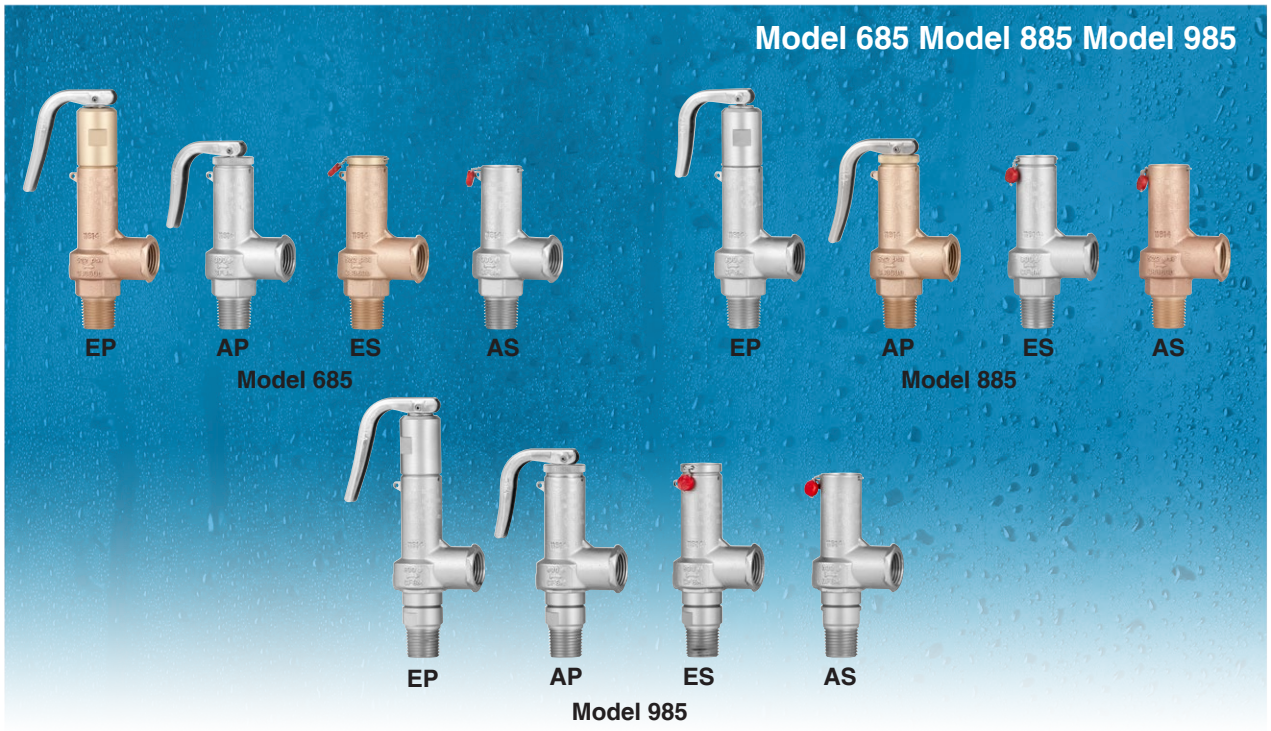
Full lift safety valve with spring loading. (AIT)

ASME

Catalog available in International System Units (SI) in PDF format.



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 B1.20.1 standard..
In accordance with the requirements of the pressure equipment directive 2014/68/EU.
EC valve verification certified by: TÜV Internacional Grupo TÜV Rheinland, S.L. EC 0035. Type (Module D) EC examination report nº 33530455 certified by: TÜV Internacional Grupo TÜV Rheinland, S.L. 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.

Características

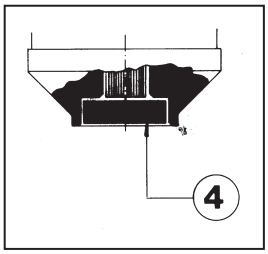
— 90° angular flow.
— Activated by direct action helicoid spring.
— Simplicity of construction ensuring minimum maintenance.
— Materials carefully selected for their resistance to corrosion.
— Internal body designed to offer favourable flow profile.
— Sealing surfaces balanced and making them extremely tightness, even exceeding API-527 requeriments.
— Great discharge capacity. For liquids typically used with openings similar to proportional safety valves.
— Auto-centering plug.
— Totally precise open and close.
— 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

1.- Fluorelastomer (Vitón) seals, Silicone’s rubber, PTFE (Teflón) o Perfluorelastomer (FFKM).

