



# COSPECT<sup>®</sup> STEAM PRESSURE REDUCING VALVE

MODEL COS-3/COS-16  
DUCTILE CAST IRON, CAST IRON  
STAINLESS STEEL

## Features

Technologically advanced pressure reducing valve combined with condensate separator and steam trap provides accurate control and steam conditioning to maximize process system performance.

1. Space-saving unit simplifies system layout, piping and maintenance.
2. Patented self-aligning shock-absorbing spherical piston and advanced pilot regulator designs maintain secondary steam pressure accuracy, even during adverse process conditions.
3. Built-in patented separator, with condensate separation efficiency as high as 98%, and self-modulating free float steam trap provide dry, high-quality steam supply.
4. Major internal components made of stainless steel for long service life.
5. Large surface area integral screens for pilot valve and main valve extend trouble-free service.
6. Internal secondary pressure-sensing channel makes external sensing line unnecessary.
7. COS-16, sizes 65 mm and larger have a silencer for noise reduction.



Patented

## Specifications

| Model   | COS-3   |                                    |                                     | COS-16   |   |                                     |                |                |
|---|---|------------------------------------|-------------------------------------|--|---|-------------------------------------|----------------|----------------|
| Body Material   | Cast Iron<br>(JIS FC250)<br>(Equivalent to GG-25) | Ductile Cast<br>Iron<br>(GGG-40.3) | Cast Stainless<br>Steel<br>(1.4308) | Cast Iron<br>(JIS FC250)<br>(Equivalent to GG-25)                              | Ductile Cast<br>Iron<br>(GGG-40.3)      | Cast Stainless<br>Steel<br>(1.4308) |                |                |
| Connection  | Screwed   | Flanged<br>ASME                    | Flanged<br>DIN                      | Flanged<br>DIN   | Screwed                                 | Flanged<br>ASME                     | Flanged<br>DIN | Flanged<br>DIN |
| Size  | 3/4", 1"  | DN 20, 25, 40, 50                  |                                     | 1/2", 3/4", 1"   | DN 15, 20, 25, 40, 50,<br>65*, 80*, 100 | DN 15, 20, 25,<br>40, 50            |                |                |
| Max. Operating Pressure (barg) PMO                        | 3   |                                    |                                     | 13   | 16                                      |                                     |                |                |
| Max. Operating Temperature (°C) TMO                       | 200   | 220                                |                                     | 200  | 220                                     |                                     |                |                |
| Primary Pressure Range (barg)                             | 1 – 3   |                                    |                                     | 2 – 13   | 2 – 16                                  |                                     |                |                |
| Adjustable Pressure Range<br>(all conditions must be met) | 0.1 – 0.5 barg                                    |                                    |                                     | Within 10 – 84% of primary pressure<br>but with a minimum pressure of 0.3 barg |   |                                     |                |                |
|   | –   |                                    |                                     | Differential pressure between 0.7 – 8.5 bar                                    |   |                                     |                |                |
| Minimum Adjustable Flow Rate                              | 5% of rated flow rate                             |                                    |                                     | 5% of rated flow rate<br>(For DN 65 – DN 150 : 10% of rated flow rate)         |   |                                     |                |                |

\* COS-16 flanged (DIN): cast steel DN 65, DN 80 available on request

1 bar = 0.1 MPa

PRESSURE SHELL DESIGN CONDITIONS (**NOT** OPERATING CONDITIONS):

Maximum Allowable Pressure (barg) PMA: 13 (FC250), 21 (GGG-40.3, 1.4308)

Maximum Allowable Temperature (°C) TMA: 200 (FC250), 220 (GGG-40.3, 1.4308)



To avoid abnormal operation, accidents or serious injury, DO NOT use this product outside of the specification range. Local regulations may restrict the use of this product to below the conditions quoted.

