

Safety Valve

with bellow, standard

AT 4522, 4523, 4577, 4578

| Dimension range | PN | Temperature range | Material |
|-----------------|----|-------------------|-----------------|
| DN 15-150 | 40 | -85°C to +450 °C | Steel |
| DN 15-100 | 40 | -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. Suitable as safety valve also when back-pressure is varying. Provided with back-pressure compensating and sealing stainless steel bellows.

Quality Assurance

Approved by TÜV and several other classification authorities.
Fulfills 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.



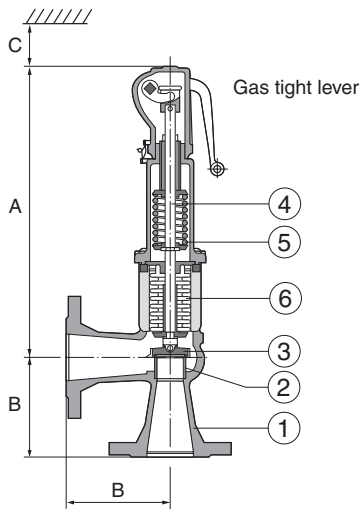
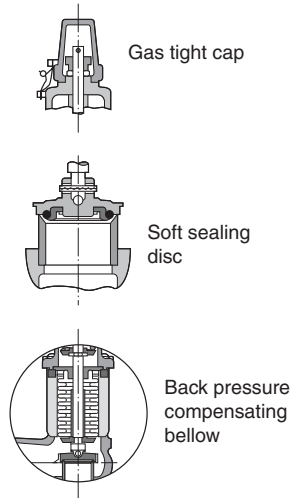
Material Specification

| | AT 4522/AT 4523 | AT 4577/AT 4578 | |
|---|--------------------|---|---|
| 1 | Body | 1.0619/SA 216 WCB | 1.4408/SA 351 CF8M |
| 2 | Seat | 1.4404/316L | 1.4404/316L |
| 3 | Disc | 1.4122/Hardened stainless steel | 1.4404/316L |
| 4 | Spindle | 1.4404/316L | 1.4404/316L |
| 5 | Spring | 1.1200,1.8159,1.7102/Spring steel | 1.4310/Stainless steel |
| 6 | Bellows | 1.4571/316Ti | 1.4571/316Ti |
| | Bonnet spacer | 1.4404/316L | 1.4404/316L |
| 7 | Guide | 1.4104,1.0501,1.0570/Chrome- or stainless steel | 1.4404/316L |
| | Bushing for guide | 1.4104 tenifer/Chrome steel | - |
| 8 | Bonnet | 1.7040/Nodular iron Gr.60-40-18 | 1.4408,1.4404/ SA 351 CF8M,SA 479 316L |
| 9 | Spring plate 2 pcs | 1.0718/Steel | 1.4404/316L |
| 1 | Adjusting screw | 1.4104 PTFE/Chrome steel PTFE | 1.4404 PTFE/316L PTFE |
| 1 | Ball | 1.3541/Hardened stainless steel | 1.4401/316 |
| 2 | Cap | 1.0718/12L13 | 1.4404/316L |
| 3 | Soft seal | EPDM (D) | EPDM (D) |
| 3 | Soft seal | Neoprene (K) | Neoprene (K) |
| 3 | Soft seal | Viton® (L) | Viton® (L) |

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Dimension and Weight

| AT4522, 4523 | | | | | | | | | | | |
|---------------|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|
| DN | 15 | 20 | 25 | 32 | 40 | 50 | 65 | 80 | 100 | 125 | 150 |
| Flow diameter | 12 | 18 | 18 | 18 | 23 | 29 | 37 | 46 | 60 | 74 | 92 |
| A (4) | 272 | 250 | 250 | 255 | 275 | 300 | 390 | 445 | 505 | 625 | 740 |
| B | 90 | 95 | 100 | 105 | 115 | 125 | 145 | 155 | 175 | 200 | 225 |
| C | 150 | 150 | 150 | 200 | 200 | 250 | 250 | 300 | 350 | 400 | 450 |
| Weight | 6,3 | 6,4 | 6,4 | 8,4 | 9,6 | 13 | 16 | 21,6 | 35,6 | 52,1 | 78,4 |

