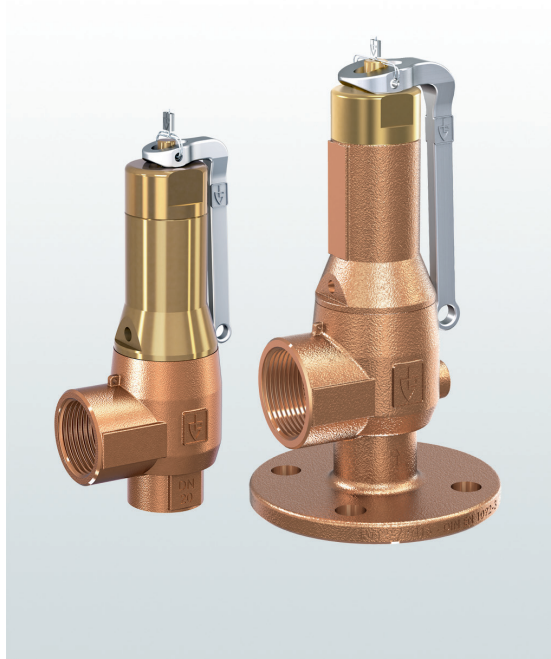


→ Series 645



■ SUITABLE FOR

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

■ EXAMPLES OF USE

For the protection of:

- Pressure-vessels/-systems for neutral / non-neutral vapours, gases and liquids
- Steam boilers and steam plants taking into account the plant-specific regulations and making use of the suitable valve versions and sealing materials.

- Mechanical engineering
- pump protection
- Pressure booster systems water- / air-side
- cooling-/chilling-systems
- Steam- and industrial-boiler systems

Safety valves are set and sealed at the factory.

■ APPROVALS

| | |
|-----------------------------------|----------------------------|
| TÜV Type test approval 2073, 2102 | D/G,F |
| EC type examination | S/G, L |
| ASME | S, G, L |
| CRN | S, G, L |
| KGS | G |
| Type approval WRAS | |
| Type approval ACS | |
| TR ZU 032/2013 - TR ZU 010/2011 | D/G (S/G), F (L) |
| Requirements | |
| AD 2000 Data sheet A2 | TRD 421 |
| DIN EN ISO 4126-1 | ASME-Code Sec. VIII Div. 1 |
| PED 2014/68/EU | KGS AA 319 |

Classification society

| | |
|---------------------------------------|---------|
| DNVGL | DNVGL |
| Bureau Veritas | BV |
| Lloyd's Register EMEA | LR EMEA |
| Russian Maritime Register of Shipping | RS |
| American Bureau of Shipping | ABS |
| Registro Italiano Navale | RINA |



■ MATERIAL



■ SPECIFICATION



1/2" – 2"



– 50°C to + 205°C
depending on version



0,5 – 16 bar



DN 25 – DN 50

■ MATERIALS

| Component | Material | DIN EN | ASME |
|-----------------------|---------------------------------|--------|--------|
| Inlet body | Gunmetal | CC499K | CC499K |
| Outlet body | Gunmetal | CC499K | CC499K |
| Internal parts | Brass | CW617N | CW617N |
| Internal wetted parts | Dezincification resistant brass | CW602N | CW602N |
| | Stainless steel | 1.4404 | 316L |
| Spring | Stainless steel | 1.4310 | 302 |

| | | |
|----------|-------------------------|---|
| m | Standard with diaphragm | The diaphragm prevents the medium entering into the spring housing and protects moving parts from being affected by the medium. |
|----------|-------------------------|---|

■ MEDIUM

| | | |
|-----------|--------------------|---|
| GF | gaseous and liquid | Air, vapours, gases, liquids and - depending on seal - also for steam |
|-----------|--------------------|---|

■ TYPE OF LIFTING MECHANISM

| | |
|----------|------------------------|
| L | Lifting lever |
| 0 | without lifting device |

