

# Type 1290 Vapor Recovery Regulator



P2103\_1

Figure 1. Type 1290 Vapor Recovery Regulator

## Features

- **Quick-Change Trim Package** — Tested trim packages can be ordered and stocked ahead of time for fast replacement.
- **Easy In-Line Maintenance** — Top-entry design reduces maintenance time and manpower requirements; trim parts can be inspected, cleaned and replaced without removing the body from the line.
- **In-Service Travel Inspection** — Standard travel indicator assembly with protective cover permits periodic inspection of plug travel without removing regulator from service.
- **High Accuracy** — Total proportional band of 0.25 in. w.c. / 0.62 mbar or less at lower set pressures.
- **Proven Technology** — Time-proven regulator technology has been adapted to meet the specific requirements of vapor recovery (depadding) applications.

## Introduction

The Type 1290 vapor recovery regulator controls vessel blanketing gas pressure when the vessel is being filled with fluid or when ambient temperature causes the vapor gas to expand. The system monitors the increasing blanket pressure and throttles open to pass excess blanketing gas into a vapor disposal or reclamation system thus controlling the desired set pressure of the vessel.

### Note

**The vapor recovery regulator is not intended to be used as an ASME certified relief device for overpressure protection.**

The vapor recovery regulator responds to any changes in the blanket gas pressure and throttles open or closed to control the flow of the blanket gas out of the vessel. A vacuum source on the outlet of the regulator is usually necessary to ensure flow of low pressure blanket gas out of the vessel into a vapor disposal or reclamation system. The higher the vacuum pressure of the vacuum source, the higher the flow capacity of the vapor recovery regulator.

# Bulletin 74.2:1290

## Specifications

This section lists the specifications for the Type 1290 vapor recovery regulator. Specifications for a given regulator as it originally comes from the factory are stamped on the regulator nameplate located on the actuator, while the pilot control spring range appears on the pilot spring case nameplate.

### Body Size and End Connection Styles<sup>(1)</sup>

| BODY SIZE,<br>NPS / DN                      | TYPE EGR MAIN VALVE END CONNECTION STYLE |  |
|---|--|--|
|   | Cast Iron                                | WCC Steel or<br>CF8M Stainless steel                                     |
| 1 or 2 /<br>25 or 50                        | NPT, CL125 FF or<br>CL250 RF flanged     | NPT, SWE, BWE, CL150 RF,<br>CL300 RF, CL600 RF<br>or PN 16/25/40 flanged |
| 3, 4, or 6 /<br>80, 100 or 150              | CL125 FF or<br>CL250 RF flanged          | BWE, CL150 RF, CL300 RF,<br>CL600 RF or PN 16 flanged                    |
| 8 x 6 or 12 x 6 /<br>200 x 150 or 300 x 150 | ----                                     | BWE, CL150 RF,<br>CL300 RF, CL600 RF<br>or PN 25 flanged                 |

### Construction Materials

See Table 1

### Maximum Inlet Pressures (Type EGR Main Valve)<sup>(2)</sup>

See Table 3

### Maximum Differential Pressure

35 psi / 2.4 bar

### Control Pressure Ranges (Type T208P or T208PL Pilot)<sup>(2)</sup>

See Table 2

### Type MR95H Supply Pressure Settings

| PILOT<br>TYPE | TYPE EGR MAIN VALVE WITH<br>GREEN SPRING, NPS / DN |                                  | SPRING<br>COLOR |
|---------------|--|----------------------------------|-----------------|
|               | 1, 2, 3 or 4 /<br>25, 50, 80 or 100                | 6 or 8 x 6 /<br>150 or 200 x 150 |                 |
| T208PL        | 8 psig / 0.55 bar                                  | 13 psig / 0.90 bar               | Black           |
| T208P         | 8 psig / 0.55 bar                                  | 13 psig / 0.90 bar               | Orange          |
|               | 8 psig / 0.55 bar                                  | 13 psig / 0.90 bar               | Red             |
|               | 9 psig / 0.62 bar                                  | 14 psig / 0.97 bar               | Unpainted       |
|               | 10 psig / 0.69 bar                                 | 14 psig / 0.97 bar               | Yellow          |
|               | 11 psig / 0.76 bar                                 | 15 psig / 1.0 bar                | Green           |
|               | 14 psig / 0.97 bar                                 | 18 psig / 1.2 bar                | Light blue      |
|               | 15 psig / 1.0 bar                                  | 20 psig / 1.4 bar                | Black           |

### Type T208P or T208PL Pilot Orifice Diameter

3/8 in. / 9.5 mm

### Flow Capacities

See Table 5

### Flow Coefficients

See Table 6

### Control Line Connection

1/2 NPT

### Exhaust Line Connection

3/4 NPT

### Supply Pressure and Spring Case Connections

1/4 NPT

### Orifice Diameters and Travels

| BODY SIZE |           | PORT DIAMETER |     | TRAVEL |    |
|-----------|-----------|---------------|-----|--------|----|
| NPS       | DN        | In.           | mm  | In.    | mm |
| 1         | 25        | 1-5/16        | 33  | 3/4    | 19 |
| 2         | 50        | 2-3/8         | 60  | 1-1/8  | 29 |
| 3         | 80        | 3-3/8         | 86  | 1-1/2  | 38 |
| 4         | 100       | 4-3/8         | 111 | 2      | 51 |
| 6         | 150       | 7-3/16        | 183 | 2      | 51 |
| 8 x 6     | 200 x 150 | 7-3/16        | 183 | 2      | 51 |
| 12 x 6    | 300 x 150 | 7-3/16        | 183 | 2      | 51 |

### Main Valve Material Temperature Capabilities<sup>(2)</sup>

#### Nitrile (NBR):

-20 to 180°F / -29 to 82°C

#### Fluorocarbon (FKM):

For In. w.c. Setpoints: 40 to 300°F / 4 to 149°C

For psig Setpoints: 0 to 300°F / -18 to 149°C

#### Ethylene propylene (EPDM):

-20 to 275°F / -29 to 135°C

#### Perfluoroelastomer (FFKM):

-20 to 300°F / -29 to 149°C

### Pilot Temperature Capabilities

See Table 4

### Approximate Weights

**NPS 1 / DN 25:** 85 lbs / 39 kg

**NPS 2 / DN 50:** 100 lbs / 45 kg

**NPS 3 / DN 80:** 145 lbs / 66 kg

**NPS 4 / DN 100:** 195 lbs / 88 kg

**NPS 6 / DN 150:** 380 lbs / 172 kg

**NPS 8 x 6 / DN 200 x 150:** 740 lbs / 336 kg

**NPS 12 x 6 / DN 300 x 150:** 1265 lbs / 574 kg

1. End connections for other than U.S. standards can usually be provided. Consult your local Sales Office.

2. The pressure/temperature limits in this Bulletin and any applicable standard or code limitation should not be exceeded.

