



KUNKLE BAILEY 746 SAFETY RELIEF VALVE

A top guided, full lift safety relief valve with an unobstructed seat bore to ensure the highest possible discharge rates, with the choice of conventional or balanced bellows designs



FEATURES

- Freely pivoting disc ensures correct alignment with the nozzle.
- Highest possible discharge rate maximizes plant protection.
- Special disc style for liquid applications enhances valve performance.
- Conventional arrangement suitable for applications where built up pressure will not exceed 5%.
- Conventional valve can also be used in systems with constant superimposed backpressure (up to 80%).
- Balanced bellows arrangement for applications where several safety relief valves discharge into a common discharge manifold or for variable back pressures to 40%.
- Choice of cap options.

GENERAL APPLICATION

The 746 is certified to BS6759 pt 1, 2, 3 and is suitable for the protection of vessels, pipelines and equipment using hot or cold water; air; process or corrosive liquids and for clean steam and gases in hygienic environments.

TECHNICAL DATA

Material: Carbon steel, stainless steel
Sizes: 1" to 4" (DN 25 to 100)
Connections: Flanged
Pressure range: 5 to 580 psig (0.35 to 40 barg)
Temperature range: -51°F to 801°F (-46°C to 427°C)

KUNKLE BAILEY 746 SAFETY RELIEF VALVE

SPECIFICATIONS

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Materials

- Body
- Carbon steel gr WCB from -20°F to 801°F [-29°C to 427°C]
 - Stainless steel gr CF8M from -51°F to 801°F [-46°C to 427°C]
- Trim
- Stainless steel from -51°F to 801°F [-46°C to 427°C]
 - FKM from -20°F to 392°F [-29°C to 200°C]
 - PTFE from -51°F to 428°F [-46°C to 220°C]
 - EPDM - hot water from -20°F to 302°F [-29°C to 150°C]

SIZE RANGE

| Size, in (DN) | Orifice, mm ² | Min pressure*, barg | Max pressure, barg |
|---------------|--------------------------|---------------------|--------------------|
| 1 (25) | 415 | 0.35 | 40 |
| 1¼ (32) | 660 | 0.35 | 40 |
| 1½ (40) | 1075 | 0.35 | 40 |
| 2 (50) | 1662 | 0.35 | 40 |
| 2½ (65) | 2827 | 0.35 | 35 |
| 3 (80) | 4301 | 0.35 | 32 |
| 4 (100) | 6648 | 0.35 | 25 |

* Minimum pressure for bellows valves is greater than stated.

PERFORMANCE

| | BS6759 | | | ASME | | |
|-------------|--------|---------------|-----------|-------|---------------|----------|
| | Kdr | Over pressure | Blow down | Kdr | Over pressure | Blowdown |
| Steam | 0.7 | 5% | 15%* | 0.738 | 10% | Fixed |
| Hot water ◊ | 0.7 | 5% | 15%* | N/A | N/A | N/A |
| Air/Gas | 0.7 | 10% | 10%* | 0.738 | 10% | Fixed |
| Liquid | 0.46 | 10% | 20%❖ | 0.482 | 10% | Fixed |

* or 0.3 barg min

◊ above 100°C

❖ or 0.6 barg min

N/A = Not available

Maximum back pressure

- Barg 16
Constant 80%
Built-up 5%
Variable 40% (when bellows fitted)
(Total % must not exceed barg shown)

