CLA-VAL
FIRE PROTECTION PRODUCTS & APPLICATIONS

Deluge • Pressure Relief • Pressure Reducing
Anti-Cavitation • Pump Start Control & Relief
Solenoid Control • Air Release Valves • Check Valves
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**Cla-Val Certifications, Approvals and Listings**

![UL Listed](#)

![NSF](#)

![ULC Listed](#)

![ABS Assessed](#)

![ISO](#)

![TUV SUD](#)

![SUD Industrie Service](#)

PED Certified Ferrous & Non-Ferrous Castings
Certification Number DGR-0036-QS-748-09

![FM Approved](#)

![MEA Approved](#)
Company Overview

Since 1936, Cla-Val has been a leading manufacturer of automatic control valves, serving waterworks, fire protection, aviation fueling and industrial customers throughout the world. Our commitment to excellence and continuous improvement shows in each valve we produce and in the many new products we introduce to the marketplace each year. Cla-Val is a global company with headquarters and a 20-acre manufacturing/foundry complex in Newport Beach, California, in addition to production/office facilities in Canada, Switzerland, France, New Zealand and the United Kingdom.

Cla-Val’s long history of manufacturing and industry excellence also enables us to provide the industry’s most comprehensive program of hands-on, personalized technical/product training at our in-house training facilities in the US, Canada, Switzerland, the UK, France and New Zealand.

Cla-Val Automatic Control Valves are renowned for their quality and superior performance. The company is also known for consistently excellent customer service as well as innovation, specifically related to products that help to conserve water and energy.

Our company website at www.cla-val.com offers a comprehensive overview of our extensive product line and field service capabilities as well as access to hundreds of technical documents.
Onsite Foundries

Soundcast Company – Sand casting foundry
Griswold Castings – Investment foundry, lost wax process

By having two on-site foundries, Cla-Val is able to provide castings in over 50 different alloys, making our product offering one of the most extensive in the valve industry. It also allows us to quickly fulfill our customers’ unique requirements. A small sample of the many materials our foundries produce include the following alloys:

- Ductile Iron
- Cast Steel
- Stainless Steel
- Monel
- Super Austenitic Stainless Steel
- Super Duplex Stainless Steel
- Titanium

Manufacturing Facilities Overview

- State-of-the-Art Machining Cells in multiple manufacturing locations worldwide: The US, Canada, Switzerland, New Zealand and China
- Large inventory of products on the shelf and ready to ship to meet customers’ immediate needs

Worldwide References, Industry Experience and Capabilities

Because of the superior quality valves we produce, a deep level of technical expertise, and longevity in the industries we serve, Cla-Val’s list of customers includes most water utility companies in North America, virtually every major city in the world, and most countries around the globe.

From fire suppression systems in high-rise buildings and industrial facilities to the rigorous demands of fire protection systems on offshore oil platforms and FPSOs, Cla-Val products provide accurate and reliable service in the most critical of applications including fire pump pressure relief valves, pump suction control valves, deluge valves, pressure regulating valves and backflow preventers. Cla-Val Breach Valves provide protection against draining of fire suppression water supplies in the event of a catastrophic breach in the piping system. Available in a wide range of special alloys, relevant Cla-Val products are MEA and ABS approved; UL and ULC listed; and have Factory Mutual approval.
Cla-Val Statement of Qualifications

Project Experience: Offshore Platforms & FPSO Fire Suppression Systems

Cla-Val has supplied superior quality valves for fire protection applications since the 1950s. You can find Cla-Val automatic control valves in fire suppression systems on offshore oil platforms, aboard Floating Production, Storage and Offloading facilities (FPSO) and in industrial and commercial facilities around the world for: Pressure Reducing; Pressure Relief; Pump Suction Control; Level Control; Deluge Service. The following is a partial list of projects where Cla-Val provided pressure control, deluge service and pump control valves for the fire protection systems in offshore oil platforms and FPSOs.

- ConocoPhillips Bohai Offshore Oil Platform and FPSO, located in China’s Bohai Bay, South China Sea
- British Gas Poinsettia Offshore Oil Platform, located offshore north coast Trinidad and Tobago
- Exxon - Diana Offshore Oil Platform, located in the Gulf of Mexico, 160 miles south of Galveston, Texas
- British Petroleum Mad Dog Offshore Oil Platform, located in the Gulf of Mexico, 190 miles off the coast of New Orleans, Louisiana
- British Petroleum - Holstein Offshore Oil Platform, located in the Gulf of Mexico, 150 miles off the coast of New Orleans, Louisiana
- British Petroleum Thunder Horse Offshore Oil Platform, located in the Gulf of Mexico, 150 miles off the coast of New Orleans, Louisiana
- British Petroleum – Atlantis Offshore Oil Platform, located in the Gulf of Mexico, 150 miles off the coast of New Orleans, Louisiana
- British Petroleum – Clair Offshore Oil Platform, located in the North Sea
- Oil and Natural Gas Corporation (ONGC) Limited – Dehradun, India
- Cla-Val fire protection valves installed on several of The National Oil and Gas Company of India ONGC’s offshore oil platforms, all offshore Mumbai, India

Project Experience: High-Rise Buildings

Cla-Val’s experience in manufacturing automatic control valves for commercial construction projects is unparalleled. Over the past seventy years, as the height of buildings increased and truly redefined the term high-rise, Cla-Val has been on the forefront of supplying products that meet the market’s unique demands. Listed below are several high-rise building projects for which Cla-Val Automatic Control Valves are used in water distribution and fire protection applications:

- Petronas Towers - Kuala Lumpur, Malaysia
  - 1483 feet tall (452 meters), 88 floors
- Burj Khalifa – Dubai, United Arab Emirates
  - 950 meters tall, 189 floors
- Rockefeller Center – New York, New York USA
  - 268 feet tall (82 meters), 26 floors
- Seven World Trade Center – New York, New York USA
  - 520 feet tall (174 meters), 47 floors
Project Experience: High-Rise Buildings

- Trump World Tower – New York, New York USA
  861 feet tall (262 meters), 72 floors
- AOL/Time-Warner National Headquarters – NY, NY USA
  Recently completed two nearly identical towers
  Each 750 feet tall (229 meters), Each with 55 floors
- Exxon Building – New York, New York USA
  750 feet tall (229 meters), 54 floors
- Sears Tower - Chicago, Illinois USA
  1450 feet tall (442 meters), 110 floors
- Trump Tower - Chicago, Illinois USA
  1362 feet tall (415 meters), 96 floors
- John Hancock Building - Chicago, Illinois USA
  1127 feet tall (344 meters), 100 floors
- ComCast Center - Philadelphia, Pennsylvania USA
  975 feet tall (297 meters), 57 floors
- Mellon Bank Center - Philadelphia, Pennsylvania USA
  792 feet tall (241 meters), 54 floors
- Two Cal Plaza – Los Angeles, California USA
  750 feet tall (229 meters), 52 floors
- Mandarin Hotel – Singapore
  - 1200 guest rooms; Voted one the best luxury hotels in Asia, with
    an emphasis on comfort and safety. Scope of supply included water
    distribution as well as fire protection valves throughout the property
- Shanghai Grand Hyatt – Shanghai, People’s Republic of China
  - 87 floors. Scope of supply included water distribution as well as
    fire protection valves throughout the property

Additional Industrial and Commercial Fire Protection Projects

- Assembly Hall Airbus A380 – Toulouse France
  - Pump relief valves for fire protection system
- Grey Mare Mining Project – Australia
  - Located in New South Wales
  - Scope of supply included water distribution as well as fire
    protection valves throughout this mining complex
- BVT Liquefied Natural Gas [LNG]–Costa-Azul/Ensenada, Mexico
  - Scope of supply included water distribution as well as fire
    protection valves throughout this industrial facility
- AKPO Field development project - Nigeria
  - Fire and cooling water systems and high-capacity air
    release/vacuum breaker valves in nickel aluminum bronze
- Terminal Methanier de Fos-Cavaou
  - Air release/vacuum breaker valves for fire protection
    system
- Hallandsas Tunnel Project - Pressure reducing valves for fire protection system
- Guangdong LNG Terminal - Pump pressure relief valves for fire protection system
The Cla-Val Model 100S/2100S Seawater Service Hytrol Valve is a hydraulically operated, diaphragm actuated, globe or angle pattern valve. It consists of three major components: body, diaphragm assembly and cover. The diaphragm assembly is the only moving part.

The body (ductile iron or cast steel) is epoxy coated and contains a removable seat insert. The diaphragm assembly is guided top and bottom by a precision machined stem. It utilizes a non-wicking diaphragm of nylon fabric bonded with synthetic rubber. A resilient synthetic rubber disc retained on three and one half sides by a disc retainer forms a drip-tight seal with the renewable seat when pressure is applied above the diaphragm.

The Model 100S/2100S Seawater Service Hytrol Valve is the basic valve used for seawater applications. It is the valve of choice for system applications requiring deluge, pressure regulation, pressure relief, solenoid operation, rate of flow control, liquid level control or check valve operation. The rugged simplicity of design and packless construction assure a long life of dependable, trouble-free operation. It is available in various materials and in a full range of sizes, with either screwed or flanged ends. Its applications are unlimited.

Principle of Operation

- **Full Open Operation**
  When pressure in the cover chamber is relieved to a zone of lower pressure, the line pressure at the valve inlet opens the valve, allowing full flow.

- **Tight Closing Operation**
  When pressure from the valve inlet is applied to the cover chamber, the valve closes drip-tight.

- **Modulating Action**
  The valve holds any intermediate position when operating pressures are equal above and below the diaphragm. A Cla-Val “modulating” pilot control will allow the valve to automatically compensate for line pressure changes.
Specifications

Available Sizes

<table>
<thead>
<tr>
<th>Pattern</th>
<th>Threaded</th>
<th>Flanged</th>
<th>Grooved End</th>
</tr>
</thead>
<tbody>
<tr>
<td>Globe</td>
<td>1&quot; - 3&quot;</td>
<td>1 1/4&quot; - 36&quot;</td>
<td>1 1/2&quot; - 3&quot;, 2 1/2&quot;, 3&quot;, 4&quot;, 6&quot;, 8&quot;</td>
</tr>
<tr>
<td>Angle</td>
<td>1&quot; - 3&quot;</td>
<td>2&quot; - 24&quot;</td>
<td>2&quot; - 3&quot; - 4&quot;</td>
</tr>
</tbody>
</table>

Pressure Ratings (Recommended Maximum Pressure - psi)

<table>
<thead>
<tr>
<th>Valve Body &amp; Cover</th>
<th>Pressure Class</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ANSI Standards*</td>
</tr>
<tr>
<td>Grade</td>
<td>Material</td>
</tr>
<tr>
<td>ASTM A536</td>
<td>Ductile Iron</td>
</tr>
<tr>
<td>ASTM A216-WCB</td>
<td>Cast Steel</td>
</tr>
<tr>
<td>ASTM B62</td>
<td>Bronze</td>
</tr>
</tbody>
</table>

Note:  
* ANSI standards are for flange dimensions only.  
Flanged valves are available faced but not drilled. 
† End Details machined to ANSI B2.1 specifications. 
Valves for higher pressure are available; consult factory for details.

Materials

<table>
<thead>
<tr>
<th>Component</th>
<th>Standard Material Combinations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body &amp; Cover</td>
<td>Ductile Iron, Cast Steel, Bronze, Stainless Steel Type 316, Ni. AL. Bronze, Super Duplex Stainless Steel</td>
</tr>
<tr>
<td>Available Sizes</td>
<td>1 1/2&quot; - 36&quot;, 1 3/4&quot; - 16&quot;, 1 1/2&quot; - 16&quot;, 1 3/4&quot; - 16&quot;, 1 1/2&quot; - 16&quot;</td>
</tr>
<tr>
<td>Disc Retainer &amp; Diaphragm Washer</td>
<td>Cast Iron, Cast Steel, Bronze, Bronze, Monel, Super Duplex Stainless Steel</td>
</tr>
<tr>
<td>Trim: Disc Guide, Seat &amp; Cover Bearing</td>
<td>Bronze is Standard Stainless Steel is optional</td>
</tr>
<tr>
<td>Disc</td>
<td>Buna-N® Rubber</td>
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<tr>
<td>Diaphragm</td>
<td>Nylon Reinforced Buna-N® Rubber</td>
</tr>
<tr>
<td>Stem, Nut &amp; Spring</td>
<td>Stainless Steel</td>
</tr>
</tbody>
</table>

For material options not listed, consult factory. 
Cla-Val manufactures valves in more than 50 different alloys.

When Ordering, Please Specify:

1. Model No. 100S or No. 2100S
2. Valve Size
3. Pattern - Globe or Angle
4. Pressure Class
5. Screwed or Flanged
6. Temperature and fluid to be handled.
7. Static and Flowing Line Pressure.
8. Body & Trim Material
9. Desired Options
10. When Vertically Installed
### Functional Data

<table>
<thead>
<tr>
<th>Valve Size</th>
<th>Inches</th>
<th>1</th>
<th>1½</th>
<th>1¼</th>
<th>2</th>
<th>2½</th>
<th>3</th>
<th>4</th>
<th>6</th>
<th>8</th>
<th>10</th>
<th>12</th>
<th>14</th>
<th>16</th>
<th>18</th>
<th>20</th>
<th>24</th>
<th>30</th>
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<tr>
<td>mm.</td>
<td></td>
<td>25</td>
<td>32</td>
<td>40</td>
<td>50</td>
<td>65</td>
<td>80</td>
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<td>450</td>
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<td>30</td>
<td>54</td>
<td>85</td>
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<td>200</td>
<td>440</td>
<td>770</td>
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<td>5345</td>
<td>7655</td>
<td>10150</td>
<td>14020</td>
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<tr>
<td>Globe Pattern</td>
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<td>7.2</td>
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<td>20</td>
<td>28</td>
<td>48</td>
<td>106</td>
<td>185</td>
<td>299</td>
<td>414</td>
<td>552</td>
<td>752</td>
<td>894</td>
<td>1286</td>
<td>1837</td>
<td>2436</td>
<td>3200</td>
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<td>Angle Pattern</td>
<td>Liters/Sec. (l/s.)</td>
<td>6.5</td>
<td>6.5</td>
<td>7</td>
<td>15</td>
<td>24</td>
<td>33</td>
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<td>130</td>
<td>238</td>
<td>378</td>
<td>600</td>
<td>734</td>
<td>1008</td>
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<td>1311</td>
<td>2388</td>
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<td>Equivalent Length of Pipe</td>
<td>Feet (ft.)</td>
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<td>19</td>
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<td>53</td>
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<td>Angle Pattern</td>
<td>Feet (ft.)</td>
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<td>Meters (m.)</td>
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<td>5.7</td>
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<td>7.1</td>
<td>4.4</td>
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<td>3.7</td>
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<td>—</td>
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<tr>
<td>Liquid Displaced from Cover Chamber When Valve Opens</td>
<td>U.S. Gal.</td>
<td>0.02</td>
<td>0.02</td>
<td>0.02</td>
<td>0.03</td>
<td>0.04</td>
<td>0.08</td>
<td>0.17</td>
<td>0.53</td>
<td>1.26</td>
<td>2.51</td>
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<td>6.5</td>
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<td>11</td>
<td>12</td>
<td>29</td>
<td>42</td>
<td>90</td>
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<tr>
<td>Liquid Displaced from Cover Chamber When Valve Opens</td>
<td>Litres</td>
<td>20.7</td>
<td>75.7</td>
<td>75.7</td>
<td>121</td>
<td>163</td>
<td>303</td>
<td>643</td>
<td>——</td>
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<tr>
<td>Liquid Displaced from Cover Chamber When Valve Opens</td>
<td>ml</td>
<td>20.7</td>
<td>75.7</td>
<td>75.7</td>
<td>121</td>
<td>163</td>
<td>303</td>
<td>643</td>
<td>——</td>
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</tr>
</tbody>
</table>

### Model 1000-01 Flow Chart

(Models 100 & 2100 Series)

- **Angle Valve Sizes (Inches):** 1 1/4 1 1/2 2 2 1/2 3 4 6 8 10 12 14 16 20 24 30 36
- **Globe Valve Sizes (Inches):** 1 1/4 1 1/2 2 2 1/2 3 4 6 8 10 12 14 16 20 24 30 36

**Flow Rate (gpm)**

- **Pressure Drop (psi)**

Where:

- CV = U.S. (gpm) @ 1 psi differential at 60°F water or
  - (l/s) @ 1 bar (14.5 PSIG) differential at 15°C water
- d = inside pipe diameter of Schedule 40 Steel Pipe (inches)
- f = friction factor for clean, new Schedule 40 pipe (dimensionless) (from Cameron Hydraulic Data, 18th Edition, P 3-119)
- K = Resistance Coefficient (calculated)
- L = Equivalent Length of Pipe (feet)
- Q = Flow Rate in U.S. (gpm) or (l/s)
- V = Fluid Velocity (feet per second) or (meters per second)
- ΔP = Pressure Drop in (psi) or (bar)

Formulas for computing CV Factor, Flow (Q) and Pressure Drop (ΔP):\

\[ \frac{Q}{\sqrt{\Delta P}} = CV \]

\[ Q = CV \sqrt{\Delta P} \]

\[ \Delta P = \left(\frac{Q}{CV}\right)^2 \]

**K Factor** (Resistance Coefficient) The Value of K is calculated from the formula: \[ K = \frac{894d^4}{CV^2} \]

**Equivalent Length of Pipe** Equivalent lengths of pipe (L) are determined from the formula: \[ L = \frac{Kd}{12f} \]

**Fluid Velocity** Fluid velocity can be calculated from the following formula: \[ V = \frac{4085Q}{d^2} \]

*Estimated
Cla-Val Control Valves operate with maximum efficiency when mounted in horizontal piping with the main valve cover UP, however, other positions are acceptable. Due to adequate space above and around the valve for service personnel should be considered essential. A regular maintenance program should be established based on the specific application data. However, we recommend a thorough inspection be done at least once a year. Consult factory for specific recommendations.
The Cla-Val Model 100G/2100G Deluge Valve is designed for use in controlling water flow to Deluge, Pre-Action, or Foam-Water type fire protection sprinkler systems. This valve is UL Listed in "Special Systems Water Control Valves Class I (VLFT) for both vertical and horizontal installation applications. The Model 100G/2100G is UL Listed for operation manually, electronically, with hydraulic or pneumatic pilot control system for a wet pilot line of sprinklers. It is a hydraulically-operated, diaphragm-actuated, globe or angle pattern Deluge Valve. It consists of three major components: the body, the cover, and the diaphragm assembly. The only moving part is the diaphragm assembly. Packless construction and simplicity of design assures long service life and dependable low maintenance for this valve. All ferrous parts are fusion epoxy coated internally and externally for added corrosion resistance, along with a Dura Kleen™ stem.

The 100GS/2100GS is manufactured in materials suitable for seawater.

**Typical Application**

The Model 100G/2100G is installed to control the water flow to the sprinklers in Deluge, Pre-Action, or Foam-Water type systems. A simplified system is used to illustrate typical operation. The Model 100G/2100G Deluge Valve (3) is maintained in the closed position by means of system water pressure controlled by a pilot control (4). When the pilot control valve receives a signal from the fire detection system, it allows the deluge valve to open. Firefighting water (1) then enters system piping (5) and discharges from sprinklers (6).

**Specifications**

- **Sizes**
  - Globe: 3" – 12"
  - Angle: 3" – 12"

- **End Details**
  - Ductile Iron 150 ANSI B16.42 flanged
  - Cast Steel 150 ANSI B16.5 flanged

- **Pressure Rating**
  - 150 class, 250 psi maximum (Ductile Iron)
  - 150 class, 285 psi maximum (All other materials)
  - 300 class, 300 psi maximum (All materials)
  - Water, to 180°F MAX.

- **Temperature Range**
  - Max. 200°F

- **Main Valve Body & Cover**
  - Ductile Iron ASTM A-536* UL, ULC
  - Cast Steel ASTM A216-WCB* UL, ULC
  - Nickel Aluminum Bronze ASTM B148 UL, ULC
  - Naval Bronze ASTM B61 UL, ULC
  - 316 Stainless Steel - ASTM A743 Grades CF3M and CFM8
  - Super Austenitic Stainless Steel - ASTM A351 Grade CK3MCuN (SMO 254)
  - Super Duplex Stainless Steel - ASTM A890 Grade 5A (CE3MN)

- **Main Valve Internal Trim**
  - Bronze ASTM B61 • Monel QQ-N-281 Class B
  - Buna-N® synthetic rubber

*optional Teflon™ coated seat upon request.

**Seawater Service Option**

- **Sizes**
  - Globe: 3" - 12" flanged
  - Angle: 3" - 12" flanged

Consult factory for materials and flange ratings.

**When Ordering, Please Specify**

1. Model No. 100GS or 2100GS
2. Size
3. Body and Cover Material
4. Globe or Angle Pattern
5. Pressure Class
6. Internal Trim Material

*Internally & Externally Epoxy Coated
To calculate the maximum wet sprinkler pilot height above the valve, use the graph below.

