

# Flanged safety and relief valve with full nozzle



# HA, HF

DIN PN 16 - 40 — ND 25 x 50 - 150 x 200  
ANSI 150-300 — 1"x 2" - 6" - 8"

13, 14, 16  
33, 34, 36

## Application

The ASCA type HA and HF safety and relief valves are used to protect industrial equipment and facilities against overpressure from air, water, steam, gases, viscous fluids and chemicals in general. They find wide application in chemical industries, petrochemical, steam generation and distribution, heating and cooling systems among others.

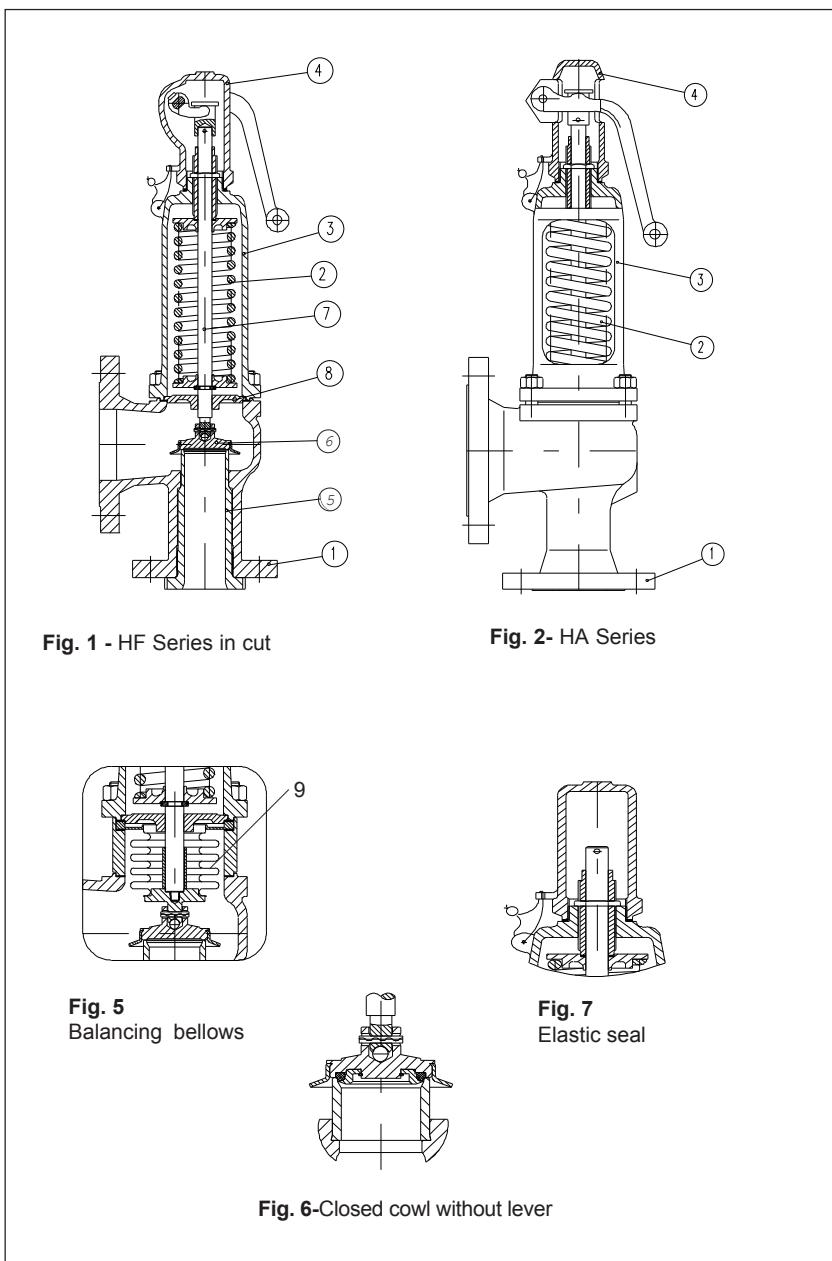
## Main features

- Flow capacities up to 100% greater than in the conventional models enable applying valves with smaller nominal diameter in the same operational conditions. Simple and sturdy construction with few internal components reduces the possibility of failure, thereby raising intrinsic safety.
- Overpressure and relief differential values established in the valve's design dismiss adjustment rings, eliminating the risk of failure by incorrect calibration of these rings.
- Conforms widely to ASME standards Section VIII, API 520, API 526, ISO 4126 and DIN 3320, among others.
- Removable end bell and integral nozzle facilitate maintenance.

