

# Safety Valve

with bellows, full lift

AT 4547, 4548, 4583, 4584

Dimension range	PN	Temperature range	Material
DN 20-150	40	-85°C to +450 °C	Steel
DN 200	25	-85°C to +450 °C	Steel
DN 20-150	40	-270°C to +400 °C	Stainless steel
DN200	25	-270°C to +400 °C	Stainless steel

## Range of Application

Safety valve for protection of pressure vessels and piping systems with liquids, air, gases and steam.

Provided with back-pressure compensating and sealing stainless steel bellows. This raises the maximum allowable back-pressure in the outlet from 15 % to 30-35 % of the set pressure. The design pressure of the bellows must however be taken into account. See **Additional information**.

With back-pressure compensating bellows, the outlet dimension can be kept down.

Bellows are also recommended when the safety valve is to be connected to a silencer.

PSG. 11 Safety valve

Safety valve with back pressure compensating bellows AT4547, DN ..., set pressure... bar, stainless steel.



## Quality Assurance

Approved by TÜV and several other classification authorities.

Fulfils the requirements according to ISO 4126.

Certificate SS-EN 10204, type 2, 3 and from most of the classification authorities.

Type of certificate has to be specified upon ordering.

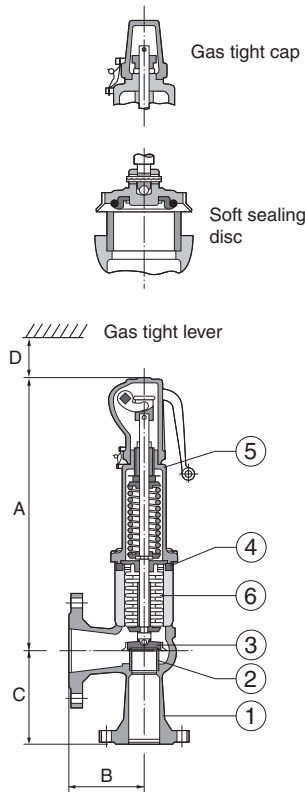
## CE-marking

Meets the requirements in AFS 2016:1 and 2014/68/EU (Pressure Equipment Directive) according to category IV, fluids group 1 and 2.

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## Material Specification

		AT 4547/AT 4548	AT 4583/AT 4584
1	Body	1.0619/SA 216 WCB, steel	1.4408/SA 351 CF8M, stain- less steel
2	Seat	1.4404/316L	1.4404/316L
3	Disc	1.4122/hardened stain- less steel	1.4404/316L
4	Spindle	1.4021/420	1.4404/316L
5	Spring	1.1200, 1.8159, 1.7102/carbon steel	1.4310/stainless steel
6	Bellows	1.4571/316Ti	1.4571/316Ti
7	Guide	1.4104, 1.0501, 0.7040/ chrome- or carbon steel	1.4404/316L
8	Bonnet	0.7040, 0.7043, 1.0619/ nodular iron Gr.60-40-18, SA 216 WCB	1.4408, 1.4404, 1.4571/ SA 351 CF8M, SA 479 316L, SA 479 316Ti
9	Spring plate 2 pcs	1.0718/steel	1.4404/316L
10	Adjusting screw	1.4104 PTFE/ chrome steel PTFE	1.4404 PTFE/316L PTFE
11	Ball	1.3541/hardened stain- less steel	1.4401/316
12a	Cap	1.0718 or 0.7043/12L13 or Gr.60-40-18	1.4404/316L
12b	Lever (4)	1.0718 or 0.7043/12L13 or Gr.60-40-18	1.4404/316L
13a	Soft sealing	EPDM (D)	EPDM (D)
13b	Soft sealing	Neoprene (K)	Neoprene (K)
13c	Soft sealing	Viton® (L)	Viton® (L)
14	Bonnet spacer for bellow	1.0460/ carbon steel	1.4404/316L

## Dimensions and weight

AT 4547, 4548											
DN Inlet	20	25	32	40	50	65	80	100	125	150	200
DN Outlet	40	40	50	65	80	100	125	150	200	250	300
Seat diameter	18	23	29	37	46	60	74	92	98	125	165
A	252	273	373	410	465	599	665	719	719	856	1090
B	95	100	110	115	120	140	160	180	200	225	300
C	85	105	115	140	150	170	195	220	250	285	290
D	150	150	200	250	300	350	400	450	450	450	700
Weight	9,4	10	13	17	24	36	60	83	93	142	289

Measurements in mm, weight in kg.

(2)= gas tight cap, (4)= gas tight lifting device.