**Functional Data**

<table>
<thead>
<tr>
<th>Valve Size (In.)</th>
<th>3</th>
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**CLA-VAL**

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The Cla-Val Model Ti 100GS Deluge Valve is designed for use in controlling water flow to Deluge, Pre-Action, or Foam-Water type fire protection sprinkler systems. This valve is U.L. Listed in "Special Systems Water Control Valves Class I (VLFT)". The Model Ti 100GS is a hydraulically-operated, diaphragm-actuated, globe or angle pattern Deluge Valve. It consists of three major components: the body, the cover, and the diaphragm assembly. The only moving part is the diaphragm assembly. Packless construction and simplicity of design assures long service life and dependable low maintenance for this valve.

The Ti 100GS are manufactured in materials suitable for seawater.

Typical Application
The Model Ti 100GS is installed to control the water flow to the sprinklers in Deluge, Pre-Action, or Foam-Water type systems. A simplified system is used to illustrate typical operation. The Model Ti 100GS Deluge Valve (3) is maintained in the closed position by means of system water pressure controlled by a pilot control (4). When the pilot control valve receives a signal from the fire detection system, it allows the deluge valve to open. Firefighting water (1) then enters system piping (5) and discharges from sprinklers (6).

Specifications
Sizes: Globe: 3” – 4” – 6”
End Details: ISO 7005-2 PN 10-16
150 ANSI B16.42 flanged
Pressure Rating: 26 bar max.
Temperature Range: Water, to 180°F MAX.
Material: Main Valve Body & Cover
Titanium ASTM B367 Grade C2
Standard Main Valve Trim:
Titanium ASTM B367, Grade C2
Diaphragm and Disc:
Buna-N, synthetic rubber

Friction Loss
For use in hydraulically calculated systems, friction loss equivalent to:
Ti 100GS (Globe):
3” Size=42 Ft. of 3” Pipe
4” Size=92 Ft. of 4” Pipe
6” Size=116 Ft. of 6” Pipe

When Ordering, Please Specify
1. Catalog No. Ti 100GS
2. Size
3. Pressure Class
4. Internal Trim Material
To calculate the maximum wet sprinkler pilot height above the valve, use the graph below.

**CLA-VAL TI 100GS WET PILOT LINE DESIGN CRITERIA**

*For All Valve Sizes*

**Functional Data**

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<th>Valve Size</th>
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<th>4</th>
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**Cla-Val Titanium Valves: the lighter weight alternative with heavyweight capabilities**

The UL Listed Cla-Val Model 100GS Ti is ideal for applications where valves are exposed to seawater, chlorine, and other aggressive media. Constructed of a titanium alloy, the 100GS Ti is designed to control water flow to deluge, pre-action or foam-water type fire protection sprinkler systems.

**The Titanium Advantage**

- Titanium is as strong as steel but 50% lighter -- a distinct advantage when the valves are installed on offshore platforms or FPSOs
- Titanium is not only high strength, it is also low density and exceptionally corrosion resistant
- Because titanium can withstand harsh environmental conditions, service life is extended, making titanium valves more cost effective than other available options
- Titanium is virtually immune to the following material failures:
  - Corrosion fatigue
  - Pitting attack
  - Erosion
  - Galvanic attack
  - Microbiological corrosion

To learn more, visit [www.cla-val.com](http://www.cla-val.com) and type 100GS Ti in the search field.
**Got Vibration?**

*Cla-Val valves with anti-cavitation trim are the ideal solution for applications with a high probability of vibration*

- Cla-Val’s patented KO anti-cavitation trim helps protect piping from damage caused by vibration
- Minimizes vibration across the relief valve during pump starts
- Alleviates vibration caused by cavitation when discharging to atmosphere or in other applications with excessive pressure fluctuations

**Other advantages include the following:**
- Special alloys and metals available, including Monel, and 316 Stainless Steel
- Existing Cla-Val control valves can field retrofitted with KO anti-cavitation trim
- Proven track record of trouble-free performance on offshore platforms around the world
- Backed by more than seventy years of industry experience
- Three-year warranty

**Typical Cla-Val Anti-Cavitation Application**

To learn more, visit www.cla-val.com and click the “Vibration” Quick Link
Anti-Cavitation Hytrol Valve

- Virtually Cavitation Free Operation
- Severe Service Design - High Pressure Differentials
- Reduced Noise and Vibration
- 316 Stainless Steel Disc Guide and Seat Standard
- Drip-Tight, Positive Sealing
- Service Without Removal From Line
- Retrofit to Standard Hytrol Valves

The Cla-Val Model 100-01KO Anti-Cavitation Hytrol Valve is designed for applications where there is a high potential for damage from cavitation. Specify this valve series for a wide variety of control valve applications having pressure differentials up to 300 psid or for relief valves having atmospheric discharge up to 150 psid.

The 100-01KO Hytrol main valve provides optimum internal pressure control through a unique anti-cavitation trim design. Constructed of 316 Stainless Steel, the seat and disc guide trim components feature dual interlocked sleeves containing radial slots that deflect internal flow to impinge upon itself in the center of the flow path, harmlessly dissipating the potential cavitation damage. This unique design also lessens the possibility of fouling if large particles in the water are present due to the large flow path of the radial slots.

The 100-01KO Hytrol is the basic valve used in Cla-Val Automatic Control Valves for high differential applications requiring remote control, pressure regulation, solenoid operation, rate of flow control, or liquid level control.

The Anti-Cavitation Trim components can be retrofitted to existing valves if the application indicates an appropriate need. Please consult factory for details.

### Principle of Operation

- **Full Open Operation**
  When pressure in the cover chamber is relieved to a zone of lower pressure, the line pressure at the valve inlet opens the valve, allowing full flow.

- **Tight Closing Operation**
  When pressure from the valve inlet is applied to the cover chamber, the valve closes drip-tight.

- **Modulating Action**
  The valve holds any intermediate position when operating pressures are equal above and below the diaphragm. A Cla-Val “Modulating” Pilot Control will allow the valve to automatically compensate for line pressure changes.
### Specifications

**Pattern**
- Globe
- Angle
- Grooved End

**Size**
- 1" - 36" (1" - 16" & 24"
- 1 1/2" - 8"

### Pressure Ratings

(Recommended Maximum Pressure - psi)

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</tr>
<tr>
<td>ASTM A536</td>
<td>Ductile Iron</td>
<td>B16.42</td>
<td>250</td>
<td>400</td>
</tr>
<tr>
<td>ASTM A216-WCB</td>
<td>Cast Steel</td>
<td>B16.5</td>
<td>285</td>
<td>400</td>
</tr>
<tr>
<td>ASTM B62</td>
<td>Bronze</td>
<td>B16.24</td>
<td>225</td>
<td>400</td>
</tr>
</tbody>
</table>

Note:
- ANSI standards are for flange dimensions only.
- Flanged valves are available faced but not drilled.
- End Details machined to ANSI B2.1 specifications.
- Valves for higher pressure are available; consult factory for details.

### Operating Temp. Range

- -40 to 180°F

### Materials

**Component**
- Body & Cover: Ductile Iron, Cast Steel, Bronze
- Available Sizes: 1" - 36", 1" - 16", 1" 16"* 1" 16"*
- Disc Retainer & Diaphragm Washer: Cast Iron, Cast Steel, Bronze
- Trim: Disc Guide, Seat & Cover Bearing: Stainless Steel is Standard
- Disc: Buna-N® Rubber
- Diaphragm: Nylon Reinforced Buna-N® Rubber
- Stem, Nut & Spring: Stainless Steel

For material options not listed consult factory.

Cla-Val manufactures valves in more than 50 different alloys.

### Valve Size (Inches)

<table>
<thead>
<tr>
<th>Valve Size</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1</td>
<td>1 1/4</td>
<td>1 1/2</td>
</tr>
<tr>
<td>B</td>
<td>2</td>
<td>2 1/2</td>
<td>3</td>
</tr>
<tr>
<td>C</td>
<td>3</td>
<td>3 1/2</td>
<td>4</td>
</tr>
<tr>
<td>D</td>
<td>4</td>
<td>4 1/2</td>
<td>5</td>
</tr>
</tbody>
</table>

**Valve Body & Cover**
- A Threaded
- AA 150 ANSI
- AAA 300 ANSI
- B Dia.
- C Max.
- DD Threaded
- DD 150 ANSI
- DDD 300 ANSI
- DDDD Grooved End
- EE Grooved End
- FF 300 ANSI
- GG Threaded
- GG 150 ANSI
- GGG Grooved End
- H NPT Body Tapping
- J NPT Cover Center Plug
- KK NPT Cover Tapping
- Stem Travel
- Approx. Ship Wt. Lbs.

**Fluids**
- APPROVED
  - (4" - 24")

**Model 100-01KO**

**Pattern**
- Globe
- Angle
- Grooved End

**Flanges**
- Flanged
- Grooved

**Materials**
- Standard Material Combinations
  - Body & Cover: Ductile Iron, Cast Steel, Bronze
  - Available Sizes: 1" - 36", 1" - 16", 1" 16"
  - Disc Retainer & Diaphragm Washer: Cast Iron, Cast Steel, Bronze
  - Trim: Disc Guide, Seat & Cover Bearing: Stainless Steel is Standard
  - Disc: Buna-N® Rubber
  - Diaphragm: Nylon Reinforced Buna-N® Rubber
  - Stem, Nut & Spring: Stainless Steel

For material options not listed consult factory.

Cla-Val manufactures valves in more than 50 different alloys.

Cla-Val Control Valves with KO ANTI-CAVITATION Trim operate with maximum efficiency when mounted in horizontal piping with the main valve cover Up. We recommend isolation valves be installed on inlet and outlet for maintenance. Adequate space above and around the valve for service personnel should be considered essential. A regular maintenance program should be established based on the specific application data. However, we recommend a thorough inspection be done at least once a year. Consult factory for specific recommendations.
Equivalent liquid Displaced from Length of Cover Chamber When K Factor Globe Pattern

The Value of K is calculated from the formula:

\[ K = \frac{894d^4}{C_v^2} \]

K Factor (Resistance Coefficient)
The Value of K is calculated from the formula: \( K = \frac{894d^4}{C_v^2} \) (U.S. system units)

Equivalent Length of Pipe

Equivalent lengths of pipe (L) are determined from the formula: \( L = \frac{Kd}{12f} \) (U.S. system units)

Fluid Velocity

Fluid velocity can be calculated from the following formula: \( V = \frac{4085Q}{d^2} \) (U.S. system units)

For assistance in selecting appropriate valve options or valves manufactured with special design requirements, please contact our Regional Sales Office or Factory.

| Valve Size | Inches | 1 | 1½ | 1¾ | 2 | 2½ | 3 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 24 | 30 | 36 |
|------------|--------|---|----|----|---|----|---|---|---|---|----|----|----|----|----|----|----|----|----|----|
| C\(_V\) Factor | | | | | | | | | | | | | | | | | | | | |
| Globe Pattern | Gal./Min. (gpm.) | 14 | 14 | 14 | 25 | 37 | 52 | 90 | 218 | 362 | 660 | 810 | 1100 | 1200 | 1550 | 1950 | 3900 | 6100 | 9150 |
| Angle Pattern | Gal./Min. (gpm.) | 15 | 15 | 15 | 26 | 39 | 55 | 95 | 232 | 388 | 749 | 790 | 1075 | 1175 | —— | —— | —— | —— | —— |
| Equiv. Length of Pipe | Litres/Sec. (l/s.) | 4.8 | 6.2 | 9.4 | 13.2 | 22.8 | 56 | 93 | 115 | 258 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 |
| Angle Pattern | Litres./Sec. (l/s.) | 3.5 | 3.5 | 3.5 | 6.0 | 9.1 | 15.3 | 25.5 | 56 | 81 | 175 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 |
| Angle Pattern | Litres./Sec. (l/s.) | 3.2 | 3.2 | 3.2 | 5.9 | 9.4 | 15.6 | 25.8 | 56 | 81 | 175 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 |
| Angle Pattern | Litres./Sec. (l/s.) | 2.9 | 2.9 | 2.9 | 5.6 | 9.2 | 15.4 | 25.6 | 56 | 81 | 175 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 |

For model 100-01KO:

C\(_V\) Factor

Formulas for computing C\(_V\) Factor, Flow (Q) and Pressure Drop (\(\Delta P\)):

\[ C_v = \sqrt{\frac{Q}{\Delta P}} \quad Q = C_v \sqrt{\Delta P} \quad \Delta P = \left(\frac{Q}{C_v}\right)^2 \]

Where:

- \( C_v \) = U.S. (gpm) @ 1 psi differential at 60°F water or \( = \) (l/s) @ 1 bar (14.5 PSIG) differential at 15°C water
- \( \Delta P \) = pressure drop (psi) or (bar)
- \( d \) = inside pipe diameter of Schedule 40 Steel Pipe (inches)
- \( f \) = friction factor for clean, new Schedule 40 pipe (dimensionless) (from Cameron Hydraulic Data, 18th Edition, P 3-119)
- \( L \) = Equivalent Length of Pipe (feet)
- \( Q \) = Flow Rate in U.S. (gpm) or (l/s)
- \( V \) = Fluid Velocity (feet per second) or (meters per second)

Notes: On Operating Differential

1. For atmospheric discharge, the maximum inlet pressure cannot exceed 150 psi.
2. For pressure differentials greater than 300 psi the maximum flow velocity should not exceed 18 ft/sec.
3. Flow velocities greater than 25 ft/sec are not recommended.
4. Recommended minimum flow velocity is 1 ft/sec.
5. Consult factory for conditions exceeding these recommendations.
100-01KO Hytrol Main Valve with Anti-Cavitation Trim Purchase Specifications

**Function**
The valve shall be hydraulically operated, single diaphragm actuated, globe pattern. The valve shall consist of three major components: the body with seat installed, the cover with bearing installed, and the diaphragm assembly. The diaphragm assembly shall be the only moving part and shall form a sealed chamber in the upper portion of the valve, separating operating pressure from line pressure. Packing glands and/or stuffing boxes are not permitted and there shall be no pistons operating the main valve or pilot controls. Ductile Iron is standard, other materials shall be available. No fabrication or welding shall be used in the manufacturing process.

**Description**
The anti-cavitation features of the seat and disc guide detail shall have flow slots equally spaced around their perimeters. The seat slots shall be oriented around the perimeter of the seat so that fluid entering the valve shall flow through the seat slot detail such that the fluid flow converges in the center chamber of the seat allowing potential cavitation to dissipate. The disc guide slots shall be positioned around the perimeter of the disc guide, configured and oriented in an angular direction so that fluid flow exiting through the slots is diverted away from direct impact into pressure boundary surfaces. Flow exiting the disc guide slots is directed in an angular path to increase the distance between the slot geometry and pressure boundary surfaces. If cavitation conditions exist, the increased distance between the slots and pressure boundary surfaces minimizes the potential for damage by allowing the cavitation bubbles to dissipate before they come in contact with pressure boundary surfaces. Anti-cavitation characteristics shall be controlled by the described slotted seat and disc guide components. The disc guide shall slide in the seat and allow controlled flow through the seat slots into the central seat chamber where flow shall continue from the seat chamber and exit through the angularly oriented slots of the disc guide. The seat and disc guide features used together shall provide anti-cavitation characteristics suitable for applications where a large controlled pressure drop is desired.

The flexible, non-wicking, FDA approved diaphragm shall consist of nylon fabric bonded with synthetic rubber compatible with the operating fluid. The diaphragm must withstand a Mullins burst test of a minimum of 600 psi per layer of nylon fabric and shall be cycle tested 100,000 times to insure longevity. The diaphragm shall be fully supported in the valve body and cover by machined surfaces which support no less than one-half of the total surface area of the diaphragm in either the fully open or fully closed position. The valve seat in six inch and smaller size valves shall be threaded into the body. Valve seat in eight inch and larger size valves shall be retained by flat head machine screws for ease of maintenance. The seat shall be of the solid, one-piece design and shall have a minimum of a five degree taper on the seating surface for positive drip-tight shut-off. Pressed-in bearings and/or multi-piece seats shall not be permitted.

To insure proper alignment of the valve stem, the valve body and cover shall be machined with a locating lip. No "pinned" covers to the valve body shall be permitted. All necessary repairs and/or modifications other than replacement of the main valve body shall be possible without removing the valve from the pipeline.

The valve manufacturer shall warrant the valve to be free of defects in material and workmanship for a period of three years from date of shipment, provided the valve is installed and used in accordance with all applicable instructions. The valve manufacturer shall be able to supply a complete line of equipment from 11⁄4” through 48” sizes and a complete selection of complementary equipment.

**Material Specification**

| Valve Size: | Main Valve Body and Cover: | Main Valve Trim: | End Detail: | Pressure Rating: | Temperature Range: | Coating: | Desired Options: |

**Application Information**

| Inlet/Outlet Pressures: | Flow Rate: | Function (i.e. - Pressure Reducing, Pressure Relief, etc.): |

This valve shall be a Cla-Val Model No. 100-01KO Hytrol Main Valve with Anti-Cavitation Trim as manufactured by Cla-Val, Newport Beach, CA

**Note:** Add this Hytrol Anti-Cavitation Trim Purchase Specification to main valve specification for control valves where there is a high potential for cavitation damage. Please contact our Regional Sales Offices or Factory for assistance.
Seawater Service Reduced Port Valve

Principle of Operation

- **Full Open Operation**
  - When pressure in the cover chamber is relieved to a zone of lower pressure, the line pressure at the valve inlet opens the valve, allowing full flow.

- **Tight Closing Operation**
  - When pressure from the valve inlet is applied to the cover chamber, the valve closes drip-tight.

- **Modulating Action**
  - The valve holds any intermediate position when operating pressure is equal above and below the diaphragm. Using a Cla-Val “Modulating” Control will allow the valve to automatically compensate for line pressure changes.
Model 100-29S Flow Chart (Based on normal flow through a wide open valve)

### Functional Data

<table>
<thead>
<tr>
<th>Valve Size</th>
<th>Inches</th>
<th>3</th>
<th>4</th>
<th>6</th>
<th>8</th>
<th>10</th>
<th>12</th>
<th>14</th>
<th>16</th>
<th>18</th>
<th>20</th>
<th>24</th>
<th>30</th>
<th>36</th>
<th>42</th>
<th>48</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mm.</td>
<td>80</td>
<td>100</td>
<td>150</td>
<td>200</td>
<td>250</td>
<td>300</td>
<td>350</td>
<td>400</td>
<td>460</td>
<td>500</td>
<td>600</td>
<td>750</td>
<td>900</td>
<td>1000</td>
<td>1200</td>
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<table>
<thead>
<tr>
<th>C\textsubscript{V} Factor</th>
<th>Globe Pattern</th>
<th>62</th>
<th>136</th>
<th>229</th>
<th>480</th>
<th>930</th>
<th>1458</th>
<th>1725</th>
<th>2110</th>
<th>2940*</th>
<th>3400*</th>
<th>4020</th>
<th>7900*</th>
<th>11910*</th>
<th>14500*</th>
<th>15800*</th>
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</thead>
<tbody>
<tr>
<td>Angle Pattern</td>
<td>15</td>
<td>32.5</td>
<td>55</td>
<td>115</td>
<td>223</td>
<td>350</td>
<td>414</td>
<td>506</td>
<td>705</td>
<td>816</td>
<td>966</td>
<td>1895</td>
<td>2858</td>
<td>3483</td>
<td>3796</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>135</td>
<td>233</td>
<td>545</td>
<td>219</td>
<td>229</td>
<td>298</td>
<td>300</td>
<td>343</td>
<td>917</td>
<td>650</td>
<td>872</td>
<td>1290</td>
<td>2142</td>
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<table>
<thead>
<tr>
<th>Equivalent Length of Pipe</th>
<th>Globe Pattern</th>
<th>Feet (ft.)</th>
<th>293</th>
<th>251</th>
<th>777</th>
<th>748</th>
<th>621</th>
<th>654</th>
<th>750</th>
<th>977</th>
<th>983</th>
<th>1125</th>
<th>3005</th>
<th>2130</th>
<th>2862</th>
<th>4232</th>
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<tbody>
<tr>
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<td>Feet (ft.)</td>
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<td>751</td>
<td>580</td>
<td>CF**</td>
<td>CF**</td>
<td>CF**</td>
<td>CF**</td>
<td>CF**</td>
<td>CF**</td>
<td>CF**</td>
<td>CF**</td>
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<td>CF**</td>
<td>CF**</td>
<td>CF**</td>
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</tr>
<tr>
<td></td>
<td>Meters (m.)</td>
<td>77.6</td>
<td>229</td>
<td>176.9</td>
<td>CF**</td>
<td>CF**</td>
<td>CF**</td>
<td>CF**</td>
<td>CF**</td>
<td>CF**</td>
<td>CF**</td>
<td>CF**</td>
<td>CF**</td>
<td>CF**</td>
<td>CF**</td>
<td>CF**</td>
<td>CF**</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>K Factor</th>
<th>Globe Pattern</th>
<th>Feet (ft.)</th>
<th>20.6</th>
<th>12.7</th>
<th>23.1</th>
<th>15.7</th>
<th>10.4</th>
<th>8.5</th>
<th>8.9</th>
<th>10.2</th>
<th>8.4</th>
<th>8.8</th>
<th>19.1</th>
<th>10.5</th>
<th>9.7</th>
<th>12.3</th>
<th>17.8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angle Pattern</td>
<td>Feet (ft.)</td>
<td>12.9</td>
<td>22.3</td>
<td>12.2</td>
<td>CF**</td>
<td>CF**</td>
<td>CF**</td>
<td>CF**</td>
<td>CF**</td>
<td>CF**</td>
<td>CF**</td>
<td>CF**</td>
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<td>CF**</td>
<td>CF**</td>
<td>CF**</td>
<td>CF**</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Liquid Displaced from Cover Chamber When Valve Opens</th>
<th>Fl. Oz</th>
<th>U.S. Gal.</th>
<th>Litres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Globe Pattern</td>
<td></td>
<td>0.32</td>
<td>0.12</td>
</tr>
<tr>
<td>Angle Pattern</td>
<td></td>
<td>.08</td>
<td>.30</td>
</tr>
<tr>
<td></td>
<td></td>
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<td>.64</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.53</td>
<td>2.0</td>
</tr>
</tbody>
</table>

