

→ Series 455



■ MATERIAL



■ SPECIFICATION



DN 15 to DN 100



-60°C to +400°C
depending on version
on request special
version up to -270°C



0,2 – 40 bar
depending on version

■ SUITABLE FOR

| | | |
|------------------------|-------------------------|--|
| Liquids | neutral and non-neutral | |
| Air, gases and vapours | neutral and non-neutral | |
| Steam | | |

■ EXAMPLES OF USE

Full-lift safety valve for the protection of:

- Pressure tanks and -systems for neutral / non-neutral vapours and gases
- Steam plants
- Silo containers for liquid, granular and dusty materials¹

Please observe plant-specific regulations and use of appropriate valve version and sealing material.

- Chemical and petrochemical plants
- Biogas plants
- Industrial- and commercial boiler plants
- Shipbuilding industry and marine equipment
- Production and processing of industrial gases
- secondary areas in the food-, beverage-, pharmaceutical- and cosmetics-industries

■ CHARACTERISTICS

- Maintenance-friendly construction
- single trim for gases, vapours and liquids
- replaceable seat
- easily detachable cone-stroke ring connection
- freely rotatable spindle-taper connection
- extensive range of spare parts, see spare parts flange safety valves
- vertical and horizontal installation position possible

Safety valves are set and sealed at the factory.

■ APPROVALS

| | |
|---------------------------------------|---|
| TÜV-Type test approval 2094 | D/G (full-lift), F (normal), F/K/S ¹ (Full lift) |
| EU type examination | S/G, L, F/K/S ¹ |
| TSG ZF001-2006 | D/G (S/G), F (L), F/K/S ¹ |
| TR ZU 032/2013 - TR ZU 010/2011 | D/G (S/G), F (L), F/K/S ¹ |
| Requirements | |
| DGR 2014/68/EU | TRD 421 and DIN EN 12952-7 |
| DIN EN ISO 4126-1 | DIN EN 12953-8 |
| AD 2000 Data sheet A2 | UK PESR 2016 No. 1105 |
| VdTÜV Guideline SV 100 | |
| Classification society | |
| Det Norske Veritas | DNV |
| Bureau Veritas | BV |
| Russian Maritime Register of Shipping | RS |
| Lloyds Register | LR |
| Registro Italiano Navale | RINA |

■ MATERIALS

| Component | Material | DIN EN | ASME |
|-------------------------|-----------------|--------|--------|
| Body and spring housing | Stainless steel | 1.4408 | CF8M |
| Valve seat | Stainless steel | 1.4404 | 316 L |
| Internal parts | Stainless steel | 1.4404 | 316 L |
| Spring | Stainless steel | 1.4310 | 302 |
| Bellows (optional) | Stainless steel | 1.4571 | 316 Ti |

¹ Only for version with bellows and gas-tight spring housing

Series 455 ■ VALVE VERSION

| | | |
|-----------|--|--|
| s | non-gastight, open spring housing | for neutral media, no liquids, without counter pressure |
| b | with bellows, non-gastight version of spring housing (10mm bore) | for neutral and non-neutral media and/or counter pressure ¹ . Spring, moving parts and the environment are protected from being affected by the medium. |
| t | gastight version of spring housing | for neutral and non-neutral media without counter pressure. The environment is protected from being affected by the medium. |
| tb | gastight version with bellows | for neutral and non-neutral and particularly for flammable, toxic and environmentally hazardous media and/or counter pressure ¹ . Spring, moving parts and the environment are protected from being affected by the medium. Double gastight. |

¹ up to max. 30% of the response pressure

■ MEDIUM

| | | |
|-----------|--------------------|--|
| G | gaseous | Air, vapours, gases and steam |
| GF | gaseous and liquid | Air, vapours, gases, steam and liquids |

■ TYPE OF LIFTING MECHANISM

| | |
|----------|-----------------------------|
| L | Standard with lifting lever |
| O | without lifting device |

■ AVAILABLE NOMINAL DIAMETERS AND CONNECTION SIZES

| Nominal diameter DN | 15 | 20 | 25 | 32 | 40 | 50 | 65 | 80 | 100 |
|---------------------|-----|----|----|----|----|----|----|----|-----|
| Inlet | 15 | 20 | 25 | 32 | 40 | 50 | 65 | 80 | 100 |
| Outlet | 25 | ■ | | | | | | | |
| | 32 | | ■ | | | | | | |
| | 40 | | | ■ | | | | | |
| | 50 | | | | ■ | | | | |
| | 65 | | | | | ■ | | | |
| | 80 | | | | | | ■ | | |
| | 100 | | | | | | | ■ | |
| | 150 | | | | | | | | ■ |

■ CONNECTION TYPE INLET / OUTLET FLANGE CONNECTIONS

| | | | |
|----------------|----------|---------------------------------------|---------------------------|
| FL / FL | Standard | Flange connection / flange connection | DIN EN 1092 / DIN EN 1092 |
|----------------|----------|---------------------------------------|---------------------------|

■ SEALS

| | | | | |
|-------------------------|-------------------------------------|-----------|------------------------------|--|
| MD | Metal-to-metal sealing | Flat seal | 0,2bar to 40bar | -60°C (-270°C ⁴) to +400°C |
| EPDM | Ethylene propylene diene | Flat seal | 0,2bar to 40bar | -40°C to +170°C |
| FKM | Fluorocarbon | Flat seal | 0,2bar to 40bar | -20°C to +200°C |
| FFKM² | Perfluorinated rubber | Flat seal | 0,2bar to 40bar | -10°C to +260°C |
| PTFE | Polytetrafluoroethylene | Flat seal | 0,2bar ³ to 10bar | -60°C (-200°C ⁴) to +225°C |
| PTFE CARBON | Polytetrafluoroethylene with carbon | Flat seal | 10bar to 40bar | -60°C (-200°C ⁴) to +225°C |

Auxiliary seals are made of highly resistant, adhesive-free graphite/stainless steel foil. Top cap with O-rings in EPDM.

² Standard Kalrez® 6375, alternatively Kalrez® 6230 with FDA, USP, 3-A

³ DN15 from 2bar, DN20 from 1,5bar, DN25 from 1bar (lower set pressures on request)