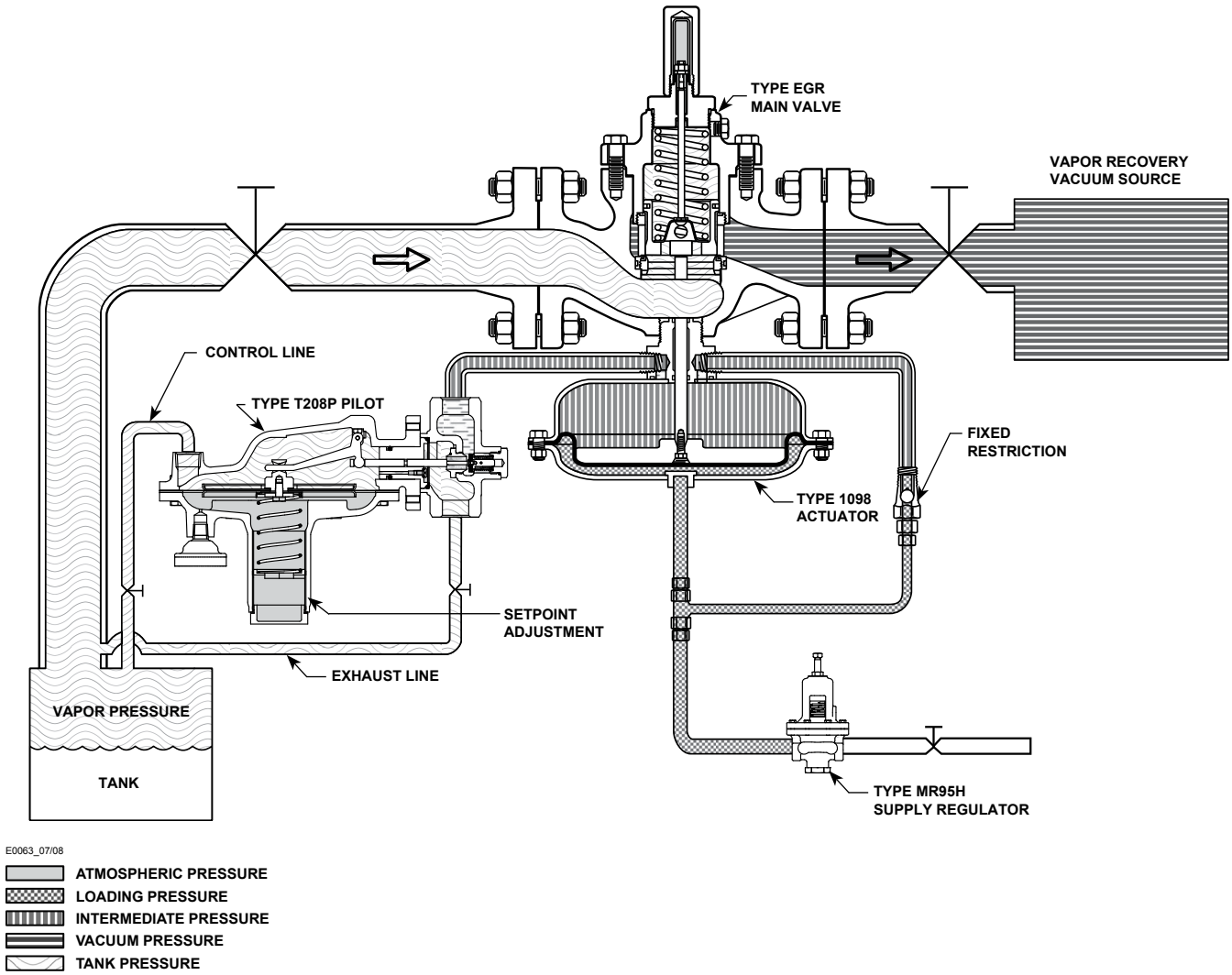


Figure 2. Operational Schematic

Table 1. Construction Materials (Refer to Table 9 for Reference on Material Compatibility)<sup>(1)</sup>

| MAIN VALVE           |                     |                |  | SIZE 40 ACTUATOR | PILOT                | SUPPLY REGULATOR     | DIAPHRAGM   | O-RING AND SEAL  |
|----------------------|---------------------|----------------|--|------------------|----------------------|----------------------|---|--|
| Body and Body Flange | Plug and Seat Ring  | Spring         | Cage                                   |                  |                      |                      |   |  |
| Cast iron            | 416 Stainless steel | Steel          | Cast iron                              | Steel            | Cast iron            | Cast iron            | Nitrile (NBR), Fluorocarbon (FKM), Fluorinated Ethylene Propylene (FEP) or Ethylenepropylene (EPDM) | Nitrile (NBR), Fluorocarbon (FKM), Ethylenepropylene (EPDM) or Perfluoroelastomer (FFKM) |
| WCC Steel            | 416 Stainless steel | Steel          | Steel                                  | Steel            | WCC Steel            | WCC Steel            |   |  |
| CF8M Stainless steel | 316 Stainless steel | Inconel® X-750 | 316 Stainless steel Whisper Trim™ Cage | Stainless steel  | CF3M Stainless steel | CF8M Stainless steel |   |  |

1. Special construction materials are offered for your system compatibility. Contact your local Sales Office for additional information.

## Principle of Operation

The Type 1290 vapor recovery regulator serves as a vessel vapor recovery system. The Type 1290 regulator controls vessel blanketing gas pressure when the vessel is being filled with fluid or when ambient temperature causes the vapor gas to expand.

The system monitors the increasing blanket pressure and throttles open to pass excess blanketing gas into a vapor recovery system thus controlling the desired set pressure of the vessel.

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# Bulletin 74.2:1290

**Table 2. Control Pressure Ranges**

| PILOT TYPE | CONTROL PRESSURE RANGES <sup>(1)</sup>            | SPRING COLOR | SPRING PART NUMBER | BUILDUP TO WIDE-OPEN (TYPE EGR MAIN VALVE) | SPRING WIRE DIAMETER |      | SPRING FREE LENGTH |      |
|------------|---|--------------|--------------------|--|----------------------|------|--------------------|------|
|            |   |              |                    |  | In.                  | mm   | In.                | mm   |
| T208PL     | 0.5 to 1.5 in. w.c. / 1 to 4 mbar <sup>(2)</sup>  | Black        | 1B413627222        | 0.25 in. w.c. / 0.60 mbar                  | 0.075                | 1.90 | 2.19               | 56.0 |
| T208P      | 1 to 2.5 in. w.c. / 2 to 6 mbar <sup>(2)(3)</sup> | Orange       | 1B558527052        | 0.25 in. w.c. / 0.60 mbar                  | 0.072                | 1.83 | 3.25               | 83   |
|            | 2 to 7 in. w.c. / 5 to 17 mbar <sup>(2)(4)</sup>  | Red          | 1B653827052        | 0.25 in. w.c. / 0.60 mbar                  | 0.085                | 2.20 | 3.63               | 92.0 |
|            | 4 to 14 in. w.c. / 10 to 35 mbar                  | Unpainted    | 1B653927022        | 0.25 in. w.c. / 0.60 mbar                  | 0.100                | 2.70 | 3.75               | 95.0 |
|            | 0.5 to 1.2 psig / 35 to 83 mbar                   | Yellow       | 1B537027052        | 1.4 in. w.c. / 3 mbar                      | 0.114                | 2.90 | 4.31               | 109  |
|            | 1.0 to 2.5 psig / 0.07 to 0.17 bar                | Green        | 1B537127022        | 2.8 in. w.c. / 7 mbar                      | 0.156                | 4.00 | 4.06               | 103  |
|            | 2.5 to 4.5 psig / 0.17 to 0.31 bar                | Light blue   | 1B537227022        | 4.2 in. w.c. / 10 mbar                     | 0.187                | 4.80 | 3.94               | 100  |
|            | 4.5 to 7 psig / 0.31 to 0.48 bar                  | Black        | 1B537327052        | 5.5 in. w.c. / 14 mbar                     | 0.218                | 5.40 | 3.98               | 101  |

1. Spring ranges based on pilot being installed with the spring case pointed down.  
 2. Do not use Fluorocarbon (FKM) diaphragm with this spring at diaphragm temperatures lower than 60°F / 16°C.  
 3. When using a Fluorocarbon (FKM) diaphragm, the minimum outlet pressure is 2 in. w.c. / 5 mbar.  
 4. When using a Fluorocarbon (FKM) diaphragm, the minimum outlet pressure is 2.5 in. w.c. / 6 mbar.

**Table 3. Maximum Main Valve Inlet Pressures**

| PILOT TYPE | MAXIMUM INLET PRESSURE, psig / bar    |                          |                          |                |   | SPRING COLOR |
|------------|---------------------------------------|--------------------------|--------------------------|----------------|---|--------------|
|            | Type EGR Main Valve with Green Spring |                          |                          |                |   |              |
|            | NPS 1 / DN 25                         | NPS 2 / DN 50            | NPS 3 / DN 80            | NPS 4 / DN 100 | NPS 6, 8 x 6 or 12 x 6 / DN 150, 200 x 150 or 300 x 150 |              |
| T208PL     | 5.5 / 0.38                            | 5 / 0.35                 | 4 / 0.28                 | 3 / 0.21       | 3.5 / 0.24  | Black        |
| T208P      | 5.5 / 0.38                            | 5 / 0.35                 | 4 / 0.28                 | 3 / 0.21       | 3.5 / 0.24  | Orange       |
|            | 5.5 / 0.38                            | 5 / 0.35                 | 4 / 0.28                 | 3 / 0.21       | 3.5 / 0.24  | Red          |
|            | 6.5 / 0.45                            | 6 / 0.41                 | 5 / 0.35                 | 4 / 0.28       | 4.5 / 0.31  | Unpainted    |
|            | 7.5 / 0.52                            | 7 / 0.48                 | 6 / 0.41                 | 5 / 0.35       | 4.5 / 0.31  | Yellow       |
|            | 8.5 / 0.59                            | 8 / 0.55                 | 7 / 0.48                 | 6 / 0.41       | 5.5 / 0.38  | Green        |
|            | 11.5 / 0.79 <sup>(1)</sup>            | 11 / 0.76 <sup>(1)</sup> | 10 / 0.69                | 9 / 0.62       | 8.5 / 0.59  | Light Blue   |
|            | 12.5 / 0.86 <sup>(1)</sup>            | 12 / 0.83 <sup>(1)</sup> | 11 / 0.76 <sup>(1)</sup> | 10 / 0.69      | 10.5 / 0.72 <sup>(1)</sup>                              | Black        |