Achieving leakage levels less than: $0{,}2\times10^{-8}\frac{\text{psi pulg}^3}{\text{seg.}}$

RANGE OF APPLICATION FOR THE SEALS									
FLUID		SET PRESSURE IN psi							
		2,90	26,10	69,61	290,07	435,11	523,58	652,67	2088,54
Saturated steam		S		V		K	T		
Liquids and gases		S			V	K		T	
SEALS		TEMPERATURE IN ºF							
		MINIMUM				MAXIMUM			
Silicone’s rubber	S	-58				392			
Fluorelastomer (Viton)	V	-4				428			
PTFE (Teflon)	T	-320,8				500			
Perfluorelastomer (FFKM)	K	14				482			



Depending on demand:
1. Buna-nitryls seals, Butyl, Natural rubber, E.P.D.M., Chlorosulphonate polyethylene (Hypalon), Neoprene, etc.
2. Possibility of manufacture in other types of material, for use in special working conditions (high temperatures, fluids, etc.).

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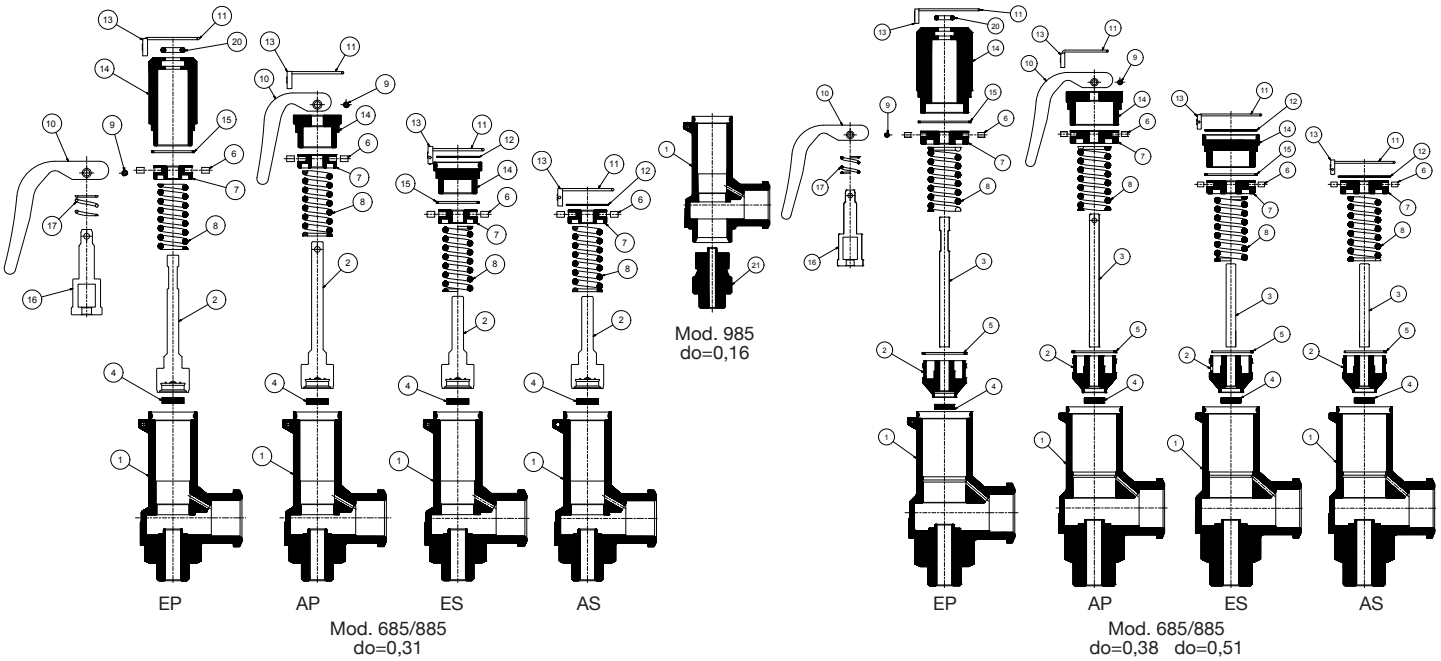
N.º PIECE	PIECE	MATERIAL	
		BRONZE	STAINLESS STEEL
1	Body	Bronze (ASTM UNS C83600)	Stainless steel (ASTM A351 CF8M)
2	Plug	Brass (ASTM C38000)	Stainless steel (AISI 316)
3	Shaft	Stainless steel (AISI 303)	Stainless steel (AISI 303)
4	Seal	Silicone rubber	Silicone rubber
		Fluorelastomer (Viton)	Fluorelastomer (Viton)
		PTFE (Teflon)	PTFE (Teflon)
		Perfluorelastomer (FFKM)	Perfluorelastomer (FFKM)
5	Limiter ring	Stainless steel. (AISI 301)	Stainless steel (AISI 301)
6	End-stop	PTFE (Teflon)	PTFE (Teflon)
7	Spring press	Brass (ASTM C38000)	Stainless steel (AISI 303)
8	Spring	Stainless steel (AISI 301)	Stainless steel (AISI 301)
9	Clip	Stainless steel (AISI 301)	Stainless steel (AISI 301)
10	Lever	Stainless steel (AISI 304)	Stainless steel (AISI 304)
11	Sealing wire	Sealing wire	Sealing wire
12	Characteristic plate	Aluminium	Aluminium
13	Seal	Plastic	Plastic
14	Cap	Brass (ASTM C38000)	Stainless steel (AISI 303)
15	Hood coupling	PTFE (Teflon)	PTFE (Teflon)
16	Piston	Brass (ASTM C38000)	Stainless steel. (AISI 303)
17	Piston Spring	Stainless steel (AISI 301)	Stainless steel (AISI 301)
18	Inlet clamp	-	Stainless steel (AISI 316L)
19	Outlet clamp	-	Stainless steel (AISI 316L)
20	O-ring	Fluorelastomer (Vitón) (1)	Fluorelastomer (Vitón) (1)
21	Seat	-	-