⁴ on request, with option P13 - design for cryogenic operating temperatures

■ NOMINAL DIAMETERS, CONNECTIONS, INSTALLATION DIMENSIONS

| Series 455: Connection, installation dimensions, ranges of adjustment | | | | | | | | | | | |
|---|--|-----------|-----------------------|------------|------------|------------|------------|-----------------------------|-----------------------------|-----------------------------|------------|
| Nominal diameter | DN | 15 | 20 | 25 | 32 | 40 | 50 | 65 | 80 | 100 | |
| Connection DIN EN 1092-1 | DN / PN | 15 / 40 | 20 / 40 | 25 / 40 | 32 / 40 | 40 / 40 | 50 / 40 | 65 / 40 | 80 / 40 | 100 / 40 | |
| Outlet DIN EN 1092-1 | DN1 / PN | 25 / 16 | 32 / 16 | 40 / 16 | 50 / 16 | 65 / 16 | 80 / 16 | 100 / 16 | 125 / 16 | 150 / 16 | |
| Installation dimensions in mm | L | 80 | 95 (85 ⁷) | 100 | 110 | 115 | 120 | 140 | 160 | 180 | |
| | h | 90 | 85 (95 ⁷) | 105 | 115 | 140 | 150 | 170 | 195 | 220 | |
| | D | 95 | 105 | 115 | 140 | 150 | 165 | 185 | 200 | 235 | |
| | K / nxd | 65 / 4x14 | 75 / 4x14 | 85 / 4x14 | 100 / 4x18 | 110 / 4x18 | 125 / 4x18 | 145 / 8x18 | 160 / 8x18 | 180 / 8x18 | 210 / 8x18 |
| | D1 | 115 | 140 | 150 | 165 | 185 | 200 | 220 | 250 | 285 | |
| | K1 / n1xd1 | 85 / 4x14 | 100 / 4x18 | 110 / 4x18 | 125 / 4x18 | 145 / 8x18 | 160 / 8x18 | 180 / 8x18 | 210 / 8x18 | 240 / 8x22 | |
| | H / H1 ¹ | 167 / 207 | 165 / 205 | 204 / 249 | 260 / 300 | 302 / 330 | 352 / 392 | 427 / 462 | 486 / 530 | 577 / 624 | |
| | H2 ² / H3 ³ | 206 / 246 | 204 / 244 | 242 / 287 | 321 / 361 | 363 / 391 | 413 / 453 | 497 / 532 | 556 / 600 | 647 / 694 | |
| | Lmax | 75 | 85 | 95 | 120 | 130 | 160 | 205 | 215 | 255 | |
| | A02 | 1/8" | 1/8" | 1/4" | 1/4" | 1/2" | 1/2" | 1/2" | 1/2" | 1/2" | |
| | α_w / K_{dr} (F) | 0,49 | 0,54 | 0,54 | 0,54 | 0,54 | 0,54 | 0,54 | 0,54 | 0,54 | |
| | α_w / K_{dr} (D/G) ⁴ | 0,72 | 0,74 | 0,74 | 0,74 | 0,74 | 0,74 | 0,74 | 0,74 | 0,74 | |
| | do | 15,0 | 18,0 | 22,5 | 29,3 | 36,0 | 45,0 | 59,0 | 72,0 | 90,0 | |
| Weight | kg ⁵ | 5,0 | 6,0 | 10,5 | 16,0 | 18,5 | 25,0 | 45,0 | 57,5 | 91,5 | |
| | kg ^{1.5} | 5,5 | 6,5 | 11,0 | 18,5 | 20,5 | 27,5 | 49,0 | 63,5 | 100,5 | |
| | kg ^{2.5} | 5,5 | 6,5 | 12,0 | 18,0 | 20,5 | 27,0 | 48,5 | 61,0 | 95,0 | |
| | kg ^{3.5} | 6,0 | 7,0 | 12,5 | 20,0 | 22,5 | 29,5 | 52,0 | 67,0 | 104,0 | |
| Range of adjustment | bar | 0,2 - 40 | 0,2 - 40 | 0,2 - 40 | 0,2 - 40 | 0,2 - 40 | 0,2 - 40 | 0,2 - 24 | 0,2 - 25,5 | 0,2 - 20 | |
| Pressure range with bellows | bar | 1,2 - 40 | 0,8 - 40 | 0,5 - 40 | 1,0 - 40 | 0,9 - 40 | 0,5 - 40 | 0,3 - 30 (40 ⁶) | 0,2 - 29 (40 ⁶) | 0,2 - 25 (40 ⁶) | |

¹ Values for the version with bellows

² Values for the version with lifting lever

³ Values for the version with bellows and lifting lever

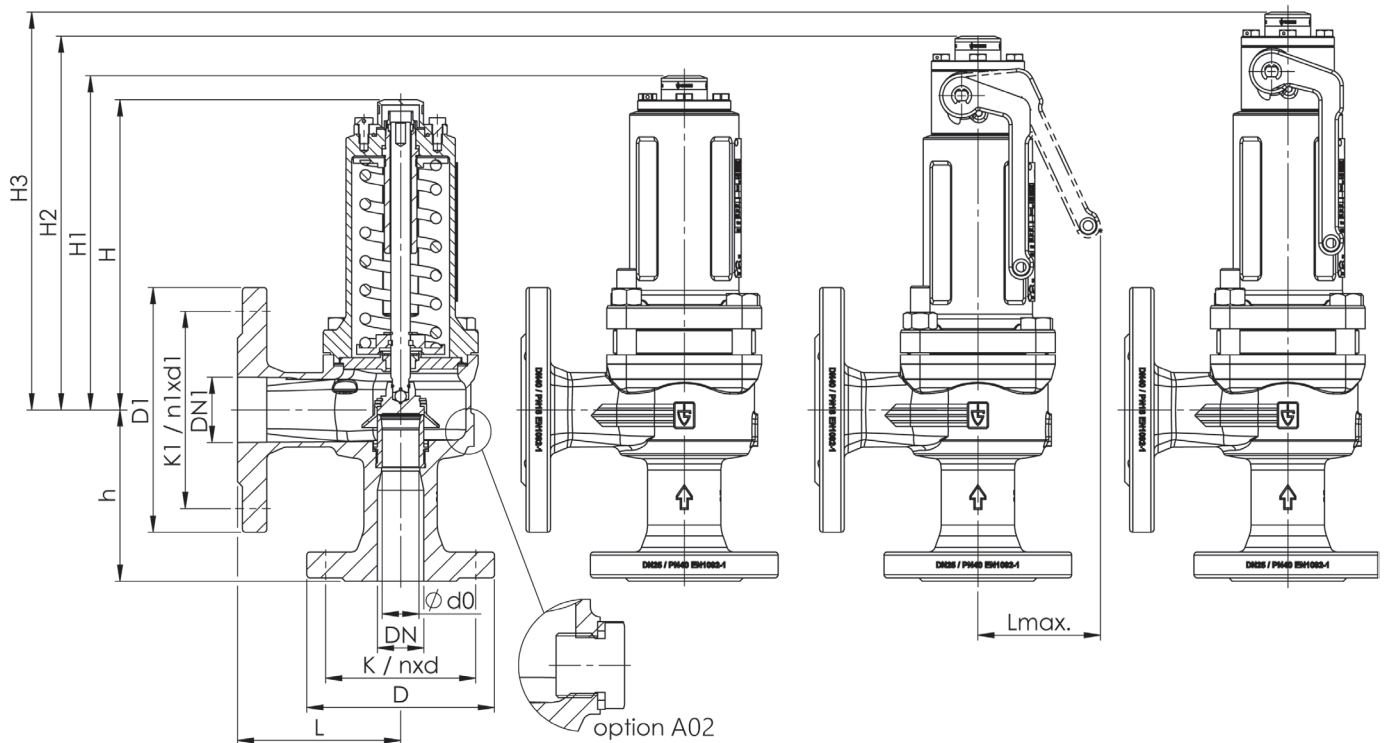
⁴ Flow coefficients for blow-off pressures < 3,0 bar: Please refer to the Flow Coefficients Chart.