■ AVAILABLE NOMINAL DIAMETERS AND CONNECTION SIZES

| Nominal diameter DN | 15 | 20 | 25 | 32 | 40 | 50 |
|---------------------|-------------|-----------|---------|-------------|-------------|---------|
| Inlet | 1/2" (15) | 3/4" (20) | 1" (25) | 1 1/4" (32) | 1 1/2" (40) | 2" (50) |
| Outlet | 3/4" (20) | | | | | |
| | 1" (25) | | | | | |
| | 1 1/4" (32) | | | | | |
| | 1 1/2" (40) | | | | | |
| | 2" (50) | | | | | |
| | 2 1/2" (65) | | | | | |

■ TYPE OF CONNECTION INLET / OUTLET

| | | | |
|------------------|----------|--|-------------------------------------|
| f / f | Standard | Female thread BSP-P / Female thread BSP-P | DIN EN ISO 228-1 / DIN EN ISO 228-1 |
| FLDIN / f | | Flange connection (from DN 25) / Female thread BSP-P | DIN EN ISO 228-1 / DIN EN ISO 228-1 |

■ SEAT SEALS / DIAPHRAGMS

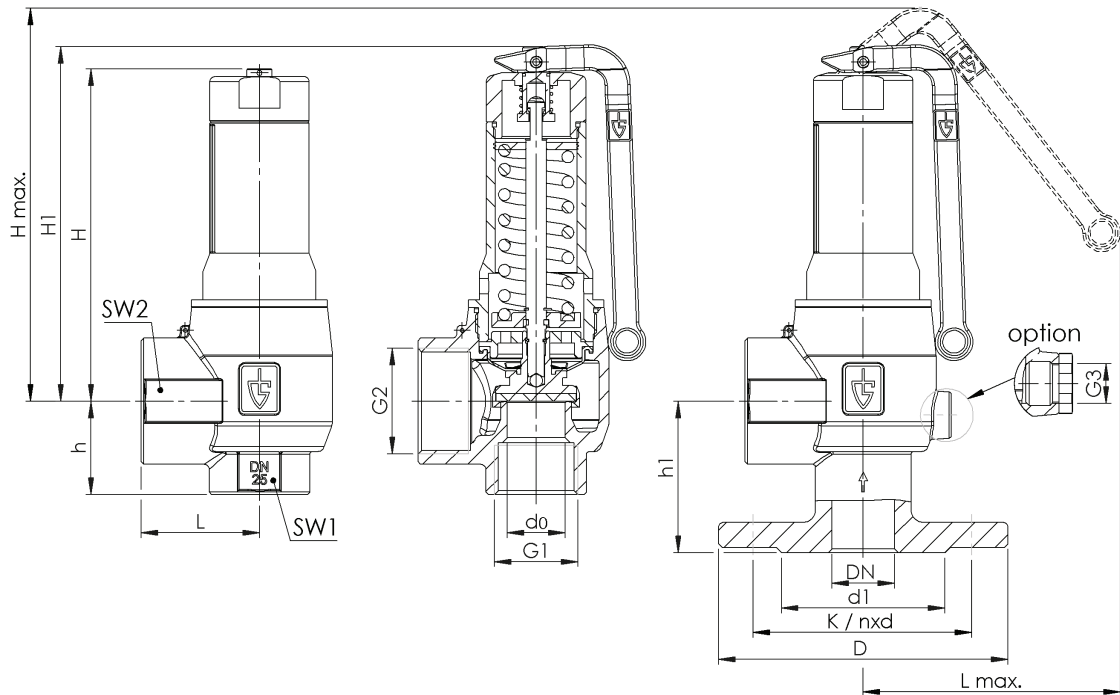
| | | | |
|--------------------|--|--|------------------|
| PTFE / EPDM | Polytetrafluorethylen / Ethylen-Propylene-Diene (Standard) | Flat seal and moulded diaphragm | -50°C to +205°C |
| EPDM / EPDM | Ethylen-Propylene-Diene / Ethylen-Propylene-Diene | Flat seal and moulded diaphragm | -50°C bis +150°C |
| PTFE / FKM | Polytetrafluorethylen / Fluorcarbon | Flat seal and moulded diaphragm | -30°C to +200°C |
| FKM / FKM | Fluorcarbon / Fluorcarbon | Elastomere seals and moulded diaphragm | -20°C to +200°C |