## Dimension and weight AT 4583-4584

AT 4583, 4584									
DN Inlet	25	32	40	50	65	80	100	125	150
DN Outlet	40	50	65	80	100	125	150	200	250
Flow diameter	23	29	37	46	60	74	92	98	125
A max	273	373	410	465	599	665	719	719	856
B	100	110	115	120	140	160	180	200	225
C	105	115	140	150	170	195	220	250	285
D	150	200	250	300	350	400	450	450	450
Weight	10	13	17	24	36	60	83	93	142

Measures in mm, weights in kg.

(2)= gastight cap (4)= gastight lifting device.

Rätten till ändringar utan föregående meddelande förbehålls.  
Armatec ansvarar inte för eventuella tryckfel eller missförstånd.  
Dokumentet får kopieras endast i sin helhet.

# Safety Valve

with bellows, full lift

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## Function and Design

Spring loaded and directly acting safety valve for air, gases and steam with full lift opening characteristics.

For liquids, the safety valve has normal opening characteristics.

With lifting device for manual testing or with gas tight cap.

If possible, a soft sealing disc should be used since it has better tightness and is easier to renovate.

The bellows protect the moving parts and spring against dirt, corrosion and temperature, and permit an increased maximum back-pressure in the outlet pipe from 15 % to 30-35 % of the set pressure.

The bellows design pressure must be considered. See **Additional information**.

## Technical Information

### Overpressure

The safety valve is fully open at an overpressure exceeding the set pressure with a maximum of 5 % (for liquids, 10 %).

If lower overpressure is requested please contact Armatec.

### Blowdown

Steam/air/gases:	Max 10% at set pressure $\geq$ 3,0 bar Max 0,3 bar at set pressure $<$ 3,0 bar
Liquids:	Max 20% at set pressure $\geq$ 3,0 bar Max 0,6 bar at set pressure $<$ 3,0 bar
If lower blowdown pressures are required please contact Armatec.	

## Pressure and temperature

DN	AT 4547/AT 4548		AT 4583/AT 4584	
	Set pressure max. bar	Temp. -85°C to +450°C	Set pressure max. bar	Temp. -85°C to +400°C
20	40		-	
25	40		40	
32	40		40	
40	40		40	
50	40		37	
65	40		28	
80	40		25	
100	40		26	
125	25		24	
150	25		10	
200	25		-	

Pressure and temperatures according to applied standards for each valve material.

At temperatures above 200°C the temperature has to be specified in the order, so that a high temperature spring is used.

If other temperatures and pressures limits are requested please contact Armatec.

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## Soft sealing

### Temperature range soft sealed safety valves:

O-ring	Neoprene (CR) K -40°C to +100°C, e.g. refrigerants Ethylene (EPDM) D -45°C to +150°C, e.g. hot water and low temperature steam Viton (FPM) L -20°C to +180°C, e.g. oil and air
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## Additional information

Sizing based on submitted data can be performed on request.

Please state: Fluid, density (for liquids), capacity/power, maximum temperature and set pressure

Bar implies bar gauge: bar(ö), bar(g), bar(e), atö or kg/cm<sup>2</sup> if nothing else is stated.

Nm<sup>3</sup>/h implies "free" capacity air/gas (N=normal) and is equal with m<sup>3</sup>/h if other is not stated.

### Coefficient of discharge steam/gases $\gamma_d$ D/G

0,7

### Coefficient of discharge liquids, $\gamma_d$ F

0,45

Flow diameter  $D_o$ , see **Dimension and Weight**

Lowest set pressure for valve with bellows:

3,0 barg (DN20-80)

2,74 barg (DN100)

2,01 barg (DN125)

0,2 barg (DN150-200)

## Design pressure for stainless steel bellows

Max. pressure bar	At 20°C	At 100°C	At 200°C	At 400°C
DN20	30	28	24	20
DN25	16	15	13	11
DN32-125	10	9,3	8	6,6
DN150	6	5,6	4,8	4
DN200	5	4,7	4	3,3