Connections

Flanged in x flanged out

Cap options

- Pressure tight dome
Packed lever
Open lever

Approvals

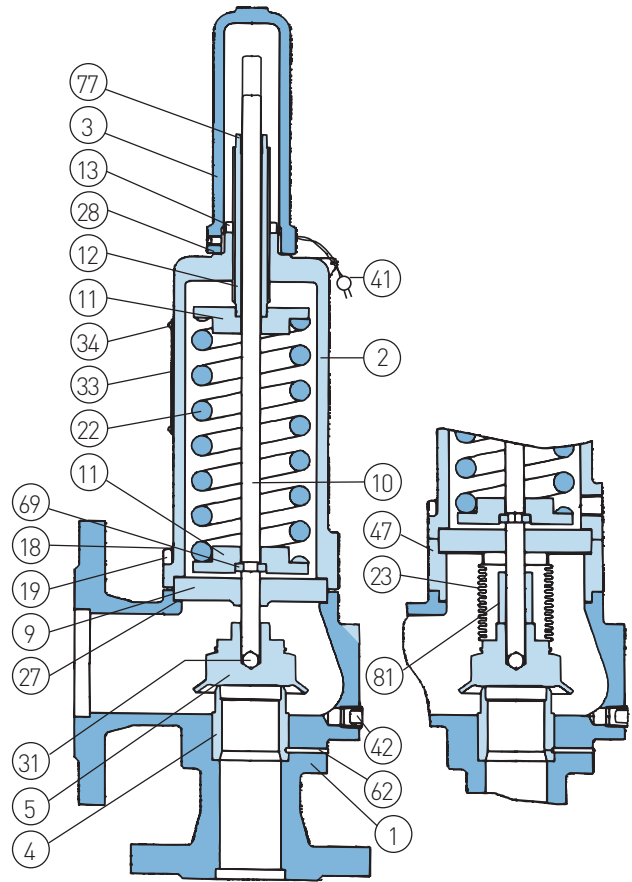
- BS6759 Pt 1, 2 and 3
ASME VIII
TUV-AD Merkblatt A2
PED certified category IV

KUNKLE BAILEY 746 SAFETY RELIEF VALVE

PARTS AND MATERIALS/DIMENSIONS

MATERIALS

| Item | Part | Materials | |
|--------|----------------------|-----------------|-----------------|
| | | Carbon steel | Stainless steel |
| 1 | Body | Carbon steel | Stainless steel |
| 2 | Bonnet | Carbon steel | Stainless steel |
| 3 | Cap | Carbon steel | Stainless steel |
| 4 | Seat | Stainless steel | Stainless steel |
| 5* | Disc# | Stainless steel | Stainless steel |
| 9 | Guide plate | Stainless steel | Stainless steel |
| 10(H) | Spindle | Stainless steel | Stainless steel |
| 11 | Spring plate | Stainless steel | Stainless steel |
| 12 | Adjusting screw | Stainless steel | Stainless steel |
| 13 | Locknut | Stainless steel | Stainless steel |
| 18(H) | Body stud | Carbon steel | Stainless steel |
| 19 | Body nut | Carbon steel | Stainless steel |
| 22(H) | Spring** | C.V | Stainless steel |
| 23(B)* | Bellows unit | Stainless steel | Stainless steel |
| 27* | Body/bonnet gasket | Garlock | Garlock |
| 28* | Cap gasket | Garlock | Garlock |
| 31* | Ball | Stainless steel | Stainless steel |
| 33 | Nameplate | Stainless steel | Stainless steel |
| 34 | Nameplate pin | Carbon steel | Stainless steel |
| 41 | Warranty seal | Lead/wire | Lead/wire |
| 42 | Drain plug | Carbon steel | Stainless steel |
| 47(BH) | Spacing piece | Stainless steel | Stainless steel |
| 62 | Seat pin | Stainless steel | Stainless steel |
| 69 | Split collar | Stainless steel | Stainless steel |
| 77 | Adjusting screw bush | PTFE | PTFE |
| 81(B) | Lift stop | Stainless steel | Stainless steel |



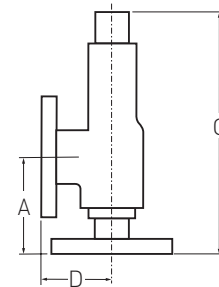
NOTES

- B - Denotes used on bellows type valves.
 - H - High pressure type valves; spacer, larger studs, spring and spindle.
 - # Resilient trims are available.
 - * Recommended spares.
 - ** Other spring material options are available dependent on duty.
- Recommended inspection every 12 months.

DIMENSIONS

| Valve size | | | A | C Dome | C Lever | C Bellows | Weight | |
|------------|-------|--------|-----|-----------|-----------|-----------|--------|------|
| DN | Inlet | Outlet | mm | mm | mm | mm | D | (kg) |
| 25 | 1" | 1½" | 105 | 410 | 410 | 445 | 100 | 8.5 |
| 32 | 1¼" | 2" | 115 | 455 | 455 | 490 | 110 | 14.0 |
| 40 | 1½" | 2½" | 140 | 570 | 570 | 605 | 115 | 20.0 |
| 50 | 2" | 3" | 150 | 615 | 615 | 665 | 120 | 30.0 |
| 65 | 2½" | 4" | 170 | 725 | 725 | 785 | 140 | 42.5 |
| 80 | 3" | 5" | 195 | 825/925H | 825/925H | 865/965H | 160 | 64.5 |
| 100 | 4" | 6" | 220 | 925/1030H | 925/1030H | 955/1060 | 180 | 86.0 |

