



KUNKLE BAILEY 776 CRYOGENIC SAFETY VALVE

The 776 safety relief valve is designed for cryogenic duty down to -321°F [-196°C]



FEATURES

- Full lift design, top guided construction and an unobstructed seat bore provide maximum discharge capacity.
- Positive sealing through a freely pivoted disc with Kel F (PCTFE) soft seat technology.
- Designed to conform to ISO4126, AD Merkblatt A2, ASME VIII and BS6759 Parts 2 and 3.
- Production assembly and tests carried out in accordance with both BOC and Air Products specifications.
- Pressure tight dome fitted as standard.

GENERAL APPLICATION

The 776 is suitable for the protection of pipework, tanks and equipment containing cryogenic, cold and fine gases.

TECHNICAL DATA

Material: Bronze, stainless steel
Sizes: ½" to 2" (DN 15 to 50)
Connections: Threaded
Pressure range: 15 to 599 psig (1 to 41.3 barg)
Temperature range: -321°F to 140°F (-196°C to 60°C)

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SPECIFICATIONS

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Materials

- Body - Bronze from -321°F to 140°F (-196°C to 60°C)
- Stainless steel from -450°F to 140°F (-268°C to 60°C)
Trim - Kel F PCTFE from -450°F to 140°F (-268°C to 60°C)

SIZE RANGE

| Size, in (DN) | Orifice code | Orifice, mm ² | Min pressure, barg | Max pressure, barg |
|---------------|--------------|--------------------------|--------------------|--------------------|
| ½ (15) | 1, 2M | 109 | 1 | 41.3 |
| ¾ (20) | 2R | 109 | 1 | 41.3 |
| ¾ (20) | 2, 2M1 | 109 | 1 | 41.3 |
| ¾ (20) | 3 | 314 | 1 | 38.6 |
| 1 (25) | 4 | 314 | 1 | 38.6 |
| 1¼ (32) | 5 | 415 | 1 | 34.5 |
| 1½ (40) | 6 | 660 | 1 | 34.5 |
| 2 (50) | 7 | 1075 | 1 | 31.0 |

COEFFICIENT OF DISCHARGE - AIR

| (TUV alpha W) Orifice codes | Above | | | | |
|--------------------------------|--------|----------|--------|----------|--------|
| | 3 barg | 2.5 barg | 2 barg | 1.5 barg | 1 barg |
| 1, 2, 4, 5, 6, 7 | 0.69 | 0.69 | 0.69 | 0.67 | 0.63 |
| 3 | 0.67 | 0.65 | 0.63 | 0.62 | 0.58 |
| 1R, 2R | 0.40 | 0.40 | 0.40 | 0.39 | 0.36 |
| (ASME Kdr) | 0.737 | | | | |

Performance

- Over pressure: 10%
Blowdown: 10%

Maximum back pressure

- Barg 5.5
Constant 80%
Built-up 10%
Variable 0%
(Total % must not exceed barg shown)

Connections

Screwed in x screwed out

Cap options

Pressure tight dome fitted as standard

Approvals

- AD Merkblatt A2
ASME VIII
BS6759 Pt 2 and 3
PED certified category IV

Assembly and test specifications

- BOC: 1819660 and 399856.
Air products: 4WPI-EW80010 and 4WPI-SW70003.

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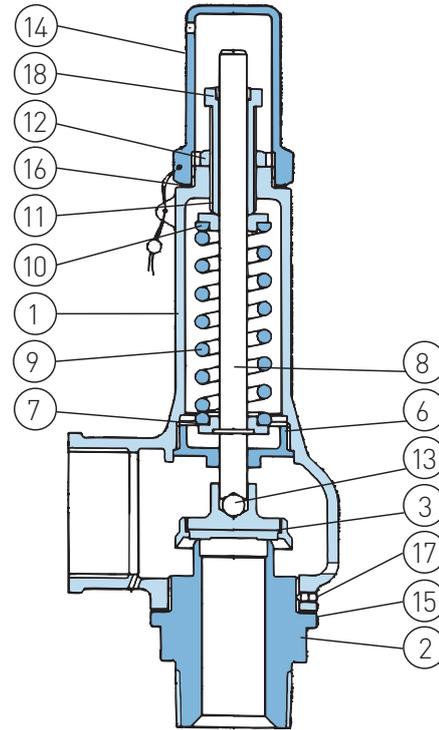
PARTS AND MATERIALS / DIMENSIONS

MATERIALS

| Item | Part | Material |
|------|--------------------|----------------------|
| 1 | Body | Bronze |
| 2 | Seat | Bronze |
| 3* | Disc assembly | St.St. / Kel F PCTFE |
| 6 | Guide | Bronze |
| 7 | Lower spring plate | Brass |
| 8 | Spindle | Brass |
| 9* | Spring | St.St |
| 10 | Upper spring plate | Brass |
| 11 | Adjusting screw | Brass |
| 12 | Locknut | Brass |
| 13* | Ball | St.St |
| 14 | Cap | Brass |
| 15* | Body gasket | Gylon PTFE |
| 16* | Cap gasket | Gylon PTFE |
| 17 | Grubscrew | St.St |
| 18 | Bush | PTFE |

NOTES

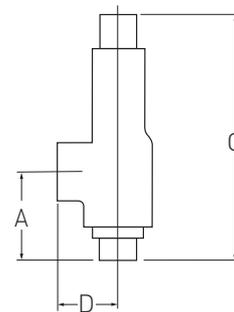
* Recommended spares.
 Refer to factory for stainless steel version.
 Recommended inspection every 12 months.