⁵ Details for version with gastight spring housing

⁶ Spring material 1.8159 nickel plated

⁷ deviating leg dimension with option P13

■ MAIN DIMENSIONS, INSTALLATION DIMENSIONS



Series 455 ■ INDIVIDUAL SELECTION / VALVE CONFIGURATION

| Series | Valve version | Medium | Lifting device | Nominal diameter DN | Connection type | | Connection size | | Seal | Options | Set pressure | Quantity |
|--------|---------------|--------|----------------|---------------------|-----------------|--------|-----------------|--------|------|---------|--------------|----------|
| | | | | | Inlet | Outlet | Inlet | Outlet | | | | |
| 455 | t | GF | L | 50 | FL | FL | 50 | 80 | MD | S62 | 10,0 | 1 |
| 455 | | | | | FL | FL | | | | | | |
| 455 | | | | | FL | FL | | | | | | |
| 455 | | | | | FL | FL | | | | | | |

■ TECHNICAL FINISHES, VARIANTS, ACCESSORIES

| | | | | | |
|-----|--|--------------------------|-----|---|--------------------------|
| S60 | Pressure sensor connection M5 or G1/4 for monitoring the springhousing (only for valves with bellow) | <input type="checkbox"/> | A01 | Gagging screw for tests of valve tightness and resistance to pressure with the fitted valve | <input type="checkbox"/> |
| S62 | Inductive proximity sensor, assembled, for indication of valve position, including connection cable 5m | <input type="checkbox"/> | A02 | Connection for condensate in the outlet body – G1/4" upto DN32, G1/2" as of DN40 | <input type="checkbox"/> |
| | | <input type="checkbox"/> | A07 | Stroke limitation | <input type="checkbox"/> |

■ PROPERTIES

| | | | | | |
|-----|--|--------------------------|--|--|--------------------------|
| GOX | Especially for gaseous O2 applications by employment of specific materials including oil- and grease free production process | <input type="checkbox"/> | | | <input type="checkbox"/> |
| P01 | Oil- and grease-free production | <input type="checkbox"/> | | | <input type="checkbox"/> |
| P13 | Version for cryogenic operating temperatures | <input type="checkbox"/> | | | <input type="checkbox"/> |

■ CERTIFICATES / APPROVALS

| | | | | | |
|-----|--|--------------------------|-----|---|--------------------------|
| C01 | Factory certificate acc. DIN EN 10204 2.2 (WKZ 2.2) | <input type="checkbox"/> | C06 | ATEX evaluation acc. to 2014/34/EU | <input type="checkbox"/> |
| C02 | Test certificate acc. DIN EN 10204 3.1 (WPZ 3.1) | <input type="checkbox"/> | C07 | SIL evaluation relating to IEC 61508-2 | <input type="checkbox"/> |
| C03 | Material test certificate acc. DIN EN 10204 3.1 (MPZ 3.1) (pressure retaining part) | <input type="checkbox"/> | C09 | Seat tightness test with helium, leak detection method under vacuum incl. Factory Inspection Certificate 3.1 acc. to DIN EN 10204 | <input type="checkbox"/> |
| C04 | TÜV/DEKRA individual inspection acc. EN 10204 3.2 (TÜV/DEKRA-APZ) | <input type="checkbox"/> | C10 | Certificate of oil- and grease free production | <input type="checkbox"/> |
| C05 | Sealing material Manufacturer certification (FDA, USP 3, 3-A,...), Please indicate description of certificate: _____ | <input type="checkbox"/> | C11 | Certification of the production process especially for gaseous oxygen applications by employment of specific materials | <input type="checkbox"/> |

■ ADMISSIONS / ACCREDITATIONS

| | | | | | |
|------|--|--------------------------|-----|--|--------------------------|
| AA1 | EC Type examination acc. to Directive 2014/68/EU | <input type="checkbox"/> | AK1 | Det Norske Veritas (DNV) type approval | <input type="checkbox"/> |
| AA2 | TÜV component test acc. to VdTÜV specification sheet SV 100 | <input type="checkbox"/> | AK2 | Lloyd's Register (LR) type approval | <input type="checkbox"/> |
| AA4 | EAC - certificate/declaration with passport for the valve and laser marking of the valve | <input type="checkbox"/> | AK3 | American Bureau of Shipping (ABS) type approval | <input type="checkbox"/> |
| AA5 | Manufacture License of Special Equipment People's Republic of China (ML) ¹ | <input type="checkbox"/> | AK4 | Bureau Veritas (BV) type approval | <input type="checkbox"/> |
| AA11 | UK Type examination acc. to Directive UK PESR 2016 No. 1105 | <input type="checkbox"/> | AK5 | Russian Maritime Register of Shipping (RMRS) type approval | <input type="checkbox"/> |
| | | <input type="checkbox"/> | AK6 | Registro Italiano Navale (RINA) type approval | <input type="checkbox"/> |
| | | <input type="checkbox"/> | AL | Individual inspection by notified body inspector – (body to be indicated): _____ | <input type="checkbox"/> |

¹ approved up to -196°C, below -60°C with option P13

■ ENQUIRY

Copy and send to: order@goetze-armaturen.de.