Measurements in mm, weight in kg. (4)= with gastight lifting device

| AT 4577, 4578 | | | | | | | | | | | |
|---------------|-----|-----|-----|-----|-----|-----|-----|------|------|--|--|
| DN | 15 | 20 | 25 | 32 | 40 | 50 | 65 | 80 | 100 | | |
| Flow diameter | 12 | 18 | 18 | 18 | 23 | 29 | 37 | 46 | 60 | | |
| A (4) | 272 | 250 | 250 | 255 | 275 | 300 | 390 | 445 | 505 | | |
| B | 90 | 95 | 100 | 105 | 115 | 125 | 145 | 155 | 175 | | |
| C | 150 | 150 | 150 | 200 | 200 | 250 | 250 | 300 | 350 | | |
| Weight | 6,3 | 6,4 | 6,4 | 8,4 | 9,6 | 13 | 16 | 21,6 | 35,6 | | |

Measurements in mm, weight in kg. (2)= with gas tight cap (4)= with gas tight lifting device

Function and Design

Spring loaded and directly acting safety valve with standard characteristics, with stainless steel bellows. The bellows can compensate for varying back-pressure up to around 35 % of the set pressure. In addition, the bellows protect the moving parts against dirt, corrosion and temperature. 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.

Technical Information

Overpressure

The safety valve is fully open at an overpressure exceeding the set pressure with a maximum of 10 %.

For set pressure lower than 1,0 bar, the overpressure is set pressure + 0,1 bar. 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 pressure is requested please contact Armatec

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Pressure and temperature

| DN | AT 4522/AT 4523 | | AT 4577/AT 4578 | |
|-----|-----------------------------|-----------------------------|------------------------------|------------------------------|
| | Set pressure max. bar | Temp. -85°C to +450°C | Set pressure- max. bar | Temp. -270°C to +400°C |
| 15 | 40 | | 40 | |
| 20 | 40 | | 40 | |
| 25 | 40 | | 40 | |
| 32 | 40 | | 40 | |
| 40 | 40 | | 40 | |
| 50 | 40 | | 40 | |
| 65 | 40 | | 26 | |
| 80 | 35 | | 25 | |
| 100 | 30 | | 22 | |
| 125 | 32 | | - | |
| 150 | 16 | | - | |

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.

Soft sealing

Temperature range soft sealed safety valves; AT 4523 and 4578

| | |
|--------|--|
| 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 |
|--------|--|

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/cm² if nothing else is stated.

Nm³/h implies "free" capacity air/gas (N=normal) and is equal with m³/h if other is not stated.

Coefficient of discharge steam/gases ?d D/G

DN15 metal to metal: 0,62

DN15 soft sealed: 0,59

DN20: 0,29

DN25-150: 0,38

Coefficient of discharge liquids ?d F

DN15 metal to metal: 0,48

DN15 soft sealed: 0,47

DN20: 0,19

DN25-150: 0,25

Flow diameter, Do see Dimension and weight.