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## Sizing DN20-50

DN	20			25			32			40			50		
	18 mm			23 mm			29 mm			37 mm			46 mm		
	Seat	Pset		Seat	Pset		Seat	Pset		Seat	Pset		Seat	Pset	
bar	Steam	Air	Water	Steam	Air	Water	Steam	Air	Water	Steam	Air	Water	Steam	Air	Water
3	451	580	11778	737	947	19222	1167	1500	30556	1900	2444	49667	2944	3778	76778
4	563	728	13556	919	1178	22111	1456	1889	35222	2378	3067	57333	3667	4744	88667
5	674	876	15222	1100	1422	24778	1744	2267	39444	2844	3700	64111	4400	5711	99111
6	784	1024	16667	1278	1667	27111	2033	2656	43111	3311	4322	70222	5122	6689	108556
7	896	1167	18000	1456	1911	29333	2322	3033	46667	3778	4944	75889	5844	7656	117778
8	1006	1311	19222	1633	2156	31333	2600	3422	49778	4244	5578	81111	6567	8622	125556
9	1111	1467	20333	1811	2389	33222	2889	3811	52889	4711	6200	86000	7278	9589	133333
10	1222	1611	21444	2000	2633	35000	3178	4189	55667	5178	6833	90667	8000	10556	140000
12	1440	1911	23556	2356	3122	38444	3744	4967	61000	6100	8078	99333	9433	12444	153333
14	1656	2200	25444	2711	3600	41444	4322	5733	65889	7033	9333	107333	10867	14333	165556
16	1878	2500	27111	3078	4089	44333	4889	6500	70444	7967	10589	114444	12222	16333	177778
18	2100	2800	28778	3433	4567	47000	5456	7267	74778	8889	11778	122222	13667	18222	187778
20	2322	3089	30333	3789	5056	49556	6033	8044	78778	9822	13000	127778	15111	20222	197778
22	2544	3389	31889	4156	5544	52000	6611	8811	82667	10756	14333	134444	16556	22111	207778
24	2767	3689	33222	4522	6022	54333	7189	9578	86333	11667	15556	140000	18000	24111	216667
26	2989	3989	34556	4878	6511	56556	7767	10344	89889	12556	16778	146667	19444	26000	225556
28	3211	4278	35889	5244	6989	58667	8344	11111	93222	13556	18000	152222	21000	27889	234444
30	3433	4578	37222	5611	7478	60667	8922	11889	96444	14444	19333	156667	22444	29889	243333
32	3656	4878	38444	5978	7956	62667	9511	12556	99667	15444	20556	162222	23889	31778	251111
34	-	5167	39556	-	8444	64667	-	13333	102778	-	21778	167778	-	33778	258889
36	-	5467	40778	-	8933	66444	-	14111	105667	-	23111	172222	-	35667	265556
38	-	5767	41889	-	9411	68333	-	14889	108556	-	24333	176667	-	37667	273333
40	-	6056	42889	-	9900	70111	-	15667	111111	-	25556	181111	-	39556	280000

Pset = set pressure

According to applied standards the value above should be multiplied with the safety factor 0,9.

Saturated steam in kg/h. Air in Nm<sup>3</sup>/h (free air) at 0°C and atmospheric pressure 1013 mbar(a). Water in kg/h at 20°C.

Capacities are given for an overpressure of 10% of set pressure.

Contact Armatec for sizing with other fluids etc.

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## Sizing DN65-100

DN Seat Pset bar	65 60 mm			80 74 mm			100 92 mm		
	Steam	Air	Water	Steam	Air	Water	Steam	Air	Water
	2	3722	4733	106667	5667	7211	162222	8756	11111
3	5011	6433	131111	7622	9789	198889	11778	15111	306667
4	6244	8078	151111	9511	12222	228889	14667	19000	354444
5	7489	9733	168889	11333	14778	256667	17556	22778	396667
6	8711	11333	184444	13222	17222	281111	20444	26667	434444
7	9944	13000	200000	15111	19778	303333	23333	30556	468889
8	11111	14667	213333	16889	22222	324444	26222	34444	501111
9	12333	16222	226667	18778	24778	344444	29111	38333	532222
10	13556	17889	238889	20667	27333	362222	32000	42222	561111
12	16000	21222	261111	24333	32333	397778	37667	49889	614444
14	18444	24556	282222	28111	37333	428889	43444	57667	663333
16	20889	27778	301111	31778	42333	458889	49222	65444	708889
18	23333	31111	320000	35556	47333	486667	55000	73222	752222
20	25778	34333	337778	39222	52333	513333	60667	80889	793333
22	28222	37667	353333	43000	57333	537778	66556	88667	831111
24	30778	41000	370000	46778	62333	562222	72333	96444	868889
26	33222	44222	384444	50556	67333	584444	78222	105556	904444
28	35667	47556	398889	54333	72333	606667	84000	113333	937778
30	38222	50889	413333	58111	77444	627778	89889	121111	971111
32	40667	54111	426667	61889	82444	648889	95778	128889	1003333
34	-	57444	440000	-	88556	668889	-	136667	1034444
36	-	61556	452222	-	93667	687778	-	-	-
38	-	64889	464444	-	98778	706667	-	-	-
40	-	68222	476667	-	103889	725556	-	-	-

Pset = set pressure

According to applied standards the value above should be multiplied with the safety factor 0,9.