| CONTINUATION - Series 455: Blowing-off rates at 10% above set pressure | | | | | | | | | | | | | |
|--|---------|------------|--------|---------|------------|---------|---------|------------|---------|----------|------------|---------|-------|
| Nominal diameter DN | | 50 | | | 65 | | | 80 | | | 100 | | |
| | | d0 = 45 mm | | | d0 = 59 mm | | | d0 = 72 mm | | | d0 = 90 mm | | |
| Set pressure bar | | I | II | III | I | II | III | I | II | III | I | II | III |
| Air I Nm ³ /h | 0,2 | 738,1 | 622,3 | 23,4 | 1268,7 | 1069,7 | 40,3 | 1889,4 | 1593,0 | 60,0 | 2952,2 | 2489,0 | 93,7 |
| | 0,5 | 1085,0 | 885,1 | 33,5 | 1865,1 | 1521,5 | 57,6 | 2777,6 | 2265,9 | 85,8 | 4340,0 | 3540,4 | 134,1 |
| | 1 | 1562,2 | 1244,3 | 45,6 | 2685,4 | 2138,9 | 78,4 | 3999,1 | 3185,3 | 116,8 | 6248,6 | 4977,0 | 182,5 |
| Steam II kg/h ¹⁾ | 1,5 | 2058,3 | 1628,1 | 56,0 | 3538,2 | 2798,8 | 96,2 | 5269,1 | 4168,0 | 143,3 | 8233,0 | 6512,6 | 224,0 |
| | 2 | 2528,9 | 1988,0 | 64,7 | 4347,2 | 3417,4 | 111,2 | 6473,9 | 5089,3 | 165,7 | 10115,5 | 7952,0 | 258,9 |
| | 2,5 | 2998,2 | 2345,0 | 72,4 | 5153,9 | 4031,1 | 124,5 | 7675,3 | 6003,3 | 185,3 | 11992,7 | 9380,1 | 289,6 |
| Water III m ³ /h | 3 | 3457,5 | 2692,5 | 79,3 | 5943,5 | 4628,4 | 136,4 | 8851,2 | 6892,7 | 203,1 | 13830,0 | 10769,8 | 317,4 |
| | 3,5 | 3901,1 | 3026,2 | 85,7 | 6706,0 | 5202,1 | 147,4 | 9986,8 | 7747,1 | 219,5 | 15604,4 | 12104,9 | 342,9 |
| | 4 | 4345,0 | 3359,1 | 91,7 | 7469,1 | 5774,3 | 157,6 | 11123,2 | 8599,2 | 234,7 | 17380,1 | 13436,3 | 366,6 |
| | 4,5 | 4789,2 | 3690,5 | 97,2 | 8232,8 | 6344,0 | 167,2 | 12260,5 | 9447,6 | 248,9 | 19157,0 | 14761,9 | 389,0 |
| | 5 | 5233,8 | 4022,1 | 102,5 | 8997,0 | 6914,0 | 176,2 | 13398,5 | 10296,5 | 262,4 | 20935,2 | 16088,3 | 410,0 |
| | 5,5 | 5678,6 | 4352,4 | 107,5 | 9761,6 | 7481,9 | 184,8 | 14537,3 | 11142,3 | 275,3 | 22714,5 | 17409,8 | 430,1 |
| | 6 | 6123,7 | 4682,5 | 112,3 | 10526,8 | 8049,3 | 193,1 | 15676,8 | 11987,3 | 287,5 | 24495,0 | 18730,2 | 449,3 |
| | 6,5 | 6569,2 | 5011,7 | 116,9 | 11292,5 | 8615,2 | 201,0 | 16817,1 | 12829,9 | 299,3 | 26276,7 | 20046,8 | 467,7 |
| | 7 | 7014,9 | 5340,7 | 121,3 | 12058,8 | 9180,7 | 208,6 | 17958,2 | 13672,2 | 310,6 | 28059,7 | 21362,8 | 485,3 |
| | 7,5 | 7461,0 | 5669,3 | 125,6 | 12825,5 | 9745,6 | 215,9 | 19100,1 | 14513,4 | 321,5 | 29843,9 | 22677,3 | 502,4 |
| | 8 | 7907,3 | 5997,8 | 129,7 | 13592,7 | 10310,3 | 223,0 | 20242,7 | 15354,4 | 332,1 | 31629,2 | 23991,3 | 518,9 |
| | 8,5 | 8354,2 | 6326,5 | 133,7 | 14360,9 | 10875,4 | 229,9 | 21386,7 | 16195,9 | 342,3 | 33416,7 | 25306,1 | 534,9 |
| | 9 | 8801,1 | 6655,1 | 137,6 | 15129,2 | 11440,2 | 236,5 | 22530,8 | 17037,1 | 352,3 | 35204,4 | 26620,5 | 550,4 |
| | 9,5 | 9248,6 | 6983,0 | 141,4 | 15898,4 | 12003,8 | 243,0 | 23676,3 | 17876,4 | 361,9 | 36994,3 | 27931,9 | 565,5 |
| | 10 | 9696,1 | 7310,1 | 145,1 | 16667,7 | 12566,1 | 249,4 | 24821,9 | 18713,7 | 371,4 | 38784,3 | 29240,2 | 580,2 |
| | 11 | 10592,3 | 7962,4 | 152,1 | 18208,3 | 13687,5 | 261,5 | 27116,2 | 20383,8 | 389,5 | 42369,1 | 31849,7 | 608,6 |
| | 12 | 11490,0 | 8616,3 | 158,9 | 19751,5 | 14811,6 | 273,2 | 29414,4 | 22057,8 | 406,8 | 45960,1 | 34465,4 | 635,7 |
| 13 | 12388,9 | 9269,5 | 165,4 | 21296,7 | 15934,3 | 284,4 | 31715,6 | 23729,8 | 423,5 | 49555,7 | 37077,9 | 661,7 | |
| 14 | 13289,1 | 9924,7 | 171,7 | 22844,1 | 17060,6 | 295,1 | 34020,0 | 25407,1 | 439,5 | 53156,3 | 39698,6 | 686,7 | |
| 15 | 14190,4 | 10575,7 | 177,7 | 24393,5 | 18179,7 | 305,5 | 36327,5 | 27073,7 | 454,9 | 56761,7 | 42302,6 | 710,8 | |
| 16 | 15093,0 | 11228,3 | 183,5 | 25945,0 | 19301,6 | 315,5 | 38638,0 | 28744,5 | 469,8 | 60371,9 | 44913,2 | 734,1 | |
| 17 | 15997,2 | 11881,4 | 189,2 | 27499,3 | 20424,2 | 325,2 | 40952,7 | 30416,3 | 484,3 | 63988,6 | 47525,5 | 756,7 | |
| 18 | 16902,1 | 12530,7 | 194,7 | 29055,0 | 21540,4 | 334,6 | 43269,5 | 32078,5 | 498,4 | 67608,5 | 50122,7 | 778,7 | |
| 19 | 17808,7 | 13184,6 | 200,0 | 30613,3 | 22664,5 | 343,8 | 45590,2 | 33752,5 | 512,0 | 71234,7 | 52738,3 | 800,0 | |
| 20 | 18716,9 | 13839,0 | 205,2 | 32174,5 | 23789,5 | 352,8 | 47915,2 | 35427,9 | 525,3 | 74867,4 | 55356,1 | 820,8 | |
| 21 | 19625,9 | 14492,7 | 210,3 | 33737,1 | 24913,2 | 361,5 | 50242,2 | 37101,4 | 538,3 | 78503,5 | 57971,0 | 841,1 | |
| 22 | 20536,5 | 15145,7 | 215,2 | 35302,6 | 26035,7 | 370,0 | 52573,5 | 38773,1 | 551,0 | 82146,1 | 60582,9 | 860,9 | |
| 23 | 21448,5 | 15798,0 | 220,1 | 36870,2 | 27156,9 | 378,3 | 54908,1 | 40442,8 | 563,4 | 85794,0 | 63191,9 | 880,3 | |
| 24 | 22361,5 | 16449,5 | 224,8 | 38439,7 | 28276,9 | 386,4 | 57245,5 | 42110,7 | 575,5 | 89446,1 | 65798,0 | 899,2 | |
| 25 | 23275,8 | 17102,5 | 229,4 | 40011,4 | 29399,3 | 394,4 | 59586,1 | 43782,3 | 587,4 | 93103,3 | 68409,8 | 917,8 | |
| 26 | 24192,0 | 17757,6 | 234,0 | 41586,3 | 30525,5 | 402,2 | 61931,4 | 45459,4 | 599,0 | 96767,8 | 71030,3 | 936,0 | |
| 27 | 25109,2 | 18412,3 | 238,5 | 43163,0 | 31651,0 | 409,9 | 64279,5 | 47135,5 | 610,4 | 100436,6 | 73649,3 | 953,8 | |
| 28 | 26027,7 | 19066,7 | 242,8 | 44741,9 | 32775,9 | 417,4 | 66630,8 | 48810,8 | 621,6 | 104110,6 | 76266,8 | 971,3 | |
| 29 | 26947,3 | 19720,7 | 247,1 | 46322,8 | 33900,2 | 424,8 | 68985,1 | 50485,0 | 632,6 | 107789,3 | 78882,9 | 988,5 | |
| 30 | 27868,3 | 20374,4 | 251,4 | 47905,9 | 35023,8 | 432,1 | 71342,7 | 52158,4 | 643,5 | 111473,0 | 81497,5 | 1005,4 | |
| 32 | 29714,9 | 21692,7 | 259,6 | 51080,3 | 37290,0 | 446,3 | 76070,2 | 55533,3 | 664,6 | 118859,7 | 86770,8 | 1038,4 | |
| 34 | 31566,3 | 23011,0 | 267,6 | 54262,9 | 39556,3 | 460,0 | 80809,8 | 58908,3 | 685,0 | 126265,4 | 92044,2 | 1070,4 | |
| 36 | 33424,0 | 24330,9 | 275,4 | 57456,2 | 41825,1 | 473,3 | 85565,3 | 62287,0 | 704,9 | 133695,8 | 97323,5 | 1101,4 | |
| 38 | 35286,5 | 25655,0 | 282,9 | 60657,9 | 44101,3 | 486,3 | 90333,4 | 65676,9 | 724,2 | 141145,9 | 102620,2 | 1131,6 | |
| 40 | 37154,5 | 26979,8 | 290,3 | 63869,1 | 46378,6 | 498,9 | 95115,5 | 69068,3 | 743,0 | 148618,0 | 107919,2 | 1161,0 | |