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Sizing DN15-50

| DN Seat Pset bar | 15 Met. 12mm | | | 15 Soft 12mm | | | 20 18mm | | | 25+32 18mm | | | 40 23mm | | | 50 29mm | | |
|---------------------------|-----------------|------|-------|-----------------|------|-------|------------|------|-------|---------------|------|-------|------------|------|-------|------------|------|-------|
| | Stea | Air | Water | Stea | Air | Water | Stea | Air | Water | Stea | Air | Water | Stea | Air | Water | Stea | Air | Water |
| | m | | | m | | | m | | | m | | | m | | | m | | |
| 0, 2 | 36 | 43 | 1678 | 35 | 41 | 1633 | 1 | 1 | 1500 | 32 | 38 | 1967 | 53 | 63 | 3211 | 84 | 99 | 5111 |
| 0, 5 | 57 | 70 | 2378 | 54 | 66 | 2333 | 32 | 39 | 2111 | 68 | 84 | 2789 | 111 | 137 | 4544 | 177 | 217 | 7233 |
| 1 | 81 | 102 | 3222 | 77 | 97 | 3156 | 72 | 90 | 2867 | 106 | 133 | 3767 | 173 | 218 | 6156 | 277 | 347 | 9789 |
| 2 | 128 | 163 | 4556 | 121 | 156 | 4467 | 133 | 170 | 4056 | 178 | 227 | 5333 | 290 | 370 | 8711 | 461 | 588 | 13889 |
| 3 | 172 | 221 | 5578 | 163 | 210 | 5467 | 184 | 237 | 4967 | 240 | 309 | 6533 | 392 | 504 | 10667 | 624 | 802 | 17000 |
| 4 | 214 | 278 | 6433 | 203 | 264 | 6300 | 233 | 301 | 5733 | 306 | 396 | 7544 | 499 | 646 | 12333 | 793 | 1026 | 19556 |
| 5 | 257 | 333 | 7200 | - | 317 | 7056 | 279 | 363 | 6411 | 366 | 476 | 5100 | 598 | 777 | 13778 | 950 | 1233 | 21889 |
| 6 | 299 | 390 | 7878 | - | 370 | 7722 | 326 | 424 | 7022 | 426 | 556 | 9233 | 696 | 908 | 15111 | 1106 | 1433 | 24000 |
| 7 | 341 | 447 | 8511 | - | 424 | 8344 | 371 | 486 | 7578 | 486 | 637 | 9978 | 793 | 1039 | 16333 | 1256 | 1644 | 25889 |
| 8 | 383 | 503 | 9100 | - | 478 | 8922 | 417 | 547 | 8111 | 546 | 717 | 10667 | 891 | 1167 | 17444 | 1411 | 1856 | 27667 |
| 9 | 426 | 560 | 9656 | - | 532 | 9467 | 462 | 609 | 8600 | 606 | 798 | 11333 | 989 | 1300 | 18444 | 1567 | 2067 | 29333 |
| 10 | 467 | 617 | 10178 | - | 586 | 9978 | 508 | 670 | 9067 | 666 | 878 | 11889 | 1087 | 1433 | 19444 | 1722 | 2278 | 31000 |
| 12 | 551 | 729 | 11111 | - | 692 | 10889 | 599 | 793 | 9922 | 784 | 1039 | 13111 | 1278 | 1689 | 21333 | 2033 | 2689 | 33889 |
| 14 | 634 | 842 | 12000 | - | 800 | 11778 | 690 | 916 | 10722 | 904 | 1189 | 14111 | 1467 | 1956 | 23000 | 2344 | 3111 | 36667 |
| 16 | 718 | 954 | 12889 | - | 907 | 12667 | 781 | 1039 | 11444 | 1023 | 1356 | 15111 | 1667 | 2211 | 24667 | 2656 | 3522 | 39111 |
| 18 | 802 | 1068 | 13667 | - | 1014 | 13444 | 872 | 1156 | 12111 | 1133 | 1511 | 16000 | 1856 | 2478 | 26111 | 2967 | 3944 | 41556 |
| 20 | 887 | 1178 | 14444 | - | 1122 | 14111 | 963 | 1278 | 12778 | 1256 | 1678 | 16889 | 2056 | 2744 | 27556 | 3278 | 4367 | 43778 |
| 22 | 971 | 1289 | 15111 | - | 1222 | 14778 | 1056 | 1400 | 13444 | 1378 | 1833 | 17667 | 2256 | 3000 | 28889 | 3589 | 4778 | 45889 |
| 24 | 1056 | 1400 | 15778 | - | 1333 | 15444 | 1144 | 1522 | 14000 | 1500 | 2000 | 18444 | 2444 | 3267 | 30111 | 3900 | 5200 | 48000 |
| 26 | 1133 | 1511 | 16444 | - | 1433 | 16111 | 1233 | 1644 | 14667 | 1622 | 2156 | 19222 | 2644 | 3533 | 31444 | 4211 | 5611 | 49889 |
| 28 | 1222 | 1622 | 17000 | - | 1544 | 16667 | 1322 | 1767 | 15111 | 1744 | 2322 | 20000 | 2844 | 3789 | 32556 | 4522 | 6033 | 51778 |
| 30 | 1300 | 1744 | 17667 | - | 1656 | 17333 | 1422 | 1889 | 15667 | 1867 | 2478 | 20667 | 3044 | 4056 | 33667 | 4844 | 6456 | 53556 |
| 32 | 1389 | 1856 | 18222 | - | 1767 | 17889 | 1511 | 2011 | 16222 | 1989 | 2644 | 21333 | 3244 | 4322 | 34778 | 5156 | 6867 | 55333 |
| 34 | - | 1967 | 18778 | - | 1867 | 18444 | - | 2133 | 16667 | - | 2800 | 22000 | - | 4578 | 35889 | - | 7289 | 57111 |
| 36 | - | 2078 | 19333 | - | 1978 | 19000 | - | 2267 | 17222 | - | 2967 | 22667 | - | 4844 | 36889 | - | 7700 | 58778 |
| 38 | - | 2189 | 19889 | - | 2078 | 19444 | - | 2389 | 17667 | - | 3122 | 23222 | - | 5111 | 38000 | - | 8122 | 60333 |
| 40 | - | 2300 | 20333 | - | 2189 | 19889 | - | 2511 | 18111 | - | 3289 | 23889 | - | 5367 | 38889 | - | 8544 | 61889 |