**Capacity Table**

**COS-16 with internal secondary pressure-sensing channel (factory standard) (kg/h)**

| Primary Steam Press. (barg) | Secondary "Set" Steam Press. (barg) | Nominal Valve Size (DN) |      |      |      |      |      |       |       |
|-----------------------------|-------------------------------------|-------------------------|------|------|------|------|------|-------|-------|
|                             |                                     | 15                      | 20   | 25   | 40   | 50   | 65   | 80    | 100   |
| 2                           | *1.3                                | 170                     | 240  | 340  | 670  | 920  | 1460 | 2090  | 3150  |
|                             | 1.1                                 | 180                     | 260  | 370  | 720  | 990  | 1570 | 2250  | 3400  |
|                             | 1                                   | 185                     | 270  | 380  | 730  | 1010 | 1610 | 2310  | 3480  |
|                             | 0.7                                 | 60                      | 160  | 360  | 700  | 1000 | 1600 | 2300  | 3470  |
|                             | **0.3                               | 50                      | 140  | 340  | 660  | 990  | 1590 | 2290  | 3460  |
| 3                           | *2.3                                | 190                     | 280  | 400  | 710  | 1090 | 1740 | 2500  | 3760  |
|                             | 2                                   | 200                     | 290  | 430  | 800  | 1240 | 1790 | 2820  | 4250  |
|                             | 1.5                                 | 210                     | 310  | 450  | 880  | 1370 | 2180 | 3120  | 4700  |
|                             | 1                                   | 80                      | 190  | 400  | 840  | 1300 | 2080 | 2980  | 4480  |
|                             | **0.3                               | 50                      | 140  | 340  | 740  | 1150 | 1830 | 2630  | 3950  |
| 4                           | *3.3                                | 200                     | 290  | 410  | 800  | 1250 | 1980 | 2840  | 4280  |
|                             | 3                                   | 220                     | 310  | 450  | 920  | 1420 | 2270 | 3250  | 4900  |
|                             | 2.5                                 | 230                     | 320  | 480  | 1040 | 1610 | 2570 | 3690  | 5560  |
|                             | 2                                   | 240                     | 350  | 520  | 1130 | 1750 | 2790 | 3990  | 6020  |
|                             | 1                                   | 80                      | 280  | 440  | 960  | 1490 | 2370 | 3390  | 5110  |
|                             | **0.4                               | 60                      | 150  | 390  | 850  | 1310 | 2090 | 3000  | 4510  |
| 5                           | *4.2                                | 220                     | 320  | 370  | 940  | 1460 | 2320 | 3330  | 5010  |
|                             | 4                                   | 240                     | 340  | 470  | 1030 | 1590 | 2530 | 3630  | 5470  |
|                             | 3                                   | 260                     | 380  | 590  | 1270 | 1980 | 3050 | 4510  | 6800  |
|                             | 2.5                                 | 270                     | 400  | 620  | 1350 | 2080 | 3320 | 4760  | 7170  |
|                             | 1.5                                 | 170                     | 320  | 520  | 1120 | 1730 | 2760 | 3950  | 5950  |
|                             | **0.5                               | 60                      | 150  | 410  | 890  | 1380 | 2190 | 3140  | 4730  |
| 6                           | *5                                  | 250                     | 350  | 520  | 1120 | 1740 | 2770 | 3970  | 5980  |
|                             | 4                                   | 280                     | 410  | 660  | 1420 | 2210 | 3520 | 5040  | 7590  |
|                             | 3.5                                 | 290                     | 440  | 690  | 1500 | 2330 | 3710 | 5320  | 8010  |
|                             | 3                                   | 300                     | 460  | 720  | 1560 | 2420 | 3860 | 5530  | 8330  |
|                             | 1.5                                 | 170                     | 320  | 480  | 1030 | 1600 | 2550 | 3800  | 5500  |
|                             | **0.6                               | 60                      | 150  | 420  | 920  | 1420 | 2260 | 3250  | 4890  |
| 7                           | *5.8                                | 250                     | 370  | 600  | 1300 | 2020 | 3220 | 4610  | 6940  |
|                             | 5                                   | 290                     | 450  | 720  | 1560 | 2420 | 3850 | 5520  | 8320  |
|                             | 4                                   | 330                     | 500  | 800  | 1720 | 2670 | 4260 | 6110  | 9200  |
|                             | 3.5                                 | 350                     | 510  | 820  | 1780 | 2750 | 4390 | 6290  | 9480  |
|                             | 2                                   | 200                     | 380  | 610  | 1310 | 2040 | 3250 | 4660  | 7010  |