¹⁾Please observe the pressure-/temperature rating

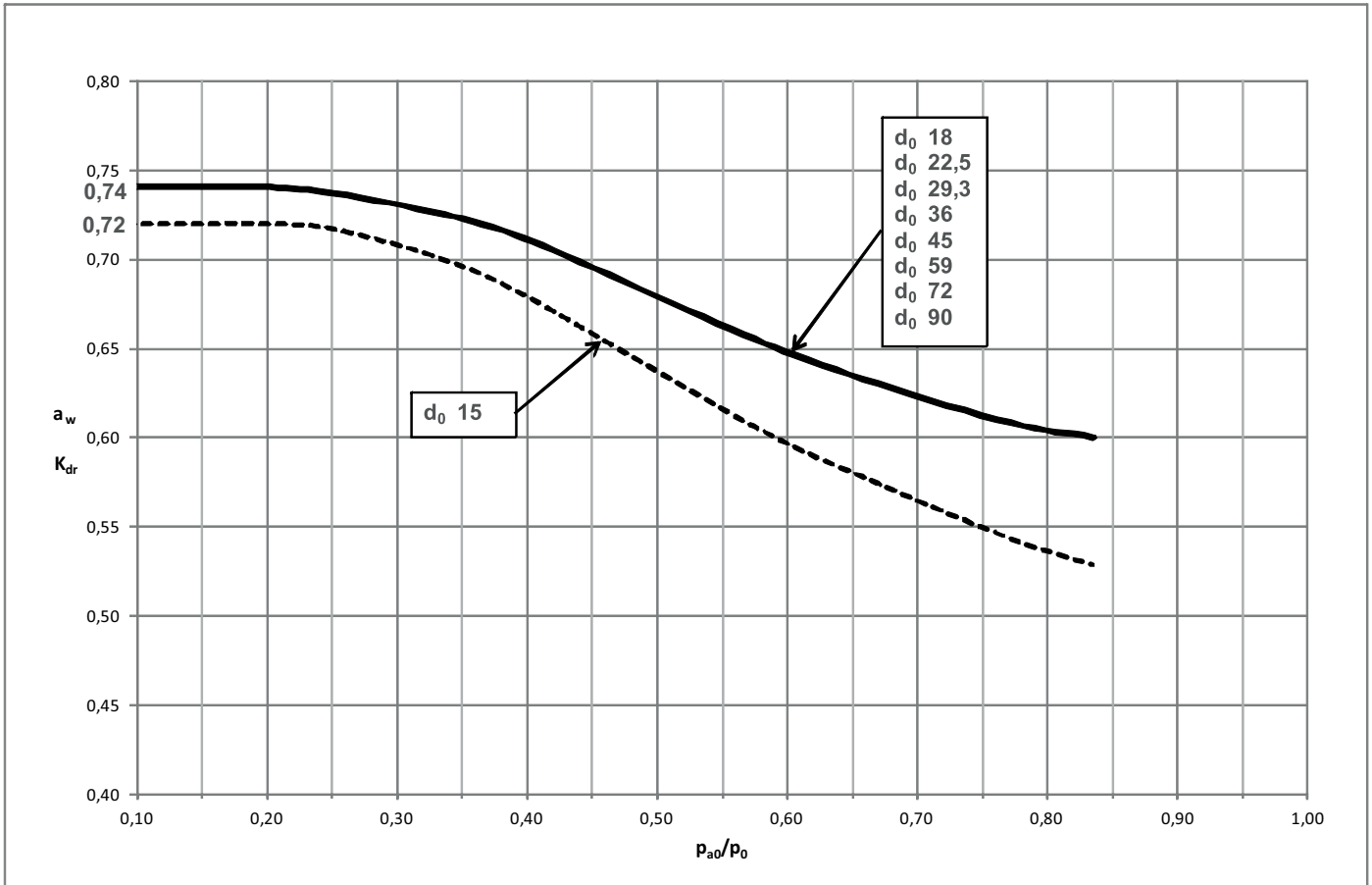
| Series 455: Blowing-off rates at 5% above set pressure | | | | | | | | | | | |
|--|--------------------|------------|--------|------------|--------|--------------|---------|--------------|---------|------------|---------|
| Nominal diameter DN | | 15 | | 20 | | 25 | | 32 | | 40 | |
| | | d0 = 15 mm | | d0 = 18 mm | | d0 = 22,5 mm | | d0 = 29,3 mm | | d0 = 36 mm | |
| Set pressure bar | | I | II | I | II | I | II | I | II | I | II |
| Air I | 0,2 | 71,7 | 60,5 | 118,1 | 99,6 | 184,5 | 155,6 | 312,9 | 263,8 | 472,4 | 398,2 |
| | 0,5 | 112,6 | 91,9 | 173,6 | 141,6 | 271,3 | 221,3 | 460,0 | 375,2 | 694,4 | 566,5 |
| | Nm ³ /h | 1 | 167,1 | 133,1 | 250,0 | 199,1 | 390,5 | 311,1 | 662,3 | 527,5 | 999,8 |
| Steam II (kg/h ¹⁾) | 1,5 | 220,3 | 174,4 | 322,5 | 255,3 | 503,9 | 398,9 | 854,6 | 676,4 | 1290,1 | 1021,1 |
| | 2 | 269,3 | 211,9 | 391,2 | 307,8 | 611,2 | 480,9 | 1036,5 | 815,5 | 1564,7 | 1231,1 |
| | 2,5 | 315,0 | 246,6 | 462,5 | 362,2 | 722,7 | 565,9 | 1225,5 | 959,6 | 1850,1 | 1448,6 |
| | 3 | 360,7 | 281,2 | 533,9 | 416,2 | 834,2 | 650,3 | 1414,7 | 1102,7 | 2135,6 | 1664,7 |
| | 3,5 | 406,5 | 315,7 | 601,6 | 467,2 | 940,1 | 730,1 | 1594,2 | 1238,0 | 2406,6 | 1869,0 |
| | 4 | 452,3 | 350,1 | 669,4 | 518,1 | 1046,0 | 809,5 | 1773,8 | 1372,8 | 2677,8 | 2072,4 |
| | 4,5 | 498,2 | 384,3 | 737,3 | 568,8 | 1152,0 | 888,8 | 1953,6 | 1507,2 | 2949,2 | 2275,3 |
| | 5 | 544,0 | 418,5 | 805,2 | 619,4 | 1258,1 | 967,9 | 2133,5 | 1641,3 | 3220,8 | 2477,7 |
| | 5,5 | 589,9 | 452,7 | 873,1 | 670,0 | 1364,3 | 1046,8 | 2313,5 | 1775,2 | 3492,5 | 2679,9 |
| | 6 | 635,9 | 486,8 | 941,1 | 720,4 | 1470,5 | 1125,7 | 2493,6 | 1908,9 | 3764,5 | 2881,7 |
| | 6,5 | 681,9 | 520,8 | 1009,2 | 770,8 | 1576,8 | 1204,3 | 2673,9 | 2042,2 | 4036,6 | 3083,0 |
| | 7 | 727,9 | 554,8 | 1077,2 | 821,0 | 1683,2 | 1282,9 | 2854,3 | 2175,5 | 4308,9 | 3284,1 |
| | 7,5 | 773,9 | 588,7 | 1145,4 | 871,2 | 1789,6 | 1361,3 | 3034,8 | 2308,4 | 4581,5 | 3484,9 |
| | 8 | 820,0 | 622,6 | 1213,5 | 921,4 | 1896,2 | 1439,8 | 3215,5 | 2441,5 | 4854,2 | 3685,8 |
| | 8,5 | 866,1 | 656,5 | 1281,8 | 971,6 | 2002,8 | 1518,1 | 3396,3 | 2574,3 | 5127,1 | 3886,3 |
| | 9 | 912,2 | 690,4 | 1350,0 | 1021,8 | 2109,5 | 1596,6 | 3577,2 | 2707,5 | 5400,2 | 4087,3 |
| | 9,5 | 958,4 | 724,3 | 1418,4 | 1072,0 | 2216,2 | 1675,0 | 3758,2 | 2840,4 | 5673,5 | 4287,9 |
| | 10 | 1004,6 | 758,1 | 1486,7 | 1122,0 | 2323,0 | 1753,2 | 3939,4 | 2973,0 | 5947,0 | 4488,1 |