DIMENSIONS - MALE x FEMALE

| Valve size DN | Inlet *BSP | Outlet *BSP | A mm | C Dome | D | Weight (kg) |
|---------------|---------------|----------------|---------|-----------|----|----------------|
| 15 / 1 | 1/2" | 3/4" | 52 | 173 | 40 | 1.0 |
| 15 / 1R | 1/2" | 3/4" | 52 | 173 | 40 | 1.0 |
| 15 / 2M | 1/2" | 1" | 52 | 173 | 45 | 1.0 |
| 20 / 2R | 3/4" | 1" | 70 | 191 | 45 | 1.0 |
| 20 / 2 | 3/4" | 1" | 70 | 191 | 45 | 1.0 |
| 20 / 3 | 3/4" | 1 1/4" | 63 | 231 | 55 | 1.6 |
| 25 / 2M1 | 1" | 1" | 70 | 191 | 45 | 1.0 |
| 25 / 4 | 1" | 1 1/4" | 73 | 241 | 55 | 1.6 |
| 32 / 5 | 1 1/4" | 1 1/2" | 78 | 265 | 60 | 2.1 |
| 40 / 6 | 1 1/2" | 2" | 84 | 323 | 70 | 4.0 |
| 50 / 7 | 2" | 2 1/2" | 95 | 371 | 81 | 7.0 |

Male x Female



NOTES

* Other threaded options are also available.
 All dimensions in mm.

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AIR CAPACITY

AIR CAPACITY (l/s) at 0.3 barg or 10% overpressure* and 15°C

| Set pressure (barg) | AD MERKBLATT A2 | | | | | | | | |
|---------------------|-----------------|------------|--------------|---------------|-----------|-----------|-----------|-----------|-----------|
| | 1R / DN 20 | 2R / DN 20 | 1/2M / DN 15 | 2/2M1 / DN 20 | 3 / DN 20 | 4 / DN 25 | 5 / DN 32 | 6 / DN 40 | 7 / DN 50 |
| 1.0 | 15.3 | 15.3 | 26.9 | 26.9 | 71.3 | 77.5 | 103 | 163 | 265 |
| 2.0 | 24.9 | 24.9 | 40.3 | 40.3 | 107 | 116 | 153 | 244 | 397 |
| 3.0 | 34 | 34 | 58.7 | 58.7 | 155 | 169 | 224 | 356 | 579 |
| 4.0 | 42.5 | 42.5 | 73.4 | 73.4 | 205 | 211 | 279 | 444 | 723 |
| 5.0 | 51.0 | 51.0 | 88.0 | 88.0 | 246 | 253 | 335 | 533 | 868 |
| 6.0 | 59.5 | 59.5 | 103 | 103 | 287 | 296 | 391 | 621 | 1012 |
| 7.0 | 67.9 | 67.9 | 117 | 117 | 328 | 338 | 446 | 710 | 1156 |
| 8.0 | 76.4 | 76.4 | 132 | 132 | 369 | 380 | 502 | 798 | 1301 |
| 9.0 | 84.9 | 84.9 | 147 | 147 | 410 | 422 | 558 | 887 | 1445 |
| 10.0 | 93.4 | 93.4 | 161 | 161 | 451 | 464 | 613 | 976 | 1589 |
| 12.0 | 110 | 110 | 190 | 190 | 533 | 548 | 725 | 1153 | 1878 |
| 12.5 | 115 | 115 | 198 | 198 | 553 | 570 | 752 | 1197 | 1950 |
| 14.0 | 128 | 128 | 220 | 220 | 614 | 633 | 836 | 1330 | 2166 |
| 16.0 | 144 | 144 | 249 | 249 | 696 | 717 | 948 | 1507 | 2455 |
| 18.0 | 161 | 161 | 278 | 278 | 778 | 801 | 1059 | 1684 | 2743 |
| 20.0 | 178 | 178 | 307 | 307 | 860 | 886 | 1171 | 1862 | 3032 |
| 22.0 | 195 | 195 | 337 | 337 | 942 | 970 | | | |
| 24.0 | 212 | 212 | 366 | 366 | 1024 | 1054 | | | |
| 26.0 | 229 | 395 | 395 | 1106 | 1139 | | | | |
| 28.0 | 246 | 424 | 424 | 1187 | 1223 | | | | |
| 30.0 | 263 | 454 | 454 | 1269 | 1307 | | | | |

* Minimum overpressure = 0.07 barg at set pressure less than 0.7 barg.

Other gases

If you wish to use the valve on other compatible gases, the sizing details above can be used. However, the valve capacity will change depending on the specific gravity of the flowing gas. Multiply the valve air capacity by $1/\sqrt{SG}$ to give the gas capacity. SG = specific gravity (relative to air = 1).

Useful conversions

$Nm^3/h = l/sec \times 3.60$

$SCFM = l/sec \times 2.12$

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