1. For Fluorinated Ethylene Propylene (FEP) Pilot Diaphragm, the maximum inlet pressure is 10 psig / 0.69 bar.

**Table 4. Diaphragm Material Selection Information**

| TRIM OPTION CODE | DIAPHRAGM MATERIAL                   | DISK AND O-RING MATERIAL        | OPERATING TEMPERATURE RANGE |
|------------------|--------------------------------------|---------------------------------|-----------------------------|
| Standard         | Nitrile (NBR)                        | Nitrile (NBR)                   | -40 to 180°F / -40 to 82°C  |
| VV               | Fluorocarbon (FKM)                   | Fluorocarbon (FKM)              | 40 to 300°F / 4 to 149°C    |
| TN               | Fluorinated Ethylene Propylene (FEP) | Nitrile (NBR)                   | -20 to 180°F / -29 to 82°C  |
| TV               | Fluorinated Ethylene Propylene (FEP) | Fluorocarbon (FKM)              | 40 to 180°F / 4 to 82°C     |
| TK               | Fluorinated Ethylene Propylene (FEP) | Perfluoroelastomer (FFKM)       | 0 to 180°F / -18 to 82°C    |
| TE               | Fluorinated Ethylene Propylene (FEP) | Ethylene Propylene Diene (EPDM) | -20 to 180°F / -29 to 82°C  |

**Table 5. Flow Capacities for Type 1290 Vapor Recovery Regulators**

| PILOT TYPE        | PILOT SPRING COLOR    | CONTROL PRESSURE          | BUILDUP OVER CONTROL PRESSURE TO WIDE-OPEN <sup>(1)</sup> | DOWNSTREAM VACUUM PRESSURE | CAPACITIES IN SCFH / Nm <sup>3</sup> /h OF 0.97 SPECIFIC GRAVITY NITROGEN |        |                    |        |                    |         |                     |         |                     |      |
|-------------------|-----------------------|---------------------------|---|----------------------------|---|--------|--------------------|--------|--------------------|---------|---------------------|---------|---------------------|------|
|                   |                       |                           |   |                            | NPS 1 / DN 25 Body  |        | NPS 2 / DN 50 Body |        | NPS 3 / DN 80 Body |         | NPS 4 / DN 100 Body |         | NPS 6 / DN 150 Body |      |
| T208P             | Black                 | 0.5 in. w.c. / 1 mbar     | 0.25 in. w.c. / 0.60 mbar                                 | 0 psig / 0 bar             | 600   | 16.1   | 2300               | 61.6   | 4900               | 131     | 7600                | 204     | 14,600              | 391  |
|                   |                       |                           |   | 2.5 psig / 0.17 bar        | 5600  | 150    | 19,900             | 533    | 43,200             | 1158    | 66,900              | 1793    | 124,500             | 3337 |
|                   | 5 psig / 0.34 bar     | 7300                      | 196   | 25,800                     | 691   | 55,700 | 1493               | 86,700 | 2324               | 160,600 | 4304                |         |                     |      |
|                   | Orange                | 1 in. w.c. / 2 mbar       | 0.25 in. w.c. / 0.60 mbar                                 | 0 psig / 0 bar             | 700   | 18.8   | 2700               | 72.4   | 5900               | 158     | 9200                | 247     | 17,700              | 474  |
|                   |                       |                           |   | 2.5 psig / 0.17 bar        | 5700  | 153    | 10,000             | 268    | 43,200             | 1158    | 67,000              | 1796    | 126,700             | 3396 |
|                   |                       |                           |   | 5 psig / 0.34 bar          | 7400  | 198    | 25,900             | 694    | 55,800             | 1495    | 86,800              | 2326    | 160,800             | 4309 |
|                   | Unpainted             | 2 in. w.c. / 5 mbar       | 0.25 in. w.c. / 0.60 mbar                                 | 0 psig / 0 bar             | 1100  | 29.5   | 3900               | 105    | 8400               | 225     | 13,000              | 348     | 25,000              | 670  |
|                   |                       |                           |   | 2.5 psig / 0.17 bar        | 5800  | 155    | 20,200             | 541    | 43,500             | 1166    | 67,600              | 1812    | 127,700             | 3422 |
|                   |                       |                           |   | 5 psig / 0.34 bar          | 7400  | 198    | 26,000             | 697    | 56,000             | 1501    | 87,200              | 2337    | 161,500             | 4328 |
|                   |                       | 8 in. w.c. / 20 mbar      | 0.25 in. w.c. / 0.60 mbar                                 | 0 psig / 0 bar             | 1500  | 40.2   | 5300               | 142    | 11,500             | 308     | 17,800              | 477     | 34,200              | 917  |
|                   |                       |                           |   | 2.5 psig / 0.17 bar        | 5800  | 155    | 20,500             | 549    | 44,100             | 1182    | 68,500              | 1836    | 129,400             | 3468 |
|                   |                       |                           |   | 5 psig / 0.34 bar          | 7500  | 201    | 26,300             | 705    | 56,600             | 1517    | 88,100              | 2361    | 162,200             | 4347 |
|                   | 14 in. w.c. / 35 mbar | 0.25 in. w.c. / 0.60 mbar | 0 psig / 0 bar  | 2100                       | 56.3  | 7400   | 198                | 16,000 | 429                | 24,800  | 665                 | 47,600  | 1276                |      |
|                   |                       |                           | 2.5 psig / 0.17 bar                                       | 6000                       | 161   | 21,000 | 563                | 45,300 | 1214               | 70,400  | 1887                | 132,800 | 3559                |      |
| 5 psig / 0.34 bar |                       |                           | 7600  | 204                        | 26,800  | 718    | 57,700             | 1546   | 89,800             | 2407    | 166,200             | 4454    |                     |      |
| Yellow            | 1 psig / 0.07 bar     | 0.05 psig / 3 mbar        | 0 psig / 0 bar  | 4000                       | 107   | 14,100 | 378                | 30,500 | 817                | 47,200  | 1265                | 90,300  | 2420                |      |
|                   |                       |                           | 2.5 psig / 0.17 bar                                       | 6800                       | 182   | 23,900 | 641                | 51,400 | 1378               | 79,900  | 2141                | 150,100 | 4023                |      |
| 5 psig / 0.34 bar | 8100                  | 217                       | 28,700  | 769                        | 61,800  | 1656   | 96,200             | 2578   | 177,200            | 4749    |                     |         |                     |      |
| Light blue        | 3 psig / 0.21 bar     | 0.15 psig / 10 mbar       | 0 psig / 0 bar  | 7000                       | 188   | 24,700 | 662                | 53,200 | 1426               | 82,500  | 2211                | 155,800 | 4175                |      |
|                   |                       |                           | 2.5 psig / 0.17 bar                                       | 8700                       | 233   | 30,600 | 820                | 66,000 | 1769               | 102,700 | 2752                | 190,700 | 5111                |      |
|                   |                       |                           | 5 psig / 0.34 bar   | 9600                       | 257   | 34,100 | 914                | 73,400 | 1967               | 114,600 | 3071                | 209,100 | 5604                |      |
| 5 psig / 0.34 bar | 0.15 psig / 10 mbar   | 0 psig / 0 bar            | 9100  | 244                        | 31,900  | 855    | 68,600             | 1838   | 106,700            | 2860    | 199,500             | 5347    |                     |      |
|                   |                       | 2.5 psig / 0.17 bar       | 10,200  | 273                        | 36,300  | 973    | 78,100             | 2093   | 121,600            | 3259    | 224,000             | 6003    |                     |      |
| 5 psig / 0.34 bar | 11,000                | 295                       | 39,000  | 1045                       | 83,900  | 2249   | 131,000            | 3511   | 327,400            | 8774    |                     |         |                     |      |
| Black             | 7 psig / 0.48 bar     | 0.20 psig / 14 mbar       | 0 psig / 0 bar  | 10,800                     | 289   | 38,200 | 1024               | 82,200 | 2203               | 127,900 | 3428                | 237,100 | 6354                |      |
|                   |                       |                           | 2.5 psig / 0.17 bar                                       | 11,700                     | 314   | 41,600 | 1115               | 89,500 | 2399               | 139,700 | 3744                | 255,300 | 6842                |      |
| 5 psig / 0.34 bar | 12,300                | 330                       | 43,800  | 1174                       | 94,200  | 2525   | 147,300            | 3948   | 265,100            | 7105    |                     |         |                     |      |