| | 11 | 1097,0 | 825,6 | 1623,6 | 1221,8 | 2536,9 | 1909,1 | 4302,1 | 3237,4 | 6494,5 | 4887,3 |
| | 12 | 1189,7 | 893,0 | 1760,7 | 1321,6 | 2751,1 | 2065,0 | 4665,3 | 3501,8 | 7042,9 | 5286,4 |
| | 13 | 1282,4 | 960,3 | 1898,0 | 1421,3 | 2965,6 | 2220,8 | 5029,1 | 3766,0 | 7592,0 | 5685,3 |
| | 14 | 1375,3 | 1027,9 | 2035,5 | 1521,3 | 3180,4 | 2377,0 | 5393,3 | 4030,8 | 8141,9 | 6085,0 |
| | 15 | 1468,4 | 1095,4 | 2173,2 | 1621,3 | 3395,6 | 2533,2 | 5758,1 | 4295,8 | 8692,6 | 6485,0 |
| | 16 | 1561,5 | 1162,4 | 2311,0 | 1720,3 | 3611,0 | 2688,0 | 6123,4 | 4558,3 | 9244,1 | 6881,3 |
| | 17 | 1654,8 | 1230,0 | 2449,1 | 1820,4 | 3826,7 | 2844,4 | 6489,3 | 4823,6 | 9796,4 | 7281,8 |
| | 18 | 1748,2 | 1297,2 | 2587,4 | 1919,9 | 4042,8 | 2999,9 | 6855,7 | 5087,2 | 10349,5 | 7679,7 |
| | 19 | 1841,8 | 1364,2 | 2725,8 | 2019,1 | 4259,1 | 3154,8 | 7222,5 | 5349,8 | 10903,3 | 8076,2 |
| | 20 | 1935,5 | 1431,8 | 2864,5 | 2119,1 | 4475,8 | 3311,0 | 7590,0 | 5614,8 | 11458,1 | 8476,2 |
| | 21 | 2029,3 | 1499,3 | 3003,4 | 2219,0 | 4692,8 | 3467,2 | 7957,9 | 5879,6 | 12013,5 | 8876,0 |
| | 22 | 2123,3 | 1566,8 | 3142,5 | 2318,8 | 4910,1 | 3623,2 | 8326,4 | 6144,1 | 12569,8 | 9275,4 |
| | 23 | 2217,4 | 1634,2 | 3281,7 | 2418,6 | 5127,7 | 3779,0 | 8695,5 | 6408,4 | 13127,0 | 9674,3 |
| | 24 | 2311,6 | 1701,5 | 3421,2 | 2518,2 | 5345,6 | 3934,7 | 9065,0 | 6672,4 | 13684,7 | 10072,8 |
| | 25 | 2406,0 | 1768,7 | 3560,9 | 2617,7 | 5563,9 | 4090,2 | 9435,2 | 6936,0 | 14243,6 | 10470,8 |
| | 26 | 2500,5 | 1836,0 | 3700,8 | 2717,3 | 5782,5 | 4245,8 | 9805,8 | 7200,0 | 14803,1 | 10869,3 |
| | 27 | 2595,2 | 1903,6 | 3840,9 | 2817,4 | 6001,4 | 4402,2 | 10177,0 | 7465,1 | 15363,5 | 11269,6 |
| | 28 | 2690,0 | 1971,2 | 3981,2 | 2917,4 | 6220,6 | 4558,4 | 10548,8 | 7730,1 | 15924,7 | 11669,6 |
| | 29 | 2784,9 | 2038,8 | 4121,7 | 3017,4 | 6440,1 | 4714,6 | 10921,0 | 7995,0 | 16486,6 | 12069,5 |
| 30 | 2880,0 | 2106,3 | 4262,3 | 3117,3 | 6659,9 | 4870,7 | 11293,7 | 8259,7 | 17049,3 | 12469,1 | |
| 32 | 3070,5 | 2241,5 | 4544,3 | 3317,4 | 7100,5 | 5183,5 | 12041,0 | 8790,1 | 18177,4 | 13269,7 | |
| 34 | 3261,6 | 2377,5 | 4827,2 | 3518,8 | 7542,5 | 5498,1 | 12790,4 | 9323,6 | 19308,8 | 14075,1 | |
| 36 | 3453,3 | 2513,6 | 5110,9 | 3720,1 | 7985,8 | 5812,7 | 13542,1 | 9857,1 | 20443,6 | 14880,5 | |
| 38 | 3645,5 | 2649,9 | 5395,4 | 3921,8 | 8430,3 | 6127,9 | 14295,9 | 10391,5 | 21581,4 | 15687,3 | |
| 40 | 3836,8 | 2786,5 | 5678,4 | 4124,1 | 8872,5 | 6443,9 | 15045,8 | 10927,4 | 22713,6 | 16496,3 | |