■ NOMINAL DIAMETERS, CONNECTIONS, INSTALLATION DIMENSIONS

| Series 645: Connection, installation dimensions, ranges of adjustment | | | | | | | | |
|---|--------------------------|-----------|-----------|---------------|---------------|---------------|----------------|-----------|
| Nominal diameter | DN | 15 | 20 | 25 | 32 | 40 | 50 | |
| Connection DIN EN ISO 228 | G1 | 1/2" (15) | 3/4" (20) | 1" (25) | 1 1/4" (32) | 1 1/2" (40) | 2" (50) | |
| Connection DIN EN 1092-3 | DN / PN | | | 25 / 16 | 32 / 16 | 40 / 16 | 50 / 16 | |
| Connection ANSI B 16.24 | NPS / CLASS | | | 1" / 150 | 1 1/4" / 150 | 1 1/2" / 150 | 2" / 150 | |
| Outlet DIN EN ISO 228 | G2 | 3/4" (20) | 1" (25) | 1 1/4" (32) | 1 1/2" (40) | 2" (50) | 2 1/2" (65) | |
| Installation dimensions in mm | L | 35,5 | 42,5 | 48 | 58 | 68 | 80 | |
| | Lmax | 63 | 77 | 102 | 145 | 150 | 155 | |
| | H | 82 | 107 | 132 | 168 | 199 | 240 | |
| | H1 | 90 | 115 | 146 | 192 | 229 | 276 | |
| | Hmax | 102 | 133 | 153 | 210 | 252 | 298 | |
| | h | 30 | 35 | 37 | 45 | 55 | 65 | |
| | h1 | | | 60 | 66 | 73 | 83 | |
| | D DIN / ANSI | | | | 115 / 110 | 140 / 115 | 150 / 125 | 165 / 150 |
| | d1 DIN / ANSI | | | | 65 / 50,8 | 76 / 63,5 | 84 / 73 | 99 / 92,1 |
| | SW1 | 27 | 34 | 41 | 55 | 65 | 80 | |
| | SW2 | 34 | 41 | 50 | 60 | 70 | 90 | |
| | do | 13 | 18 | 23 | 30 | 39 | 48 | |
| G3 | | | | 1/4" | 1/4" | 1/4" | 1/4" | |
| K / nxd (DIN) | | | | 85 / 4x14 | 100 / 4x18 | 110 / 4x18 | 125 / 4x18 | |
| K / nxd (ANSI) | | | | 79,4 / 4x15,9 | 88,9 / 4x15,9 | 98,4 x 4x15,9 | 120,7 / 4x19,1 | |
| Coefficients of flow ISO 4126-1 | $\alpha_w / Kdr (F)$ | 0,43 | 0,43 | 0,4 | 0,38 | 0,38 | 0,38 | |
| | $\alpha_w / Kdr (D/G)^1$ | 0,67 | 0,67 | 0,6 | 0,55 | 0,55 | 0,55 | |
| Coefficients of flow ASME-Code Sec. VIII Div. 1 | $\alpha_w / Kdr (F)$ | 0,43 | 0,43 | 0,43 | 0,36 | 0,36 | 0,36 | |
| | $\alpha_w / Kdr (D/G)$ | 0,65 | 0,65 | 0,65 | 0,55 | 0,55 | 0,55 | |
| Weight | kg | 0,5 | 0,9 | 1,6 | 3,3 | 5,8 | 8,9 | |
| | kg FLDIN / FLANSI | | | 2,6 / 2,4 | 4,8 / 4,3 | 7,5 / 6,9 | 11,3 / 10,8 | |
| Range of adjustment | bar | 0,5 - 16 | 0,5 - 16 | 0,5 - 16 | 0,5 - 16 | 0,5 - 16 | 0,5 - 16 | |
| Range of adjustment ASME | psi | 15 - 232 | 15 - 232 | 15 - 232 | 15 - 232 | 15 - 232 | 15 - 232 | |

¹Coefficients of flow for blow-off pressures for blow-off pressures > 3,5 bar. For lower pressures refer to values in the capacity table.