## Presentation

The HA and HF safety and relief valves are of angular construction, basically composed of body (1), castle (3), spring (2), seat (5), plug (6) and cowl (4). Model HA has an open castle and is used mainly for steam and compressed air. Model HF has a long castle and is applied on the other cases.

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## Materials

I -Standardization of body and spring materials conforming API 526												
Item	Model			Working temperature ranges								
	Pressure rating		°C	-268 to -102	-102 to -60	-60 to -29	-29 to 38	38 to 232	232 to 350	350 to 427	427 to 538	
N°	description	ANSI 150x150	ANSI 300x150	°F	-450 to -151	-151 to -76	-76 to -21	-21 to 100	100 to 450	100 to 662	662 to 800	800 to 1000
1	Body	HA/HF 13 HF 14 HA/HF 16	HA/HF 33 HF 34 HA/HF 36	ASTM A 216 WCB								
				ASTM A 351 CF 8								
				ASTM A 217 WC 6*								
2	Spring	Normal	HA/HF 13	HA/HF 33	Suffix	N	Spring steel SAE 1070/1080					
		High temp.	HA/HF 13/16	HA/HF 33/36			SAE 5160					
		Low temp.	HF 14	HF 34			AISI 302					

\* Optional Executions

Specification example: HF 16A – Closed-castle safety and relief valve, ANSI 150, body in 217 WC6 with SAE 5160.

## Installation

The HA and HF safety and relief valves must always be installed with the bonnet in the vertical position with the inlet turned downwards and the lever aligned with the body. The loss of load in the pipe that connects the equipment to the valve must not exceed 3% of the opening pressure and its nominal diameter ND must be greater than or equal to that of the valve (see ASCA technical information IT0901). Before carrying out the installation, clean the pipe thoroughly and only remove the flange protectors at the moment of assembly (see also Installation and maintenance instruction IM – 09.20.10).

## Optional

- Execution with flanges according to DIN standard 2501 PN 16 and 40.
- AISI 316Ti stainless steel balancing bellows (fig. 5) to relieve backpressure developed above 15% and up to 35% of the opening pressure or variable backpressures, for protection of moving components against corrosive fluids, high temperatures and sedimentation, as well as to seal toxic or high-cost fluids.
- Elastic seal in NEOPRENE, in VITON, EPDM and Kalrez (under consultation) (fig. 6).
- Closed cowl without lever (fig. 7) for processes in which manual opening of the valve must be avoided or is unnecessary.

## Special Executions

- Execution with cost limitation to meet orifice standardization conforming API 526 or special working conditions.
- Special overpressure and relief executions.
- 1.1/2" x 3" connection (dimensions similar to 1.1/2" x 2 1/2")

## Operation

-The HA and HF safety and relief valves are automatic pressure relief devices, actuated by static pressure at the inlet, characterized by an instantaneous opening when operating with gases or steam and by a proportional opening when operating with liquids. The overpressures for gases or steam and for liquids are 10%. Both HA open bonnet valves and HF closed bonnet valves are normally provided with lifting device.