Flanged x flanged



NOTES

- Flange sizes listed are for:
- Carbon steel flanges PN 40x16
- Others available on request
- All dimensions in mm

KUNKLE BAILEY 746 SAFETY RELIEF VALVE

AIR CAPACITY

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

| Set pressure (barg) | (BS6759 Pt2)# | | | | | | |
|------------------------|---------------|-------|-------|-------|-------|-------|--------|
| | DN 25 | DN 32 | DN 40 | DN 50 | DN 65 | DN 80 | DN 100 |
| 0.35 | 69.6 | 109 | 178 | 275 | 467 | 711 | 1098 |
| 1.0 | 115 | 182 | 297 | 459 | 781 | 1188 | 1836 |
| 2.0 | 181 | 287 | 468 | 723 | 1231 | 1872 | 2894 |
| 3.0 | 242 | 384 | 626 | 968 | 1646 | 2505 | 3872 |
| 4.0 | 303 | 482 | 786 | 1215 | 2066 | 3144 | 4859 |
| 5.0 | 365 | 580 | 945 | 1462 | 2486 | 3782 | 5846 |
| 6.0 | 427 | 678 | 1105 | 1708 | 2906 | 4421 | 6834 |
| 7.0 | 488 | 776 | 1265 | 1955 | 3326 | 5060 | 7821 |
| 8.0 | 550 | 874 | 1424 | 2202 | 3746 | 5699 | 8808 |
| 9.0 | 611 | 972 | 1584 | 2449 | 4165 | 6337 | 9795 |
| 10.0 | 673 | 1070 | 1744 | 2696 | 4585 | 6976 | 10783 |
| 12.0 | 796 | 1267 | 2063 | 3189 | 5425 | 8253 | 12757 |
| 12.5 | 827 | 1316 | 2143 | 3313 | 5635 | 8573 | 13251 |
| 14.0 | 920 | 1463 | 2382 | 3683 | 6265 | 9531 | 14732 |
| 16.0 | 1043 | 1659 | 2701 | 4177 | 7104 | 10808 | 16706 |
| 18.0 | 1166 | 1855 | 3021 | 4670 | 7944 | 12086 | 18681 |
| 20.0 | 1289 | 2051 | 3340 | 5164 | 8784 | 13363 | 20655 |
| 22.0 | 1413 | 2247 | 3659 | 5658 | 9623 | 14641 | 22630 |
| 24.0 | 1536 | 2443 | 3979 | 6151 | 10463 | 15918 | 24605 |
| 26.0 | 1659 | 2639 | 4298 | 6645 | 11303 | 17196 | |
| 28.0 | 1782 | 2835 | 4617 | 7138 | 12142 | 18473 | |
| 30.0 | 1906 | 3031 | 4936 | 7632 | 12982 | 19751 | |
| 32.0 | 2029 | 3227 | 5256 | 8126 | 13822 | 21028 | |
| 34.0 | 2152 | 3423 | 5575 | 8619 | 14661 | | |
| 36.0 | 2276 | 3619 | 5894 | 9113 | | | |
| 38.0 | 2399 | 3815 | 6214 | 9607 | | | |
| 40.0 | 2522 | 4011 | 6533 | 10100 | | | |

* Minimum overpressure = 0.07 barg at set pressure less than 1.0 barg.

The 746 can be sized/certified to ASME VIII and AD Merkblatt A2 - contact factory for details.

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

Nm³/h = l/sec x 3.60

SCFM = l/sec x 2.12

KUNKLE BAILEY 746 SAFETY RELIEF VALVE

STEAM CAPACITY/FSH CONVERSION

SATURATED STEAM CAPACITY (kg/h)