■ MAIN DIMENSIONS, INSTALLATION DIMENSIONS



| Series | Valve version | Medium | Lifting device | Nominal diameter DN | Connection type | | Connection size | | Seal | Options | Set pressure | Quantity |
|--------|---------------|--------|----------------|---------------------|-----------------|--------|-----------------|--------|-------------|---------|--------------|----------|
| | | | | | Inlet | Outlet | Inlet | Outlet | | | | |
| 645 | m | GF | L | 15 | f | f | 15 | 20 | PTFE / EPDM | | 6 | 2 |
| 645 | m | GF | O | 25 | m | f | 25 | 32 | FKM / FKM | | 2 | 4 |
| 645 | m | GF | | | | f | | | | | | |
| 645 | m | GF | | | | f | | | | | | |

■ TECHNICAL FINISHES, VARIANTS, ACCESSORIES

| | | |
|-----|--|--------------------------|
| A02 | Connection for condensate in the outlet body | <input type="checkbox"/> |
| | | <input type="checkbox"/> |
| | | <input type="checkbox"/> |

■ PROPERTIES

| | | | | | |
|-----|---------------------------------|--------------------------|-----|-----------------------------------|--------------------------|
| P01 | Oil- and grease-free production | <input type="checkbox"/> | P03 | Galvanically nickel-plated finish | <input type="checkbox"/> |
| P02 | Chemically nickel-plated finish | <input type="checkbox"/> | P04 | Chrome-plated finish | <input type="checkbox"/> |
| | | <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 | DNV-GL (DNVGL) 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"/> |
| AB2 | Water regulations and advisory scheme WRAS type approval | <input type="checkbox"/> | AK4 | Bureau Veritas (BV) type approval | <input type="checkbox"/> |
| | | <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"/> |

■ ENQUIRY

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

Order form easily to be found online under the section for each series.

| Series 645: Blowing-off rates at 10% above set pressure | | | | | | | | | | |
|---|-----|------------------------|-----|------|------------------------|------|------|------------------------|------|------|
| Nominal diameter DN | | 15 | | | 20 | | | 25 | | |
| Set pressure bar | | d ₀ = 13 mm | | | d ₀ = 18 mm | | | d ₀ = 23 mm | | |
| | | I | II | III | I | II | III | I | II | III |
| Air I | 0,5 | 77 | 58 | 2,3 | 141 | 106 | 4,3 | 208 | 157 | 6,6 |
| Nm ³ /h | 1 | 114 | 91 | 3,0 | 222 | 177 | 5,8 | 315 | 251 | 8,9 |
| | 2 | 188 | 148 | 4,3 | 366 | 288 | 8,3 | 525 | 413 | 12,6 |
| Steam II | 3 | 256 | 200 | 5,3 | 499 | 390 | 10,1 | 729 | 570 | 15,4 |
| kg/h | 4 | 327 | 253 | 6,1 | 626 | 486 | 11,7 | 916 | 710 | 17,7 |
| | 5 | 393 | 303 | 6,8 | 754 | 582 | 13,1 | 1103 | 851 | 19,8 |
| Water III | 6 | 460 | 354 | 7,5 | 882 | 678 | 14,3 | 1289 | 992 | 21,7 |
| m ³ /h | 7 | 526 | 403 | 8,1 | 1009 | 773 | 15,5 | 1476 | 1130 | 23,5 |
| | 8 | 593 | 453 | 8,6 | 1137 | 868 | 16,5 | 1662 | 1269 | 25,1 |
| | 9 | 660 | 502 | 9,1 | 1265 | 963 | 17,5 | 1849 | 1408 | 26,6 |
| | 10 | 726 | 551 | 9,6 | 1392 | 1057 | 18,5 | 2036 | 1546 | 28,1 |
| | 11 | 793 | 601 | 10,1 | 1520 | 1151 | 19,4 | 2222 | 1683 | 29,4 |
| | 12 | 859 | 649 | 10,6 | 1647 | 1245 | 20,2 | 2409 | 1820 | 30,7 |
| | 13 | 926 | 698 | 11,0 | 1775 | 1339 | 21,1 | 2595 | 1958 | 32,0 |
| | 14 | 992 | 748 | 11,4 | 1903 | 1434 | 21,9 | 2782 | 2097 | 33,2 |
| | 15 | 1059 | 797 | 11,8 | 2030 | 1528 | 22,6 | 2969 | 2234 | 34,4 |
| | 16 | 1126 | 846 | 12,2 | 2158 | 1622 | 23,4 | 3155 | 2372 | 35,5 |