¹⁾Please observe the pressure-/temperature rating

| CONTINUATION - Series 455: Blowing-off rates at 5% above set pressure | | | | | | | | | |
|---|-----|------------|---------|------------|---------|------------|---------|------------|----------|
| Nominal diameter DN | | 50 | | 65 | | 80 | | 100 | |
| | | d0 = 45 mm | | d0 = 59 mm | | d0 = 72 mm | | d0 = 90 mm | |
| Set pressure bar | | I | II | I | II | I | II | I | II |
| Air I | 0,2 | 738,1 | 622,3 | 1268,7 | 1069,7 | 1889,5 | 1593,0 | 2952,3 | 2489,0 |
| | 0,5 | 1085,0 | 885,1 | 1865,2 | 1521,5 | 2777,7 | 2265,9 | 4340,1 | 3540,4 |
| | 1 | 1562,2 | 1244,3 | 2685,4 | 2138,9 | 3999,2 | 3185,3 | 6248,8 | 4977,0 |
| Nm ² /h | 1,5 | 2015,8 | 1595,5 | 3465,2 | 2742,6 | 5160,4 | 4084,4 | 8063,1 | 6381,9 |
| | 2 | 2444,8 | 1923,6 | 4202,6 | 3306,6 | 6258,6 | 4924,3 | 9779,1 | 7694,3 |
| | 2,5 | 2890,8 | 2263,5 | 4969,3 | 3891,0 | 7400,5 | 5794,6 | 11563,2 | 9054,0 |
| Steam II | 3 | 3336,9 | 2601,0 | 5736,1 | 4471,2 | 8542,4 | 6658,6 | 13347,5 | 10404,1 |
| | 3,5 | 3760,3 | 2920,3 | 6464,0 | 5020,0 | 9626,4 | 7475,9 | 15041,2 | 11681,1 |
| | 4 | 4184,1 | 3238,1 | 7192,4 | 5566,3 | 10711,2 | 8289,5 | 16736,2 | 12952,3 |
| kg/h ¹⁾ | 4,5 | 4608,1 | 3555,1 | 7921,4 | 6111,3 | 11796,8 | 9101,1 | 18432,5 | 14220,5 |
| | 5 | 5032,4 | 3871,4 | 8650,8 | 6655,1 | 12883,0 | 9910,9 | 20129,7 | 15485,8 |
| | 5,5 | 5457,0 | 4187,4 | 9380,7 | 7198,2 | 13970,0 | 10719,7 | 21828,1 | 16749,6 |
| | 6 | 5882,0 | 4502,7 | 10111,2 | 7740,1 | 15057,8 | 11526,8 | 23527,8 | 18010,6 |
| | 6,5 | 6307,2 | 4817,2 | 10842,1 | 8280,8 | 16146,4 | 12332,0 | 25228,8 | 19268,8 |
| | 7 | 6732,7 | 5131,5 | 11573,6 | 8821,1 | 17235,8 | 13136,6 | 26930,9 | 20525,9 |
| | 7,5 | 7158,5 | 5445,1 | 12305,6 | 9360,3 | 18325,9 | 13939,6 | 28634,2 | 21780,6 |
| | 8 | 7584,6 | 5759,0 | 13038,1 | 9899,8 | 19416,7 | 14743,0 | 30338,5 | 23036,0 |
| | 8,5 | 8011,1 | 6072,3 | 13771,1 | 10438,4 | 20508,3 | 15545,2 | 32044,2 | 24289,4 |
| | 9 | 8437,8 | 6386,3 | 14504,7 | 10978,2 | 21600,8 | 16349,0 | 33751,2 | 25545,3 |
| | 9,5 | 8864,9 | 6699,9 | 15238,9 | 11517,2 | 22694,1 | 17151,7 | 35459,6 | 26799,5 |
| | 10 | 9292,1 | 7012,7 | 15973,3 | 12055,0 | 23787,9 | 17952,6 | 37168,6 | 28050,9 |
| | 11 | 10147,7 | 7636,4 | 17444,0 | 13127,1 | 25978,1 | 19549,2 | 40590,7 | 30545,6 |
| | 12 | 11004,5 | 8259,9 | 18917,0 | 14198,9 | 28171,6 | 21145,4 | 44018,2 | 33039,7 |
| | 13 | 11862,5 | 8883,2 | 20391,8 | 15270,3 | 30368,0 | 22741,0 | 47450,0 | 35532,8 |
| | 14 | 12721,7 | 9507,9 | 21868,8 | 16344,2 | 32567,6 | 24340,2 | 50886,9 | 38031,6 |
| | 15 | 13582,3 | 10132,8 | 23348,1 | 17418,4 | 34770,6 | 25940,0 | 54329,0 | 40531,3 |
| | 16 | 14443,9 | 10752,0 | 24829,2 | 18482,8 | 36976,3 | 27525,1 | 57775,4 | 43007,9 |
| | 17 | 15306,9 | 11377,8 | 26312,7 | 19558,5 | 39185,6 | 29127,1 | 61227,6 | 45511,0 |
| | 18 | 16171,1 | 11999,5 | 27798,3 | 20627,3 | 41397,9 | 30718,8 | 64684,3 | 47998,1 |
| | 19 | 17036,4 | 12619,1 | 29285,8 | 21692,4 | 43613,2 | 32304,9 | 68145,6 | 50476,4 |
| | 20 | 17903,2 | 13244,1 | 30775,9 | 22766,8 | 45832,2 | 33904,9 | 71612,9 | 52976,4 |
| | 21 | 18771,1 | 13868,8 | 32267,7 | 23840,6 | 48053,9 | 35504,0 | 75084,2 | 55475,0 |
| | 22 | 19640,3 | 14492,7 | 33762,0 | 24913,2 | 50279,3 | 37101,4 | 78561,4 | 57971,0 |
| | 23 | 20510,9 | 15116,1 | 35258,4 | 25984,7 | 52507,8 | 38697,1 | 82043,5 | 60464,2 |
| | 24 | 21382,4 | 15738,7 | 36756,6 | 27055,0 | 54739,0 | 40291,1 | 85529,6 | 62954,8 |
| | 25 | 22255,7 | 16360,7 | 38257,8 | 28124,2 | 56974,6 | 41883,4 | 89022,8 | 65442,8 |
| | 26 | 23129,9 | 16983,3 | 39760,5 | 29194,5 | 59212,5 | 43477,3 | 92519,5 | 67933,2 |
| | 27 | 24005,5 | 17608,7 | 41265,7 | 30269,6 | 61454,1 | 45078,3 | 96022,0 | 70434,9 |
| | 28 | 24882,4 | 18233,8 | 42773,1 | 31344,1 | 63698,9 | 46678,5 | 99529,5 | 72935,2 |
| | 29 | 25760,4 | 18858,5 | 44282,4 | 32418,0 | 65946,5 | 48277,8 | 103041,4 | 75434,1 |
| | 30 | 26639,6 | 19482,9 | 45793,8 | 33491,4 | 68197,3 | 49876,3 | 106558,3 | 77931,7 |
| | 32 | 28402,2 | 20733,9 | 48823,7 | 35641,9 | 72709,6 | 53078,8 | 113608,7 | 82935,6 |
| | 34 | 30170,0 | 21992,3 | 51862,6 | 37805,1 | 77235,1 | 56300,4 | 120679,9 | 87969,3 |
| | 36 | 31943,1 | 23250,7 | 54910,5 | 39968,3 | 81774,2 | 59521,9 | 127772,2 | 93003,0 |
| | 38 | 33721,0 | 24511,4 | 57966,8 | 42135,4 | 86325,8 | 62749,2 | 134884,1 | 98045,6 |
| | 40 | 35490,0 | 25775,5 | 61007,7 | 44308,3 | 90854,4 | 65985,2 | 141960,0 | 103101,8 |

¹⁾Please observe the pressure-/temperature rating

Coefficient of discharge α_w i.e. K_{dr} as a function of the relation between the pressures p_{a0}/p_0 of vapours and gases



$$\frac{p_{a0}}{p_0} = \frac{\text{counter pressure bar(a)}}{\text{blow-off pressure bar(a)}} \quad p_{atm} = \text{ambient i.e. atmospheric pressure} = 1,01325 \text{ bar(a)}$$

Example to determine the coefficient of discharge α_w i.e. K_{dr} in relation to the set-pressure p_{set}

| Set-pressure | Blow-off pressure |
|------------------|---------------------------------------|
| p_{set} bar(g) | p_0 bar(a) |
| ≤ 1 | $p_{set} + p_{atm} + 0,1 \text{ bar}$ |
| > 1 | $p_{set} \times 1,1 + p_{atm}$ |

For DN50 ($d_0=45 \text{ mm}$), safety valve set at $= 0,3 \text{ bar(g)}$ and blowing-off into the environment the blow-off pressure is determined as follows:

| | | |
|----------------------------|---------|--------|
| Set-pressure | 0,3 | bar(g) |
| + Atmospheric pressure | 1,01325 | bar(a) |
| + permissible overpressure | 0,1 | bar(g) |
| ~ Blow-off pressure | 1,41 | bar(a) |

Consequently:

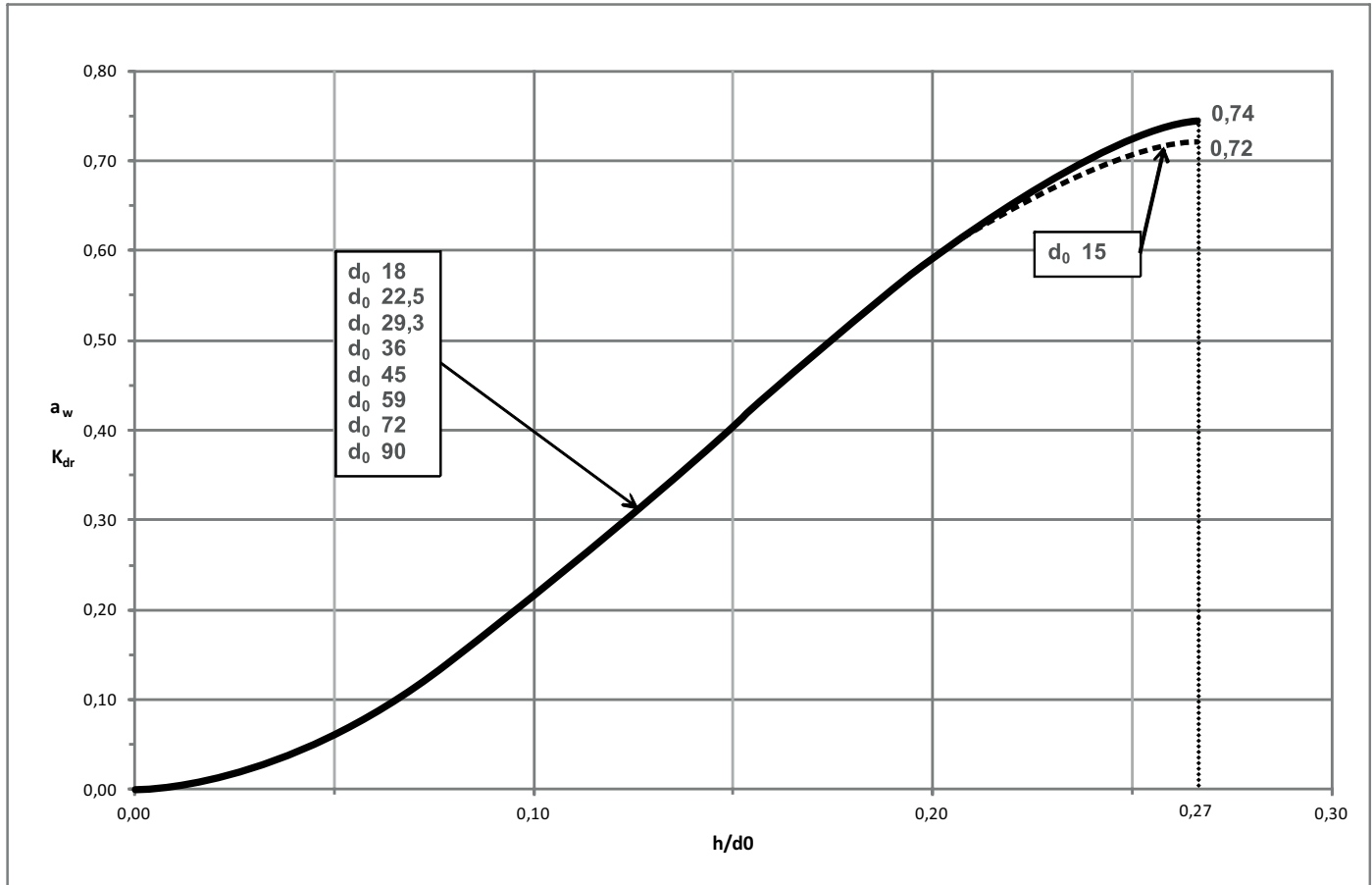
$$\frac{p_{a0}}{p_0} = \frac{1,01325 \text{ bar(a)}}{1,41 \text{ bar(a)}} = 0,72 \quad \text{and extracted from the chart} \quad \alpha_w \text{ i.e. } K_{dr} = 0,62$$

Units:

bar(a) $\hat{=}$ absolute pressure - pressure in relation to absolute vacuum (zero), e.g. $p_{atm} = 1,01325 \text{ bar(a)}$

bar(g) $\hat{=}$ overpressure - pressure above i.e. in relation to $p_{atm} = 1,01325 \text{ bar(a)}$

Coefficient of discharge α_w i.e. K_{dr} as a function of the ratio of stroke / flow diameter h/d_0 of vapours and gases

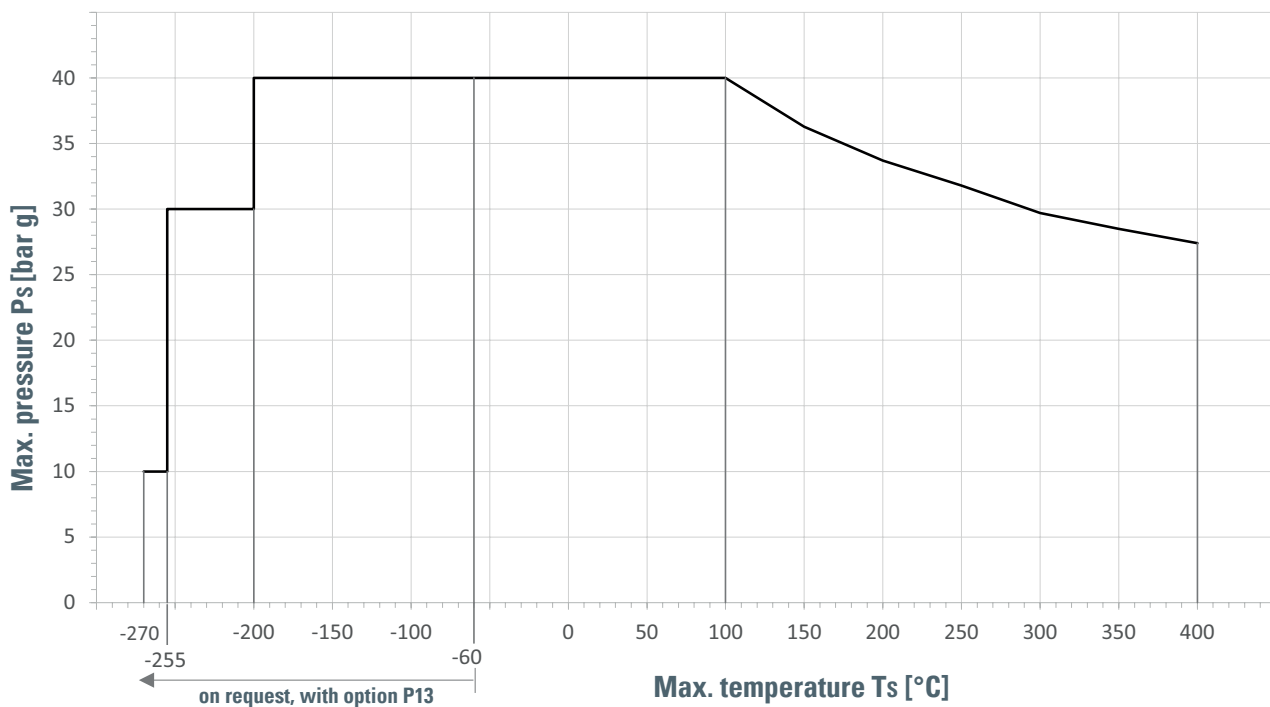


If the capacity of the respective nominal diameter is too high, the minimum necessary stroke can be determined with the required coefficient of discharge α_w bzw. K_{dr} .

The required discharge coefficient α_w / K_{dr} must be specified to determine the necessary stroke limitation.

Pressure-/ temperature rating

PN 40 | Material: 1.4408



Pressure-temperature assignment above 50°C according to DIN EN 1092-1; below -10°C according to AD2000 W10.