|                             | **0.7                               | 70                      | 230  | 430  | 930  | 1450 | 2310 | 3310  | 4980  |
| 8                           | *6.7                                | 280                     | 410  | 670  | 1440 | 2230 | 3550 | 5100  | 7620  |
|                             | 6                                   | 300                     | 480  | 780  | 1680 | 2610 | 4160 | 5970  | 8980  |
|                             | 5                                   | 340                     | 540  | 870  | 1890 | 2930 | 4670 | 6690  | 10100 |
|                             | 4                                   | 400                     | 570  | 920  | 1990 | 3090 | 4920 | 7060  | 10600 |
|                             | 2                                   | 200                     | 380  | 610  | 1310 | 2040 | 3250 | 4660  | 7010  |
|                             | **0.8                               | 70                      | 160  | 410  | 900  | 1390 | 2220 | 3180  | 4780  |
| 10                          | *8.4                                | 310                     | 500  | 810  | 1750 | 2720 | 4330 | 6210  | 9360  |
|                             | 7                                   | 390                     | 630  | 1010 | 2180 | 3380 | 5390 | 7730  | 11600 |
|                             | 6                                   | 470                     | 670  | 1080 | 2340 | 3620 | 5780 | 8280  | 12500 |
|                             | 5                                   | 500                     | 700  | 1120 | 2420 | 3750 | 5990 | 8580  | 12900 |
|                             | 3                                   | 300                     | 460  | 740  | 1600 | 2480 | 3950 | 5790  | 8520  |
|                             | **1.5                               | 170                     | 320  | 480  | 970  | 1510 | 2390 | 3430  | 5170  |
| 12                          | *10                                 | 350                     | 610  | 980  | 2110 | 3270 | 5220 | 7480  | 11300 |
|                             | 8                                   | 500                     | 760  | 1230 | 2650 | 4110 | 6560 | 9400  | 14200 |
|                             | 7                                   | 570                     | 800  | 1290 | 2780 | 4310 | 6870 | 9850  | 14800 |
|                             | 6                                   | 600                     | 820  | 1320 | 2850 | 4420 | 7050 | 10100 | 15200 |
|                             | 5                                   | 500                     | 680  | 1090 | 2370 | 3670 | 5850 | 8380  | 12600 |
|                             | **3.5                               | 360                     | 550  | 890  | 1930 | 2980 | 4760 | 6820  | 10300 |
| 13                          | *10.9                               | 360                     | 650  | 1040 | 2250 | 3490 | 5560 | 7960  | 12000 |
|                             | 10                                  | 410                     | 740  | 1190 | 2560 | 3970 | 6330 | 9080  | 13700 |
|                             | 8                                   | 470                     | 850  | 1360 | 2950 | 4570 | 7290 | 10500 | 15700 |
|                             | 6.5                                 | 480                     | 880  | 1410 | 3060 | 4740 | 7550 | 10800 | 16300 |
|                             | 5.5                                 | 400                     | 730  | 1180 | 2550 | 3950 | 6290 | 9010  | 13600 |
|                             | **4.5                               | 320                     | 580  | 940  | 2020 | 3140 | 5000 | 7170  | 10800 |
| 14                          | *11.7                               | 410                     | 700  | 1120 | 2430 | 3760 | 6000 | 8590  | 12400 |
|                             | 10                                  | 540                     | 840  | 1360 | 2940 | 4550 | 7260 | 10400 | 15600 |
|                             | 8                                   | 670                     | 980  | 1490 | 3220 | 4990 | 7950 | 11400 | 17200 |
|                             | 7                                   | 730                     | 1050 | 1520 | 3280 | 5090 | 8110 | 11600 | 17500 |
|                             | 6                                   | 600                     | 840  | 1240 | 2690 | 4170 | 6650 | 9530  | 14300 |
|                             | **5.5                               | 550                     | 770  | 1130 | 2450 | 3790 | 6040 | 8660  | 13000 |
| 16                          | *13.4                               | 470                     | 790  | 1270 | 2740 | 4250 | 6770 | 9710  | 14600 |
|                             | 10                                  | 730                     | 1100 | 1650 | 3560 | 5520 | 8800 | 12600 | 19000 |
|                             | 9                                   | 790                     | 1200 | 1750 | 3650 | 5660 | 9030 | 12900 | 19500 |
|                             | 8                                   | 880                     | 1300 | 2000 | 3710 | 5750 | 9170 | 13100 | 19800 |
|                             |                                     | **7.5                   | 820  | 1250 | 1800 | 3400 | 5260 | 8390  | 12000 |