\*Estimated

**Consult Factory

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### C\textsubscript{V} Factor

Formulas for computing C\textsubscript{V} Factor, Flow (Q) and Pressure Drop (\(\Delta P\)):

\[ C_V = \frac{Q}{\Delta P} \]

\[ Q = C_V \sqrt{\Delta P} \]

\[ \Delta P = \left( \frac{Q}{C_V} \right)^2 \]

### K Factor (Resistance Coefficient)

The Value of K is calculated from the formula:

\[ K = \frac{894d^4}{C_V^2} \]

### Equivalent Length of Pipe

Equivalent lengths of pipe (L) are determined from the formula:

\[ L = \frac{Kd}{12f} \]

(U.S. system units)

### Fluid Velocity

Fluid velocity can be calculated from the following formula:

\[ V = \frac{0.4085Q}{d^2} \]

(U.S. system units)

### Model 100-29S Flow Chart

Where:

\[ C_V = \text{U.S. (gpm)} @ 1 \text{ psi differential at 60° F water} \]

\[ = (l/s) @ 1 \text{ bar (14.5 PSIG) differential} \]

\[ d = \text{inside pipe diameter of Schedule 40 Steel Pipe (inches)} \]

\[ f = \text{friction factor for clean, new Schedule 40 pipe} \]

\[ \text{(dimensionless)} \] (from Cameron Hydraulic Data, 18th Edition, P 3-119)

\[ K = \text{Resistance Coefficient (calculated)} \]

\[ L = \text{Equivalent Length of Pipe (feet)} \]

\[ Q = \text{Flow Rate in U.S. (gpm) or (l/s)} \]

\[ V = \text{Fluid Velocity (feet per second) or (meters per second)} \]

\[ \Delta P = \text{Pressure Drop in (psi) or (bar)} \]

---

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Specifications

Available Sizes

<table>
<thead>
<tr>
<th>Pattern</th>
<th>Flanged</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angle</td>
<td>4&quot;, 6&quot;, 8&quot;</td>
</tr>
</tbody>
</table>

Pressure Ratings (Recommended Maximum Pressure - psi)

<table>
<thead>
<tr>
<th>Valve Body &amp; Cover</th>
<th>Pressure Class</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Flanged</td>
</tr>
<tr>
<td>Material</td>
<td>Material</td>
</tr>
<tr>
<td>Ductile Iron*</td>
<td>ASTM-A536</td>
</tr>
<tr>
<td>Cast Steel*</td>
<td>ASTM A216</td>
</tr>
<tr>
<td>Naval Bronze</td>
<td>ASTM B61</td>
</tr>
<tr>
<td>Stainless Steel Type 316</td>
<td>ASTM A743-CF-8M</td>
</tr>
<tr>
<td>Ni.AL.Bronze</td>
<td>ASTM B148</td>
</tr>
<tr>
<td>Super Duplex Stainless Steel</td>
<td></td>
</tr>
</tbody>
</table>

Note:
* Fusion Bonded Epoxy Coated Internal and External.
** ANSI standards are for flange dimensions only.
† Flanged valves are available faced but not drilled.
‡ End Details machined to ANSI B2.1 specifications.
†† Consult factory when Maximum Operating Pressure Differential (MOPD) is greater than 400 PSID

Operating Temp. Range

<table>
<thead>
<tr>
<th>Fluids</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-40° to 180° F</td>
</tr>
</tbody>
</table>

Materials

<table>
<thead>
<tr>
<th>Component</th>
<th>Standard Material Combinations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body &amp; Cover</td>
<td>Ductile Iron Cast Steel Bronze Stainless Steel Type 316 Ni. AL. Bronze Super Duplex Stainless Steel</td>
</tr>
<tr>
<td>Available Sizes</td>
<td>1¼&quot; - 48&quot; 1¼&quot; - 16&quot; 1½&quot; -16&quot; 1½&quot; -16&quot; 1¼&quot; -16&quot; 1¼&quot; -16&quot;</td>
</tr>
<tr>
<td>Disc Retainer &amp; Diaphragm Washer</td>
<td>Cast Iron Cast Steel Bronze Ni. AL. Bronze Super Duplex Stainless Steel</td>
</tr>
<tr>
<td>Trim: Disc Guide, Seat &amp; Cover Bearing</td>
<td>Bronze is Standard Stainless Steel is optional</td>
</tr>
<tr>
<td>Disc</td>
<td>Buna-N® Rubber</td>
</tr>
<tr>
<td>Diaphragm</td>
<td>Nylon Reinforced Buna-N® Rubber</td>
</tr>
<tr>
<td>Stem, Nut &amp; Spring</td>
<td>Stainless Steel</td>
</tr>
</tbody>
</table>

For material options not listed, consult factory.
Cla-Val manufactures valves in more than 50 different alloys.

Options

Epoxy Coating - suffix KC
An FDA approved fusion bonded epoxy coating for use with cast iron, ductile iron or steel valves. This coating is resistant to various water conditions, certain acids, chemicals, solvents and alkalis. Epoxy coatings are applied in accordance with AWWA coating specifications C116-03. Do not use with temperatures above 175° F.

Water Treatment Clearance - suffix KW
This additional clearance is beneficial in applications where water treatment compounds can interfere with the closing of the valve. The smaller outside diameter disc guide provides more clearance between the disc guide and the valve seat. This option is best suited for valves used in on-off (non-modulating) service.

Viton® Rubber Parts - suffix KB
Optional diaphragm, disc and o-ring fabricated with Viton® synthetic rubber. Viton® is well suited for use with mineral acids, salt solutions, chlorinated hydrocarbons, and petroleum oils; and is primarily used in high temperature applications up to 250° F. Do not use with epoxy coatings above 175° F.

Heavy Spring - suffix KH
The heavy spring option is used in applications where there is low differential pressure across the valve, and the additional spring force is needed to help the valve close. This option is best suited for valves used in on-off (non-modulating) service.

Low Temperature Diaphragm - suffix KA
This single ply diaphragm uses Buna-N® Synthetic Rubber, formulated for low temperature applications to -65° F. Operating pressures in excess of 125 psi are not recommended.

For assistance in selecting appropriate valve options or valves manufactured with special design requirements, please contact our Regional Sales Office or Factory.
Clara Val Control Valves operate with maximum efficiency when mounted in horizontal piping with the main valve cover UP, however, other positions effective. A regular maintenance program should be established based on the specific application data. We recommend a thorough maintenance program.

### Dimensions

**Valve Size** (Inches)

<table>
<thead>
<tr>
<th>Valve Size</th>
<th>D</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>2.0</td>
<td>1.5</td>
<td>1.0</td>
<td>0.7</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
</tr>
<tr>
<td>4</td>
<td>2.8</td>
<td>2.0</td>
<td>1.5</td>
<td>1.2</td>
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<tr>
<td>6</td>
<td>4.0</td>
<td>3.0</td>
<td>2.5</td>
<td>2.2</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>8</td>
<td>5.6</td>
<td>4.5</td>
<td>4.0</td>
<td>3.7</td>
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### Approx. Ship Wt. Kgs

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<td>41.3</td>
<td>41.1</td>
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### Service and Installation

Clara Val Control Valves operate with maximum efficiency when mounted in horizontal piping with the main valve cover UP, however, other positions are effective. Due to component size and weight of 10 inch and larger valves, installation with cover UP is advisable. We recommend isolation valves be installed on inlet and outlet for maintenance. Adequate space above and around the valve for service personnel should be considered essential. A regular maintenance program should be established based on the specific application data. However, we recommend a thorough inspection be done at least once a year. Consult factory for specific recommendations.

**Service Phone Numbers**

**CLA-VAL CANADA**
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ZAC du Champ du Père
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E-mail: cla-val@cla-val.fr

**CLA-VAL PACIFIC**
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Woolston, Christchurch, 8023
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Phone: 64-3644860
www.cla-valpacific.com
E-mail: info@cla-valpacific.com

For assistance in selecting appropriate valve options or valves manufactured with special design requirements, please contact our Regional Sales Office or Factory.
800GS — MODEL —
800 Series (Tubular Diaphragm Valve)

Deluge Valve

- Low Head Loss
- Cast Steel Construction
- Stainless Steel Pilot and Tubing
- Stainless Steel Solenoid
- Anti-Cavitation Design
- Fusion Coated Epoxy Inside and Out
- Nickel Aluminum Bronze Construction Option (ASTM B148)
- Super Duplex Stainless Steel Construction Option (ASTM A890 GR5A)
- Low Maintenance
- Simple and Reliable Operation
- 1-Year Warranty

The Cla-Val Model 800GS Deluge Valve is a pressure operated, in-line axial valve. A tube diaphragm actuates the valve, which is comprised of three major components: 1) Tube 2) Barrier and 3) Body. There is only one moving part in the valve - the tube diaphragm. There are no shafts, packing, stem guides or springs.

The tube diaphragm is a one piece, homogeneous nitrile rubber part which is extremely durable. The ends of the tube are thick solid rubber, designed to fit between mating flanges. This design eliminates the possibility of cutting the tube diaphragm due to over tightening or piping misalignment during installation.

The tube forms a drip tight seal around the barrier when the pressure is equalized between the valve inlet and the control chamber. When pressure is removed from the control chamber, the valve is open. The minimum recommended operating pressure is 40 P.S.I. of inlet pressure.

The 800GS is manufactured in materials suitable for seawater and freshwater service.

Principle of Operation

Control Options
Electric Operation
Pneumatic Operation
Hydraulic Operation
Manual Operation

Full Open Operation
When pressure in control chamber is relieved, the valve is open.

Tight Closing Operation
Water pressure from valve inlet is applied to the control chamber. Valve closes bubble tight.
Dimensions

**FLOW FACTORS**

<table>
<thead>
<tr>
<th>Valve Size (inches)</th>
<th>4</th>
<th>6</th>
<th>8</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>17.25</td>
<td>18.25</td>
<td>20.00</td>
<td>22.00</td>
</tr>
<tr>
<td>CV (gpm)</td>
<td>340</td>
<td>885</td>
<td>1667</td>
<td>2424</td>
</tr>
<tr>
<td>KV</td>
<td>77.3</td>
<td>201</td>
<td>379</td>
<td>550</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Valve Size (mm)</th>
<th>100</th>
<th>150</th>
<th>200</th>
<th>250</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>438</td>
<td>464</td>
<td>508</td>
<td>559</td>
</tr>
<tr>
<td>D</td>
<td>241</td>
<td>299</td>
<td>356</td>
<td>406</td>
</tr>
<tr>
<td>T-1/T-2 (NPT)</td>
<td>1/2</td>
<td>1/2</td>
<td>1/2</td>
<td>1/2</td>
</tr>
<tr>
<td>T-3 (NPT)</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
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<tr>
<td>Approx. Wt. (Lbs.)</td>
<td>151</td>
<td>196</td>
<td>285</td>
<td>330</td>
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</table>

*Calculated

**MAIN VALVE**

- **Ends:** Flanged ANSI B16.5 (150lb Class)
- **Body:** Cast Steel (ASTM A216 WCB)
- **Tube Diaphragm:** Nitrile Rubber
- **Barrier:** Urethane
- **Bolts:** 316 SS
- **Pressure:** 250 psig (17.24 BAR)
- **Temp. Range:** 32° F to 180° F (0° C to 82.2° C)

**MAIN VALVE OPTIONS**

- **Body:** Nickel Aluminum Bronze (ASTM B148) or Super Duplex SS (ASTM A890 GR5A)

**PILOT VALVE**

- **All Parts:** 316 SS
- **O-Rings:** Nitrile Rubber
- **Control Range:** 20 to 250 PSIG
- **Pilot Pressure Range:** 20 to 250 PSIG
- **Operation:** Latches in operated position; manual reset

**PILOT VALVE OPTIONS**

- **All Parts:** Monel (Alloy 400)
- **Operation:** Non-latching

When Ordering Please Specify:

1. Catalog No. 800GS
2. Valve Size
3. Fluid Being Handled
4. Fluid Temperature Range
5. Inlet Pressure Range
6. Outlet Pressure Range
7. Maximum Differential Pressure
8. Minimum Differential Pressure
9. Maximum Flow Rate

Cla-Val 800 Series Control Valves operate with maximum efficiency when mounted in horizontal or vertical piping. We recommend isolation valves be installed on inlet and outlet for maintenance. Adequate space above and around the valve for service personnel should be considered essential. A regular maintenance program should be established based on the specific application data. However, we recommend a thorough inspection be done at least once a year. Consult factory for specific recommendations.

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Fax: 44-1862-543-423
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E-mail: info@cla-valpacific.com

© COPYRIGHT CLA-VAL 2018 Printed in USA Specifications subject to change without notice.
The Cla-Val Model 100-43 Tubular Diaphragm Valve is a pressure-operated, in-line axial valve. A tube diaphragm actuates the valve, which is comprised of three major components: 1) Tube 2) Barrier and 3) Body. There is only one moving part in the valve — the tube diaphragm. There are no shafts, packing, stem guides or springs.

The tube diaphragm is a one piece, homogeneous nitrile rubber part which is extremely durable. The ends of the tube are thick solid rubber, designed to fit between mating flanges. This design eliminates the possibility of cutting the tube diaphragm due to over tightening or piping misalignment during installation.

The tube forms a drip tight seal around the barrier when the pressure is equalized between the valve inlet and the control chamber. When pressure is removed from the control chamber, the valve is open. The minimum recommended operating pressure is 40 P.S.I. of inlet pressure.

**Principle of Operation**

**Full Open Operation**

The valve opens when pilot set pressure is reached and pressure in the control chamber is relieved.

**Tight Closing Operation**

Water pressure (equal to inlet pressure) from valve inlet or from upstream of valve is applied to the control chamber. Valve closes bubble tight.

**Modulating Action**

The valve tube diaphragm holds any intermediate position when a quantity of water is exhausted from the control chamber via the pilot. The quantity of water in the control chamber is established by the “set pressure” of the pilot.

The control chamber is filled or exhausted to atmosphere, maintaining “set pressure.”
MAIN VALVE

Ends: Flanged ANSI B16.5 (150lb Class)
Body: Cast Steel (ASTM A216 WCB)
Tube Diaphragm: Nitrile Rubber
Barrier: Urethane
Bolts: 316 SS
Pressure: 250 psig (17.24 BAR)
Temp. Range: 32° F to 180° F
(0° C to 82.2° C)

MAIN VALVE OPTIONS

Body: Nickel Aluminum Bronze (Alloy C95800) or Duplex SS (Alloy 2205)

Note: For valve pilot assembly, only use the X43 "Y" Strainer, NOT the X46A Flow Clean Strainer

Dimensions

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<tr>
<th>Valve Size (Inches)</th>
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<th>8</th>
<th>10</th>
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<td>D</td>
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<td>1/2</td>
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<tr>
<td>T-2 (NPT)</td>
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<td>Approx. Wt. (Lbs.)</td>
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<td>D</td>
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FLOW FACTORS

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<th>KV</th>
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<td>4&quot;</td>
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<td>77.3</td>
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<tr>
<td>6&quot;</td>
<td>885</td>
<td>201</td>
</tr>
<tr>
<td>8&quot;</td>
<td>1667</td>
<td>379</td>
</tr>
<tr>
<td>*10&quot;</td>
<td>2424</td>
<td>550</td>
</tr>
</tbody>
</table>

* Calculated

When Ordering Please Specify:
Cla-Val Model X43H Strainer

- Low Pressure Drop
- Ductile Iron Fusion Bonded Epoxy Coated construction with a 316 Stainless Steel Strainer
- Also available: Nickel Aluminum Bronze Construction with a Titanium Strainer
- Large Flow Area H-Style Design
- Service Without Removal From Line

The durable Cla-Val Model X43HL H-Style Strainer is the easiest and most cost effective way to protect piping and equipment from damage caused by pipeline debris. Its large flow area and durable materials of construction means it can withstand the harsh conditions often encountered in refinery and offshore applications. The body port allows for installation of a manual flush valve to clear small amounts of debris from the strainer without removing the cover. For more thorough cleaning, the top cover can easily be removed without taking strainer out of the pipeline. The strainer may be installed in any position, however, installation with cover up is recommended.

Model X43HL Style Strainer
Typical Application

Model X43HL Flow Chart

CV Factor

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<tr>
<th>Strainer Size (inches)</th>
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<th>2 ½</th>
<th>3</th>
<th>4</th>
<th>6</th>
<th>8</th>
<th>10</th>
<th>12</th>
<th>14</th>
<th>16</th>
<th>18</th>
<th>20</th>
<th>24</th>
</tr>
</thead>
<tbody>
<tr>
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<td>150</td>
<td>254</td>
<td>367</td>
<td>654</td>
<td>1644</td>
<td>3922</td>
<td>4566</td>
<td>6800</td>
<td>8949</td>
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<td>85</td>
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<td>395</td>
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<td>2150</td>
<td>2809</td>
<td>3555</td>
<td>4388</td>
<td>6319</td>
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</table>

CV in gpm = gpm @ 1psid head loss • CV in l/s = l/s @ 1bar head loss

Please consult factory to confirm flow data for 36-inch/900 mm and 48-inch/1200 mm strainers.
Specifications

Sizes (Inches): 1½, 2, 2½, 3, 4, 6, 8, 10, 12, 14, 16, 18, 20, 24, 36 and 48
Sizes (mm): 40, 50, 65, 80, 100, 150, 200, 250, 300, 350, 400, 450, 500, 600, 900 and 1200
Ends: Flanged, ANSI Class 150 and 300 (Note: 300# Flanges are Raised Face)
Max Pressure Rating: 150 - 250 psi • 300 - 400 psi
Fluids: Compatible with Materials of Construction
Temperature: Maximum 180°F
Materials:
Body & Cover: Ductile Iron ANSI B16.62; Fusion Bonded Epoxy Coating Standard or NiAlBrz ASTM B148
Cover Seal: Buna-N® Synthetic Rubber
Strainer: 316 Stainless Steel; Ductile Iron, Epoxy Coated Frame or in Titanium on a NiAlBrz Frame
Strainer Mesh Sizes: Standard 10 mesh / 2000 Micron / Openings 0.078 inch Optional .039 and .059 inch openings available
Drain/Blow-Off Connection: Furnished with Plug as Standard.
Bolts: SS 303 or Titanium

Please consult factory to confirm dimensional data for 36-inch/900 mm and 48-inch/1200 mm sizes

Dimensions

<table>
<thead>
<tr>
<th>Strainer Size (inches)</th>
<th>1 ½</th>
<th>2</th>
<th>2 ½</th>
<th>3</th>
<th>4</th>
<th>6</th>
<th>8</th>
<th>10</th>
<th>12</th>
<th>14</th>
<th>16</th>
<th>18</th>
<th>20</th>
<th>24</th>
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<tbody>
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<td>9.06</td>
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<td>11.81</td>
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<td>25.59</td>
<td>31.50</td>
<td>31.50</td>
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<td>43.31</td>
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<td>3.78</td>
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<td>5.91</td>
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</table>

Please consult factory to confirm dimensional data for 36-inch/900 mm and 48-inch/1200 mm sizes
Cla-Val Model X43HL Strainer

- Low Pressure Drop
- Ductile Iron Fusion Bonded Epoxy Coated construction with a 316 Stainless Steel Strainer
- Also available: Nickel Aluminum Bronze Construction with a Titanium Strainer
- Large Flow Area H-Style Design
- Service Without Removal From Line

The durable Cla-Val Model X43HL H-Style Strainer is the easiest and most cost effective way to protect piping and equipment from damage caused by pipeline debris. Its large flow area and durable materials of construction means it can withstand the harsh conditions often encountered in refinery and offshore applications. The body port allows for installation of a manual flush valve to clear small amounts of debris from the strainer without removing the cover. For more thorough cleaning, the top cover can easily be removed without taking strainer out of the pipeline. The strainer may be installed in any position, however, installation with cover up is recommended.