MODEL					
685		$MNPT_1xFNPT_2$		3/8”x1/2” a 1”x1”	
		Class		PMS 522,14 psi	300 lbs
	OPERATING CONDITIONS		PRESSURE IN psi	522,14	522,14
			MAX. TEMPERATURE IN ºF	392	482
			MIN. TEMPERATURE IN ºF	-76	-76
885		$MNPT_1xFNPT_2$		3/8”x1/2” a 1”x1”	
		Class		PMS 522,14 psi	300 lbs
	OPERATING CONDITIONS		PRESSURE IN psi	522,14	522,14
			MAX. TEMPERATURE IN ºF	392	482
			MIN. TEMPERATURE IN ºF	-320,80	-320,80
985		$MNPT_1xFNPT_2$		3/8”x1/2” a 1/2”x1/2”	
		Class			900 lbs
	OPERATING CONDITIONS		PRESSURE IN psi	-	2088,54
			MAX. TEMPERATURE IN ºF	-	482
			MIN. TEMPERATURE IN ºF	-	-76

(1) Mod. 895; Perfluorelastomer (FFKM)



Full lift safety valve with spring loading (AIT) version EP.

1. Disassembly and assembly

1.1 Disassmbly
To replace the spring (8) or clean any of the internal components of the valve, proceed in the following manner:
A - Cut the seal thread (11) with pliers.
B - Withdraw the fastener (9), using a punching tool, until the lever (10) comes free.
C - Unscrew and extract the hood (14).
D - Unscrew the piston (16) from the rod (3) and then the screw cap (22).
E - Holding the rod (3), unscrew the spring press (7) until you note a releasing of the spring (8).
F - Extract the spring (8).

1.2 Assembly
A - Enter the spring (8) through the upper part of the rod (3).
B - Screw the spring press (7) holding the rod (3) and the screw cap (22).
C - Adjust the set pressure with the spring press (7).
D - Screw the piston (16) to the rod (3).
E - Screw the hood (14).
F - Place the lever (10) and fix it with the fastener (9).

2. Adjusting the firing pressure
A - Proceed according to points 1.1.A, 1.1.B, 1.1.C, 1.1.D, 1.1.E.
B - Proceed according to points 1.2.C, 1.2.D, 1.1.E, 1.1.F.

Full lift safety valve with spring loading (AIT) version AP.

1. Disassembly and assembly
1.1 Disassmbly
To replace the spring (8) or clean any of the internal components of the valve, proceed in the following manner:
A - Cut the seal thread (11) with pliers.
B - Withdraw the clip (9), using a punching tool, until the lever (10) comes free.
C - Unscrew and extract the hood (14).
D - Holding the rod (3), unscrew the spring press (7) until you note a releasing of the spring (8).
E - Extract the spring (8).1.2 Assembly

1.2 Assembly
A - Enter the spring (8) through the upper part of the rod (3).
B - Screw the spring press (7) holding the rod (3).
C - Adjust the set pressure with the spring press (7).
D - Screw the hood (14).
E - Place the lever (10) and fix it with the fastener (9)

2. Adjusting the firing pressure
A - Proceed according to points 1.1.A, 1.1.B, 1.1.C, 1.1.D.
B - Proceed according to points 1.2.C, 1.2.D, 1.1.E.

Full lift safety valve with spring loading (AIT) version ES.

1. Disassembly and assembly

1.1 Disassmbly
To replace the spring (8) or clean any of the internal components of the valve, proceed in the following manner:
A - Cut the seal thread (11) with pliers and extract the characteristic plate (12).
B - Unscrew and extract the hood (14).
C - Holding the rod (3), unscrew the spring press (7) until you note a releasing of the spring (8).
D - Extract the spring (8).