| Set pressure (barg) | BS6759 Pt1 at 5% overpressure #* | | | | | | |
|------------------------|----------------------------------|-------|-------|-------|-------|-------|--------|
| | DN 25 | DN 32 | DN 40 | DN 50 | DN 65 | DN 80 | DN 100 |
| 0.35 | 124 | 198 | 322 | 498 | 847 | 1289 | 1992 |
| 1.0 | 269 | 429 | 698 | 1079 | 1836 | 2793 | 4317 |
| 2.0 | 457 | 727 | 1183 | 1830 | 3112 | 4735 | 7318 |
| 3.0 | 635 | 1010 | 1645 | 2543 | 4326 | 6581 | 10173 |
| 4.0 | 795 | 1265 | 2060 | 3185 | 5417 | 8241 | 12738 |
| 5.0 | 955 | 1519 | 2475 | 3826 | 6508 | 9901 | 15303 |
| 6.0 | 1115 | 1774 | 2889 | 4467 | 7598 | 11560 | 17869 |
| 7.0 | 1276 | 2029 | 3304 | 5108 | 8689 | 13220 | 20433 |
| 8.0 | 1436 | 2283 | 3719 | 5750 | 9780 | 14880 | 22999 |
| 9.0 | 1596 | 2538 | 4134 | 6391 | 10871 | 16539 | 25565 |
| 10.0 | 1756 | 2793 | 4549 | 7032 | 11962 | 18199 | 28130 |
| 12.0 | 2076 | 3302 | 5378 | 8315 | 14143 | 21518 | 33260 |
| 12.5 | 2156 | 3429 | 5586 | 8636 | 14689 | 22348 | 34543 |
| 14.0 | 2397 | 3811 | 6208 | 9598 | 16325 | 24838 | 38391 |
| 16.0 | 2717 | 4321 | 7038 | 10880 | 18587 | 28157 | 43522 |
| 18.0 | 3037 | 4830 | 7867 | 12163 | 20689 | 31476 | 48652 |
| 20.0 | 3357 | 5339 | 8697 | 13446 | 22871 | 34795 | 53783 |
| 22.0 | 3678 | 5849 | 9526 | 14728 | 25052 | 38115 | 58913 |
| 24.0 | 3998 | 6358 | 10356 | 16011 | 27234 | 41434 | 64044 |
| 26.0 | 4318 | 6868 | 11186 | 17293 | 29416 | 44753 | |
| 28.0 | 4638 | 7377 | 12015 | 18576 | 31598 | 48073 | |
| 30.0 | 4959 | 7886 | 12845 | 19859 | 33779 | 51392 | |
| 32.0 | 5279 | 8396 | 13675 | 21142 | 35961 | 54711 | |
| 34.0 | 5599 | 8905 | 14504 | 22424 | 38143 | | |
| 36.0 | 5919 | 9414 | 15334 | 23707 | | | |
| 38.0 | 6240 | 9924 | 16164 | 24990 | | | |
| 40.0 | 6560 | 10433 | 16993 | 26272 | | | |

* Minimum overpressure = 0.07 Barg at set pressure less than 1.0 barg.

The 746 can be sized/certified to ASME VIII and AD Merkblatt A2 - contact factory for details.

FSH - SUPERHEAT STEAM CORRECTION

| Set pressure (barg) | Saturated steam temp. °C | Total steam temperature in degrees centigrade | | | | | |
|------------------------|-----------------------------|---|------|------|------|------|------|
| | | 150 | 200 | 260 | 310 | 370 | 430 |
| 1 | 120 | 1.00 | 0.98 | 0.93 | 0.88 | 0.84 | 0.80 |
| 4 | 150 | 1.00 | 0.99 | 0.93 | 0.88 | 0.84 | 0.81 |
| 7 | 170 | 1.00 | 0.99 | 0.94 | 0.89 | 0.84 | 0.81 |
| 10 | 361 | 1.00 | 0.99 | 0.94 | 0.89 | 0.85 | 0.81 |
| 14 | 180 | 1.00 | 0.99 | 0.95 | 0.89 | 0.85 | 0.81 |
| 18 | 210 | - | 1.00 | 0.95 | 0.90 | 0.85 | 0.81 |
| 24 | 220 | - | 1.00 | 0.96 | 0.90 | 0.86 | 0.82 |
| 34 | 240 | - | 1.00 | 0.96 | 0.92 | 0.86 | 0.82 |
| 41 | 250 | - | 1.00 | 0.97 | 0.92 | 0.87 | 0.82 |

Other temperatures

This steam table is based on saturated steam, at the temperatures shown.

For steam systems operating at higher temperatures, the above capacities will need to be derated by using the super heat correction factor.