1. Increased capacity is available at higher buildups.

Table 6. Flow Coefficients

| BODY SIZE,<br>NPS / DN | PIPING STYLE                      |            |                |            |                |                                 |                |            |                |      |                |                |
|------------------------|-----------------------------------|------------|----------------|------------|----------------|---------------------------------|----------------|------------|----------------|------|----------------|----------------|
|                        | Line Size Equals Body Size Piping |            |                |            |                |                                 |                |            |                |      |                |                |
|                        | Linear Cage                       |            |                |            |                | Drilled Hole Whisper Trim™ Cage |                |            |                |      |                |                |
|                        | C <sub>g</sub>                    |            | C <sub>v</sub> |            | C <sub>i</sub> | K <sub>m</sub>                  | C <sub>g</sub> |            | C <sub>v</sub> |      | C <sub>i</sub> | K <sub>m</sub> |
| Regulating             | Wide-Open                         | Regulating | Wide-Open      | Regulating |                |                                 | Wide-Open      | Regulating | Wide-Open      |      |                |                |
| 1 / 25                 | 600                               | 632        | 16.8           | 17.7       | 35.7           | 0.70                            | 576            | 607        | 16.7           | 17.6 | 34.5           | 0.80           |
| 2 / 50                 | 2280                              | 2400       | 63.3           | 66.7       | 36.0           |                                 | 1970           | 2080       | 54.7           | 57.8 | 36.0           |                |
| 3 / 80                 | 4630                              | 4880       | 132            | 139        | 35.1           |                                 | 3760           | 3960       | 107            | 113  | 35.0           |                |
| 4 / 100                | 7320                              | 7710       | 202            | 213        | 36.2           |                                 | 6280           | 6610       | 180            | 190  | 34.8           |                |
| 6 / 150                | 12,900                            | 13,600     | 397            | 418        | 32.5           |                                 | 9450           | 9950       | 295            | 310  | 32.0           |                |
| 8 x 6 /<br>200 x 150   | 18,480                            | 19,450     | 578            | 608        | 32.0           |                                 | 10,660         | 11,220     | 305            | 321  | 35.0           |                |
| 12 x 6 /<br>300 x 150  | 21,180                            | 22,290     | 662            | 697        | 32.0           |                                 | 11,050         | 11,630     | 316            | 332  | 35.0           |                |

| BODY SIZE,<br>NPS / DN | PIPING STYLE                      |            |                |            |                |                                |                |            |                |      |                |                |
|------------------------|-----------------------------------|------------|----------------|------------|----------------|--------------------------------|----------------|------------|----------------|------|----------------|----------------|
|                        | 2:1 Line Size to Body Size Piping |            |                |            |                |                                |                |            |                |      |                |                |
|                        | Standard Linear Cage              |            |                |            |                | Drilled Hole Whisper Trim Cage |                |            |                |      |                |                |
|                        | C <sub>g</sub>                    |            | C <sub>v</sub> |            | C <sub>i</sub> | K <sub>m</sub>                 | C <sub>g</sub> |            | C <sub>v</sub> |      | C <sub>i</sub> | K <sub>m</sub> |
| Regulating             | Wide-Open                         | Regulating | Wide-Open      | Regulating |                |                                | Wide-Open      | Regulating | Wide-Open      |      |                |                |
| 1 / 25                 | 568                               | 598        | 17.2           | 18.1       | 33.0           | 0.70                           | 529            | 557        | 15.6           | 16.4 | 34.0           | 0.80           |
| 2 / 50                 | 2050                              | 2160       | 59.6           | 62.8       | 34.4           |                                | 1830           | 1930       | 52.3           | 55.1 | 35.1           |                |
| 3 / 80                 | 4410                              | 4650       | 128            | 135        | 34.4           |                                | 3630           | 3830       | 106            | 110  | 34.2           |                |
| 4 / 100                | 6940                              | 7310       | 198            | 209        | 35.0           |                                | 6020           | 6340       | 171            | 180  | 35.2           |                |
| 6 / 150                | 12,100                            | 12,800     | 381            | 404        | 31.7           |                                | 9240           | 9730       | 291            | 306  | 31.7           |                |
| 8 x 6 /<br>200 x 150   | 17,370                            | 18,280     | 543            | 571        | 32.0           |                                | 10,020         | 10,550     | 286            | 301  | 35.0           |                |
| 12 x 6 /<br>300 x 150  | 19,900                            | 20,950     | 622            | 655        | 32.0           |                                | 10,380         | 10,930     | 297            | 312  | 35.0           |                |

Table 7. Flow Rate Conversions (Gas Flow Required to Displace Blanketing Gas with Pump-in of Liquid)

| MULTIPLY MAXIMUM PUMP RATE IN | BY     | TO OBTAIN                        |
|-------------------------------|--------|----------------------------------|
| U.S. GPM                      | 8.021  | SCFH air required <sup>(2)</sup> |
| U.S. GPH                      | 0.1337 |                                  |
| Barrels/hour                  | 5.615  |                                  |
| Barrels/day                   | 0.2340 |                                  |

1. For liquids with a flash point below 100°F / 38°C or normal boiling point below 300°F / 149°C, multiply the above calculated outbreathing requirement by 2.0.  
 2. To convert to Nm<sup>3</sup>/h, multiply SCFH by 0.0268.

**Note**

**The Type 1290 Vapor Recovery Regulator is not intended to be used as an ASME certified relief device for overpressure protection. It is to be used as part of the gas blanketing system to control the outflow of blanketing gas under normal conditions and to collect vessel vapors for the vapor recovery system. You should provide alternate methods of emergency overpressure protection.**

The Type 1290 vapor recovery regulator responds to any changes in the blanket gas pressure and throttles open or closed to control the flow of the blanket gas out of the vessel. A vacuum source on the outlet of the regulator is usually necessary to ensure flow of low pressure blanket gas out of the vessel into a vapor recovery system. The higher the vacuum pressure of the vacuum source, the higher the flow capacity of the vapor recovery regulator.

The pressure of the blanket gas registers under the diaphragm of the pilot. A Type MR95H regulator provides a constant loading pressure source to the Type 1098

actuator. When the pilot is closed, the loading pressure fills both sides of the Type 1098 actuator through a fixed restriction.

The Type EGR main valve spring keeps the main valve plug tightly shut off. When the vessel blanket gas pressure reaches the setting of the pilot spring, the pilot diaphragm moves, opening the pilot valve disk and exhausting some of the Type 1098's actuator loading pressure through the pilot orifice. This typically happens when the vessel is being filled with liquid.

The small fixed restriction maintains a higher loading pressure on the bottom of the Type 1098 actuator. The pressure differential across the main valve diaphragm moves the diaphragm upward causing the main valve to open which allows the blanket gas to flow out to the vapor recovery system vacuum source, hence controlling the vessel blanket pressure.

When the vessel blanket gas pressure begins to stabilize, the pilot spring throttles the pilot disk closed. This allows the loading pressure source to fill both sides of the Type 1098 actuator through the fixed restriction. This equalizes the pressure acting on the diaphragm, thus allowing the main valve spring to close the main valve plug.

# Bulletin 74.2:1290

**Table 8. Gas Flow Required for Thermal Heating (Outbreathing) per API 2000 (Interpolate for intermediate sizes)**

| VESSEL CAPACITY |           |            | SCFH / Nm <sup>3</sup> /h AIR FLOW RATE REQUIRED   |  |
|-----------------|-----------|------------|--|--|
| Barrels         | Gallons   | Liters     | Flash Point is Equal to or Above 100°F / 38°C or Normal Boiling Point is Equal to or Above 300°F / 149°C | Flash Point is Below 100°F / 38°C or Normal Boiling Point is Below 300°F / 149°C |
| 60              | 2500      | 9500       | 40 / 1.07  | 60 / 1.61  |
| 100             | 4200      | 16,000     | 60 / 1.61  | 100 / 2.68   |
| 500             | 21,000    | 79,500     | 300 / 8.04   | 500 / 13.4   |
| 1000            | 42,000    | 159,000    | 600 / 16.1   | 1000 / 26.8  |
| 2000            | 84,000    | 318,000    | 1200 / 32.2  | 2000 / 53.6  |
| 3000            | 126,000   | 477,000    | 1800 / 48.2  | 3000 / 80.4  |
| 4000            | 168,000   | 636,000    | 2400 / 64.3  | 4000 / 107   |
| 5000            | 210,000   | 795,000    | 3000 / 80.4  | 5000 / 134   |
| 10,000          | 420,000   | 1,590,000  | 6000 / 161   | 10,000 / 268   |
| 15,000          | 630,000   | 2,385,000  | 9000 / 241   | 15,000 / 402   |
| 20,000          | 840,000   | 3,180,000  | 12,000 / 322   | 20,000 / 536   |
| 25,000          | 1,050,000 | 3,975,000  | 15,000 / 402   | 24,000 / 643   |
| 30,000          | 1,260,000 | 4,769,000  | 17,000 / 456   | 28,000 / 750   |
| 35,000          | 1,470,000 | 5,564,000  | 19,000 / 509   | 31,000 / 831   |
| 40,000          | 1,680,000 | 6,359,000  | 21,000 / 563   | 34,000 / 911   |
| 45,000          | 1,890,000 | 7,154,000  | 23,000 / 616   | 37,000 / 992   |
| 50,000          | 2,100,000 | 7,949,000  | 24,000 / 643   | 40,000 / 1072  |
| 60,000          | 2,520,000 | 9,539,000  | 27,000 / 724   | 44,000 / 1179  |
| 70,000          | 2,940,000 | 11,298,000 | 29,000 / 777   | 48,000 / 1286  |
| 80,000          | 3,360,000 | 12,718,000 | 31,000 / 831   | 52,000 / 1394  |
| 90,000          | 3,780,000 | 14,308,000 | 34,000 / 911   | 56,000 / 1501  |
| 100,000         | 4,200,000 | 15,897,000 | 36,000 / 965   | 60,000 / 1608  |
| 120,000         | 5,040,000 | 19,077,000 | 41,000 / 1099  | 68,000 / 1822  |
| 140,000         | 5,880,000 | 22,256,000 | 45,000 / 1206  | 75,000 / 2010  |
| 160,000         | 6,720,000 | 25,436,000 | 50,000 / 1340  | 82,000 / 2198  |
| 180,000         | 7,560,000 | 28,615,000 | 54,000 / 1447  | 90,000 / 2412  |

## Sizing Blanketing Systems

When sizing a gas vapor recovery regulator system, you must consider the volume of blanketing gas that must be displaced from the vessel when either filling the vessel with liquid (pump-in) or the expansion of vapors inside the vessel during atmospheric thermal heating.