### Model X43HL Style Strainer

#### Typical Application

- High Pressure
- Optional Drain Valve
- Isolation Valve
- X43HL Strainer
- CLA-VAL 90-01KO/690-01KO Pressure Reducing Valve with Anti-Cavitation Trim for Excess Pressure Drop
- Constant Downstream Pressure

### Model X43HL Flow Chart

#### CV Factor

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<th>Strainer Size (inches)</th>
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CV in gpm = gpm @ 1psid head loss * CV in l/s = l/s @ 1 bar head loss

Please consult factory to confirm flow data for 36-inch/900 mm and 48-inch/1200 mm strainers.
### Specifications

**Sizes (Inches):**
- 1½, 2, 2½, 3, 4, 6, 8, 10, 12, 14, 16, 18, 20, 24, 36 and 48

**Sizes (mm):**
- 40, 50, 65, 80, 100, 150, 200, 250, 300, 350, 400, 450, 500, 600, 900 and 1200

**Ends:**
- Flanged, ANSI Class 150 and 300 (Note: 300# Flanges are Raised Face)

**Max Pressure Rating:**
- 150 - 250 psi
- 300 - 400 psi

**Fluids:**
- Compatible with Materials of Construction

**Temperature:**
- Maximum 180°F

**Materials:**
- **Body & Cover:** Ductile Iron ANSI B16.62; Fusion Bonded Epoxy Coating Standard or NiAlBrz ASTM B148
- **Cover Seal:** Buna-N® Synthetic Rubber
- **Strainer:** 316 Stainless Steel; Ductile Iron, Epoxy Coated Frame or in Titanium on a NiAlBrz Frame
- **Strainer Mesh Sizes:** Standard 10 mesh / 2000 Micron / Openings 0.078 inch
- Optional .039 and .059 inch openings available
- **Drain/Blow-Off Connection:** Furnished with Plug as Standard.
- **Bolts:** SS 303 or Titanium

**Dimensions**

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<tr>
<th>Strainer Size (inches)</th>
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Please consult factory to confirm dimensional data for 36-inch/900mm strainers.
**Solid Performer**

**Cla-Val Model X43HL H-Style Strainer**

The durable Cla-Val Model X43HL H-Style Strainer is the easiest and most cost effective way to protect piping and equipment from damage caused by pipeline debris. Its large flow area and durable materials of construction means it can withstand the harsh conditions often encountered in refinery and offshore applications. The body port allows for installation of a manual flush valve to clear small amounts of debris from the strainer without removing the cover. For more thorough cleaning, the top cover can easily be removed without taking strainer out of the pipeline.

**Product Advantages**

The X43HL Strainer provides many product advantages that make it an easy choice when considering the most effective means to protect your system from pipeline debris.

- Available in nickel aluminum bronze with titanium strainer mesh or fusion-bonded epoxy coated ductile iron with 316 Stainless Steel strainer mesh
- Compact profile requires less space than a wye-style strainer which typically has a body configuration that extends well below the pipeline
- Low pressure drop
- Equipped with a plug on both sides of the unit that can be used as drain or flush valves
- Available in 150# class in sizes 2” through 24”
- Lower cost than most other available strainers
- Backed by the assurance that comes from using the most trusted products in the industry

To learn more, visit www.cla-val.com and type X43HL in the search field
From the street to the sprinkler head: Controlling your fire flow

**Trust the valve with over eighty years of proven performance**
- Pump suction control
- Pump relief control
- Air release
- Pressure reducing
- Check valves
- Direct acting pressure relief

**Typical Cla-Val Fire Protection Applications in High Rise Buildings**

To learn more, visit www.cla-val.com and click the “High-Rise Fire Protection Applications” Quick Link
50B-4KG1- Globe
2050B-4KG1- Angle

Fire Protection Pressure Relief Valve

- UL Listed / ULC Listed
- Factory Mutual Approved
- Fast Opening to Maintain Steady Line Pressure
- Accommodates Wide Range of Flow Rates
- Closes Gradually for Surge-Free Operation
- Adjustable Pressure Settings, Not Affected by Pressure At Valve Discharge

The Cla-Val Model 50B-4KG1 Globe / 2050B-4KG1 Angle Pressure Relief Valve is designed specifically to automatically relieve excess pressure in fire protection pumping systems. Pilot controlled, it maintains constant system pressure at the pump discharge within very close limits as demands change. The 50B-4KG1 and 2050B-4KG1 can be supplied with optional internal and external epoxy coating of the main valve wetted surfaces.

Operation Sequence

At pump start, Cla-Val Relief Valve modulates to relieve excess pump capacity, maintaining positive system pressure at the pump discharge.

When fire demand slows or ceases, Cla-Val Model 50B-4KG1 opens, diverting entire pump output to discharge, allowing fire pump to be stopped without causing surging in the lines.

(Please note that if the Model 50B-4KG1 is to be used on a continuous duty basis to maintain fire-system pressure, suitable back pressure must be provided on the valve to prevent cavitation damage. Consult the factory for details.)

Typical Application

KOModel 2050B-4KG1 Pressure Relief Valve (Angle Pattern)

"Fluid Control at It's Best"

Optional UL Listed Materials for Seawater and Severe Service Applications:
- Nickel Aluminum Bronze (NAB) - ASTM B148 Alloy C95800
- Monel - QQ-N-288 Comp B - ASTM A494 Grade M30H
- Cast Steel - ASTM A216 Grade WCB
- 316 Stainless Steel - ASTM A743 Grades CF3M and CFM8
- Super Austenitic Stainless Steel - ASTM A351 Grade CK3MCuN (SMO 254)
- Super Duplex Stainless Steel - ASTM A890 Grade 5A (CE3MN)
Specifications

Sizes

Globe: 2" - 10" flanged
Angle: 2" - 10" flanged

End Details

150 and 300 ANSI B16.42

Pressure Ratings

Class 150 - 250 psi Max.
Class 300 - 300 psi Max.

Water, to 180°F Max.

Standard Materials

Main Valve Body & Cover
Ductile Iron ASTM A536 Grade 65-45-12

Standard Main Valve Trim:
Bronze Seat, Teflon Coated Stainless Steel Stem, Dura-Kleen Stem

Standard Pilot Control System:
Cast Bronze with Stainless Steel trim

Available in the following relief pressure ranges:

20-200 psi (150 Class)
100-300 psi (300 Class)

Adjustment Range

Protective epoxy resin coating of wetted surfaces of main

Optional

valve cast iron components (UL listed HNFX EX2855)

Purchase Specifications

The Fire Pump Pressure Relief Valve shall modulate to relieve excess pressure in a fire protection system. It shall maintain constant pressure in the system regardless of demand changes. It shall be pilot controlled and back pressure shall not affect its set point. It shall be actuated by line pressure through a pilot control system and open fast in order to maintain steady system pressure as system demand decreases. It shall close gradually to control surges and shall re-seat drip-tight within 5% of its pressure setting. The main valve shall be of the hydraulically-operated, pilot-controlled, diaphragm-type, globe or angle valve. It shall have a single, removable, teflon-coated seat, a grooved stem guided at both ends, and a resilient disc with a rectangular cross section, being contained on 3 1/2 sides. No external packing glands shall be permitted and the diaphragm shall not be used as a seating surface. The pilot control shall be a direct-acting, adjustable, spring-loaded, diaphragm-type valve designed for modulating service to permit flow when controlling pressure exceeds spring setting. This valve shall be UL Listed and Factory Mutual approved. It shall be the Model 50B-4KG1 (globe) or Model 2050B-4KG1 (angle) Pressure Relief Valve as manufactured by Cla-Val Newport Beach, California.

*Special Note:
The Model 50B-4KG1 Pressure Relief Valve is available with 300#/ ANSI inlet flange and 150#/ ANSI outlet flange. This valve is used on higher pressure systems where 300#/ flange connections are required, and allows for adapting of a discharge cone (generally supplied with 150#/ flange) to accommodate “atmospheric break” at relief valve discharge. This relief valve, with 300#/ 150#/ flanges is available on special order, and is UNDERWRITERS LABORATORIES LISTED AND FACTORY MUTUAL APPROVED.

Specifications: Seawater Service Option

Sizes

Globe: 2" - 8" flanged
Angle: 2" - 8" flanged

Consult factory for flange ratings.

See page 1 for seawater service materials options.

Dimensions

Valve Size (in)

2"  2-1/2"  3"  4"  6"  8"  10"

Threaded Ends

9.38  11.00  12.50  - - - -

A 150 Flanged

9.38  11.00  12.00  15.00  20.00  25.38  29.75

300 Flanged


300 X 150

12.88  15.31  20.56  25.88  30.44

B

3.31  4.00  4.56  5.75  7.78  10.00  11.81

C

12.00  12.25  12.50  13.00  14.31  16.31  18.00

D

1.50  1.69  2.66  3.19  4.31  5.31  9.25

Threaded Ends

4.75  5.50  6.25  - - - -

E 150 Flanged

4.75  5.50  6.00  7.50  10.00  12.75  14.88

300 Flanged

5.00  5.88  6.38  7.88  10.50  13.25  15.56

Threaded Ends

3.25  4.00  4.50  - - - -

F 150 Flanged

3.25  4.00  4.00  5.00  6.00  8.00  8.62

300 Flanged

3.50  4.31  4.38  5.31  6.50  8.50  9.31

G & H

6.00  6.69  7.75  7.88  8.50  9.75  13.25

Valve Size in Inches

50  65  80  100  150  200  250

Threaded Ends

238  279  318  - - - -

A 150 Flanged

234  279  305  381  508  645  756

300 Flanged

254  295  337  397  533  670  790

300 X 150

- - - 327  389  522  657  773

B

84  102  116  146  200  254  300

C

305  311  1318  330  363  414  457

D

38  43  65  81  109  135  235

Threaded Ends

121  140  159  - - - -

E 150 Flanged

121  140  152  191  254  324  378

300 Flanged

127  149  162  200  267  337  395

Threaded Ends

83  102  114  - - - -

F 150 Flanged

83  102  102  127  152  203  219

300 Flanged

89  109  111  135  165  216  236

G & H

152  170  197  200  216  248  337

Valve Capacity

Valve Sizes in Inches:

2"  2 1/2"  3"  4"  6"  8"  10"

NFPA 20 Maximum

Recommended GPM

208  300  500  1000  2500  5000  11000

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37
50B-4KG1KOL Globe MODELS –
2050B-4KG1KOL Angle
Pressure Relief Valve with Anti-Cavitation Trim

- For Onshore and Offshore Applications
- KOL Anti-Cavitation Trim Seat:
  - Protects Against Cavitation
  - Reduces Noise and Vibration
  - Extends Valve Life
- Compliant with NFPA 20 Standards

The Cla-Val Globe Pattern Model 50B-4KG1KOL and Angle Pattern Model 2050B-4KG1KOL relief valve is designed to relieve excess pressure in a fire protection system, while eliminating the damaging effects of cavitation.

The valve features an adjustable pressure setting, fast opening to maintain steady line pressure, and gradual closing for surge free operation.

Typical Applications

Offshore Platform Pump Relief

Onshore Fire Pump Relief

Optional UL Listed Materials for Seawater and Severe Service Applications:
- Nickel Aluminum Bronze (NAB) - ASTM B148 Alloy C95800
- Monel - QQ-N-288 Comp B - ASTM A494 Grade M30H
- Cast Steel - ASTM A216 Grade WCB
- 316 Stainless Steel - ASTM A743 Grades CF3M and CFM8
- Super Austenitic Stainless Steel - ASTM A351 Grade CK3MCuN (SMO 254)
- Super Duplex Stainless Steel - ASTM A890 Grade 5A (CE3MN)
Specifications

Sizes

Globe: 3" - 8" flanged; Angle: 3" - 8" flanged
FM Approved, UL and ULC Listed

End Details

150 and 300 ANSI B16.42

Pressure Ratings

Class 150 - 250 psi Max; Class 300 - 300 psi Max
Water, to 180°F Max.

Adjustment Range

Available in the following relief pressure ranges:
20-200 psi (150 Class)
100-300 psi (300 Class)

Optional Coating

Protective epoxy resin coating of wetted surfaces of main valve iron components
UL listed HNFX EX2855

Standard Valve Materials

Main Valve Body & Cover: Ductile Iron ASTM A536 Grade 65-45-12
Main Valve Trim: Teflon Coated Stainless Seat, Stainless Steel Stem
Pilot Control System: Cast Bronze with Stainless Steel Trim

Materials for Seawater and Severe Service Applications

Optional UL Listed Materials:

• Nickel Aluminum Bronze (NAB) - ASTM B148 Alloy C95800
• Monel - QQ-N-288 Comp B - ASTM A494 Grade M30H
• Cast Steel - ASTM A216 Grade WCB
• 316 Stainless Steel - ASTM A743 Grades CF3M and CFM8
• Super Austenitic Stainless Steel - ASTM A351 Grade CK3MCuN (SMO 254)
• Super Duplex Stainless Steel - ASTM A890 Grade 5A (CE3MN)

Trim and pilot control system material options available to suit specific applications

Purchase Specifications

The Fire Pump Pressure Relief Valve shall modulate to relieve excess pressure in a fire protection system, maintaining constant pressure in the system regardless of demand changes. It shall be pilot controlled and back pressure shall not affect its set point. It shall be actuated by line pressure through a pilot control system and open fast in order to maintain steady system pressure as system demand decreases. It shall close gradually to control surges and shall re-seat drip-tight within 5% of its pressure setting.

The main valve shall be of the hydraulically-operated, pilot-controlled, diaphragm-type, globe or angle valve. It shall be equipped with a teflon-coated anti-cavitation seat, a grooved stem guided at both ends, and a resilient disc with a rectangular cross section, being contained on 3-1/2 sides. No external packing glands shall be permitted and the diaphragm shall not be used as a sealing surface. The pilot control shall be a direct-acting, adjustable, spring-loaded, diaphragm-type valve designed for modulating service to permit flow when controlling pressure exceeds spring setting. This valve shall be UL Listed and Factory Mutual approved. It shall be the Model 50B-4KG1KOL (globe) or Model 2050B-4KG1KOL (angle) Pressure Relief Valve as manufactured by Cla-Val Newport Beach, California.

*Special Note:
The Model 50B-4KG1KOL/2050B-4KG1KOL Pressure Relief Valve is available with 300# ANSI inlet flange and 150# ANSI outlet flange for high pressure systems where 300# flange connections are required, to allow for adapting of a discharge cone (generally supplied with 150# flange) to accommodate “atmospheric break” at relief valve discharge. This relief valve, with 300#/150# flanges is available on special order, and is UNDERWRITERS LABORATORIES LISTED AND FACTORY MUTUAL APPROVED.

Dimensions

Model 50B-4KG1KOL Globe
Model 2050B-4KG1KOL Angle

We recommend providing adequate space around valve for maintenance work.

Valve Size (inches)

3” 4” 6” 8” 10”

Threaded Ends

12.50 - - - - - - -
10.00 - - - - - - -
8.50 - - - - - - -
7.75 - - - - - - -

A 150 Flanged

12.00 15.00 20.00 25.00 30.00
300 Flanged

300 X 150

12.88 15.31 20.56 25.88 30.44
B

4.56 5.75 7.88 10.00 11.81
C

12.50 13.00 14.31 16.31 18.00
D

2.66 3.19 4.31 5.31 9.25

Threaded Ends

8.25 - - - - - - -
6.50 - - - - - - -
4.00 - - - - - - -
3.75 - - - - - - -

E 150 Flanged

6.00 7.50 10.00 12.75 14.88
300 Flanged

6.38 7.88 10.50 13.25 15.56

300 Flanged

4.00 5.00 6.00 8.00 8.62
G & H

7.75 7.88 8.50 9.75 13.25

Valve Capacity

<table>
<thead>
<tr>
<th>Valve Sizes in Inches:</th>
<th>3”</th>
<th>4”</th>
<th>6”</th>
<th>8”</th>
<th>10”</th>
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<tbody>
<tr>
<td>NFPA 20 Maximum Recommended GPM</td>
<td>500</td>
<td>1000</td>
<td>2500</td>
<td>4000</td>
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E-mail: info@cla-valpacific.com

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We recommend providing adequate space around valve for maintenance work.

Valve Size (inches) 3” 4” 6” 8” 10”

Threaded Ends 12.50 - - - - - - -
10.00 - - - - - - -
8.50 - - - - - - -
7.75 - - - - - - -

A 150 Flanged 12.00 15.00 20.00 25.00 30.00
300 X 150 12.88 15.31 20.56 25.88 30.44
B 4.56 5.75 7.88 10.00 11.81
C 12.50 13.00 14.31 16.31 18.00
D 2.66 3.19 4.31 5.31 9.25

Threaded Ends 8.25 - - - - - - -
6.50 - - - - - - -
4.00 - - - - - - -
3.75 - - - - - - -

E 150 Flanged 6.00 7.50 10.00 12.75 14.88
300 Flanged 6.38 7.88 10.50 13.25 15.56

300 Flanged 4.00 5.00 6.00 8.00 8.62
G & H 7.75 7.88 8.50 9.75 13.25

Valve Capacity

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<td>500</td>
<td>1000</td>
<td>2500</td>
<td>4000</td>
<td>11000</td>
</tr>
</tbody>
</table>
Waste Cone

- Available for Onshore and Offshore Applications
- Manufactured in Accordance with NFPA 20 Requirements
- Designed for use with UL/FM Approved Fire Pump Pressure Relief Valves

Optional Materials for Seawater and Severe Service Applications:
- Nickel Aluminum Bronze (NAB) - ASTM B148 Alloy C95800
- Monel - QQ-N-288 Comp B - ASTM A494 Grade M30H
- Cast Steel - ASTM A216 Grade WCB
- 316 Stainless Steel - ASTM A743 Grades CF3M and CF3M8
- Super Austenitic Stainless Steel - ASTM A351 Grade CK3MCuN (SMO 254)
- Super Duplex Stainless Steel - ASTM A890 Grade 5A (CE3MN)

Standards:
- Fusion Bonded Red Epoxy Coated
- Ductile Iron - ASTM A536-65
- (2) 2” 316 SS Sight Glasses per WC-1
- Single Body Casting (No Welding)

Flanges
- 150# Class (FF Standard)
- 300# Class (RF Standard)
- Raised Face and Flat Faced Options

Typical Application:
Fire Pump Relief
### Technical Data & Dimensions

![Diagram of WC-1](image)

#### WC-1

Visit www.cla-val.com to learn more about Cla-Val Fire Protection Products

---

#### Technical Data & Dimensions

<table>
<thead>
<tr>
<th>SIZE</th>
<th>INLET X OUTLET</th>
<th>PRESSURE CLASS</th>
<th>A</th>
<th>AA</th>
<th>B</th>
<th>BB</th>
<th>C</th>
<th>CC</th>
<th>D (B.C.D.)</th>
<th>E</th>
<th>NUMBER OF HOLES (INLET)</th>
<th>DIAMETER OF HOLES (INLET)</th>
<th>F</th>
<th>DIAMETER OF HOLES (OUTLET)</th>
<th>NUMBER OF HOLES (OUTLET)</th>
<th>DIAMETER OF HOLES (OUTLET)</th>
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<td>150LB</td>
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<td>4</td>
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<td>.875</td>
<td>8</td>
<td>.750</td>
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<td>.750</td>
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<td>7.500</td>
<td>.750</td>
<td>8</td>
<td>.625</td>
<td>9.500</td>
<td>.875</td>
<td>8</td>
<td>.750</td>
<td></td>
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<tr>
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<td>8</td>
<td>.750</td>
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<tr>
<td>6&quot; X 8&quot;</td>
<td>150LB</td>
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<td>8&quot; X 14&quot;</td>
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</tbody>
</table>

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**Visit www.cla-val.com to learn more about Cla-Val Fire Protection Products**
The Model 50B-5KG Pump Suction Control Valve is designed specifically for Fire Pump Suction Control Service. It modulates to maintain the pump discharge in relation to the suction head available, thus assuring that the suction head pressure does not fall below the pre-set minimum.

**Typical Installation**
When there is a demand in the Fire System, the pump is started, delivering water from the supply source to the area of demand. To assure that the fire pump draw does not exceed the available water supply, the Model 50B-5KG, sensing the pump suction, modulates to prevent suction pressure from dropping below a pre-set minimum.

By maintaining minimum pressure requirements in the supply main, the main is protected from possible damage or backflow conditions. Also, a minimum supply pressure is provided for local fire apparatus.

**Specifications**
- **Sizes**
  - Globe: 3" - 8" flanged
  - Angle: 3" - 8" flanged
- **End Details**
  - 150 and 300 ANSI B16.42
- **Pressure Ratings**
  - 150 class - 250 psi Max.
  - 300 class - 400 psi Max
- **Temperature Range**
  - Water, to +180°F Max.
- **Materials**
  - Main valve body & cover
    - Ductile Iron ASTM A-536
  - Main valve trim:
    - Brass QQ-B-626
    - Bronze Seat ASTM B61
    - Stainless Steel Stem 303
    - Delrin Sleeved
  - Pilot control system:
    - Cast Bronze ASTM B62 with 303 Stainless Steel trim
- **Adjustment Range**
  - Available in the following pressure range only:
    - 5 to 25 psi
    - Set at 10 psi
Purchase Specifications

The Fire Pump Suction Control Valve shall modulate to maintain a minimum pressure at the pump suction regardless of system demand. It shall control the pump discharge in relation to the suction head available, and shall not allow suction head pressure to fall below a pre-set minimum.

It shall be actuated by line pressure through a pilot control system which allows rapid response to changing pressure conditions without line surges. The pilot control shall be remote sensed to the pump suction head pressure.

The main valve shall be of the hydraulically-operated, pilot-controlled, diaphragm-type, globe or angle valve. It shall have a single removable seat, a delrin-sleeved guided stem and a renewable resilient synthetic rubber disc with a rectangular cross section, contained on three and one-half sides by a disc retainer and disc guide. No external packing glands shall be permitted and the diaphragm shall not be used as a seating surface. The pilot control shall be a direct-acting, adjustable, spring-loaded, diaphragm-type valve designed for modulating service to permit flow when controlling pressure exceeds spring setting.