1.2 Assembly
A - Enter the spring (8) through the upper part of the rod (3).
B - Screw the spring press (7) holding the rod (3).
C - Adjust the set pressure with the spring press (7).
D - Screw the hood (14).

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.C, 1.2.D..

Full lift safety valve with spring loading (AIT) version AS.

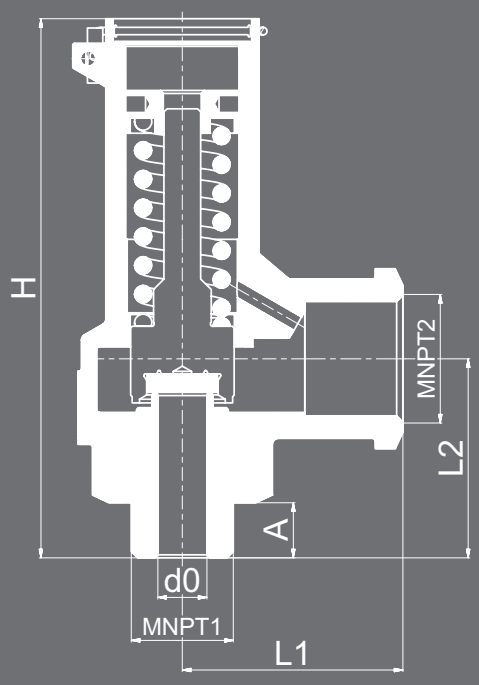
1. Disassembly and assembly

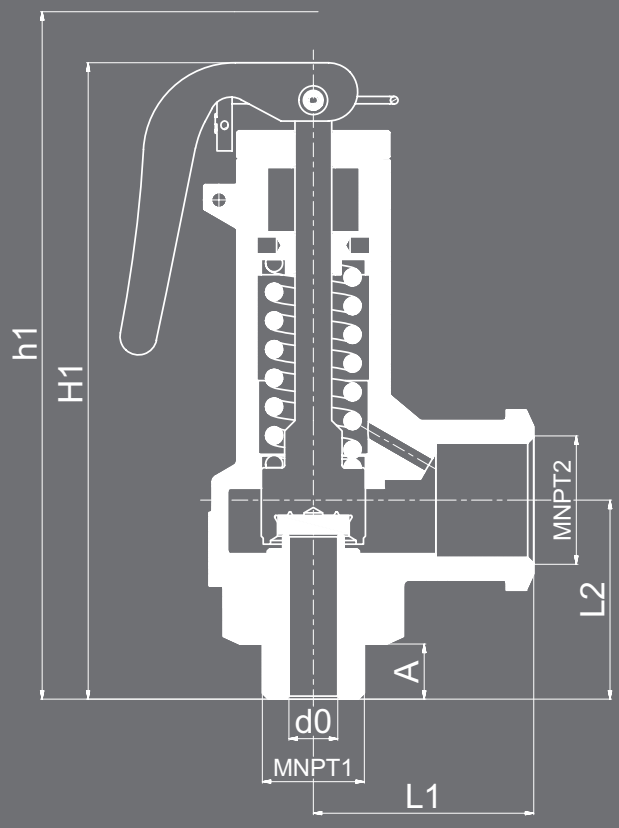
1.1 Disassmbly
To replace the spring (8) or clean any of the internal components of the valve, proceed in the following manner:
A - Cut the seal thread (11) with pliers and extract the characteristic plate (12).
B - Holding the rod (3), unscrew the spring press (7) until you note a releasing of the spring (8).
C - Extract the spring (8).

1.2 Assembly
A - Enter the spring (8) through the upper part of the rod (3).
B - Screw the spring press (7) holding the rod (3).
C - Adjust the set pressure with the spring press (7).

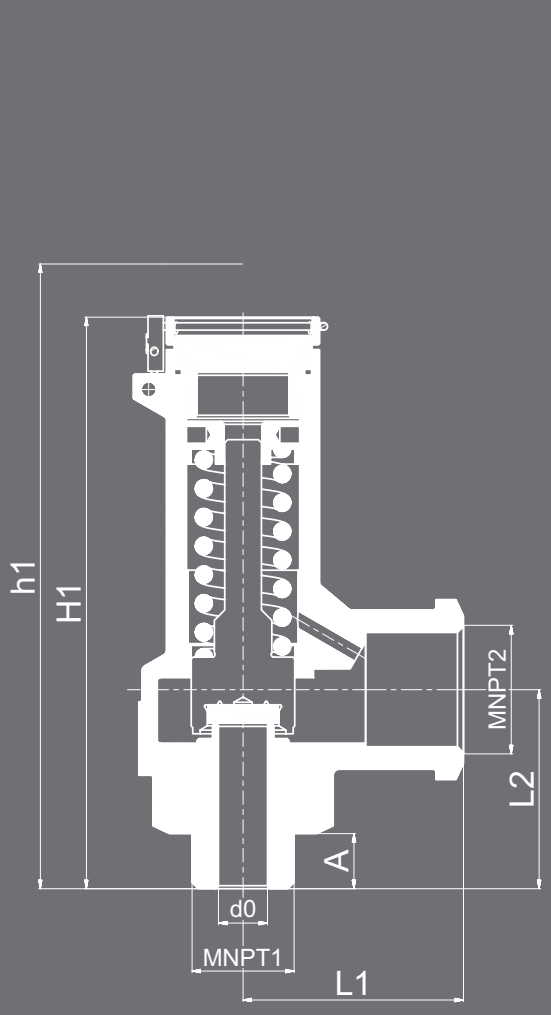
2. Adjusting the firing pressure
A - Proceed according to points 1.1.A, 1.1.B.
B - Proceed according to points 1.2.C.