Using the established procedures from American Petroleum Institute Standard 2000 (API 2000), determine the flow rate for outbreathing.

1. Determine the flow rate of blanketing gas displaced when liquid is being pumped into the vessel (see Table 7).
2. Determine the gas flow rate due to outbreathing caused by atmospheric thermal heating (see Table 8).
3. Add the requirements of 1 and 2 and select a vapor recovery regulator size based on total capacity required from Table 5.

### Sample Sizing Problem for Vapor Recovery Applications:

Vessel Capacity . . . . . 1000 barrels  
 Pump in Capacity . . . . . 20 GPM / 75.7 lpm  
 Inlet Pressure Source . . . . . 60 psig / 4.1 bar nitrogen  
 Desired Blanket Setpoint . . . . . .0.5 in. w.c. / 1 mbar  
 Desired Vapor Recovery Setpoint . . . . . 2 in. w.c. / 5 mbar  
 Vapor Recovery Vacuum Source . . . . . 5 in. Hg / 169 mbar  
 Fluid . . . . . Hexane  
 Boiling Point . . . . . 155°F / 68°C

1. From Table 7 the desired air flow rate due to pump in equals 20 GPM x 8.021 x 2 = 320 SCFH / 8.58 Nm<sup>3</sup>/h air.

2. From Table 8 the desired air flow rate = 1000 SCFH / 26.8 Nm<sup>3</sup>/h air due to thermal heating.
3. Total required flow rate = 1000 SCFH air + 320 SCFH = 1320 SCFH / 35.4 Nm<sup>3</sup>/h air. This converts to nitrogen requirements of 1340 SCFH / 35.9 Nm<sup>3</sup>/h.

## Capacity Information

Table 5 gives typical nitrogen regulating capacities at selected inlet pressures and outlet pressure settings. Flows are in SCFH (at 60°F and 14.7 psia) and Nm<sup>3</sup>/h (at 0°C and 1.01325 bar) of 0.97 specific gravity nitrogen. For gases of other specific gravities, multiply the given capacity of nitrogen by 0.985 and divide by the square root of the appropriate specific gravity of the gas required. To determine regulating capacities at pressure settings not given or to determine wide-open flow capacities, use the following formula:

$$Q = \sqrt{\frac{520}{GT}} C_g P_1 \sin \left[ \frac{3417}{C_1} \sqrt{\frac{\Delta P}{P_1}} \right] \text{ Deg}$$

where:

- C<sub>g</sub> = gas sizing coefficient from Table 6
- C<sub>1</sub> = C<sub>g</sub>/C<sub>v</sub> or 35 from Table 6
- G = gas specific gravity (air = 1.0)
- P<sub>1</sub> = absolute inlet pressure, psia (add 14.7 psi to gauge inlet pressure to obtain absolute inlet pressure)
- Q = flow rate, SCFH
- T = absolute temperature in °R of gas at inlet (°F + 460)

Table 9. Materials Compatibility

| CORROSION INFORMATION   |              |                      |                            |                             |                     |                        |   |  |              |                      |                            |                             |                     |                        |   |
|---|--------------|----------------------|----------------------------|-----------------------------|---------------------|------------------------|---|--|--------------|----------------------|----------------------------|-----------------------------|---------------------|------------------------|---|
| Fluid   | Material     |                      |                            |                             |                     |                        |   | Fluid  | Material     |                      |                            |                             |                     |                        |   |
|   | Carbon steel | Cast or Ductile Iron | 302 or 304 Stainless Steel | CF8M or 316 Stainless steel | 416 Stainless steel | Monel <sup>®</sup> (1) | Hastelloy <sup>®</sup> C <sup>(2)</sup> |  | Carbon steel | Cast or Ductile Iron | 302 or 304 Stainless steel | CF8M or 316 Stainless steel | 416 Stainless steel | Monel <sup>®</sup> (1) | Hastelloy <sup>®</sup> C <sup>(2)</sup> |
| Acetic Acid (Air Free)  | C            | C                    | B                          | B                           | C                   | B                      | A                                       | Hydrochloric Acid (Air Free)                   | C            | C                    | C                          | C                           | C                   | C                      | B                                       |
| Acetic Acid Vapors  | C            | C                    | A                          | A                           | C                   | A                      | A                                       | Hydrogen                                       | A            | A                    | A                          | A                           | A                   | A                      | A                                       |
| Acetone   | A            | A                    | A                          | A                           | A                   | A                      | A                                       | Hydrogen Peroxide                              | I.L.         | A                    | A                          | A                           | B                   | A                      | B                                       |
| Acetylene   | A            | A                    | A                          | A                           | A                   | A                      | A                                       | Hydrogen Sulfide (Liquid)                      | C            | C                    | A                          | A                           | C                   | C                      | A                                       |
| Alcohols  | A            | A                    | A                          | A                           | A                   | A                      | A                                       | Magnesium Hydroxide                            | A            | A                    | A                          | A                           | A                   | A                      | A                                       |
| Aluminum Sulfate  | C            | C                    | A                          | A                           | C                   | B                      | A                                       | Methanol                                       | A            | A                    | A                          | A                           | A                   | A                      | A                                       |
| Ammonia   | A            | A                    | A                          | A                           | A                   | A                      | A                                       | Methyl Ethyl Ketone                            | A            | A                    | A                          | A                           | A                   | A                      | A                                       |
| Ammonium Chloride   | C            | C                    | B                          | B                           | C                   | B                      | A                                       | Natural Gas                                    | A            | A                    | A                          | A                           | A                   | A                      | A                                       |
| Ammonium Nitrate  | A            | C                    | A                          | A                           | C                   | C                      | A                                       | Nitric Acid                                    | C            | C                    | A                          | B                           | C                   | C                      | B                                       |
| Ammonium Sulfate  | C            | C                    | B                          | A                           | C                   | A                      | A                                       | Petroleum Oils (Refined)                       | A            | A                    | A                          | A                           | A                   | A                      | A                                       |
| Ammonium Sulfite  | C            | C                    | A                          | A                           | B                   | C                      | A                                       | Phosphoric Acid (Air Free)                     | C            | C                    | A                          | A                           | C                   | B                      | A                                       |
| Beer  | B            | B                    | A                          | A                           | B                   | A                      | A                                       | Phosphoric Acid Vapors                         | C            | C                    | B                          | A                           | C                   | C                      | I.L.                                    |
| Benzene (Benzol)  | A            | A                    | A                          | A                           | A                   | A                      | A                                       | Potassium Chloride                             | B            | B                    | A                          | A                           | C                   | B                      | A                                       |
| Benzoic Acid  | C            | C                    | A                          | A                           | A                   | A                      | A                                       | Potassium Hydroxide                            | B            | B                    | A                          | B                           | B                   | A                      | A                                       |
| Boric Acid  | C            | C                    | A                          | A                           | B                   | A                      | A                                       | Propane  | A            | A                    | A                          | A                           | A                   | A                      | A                                       |
| Butane  | A            | A                    | A                          | A                           | A                   | A                      | A                                       | Silver Nitrate                                 | C            | C                    | A                          | A                           | B                   | C                      | A                                       |
| Calcium Chloride (Alkaline)   | B            | B                    | C                          | B                           | C                   | A                      | A                                       | Sodium Acetate                                 | A            | A                    | B                          | A                           | A                   | A                      | A                                       |
| Carbon Dioxide (Dry)  | A            | A                    | A                          | A                           | A                   | A                      | A                                       | Sodium Carbonate                               | A            | A                    | A                          | A                           | B                   | A                      | A                                       |
| Carbon Dioxide (Wet)  | C            | C                    | A                          | A                           | A                   | A                      | A                                       | Sodium Chloride                                | C            | C                    | B                          | B                           | B                   | A                      | A                                       |
| Carbon Disulfide  | A            | A                    | A                          | A                           | B                   | B                      | A                                       | Sodium Chromate                                | A            | A                    | A                          | A                           | A                   | A                      | A                                       |
| Carbon Tetrachloride  | B            | B                    | B                          | B                           | C                   | A                      | A                                       | Sodium Hydroxide                               | A            | A                    | A                          | A                           | B                   | A                      | A                                       |
| Carbonic Acid   | C            | C                    | B                          | B                           | A                   | A                      | A                                       | Stearic Acid                                   | A            | C                    | A                          | A                           | B                   | B                      | A                                       |
| Chlorine Gas (Dry)  | A            | A                    | B                          | B                           | C                   | A                      | A                                       | Sulfur   | A            | A                    | A                          | A                           | A                   | A                      | A                                       |
| Chlorine Gas (Wet)  | C            | C                    | C                          | C                           | C                   | C                      | B                                       | Sulfur Dioxide (Dry)                           | A            | A                    | A                          | A                           | B                   | A                      | A                                       |
| Chlorine (Liquid)   | C            | C                    | C                          | C                           | C                   | C                      | A                                       | Sulfur Trioxide (Dry)                          | A            | A                    | A                          | A                           | B                   | A                      | A                                       |
| Chromic Acid  | C            | C                    | C                          | B                           | C                   | A                      | A                                       | Sulfuric Acid (Aerated)                        | C            | C                    | C                          | C                           | C                   | C                      | A                                       |
| Citric Acid   | I.L.         | C                    | B                          | A                           | B                   | B                      | A                                       | Sulfuric Acid (Air Free)                       | C            | C                    | C                          | C                           | C                   | B                      | A                                       |
| Coke Oven Gas   | A            | A                    | A                          | A                           | A                   | B                      | A                                       | Sulfurous Acid                                 | C            | C                    | B                          | B                           | C                   | C                      | A                                       |
| Copper Sulfate  | C            | C                    | B                          | B                           | A                   | C                      | A                                       | Trichloroethylene                              | B            | B                    | B                          | A                           | B                   | A                      | A                                       |
| Ether   | B            | B                    | A                          | A                           | A                   | A                      | A                                       | Water (Boiler Feed)                            | B            | C                    | A                          | A                           | B                   | A                      | A                                       |
| Ethyl Chloride  | C            | C                    | A                          | A                           | B                   | A                      | A                                       | Water (Distilled)                              | A            | A                    | A                          | A                           | B                   | A                      | A                                       |
| Ethylene  | A            | A                    | A                          | A                           | A                   | A                      | A                                       | Water (Sea)                                    | B            | B                    | B                          | B                           | C                   | A                      | A                                       |
| Ethylene Glycol   | A            | A                    | A                          | A                           | A                   | A                      | I.L.                                    | Zinc Chloride                                  | C            | C                    | C                          | C                           | C                   | C                      | A                                       |
| Formaldehyde  | B            | B                    | A                          | A                           | A                   | A                      | A                                       | Zinc Sulfate                                   | C            | C                    | A                          | A                           | B                   | A                      | A                                       |
| Formic Acid   | I.L.         | C                    | B                          | B                           | C                   | A                      | A                                       | ----   | -            | -                    | -                          | -                           | -                   | -                      | -                                       |
| Freon (Wet)   | B            | B                    | B                          | A                           | I.L.                | A                      | A                                       | ----   | -            | -                    | -                          | -                           | -                   | -                      | -                                       |
| Freon (Dry)   | B            | B                    | A                          | A                           | I.L.                | A                      | A                                       | ----   | -            | -                    | -                          | -                           | -                   | -                      | -                                       |
| Gasoline (Refined)  | A            | A                    | A                          | A                           | A                   | A                      | A                                       | ----   | -            | -                    | -                          | -                           | -                   | -                      | -                                       |
| Glucose   | A            | A                    | A                          | A                           | A                   | A                      | A                                       | ----   | -            | -                    | -                          | -                           | -                   | -                      | -                                       |
| Hydrochloric Acid (Aerated)   | C            | C                    | C                          | C                           | C                   | C                      | B                                       | ----   | -            | -                    | -                          | -                           | -                   | -                      | -                                       |
| A+--Best possible selection<br>A--Recommended<br>B--Minor to moderate effect. Proceed with caution. |              |                      |                            |                             |                     |                        |   | C--Unsatisfactory<br>I.L.--Information lacking |              |                      |                            |                             |                     |                        |   |