A device indicating the percent at which the valve is open or closed shall be supplied on the assembly, together with a sediment evacuator and dampening device.

The valve shall be designed to allow for repair and servicing without removing the valve body from the line.

The valve shall be Factory Mutual Approved. It shall be the MODEL 50B-5KG FIRE PUMP SUCTION CONTROL VALVE as manufactured by Cla-Val, Newport Beach, California.

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E-mail: info@cla-val.com

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Seawater Service Pressure Relief Valve

- Fast Opening to Maintain Steady Line Pressure
- Accommodates Wide Range of Flow Rates
- Closes Gradually for Surge-Free Operation
- Adjustable Pressure Settings, Not Affected by Pressure At Valve Discharge

The Cla-Val Model 50-20 Seawater Service Pressure Relief Valve is designed specifically to automatically relieve excess pressure in fire protection pumping systems. Pilot controlled, it maintains constant system pressure at the pump discharge within very close limits as demands change.

Schematic Diagram

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100S/200S Hytrol (Main Valve)</td>
</tr>
<tr>
<td>2</td>
<td>CRL Pressure Relief Control</td>
</tr>
<tr>
<td>3</td>
<td>X44A Strainer &amp; Orifice Assy</td>
</tr>
<tr>
<td>4</td>
<td>81-01 Check Valve</td>
</tr>
</tbody>
</table>

Optional Features

- B CK2 (Isolation Valves)
- C CV Flow Control (Closing)
- F Remote Pilot Sensing
- H Drain to Atmosphere
- S CV Flow Control (Opening)

Please note that if the Model 50-20 is to be used on a continuous duty basis to maintain fire-system pressure, suitable back pressure must be provided on the valve to prevent cavitation damage. Consult the factory for details.

Specification

**Sizes:**
- Threaded Ends: 1 1/2" - 3"
- Globe Flanged: 2" - 36"
- Angle Flanged: 2" - 16"

**End Details:**
- Cast Steel ANSI B16.5
- Bronze ANSI B16.24
- Stainless Steel ANSI B16.5
- Ductile Iron ANSI B16.42

**Pressure:**
- 150 Class 250 psi Max.
- 300 Class 400 psi Max.

**Temperature Range:**
- Water 180°F Max.

**Materials:**
- **Main valve body & cover**
  - Ductile Iron ASTM A-536*
  - Cast Steel ASTM A216-WCB*
  - Naval Bronze ASTM B61
  - Stainless Steel ASTM A743-CF-8M
  - Ni. AL. Bronze ASTM B148
  - Super Duplex SST

- **Main valve trim:**
  - ASTM B61 Bronze Seat,
  - Monel Trim

**Adjustment Ranges:**
- 20 - 200 psi (150 class)
- 100 - 300 psi (300 class)

*The 50G-20 (globe) and 50A-20 (angle) in cast steel are supplied with standard internal and external epoxy coating.
We recommend providing adequate space around valve for maintenance work.

<table>
<thead>
<tr>
<th>Valve Size (Inches)</th>
<th>1</th>
<th>1 1/4</th>
<th>1 1/2</th>
<th>2</th>
<th>2 1/2</th>
<th>3</th>
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Valve Capacity

Purchase Specifications

The Fire Pump Pressure Relief Valve shall modulate to relieve excess pressure in a fire protection system. It shall maintain constant pressure in the system regardless of demand changes. It shall be pilot controlled and back pressure shall not affect its set point. It shall be actuated by line pressure through a pilot control system and open fast in order to maintain steady system pressure as system demand decreases. It shall close gradually to control surges and shall re-seat drip-tight within 5% of its pressure setting. The main valve shall be of the hydraulically-operated, pilot-controlled, diaphragm-type, globe or angle valve. It shall have a single, removable, tetlon-coated seat. Internal and external Connections shall be permitted and the diaphragm shall not be used as a seating glands shall be permitted and the diaphragm shall not be used as a seating surface. The pilot control shall be a direct-acting, adjustable, spring-loaded, diaphragm-type valve designed for modulating service to permit flow when controlling pressure exceeds spring setting. It shall be the MODEL 50G-20 (globe) or Model 50A-20 (angle) Pressure Relief Valve as manufactured by Cla-Val, Newport Beach, California.

We recommend providing adequate space around valve for maintenance work. After installation, a epoxy coating, a stem guided at both ends, and a resilient disc with a rectangular cross section, being contained on 3 1/2 sides. No external packing glands shall be permitted and the diaphragm shall not be used as a seating surface. The pilot control shall be a direct-acting, adjustable, spring-loaded, diaphragm-type valve designed for modulating service to permit flow when controlling pressure exceeds spring setting. It shall be the MODEL 50G-20 (globe) or Model 50A-20 (angle) Pressure Relief Valve as manufactured by Cla-Val Newport Beach, California.

1701 Placentia Avenue • Costa Mesa  CA 92627 • Phone: 949-722-4800 • Fax: 949-548-5441 • E-mail: info@cla-val.com • Website cla-val.com
© Copyright Cla-Val 2018 Printed in USA Specifications subject to change without notice.
For applications which have cavitation issues, Cla-Val can provide a complete cavitation analysis and recommend orifice plate sizing. The Model 50-49 can be fitted with KO Anti-Cav Trim to prevent cavitation.

Cla-Val Model 50-49 Pump Start / Pressure Relief Valve provides pump and pipeline protection during pump start sequence and pump operation when discharge pressure rises to unsafe levels.

Cla-Val Model 50-49 Pump Start / Pressure Relief Valve available in sizes 2” - 36” in both globe and angle pattern.

Operation:
The Model 50-49 has both a normally open and normally closed pilot controls. The valve mounts on a pipe tee at the pump discharge and provides pipeline protection at pump start-up through the normally open pilot control. This pilot will be open to vent the relief valve cover chamber and enable the relief valve to be open at pump start. When the pump first starts, the relief valve relieves both air and start-up water pressure to atmosphere and protects the pump discharge piping from accelerated pressure spikes. The spring loaded pilot with adjustable spring range will slowly close and divert the system pressure into system eliminating unsafe pressure spikes which can damage or rupture discharge piping.

Should the discharge pump pressure continue to rise due to little or no system demand, the normally closed pilot provides overpressure protection by relieving excess pressure to atmosphere as long as the relief valve inlet pressure is greater than the pilot pressure setting. This pilot has various adjustable spring ranges to meet the system pressure requirements.

Materials:

Main Valve Body & Cover:
- Ductile Iron ASTM A-536
- Cast Steel ASTM A216-WCB
- Naval Bronze ASTM B61
- Stainless Steel ASTM A743-CF-8M
- Ni. AL. Bronze ASTM B148

Main Valve Trim:
- ASTM B61 Bronze Seat, Monel Trim

Pilot Control System:
- Cast Bronze with Monel Trim
- Monel, Super Duplex Stainless Steel Optional
- Stainless Steel 316 Tubing & Fittings

Schematic Diagram

Optional Features

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
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<tbody>
<tr>
<td>B</td>
<td>CK2 (Isolation Valves)</td>
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<tr>
<td>C</td>
<td>CV Flow Control (Closing)</td>
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</tbody>
</table>

For applications which have cavitation issues, Cla-Val can provide a complete cavitation analysis and recommend orifice plate sizing. The Model 50-49 can be fitted with KO Anti-Cav Trim to prevent cavitation.
### Model 50-49 Functional Data (Uses Basic Valve Model 100-01)

| Valve Size (mm.) | 1 | 1 1/4 | 1 1/2 | 2 | 2 1/2 | 3 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 24 | 30 | 36 |
|------------------|---|-------|-------|---|-------|---|---|---|---|----|----|----|----|----|----|----|----|----|----|
| C<sub>V</sub>    | 25 | 32 | 40 | 50 | 65 | 80 | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 550 | 600 | 700 |
| Factor           |     |     |     |   |     |   |   |   |   |    |    |    |    |    |    |    |    |    |    |
| Globe Pattern    | 13.3 | 30 | 32 | 54 | 85 | 115 | 200 | 440 | 770 | 1245 | 1725 | 2300 | 3130 | 3725 | 5345 | 7655 | 10150 | 14020 |
| Liters/(in.)     | 3.2 | 7.2 | 7.7 | 13 | 20 | 28 | 48 | 106 | 185 | 299 | 414 | 552 | 752 | 894 | 1286 | 1837 | 2436 | 3200 |
| Angle Pattern    | 27 | 27 | 29 | 61 | 101 | 139 | 240 | 541 | 990 | 1575 | 2500 | 3060 | 4200 |     |     |     |     |     |
| Liters/(in.)     | 6.5 | 6.5 | 7 | 15 | 24 | 33 | 58 | 130 | 238 | 378 | 600 | 734 | 1008 |     |     |     |     |     |
| Equivalent Length of Pipe | 23 | 19 | 37 | 51 | 85 | 116 | 211 | 291 | 347 | 467 | 422 | 503 | 612 | 595 | 628 | 618 | 1181 | 2285 |
| Feet (ft.)       | 7.1 | 5.7 | 12 | 15.5 | 26 | 35 | 64 | 89 | 106 | 142 | 129 | 154 | 187 | 181 | 192 | 552 | 569 |     |
| Meters (m)       | 28 | 28 | 46 | 40 | 37 | 58 | 80 | 139 | 176 | 217 | 222 | 238 | 247 |     |     |     |     |     |
| Angle Pattern    | 4.4 | 4.4 | 7 | 1.4 | 33 | 4.1 | 4.1 | 4.1 | 3.7 | 3.6 | 2.9 | 2.8 | 2.6 |     |     |     |     |     |     |
| Meters (m)       |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| K Factor         |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Globe Pattern    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Angle Pattern    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Fl. Oz.          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Liquid Displaced from Cover Chamber When Valve Opens |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| U.S. Gal.        | .02 | .02 | .02 | .03 | .04 | .08 | .17 | .53 | 1.26 | 2.51 | 2.22 | 3.38 | 4.07 |     |     |     |     |     |     |
| ml               | 20.7 | 75.7 | 75.7 | 121 | 163 | 303 | 643 |     |     |     |     |     |     |     |     |     |     |     |
| Litres           |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Valve Capacity   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Valve Size (mm.) |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Max. Continuous GPM | 55 | 93 | 125 | 210 | 300 | 460 | 800 | 1800 | 3100 | 4900 | 7000 | 8400 | 11000 | 14000 | 17000 | 25000 | 42000 | 50000 |
| Max Surge GPM    | 120 | 210 | 280 | 470 | 670 | 1000 | 1800 | 4000 | 7000 | 11000 | 16000 | 19000 | 25000 | 31000 | 39000 | 56500 | 63000 | 85000 |

---

**100S/2100S**
- **Threaded & Flanged**
- **Inlet:** A, D, AA, AAA
- **Outlet:** B, C, J, K

**Model 50-49 Dimensions**
- **Inlet:** A, D, AA, AAA
- **Outlet:** B, C, J, K

**Valve Capacity**
- **Valve Size (mm.)**
  - 1
  - 1 1/4
  - 1 1/2
  - 2
  - 2 1/2
  - 3
  - 4
  - 6
  - 8
  - 10
  - 12
  - 14
  - 16
  - 18
  - 20
  - 24
  - 30
  - 36

- **Max. Continuous GPM**
  - 55
  - 93
  - 125
  - 210
  - 300
  - 460
  - 800
  - 1800
  - 3100
  - 4900
  - 7000
  - 8400
  - 11000
  - 14000
  - 17000
  - 25000
  - 42000
  - 50000

- **Max Surge GPM**
  - 120
  - 210
  - 280
  - 470
  - 670
  - 1000
  - 1800
  - 4000
  - 7000
  - 11000
  - 16000
  - 19000
  - 25000
  - 31000
  - 39000
  - 56500
  - 63000
  - 85000

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**CLA-VAL**
- **1701 Placentia Avenue • Costa Mesa CA 92627**
- **Phone:** 949-722-4800 • **Fax:** 949-548-5441 • **E-mail:** info@cla-val.com • **Website:** cla-val.com
- **© Copyright Cla-Val 2018 Printed in USA** Specifications subject to change without notice.
Pressure Relief Valve/ Pump Casing Relief Valve

**55L-60 — MODEL —**

The Cla-Val Model 55L-60 (UL Listed, FM Approved) Pressure Relief Valve is a direct-acting, spring loaded, diaphragm type relief valve. The valve may be installed in any position and will open and close within very close pressure limits. The bottom plug may be removed and installed in the inlet to convert it to an angle pattern flow path.

The Model 55L-60 is normally held closed by the force of the compression spring above the diaphragm. When the controlling pressure applied under the diaphragm exceeds the spring setting, the disc is lifted off its seat, permitting flow through the control. When control pressure drops below the spring setting, the spring forces the control back to its normally closed position. The controlling pressure is applied to the chamber beneath the diaphragm through an internal passage. A gauge port is provided for accurate pressure setting.

Pressure adjustment is done by turning the adjusting screw to vary the spring load on the diaphragm. The 55L-60 is available in pressure ranges suited to agency approval tests. To prevent tampering, the adjustment cap can be wire sealed by using the lock wire holes provided in the cap and cover.

**Typical Application for Fresh Water or Seawater Service**

The **Model 55L-60** is typically used in a fire protection system to trim water pressure, thus preventing pressure build-up whenever line pressure exceeds the setting of the spring.

The 55L-60 will relieve excess pressure to atmosphere to prevent damage to the distribution network.

**NOTE:** Model 55L-60 is not suitable for discharging the full-rated pump capacity of a fire pump. See Model 50B-4KG1 Fire Pump Relief Valve for such applications.
Specifications

**Size**

1/2", 3/4" and 1" Threaded NPT

**Temperature Range**

Water, Air: to 180°F Max.

**Materials**

- **Body & Cover:** Cast Bronze UNS C87850 - Standard Stainless Steel ASTM A743-CF-16F
- **Trim:** Monel
- **Rubber:** Buna-N® Synthetic Rubber

**Pressure Ratings**

- Cast Bronze 400 psi Max.
- Stainless Steel 400 psi Max.

**Other Materials**

Available on special order

**Adjustment Ranges**

- **UL Listed**
  - 10 to 75 psi • 20 to 200 psi • 100 to 300 psi

**Adjustment Ranges**

- **FM Approved**
  - 0 to 75 psi • 20 to 200 psi • 100 to 300 psi

**Pressure Drop Chart** (Full Open Valve)

<table>
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<tr>
<th>Valve Size</th>
<th>CV Factor</th>
<th>Max Flow (GPM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2&quot;</td>
<td>6</td>
<td>25</td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>8.5</td>
<td>40</td>
</tr>
<tr>
<td>1&quot;</td>
<td>12.8</td>
<td>65</td>
</tr>
</tbody>
</table>

**When Ordering, Please Specify**

1. Catalog No. 55L-60
2. Valve Size
3. Adjustment Range Desired
4. Optional Materials
Principle of Operation

Full Open Operation
The valve opens when pilot set pressure is reached and pressure in the control chamber is relieved.

Tight Closing Operation
Water pressure (equal to inlet pressure) from valve inlet or from upstream of valve is applied to the control chamber. Valve closes bubble tight.

Modulating Action
The valve tube diaphragm holds any intermediate position when a quantity of water is exhausted from the control chamber via the pilot. The quantity of water in the control chamber is established by the “set pressure” of the pilot. The control chamber is filled or exhausted to atmosphere, maintaining “set pressure.”
Cla-Val 800 Series Control Valves operate with maximum efficiency when mounted in horizontal or vertical piping. Adequate space above and around the valve for service personnel should be considered essential. A regular maintenance program should be established based on the specific application data. However, we recommend a thorough inspection be done at least once a year. Consult factory for specific recommendations.

### Model 850B-4

#### Main Valve
- **Ends:** Flanged ANSI B16.5 (150lb Class)
- **Body:** Cast Steel (ASTM A216 WCB)
- **Diaphragm:** Nitrile Rubber
- **Barrier:** Urethane
- **Bolts:** 316 SS
- **Pressure:** 250 psig (17.24 BAR)
- **Temp. Range:** 32ºF to 180ºF (0ºC to 82.2ºC)

#### Main Valve Options
- **Body:** Nickel Aluminum Bronze (Alloy C95800) or Duplex SS (Alloy 2205)

#### Pilot Valve
- **All Parts:** Bronze / Stainless Steel
- **O-Rings:** Nitrile Rubber
- **Control:** Controls Pressure Excursions within 3% of Set Point
- **Spring Range:** 30 to 200 PSIG
- **Operation:** Normally Closed; Opens at Set Pressure; Modulates

#### Pilot Valve Options
- **All Wetted Parts:** Monel (Alloy 400)

### 850B-4 Basic Components

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100-43 TDV Main Valve</td>
</tr>
<tr>
<td>2</td>
<td>CRL Pressure Relief Control</td>
</tr>
<tr>
<td>3</td>
<td>X44A Strainer and Orifice Assembly</td>
</tr>
<tr>
<td>4</td>
<td>Pressure Gauge</td>
</tr>
</tbody>
</table>

Cla-Val 800 Series Control Valves are recommended for maximum efficiency when mounted in horizontal or vertical piping. Adequate space above and around the valve is recommended for service personnel. A regular maintenance program should be established based on specific application data. We recommend a thorough inspection at least once a year. Consult the factory for specific recommendations.
Seawater Relief Valve

- Low Head Loss
- One Spring for all Pressure Ranges between 30 and 200 PSIG
- Cast Steel Construction
- Pressure Excursions Do Not Exceed 3% of Set Pressure
- Fusion Coated Epoxy Inside and Out
- Anti-Cavitation Design
- Nickel Aluminum Bronze Construction Option (Alloy C95800)
- Duplex Stainless Steel Construction Option (Alloy 2205)
- Low Maintenance
- Simple and Reliable Operation
- 1-Year Warranty

The Cla-Val Model 850-20 Seawater Relief Valve is a pressure-operated, in-line axial valve. A tube diaphragm actuates the valve, which is comprised of three major components: 1) Tube 2) Barrier and 3) Body. There is only one moving part in the valve — the tube diaphragm. There are no shafts, packing, stem guides or springs.

The tube diaphragm is a one piece, homogeneous nitrile rubber part which is extremely durable. The ends of the tube are thick solid rubber, designed to fit between mating flanges. This design eliminates the possibility of cutting the tube diaphragm due to over tightening or piping misalignment during installation.

The tube forms a drip tight seal around the barrier when the pressure is equalized between the valve inlet and the control chamber. When pressure is removed from the control chamber, the valve is open. The minimum recommended operating pressure is 40 P.S.I. of inlet pressure.

**Principle of Operation**

**Full Open Operation**

The valve opens when pilot set pressure is reached and pressure in the control chamber is relieved.

**Tight Closing Operation**

Water pressure (equal to inlet pressure) from valve inlet or from upstream of valve is applied to the control chamber. Valve closes bubble tight.

**Modulating Action**

The valve tube diaphragm holds any intermediate position when a quantity of water is exhausted from the control chamber via the pilot. The quantity of water in the control chamber is established by the “set pressure” of the pilot. The control chamber is filled or exhausted to atmosphere, maintaining “set pressure.”
**FLOW FACTORS**

<table>
<thead>
<tr>
<th>SIZE (IN)</th>
<th>CV (gpm)</th>
<th>KV</th>
</tr>
</thead>
<tbody>
<tr>
<td>3&quot;</td>
<td>160</td>
<td>36.4</td>
</tr>
<tr>
<td>4&quot;</td>
<td>340</td>
<td>77.3</td>
</tr>
<tr>
<td>6&quot;</td>
<td>885</td>
<td>201</td>
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<tr>
<td>8&quot;</td>
<td>1667</td>
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</tr>
<tr>
<td>&quot;10&quot;</td>
<td>2424</td>
<td>550</td>
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</tbody>
</table>

*CALCULATED*

**Valve Capacity**

<table>
<thead>
<tr>
<th>Valve Sizes</th>
<th>3&quot;</th>
<th>4&quot;</th>
<th>6&quot;</th>
<th>8&quot;</th>
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<tbody>
<tr>
<td>NFPA 20 Maximum</td>
<td>500</td>
<td>1000</td>
<td>2500</td>
<td>5000</td>
<td>11000</td>
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**850-20 Basic Components**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
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<tbody>
<tr>
<td>1</td>
<td>100-43 TDV Main Valve</td>
</tr>
<tr>
<td>2</td>
<td>CRL Pressure Relief Control</td>
</tr>
<tr>
<td>3</td>
<td>X44A Strainer and Orifice Assembly</td>
</tr>
<tr>
<td>4</td>
<td>4&quot; Gauge Connection</td>
</tr>
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</table>

Cla-Val 800 Series Control Valves operate with maximum efficiency when mounted in horizontal or vertical piping. Adequate space above and around the valve for service personnel should be considered essential. A regular maintenance program should be established based on the specific application data. However, we recommend a thorough inspection be done at least once a year. Consult factory for specific recommendations...
Cla-Val 90-21 and 90-21P Pressure Reducing Valves are indispensable in any fire protection system. Available in globe (90G-21/90G-21P) and angle patterns (90A-21 and 90A-21P), our diaphragm actuated design is proven to be highly reliable and easy to maintain. Globe and angle pattern valves feature a full range of adjustments. These valves are also available in a variety of material options. Epoxy coating is strongly recommended for all fire system valves (excluding bronze valves). All configurations of the valve can be supplied with optional internal and external epoxy coating of the main valve wetted surfaces.