## II - Materials of other components

Item		Models HA/HF	Models HF	
n°	Description	13,33	14, 34	16, 36
3	Bonnet	-	ASTM A 351CF8	ASTM A 217 WC6
4	Cap	ASTM A 216 WCB	ASTM A 351CF8	ASTM A 217 WC6
5	Seat / Nozzle	AISI 316	AISI 316	
6	Plug	AISI 420	AISI 316	
7	Spindle	AISI 420	AISI 316	
8	Spindle guide	AISI 420	AISI 316	

## III - Materials of optional items

Item		Materials
n°	Description	
09	Balancing metal bellows	AISI 316 Ti
11	Elastic seal	Neoprene -45 to 100°C (-49 to 212°F) Viton -25 to 180°C (-13 to 356°F) EPDM at 150°C (302°F)

## Main Dimensions

Inlet ND x outlet ND		25 x 50	40 x 50	40 x 65	50 x 80	65 x 100	80 x 100	100 x 150	150 x 200
Conforming API 526 pol.		1x2	1.1/2x2	1.1/2x2 1/2	2x3	2.1/2x4	3x4	4x6	6x8
Center-face A	mm	114	121	121	124	143	165	229	241
Center-face A	mm	105	124	124	137	137	156	181	240
Height H	mm	265	330	375	420	525	525	655	735
(closed castle)									
Free distance x	mm	150	200	250	300	350	350	450	450
(recommended)									
orifice diameter d <sub>o</sub>	mm	23	29	37	46	60	60	92	125
Weight	Kg	10	14	17	11	33	35	77	133

ND	Maximum Opening Pressure bar man.
1" x 2"	40
1 1/2" x 2"	40
1 1/2" x 2 1/2"	40
2" x 3"	40
2 1/2" x 4"	32
3" x 4"	32
4" x 6"	24
6" x 8"	16

**Air flow capacity Nm<sup>3</sup>/h a 0°C and 1013,25 mbar**

Pressure (bar man.)	Inlet ND x ND Outlet (mm)							
	25 x 50	40 x 50	40 x 65	50 x 80	65 x 100	80 x 100	100 x 150	150 x 200
0,25	151	239	391	605	1029	1029	2419	4438
0,5	232	369	602	930	1583	1583	3721	6769
0,75	307	489	796	1230	2094	2094	4923	8922
1	358	570	928	1434	2440	2440	5738	10713
1,5	476	758	1234	1908	3246	3246	7632	14023
2	589	937	1525	2357	4011	4011	9432	17189
2,5	682	1085	1767	2731	4646	4646	10924	20323
3	786	1249	2034	3144	5349	5349	12576	23456
4	996	1584	2579	3987	6783	6783	15948	29321
5	1196	1901	3095	4784	8140	8140	19138	35170
6	1395	2218	3611	5582	9496	9496	22328	41019
7	1594	2535	4127	6379	10853	10853	25517	46868
8	1794	2852	4643	7176	12210	12210	28707	52717
9	1993	3169	5159	7974	13566	13566	31897	58566
10	2192	3486	5675	8771	14923	14923	35087	64416
12	2591	4120	6706	10366	17636	17636	41466	76114
14	2990	4754	7738	11961	20350	20350	47845	87812
16	3389	5387	8770	13556	23063	23063	54225	99510
18	3787	6021	9802	15151	25777	25777	60604	
20	4186	6655	10834	16746	28490	28490	66984	
22	4585	7289	11866	18340	31203	31203	73363	
24	4983	7923	12897	19935	33917	33917	79743	
26	5382	8557	13929	21530	36630	36630		
28	5781	9191	14961	23125	39343	39343		
30	6180	9825	15993	24720	42056	42056		
32	6578	10458	17025	26315	44770	44770		
34	6977	11092	18057	27910	47483	47483		
36	7376	11726	19089	29504				
38	7774	12360	20120	31099				
40	8173	12994	21152	32694				

Overheated steam correction factor.

Multiply the actual values of overheated steam by the factors below to consult the saturated steam tables and determine the size of the valve.