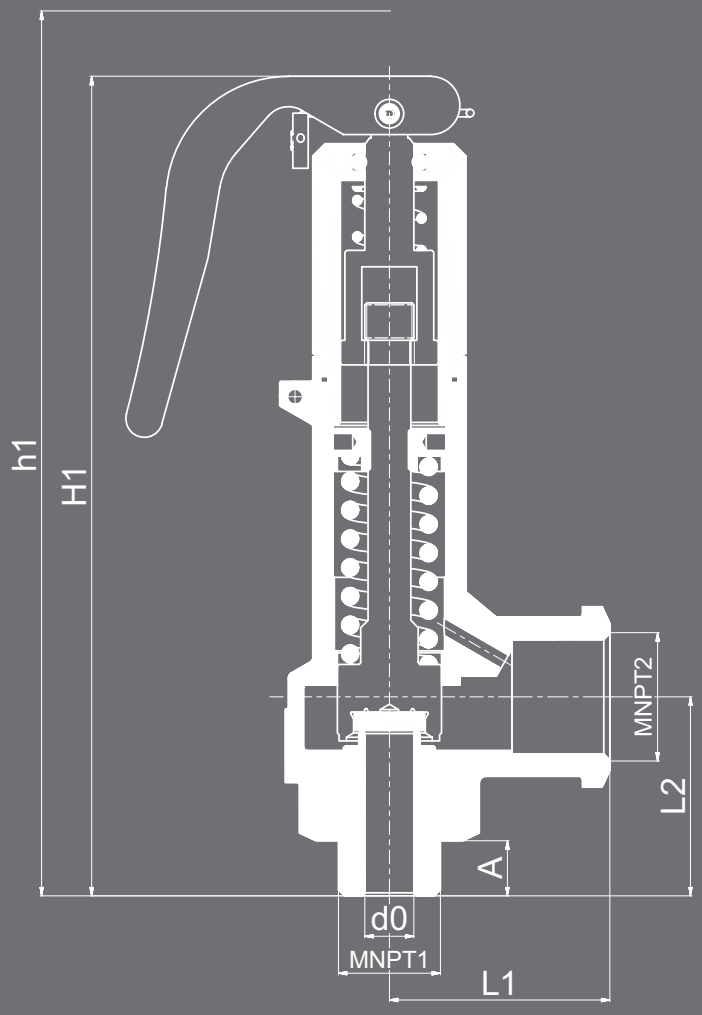
MODEL 685/885/985												
$MNPT_1xFNPT_2$		3/8"x1/2"				1/2"x 1/2"				1/2"x 3/4"		
CONNECTIONS		Male thread x Female thread NPT ASME B1.20.1										
d_0	685/885	0,31								0,38		
	985	0,16										
$A_0 = \frac{\pi \cdot d_0^2}{4}$	685/885	0,08								0,12		
	985	0,02										
H	685/885	-	3,71	-	-	-	3,89	-	-	-	4,60	
	985	-	4,14	-	-	-	4,32	-	-			
H¹	685/885	4,26	-	5,72	3,91	4,44	-	5,78	4,09	5,31	-	
	985	4,69	-	6,03	4,09	4,88	-	6,21	4,52			
h¹	685/885	4,93	-	6,07	4,54	5,11	-	6,25	4,72	5,90	-	
	985	5,36	-	6,51	4,97	5,55	-	6,69	5,15			
A	685/885/985	0,60				0,78				0,78		
L_1	685/885/985	1,42								1,73		
L_2	685/885	1,53				1,71				1,79		
	985	1,96				2,14						
WEIGHT IN lbs		EP	AP	ES	AS	EP	AP	ES	AS	EP	AP	
685/885/985	BRONZE	1,04	0,84	0,79	0,75	1,04	0,84	0,79	0,75	2,14	1,63	
	S. STEEL	0,99	0,79	0,75	0,71	0,99	0,79	0,75	0,71	2,09	1,59	
CODE 685	BRONZE 2002-685.	83810	838110	838120	838130	80210	802110	802120	802130	80211	802111	
	S. STEEL 2002-685.	83820	838210	838220	838230	80220	802210	802220	802230	80221	802211	
CODE 885	BRONZE 2002-885.	83810	838110	838120	838130	80210	802110	802120	802130	80211	802111	
	S. STEEL 2002-885.	83820	838210	838220	838230	80220	802210	802220	802230	80221	802211	
CODE 985	S. STEEL 2002-985.	03820	03821	03822	03823	0022	00221	00222	00223			