- continued -

## Installation

Using a straight run of pipe the same size or larger than the regulator body, install the Type 1290 regulator as shown in Figure 1 so that flow through the main valve body matches the flow arrow cast on the body. A control and exhaust line as in Figure 2 is required. If a block valve is required, install

a full flow valve between the regulator and the blanketed vessel. For proper operation at low setpoint ranges, the regulators should be installed with the pilot spring case barrel pointed down.

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# Bulletin 74.2:1290

**Table 9. Materials Compatibility (continued)**

| FLUID INFORMATION   |               |               |  |                          |                          |
|---|---------------|---------------|--|--------------------------|--------------------------|
| Fluid   | Material      |               |  |                          |                          |
|   | Neoprene (CR) | Nitrile (NBR) | Fluorocarbon (FKM)                             | Perfluorelastomer (FFKM) | Ethylenepropylene (EPDM) |
| Acetic Acid (30%)   | C             | B             | B  | A                        | A                        |
| Acetone   | B             | C             | C  | A                        | A                        |
| Alcohol (Ethyl)   | A             | A             | B  | A                        | A                        |
| Alcohol (Methyl)  | A+            | A             | C  | A                        | A                        |
| Ammonia (Anhydrous)   | A             | C             | C  | A                        | A                        |
| Ammonia (Gas, Hot)  | B             | C             | C  | A                        | B                        |
| Benzene   | C             | C             | A  | A                        | C                        |
| Brine (Calcium Chloride)  | A             | A             | B  | A                        | A                        |
| Butadiene Gas   | B             | C             | B  | A                        | C                        |
| Butane (Gas)  | A             | A+            | A  | A                        | C                        |
| Butane (Liquid)   | B             | A             | A  | A                        | C                        |
| Carbon Tetrachloride  | C             | C             | A  | A                        | C                        |
| Chlorine (Dry)  | C             | C             | A  | A                        | C                        |
| Chlorine (Wet)  | C             | C             | A  | A                        | C                        |
| Coke Oven Gas   | C             | B             | A+   | A                        | C                        |
| Ethyl Acetate   | C             | C             | C  | A                        | B                        |
| Ethylene Glycol   | A             | A             | A  | A                        | A                        |
| Freon 11  | B             | A             | A+   | A                        | C                        |
| Freon 12  | A+            | A             | B  | A                        | B                        |
| Freon 22  | A+            | C             | C  | A                        | A                        |
| Freon 114   | A             | A             | B  | A                        | A                        |
| Gasoline  | B             | A+            | A  | A                        | C                        |
| Hydrogen Gas  | A             | A             | A  | A                        | A                        |
| Hydrogen Sulfide (Dry)  | A             | C             | C  | A                        | A                        |
| Hydrogen Sulfide (Wet)  | B             | C             | C  | A                        | A                        |
| Jet Fuel (JP-4)   | C             | A             | A  | A                        | I.L.                     |
| Natural Gas   | A             | A+            | A  | A                        | C                        |
| Natural Gas + H <sub>2</sub> S (Sour Gas)   | A             | B             | C  | A                        | C                        |
| Nitric Acid (20%)   | B             | C             | A  | A                        | C                        |
| Nitric Acid (50 to 100%)  | C             | C             | A  | A                        | C                        |
| Nitrogen  | A             | A             | A  | A                        | A                        |
| Oil (Fuel)  | B             | A+            | A  | A                        | C                        |
| Propane   | A             | A             | A  | A                        | C                        |
| Sulfur Dioxide  | B             | A             | A  | A                        | A                        |
| Sulfuric Acid (to 50%)  | A             | C             | A  | A                        | A                        |
| Sulfuric Acid (50 to 100%)  | B             | C             | A  | A                        | B                        |
| Water (Ambient)   | C             | C             | A  | A                        | B                        |
| Water (at 200°F / 93°C)   | A             | A             | A  | A                        | A                        |
| Water (Sea)   | C             | B             | B  | A                        | A                        |
| A+--Best possible selection<br>A--Recommended<br>B--Minor to moderate effect. Proceed with caution. |               |               | C--Unsatisfactory<br>I.L.--Information lacking |                          |                          |