Acetylene	C <sub>2</sub> H <sub>2</sub>	0,98	Hydrogen	H <sub>2</sub>	0,26
Ammonia	NH <sub>3</sub>	0,78	Methane	CH <sub>4</sub>	0,76
Butane	C <sub>4</sub> H <sub>10</sub>	1,54	Carbon monoxide	CO	0,98
Carbon Dioxide	CO <sub>2</sub>	1,27	Nitrogen	N <sub>2</sub>	0,98
Ethane	C <sub>2</sub> H <sub>6</sub>	1,08	Oxygen	O <sub>2</sub>	1,05
Ethylene	C <sub>2</sub> H <sub>4</sub>	1,02	Propane	C <sub>3</sub> H <sub>8</sub>	1,32

For a more detailed dimensioning, see Technical Information 0901

**Saturated steam flow capacity in kg/h**

Pressure (bar man.)	Inlet ND Outlet ND (mm)							
	25 x 50	40 x 50	40 x 65	50 x 80	65 x 100	80 x 100	100 x 150	150 x 200
0,25	126	201	328	505	861	861	2026	3760
0,5	189	300	490	757	1288	1288	3029	5565
0,75	243	388	631	975	1659	1659	3903	7154
1	282	449	731	1129	1922	1922	4519	8511
1,5	373	593	966	1493	2540	2540	5971	11060
2	458	729	1186	1834	3121	3121	7339	13480
2,5	532	846	1378	2129	3624	3624	8520	15862
3	606	964	1569	2425	4126	4126	9702	18235
4	763	1214	1976	3055	5198	5198	12221	22646
5	911	1449	2359	3647	6205	6205	14590	27024
6	1058	1683	2740	4235	7206	7206	16942	31387
7	1205	1916	3119	4822	8204	8204	19288	35738
8	1352	2149	3499	5408	9202	9202	21635	40080
9	1498	2381	3877	5992	10195	10195	23971	44416
10	1643	2613	4254	6575	11186	11186	26301	48746
12	1935	3076	5007	7740	13168	13168	30961	57397
14	2223	3535	5754	8894	15132	15132	35579	66043
16	2512	3994	6502	10049	17098	17098	40199	74692
18	2801	4454	7251	11207	19068	19068	44831	
20	3089	4912	7996	12359	21027	21027	49437	
22	3374	5365	8733	13499	22966	22966	53997	
24	3666	5828	9488	14665	24951	24951	58663	
26	3958	6293	10244	15834	26940	26940		
28	4244	6748	10984	16978	28886	28886		
30	4532	7205	11729	18129	30824	30824		
32	4824	7669	12485	19297	32830	32830		

Overheated steam correction factor.

Multiply the actual values of overheated steam by the factor below to consult the saturated steam tables and determine the size of the valve.

Pressure		Temperature in °F e °C																						
		°F	300	320	340	360	375	390	430	460	500	540	570	610	640	680	720	750	790	820	860	900	930	
(PSIG)	(bar)	°C	150	160	170	180	190	200	220	240	260	280	300	320	340	360	380	400	420	440	460	480	500	
7	0,5		1,02	1,03	1,04	1,05	1,07	1,08	1,10	1,12	1,15	1,17	1,19	1,21	1,23	1,25	1,27	1,29	1,31	1,33	1,35	1,37	1,39	
15	1			1,01	1,03	1,04	1,05	1,07	1,10	1,12	1,14	1,16	1,18	1,21	1,23	1,25	1,27	1,29	1,31	1,32	1,34	1,36		
30	2				1,01	1,02	1,04	1,06	1,08	1,11	1,13	1,15	1,17	1,19	1,21	1,23	1,25	1,27	1,29	1,31	1,33	1,35		
45	3					1,01	1,02	1,05	1,07	1,09	1,12	1,14	1,16	1,18	1,20	1,22	1,24	1,26	1,28	1,30	1,32	1,33		
75	5						1,01	1,03	1,06	1,08	1,10	1,12	1,14	1,16	1,18	1,20	1,22	1,24	1,26	1,28	1,30	1,32		
100	7							1,02	1,04	1,07	1,09	1,11	1,13	1,15	1,17	1,19	1,21	1,23	1,25	1,27	1,29	1,31		
150	10								1,03	1,05	1,08	1,10	1,12	1,14	1,16	1,18	1,20	1,22	1,24	1,26	1,28	1,29		
220	15									1,01	1,03	1,06	1,08	1,10	1,12	1,14	1,16	1,18	1,20	1,22	1,24	1,26	1,28	
300	20										1,02	1,05	1,07	1,09	1,11	1,13	1,15	1,17	1,19	1,21	1,23	1,25	1,27	
370	25											1,01	1,03	1,06	1,08	1,11	1,13	1,15	1,17	1,19	1,21	1,23	1,25	1,26
440	30												1,02	1,04	1,07	1,09	1,11	1,14	1,16	1,18	1,20	1,21	1,23	1,25
590	40													1,03	1,05	1,08	1,10	1,13	1,15	1,17	1,19	1,21	1,23	1,25

