Triple Duty® Valves – Three Valves In One

- SHUT-OFF
- CENTER GUIDED NON-SLAM CHECK
- CALIBRATED BALANCE VALVE
Are you paying for THREE valves when ONE will do the job?

Typical piping methods

- Lowest pressure drop
- 3-Valves in one; center guided non-slam check, calibrated balance and shut-off
- Maximum range of control (8-9 turns)
- Spring loaded with "soft seat" design
- Brass seat, stainless steel stem and bronze disc
- Brass read-out valves
- Calibrated nameplate & memory button
- Backseating valve stem
- Available in flanged, grooved and NPT connections

Triple Duty method

- Calibrated balance
- Shut-off
- Non-slam check

**TDV FEATURES**

- Meets ASHRAE 90.1 requirements by providing the most energy efficient operation of any similar valve
- Minimizes cost and reduces installation time
- Provides precise flow controls versus 1/4 turn "on-off" throttling valves
- Assures positive shut-off and prevents valve chatter
- Provides maximum long life protection against aggressive liquids
- Permits accurate system balance to maximize operating efficiency
- Allows return of valve to the balanced position after shut-off
- Allows for repacking under full system pressure
- Custom valves that meet your every selection.

**KEY BELL & GOSETT TDV FEATURES VERSUS THE COMPETITION**

<table>
<thead>
<tr>
<th>Key Features</th>
<th>B&amp;G</th>
<th>Competitor-A</th>
<th>Competitor-T</th>
<th>Competitor-W</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Lowest Pressure Drop</td>
<td>YES</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>2. ASHRAE 90.1 Energy Efficient Design</td>
<td>YES</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>3. 3-Valves in One</td>
<td>YES</td>
<td>YES</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>4. EPDM Disc Soft Seat Design</td>
<td>YES</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>5. Repack Under Pressure</td>
<td>YES</td>
<td>YES</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>6. Brass seat, stainless steel stem &amp; bronze disc</td>
<td>YES</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>7. Multi-turn Valve (8-9 turns) vs 1/4 turn range of control</td>
<td>YES</td>
<td>YES</td>
<td>NO</td>
<td>NO</td>
</tr>
</tbody>
</table>
**Materials of Construction for Flanged & Grooved Models**

**Typical Cross Section View**

**CONSTRUCTION MATERIAL**

- **Body:**
  - NPT & flanged models: Cast iron
  - Grooved Models: Ductile iron
- **Seat:** Brass
- **Disc:** Bronze with EPDM seat insert
- **Stem:** Stainless Steel
- **Spring:** Stainless Steel
- **Packing:** Teflon-Graphite
- **Read-Out Valves:** Brass

**OPERATING DATA**

- **Maximum working pressure:**
  - Cast iron models: 175 PSIG (1207 kPa)
  - Ductile iron models: **300 PSIG (2609 kPa)**
- **Maximum operating temperature:** 250°F (121°C)

**Soft Seat Valve Disc provides positive shut-off**

- **4" THROUGH 14" MODELS:**
  - 2", 3", & 4" MODELS HAVE A SCREWED BONNET

- **Inlet:**
- **Outlet:**
- **Stem:**
- **Disc:**
- **Spring:**
- **Gasket:**
- **Nameplate with Memory Button:**
- **Packing:**
- **Position Indicator Ring:**
- **Bonnet & Bushing Assy.:**
- **Warning Label:**

**BRONZE DISC**

**EPDM SEAL RING**

**SEAL RETAINER**

**BRASS RETAINER NUT**

**STAINLESS STEEL SPRING**

**STAINLESS STEEL STEM**

**TRIPLE DUTY VALVE**

**PART NO.**

**MODEL NO.**

**REV.**

**MAX. PRESSURE 175 PSIG**

**MAX. TEMPERATURE 250°F**

**CLOSED**

**OPEN**

**Available in groove connection only**

Within ASHRAE 90.1, Section 9.4.10.3 addresses hydronic system balancing and states that hydronic system balancing shall be accomplished in such a manner to first minimize throttling losses. The intent of the code is to substantially reduce the throttling of valves, which waste energy, utilized to balance the system and to apply valves that do not “increase the overall building energy costs.”

“Line sizing” the valve to match the distribution piping is the most common method seen today for selecting a valve size.

Unfortunately, this method of oversizing the control valve by “line sizing” results in:
• Higher overall operating costs (higher HP usage)
• Higher “first cost basis” for the valve
• The possibility of damage to the valve seat (wire draw.)