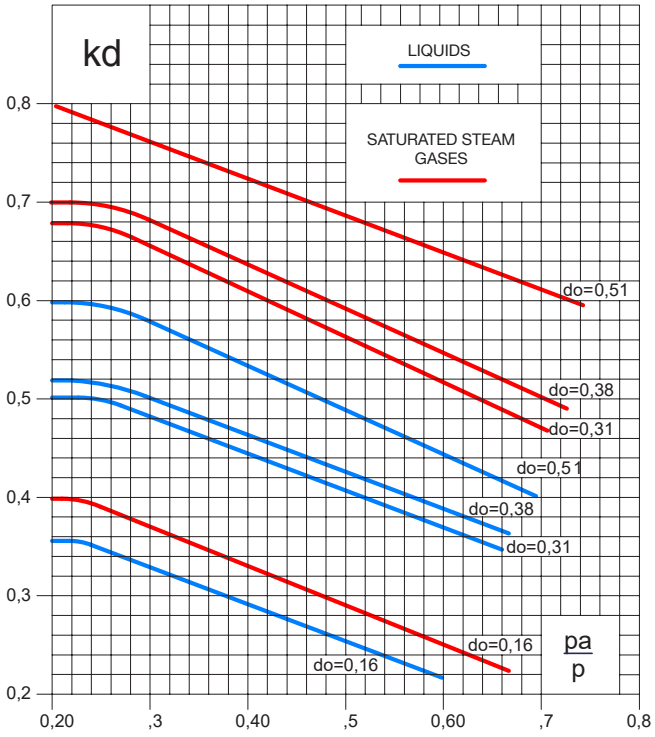
	MODEL 685/885/985													
	1/2"x 3/4"		3/4"x3/4"				3/4"x1"				1"x1"			
	Male thread x Female thread NPT ASME B1.20.1													
	0,38						0,51							
	0,12						0,21							
	-	-	-	4,61	-	-	-	5,64	-	-	-	5,75	-	-
	6,77	4,88	5,32	-	6,38	4,89	6,46	-	7,92	5,99	6,58	-	8,04	6,11
	7,32	5,58	5,91	-	7,33	5,60	7,05	-	8,47	6,70	5,99	-	8,59	6,82
	0,78		0,79				0,79				0,98			
	1,73						2,36							
	1,79		1,91				2,30				2,42			
	ES	AS	EP	AP	ES	AS	EP	AP	ES	AS	EP	AP	ES	AS
	1,59	1,54	2,14	1,63	1,59	1,54	3,68	2,98	2,93	2,89	3,68	2,98	2,93	2,89
	1,54	1,50	2,09	1,59	1,54	1,50	3,64	2,93	2,89	2,84	3,64	2,93	2,89	2,84
	802121	802131	83410	834110	834120	834130	83411	834111	834121	834131	81010	810110	810120	810130
	802221	802231	83420	834210	834220	834230	83421	834211	834221	834231	81020	810210	810220	810230
	802121	802131	83410	834110	834120	834130	83411	834111	834121	834131	81010	810110	810120	810130
	802221	802231	83420	834210	834220	834230	83421	834211	834221	834231	81020	810210	810220	810230