**Function**

Cla-Val 90G-21 (globe) and 90A-21 (angle) Pressure Reducing Valves automatically reduce a higher inlet pressure to a steady lower outlet pressure regardless of changing flow rate and/or varying inlet pressure. The valves' pilot control system is very sensitive to slight downstream pressure fluctuations, and will automatically open or close to maintain the desired pressure setting. The downstream pressure can be set over a wide range by turning the adjustment screw on the CRD pilot control. The adjustment screw is protected by a screw-on cover, which can be sealed to discourage tampering.

**Schematic Diagram**

**Item** | **Description**
--- | ---
1 | 100KX Hytrol Main Valve
2 | X58C Restriction Assembly
3 | CRD Pressure Reducing Control (see note)
4 | X46A Flow Clean Strainer
P | Gauge Option

**Note:**
For Steel and Ductile Iron 300 Class Valves, use CRDKX with a special diaphragm washer, yoke and screws (30-165).

**Typical Application**

Underwriters Laboratories requires the installation of pressure gauges upstream and downstream of the Pressure Reducing Valve.

A relief valve of not less than 1/2 inch in size must also be installed on the downstream side of the pressure control valve. Adequate drainage for the relief valve discharge must be provided.

The valve made be installed in either vertical or horizontal positions.

**UL / ULC Listings**

<table>
<thead>
<tr>
<th>Size</th>
<th>Ductile Iron 150# Flanged</th>
<th>Ductile Iron 300# Screwed</th>
<th>Ductile Iron 300# Flanged</th>
<th>Bronze 300# Threaded</th>
<th>Bronze 150# Flanged</th>
<th>Bronze 300# Flanged</th>
<th>Cast Steel 300# Flanged</th>
<th>Grooved End</th>
<th>Globe Pattern</th>
<th>Ductile Iron Grooved End</th>
<th>Angle Pattern Ductile Iron Grooved End</th>
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<tr>
<td>1 1/2&quot;</td>
<td>UL / ULC</td>
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<td>UL / ULC</td>
<td>UL / ULC</td>
<td>UL / ULC</td>
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<td>UL / ULC</td>
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<td>2 1/2&quot;</td>
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<tr>
<td>4&quot;</td>
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</tbody>
</table>
### Selection Guidelines

#### Flow Capacity Table

<table>
<thead>
<tr>
<th>Valve Size (GPM of Water)</th>
<th>Maximum</th>
<th>Minimum</th>
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</thead>
<tbody>
<tr>
<td>1½&quot;</td>
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<td>1</td>
</tr>
<tr>
<td>2&quot;</td>
<td>262</td>
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<tr>
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<td>15</td>
</tr>
<tr>
<td>10&quot;</td>
<td>6150</td>
<td>35</td>
</tr>
</tbody>
</table>

Optional UL Listed Materials for Seawater and Severe Service Applications:
- Nickel Aluminum Bronze (NAB) - ASTM B148 Alloy C95800
- Monel - QQ-N-288 Comp B - ASTM A494 Grade M30H
- Cast Steel - ASTM A216 Grade WCB
- 316 Stainless Steel - ASTM A743
- Ductile Iron ASTM A536 Grade 65-45-12
- Bronze Seat
- Stainless Steel Stem
- Stainless Steel Trim
- Cast Bronze with Stainless Steel Trim

#### Optional Epoxy Coating
- Marine Grade 5A Epoxy (5E) - Epoxy Coating

Note: The Actual Capacity is limited by available DP.

**SPECIAL NOTE:** THE MODEL 90-21/90-21P CAN BE SUPPLIED WITH INTERNAL EPOXY COATING OF THE MAIN VALVE. THIS OPTION IS U.L. FILE NO. EX2855, C.C. NO. HNFX EPOXY COATING IS STRONGLY RECOMMENDED FOR ALL CAST VALVES.

### Pressure Adjustment Range

#### Sizes

See chart on first page.

#### Pressure Ratings

- Class 150 - 250 psi Max.
- Class 300 - 400 psi Max.
- Water, to 180°F Max.

#### Standard Materials

- Main Valve Body & Cover: Cast Bronze with Stainless Steel Trim
- Standard Pilot Control System: Stainless Steel Stem

#### Pressure Differential

- 10 PSI Minimum

#### Temperature Range

- Water to 180°F Maximum

### When Ordering Please Specify

1. Model Number 90-21 or 90-21P
2. Size
3. Globe or Angle Pattern
4. Main Valve Body and Cover Material
5. Threaded, Flanged or Grooved
6. Pressure Class
7. Optional Epoxy Coating (specify w/suffix KC)
MODEL 90-FS-PRV-15

Factory Set (1-1/2-inch) Pressure Reducing Valve

- Sensitive and Accurate Pressure Control
- Complies with NFPA for Class II Systems
- UL/ULC Listed

The Cla-Val 1 ½” Model 90-FS-PRV Is a UL/ULC listed Factory Set pressure reducing valve which can be used as a standpipe valve, floor control valve and a checking device.

The valve is in compliance with NFPA for Class II systems and can handle “Flow” and “No Flow” conditions and rated for systems up to a maximum inlet 300 psi.

A brass body is standard but can be supplied with a chrome plate finish. An optional Supervisory Switch is available at an additional charge.

End Connection Options

- Female NPT x Female NPT- (FF)
- Groove x Groove - Angle - (GG)
- Groove x Male Outlet - (GM)

When protecting life and property, count on Cla-Val

The Cla-Val Company Valve Selection and Sizing Program is available upon request
90-FS-PRV-25
Factory Set (2-1/2-inch) Pressure Reducing Valve

- Sensitive and Accurate Pressure Control
- Complies with NFPA for Class I Systems
- UL/ULC Listed

The Cla-Val 2 ½” Model 90-FS-PRV Is a UL/ULC listed Factory Set pressure reducing valve which can be used as a standpipe valve, floor control valve and a checking device.

The valve is in compliance with NFPA for Class I systems and can handle “Flow” and “No Flow” conditions and rated for systems up to a maximum inlet pressure of 400 psi.

A brass body is standard but can be supplied with a chrome plate finish. An optional Supervisory Switch is available at an additional charge.

End Connection Options

- Female NPT x Male Hose - Angle - (FM)
- Female NPT x Female NPT- Straight - (SF)
- Groove x Groove - Angle - (GG)
- Groove x Groove -Straight -(SG)
- Groove x Male Outlet -Angle - (GM)

The Cla-Val Company Valve Selection and Sizing Program is available upon request.

When protecting life and property, count on Cla-Val
Pressure Restricting Valve

- Sensitive and Accurate Pressure Restriction
- Easy Adjustment and Maintenance
- UL/ULC Listed
- FM Approved

The Cla-Val 1 ½” Model 90-PRV-175-15 features a Cast Brass finish body with Forgeline Bonnet and Seat Assembly. The system water pressure is controlled by adjusting the flow restriction, however, if full flow is required the restriction can be overridden.

This heavy duty design is factory tested to 300 psi (2070 KPa). It is also UL/ULC Listed and FM approved.

A brass body is standard but can be supplied with a polish chrome, cast chrome or polish brass finish.

End Connection Options

- Female NPT x Male Hose (Angle)-FM
- Female NPT x Female NPT
- Groove X Male Outlet

Standards

NFPA 14
- 100 psi max. outlet
- 175 psi max. inlet

When protecting life and property, count on Cla-Val
Pressure Restricting Valve

- Sensitive and Accurate Pressure Restriction
- Easy Adjustment and Maintenance
- UL/ULC Listed
- FM Approved

The Cla-Val 2½" Model 90-PRV-175-25 features a Cast Brass finish body with Forgeline Bonnet and Seat Assembly. The system water pressure is controlled by adjusting the flow restriction, however is full flow is required the restriction can be overridden.

This heavy duty design is factory tested to 300 psi (2070 KPa). It is also UL/ULC Listed and FM approved.

A brass body is standard but can be supplied with a polish chrome, cast chrome or polish brass finish.

End Connection Options

- Female NPT x Male Hose (Angle)-FM
- Female NPT x Female NPT
- Groove X Male Outlet

Standards

NFPA 14
- 175 psi max. outlet
- 125 psi max. inlet
MODEL HV-100-15

Angle Hose Valve

- Sensitive and Accurate Performance
- UL/ULC Listed
- FM Approved

The Cla-Val 1 1/2” Model HV-100-15 features a Cast Brass finish body with Forged Bonnet and Seat Assembly.

This heavy duty design is factory tested to 300 psi (2070 KPa). It is also UL/ULC Listed and FM approved.

A brass body is standard but can be supplied with a polish chrome, cast chrome or polish brass finish.

End Connection Options

- Female NPT x Male Hose (Angle)-FM
- Female NPT x Female NPT

Standards

NFPA 14
- 100 psi max.
- 100 gpm max.

When protecting life and property, count on Cla-Val
MODEL HV-100-25

Angle Hose Valve

- Sensitive and Accurate Performance
- UL/ULC Listed
- FM Approved

The Cla-Val 2 ½” Model HV-100-25 features a Cast Brass finish body with Forgeline Bonnet and Seat Assembly.

This heavy duty design is factory tested to 300 psi (2070 KPa). It is also UL/ULC Listed and FM approved. Please specify regional hose thread for outlet as shown below.

A brass body is standard but can be supplied with a polish chrome, cast chrome or polish brass finish.

Available hose threads include:
BCT, CSA, NSST, NPSH, NST, QST, WCT, Louisville, Cleveland, Chicago, Pittsburg, New Cincinnati, New York Corp, New York Fire Department, Richmond, and Raleigh

End Connection Options

- Female NPT x Male Hose (Angle)-FM
- Female NPT x Female NPT
- Groove X Male Outlet

Standard
NFPA 14
- 175 psi max.
- 250 gpm max.
- Fire Department - 100 psi min.

When protecting life and property, count on Cla-Val
Cla-Val Model 90G-42 (globe) and 90A-42 (angle) Seawater Service Pressure Reducing Valves automatically reduce a higher inlet pressure to a steady lower outlet pressure regardless of changing flow rate and/or varying inlet pressure. The valves pilot control system is very sensitive to slight downstream pressure fluctuations, and will automatically open or close to maintain the desired pressure setting. The downstream pressure can be set over a wide range by turning the adjustment screw on the CRD pilot control. The adjustment screw is protected by a screw-on cover, which can be sealed to discourage tampering.

Cla-Val 90G-42 (globe) and 90A-42 (angle) Pressure Reducing Valves are indispensable in any fire protection system. Our diaphragm actuated design is proven highly reliable and easy to maintain. We offer both a globe or angle pattern with a full range of adjustments. These valves are available in cast bronze, iron or steel and all special alloy. Epoxy coating for all system valves are supplied with internal and external epoxy coating of the main valve wetted surfaces, for ductile iron and cast steel only.

If UL Listed is required for Model 90-42 Seawater Service use Model 90-21KX when ordering. UL Listed sizes limited to 1 ½ - 8” sizes.

### Schematic Diagram

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Model 100S/2100S Hytrol (Globe or Angle)</td>
</tr>
<tr>
<td>2</td>
<td>X58C Restriction Tube Fitting</td>
</tr>
<tr>
<td>3</td>
<td>CRD Pressure Reducing Control</td>
</tr>
<tr>
<td>4</td>
<td>X46A Flow Clean Strainer</td>
</tr>
</tbody>
</table>

### Function

Cla-Val Model 90G-42 (globe) and 90A-42 (angle) Seawater Service Pressure Reducing Valves are available in Cast Bronze, Iron and Steel, and feature Accurate Pressure Control and In Line Service.

### Materials:

- **Main valve body & cover**
  - Ductile Iron ASTM A-536*
  - Cast Steel ASTM A216-WCB*
  - Naval Bronze ASTM B61
  - Stainless Steel ASTM A743-CF-8M
  - Ni. AL. Bronze ASTM B148
  - Super Duplex SST
  - Monel QQ-N-281 Class B

- **Main valve trim:**
  - ASTM B61 Bronze Seat, Monel Trim

**Pilot control system:**
- Cast Bronze with Monel Trim
- Monel, Super Duplex Stainless Steel optional
- Stainless Steel 316 Tubing & Fittings

### Pressure and Temperature

| Sizes: | Threaded Ends: 1 1/2" - 3"
|        | Globe Flanged: 2" - 36"
|        | Angle Flanged: 2" - 16"
| End Details: | Cast Steel ANSI B16.5
|            | Bronze ANSI B16.24
|            | Stainless Steel ANSI B16.5
|            | Ductile Iron ANSI B16.42
| Pressure | 150 Class 250 psi Max.
| Ratings: | 300 Class 400 psi Max.
| Temperature | Water 180°F Max.
| Adjustment Ranges: | 15 - 75 psi
|                  | 30 - 300 psi

*The 90G-42 (globe) and 90A-42 (angle) in cast steel are supplied with standard internal and external epoxy coating.
### Selection Guidelines - Flow Capacity Table

| Size  | 1 | 1½ | 1 1/4 | 1 1/2 | 2 | 2½ | 3 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 24 | 30 | 36 |
|-------|---|----|-------|-------|---|----|---|---|---|---|----|----|----|----|----|----|----|----|----|----|
| Max. Flow Rate (GPM of Water) | 100 | 125 | 160 | 262 | 373 | 576 | 992 | 2251 | 3900 | 6150 | 8720 | 10540 | 13700 | 17500 | 21700 | 31300 | 48000 | 62500 |

*For UL Listed, see Cla-Val Model 90-21 for sizes and pressure class information.

Cla-Val Control Valves operate with maximum efficiency when mounted in horizontal piping with the main cover UP, however, other positions are acceptable. Due to component size and weight of 8 inch and larger valves, installation with cover UP is advisable. We recommend isolation valves be installed on inlet and outlet for maintenance. Adequate space above and around the valve for service personnel should be considered essential. A regular maintenance program should be established based on the specific application data. However, we recommend a thorough inspection be done at least once a year. Consult factory for specific recommendations.
Cavitation Guide

(Appplies To All Valves in This Catalog except the 100-42 Series) This chart should only be used as a guide to the proper selection of the pressure drop to be taken across Cla-Val Valves. Continued use of a valve in the shaded area of the chart could cause extensive deterioration of the valve's internals.

Consult factory for specific cavitation information. After selecting valve size, locate inlet and outlet pressures on cavitation chart. If point located falls in shaded area, cavitation may occur.

The shaded portion of this chart is based on a cavitation index (K) of 0.5 derived from the formula \( K = \frac{P_1}{P_2} \), where \( P_1 \) = inlet pressure, \( P_2 \) = outlet pressure, \( P_v \) = water vapor pressure relative to atmospheric pressure.

![Image of Cla-Val Valves]
Valve Sizing Coefficient - \( C_V \)

A very useful expression often used in determining the head loss and/or flow rate capacity of control valves is the \( C_V \) factor. Commonly referred to as the flow coefficient or valve sizing coefficient, this empirically determined factor describes the flow capacity of a valve.

The \( C_V \) factor is defined as the number of U.S. gallons per minute of water (at 60°F flowing temperature) discharged through a flow restriction with a head loss of one psi. In the case of a control valve, the \( C_V \) value is normally stated for the valve in the fully open position. For conditions other than full open, (i.e. modulating valves), contact Cla-Val Technical Services.

**NOTE:** The flow rate vs. head loss data presented here is based on a fully open valve condition. The maximum recommended velocity is 20 ft./sec.

### CV Factors

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<tr>
<th>Valve Size</th>
<th>Inches</th>
<th>⅛</th>
<th>⅜</th>
<th>⅝</th>
<th>⅞</th>
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<th>30</th>
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<tbody>
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<td>10</td>
<td>15</td>
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<td>200</td>
<td>250</td>
<td>300</td>
<td>350</td>
<td>400</td>
<td>450</td>
<td>500</td>
<td>600</td>
<td>750</td>
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<td>Gal./Min. (gpm.)</td>
<td>1.8</td>
<td>6</td>
<td>8.5</td>
<td>13.3</td>
<td>30</td>
<td>32</td>
<td>54</td>
<td>85</td>
<td>115</td>
<td>200</td>
<td>440</td>
<td>770</td>
<td>1245</td>
<td>1725</td>
<td>2300</td>
<td>3130</td>
<td>3725</td>
<td>5345</td>
<td>7655</td>
<td>10150</td>
<td>14020</td>
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<td></td>
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<td>Angle Pattern</td>
<td>Gal./Min. (gpm.)</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>29</td>
<td>61</td>
<td>101</td>
<td>139</td>
<td>240</td>
<td>541</td>
<td>990</td>
<td>1575</td>
<td>2500*</td>
<td>3060*</td>
<td>4200*</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
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</tr>
<tr>
<td>Litres/Sec. (l/s.)</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
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<td>15</td>
<td>24</td>
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<td>58</td>
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<td>238</td>
<td>378</td>
<td>600</td>
<td>734</td>
<td>1008</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Estimated
Valve Sizing Coefficient - $C_v$
A very useful expression often used in determining the head loss and/or flow rate capacity of control valves is the $C_v$ factor. Commonly referred to as the flow coefficient or valve sizing coefficient, this empirically determined factor describes the flow capacity of a valve.

The $C_v$ factor is defined as the number of U.S. gallons per minute of water (at 60°F flowing temperature) discharged through a flow restriction with a head loss of one psi. In the case of a control valve, the $C_v$ value is normally stated for the valve in the fully open position. For conditions other than full open, (i.e. modulating valves), contact Cla-Val Technical Services.

### CV Factors

<table>
<thead>
<tr>
<th>Valve Size</th>
<th>3&quot;</th>
<th>4&quot;</th>
<th>6&quot;</th>
<th>8&quot;</th>
<th>10&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>$C_v$ (gpm)</td>
<td>160</td>
<td>340</td>
<td>885</td>
<td>1667</td>
<td>2424</td>
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<tr>
<td>$C_v$ (KV)</td>
<td>36.36</td>
<td>77.27</td>
<td>201.01</td>
<td>378.62</td>
<td>550</td>
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* Calculated
Typical Deluge Valve Applications

134 Series Solenoid Operated Deluge Valve used in Water Curtain Application

403 Series Pneumatic Deluge Valve used in Water Cannon Application
Solenoid Operated Deluge Valve

- UL Listed / ULC Listed Main Valve 3 - 12 inch sizes
- Fast Acting Solenoid Control
- Reliable Drip Tight Shut-off
- Simple Design, Proven Reliable
- Easy Installation & Maintenance

The Cla-Val Model 134-05 Solenoid Control Valve is an on-off control valve which either opens or closes upon receiving an electrical signal to the solenoid pilot control. This valve consists of a 100G/2100G UL/ULC Listed Hytrol Main Valve, a three-way solenoid valve and an auxiliary pilot valve. This pilot control system alternately applies pressure to/or relieves pressure from the diaphragm chamber of the main valve. It is furnished either normally open (de-energize solenoid to open) or normally closed (energize solenoid to open).