Useful conversions

lbs/h = kg/h x 2.2046

KUNKLE BAILEY 746 SAFETY RELIEF VALVE

WATER CAPACITY

WATER CAPACITY (l/min) at 10% overpressure* at 20°C

| Set pressure (barg) | (BS6759 Pt3)#* | | | | | | |
|------------------------|----------------|-------|-------|-------|-------|-------|--------|
| | DN 25 | DN 32 | DN 40 | DN 50 | DN 65 | DN 80 | DN 100 |
| 0.35 | 105 | 167 | 272 | 420 | 715 | 1088 | |
| 1.0 | 170 | 270 | 440 | 680 | 1157 | 1761 | 2722 |
| 2.0 | 240 | 382 | 622 | 962 | 1637 | 2490 | 3849 |
| 3.0 | 294 | 468 | 762 | 1178 | 2005 | 3050 | 4714 |
| 4.0 | 340 | 540 | 880 | 1361 | 2315 | 3522 | 5443 |
| 5.0 | 380 | 604 | 984 | 1521 | 2588 | 3937 | 6086 |
| 6.0 | 416 | 662 | 1078 | 1667 | 2835 | 4313 | 6666 |
| 7.0 | 449 | 715 | 1164 | 1800 | 3062 | 4659 | 7210 |
| 8.0 | 481 | 764 | 1245 | 1924 | 3273 | 4980 | 7698 |
| 9.0 | 510 | 811 | 1320 | 2041 | 3472 | 5282 | 8165 |
| 10.0 | 537 | 854 | 1392 | 2152 | 3660 | 5568 | 8606 |
| 12.0 | 589 | 936 | 1525 | 2357 | 4009 | 6099 | 9428 |
| 12.5 | 601 | 955 | 1556 | 2406 | 4092 | 6225 | 9622 |
| 14.0 | 636 | 1011 | 1647 | 2546 | 4330 | 6588 | 10183 |
| 16.0 | 680 | 1081 | 1760 | 2722 | 4629 | 7043 | 10886 |
| 18.0 | 721 | 1146 | 1867 | 2887 | 4910 | 7470 | 11547 |
| 20.0 | 760 | 1208 | 1968 | 3043 | 5176 | 7874 | 12171 |
| 22.0 | 797 | 1267 | 2064 | 3191 | 5428 | 8259 | 12765 |
| 24.0 | 832 | 1324 | 2156 | 3333 | 5670 | 8626 | 13332 |
| 26.0 | 866 | 1378 | 2244 | 3469 | 5901 | 8978 | |
| 28.0 | 899 | 1430 | 2329 | 3600 | 6124 | 9317 | |
| 30.0 | 931 | 1480 | 2410 | 3727 | 6339 | 9644 | |
| 32.0 | 961 | 1528 | 2490 | 3849 | 6547 | 9960 | |
| 34.0 | 991 | 1575 | 2566 | 3967 | 6748 | | |
| 36.0 | 1019 | 1621 | 2641 | 4082 | | | |
| 38.0 | 1047 | 1666 | 2713 | 4194 | | | |
| 40.0 | 1074 | 1709 | 2783 | 4303 | | | |

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

The 746 can be sized/certified to ASME VIII and AD Merkblatt A2 - contact factory for details.