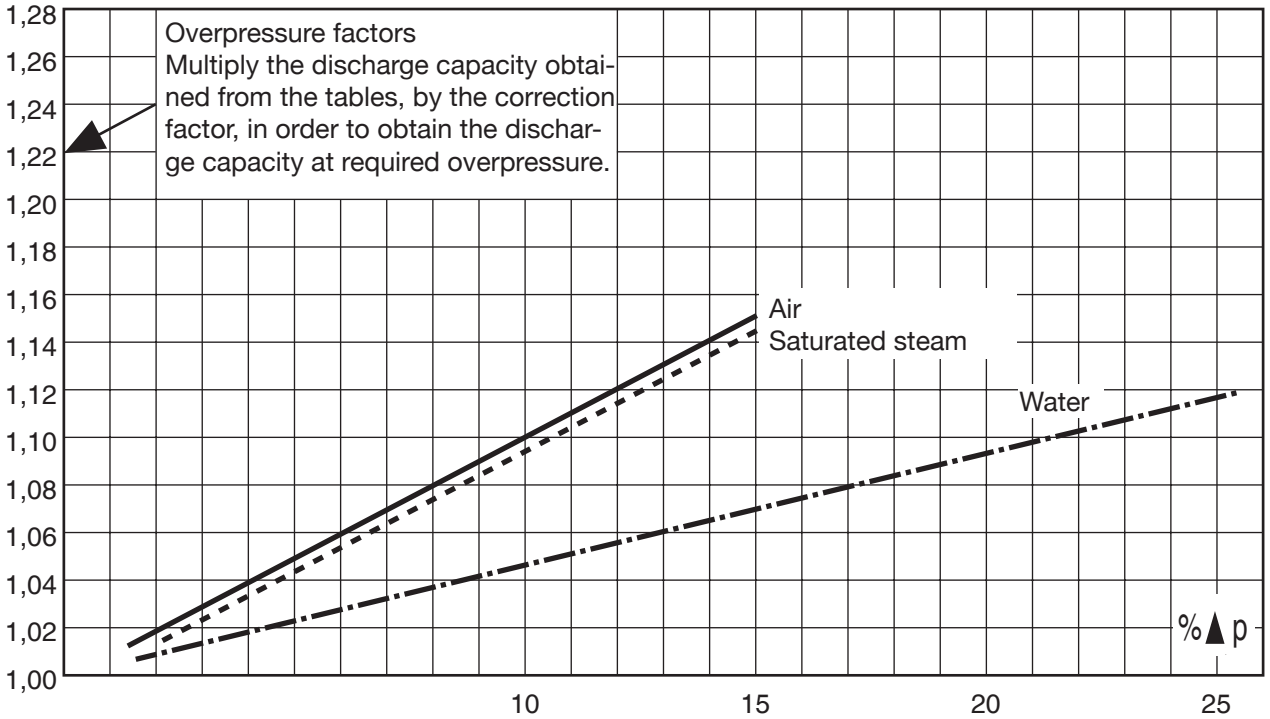




SET PRESSURES AND REGULATING RANGES									
MODEL				685/885/985					
ENTRY CONNECTION	685/885/985		$MNPT_1$	3/8	1/2”	1/2”	3/4”	3/4”	1”
EXIT CONNECTION	685/885/985		$FNPT_2$	1/2”		3/4”		1”	
d_0	685/885			0,31		0,38		0,51	
	985			0,16					
SET PRESSURE IN psi	MAXIMUM	685/885	PMS. 522,14 psi	522,14		522,14		522,14	
		685	300 lbs	522,14		522,14		522,14	
		985	900 lbs	2088,54					
	MINIMUM	685/885	PMS. 522,14 psi	2,90		2,90		2,90	
		685	300 lbs	2,90		2,90		2,90	
		985	900 lbs	523,58					
SPRING REGULATING RANGE IN psi	685/885	985							
	2,90 a 10,15		CODE	56160		56169		56178	
	8,70 a 23,21		CODE	56161		56170		56179	
	21,76 a 50,76		CODE	56162		56171		56180	
	49,31 a 79,77		CODE	56163		56172		56181	
	78,32 a 145,04	523,58 a 580,15	CODE	56164-56334		56173		56182	
	142,14 a 217,56	565,65 a 870,23	CODE	56165-56335		56174		56183	
	210,30 a 290,08	841,22 a 1160,30	CODE	56166-56336		56175		56184	
	275,57 a 362,59	1102,29 a 1450,38	CODE	56167-56337		56176		56185	
	348,09 a 522,14	1392,36 a 2088,54	CODE	56168-56338		56177		56186	

RECOMMENDED RANGES OF APPLICATION						
MODEL			685/885/985			
			AP	AS	EP	ES
FLUID	SATURATED STEAM		*	*	*	*
	GASES	INERT	*	*	*	*
		NON INERT			*	*
	LIQUIDS				*	*
OPENING PRESSURE IN % OF THE SET PRESSURE			+10%			
CLOSURE PRESSURE IN % OF THE SET PRESSURE			-10%			





DISCHARGE CAPACITY

MODEL	685-885						985	
ENTRY CONNECTION	MNPT1	3/8"	1/2"	1/2"	3/4"	3/4"	1"	3/8"	1/2"
EXIT CONNECTION	FNPT2	1/2"		3/4"		1"		1/2"	
do		0,31		0,38		0,51		0,16	
$A_0 = \frac{\pi \cdot d_0^2}{4}$		0,08		0,12		0,21		0,02	

p [psi]

SET PRESSURE IN psi

For other, not so dense liquids, other than water at 70°F apply:

$$V_L = \sqrt{\frac{\rho A}{\rho L}} \cdot V_A \qquad V_A = V_L \cdot \sqrt{\frac{\rho A}{\rho L}}$$

I- Saturated steam in lb/h.
II- Air at 60° F and 14,50 psi in [S.C.F.M.]
III- Water at 70° F in US-G.P.M.