Note: For seawater applications use 100GS/2100GS main valve

### Functional Data

<table>
<thead>
<tr>
<th>Valve Size</th>
<th>Inches</th>
<th>3</th>
<th>4</th>
<th>6</th>
<th>8</th>
<th>10</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>80</td>
<td>100</td>
<td>150</td>
<td>200</td>
<td>250</td>
<td>300</td>
<td></td>
</tr>
<tr>
<td>Gal./Min. (gpm)</td>
<td>115</td>
<td>200</td>
<td>440</td>
<td>770</td>
<td>1245</td>
<td>1725</td>
<td></td>
</tr>
<tr>
<td>Litres/Sec. (/s)</td>
<td>27.6</td>
<td>48</td>
<td>105.6</td>
<td>184.8</td>
<td>299</td>
<td>414</td>
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<tr>
<td>Gal./Min. (gpm)</td>
<td>139</td>
<td>240</td>
<td>541</td>
<td>990</td>
<td>1575</td>
<td>2500*</td>
<td></td>
</tr>
<tr>
<td>Litres/Sec. (/s)</td>
<td>33.4</td>
<td>58</td>
<td>130</td>
<td>238</td>
<td>378</td>
<td>600</td>
<td></td>
</tr>
</tbody>
</table>

### Schematic Diagram

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100G/2100G UL/ULC Listed Hytrol Main Valve</td>
</tr>
<tr>
<td>2</td>
<td>CS3 Solenoid Control</td>
</tr>
<tr>
<td>3</td>
<td>100-01 Hytrol Pilot Valve</td>
</tr>
<tr>
<td>4</td>
<td>X58C Restriction Orifice</td>
</tr>
<tr>
<td>5</td>
<td>X46A Flow Clean Strainer</td>
</tr>
</tbody>
</table>

### Specifications

**SIZES**
- Globe: 3” - 12” flanged
- Angle: 3” - 12” flanged

**END DETAILS**
- Ductile Iron 150 ANSI B16.42 flanged
- Cast Steel 150 ANSI B16.5 flanged

**PRESSURE RATINGS**
- 150 class, 250 psi maximum (Ductile Iron)
- 150 class, 285 psi maximum (All other materials)
- 300 class, 300 psi maximum (All materials)

**TEMPERATURE RANGE**
- Water: to 180° F. Max

### Materials

**Main valve body & cover:**
- Ductile Iron ASTM A-536*
- Cast Steel ASTM A216-WCB*
- Naval Bronze ASTM B61
- Nickel Aluminum Bronze ASTM B148
- Super Duplex Stainless Steel
- Stainless Steel ASTM A743-CF-8M

**Main valve trim:**
- Bronze / Stainless Steel

**Pilot control system:**
- Cast Bronze ASTM B62
- UL/ULC Listed Main Valve 3" - 12"

### Cover Capacity

<table>
<thead>
<tr>
<th>Valve Size</th>
<th>Displacement</th>
</tr>
</thead>
<tbody>
<tr>
<td>3&quot;</td>
<td>.080 gal</td>
</tr>
<tr>
<td>4&quot;</td>
<td>.169 gal</td>
</tr>
<tr>
<td>6&quot;</td>
<td>.531 gal</td>
</tr>
<tr>
<td>8&quot;</td>
<td>1.26 gal</td>
</tr>
<tr>
<td>10&quot;</td>
<td>2.51 gal</td>
</tr>
<tr>
<td>12&quot;</td>
<td>4.00 gal</td>
</tr>
</tbody>
</table>
### Pilot System Specifications

<table>
<thead>
<tr>
<th>Temperature Range</th>
<th>Water: to 180°F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluids</td>
<td>Air, water, light oils</td>
</tr>
<tr>
<td>Rubber Parts</td>
<td>Buna-N® Synthetic Rubber</td>
</tr>
<tr>
<td>Solenoid Control*</td>
<td>Brass ASTM B283</td>
</tr>
</tbody>
</table>

**Solenoid Control***

- **Body:** Brass ASTM B283
- **Enclosure:**
  - NEMA Type 1, 2, 3, 3S, 4, 4X general purpose watertight
  - NEMA Type 6, 6P, 7, 9 watertight
- **Explosion Proof available at extra cost**

**Volatges:**
- 110, 220, 50Hz AC
- 24, 120, 240, 480 - 60Hz AC
- 6, 12, 24, 120, 240 - DC

Others available at extra cost

**Max. operating pressure differential:** 200 psi

**Coil:**
- Insulation molded Class F
- Watts AC: 6
- AC Volt Amps Inrush: 30
- AC Volt Amps Holding: 16
- Watts DC: 10.6

**Solenoid Manual operator included.**

UL Listed: 3" - 12"

*Optional material available for Seawater Service*

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**When Ordering, Please Specify**

1. Catalog No. 134-05
2. Valve Size
3. Pattern - Globe or Angle
4. Pressure Class
5. Threaded, Flanged or Grooved
6. Material Desired
7. Energized or De-energized to Open Main Valve
8. Solenoid Enclosure, Voltage & Hertz
9. When Vertically Installed

---

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MODEL 134-60

Seawater Service Solenoid Operated Deluge Valve

- Fast Acting Solenoid Control
- Reliable Drip Tight Shut-off
- Simple Design, Proven Reliable
- Easy Installation & Maintenance

The Cla-Val Model 134-60 Seawater Service Solenoid Control Valve is an on-off control valve which either opens or closes upon receiving an electrical signal to the solenoid pilot control. This valve consists of UL Listed 100GS/2100GS Hytrol Main Valve, a three-way solenoid valve and an auxiliary pilot valve. This pilot control system alternately applies pressure to/or relieves pressure from the diaphragm chamber of the main valve. It is furnished either normally open (de-energize solenoid to open) or normally closed (energized solenoid to open).

Item Description
1 100GS/2100GS UL Listed Hytrol Main Valve
2 CS3S Solenoid Control
3 100-01 Auxiliary Hytrol
4 X58C Restriction Assembly
5 CK2 Two-Way Manual Release Valve

Schematic Diagram

Specification

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100GS/2100GS UL Listed Hytrol Main Valve</td>
</tr>
<tr>
<td>2</td>
<td>CS3S Solenoid Control</td>
</tr>
<tr>
<td>3</td>
<td>100-01 Auxiliary Hytrol</td>
</tr>
<tr>
<td>4</td>
<td>X58C Restriction Assembly</td>
</tr>
<tr>
<td>5</td>
<td>CK2 Two-Way Manual Release Valve</td>
</tr>
</tbody>
</table>

Materials

Main valve body & cover
- Ductile Iron ASTM A-536*
- Cast Steel ASTM A216-WCB*
- Naval Bronze ASTM B61
- Nickel Aluminum Bronze ASTM B148 C95800
- Super Duplex Stainless Steel ASTM A890 GR5A
- Stainless Steel ASTM A743-CF-8M

Main valve trim:
- Bronze / Monel

Tubing & Fittings
- 316 SST, Monel, or 2507 SDS

Pilot control system:
- Cast Bronze ASTM B61
- UL Listed 3" - 10"

Cover Capacity

<table>
<thead>
<tr>
<th>Valve Size</th>
<th>Displacement</th>
</tr>
</thead>
<tbody>
<tr>
<td>3&quot;</td>
<td>.080 gal</td>
</tr>
<tr>
<td>4&quot;</td>
<td>.169 gal</td>
</tr>
<tr>
<td>6&quot;</td>
<td>.531 gal</td>
</tr>
<tr>
<td>8&quot;</td>
<td>1.26 gal</td>
</tr>
<tr>
<td>10&quot;</td>
<td>2.51 gal</td>
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</table>

Cover Capacity

Functional Data

<table>
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<tr>
<th>Valve Size</th>
<th>Inches</th>
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<th>4</th>
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<th>8</th>
<th>10</th>
</tr>
</thead>
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<tr>
<td>mm</td>
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<td>80</td>
<td>100</td>
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<table>
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<th>Globe Pattern</th>
<th>Gal./Min. (gpm.)</th>
<th>Litres/Sec. (L/s)</th>
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<td>Pattern</td>
<td></td>
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</tr>
<tr>
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<td>8&quot;</td>
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<thead>
<tr>
<th>Angle Pattern</th>
<th>Gal./Min. (gpm.)</th>
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<table>
<thead>
<tr>
<th>Pressure Ratings</th>
<th>Globe: 3&quot; - 10&quot; flanged</th>
<th>Angle: 3&quot; - 10&quot; flanged</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Cast Iron 150 ANSI B16.42 flanged</td>
<td>Cast Steel 150 ANSI B16.5 flanged</td>
</tr>
</tbody>
</table>

Pressure Ratings

- 150 class, 250 psi maximum (Ductile Iron)
- 150 class, 285 psi maximum (Cast Steel)
- 300 class, 400 psi maximum

Temperature Range

- Water: to 180˚ F. Max
### Pilot System Specifications

<table>
<thead>
<tr>
<th>Temperature Range</th>
<th>Fluids</th>
<th>Rubber Parts</th>
<th>Solenoid Control*</th>
</tr>
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<tbody>
<tr>
<td>Water: to 180°F</td>
<td>Air, water, light oils</td>
<td>Buna-N® Synthetic Rubber</td>
<td>Body: 316 SS</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Enclosure: NEMA Type 1, 2, 3, 3S, 4, 4X general purpose watertight</td>
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<tr>
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<td></td>
<td>NEMA Type 6, 6P, 7, 9 watertight</td>
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<td>Explosion Proof available at extra cost</td>
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### Valves Specifications

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<td>20.00</td>
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<tr>
<td>B Dia.</td>
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<td>C Max.</td>
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<td>D</td>
<td>2.56</td>
<td>3.19</td>
<td>4.31</td>
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<td>8.50</td>
</tr>
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<td>E 150 ANSI</td>
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<td>13.19</td>
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<td>6.50</td>
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<td>5.31</td>
<td>6.56</td>
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<td>3.81</td>
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<td>L</td>
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<td>N NPT</td>
<td>1/2'-14</td>
<td>3/4'-14</td>
<td>3/4'-14</td>
<td>1&quot;-11 1/2</td>
<td>1&quot;-11 1/2</td>
</tr>
<tr>
<td>P NPT</td>
<td>1-1/4&quot;-11</td>
<td>2&quot;-11 1/2&quot;</td>
<td>2&quot;-11 1/2&quot;</td>
<td>2&quot;-11 1/2&quot;</td>
<td>2&quot;-11 1/2&quot;</td>
</tr>
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<td>3.47</td>
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<td>7.81</td>
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<td>Y Pilot System</td>
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<td>Z Pilot System</td>
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<td>12.00</td>
<td>20.00</td>
<td>22.00</td>
<td>24.00</td>
</tr>
</tbody>
</table>

### When Ordering Please Specify

1. Catalog No. 134-60
2. Valve Size
3. Pattern - Globe or Angle
4. Pressure Class
5. Threaded, Flanged or Grooved
6. Material Desired
7. Energized or D-Energized to Open Main Valve
8. Solenoid Enclosure, Voltage & Hertz
9. When Vertically Installed

---

**Voltages:**
- 110, 220 - 50Hz AC
- 24, 120, 240, 480 - 60Hz AC
- 6, 12, 24, 120, 240 - DC

**Others available at extra cost**
- Max. operating pressure differential: 200 psi
- Insulation molded Class F
- Watts DC 10.6
- Watts AC 6
- AC Volt Amps Inrush 30
- AC Volt Amps Holding 16
- Manual operator available at extra cost.
- UL Listed: 3" - 10"
- *Optional material available for Seawater Service

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**CLA-VAL**

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E-mail sales@cla-val.ca

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Fax: 41-21-643-15-50
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Fax: 44-1892-514-400
E-mail: info@cla-val.co.uk

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ZAC du Champ du Périer

Phone: 33-4-72-25-04-17
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E-mail: info@cla-val.fr

---

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Fax: 33-4-72-25-04-17
E-mail: info@cla-valpacific.com

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Optional Solenoid Control Arrangements

134-60

134-47

134-30

134-61

134-50

134-81
Optional Solenoid Control Arrangements

134-56

134-82

134-57

134-83

134-05

134G-60
Fire Deluge Valve

- Low Head Loss
- Cast Steel Construction
- Stainless Steel Pilot and Tubing
- Stainless Steel Solenoid
- Anti-Cavitation Design
- Fusion Coated Epoxy Inside and Out
- Nickel Aluminum Bronze Construction Option (Alloy C95800)
- Duplex Stainless Steel Construction Option (Alloy 2205)
- Low Maintenance
- Simple and Reliable Operation
- 1-Year Warranty

The Cla-Val 834-05 Deluge Valve is a pressure-operated, in-line axial valve. A tube diaphragm actuates the valve, which is comprised of three major components: 1) Tube 2) Barrier and 3) Body. There is only one moving part in the valve - the tube diaphragm. There are no shafts, packing, stem guides or springs.

The tube diaphragm is a one piece, homogeneous nitrile rubber part which is extremely durable. The ends of the tube are thick solid rubber, designed to fit between mating flanges. This design eliminates the possibility of cutting the tube diaphragm due to over tightening or piping misalignment during installation.

The tube forms a drip tight seal around the barrier when the pressure is equalized between the valve inlet and the control chamber. When pressure is removed from the control chamber, the valve is open. The minimum recommended operating pressure is 40 P.S.I. of inlet pressure.

**Principle of Operation**

**Full Open Operation**
When pressure in control chamber is relieved, the valve is open.

**Tight Closing Operation**
Water pressure from valve inlet is applied to the control chamber. Valve closes bubble tight.
CLA-VAL 800 Series Control Valves operate with maximum efficiency when mounted in horizontal or vertical piping. We recommend isolation valves be installed on inlet and outlet for maintenance. Adequate space above and around the valve for service personnel should be considered essential. A regular maintenance program should be established based on the specific application data. However, we recommend a thorough inspection be done at least once a year. Consult factory for specific recommendations.

**MAIN VALVE**
- Ends: Flanged ANSI B16.5 (150lb Class)
- Body: Cast Steel (ASTM A216 WCB)
- Tube Diaphragm: Nitrile Rubber
- Barrier: Urethane
- Bolts: 316 SS
- Pressure: 250 psig (17.24 BAR)
- Temp. Range: 32º F to 180º F (0º C to 82.2º C)

**MAIN VALVE OPTIONS**
- Body: Nickel Aluminum Bronze (Alloy C95800) or Duplex SS (Alloy 2205)

**PILOT VALVE**
- All Parts: Bronze / Monel
- O-Rings: Nitrile Rubber
- Control Range: 20 to 250 PSIG
- Pilot Pressure Range: 20 to 250 PSIG
- Operation: Latches in operated position; manual reset

**PILOT VALVE OPTIONS**
- All Parts: Monel (Alloy 400)
- Operation: Non-latching

Cla-Val 800 Series Control Valves operate with maximum efficiency when mounted in horizontal or vertical piping. We recommend isolation valves be installed on inlet and outlet for maintenance. Adequate space above and around the valve for service personnel should be considered essential. A regular maintenance program should be established based on the specific application data. However, we recommend a thorough inspection be done at least once a year. Consult factory for specific recommendations.
The Cla-Val Model 834-60 Seawater Deluge Valve is a pressure operated, in-line axial valve. A tube diaphragm actuates the valve, which is comprised of three major components: 1) Tube 2) Barrier and 3) Body. There is only one moving part in the valve - the tube diaphragm. There are no shafts, packing, stem guides or springs. The tube diaphragm is a one piece, homogeneous nitrile rubber part which is extremely durable. The ends of the tube are thick solid rubber, designed to fit between mating flanges. This design eliminates the possibility of cutting the tube diaphragm due to over tightening or piping misalignment during installation. The tube forms a drip tight seal around the barrier when the pressure is equalized between the valve inlet and the control chamber. When pressure is removed from the control chamber, the valve is open. The minimum recommended operating pressure is 40 P.S.I. of inlet pressure.

When pressure in control chamber is relieved, the valve is open.

Water pressure from valve inlet is applied to the control chamber. Valve closes bubble tight.
Cla-Val 800 Series Control Valves operate with maximum efficiency when mounted in horizontal or vertical piping. We recommend isolation valves be installed on inlet and outlet for maintenance. Adequate space above and around the valve for service personnel should be considered essential. A regular maintenance program should be established based on the specific application data. However, we recommend a thorough inspection be done at least once a year. Consult factory for specific recommendations.

**FLOW FACTORS**

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<tr>
<th>SIZE (IN)</th>
<th>CV (gpm)</th>
<th>KV</th>
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<tr>
<td>4&quot;</td>
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<td>77.3</td>
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<td>6&quot;</td>
<td>885</td>
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<td>1667</td>
<td>379</td>
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<tr>
<td>*10&quot;</td>
<td>2424</td>
<td>550</td>
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*Calculated

**MAIN VALVE**

- **Ends:** Flanged ANSI B16.5 (150lb Class)
- **Body:** Cast Steel (ASTM A216 WCB)
- **Tube Diaphragm:** Nitrile Rubber
- **Barrier:** Urethane
- **Bolts:** 316 SS
- **Pressure:** 250 psig (17.24 BAR)
- **Temp. Range:** 32º F to 180º F (0º C to 82.2º C)

**MAIN VALVE OPTIONS**

- **Body:** Nickel Aluminum Bronze (Alloy C95800) or Duplex SS (Alloy 2205)

**PILOT VALVE**

- **All Parts:** Bronze / Monel
- **O-Rings:** Nitrile Rubber
- **Control Range:** 20 to 250 PSIG
- **Pilot Pressure Range:** 20 to 250 PSIG
- **Operation:** Latches in operated position; manual reset

**PILOT VALVE OPTIONS**

- **All Parts:** Monel (Alloy 400)
- **Operation:** Non-latching
Optional Tubular Diaphragm Valve Control Arrangements

803-35

834-60

814-01

INLET
PLUG
OUTLET

INLET
PLUG
OUTLET

INLET
PLUG
OUTLET

INSTRUMENT AIR PRESSURE SOURCE (SUPPLIED BY CUSTOMER)

AIR LINE TO DRY PILOT HEADS (30 PSI MINIMUM)
Optional Tubular Diaphragm Valve Control Arrangements

834-61

834-62

834-05
Series 403
Pneumatically Operated Remote Control Valve for Freshwater & Seawater Service

Specifications

Sizes
Globe: 1 1/2” - 24” flanged
Angle: 1 1/2” - 16” flanged

End Details
125 and 250 ANSI B16.1

Pressure Ratings
150 class - 250 psi Max.
300 class - 400 psi Max.

Temperature Range
Water: to 180°F Max.

Materials
Main valve body & cover:
Ductile Iron ASTM A-536*
Cast Steel ASTM A216-WCB*
Naval Bronze ASTM B-61
Nickel Aluminum Bronze ASTM B148
Super Duplex Stainless Steel
Stainless Steel ASTM A743-CF-8M

Main valve trim:
Bronze ASTM B61
Monel
Stainless Steel 316

Pilot control system:
Cast bronze ASTM B61 with monel trim
Stainless Steel 316 Tubing & Fitting

*Internally & Externally Epoxy Coated

- Single Seat with Resilient Disc Insures Tight Seal
- Simply Designed with Few Working Parts
- Quick Response to Remote Control
- Fully Supported Frictionless Diaphragm
- Leak-proof Service Assured – No Packing Glands
- Single Tube Line Required for Control
- Opens Wide for Minimum Flow Resistance

The Cla-Val 403 Series Remote Control Valve is used where “on-off” control is required. Pressure signals from a remote control “open or close” a small auxiliary valve installed on the main valve cover, which in turn opens or closes the main valve. Only the small amount of fluid in the auxiliary valve cover must pass through the remote control pilot in order to fully open or close the larger main valve.

The Model 403 Series consists of a 100-01 Hytrol main valve and a small Hytrol auxiliary valve. Both the main valve and the auxiliary valve are single-seated, diaphragm operated globe type valves. Line pressure applied to the auxiliary valve cover closes the main valve drip tight.

For Seawater Service use 100S/2100S or 100GS/2100GS Main Valve

Schematic Diagram

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100-01 Hytrol (Main Valve)</td>
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<tr>
<td>2</td>
<td>X47A Ejector</td>
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<tr>
<td>3</td>
<td>100-02 Powertrol</td>
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<td>4</td>
<td>CK2 Ball Valve</td>
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Optional Features

<table>
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<tr>
<th>Item</th>
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<tbody>
<tr>
<td>A</td>
<td>X46A Flow Clean Strainer</td>
</tr>
<tr>
<td>F</td>
<td>Independent Operating Pressure</td>
</tr>
<tr>
<td>H</td>
<td>Drain to Atmosphere</td>
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### Dimensions

<table>
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<tr>
<th>100-01 Threaded &amp; Flanged</th>
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<td>B (Diameter)</td>
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<td>C (Inlet)</td>
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<td>D (Outlet)</td>
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<td>E (Height)</td>
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<td>J (NPT Cover Center Plug)</td>
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<td>K (NPT Cover Center Plug)</td>
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<th>2 1/2&quot;</th>
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<th>6&quot;</th>
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<th>12&quot;</th>
<th>14&quot;</th>
<th>16&quot;</th>
<th>24&quot;</th>
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<tbody>
<tr>
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<td>208</td>
<td>300</td>
<td>460</td>
<td>800</td>
<td>1800</td>
<td>3100</td>
<td>4900</td>
<td>7000</td>
<td>8500</td>
<td>11000</td>
<td>28000</td>
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<tr>
<td>Max. Intermittent (gpm)</td>
<td>280</td>
<td>460</td>
<td>650</td>
<td>1000</td>
<td>1800</td>
<td>4000</td>
<td>7000</td>
<td>11000</td>
<td>16000</td>
<td>19000</td>
<td>25000</td>
<td>63000</td>
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### Functional Data

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<th>4</th>
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<th>8</th>
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<th>12</th>
<th>14</th>
<th>16</th>
<th>24</th>
<th>36</th>
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<tbody>
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<td>80</td>
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<td>200</td>
<td>250</td>
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<td>350</td>
<td>400</td>
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<td>900</td>
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<tr>
<td></td>
<td>Litres/Sec. (l/s)</td>
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<td>Angle Pattern</td>
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<td>24.2</td>
<td>33.4</td>
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<td>130</td>
<td>238</td>
<td>378</td>
<td>600</td>
<td>734.4</td>
<td>1008</td>
<td>—</td>
<td>—</td>
<td></td>
</tr>
</tbody>
</table>

*Estimated

### Pilot System Specifications

#### Materials

- Standard Pilot System Materials:
  - Pilot Control: Bronze ASTM B61
  - Trim: Monel
  - Rubber: Buna-N® Synthetic Rubber

- Optional Pilot System Materials
  Pilot Systems are available with optional Stainless Steel or Monel materials at extra cost.

- Temperature Range: Water: to 180°F

#### When Ordering, Please Specify

1. Catalog No. 403 Series
2. Valve Size
3. Pattern - Globe or Angle
4. Pressure Class
5. Threaded, Flanged or Grooved
6. Trim Material
7. Adjustment Range
8. Desired Options
9. When Vertically Installed

#### When Vertically Installed

<table>
<thead>
<tr>
<th>Valve Stem Internal Thread UNF</th>
</tr>
</thead>
</table>

#### Valve Stem Travel

<table>
<thead>
<tr>
<th>Approx. Ship Wt. Lbs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.0</td>
</tr>
</tbody>
</table>

#### Approx. Ship Wt. Lbs.

| 15 | 35 | 50 | 70 | 140 | 285 | 500 | 780 | 1165 | 1800 | 2265 | 6200 | 11470 |

---

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Fax: 41-21-643-15-00

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Phone: 64-3844888

www.cla-valpacific.com

E-mail: info@cla-valpacific.com

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81
414-01 MODEL

Pneumatically Operated with Manual Reset
Deluge Valve for Freshwater & Seawater Service

- Single Seat with Resilient Disc Insures Tight Seal
- Simply Designed with Few Working Parts
- Quick Response with Manual Reset
- Fully Supported Frictionless Diaphragm
- Leak-proof Service Assured – No Packing Glands
- Single Tube Line Required for Control
- Opens Wide for Minimum Flow Resistance

The Cla-Val 414-01 Remote Control Valve is used where “on-off” control is required. Pressure signals from a remote control “open or close” a small auxiliary valve installed on the main valve cover, which in turn opens or closes the main valve. Once sensing pressure drops to “set” pressure the snap action pilot opens to relieve main valve cover pressure to open deluge valve. Once open the pilot valve must be “manually reset” in order to close the valve.