Other liquids

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

Useful conversions

lgpm = l/min x 0.22

m³/min = l/min x 0.001

KUNKLE BAILEY 746 SAFETY RELIEF VALVE

HOT WATER CAPACITY

HOT WATER CAPACITY (kW) for a pressurized (un-vented) system

| Set pressure (barg) | (BS6759 Pt1 at 5% overpressure)* | | | | | | |
|------------------------|----------------------------------|-------|-------|-------|-------|-------|--------|
| | DN 25 | DN 32 | DN 40 | DN 50 | DN 65 | DN 80 | DN 100 |
| 0.35 | 227 | 360 | 587 | 907 | 1543 | 2547 | 3628 |
| 1.0 | 235 | 374 | 608 | 941 | 1600 | 2434 | 3762 |
| 2.0 | 309 | 492 | 801 | 1239 | 2107 | 3206 | 4956 |
| 3.0 | 398 | 633 | 1031 | 1594 | 2711 | 4124 | 6375 |
| 4.0 | 498 | 792 | 1291 | 1996 | 3394 | 5164 | 7983 |
| 5.0 | 599 | 952 | 1551 | 2398 | 4078 | 6204 | 9590 |
| 6.0 | 699 | 1112 | 1811 | 2799 | 4762 | 7244 | 11198 |
| 7.0 | 799 | 1271 | 2071 | 3201 | 5445 | 8285 | 12805 |
| 8.0 | 900 | 1431 | 2331 | 3603 | 6129 | 9721 | 14413 |
| 9.0 | 1000 | 1590 | 2591 | 4005 | 6813 | 10365 | 16020 |
| 10.0 | 1100 | 1750 | 2851 | 4407 | 7496 | 11405 | 17628 |
| 12.0 | 1301 | 2069 | 3370 | 5211 | 8863 | 13485 | 20843 |
| 12.5 | 1351 | 2149 | 3500 | 5412 | 9205 | 14005 | 21647 |
| 14.0 | 1501 | 2388 | 3890 | 6015 | 10231 | 15565 | 24058 |
| 16.0 | 1703 | 2708 | 4410 | 6818 | 11598 | 17645 | 27274 |
| 18.0 | 1903 | 3027 | 4930 | 7622 | 12965 | 19725 | 30489 |
| 20.0 | 2104 | 3346 | 5450 | 8426 | 14332 | 21805 | 33704 |
| 22.0 | 2304 | 3665 | 5970 | 9230 | 15699 | 23885 | 36919 |
| 24.0 | 2505 | 3984 | 6490 | 10034 | 17067 | 25965 | 40134 |
| 26.0 | 2706 | 4304 | 7010 | 10837 | 18434 | 28045 | |
| 28.0 | 2907 | 4623 | 7530 | 11641 | 19801 | 30125 | |
| 30.0 | 3107 | 4942 | 8050 | 12445 | 21168 | 32206 | |
| 32.0 | 3308 | 5261 | 8569 | 13249 | 22536 | 34286 | |
| 34.0 | 3509 | 5580 | 9089 | 14053 | 23903 | | |
| 36.0 | 3710 | 5900 | 9609 | 14856 | | | |
| 38.0 | 3910 | 6219 | 10129 | 15660 | | | |
| 40.0 | 4111 | 6538 | 10649 | 16464 | | | |

NOTE

* Minimum overpressure = 0.07 barg at set pressure less than 1.0 barg.

Pressurized (un-vented) hot water systems have the entire discharge capacity handled solely by the valve.

Open vented systems take into account the discharge capacities of the vent. Hence the equivalent discharge of the valve/system is considered to be double the chart capacities above.

KUNKLE BAILEY 746 SAFETY RELIEF VALVE

SELECTION GUIDE

| Example: | 746 | 1 | 3 | 2 | 2 | M |
|----------------------|-------------------------|---|---|---|---|---|
| Model | | | | | | |
| 746 | 746 safety relief valve | | | | | |
| Type | | | | | | |
| 1 | Conventional | | | | | |
| 2 | Bellows | | | | | |
| 3 | Liquid conventional | | | | | |
| 4 | Liquid bellows | | | | | |
| Size | | | | | | |
| 1 | DN 25 x 40 | | | | | |
| 2 | DN 32 x 50 | | | | | |
| 3 | DN 40 x 65 | | | | | |
| 4 | DN 50 x 80 | | | | | |
| 5 | DN 65 x 100 | | | | | |
| 6 | DN 80 x 125 | | | | | |
| 7 | DN 100 x 150 | | | | | |
| Connections | | | | | | |
| 1 | PN 16 RF x PN 16 RF | | | | | |
| 2 | PN 40 RF x PN 16 RF | | | | | |
| 5 | ANSI 150 RF x 150 RF | | | | | |
| 6 | ANSI 300 RF x 150 RF | | | | | |
| Body material | | | | | | |
| 2 | Carbon steel | | | | | |
| 3 | Stainless steel | | | | | |
| Features | | | | | | |
| D | Domed cap | | | | | |
| F | Ferrule | | | | | |
| G | Gag | | | | | |
| M | Open lever | | | | | |
| N | NACE materials | | | | | |
| P | Packed lever | | | | | |
| R | Resilient seat | | | | | |
| H | High pressure | | | | | |
| X | Special details | | | | | |

NOTES

- Any special requirements will be indicated by the letter X which will be agreed with the sales office.
For example, paint specification or spring material.
- Any combination of features can be called up eg. DG, PR, DFRN etc.
- (H) for '746' DN 80 and 100 valves only.

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