\*Maximum adjustable secondary pressure \*\* Minimum adjustable secondary pressure

1 bar = 0.1 MPa

### Capacity Table

#### COS-16 with external secondary pressure-sensing line (optional) (kg/h)

| Primary Steam Press. (barg) | Secondary "Set" Steam Press. (barg) | Nominal Valve Size (DN) |      |      |      |      |      |       |       |
|-----------------------------|-------------------------------------|-------------------------|------|------|------|------|------|-------|-------|
|                             |                                     | 15                      | 20   | 25   | 40   | 50   | 65   | 80    | 100   |
| 2                           | *1.3                                | 170                     | 240  | 340  | 670  | 920  | 1460 | 2090  | 3150  |
|                             | 1.1                                 | 180                     | 260  | 370  | 720  | 990  | 1570 | 2250  | 3400  |
|                             | **0.3 - 1                           | 185                     | 270  | 380  | 730  | 1010 | 1610 | 2310  | 3480  |
| 3                           | *2.3                                | 190                     | 280  | 400  | 710  | 1090 | 1740 | 2500  | 3760  |
|                             | 2                                   | 200                     | 290  | 430  | 800  | 1240 | 1790 | 2820  | 4250  |
|                             | **0.3 - 1.5                         | 210                     | 310  | 450  | 880  | 1370 | 2180 | 3120  | 4700  |
| 4                           | *3.3                                | 200                     | 290  | 410  | 800  | 1250 | 1980 | 2840  | 4280  |
|                             | 3                                   | 220                     | 310  | 450  | 920  | 1420 | 2270 | 3250  | 4900  |
|                             | 2.5                                 | 230                     | 320  | 480  | 1040 | 1610 | 2570 | 3690  | 5560  |
|                             | **0.4 - 2                           | 240                     | 350  | 520  | 1130 | 1750 | 2790 | 3990  | 6020  |
| 5                           | *4.2                                | 220                     | 320  | 370  | 940  | 1460 | 2320 | 3330  | 5010  |
|                             | 4                                   | 240                     | 340  | 470  | 1030 | 1590 | 2530 | 3630  | 5470  |
|                             | 3                                   | 260                     | 380  | 590  | 1270 | 1980 | 3050 | 4510  | 6800  |
|                             | **0.5 - 2.5                         | 270                     | 400  | 620  | 1350 | 2080 | 3320 | 4760  | 7170  |
| 6                           | *5                                  | 250                     | 350  | 520  | 1120 | 1740 | 2770 | 3970  | 5980  |
|                             | 4                                   | 280                     | 410  | 660  | 1420 | 2210 | 3520 | 5040  | 7590  |
|                             | 3.5                                 | 290                     | 440  | 690  | 1500 | 2330 | 3710 | 5320  | 8010  |
|                             | **0.6 - 3                           | 300                     | 460  | 720  | 1560 | 2420 | 3860 | 5530  | 8330  |
| 7                           | *5.8                                | 250                     | 370  | 600  | 1300 | 2020 | 3220 | 4610  | 6940  |
|                             | 5                                   | 290                     | 450  | 720  | 1560 | 2420 | 3850 | 5520  | 8320  |
|                             | 4                                   | 330                     | 500  | 800  | 1720 | 2670 | 4260 | 6110  | 9200  |
|                             | *0.7 - 3.5                          | 350                     | 510  | 820  | 1780 | 2750 | 4390 | 6290  | 9480  |
| 8                           | *6.7                                | 280                     | 410  | 670  | 1440 | 2230 | 3550 | 5100  | 7620  |
|                             | 6                                   | 300                     | 480  | 780  | 1680 | 2610 | 4160 | 5970  | 8980  |
|                             | 5                                   | 340                     | 540  | 870  | 1890 | 2930 | 4670 | 6690  | 10100 |
|                             | **0.8 - 4                           | 400                     | 570  | 920  | 1990 | 3090 | 4920 | 7060  | 10600 |
| 10                          | *8.4                                | 310                     | 500  | 810  | 1750 | 2720 | 4330 | 6210  | 9360  |
|                             | 7                                   | 390                     | 630  | 1010 | 2180 | 3380 | 5390 | 7730  | 11600 |
|                             | 6                                   | 470                     | 670  | 1080 | 2340 | 3620 | 5780 | 8280  | 12500 |
|                             | **1.5 - 5                           | 500                     | 700  | 1120 | 2420 | 3750 | 5990 | 8580  | 12900 |
| 12                          | *10                                 | 350                     | 610  | 980  | 2110 | 3270 | 5220 | 7480  | 11300 |
|                             | 8                                   | 500                     | 760  | 1230 | 2650 | 4110 | 6560 | 9400  | 14200 |
|                             | 7                                   | 570                     | 800  | 1290 | 2780 | 4310 | 6870 | 9850  | 14800 |
|                             | **3.5 - 6                           | 600                     | 820  | 1320 | 2850 | 4420 | 7050 | 10100 | 15200 |
| 13                          | *10.9                               | 360                     | 650  | 1040 | 2250 | 3490 | 5560 | 7960  | 12000 |
|                             | 10                                  | 410                     | 740  | 1190 | 2560 | 3970 | 6330 | 9080  | 13700 |
|                             | 8                                   | 470                     | 850  | 1360 | 2950 | 4570 | 7290 | 10500 | 15700 |
|                             | **4.5 - 6.5                         | 480                     | 880  | 1410 | 3060 | 4740 | 7550 | 10800 | 16300 |
| 14                          | *11.7                               | 410                     | 700  | 1120 | 2430 | 3760 | 6000 | 8590  | 12400 |
|                             | 10                                  | 540                     | 840  | 1360 | 2940 | 4550 | 7260 | 10400 | 15600 |
|                             | 8                                   | 670                     | 980  | 1490 | 3220 | 4990 | 7950 | 11400 | 17200 |
|                             | **5.5 - 7                           | 730                     | 1050 | 1520 | 3280 | 5090 | 8110 | 11600 | 17500 |
| 16                          | *13.4                               | 470                     | 790  | 1270 | 2740 | 4250 | 6770 | 9710  | 14600 |
|                             | 10                                  | 730                     | 1100 | 1650 | 3560 | 5520 | 8800 | 12600 | 19000 |
|                             | 9                                   | 790                     | 1200 | 1750 | 3650 | 5660 | 9030 | 12900 | 19500 |
|                             | **7.5 - 8                           | 880                     | 1300 | 2000 | 3710 | 5750 | 9170 | 13100 | 19800 |