Saturated steam in kg/h. Air in Nm<sup>3</sup>/h (free air) at 0°C and atmospheric pressure 1013 mbar(a). Water in kg/h at 20°C.

Capacities are given for an overpressure of 10% of set pressure.

Contact Armatec for sizing with other fluids etc.

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## Sizing DN125-200

DN Seat Pset bar	125 98 mm			150 125 mm			200 165 mm		
	Steam	Air	Water	Steam	Air	Water	Steam	Air	Water
	0,2	2756	3267	105111	4478	5311	171111	7811	9267
0,5	4278	5244	148889	6956	8533	242222	12111	14778	403333
1	6211	7811	201111	10111	12667	327778	17555	22111	570000
2	9933	12556	284444	16111	20556	463333	28111	35778	806667
3	13333	17111	348889	21667	27889	566667	37889	48667	987778
4	16667	21556	402222	27111	35000	654444	47222	61111	1144444
5	19889	25889	450000	32444	42222	732222	56555	73555	1277778
6	23222	30333	493333	37778	49333	802222	65889	86000	1400000
7	26444	34667	532222	43111	56444	865556	75222	98444	1511111
8	29778	39111	568889	48444	63667	925556	84444	110889	1611111
9	33000	43444	603333	53778	70778	982222	93667	123333	1711111
10	36222	47889	636667	59000	77889	1035556	102889	135555	1800000
12	42778	56667	696667	69667	92222	1133333	121111	160000	1977778
14	49333	65444	753333	80222	106556	1222222	138889	185555	2133333
16	55889	74222	804444	90889	120000	1300000	157778	210000	2277778
18	62333	83000	853333	101556	134444	1377778	176667	238889	2422222
20	68889	91778	900000	111111	148889	1455556	195555	263333	2555555
22	75444	100667	943333	123333	165556	1533333	214444	288889	2677778
24	82111	110889	985556	133333	180000	1600000	232222	314444	2788889

Pset = set pressure

According to applied standards the value above should be multiplied with the safety factor 0,9.

Saturated steam in kg/h. Air in Nm<sup>3</sup>/h (free air) at 0°C and atmospheric pressure 1013 mbar(a).

Water in kg/h at 20°C.

Capacities are given for an overpressure of 10% of set pressure.

Contact Armatec for sizing with other fluids etc.

For larger valve dimensions and/or larger capacities, see separate data sheet for AT 4543 - 4580, DN 200-400 are available with bellows on request.

## Accessories and Options

Test Gag for blocking the safety valve

Lift stopper

Soft sealing O-ring of Kalrez (FFKM) C for temperature range 0-250oC.

Flanges drilled acc. to ANSI.

For safety valve without bellows, see product data sheet AT 4541 and AT 4550.

## Installation

Connection AT4547/4548	Flanges drilled acc. to
Inlet/outlet	DN20-150: DIN EN 1092-1, PN40/16 DN200: DIN EN 1092-1, PN25/16

See separate installation instruction. The valve should be mounted with the bonnet in vertical position.

Connections AT4583/4584	Flanges drilled acc. to
Inlet/outlet	DN25-200: DIN EN 1092-1, PN40/16

See separate installation instruction. The valve should be mounted with the bonnet in vertical position.

## Maintenance and Spare parts

See separate installation and maintenance instruction.

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## Marking

Manufacturer, Armatec article number, DN, PN, CE-marking, material and arrow showing the flow direction.

TÜV approval label with manufacturer fig. no. 433 mounted on body.

Set pressure is punched on the outlet flange and on the TÜV approval label.

## How to order

### Metal seated safety valve with back-pressure compensating bellows.

Example: AT 4547-4-10,0-25

AT 4547	-4	-10,0	-25
Fig. no. AT 4547=steel AT 4583=stainless steel	Design -2=gas tight cap  -4=gas tight lifting device -3=open lifting device	Set pressure(bar)	DN

### Soft seated safety valve with back-pressure compensating bellows.

Example: AT 4548D4-10,0-25

AT 4545	D	4	-10,0	-25
Fig. no. AT 4548=steel AT 4584=stainless steel	O-ring D=EPDM  L=Viton  K=Neoprene N=Nitrile	Design 2=gas tight cap 4=gas tight lifting device 3=open lifting de- vice	Set pressure (bar)	DN