| Series 645: Blowing-off rates at 10% above set pressure | | | | | | | | | | |
|---|-----|------------------------|------|------|------------------------|------|------|------------------------|------|-------|
| Nominal diameter DN | | 32 | | | 40 | | | 50 | | |
| Set pressure bar | | d ₀ = 30 mm | | | d ₀ = 39 mm | | | d ₀ = 48 mm | | |
| | | I | II | III | I | II | III | I | II | III |
| Air I | 0,5 | 338 | 276 | 10,5 | 571 | 466 | 17,7 | 864 | 706 | 26,8 |
| Nm ³ /h | 1 | 491 | 392 | 14,3 | 831 | 662 | 24,1 | 1258 | 1003 | 36,5 |
| | 2 | 816 | 642 | 20,2 | 1379 | 1085 | 34,2 | 2089 | 1643 | 51,8 |
| Steam II | 3 | 1128 | 879 | 24,8 | 1907 | 1486 | 41,9 | 2888 | 2251 | 63,5 |
| kg/h | 4 | 1430 | 1107 | 28,7 | 2417 | 1872 | 48,4 | 3661 | 2835 | 73,4 |
| | 5 | 1721 | 1326 | 32,1 | 2909 | 2241 | 54,2 | 4407 | 3395 | 82,1 |
| Water III | 6 | 2013 | 1544 | 35,1 | 3402 | 2609 | 59,4 | 5153 | 3953 | 89,9 |
| m ³ /h | 7 | 2304 | 1762 | 37,9 | 3894 | 2977 | 64,1 | 5899 | 4510 | 97,1 |
| | 8 | 2595 | 1979 | 40,6 | 4386 | 3344 | 68,6 | 6644 | 5066 | 103,9 |
| | 9 | 2887 | 2196 | 43,0 | 4879 | 3711 | 72,7 | 7390 | 5621 | 110,2 |
| | 10 | 3178 | 2412 | 45,4 | 5371 | 4077 | 76,7 | 8136 | 6175 | 116,1 |
| | 11 | 3469 | 2629 | 47,6 | 5863 | 4443 | 80,4 | 8882 | 6730 | 121,8 |
| | 12 | 3761 | 2845 | 49,7 | 6356 | 4809 | 84,0 | 9627 | 7284 | 127,2 |
| | 13 | 4052 | 3061 | 51,7 | 6848 | 5174 | 87,4 | 10373 | 7837 | 132,4 |
| | 14 | 4343 | 3278 | 53,7 | 7340 | 5541 | 90,7 | 11119 | 8393 | 137,4 |
| | 15 | 4635 | 3495 | 55,6 | 7833 | 5907 | 93,9 | 11865 | 8948 | 142,3 |
| | 16 | 4926 | 3711 | 57,4 | 8325 | 6272 | 97,0 | 12611 | 9501 | 146,9 |