Proper Triple Duty Valve (TDV) sizing should consist of selecting the TDV as a true calibrated multiturn balance valve (i.e. Cv Rating), not a quarter turn on-off throttle valve. The Cv Rating is defined as the number of gallons of water at 60°F which pass through a device with one pound per square inch pressure differential.

Using a lower Cv can cost the owner money. Tests revealed the following Cv results from “other manufacturers” valves compared to the Bell & Gossett TDV.

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**Cv COMPARISON**

<table>
<thead>
<tr>
<th>4&quot; Valve</th>
<th>B&amp;G TDV</th>
<th>Competitor-A</th>
<th>Competitor-T</th>
<th>Competitor-W</th>
</tr>
</thead>
<tbody>
<tr>
<td>Published Cv (100% Open)</td>
<td>352</td>
<td>150</td>
<td>290</td>
<td>220</td>
</tr>
</tbody>
</table>

Application note: Bell & Gossett recommends a minimum three (3) ft pressure drop across.

To achieve optimum system performance and economical installation, Triple Duty Valves should be sized, based upon system flow requirements and selecting the Triple Duty Valve with the lowest minimal pressure drop.

For example. The Pressure Drop Comparison chart below was calculated utilizing the Scale #5 on the Bell & Gossett System Sizer Calculator, the above referenced Cv Comparison chart and a system based on 5" steel pipe with a flow of 400 GPM.

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**PRESSURE DROP COMPARISON**

<table>
<thead>
<tr>
<th>4&quot; Valve</th>
<th>B&amp;G TDV</th>
<th>Competitor-A</th>
<th>Competitor-T</th>
<th>Competitor-W</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure Drop (100% Open)</td>
<td>3'</td>
<td>16'</td>
<td>4.4'</td>
<td>7.6'</td>
</tr>
</tbody>
</table>

Application note: Bell & Gossett recommends a minimum three (3) ft pressure drop across the valve for accurate flow determination.

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**YEARLY COST OF OPERATION**

<table>
<thead>
<tr>
<th>Valve Size</th>
<th>B&amp;G TDV</th>
<th>Competitor-A</th>
<th>Competitor-T</th>
<th>Competitor-W</th>
</tr>
</thead>
<tbody>
<tr>
<td>2&quot;</td>
<td>3.88</td>
<td>n/a</td>
<td>12.44</td>
<td>n/a</td>
</tr>
<tr>
<td>2.5&quot;</td>
<td>7.78</td>
<td>46.23</td>
<td>6.78</td>
<td>46.25</td>
</tr>
<tr>
<td>3&quot;</td>
<td>15.20</td>
<td>70.02</td>
<td>38.51</td>
<td>70.02</td>
</tr>
<tr>
<td>4&quot;</td>
<td>44.02</td>
<td>130.69</td>
<td>59.09</td>
<td>130.69</td>
</tr>
<tr>
<td>5&quot;</td>
<td>120.25</td>
<td>456.79</td>
<td>256.94</td>
<td>456.79</td>
</tr>
<tr>
<td>6&quot;</td>
<td>258.15</td>
<td>792.84</td>
<td>487.72</td>
<td>792.84</td>
</tr>
<tr>
<td>8&quot;</td>
<td>956.52</td>
<td>1578.26</td>
<td>1854.10</td>
<td>1578.26</td>
</tr>
<tr>
<td>10&quot;</td>
<td>2003.79</td>
<td>2780.93</td>
<td>5051.93</td>
<td>2780.93</td>
</tr>
<tr>
<td>12&quot;</td>
<td>4495.91</td>
<td>3156.91</td>
<td>n/a</td>
<td>3156.91</td>
</tr>
<tr>
<td>14&quot;</td>
<td>5362.08</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

*Based upon National Utility Service survey rate of $0.0713/Kwh; complies with ASHRAE standard at max. 4'1100' requirement
### WEIGHT COMPARISON