\* Maximum adjustable secondary pressure \*\* Minimum adjustable secondary pressure

1 bar = 0.1 MPa

#### COS-3 with internal or external secondary pressure-sensing channel or line

| Pressure Sensing Method                     | Primary steam Pressure (barg) | Secondary "Set" steam Pressure (bar) | Nominal Valve Size (DN) |     |     |     |
|---|-------------------------------|--------------------------------------|-------------------------|-----|-----|-----|
|   |                               |                                      | 20                      | 25  | 40  | 50  |
| Internal sensing channel (factory standard) | 1 to less than 2              | *0.5                                 | 120                     | 180 | 750 | 950 |
|   |                               | 0.4                                  | 130                     | 190 | 700 | 920 |
|   |                               | 0.3                                  | 135                     | 195 | 680 | 900 |
|   |                               | 0.2                                  | 140                     | 200 | 500 | 690 |
|   |                               | **0.1                                | 100                     | 180 | 380 | 500 |
|   | 2 - 3                         | *0.5                                 | 240                     | 340 | 750 | 950 |
|   |                               | 0.4                                  | 230                     | 330 | 700 | 920 |
|   |                               | 0.3                                  | 220                     | 320 | 680 | 900 |
|   |                               | 0.2                                  | 160                     | 250 | 500 | 690 |
|   |                               | **0.1                                | 100                     | 180 | 380 | 500 |
| External sensing line (optional)            | 1 to less than 2              | *0.5 - **0.1                         | 120                     | 180 | 750 | 950 |
|   | 2 - 3                         | *0.5 - **0.1                         | 240                     | 340 | 750 | 950 |