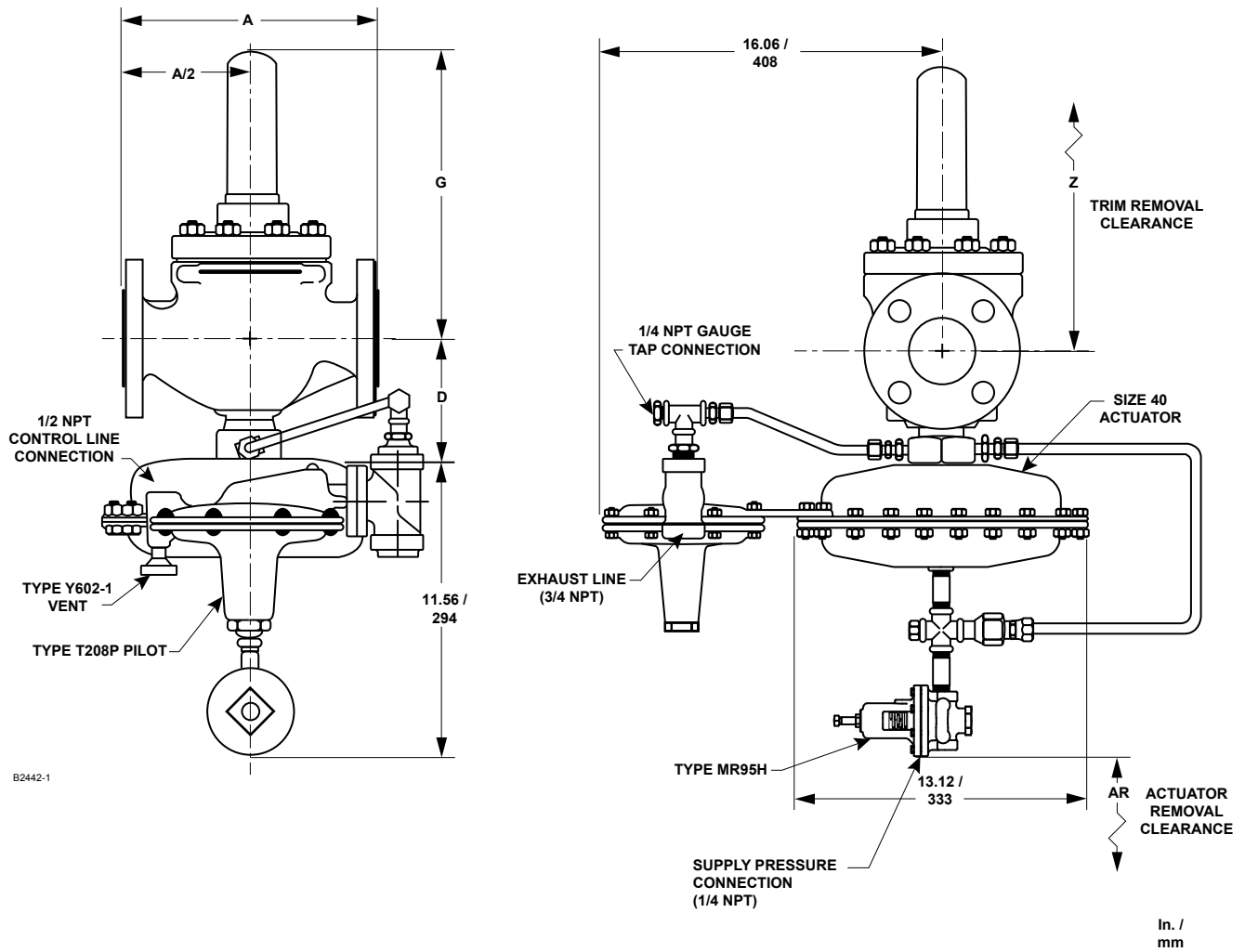


Figure 3. Type 1290 with Type T208P Pilot and Standard Closing Cap Dimensional Drawing

Table 10. Type 1290 Dimensions (See Figures 3 and 4)

| MAIN VALVE BODY SIZE |           | DIMENSION |     |   |     |   |     |  |     |      |     |       |     |           |     |                                |     |           |     |                                |     |
|----------------------|-----------|-----------|-----|---|-----|---|-----|--|-----|------|-----|-------|-----|-----------|-----|--------------------------------|-----|-----------|-----|--------------------------------|-----|
|                      |           | A         |     |   |     |   |     |  |     | D    |     | G     |     | Z         |     |                                |     | AR        |     |                                |     |
|                      |           | NPT       |     | CL125 FF<br>Cast iron, or<br>CL150 RF<br>Steel or<br>Stainless<br>steel |     | CL250 FF<br>Cast iron, or<br>CL300 RF<br>Steel<br>or Stainless<br>steel |     | CL600 RF<br>Steel or<br>Stainless<br>steel |     |      |     |       |     | Cast iron |     | Stainless<br>steel or<br>Steel |     | Cast iron |     | Stainless<br>steel or<br>Steel |     |
| NPS                  | DN        | In.       | mm  | In.   | mm  | In.   | mm  | In.  | mm  | In.  | mm  | In.   | mm  | In.       | mm  | In.                            | mm  | In.       | mm  | In.                            | mm  |
| 1                    | 25        | 8.25      | 210 | 7.25  | 184 | 7.75  | 197 | 8.25                                       | 210 | 3.88 | 99  | 8.62  | 219 | 12.00     | 305 | 10.50                          | 267 | 3.00      | 76  | 2.44                           | 62  |
| 2                    | 50        | 11.25     | 286 | 10.00   | 254 | 10.50   | 267 | 11.25                                      | 286 | 4.56 | 116 | 9.12  | 232 | 13.31     | 338 | 11.81                          | 300 | 3.12      | 79  | 3.12                           | 79  |
| 3                    | 80        | ---       | --- | 11.75   | 298 | 12.50   | 317 | 13.25                                      | 337 | 5.31 | 135 | 11.25 | 286 | 16.50     | 419 | 14.00                          | 356 | 3.88      | 99  | 3.88                           | 99  |
| 4                    | 100       | ---       | --- | 13.88   | 353 | 14.50   | 368 | 15.50                                      | 394 | 6.50 | 165 | 12.62 | 321 | 19.12     | 486 | 16.88                          | 429 | 5.12      | 130 | 5.12                           | 130 |
| 6                    | 150       | ---       | --- | 17.75   | 451 | 18.62   | 473 | 20.00                                      | 580 | 7.25 | 184 | 13.69 | 348 | 20.44     | 519 | 19.19                          | 487 | 6.38      | 162 | 6.62                           | 168 |
| 8 x 6                | 200 x 150 | ---       | --- | 21.40   | 544 | 22.40   | 569 | 24.00                                      | 610 | 9.76 | 248 | 15.02 | 382 | 20.25     | 514 | 23.25                          | 591 | 6.62      | 168 | 6.62                           | 168 |
| 12 x 6               | 300 x 150 | ---       | --- | 29.00   | 737 | 30.50   | 775 | 32.25                                      | 819 | 9.76 | 248 | 15.02 | 382 | ---       | --- | 23.25                          | 591 | ---       | --- | 6.62                           | 168 |

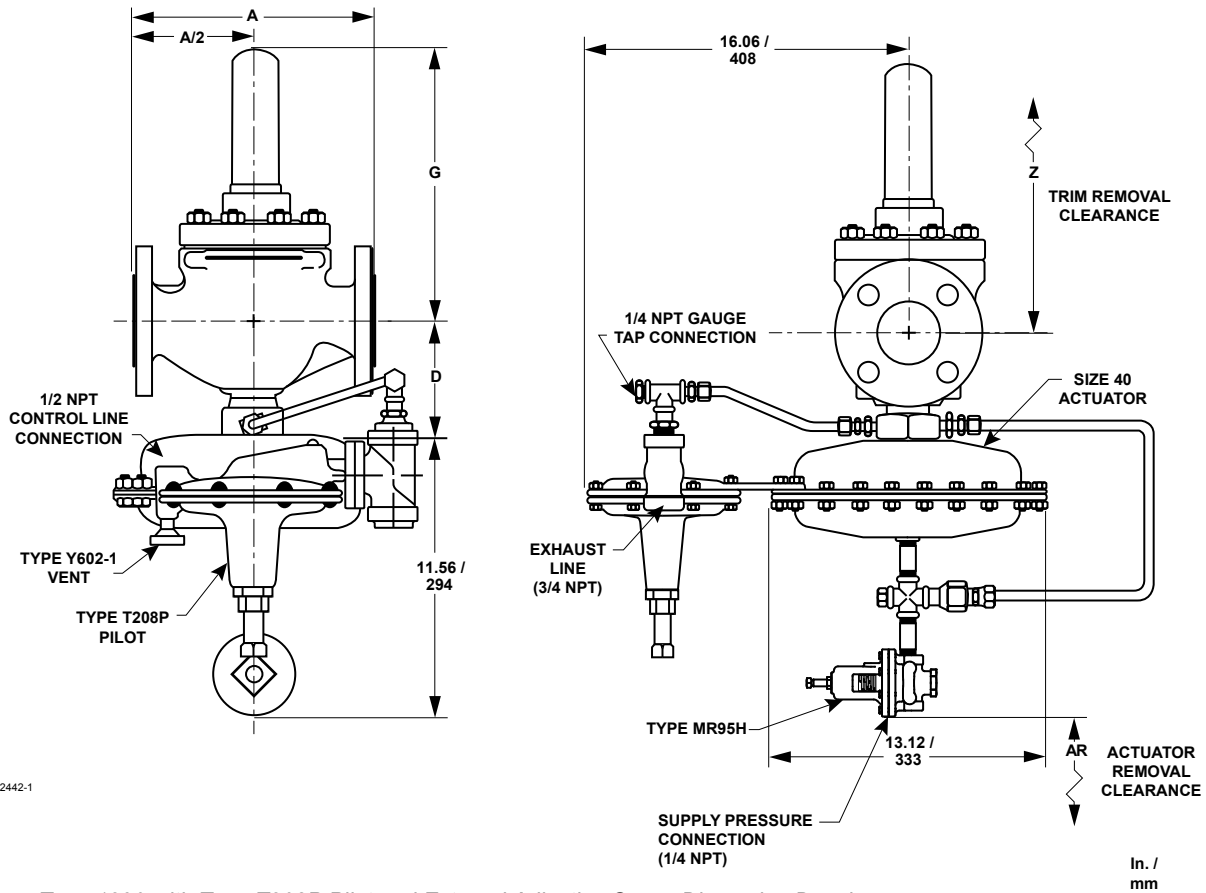


Figure 4. Type 1290 with Type T208P Pilot and External Adjusting Screw Dimension Drawing

## Ordering Information

Refer to the Specifications section on page 2 and Table 9 for reference for Material Compatibility. Carefully review the description of each specification and specify the desired

selection on the Ordering Guide page wherever there is a choice to be made.