| Series 645: Blowing-off rates at 10% above set pressure | | | | | | | | | | |
|---|-------|--------------------------------------|--------|--------|--------------------------------------|--------|--------|--------------------------------------|--------|-------|
| Nominal diameter DN | | 15 | | | 20 | | | 25 | | |
| | | d ₀ = 0,5118 inch (13 mm) | | | d ₀ = 0,7087 inch (18 mm) | | | d ₀ = 0,9055 inch (23 mm) | | |
| Set pressure psi(g) | | I | II | III | I | II | III | I | II | III |
| Air I SCFM | 15 | 80,2 | 225,2 | 14,2 | 153,8 | 431,8 | 27,2 | 210,9 | 592,1 | 37,2 |
| | 30 | 117,0 | 328,5 | 19,2 | 224,3 | 629,8 | 36,9 | 307,6 | 863,8 | 50,4 |
| | 40 | 144,0 | 404,3 | 22,2 | 276,0 | 775,0 | 42,6 | 378,6 | 1063,0 | 58,2 |
| | 50 | 171,0 | 480,0 | 24,8 | 327,8 | 920,3 | 47,6 | 449,5 | 1262,1 | 65,1 |
| | 60 | 197,9 | 555,8 | 27,2 | 379,5 | 1065,5 | 52,2 | 520,5 | 1461,3 | 71,3 |
| Steam II PPH | 70 | 224,9 | 631,5 | 29,4 | 431,2 | 1210,8 | 56,3 | 591,4 | 1660,5 | 77,0 |
| | 80 | 251,9 | 707,3 | 31,4 | 483,0 | 1356,0 | 60,2 | 662,4 | 1859,7 | 82,3 |
| | 90 | 278,9 | 783,1 | 33,3 | 534,7 | 1501,2 | 63,9 | 733,3 | 2058,9 | 87,3 |
| Water III GPM | 100 | 305,9 | 858,8 | 35,1 | 586,4 | 1646,5 | 67,3 | 804,2 | 2258,1 | 92,0 |
| | 110 | 332,9 | 934,6 | 36,8 | 638,1 | 1791,7 | 70,6 | 875,2 | 2457,3 | 96,5 |
| | 120 | 359,8 | 1010,3 | 38,5 | 689,9 | 1936,9 | 73,8 | 946,1 | 2656,5 | 100,8 |
| | 130 | 386,8 | 1086,1 | 40,1 | 741,6 | 2082,2 | 76,8 | 1017,1 | 2855,7 | 104,9 |
| | 140 | 413,8 | 1161,8 | 41,6 | 793,3 | 2227,4 | 79,7 | 1088,0 | 3054,9 | 108,9 |
| | 150 | 440,8 | 1237,6 | 43,0 | 845,0 | 2372,7 | 82,5 | 1159,0 | 3254,1 | 112,7 |
| | 160 | 467,8 | 1313,3 | 44,4 | 896,8 | 2517,9 | 85,2 | 1229,9 | 3453,3 | 116,4 |
| | 170 | 494,7 | 1389,1 | 45,8 | 948,5 | 2663,1 | 87,8 | 1300,9 | 3652,4 | 120,0 |
| | 180 | 521,7 | 1464,9 | 47,1 | 1000,2 | 2808,4 | 90,4 | 1371,8 | 3851,6 | 123,5 |
| | 190 | 548,7 | 1540,6 | 48,4 | 1052,0 | 2953,6 | 92,8 | 1442,7 | 4050,8 | 126,8 |
| | 200 | 575,7 | 1616,4 | 49,7 | 1103,7 | 3098,9 | 95,2 | 1513,7 | 4250,0 | 130,1 |
| 210 | 602,7 | 1692,1 | 50,9 | 1155,4 | 3244,1 | 97,6 | 1584,6 | 4449,2 | 133,3 | |
| 220 | 629,7 | 1767,9 | 52,1 | 1207,1 | 3389,3 | 99,9 | 1655,6 | 4648,4 | 136,5 | |
| 230 | 656,6 | 1843,6 | 53,3 | 1258,9 | 3534,6 | 102,1 | 1726,5 | 4847,6 | 139,5 | |
| 232 | 662,0 | 1858,8 | 53,5 | 1269,2 | 3563,6 | 102,6 | 1740,7 | 4887,4 | 140,2 | |