\* Maximum adjustable pressure \*\* Minimum adjustable pressure

1 bar = 0.1 MPa

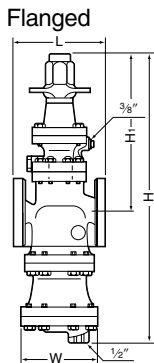
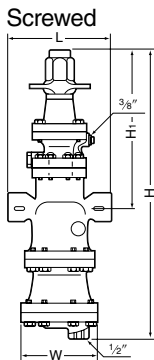
**Cv & Kvs Values**

|           | Nominal Valve Size (DN) |     |      |      |      |      |      |     |
|-----------|-------------------------|-----|------|------|------|------|------|-----|
|           | 15                      | 20  | 25   | 40   | 50   | 65   | 80   | 100 |
| Kvs (DIN) | 3.3                     | 5.9 | 9.5  | 20.6 | 31.9 | 50.8 | 72.9 | 110 |
| Cv (UK)   | 3.2                     | 5.7 | 9.2  | 20.0 | 31.0 | 49.4 | 70.8 | 107 |
| Cv (US)   | 3.8                     | 6.9 | 11.1 | 24.0 | 37.2 | 59.3 | 85.0 | 128 |

**CAUTION** The Cv & Kvs values shown are for the valve in the full fail open position. These values are not to be used for COS sizing, and instead may be used as one of the factors in calculations for safety valve selection.

**Dimensions**

**• COS-3 / COS-16**



Note:  
 Sizes 1/2" - 1" and  
 DN 15 - 25 shown.  
 Configuration of larger  
 sizes differs slightly.

**COS-3 / COS-16 Screwed\*** (mm)

| Size    | L   | H   | H <sub>1</sub> | W   | Weight (kg) |
|---------|-----|-----|----------------|-----|-------------|
| 1/2" ** | 175 | 495 | 285            | 105 | 14          |
| 3/4"    |     |     |                |     | 19          |
| 1"      | 190 | 522 | 289            | 150 | 19          |

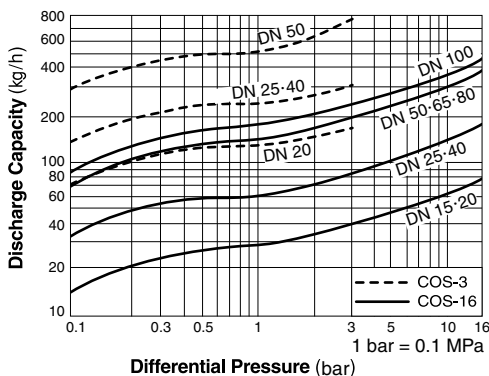
\* BSP DIN 2999, other standards available  
 \*\* COS-16 only

**COS-3 / COS-16 Flanged** (mm)

| DN     | L        |            |         |       |         | H    | H <sub>1</sub> | W   | Weight* (kg) |
|--------|----------|------------|---------|-------|---------|------|----------------|-----|--------------|
|        | DIN 2501 | ASME Class |         |       |         |      |                |     |              |
|        | PN25/40  | 125FF      | (150RF) | 250RF | (300RF) |      |                |     |              |
| (15)** | 150      | -          | 170     | -     | 170     | 495  | 285            | 105 | 16           |
| (20)   | 150      | -          | 182     | -     | 182     |      |                |     | 17           |
| 25     | 160      | 176        | 188     | 188   | 192     | 522  | 282            | 150 | 22           |
| 40     | 200      | 209        | 220     | 222   | 224     | 572  | 302            | 165 | 28           |
| 50     | 230      | 255        | 255     | 260   | 261     | 635  | 315            | 195 | 43           |
| 65**   | 370      | 362        | 372     | 377   | 378     | 870  | 411            | 280 | 65           |
| 80**   | 374      | 365        | 374     | 383   | 384     |      |                |     | 67           |
| 100**  | 434      | 434        | 434     | 450   | 450     | 1028 | 448            | 350 | 92           |

( ) No ASME standard exists for cast iron; machined to fit steel flanges  
 Class 125 FF can connect to 150 RF, 250 RF can connect to 300 RF  
 Other standards available, but length and weight may vary  
 \* Weight is for PN 25/40 (ductile cast iron)  
 \*\* COS-16 only  
 Flange to flange dimension of DN 15 and DN 65-100, not according to DIN  
 standard, due to size of separator and steam trap.

**Trap Discharge Capacity**



Note: 1. The discharge capacity is the maximum continuous condensate discharge 6 °C below saturated steam temperature.  
 2. The differential pressure is the difference between the COS inlet and its trap outlet pressure.

**CAUTION** DO NOT use this product under conditions that exceed maximum differential pressure, as condensate backup will occur!

Manufacturer

ISO 9001/ISO 14001

**TLV**® CO., LTD.  
 Kakogawa, Japan  
 is approved by LRQA Ltd. to ISO 9001/14001