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 Nm³/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 DN65-150

| DN Seat Pset bar | 65 37mm | | | 80 46mm | | | 100 60mm | | | 125 74mm | | | 150 92mm | | |
|---------------------------|------------|-------|-------|------------|-------|--------|-------------|-------|--------|-------------|-------|--------|-------------|-------|--------|
| | Stea m | Air | Water | Steam | Air | Water | Steam | Air | Water | Steam | Air | Water | Steam | Air | Water |
| | 0,2 | 137 | 162 | 8322 | 211 | 250 | 12889 | 359 | 426 | 21889 | 547 | 647 | 33333 | 844 | 1001 |
| 0,5 | 288 | 353 | 11778 | 446 | 546 | 18222 | 758 | 929 | 30889 | 1144 | 1411 | 47111 | 1778 | 2178 | 72778 |
| 1 | 450 | 564 | 15889 | 694 | 873 | 24667 | 1178 | 1478 | 41889 | 1789 | 2256 | 63778 | 2778 | 3489 | 98556 |
| 2 | 751 | 957 | 22556 | 1156 | 1478 | 34778 | 1967 | 2511 | 59222 | 3000 | 3822 | 90111 | 4644 | 5911 | 138889 |
| 3 | 1016 | 1300 | 27556 | 1567 | 2011 | 42667 | 2667 | 3422 | 72556 | 4056 | 5211 | 110333 | 6278 | 8067 | 171111 |
| 4 | 1289 | 1667 | 31889 | 1989 | 2578 | 49222 | 3389 | 3422 | 83778 | 5156 | 6667 | 127778 | 7978 | 10311 | 196667 |
| 5 | 1544 | 2000 | 35667 | 2389 | 3100 | 55111 | 4056 | 4389 | 93667 | 6178 | 8033 | 142222 | 9556 | 12333 | 220000 |
| 6 | 1800 | 2344 | 39000 | 2778 | 3622 | 60333 | 4733 | 5278 | 102667 | 7200 | 9389 | 155556 | 11111 | 14444 | 241111 |
| 7 | 2044 | 2689 | 42111 | 3167 | 4156 | 65111 | 5400 | 6178 | 110889 | 8211 | 10756 | 168889 | 12667 | 16556 | 261111 |
| 8 | 2300 | 3022 | 45111 | 3556 | 4678 | 69667 | 6056 | 7067 | 118889 | 9222 | 12111 | 180000 | 14222 | 18667 | 278889 |
| 9 | 2556 | 3367 | 47778 | 3944 | 5200 | 73889 | 6722 | 7967 | 125556 | 10233 | 13444 | 191111 | 15778 | 20778 | 295556 |
| 10 | 2811 | 3700 | 50333 | 4344 | 5733 | 77889 | 7389 | 8856 | 132222 | 11222 | 14778 | 201111 | 17333 | 22889 | 311111 |
| 12 | 3311 | 4389 | 55222 | 5122 | 6778 | 85333 | 8711 | 9744 | 145556 | 13222 | 17556 | 221111 | 20444 | 27111 | 341111 |
| 14 | 4322 | 5067 | 59667 | 5900 | 7833 | 92111 | 10044 | 11444 | 156667 | 15222 | 20222 | 238889 | 23556 | 31333 | 368889 |
| 16 | 4822 | 5744 | 63778 | 6678 | 8878 | 98556 | 11333 | 13222 | 167778 | 17222 | 23000 | 254444 | 26667 | 35444 | 394444 |
| 18 | 5333 | 6422 | 67556 | 7456 | 9933 | 104444 | 12667 | 15111 | 177778 | 19222 | 25667 | 270000 | 29889 | 40222 | 417778 |
| 20 | 5844 | 7100 | 71222 | 8244 | 10989 | 110111 | 14000 | 16889 | 187778 | 21333 | 28333 | 285556 | - | - | - |
| 22 | 6344 | 7789 | 74778 | 9033 | 12000 | 115556 | 15333 | 18667 | 196667 | 23333 | 31111 | 298889 | - | - | - |
| 24 | 6856 | 8467 | 78000 | 9811 | 13000 | 121111 | 16667 | 20444 | 205556 | 25333 | 33778 | 312222 | - | - | - |
| 26 | 7367 | 9144 | 81222 | 10600 | 14111 | 125556 | 18000 | 22222 | 213333 | - | - | - | - | - | - |
| 38 | 7889 | 9822 | 84333 | 11333 | 15111 | 130000 | 19333 | 24000 | 222222 | - | - | - | - | - | - |
| 30 | 8400 | 10500 | 87222 | 12111 | 16222 | 134444 | 20667 | 25778 | 230000 | - | - | - | - | - | - |
| 32 | - | 11111 | 90111 | 12889 | 17222 | 138889 | 22000 | 29333 | 236667 | - | - | - | - | - | - |
| 34 | - | 11778 | 92889 | - | 18333 | 143333 | - | 31667 | 244444 | - | - | - | - | - | - |
| 36 | - | - | - | - | 19667 | 147778 | - | 33444 | 251111 | - | - | - | - | - | - |
| 38 | - | - | - | - | 20667 | 152222 | - | - | - | - | - | - | - | - | - |
| 40 | - | - | - | - | 21778 | 155556 | - | - | - | - | - | - | - | - | - |