## Ordering Guide

### Construction (Select One)

- Standard
- NACE

### Type EGR Main Valve

#### Main Valve Body Size (Select One)

- NPS 1 / DN 25\*\*\*
- NPS 2 / DN 50\*\*\*
- NPS 3 / DN 80\*\*\*
- NPS 4 / DN 100\*\*\*
- NPS 6 / DN 150\*\*
- NPS 8 x 6 / DN 200 x 150\*
- NPS 12 x 6 / DN 300 x 150\*

#### Main Valve Body Material (Select One)

- Cast Iron\*\*\*
- WCC Steel\*\*\*
- CF8M Stainless steel (NACE)\*\*

### Type EGR

#### Main Valve End Connection Style (Select One)

##### Cast Iron Body

- NPT (NPS 1 and 2 / DN 25 and 50 only)\*\*\*
- CL125 FF\*\*\*
- CL250 RF\*\*\*

##### WCC Steel or CF8M Stainless steel Body

- NPT (NPS 1 and 2 / DN 25 and 50 only)\*\*\*
- SWE (NPS 1 and 2 / DN 25 and 50 only)\*
- CL150 RF\*\*\*
- CL300 RF\*\*\*
- CL600 RF\*\*\*
- BWE 40\*\*
- BWE 80\*
- PN 16/25/40\* \_\_\_\_\_ please specify rating

- continued -

## Ordering Guide (continued)

### Type EGR (continued)

#### Main Valve Body Flange Material (Select One)

- Cast Iron\*\*\*
- WCC Steel\*\*\*
- CF8M Stainless steel (NACE)\*\*

#### Percent Travel or Travel Stop (Select One)

- 100 percent (standard)\*\*\*
- 70 percent (NPS 2 / DN 50 only)\*\*
- 40 percent (Not available for NPS 1 and 2 / DN 25 and 50)\*\*
- 30 percent (NPS 2 / DN 50 only)\*\*

#### Main Valve Cage Type and Material (Select One)

- Linear, CF8M Stainless steel (NACE)\*\*\*
- Whisper Trim™ Cage, 416 Stainless steel
- Whisper Trim Cage, 316 Stainless steel (NACE)
- Quick Opening, Cast Iron
- Quick Opening, Steel (for NPS 6 / DN 150 body only)

#### Main Valve Spring Range (Select One)

- 60 psig / 4.1 bar maximum drop, Green\*\*

#### Main Valve Spring

- Steel\*\*\*
- Inconel® X-750 (NACE)<sup>(1)</sup>\*\*\*

#### O-ring and Seal Material (Select One)

- Nitrile (NBR)\*\*\*
- Fluorocarbon (FKM)\*\*
- Ethylenepropylene (EPDM)\*\*
- Perfluoroelastomer (FFKM)

### Type 1098 Actuator

#### Lower Diaphragm Case Material (Select One)

- Steel\*\*\*
- Stainless steel\*\*

#### Bonnet Material (Select One)

- Steel\*\*\*
- Stainless steel\*\*

#### O-ring Material (Select One)

- Nitrile (NBR)\*\*\*
- Fluorocarbon (FKM)\*\*
- Ethylenepropylene (EPDM)\*\*

#### Diaphragm Material (Select One)

- Nitrile (NBR)\*\*\*
- Fluorocarbon (FKM)\*\*
- Ethylenepropylene (EPDM)\*\*

### Type MR95H Supply Pressure Regulator

#### Body Material (Select One)

- Cast Iron\*\*\*
- Steel\*\*\*
- Stainless steel\*\*\*

### Type MR95H

#### Spring Case Material (Select One)

- Cast Iron\*\*\*
- Steel\*\*\*
- Stainless steel\*\*\*

#### Valve Plug Material (Select One)

- 416 Stainless steel with Nitrile (NBR)\*\*\*
- 416 Stainless steel with Fluorocarbon (FKM)\*\*\*
- 316 Stainless steel with Neoprene (CR) (NACE)\*\*
- 316 Stainless steel with Fluorocarbon (FKM)\*\*

#### Outlet Pressure Range (Select One)

- 15 to 30 psig / 1.0 to 2.1 bar, Yellow\*\*\*

#### Diaphragm Material (Select One)

- Neoprene (CR)\*\*\*
- Fluorocarbon (FKM)\*\*

### Type T208P or T208PL Pilot

#### Body, Spring Case Assembly and Diaphragm Casing Material (Select One)

- Cast iron
- WCC Steel
- CF3M Stainless steel

#### Control Pressure Range (Select One)

##### Type T208PL

- 0.5 to 1.5 in. w.c. / 1 to 4 mbar, Black\*\*\*

##### Type T208P

- 1.0 to 2.5 in. w.c. / 2 to 6 mbar, Orange\*\*\*
- 2 to 7 in. w.c. / 5 to 17 mbar, Red\*\*\*
- 4 to 14 in. w.c. / 10 to 35 mbar, Unpainted\*\*\*
- 0.5 to 1.2 psig / 35 to 83 mbar, Yellow\*\*\*
- 1 to 2.5 psig / 0.07 to 0.17 bar, Green\*\*\*
- 2.5 to 4.5 psig / 0.17 to 0.31 bar, Light Blue\*\*\*
- 4.5 to 7 psig / 0.31 to 0.48 bar, Black\*\*\*

#### Diaphragm Material (Select One)

- Nitrile (NBR)\*\*\*
- Fluorocarbon (FKM)\*\*
- Fluorinated Ethylene Propylene (FEP)

#### O-ring and Seal Material (Select One)

- Nitrile (NBR)\*\*\*
- Fluorocarbon (FKM)\*\*
- Ethylenepropylene (EPDM)\*\*
- Perfluoroelastomer (FFKM)\*

#### Closing Cap Material (Select One)

##### Type T208PL

- Zinc

##### Type T208P

- Plastic\*\*\*
- Steel\*\*
- Stainless steel\*\*

#### Vent Assembly (Select One)

- Spring Case Up (Type Y602-11)\*\*\*
- Spring Case Down (Type Y602-1)\*\*\*

# Bulletin 74.2:1290

## Ordering Guide (continued)

### Parts Kits

#### Replacement Parts Kit (Optional)

- Yes, send one replacement parts kit to match this order for each unit.

#### Quick-Change Trim Package (Optional)

- Yes, send one main valve Quick-Change Trim Package to match this order.

#### Wireless Position Monitor Mounting Kit (Optional)

- Yes, send one mounting kit for mounting the Topworx™ 4310 or the Fisher® 4320 wireless position monitor.

| Regulators Quick Order Guide  |  |
|---|--|
| ***   | Readily Available for Shipment   |
| **  | Allow Additional Time for Shipment   |
| *   | Special Order, Constructed from Non-Stocked Parts. Consult your local Sales Office for Availability. |
| Availability of the product being ordered is determined by the component with the longest shipping time for the requested construction. |  |

Hastelloy® C is a mark owned by Haynes International, Inc.

| Specification Worksheet   |  |
|---|--|
| <b>Application Specifications:</b>  |  |
| Tank Size   | _____  |
| Pump In Rate  | _____  |
| Pump Out Rate   | _____  |
| Blanketing Gas (Type and Specific Gravity)  | _____  |
| <b>Pressure Requirements (Please Designate Units):</b>  |  |
| Maximum Inlet Pressure ( $P_{1max}$ )   | _____  |
| Minimum Inlet Pressure ( $P_{1min}$ )   | _____  |
| Control Pressure Setting ( $P_2$ )  | _____  |
| Maximum Flow ( $Q_{max}$ )  | _____  |
| <b>Accuracy Requirements:</b>   |  |
| <input type="checkbox"/> 0.25 in. w.c. / 0.60 mbar  | <input type="checkbox"/> 0.5 in. w.c. / 1 mbar |
| <input type="checkbox"/> 1 in. w.c. / 2 mbar  | <input type="checkbox"/> 2 in. w.c. / 5 mbar   |
| <input type="checkbox"/> Other _____  |  |
| <b>Other Specifications:</b>  |  |
| Is a vapor recovery regulator required? <input type="checkbox"/> Yes <input type="checkbox"/> No                    |  |
| Special Material Requirements: <input type="checkbox"/> Ductile iron <input type="checkbox"/> Steel                 |  |
| <input type="checkbox"/> Stainless steel <input type="checkbox"/> Hastelloy® C <input type="checkbox"/> Other _____ |  |
| <b>Other Requirements:</b> _____  |  |

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