| Series 645: Blowing-off rates at 10% above set pressure | | | | | | | | | | |
|---|--------|--------------------------------------|--------|--------|--------------------------------------|---------|--------|--------------------------------------|---------|-------|
| Nominal diameter DN | | 32 | | | 40 | | | 50 | | |
| | | d ₀ = 1,1811 inch (30 mm) | | | d ₀ = 1,5354 inch (39 mm) | | | d ₀ = 1,8898 inch (48 mm) | | |
| Set pressure psi(g) | | I | II | III | I | II | III | I | II | III |
| Air I SCFM | 15 | 358,8 | 1007,4 | 63,3 | 606,4 | 1702,5 | 107,0 | 918,5 | 2579,0 | 162,1 |
| | 30 | 523,4 | 1469,5 | 85,7 | 884,5 | 2483,5 | 144,9 | 1339,9 | 3762,0 | 219,5 |
| | 40 | 644,1 | 1808,4 | 99,0 | 1088,5 | 3056,3 | 167,3 | 1648,9 | 4629,6 | 253,5 |
| | 50 | 764,8 | 2147,3 | 110,7 | 1292,5 | 3629,0 | 187,1 | 1957,9 | 5497,1 | 283,4 |
| | 60 | 885,5 | 2486,2 | 121,3 | 1496,5 | 4201,7 | 204,9 | 2266,9 | 6364,7 | 310,4 |
| Steam II PPH | 70 | 1006,2 | 2825,1 | 131,0 | 1700,5 | 4774,4 | 221,4 | 2575,8 | 7232,3 | 335,3 |
| | 80 | 1126,9 | 3164,0 | 140,0 | 1904,4 | 5347,1 | 236,6 | 2884,8 | 8099,8 | 358,5 |
| | 90 | 1247,6 | 3502,9 | 148,5 | 2108,4 | 5919,9 | 251,0 | 3193,8 | 8967,4 | 380,2 |
| Water III GPM | 100 | 1368,3 | 3841,8 | 156,5 | 2312,4 | 6492,6 | 264,6 | 3502,8 | 9834,9 | 400,8 |
| | 110 | 1489,0 | 4180,7 | 164,2 | 2516,4 | 7065,3 | 277,5 | 3811,8 | 10702,5 | 420,3 |
| | 120 | 1609,7 | 4519,5 | 171,5 | 2720,4 | 7638,0 | 289,8 | 4120,8 | 11570,0 | 439,0 |
| | 130 | 1730,4 | 4858,4 | 178,5 | 2924,3 | 8210,8 | 301,7 | 4429,8 | 12437,6 | 456,9 |
| | 140 | 1851,1 | 5197,3 | 185,2 | 3128,3 | 8783,5 | 313,0 | 4738,8 | 13305,2 | 474,2 |
| | 150 | 1971,8 | 5536,2 | 191,7 | 3332,3 | 9356,2 | 324,0 | 5047,7 | 14172,7 | 490,8 |
| | 160 | 2092,5 | 5875,1 | 198,0 | 3536,3 | 9928,9 | 334,7 | 5356,7 | 15040,3 | 506,9 |
| | 170 | 2213,2 | 6214,0 | 204,1 | 3740,3 | 10501,6 | 345,0 | 5665,7 | 15907,8 | 522,5 |
| | 180 | 2333,9 | 6552,9 | 210,0 | 3944,2 | 11074,4 | 355,0 | 5974,7 | 16775,4 | 537,7 |
| | 190 | 2454,6 | 6891,8 | 215,8 | 4148,2 | 11647,1 | 364,7 | 6283,7 | 17642,9 | 552,4 |
| | 200 | 2575,3 | 7230,7 | 221,4 | 4352,2 | 12219,8 | 374,2 | 6592,7 | 18510,5 | 566,8 |
| 210 | 2696,0 | 7569,5 | 226,9 | 4556,2 | 12792,5 | 383,4 | 6901,7 | 19378,0 | 580,8 | |
| 220 | 2816,7 | 7908,4 | 232,2 | 4760,2 | 13365,3 | 392,4 | 7210,7 | 20245,6 | 594,4 | |
| 230 | 2937,4 | 8247,3 | 237,4 | 4964,1 | 13938,0 | 401,2 | 7519,7 | 21113,2 | 607,8 | |
| 232 | 2961,5 | 8315,1 | 238,4 | 5004,9 | 14052,5 | 403,0 | 7581,4 | 21286,7 | 610,4 | |