V_A= Water flow according to table
V_L= Liquid flow.
ρA= Water density at a 70° F. (ρA= 0,04 lb/pulg3)
ρL= Liquid density.

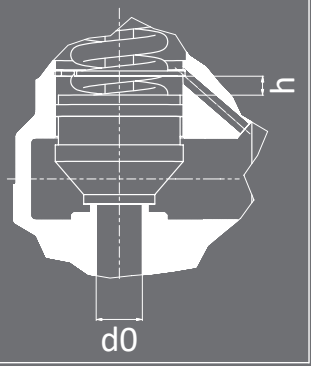
	I	II	III	I	II	III	I	II	III	I	II	III
7,25	68	24	8	102	36	11	207	74	20			
14,50	87	31	9	132	47	13	268	95	23			
21,75	107	38	9	161	57	14	329	117	25			
29,00	127	45	10	191	68	15	389	138	27			
36,25	148	53	11	224	80	17	455	162	29			
43,50	170	61	12	256	91	18	522	186	31			
50,75	192	68	13	289	103	19	589	209	33			
58,00	214	76	13	322	115	20	655	233	35			
65,25	235	84	14	355	126	21	722	257	37			
72,50	257	91	15	388	138	22	789	281	39			
87,00	301	107	16	453	161	24	922	328	42			
101,50	344	122	17	519	185	25	1056	376	45			
116,00	388	138	18	584	208	27	1189	423	48			
130,50	431	153	19	650	231	28	1323	471	50			
145,00	475	169	20	716	255	30	1456	518	53			
174,00	562	200	22	847	301	32	1723	613	57			
203,00	649	231	23	978	348	35	1990	708	61			
232,00	736	262	25	1109	395	37	2257	803	65			
261,00	823	293	26	1240	441	39	2525	898	69			
290,00	910	324	28	1371	488	41	2792	993	73			
319,00	997	355	29	1503	535	43	3059	1088	76			
348,00	1084	386	30	1634	581	45	3326	1183	79			
377,00	1171	417	31	1765	628	46	3593	1278	83			
406,00	1258	448	32	1896	675	48	3860	1373	86			
435,00	1345	479	34	2027	721	50	4127	1468	89			
464,00	1432	510	35	2159	768	51	4394	1563	91			
493,00	1519	540	36	2290	815	53	4661	1658	94			
522,00	1606	571	37	2421	861	54	4928	1753	97			
551,00										249	89	6
580,00										262	93	7
609,00										275	98	7
638,00										287	102	7
667,00										300	107	7
696,00										313	111	7
725,00										326	116	7
754,00										339	120	8
783,00										351	125	8
812,00										364	130	8
841,00										377	134	8
870,00										390	139	8
899,00										403	143	8
928,00										415	148	8
957,00										428	152	8
986,00										441	157	9
1015,00										454	161	9
1044,00										467	166	9
1073,00										479	171	9
1102,00										492	175	9
1131,00										505	180	9
1160,00										518	184	9
1189,00										531	189	9
1218,00										543	193	10
1247,00										556	198	10
1276,00										569	202	10
1305,00										582	207	10
1334,00										595	212	10
1363,00										607	216	10
1392,00										620	221	10
1421,00										633	225	10
1450,00										646	230	11
1522,50										678	241	11
1595,00										710	253	11
1667,50										742	264	11
1740,00										774	275	11
1812,50										806	287	12
1885,00										838	298	12
1957,50										870	309	12
2030,00										902	321	12
2102,50											565	12

COEFFICIENT OF DISCHARGE

MODEL			685/885/985					
ENTRY CONNECTION	R_1		3/8"	½"	½"	¾"	¾"	1"
EXIT CONNECTION	R_2		½"		¾"		1"	
d_0	685/885		0,31		0,38		0,51	
	985		0,16					
h			0,10		0,16		0,22	
h/d_0	685/885		0,32		0,42		0,43	
	985		0,62					
COEFFICIENT OF DISCHARGE kd (1)	685/885	SATURATED STEAM GASES	0,68		0,69		0,79	
	985		0,40					
	685/885	LIQUIDS	0,51		0,52		0,60	
	985		0,35					

(1) 1) For set pressures less than 43,50 psi see grapf of discharge coefficient.

pa = Backpressure permitted [psi] absolute.
p = Set pressure [psi] absolute.
αd = Coefficient of discharge.



Calculus according to ASME section VIII Div.1

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