<table>
<thead>
<tr>
<th>VALVE SIZE</th>
<th>B&amp;G TDV</th>
<th>COMPETITOR-A</th>
<th>COMPETITOR-T</th>
<th>COMPETITOR-W</th>
</tr>
</thead>
<tbody>
<tr>
<td>2&quot;</td>
<td>24 lbs.</td>
<td>19 lbs.</td>
<td>12.5 lbs.</td>
<td>19 lbs.</td>
</tr>
<tr>
<td>2.5&quot;</td>
<td>28 lbs.</td>
<td>40 lbs.</td>
<td>27 lbs.</td>
<td>40 lbs.</td>
</tr>
<tr>
<td>3&quot;</td>
<td>39 lbs.</td>
<td>42 lbs.</td>
<td>36 lbs.</td>
<td>42 lbs.</td>
</tr>
<tr>
<td>4&quot;</td>
<td>94 lbs.</td>
<td>64 lbs.</td>
<td>67 lbs.</td>
<td>64 lbs.</td>
</tr>
<tr>
<td>5&quot;</td>
<td>114 lbs.</td>
<td>95 lbs.</td>
<td>78 lbs.</td>
<td>95 lbs.</td>
</tr>
<tr>
<td>6&quot;</td>
<td>186 lbs.</td>
<td>122 lbs.</td>
<td>120 lbs.</td>
<td>122 lbs.</td>
</tr>
<tr>
<td>8&quot;</td>
<td>316 lbs.</td>
<td>165 lbs.</td>
<td>178 lbs.</td>
<td>165 lbs.</td>
</tr>
<tr>
<td>10&quot;</td>
<td>458 lbs.</td>
<td>508 lbs.</td>
<td>407 lbs.</td>
<td>508 lbs.</td>
</tr>
<tr>
<td>12&quot;</td>
<td>662 lbs.</td>
<td>580 lbs.</td>
<td>n/a</td>
<td>580 lbs.</td>
</tr>
<tr>
<td>14&quot;</td>
<td>780 lbs.</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

### PERFORMANCE DATA

**CV Rating at 100% of Stem Rise**

<table>
<thead>
<tr>
<th>VALVE PATTERN</th>
<th>CV RATING REFERENCE</th>
<th>3D-2S</th>
<th>3D-2'/S</th>
<th>3D-3S</th>
<th>3D-4S</th>
<th>3D-5S</th>
<th>3D-6S</th>
<th>3D-8S</th>
<th>3D-10S</th>
<th>3DS-12S</th>
<th>3DS-14S</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANGLE</td>
<td>A</td>
<td>113</td>
<td>106</td>
<td>241</td>
<td>456</td>
<td>632</td>
<td>863</td>
<td>1239</td>
<td>2330</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>B</td>
<td>85</td>
<td>100</td>
<td>202</td>
<td>356</td>
<td>496</td>
<td>733</td>
<td>1135</td>
<td>1998</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STRAIGHT</td>
<td>A</td>
<td>83</td>
<td>116</td>
<td>204</td>
<td>359</td>
<td>502</td>
<td>746</td>
<td>1065</td>
<td>1851</td>
<td>2446</td>
<td>3000</td>
</tr>
<tr>
<td>B</td>
<td>77</td>
<td>117</td>
<td>191</td>
<td>336</td>
<td>497</td>
<td>701</td>
<td>1079</td>
<td>1826</td>
<td>2430</td>
<td>3225</td>
<td></td>
</tr>
</tbody>
</table>

A. Flowmeter Cv for balancing, minimum reading of 3 feet of pressure drop required for accurate flow determination.

B. Cv for calculating pressure drop across across the valve.

NOTE: Maximum recommended pressure drop should not exceed 25 feet.

*Contact your local Bell & Gossett representative for complete performance curve data.

NA (Not available)

### TYPICAL SPECIFICATION (All models)

Furnish and install as shown on plans, a (select one: straight, angle or straight-angle) ________ pattern valve designed to perform the functions of a center guided nonslam check valve, shutoff valves and calibrated balancing valve.

The valve shall be of heavy-duty (select one: cast iron [NPT & flanged models only] or ductile iron [grooved models only]) ________ iron construction with (select one: NPT connections per ANSI B1.20.1-83 suitable for 175 psi [1207 kPa] working pressure [NPT models only], 125 psi [862 kPa] ANSI flanged connections suitable for 175 psi [1207 kPa] working pressure, or standard cut groove connections suitable for working pressures up to 300 psi [2069 kPa] [straight pattern models only]) ________ connections for operating temperatures up to 250°F (121°C). The valve shall be fitted with a bronze seat, replaceable bronze disc with EPDM seat insert or stainless steel ________ stem, and chatter preventing stainless steel spring. The valve design shall permit repacking under full system pressure.

Cv rating shall be provided at every 10% increment opening for the straight and angle valve. Manufacturer shall supply the Cv rating for read-out of flow determination and system pressure drop.

The valve shall be equipped with brass readout valves (with integral check valve) to facilitate taking differential pressure readings across the orifice for accurate system balance. The valve shall be produced at an ISO 9001 approved facility.

Each valve shall be Bell & Gossett Model No. 3D-______, ________ pattern Triple Duty Valve.