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 Nm³/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.

Accessories and Options

Test Gag for blocking the safety valve

Lift stopper

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

Heating jacket.

Installation

| Connection | Flanges drilled acc. to | |
|------------|-------------------------|---------------------|
| | AT 4522/AT 4523 | AT 4577/AT 4578 |
| Inlet | DIN EN 1092-1, PN40 | DIN EN 1092-1, PN40 |
| Outlet | DIN EN 1092-1, PN40 | DIN EN 1092-1, PN40 |

See separate installation instruction. The valve should be mounted with the bonnet in vertical position. The stainless steel bellows has a connection for drainage piping or for leak detection piping (which can show if the bellows are broken). Mounted protection plug is removed and replaced on site with appropriate device.

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 stainless steel bellow

Example: AT 4522-4-5,0-25

| AT 4522 | -4 | -5,0 | -25 |
|---|---|---------------------|-----|
| Fig. no AT 4522=steel AT 4577=stainless steel | design -2=gas tight cap -4=gas tight lifting device | Set pressure (barg) | DN |

Soft seated safety valve with stainless steel bellow

Exempel: AT 4523D4-5,0-25

| AT 4523 | D | 4 | -5,0 | -25 |
|---|--|---|---------------------|-----|
| Fig.no. AT 4523=steel AT 4578=stainless steel | O-ring D=EPDM L=Viton K=Neoprene N=Nitrile | Design 2=gas tight cap 4=gas tight lifting device | Set pressure (barg) | DN |