## Water flow capacity at 20°C ( ρ =998Kg/m³) in m³/h

For other liquids, multiply the desired flow by consulting the table below. The specific weight of some fluids can be found in Technical Information 0901.

Pressure (bar man.)	$\sqrt{\frac{\rho_{\text{agua}}}{\rho_{\text{liquido}}}}$ Inlet ND x Outlet ND (mm)							
	25 x 50	40 x 50	40 x 65	50 x 80	65 x 100	80 x 100	100 x 150	150 x 200
0,5	6,8	10,8	17,6	27,2	46,3	46,3	108,7	201
1,0	9,6	15,3	24,9	38,4	65,4	65,4	153,8	284
1,5	11,8	18,7	30,5	47,1	80,1	80,1	188,4	384
2,0	13,6	21,6	35,2	54,4	92,5	92,5	217,5	402
2,5	15,2	24,2	39,3	60,8	103,4	103,4	243,2	449
3,0	16,6	26,5	43,1	66,6	113,3	113,3	266,4	492
3,5	18,0	28,6	46,5	71,9	122,4	122,4	287,7	531
4,0	19,2	30,6	49,8	76,9	130,8	130,8	307,6	568
4,5	20,4	32,4	52,8	81,6	138,8	138,8	326,2	602
5	21,5	34,2	55,6	86,0	146,3	146,3	343,9	635
6	23,5	37,4	60,9	94,2	160,2	160,2	376,7	696
7	25,4	40,4	65,8	101,7	173,1	173,1	406,9	751
8	27,2	43,2	70,4	108,7	185,0	185,0	435,0	803
9	28,8	45,8	74,6	115,3	196,2	196,2	461,4	852
10	30,4	48,3	78,7	121,6	206,9	206,9	486,3	898
12	33,3	52,9	86,2	133,2	226,6	226,6	532,8	984
14	36,0	57,2	93,1	143,9	244,8	244,8	575,4	1063
16	38,4	61,1	99,5	153,8	261,7	261,7	608,4	1136
18	40,8	64,8	105,5	163,1	272,5	272,5	645,5	
20	43,0	68,3	111,2	171,9	292,5	292,5	680,4	
22	45,1	71,7	116,7	180,3	306,8	306,8	713,6	
24	47,1	74,9	121,9	188,4	320,5	320,5	745,4	
26	49,0	77,9	126,8	196,0	333,5	333,5		
28	50,9	80,7	131,6	203,4	342,4	342,4		
30	52,6	83,7	136,2	210,6	354,5	354,5		
32	54,4	86,4	140,7	217,5	366,1	366,1		
34	56,0	89,1	145,0	224,2	377,3	377,3		
36	57,7	91,7	149,3	230,7				
38	59,3	94,2	153,3	237,0				
40	60,8	96,6	157,3	243,2				

### Orders

Indicate the opening pressure, backpressure, variable or not, the fluid, its temperature, flow and viscosity, standard and type of connection, type of castle and cowl, body material, type of seal and standards to be complied with.

### Standard specification

Standardized specification  
 Safety and relief valve HA/HF.....from ASCA  
 Conforming PR-09.20.10-I brochure  
 Pressure rating.....  
 Opening Pressure.....  
 Nominal diameter.....  
 Standard.....  
 Optional.....

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