The Model 414-01 consists of a 100G/2100G Hytrol main valve and a small Hytrol Auxiliary Valve. Both the main valve and the auxiliary valve are single-seated, diaphragm operated globe type valves. Line pressure applied to the auxiliary valve cover closes the main valve drip tight.

For Seawater Service use 100GS/2100GS Main Valve

Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100G/2100G Hytrol (Main Valve)</td>
</tr>
<tr>
<td>2</td>
<td>X46A Flow Clean Strainer</td>
</tr>
<tr>
<td>3</td>
<td>CDHS-3C-A2-3 Differential Control</td>
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<td>4</td>
<td>X58C Restriction Assembly</td>
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<tr>
<td>5</td>
<td>100-01 Auxiliary Hytrol</td>
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Schematic Diagram

For Internally & Externally Epoxy Coated
### Dimensions

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<thead>
<tr>
<th>Valve Size (inches)</th>
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<th>4</th>
<th>6</th>
<th>8</th>
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<td>15.00</td>
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<td>3/4&quot;-14</td>
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<td>1&quot;-11 1/2</td>
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### Functional Data

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<td>Litres/Sec. (l/s.)</td>
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<td>130</td>
<td>238</td>
<td>378</td>
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</table>

### Pilot System Specifications

**Materials**

- Standard Pilot System Materials
  - Pilot Control: Bronze ASTM B61
  - Trim: Monel
  - Rubber: Buna-N Synthetic Rubber

- Optional Pilot System Materials
  - Pilot Systems are available with optional Stainless Steel or Monel materials at extra cost.

**When Ordering, Please Specify**

1. Catalog No. 414-01
2. Valve Size
3. Pattern - Globe or Angle
4. Pressure Class
5. Threaded, Flanged or Grooved
6. Trim Material
7. Adjustment Range
8. Desired Options
9. When Vertically Installed

**Temperature Range**

- Water: to 180°F

---

### Cla-Val

1701 Placentia Avenue • Costa Mesa CA 92627

800-942-6326 • Fax: 949-548-5441 • Web Site: cla-val.com • E-mail: info@cla-val.com
Optional Pneumatic Control Arrangements

403-01

403-07

403-26

403-27
Typical Applications
Used on reservoirs where the water is withdrawn through a separate line or through a bypass equipped with a check valve. The valve opens to refill the reservoir when the water lowers below the shut-off level. For more information see data sheet E-CDS6.

*Note: The reservoir pressure sensing line should be \( \frac{3}{8} \)" minimum I.D. installed with a 2" slope from the valve to the reservoir to avoid air pockets.

Note: We recommend protecting tubing and valve from freezing temperatures.

Schematic Diagram

<table>
<thead>
<tr>
<th>Item</th>
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<tbody>
<tr>
<td>1</td>
<td>Hytrol (Main Valve)</td>
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<tr>
<td>2</td>
<td>CDS6A Altitude Control</td>
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<tr>
<td>3</td>
<td>X101 Valve Position Indicator</td>
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<tr>
<td>4</td>
<td>Bell Reducer</td>
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<tr>
<td>5</td>
<td>CV Flow Control (Closing)</td>
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Optional Features

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<tbody>
<tr>
<td>A</td>
<td>X46A Flow Clean Strainer</td>
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<tr>
<td>B</td>
<td>CK2 (Isolation Valve)</td>
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<tr>
<td>D</td>
<td>Check Valve with Isolation Valve</td>
</tr>
<tr>
<td>F</td>
<td>Independent Operating Pressure</td>
</tr>
<tr>
<td>H</td>
<td>Dry Drain</td>
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<td>P</td>
<td>X141 Pressure Gauge</td>
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<tr>
<td>R</td>
<td>Reservoir Gauge with Tester</td>
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<tr>
<td>S</td>
<td>CV Flow Control (Opening)</td>
</tr>
<tr>
<td>Y</td>
<td>X43 &quot;Y&quot; Strainer</td>
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*3"-10" UL listed
Main Valve available upon request.

Note: When "D" check feature is ordered, the "H" feature is required.

• Accurate and Repeatable Level Control
• Drip-Tight, Positive Shut-Off
• Reliable Hydraulic Operation
• Easily Adjustable Control
• Completely Automatic Operation

The Cla-Val Model 210-01/610-01 Altitude Valve controls the high water level in reservoirs without the need for floats or other devices. It is a non-throttling valve that remains fully open until the shut-off point is reached. This valve is designed for one-way flow only.

This valve is hydraulically operated and pilot controlled. The pilot control operates on the differential in forces between a spring load and the water level in the reservoir. The desired high water level is set by adjusting the spring force. The pilot control measures the reservoir head through a customer supplied sensing line* connected directly to the reservoir.

This valve can also be furnished with auxiliary controls to meet the need for multiple functions, such as: pressure sustaining, pressure reduction, rate of flow control, solenoid override, etc.

If the check feature option is added and a pressure reversal occurs, the downstream pressure is admitted into the main valve cover chamber and the valve closes to prevent return flow.
**Model 210-01** (Uses Basic Valve Model 100-01)

**Pressure Ratings** (Recommended Maximum Pressure - psi)

<table>
<thead>
<tr>
<th>Valve Body &amp; Cover</th>
<th>ANSI Standards*</th>
<th>150 Class</th>
<th>300 Class</th>
<th>300 Class</th>
<th>End† Details</th>
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<tr>
<td>Grade</td>
<td>Material</td>
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<td>Threaded</td>
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<td>225</td>
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Note: ANSI standards are for flange dimensions only. Flanged valves are available faced but not drilled. End Details machined to ANSI B2.1 specifications.

**Valves for higher pressure are available; consult factory for details.**

**Materials**

<table>
<thead>
<tr>
<th>Component</th>
<th>Standard Material Combinations</th>
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<tr>
<td>Body &amp; Cover</td>
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<tr>
<td>Available Sizes</td>
<td>2&quot; - 36&quot;</td>
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<tr>
<td>Disc Retainer &amp; Diaphragm Washer</td>
<td>Cast Iron</td>
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<tr>
<td>Trim: Disc Guide, Seat &amp; Cover Bearing</td>
<td>Bronze is Standard</td>
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<tr>
<td>Disc</td>
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<tr>
<td>Diaphragm</td>
<td>Nylon Reinforced Buna-N® Rubber</td>
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<tr>
<td>Stem, Nut &amp; Spring</td>
<td>Stainless Steel</td>
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For material options not listed, consult factory. Cla-Val manufactures valves in more than 50 different alloys.

**Model 210-01 Dimensions** (In Inches)

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Note: The top two flange holes on valve size 36 are threaded to 1 1/2"-6 UNC.
**Model 610-01 (Uses Basic Valve Model 100-20)**

### Pressure Ratings
*(Recommended Maximum Pressure - psi)*

<table>
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<tr>
<th>Valve Body &amp; Cover</th>
<th>Pressure Class</th>
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<td>Cast Steel</td>
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<td>B16.24</td>
<td>Bronze</td>
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**Note:** ANSI standards are for flange dimensions only. Flanged valves are available faced but not drilled. *Valves for higher pressure are available; consult factory for details*

### Materials

<table>
<thead>
<tr>
<th>Component</th>
<th>Standard Material Combinations</th>
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<tbody>
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<td>Body &amp; Cover</td>
<td>Ductile Iron, Cast Steel, Bronze</td>
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<tr>
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<tr>
<td>Disc Retainer &amp; Diaphragm Washer</td>
<td>Cast Iron, Cast Steel, Bronze</td>
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<tr>
<td>Trim: Disc Guide, Seat &amp; Cover Bearing</td>
<td>Bronze is Standard Stainless Steel is Optional</td>
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<tr>
<td>Disc</td>
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<tr>
<td>Diaphragm</td>
<td>Nylon Reinforced Buna-N® Rubber</td>
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<td>Stem, Nut &amp; Spring</td>
<td>Stainless Steel</td>
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For material options not listed, consult factory. Cla-Val manufactures valves in more than 50 different alloys.

### Model 610-01 Dimensions (In Inches)

<table>
<thead>
<tr>
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<th>4</th>
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<td>6.75</td>
<td>7.25</td>
<td>CF*</td>
<td>CF*</td>
<td>CF*</td>
<td>CF*</td>
<td>CF*</td>
<td>CF*</td>
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<td>CF*</td>
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<td>330</td>
<td>625</td>
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<td>13</td>
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<td>27</td>
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<td>Y Pilot System</td>
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<td>11</td>
<td>18</td>
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<td>22</td>
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<td>30</td>
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<tr>
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<td>10</td>
<td>11</td>
<td>18</td>
<td>20</td>
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<td>47</td>
<td>49</td>
</tr>
</tbody>
</table>

**Note:** Consult Factory.

*Consult Factory* 

*Note: The top two flange holes on valve sizes 36 thru 48 are threaded to 1 1/2"-6 UNC.*
### Pilot System Specifications

**Adjustment Ranges**
- 5 - 40 ft.
- 30 - 80 ft.
- 70 - 120 ft.
- 110 - 160 ft.
- 150 - 200 ft.

**Temperature Range**
- Water: to 180°F

If flowing line pressure is less than 10 psi, consult factory for full details. If inlet pressure is above 150 psi, consult factory for recommendations.

### Materials

<table>
<thead>
<tr>
<th>Standard Pilot System Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pilot Control: Bronze ASTM B62</td>
</tr>
<tr>
<td>Trim: Stainless Steel Type 303</td>
</tr>
<tr>
<td>Rubber: Buna-N® Synthetic Rubber</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Optional Pilot System Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pilot Systems are available with optional Aluminum, Stainless Steel, or Monel materials.</td>
</tr>
</tbody>
</table>

Valve position indicator is standard.

### When Ordering, Please Specify

1. Catalog No. 210-01 or No. 610-01
2. Valve Size
3. Pattern - Globe or Angle
4. Pressure Class
5. Threaded or Flanged
6. Materials Desired
7. Adjustment Range
8. Desired Options
9. When Vertically Installed
10. When "D" feature is ordered, the "H" feature is required.
Series 33A
Sizes 1" - 2" - 3" - 4" - 6"
High Performance Combination
Air Release & Vacuum Breaker Valve

- Automatically Eliminates Air Pockets
- Easily Serviced Without Removal from Pipeline
- Simple, Effective Patented Design
- Corrosion Resistant Materials of Construction
- Engineered For Lasting Service

Designed to protect pipelines and vertical turbine pump applications on offshore platforms from air lock and vacuum collapse, the Cla-Val Model 33A Combination Air Release and Vacuum Breaker Valve eliminates air and prevents vacuum formations in pipelines. A large venting orifice and large float clearances freely exhaust or admits air during pipeline filling or draining.

During normal pipeline operation, air accumulation and buoyancy cause the float ball to lower or lift. As the water level lowers inside the valve, small amounts of accumulated air are released through the small orifice. Once air is released, the patented float poppet system closes drip tight.

Valve servicing is simple because the entire float poppet system can be replaced without removal of the valve body from the pipeline.

Typical Applications
- Standard Max. D.W.P. 300 psi (For Higher Operating Pressures Consult Factory)
- Transmission Pipeline High Points
- Water Treatment Plant Piping High Points
- Offshore Platforms
- Vertical Turbine Pump Discharge

Installation

Series 33A Combination Air Release and Vacuum Breaker Valves are typically installed at high points in pipelines for air release, or at anticipated pipeline vacuum occurrence locations. Install Series 33A at regular intervals (approximately 1/2 mile) along uniform grade line pipe. Mount the unit in the vertical position on top of the pipeline, and include an isolation/shutoff valve.

Series 33A is often installed upstream of check valves in pump discharges to vent air during start-up and to allow air reentry when the pump stops.

Operation

Air Release Mode—Valve is normally open.
When line is filled or pump started, air is exhausted through the normally open 33A valve. As liquid fills the valve, float ball rises to form a drip-tight closure and remaining air is exhausted through small orifice.

Vacuum Prevent Mode When line pressure drops below positive pressure and the liquid level lowers, the float drops, unseating the valve and allowing air into the line, thus preventing a vacuum.

Note: Available for Sea Water Service See Material Specifications
Determine anticipated water flow and allowable pressure differential for the pipeline application. Select valve from chart to exhaust or admit air at the same rate as water filling or draining (in CFS). For larger flows, two or more Model 33A’s may be installed in parallel.

Note: Higher Pressures Available upon Request

Specifications

Standard Internals
Float: Stainless Steel 304SS Standard, T316 or Monel optional (extra cost)
Balance internals parts Stainless Steel and Delrin
Seals Nitrile Rubber or Viton® (extra cost)

Temperature Range
Water to 180° F

Optional:
1. Fusion epoxy lined and coated
2. For Well Service Throttling Device on the Outlet Specify Model TD

Valve Sizing Selection
Large Orifice Air-Vacuum Capacity

During pressurized pipeline operation, small pockets of entrapped air will be released through the float actuated 0.076 or .125 inch orifice. Use chart to determine discharge capacity.
Series 33B

Sizes 1" - 2"

High Performance Combination Air Release & Vacuum Breaker Valve with Non-Surge Orifice

- Sizes 1" - 2"
- Automatically Protects Pipelines
- Easily Serviced Without Removal from Pipeline
- Pressure Sensitive Closing Orifice
- Corrosion Resistant Internal Parts
- Engineered For Lasting Service

Designed to protect pipelines from air lock and vacuum collapse, the Cla-Val Model 33B Air Release and Vacuum Breaker Valve eliminates air and prevents vacuum formations in pipelines. A large venting orifice and large float clearances freely exhaust or admits air during pipeline filling or draining.

During normal pipeline operation, air accumulation and buoyancy cause the float ball to lower or lift. As the water level lowers inside the valve, small amounts of accumulated air are released through the small orifice. Once air is released, the patented float poppet system closes drip tight.

Valve servicing is simple because the entire float poppet system, can be replaced without removal of the valve body from the pipeline.

Typical Applications
- Water Transmission Pipeline High Points
- Water Treatment Plant Piping High Points
- Vertical Turbine Pump Discharge

Installation

Series 33B Air Release and Vacuum Breaker Valves are typically installed at high points in pipelines for air release, or at anticipated pipeline vacuum occurrence locations. Install Series 33B at regular intervals (approximately 1/2 mile) along uniform grade line pipe. Mount the unit in the vertical position on top of the pipeline, and include an isolation/shutoff valve.

Series 33B is often installed upstream of check valves in pump discharges to vent air during start-up and to allow air reentry when the pump stops.

Operation

Air Release Mode—Valve is normally open.

When line is filled or pump started, air is exhausted through the normally open 33B valve. With excessive air exhaust, the non-surge orifice closes. Air will continue to be exhausted through the non-surge orifice disc. The non-surge float prevents the slam effect and therefore suppresses water hammer.

As liquid fills the valve, float ball rises to form a drip-tight closure and remaining air is exhausted through small orifice.

Vacuum Prevent Mode  When line pressure drops below positive pressure and the liquid level lowers, the float drops, unseating the valve and allowing air into the line, thus preventing a vacuum.
Specifications

MODEL 33B - 1”, 2” SIZES

Single Body Combination Air Vacuum and Air Release Valve

Pressure Ratings

<table>
<thead>
<tr>
<th>Pressure</th>
<th>Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>500 psi</td>
<td>Body and Cover: Ductile Iron ASTM A536 65-45-12</td>
</tr>
<tr>
<td>500 psi</td>
<td>Body and Cover: Stainless Steel T316</td>
</tr>
<tr>
<td>600 psi</td>
<td>Body and Cover: Cast Steel ASTM A 216 WCB</td>
</tr>
</tbody>
</table>

Seawater Service Materials:
Bronze readily available for seawater service and other corrosive fluids applications Made of:
Monel - Bronzes (ASTM B61 or ASTM B148) - 316 Stainless Steel

Standard Internals:
Bronzes  ASTM B61 or ASTM B148
Monel / 316 Stainless Steel
Duplex Stainless Steel  UNS S31803
Super Duplex Stainless Steel  ASTM A890-5A UNS J93404
Super Austenitic Stainless Steel 6MO  UNS S31254
Titanium  ASTM B367 Gr 2

Temperature Range
Water to 180° F

Optional:
1. For Well Service use 33C Type

Valve Sizing Selection

Air-Vacuum Capacity

Determine anticipated water flow and allowable pressure differential for the pipeline application. Select valve from chart to exhaust or admit air at the same rate as water filling or draining (in CF5). For larger flows, two or more Model 33B’s may be installed in parallel

When Ordering, Please Specify
1. Catalog No.
2. Valve Size
3. Pressure Rating
4. Materials

Small Orifice Capacity

During pressurized pipeline operation, small pockets of entrapped air will be released through the float actuated 0.076 or .125 inch orifice. Use chart to determine discharge capacity.

When Ordering, Please Specify
1. Catalog No.
2. Valve Size
3. Pressure Rating
4. Materials
**Model 33ATD**

**Sizes 2" - 3" - 4"**

Air Release & Vacuum Breaker Valve

( Threaded & Flanged) with Throttling Air Control Device

- Automatically eliminates air pockets
- Easily serviced without removal from pipeline
- Simple, effective patented design
- Corrosion resistant internal parts
- Engineered for lasting service
- Sizes 2", 3" and 4" UL Listed

Designed to protect pipelines from air lock and vacuum collapse, the CLA-VAL Model 33ATD Air Release and Vacuum Breaker Valve eliminates air and prevents vacuum formation in pipelines. A large venting orifice and large float clearances freely exhaust or admits air during pipeline filling or draining.

During normal pipeline operation, air accumulation and buoyancy cause the floats to lower or lift. As the water level lowers inside the valve, small amounts of accumulated air are released through the small orifice. Once air is released, the patented float poppet system closes drip tight.

Valve servicing is simple because the entire float poppet system, can be replaced without removal of the valve body from the pipeline.

**Installation**

Series 33ATD is often installed upstream of check valves in vertical pump discharges to throttle air out during start-up and to allow full air reentry when the pump stops.

**Operation**

**Air Release Mode - Valve is normally open:**

When line is filled or pump started, air is throttled through the air control device TD. As liquid fills the valve, float ball rises to form a drip-tight closure and remaining air is exhausted through small orifice. Air throttling can be adjusted by means of adjusting the screw.

**Vacuum Prevent Mode:**

When line pressure drops below positive pressure and the liquid level lowers, the float drops, unseating the valve and allowing air into the line, thus preventing a vacuum. The spring loaded disc in the TD throttling air control device is moved to the air intake position due to the negative pressure.

**Typical Applications**

- Standard Max. D.W.P. 300 psi for UL Listed assemblies (for Higher Operating Pressure Consult Factory)
- Transmission pipeline high points
- Water treatment plant piping high points
- Offshore platforms
- Vertical turbine pump discharge

visit www.cla-val.com to learn about our complete line of fire protection products.

Note: Available for Sea Water Service (see material specifications)
### Materials of Construction

- Nickel Aluminum Bronze (NAB) - ASTM B148 Alloy C95800
- Monel - QQ-N-288 Comp B - ASTM A494 Grade M30H
- Cast Steel - ASTM A216 Grade WCB
- 316 Stainless Steel - ASTM A743 Grades CF3M and CFM8
- Super Austenitic Stainless Steel - ASTM A351 Grade CK3MCuN (SMO 254)
- Super Duplex Stainless Steel - ASTM A890 Grade 5A (CE3MN)

### Specifications

#### Standard Internals
- Float: Stainless Steel 304SS Standard, T316 or Monel optional (extra cost)
- Balance internal parts Stainless Steel and Delrin
- Seals Nitrile Rubber or Viton® (extra cost)
- Note: Fluorocarbon is not a UL Listed Seal Material

#### Temperature Range
- Water to 180° F

**Optional:**
- Fusion epoxy lined and coated
- For well service throttling device on the outlet specify model TD

### Valve Sizing Selection

**Air-Vacuum Flow Capacity**

Determine anticipated water flow and allowable pressure differential for the pipeline application. Select valve from chart to exhaust or admit air at the same rate as water filling or draining (in CFS). For larger flows, two or more Model 33ATD's may be installed in parallel.

#### Pressures Ratings

<table>
<thead>
<tr>
<th>Valve Size</th>
<th>Orifice Dia.</th>
<th>Standard Maximum Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&quot;</td>
<td>.076&quot;</td>
<td>300 psi</td>
</tr>
<tr>
<td>2&quot;</td>
<td>.076&quot;</td>
<td>500 psi</td>
</tr>
<tr>
<td>3&quot; &amp; 4&quot;</td>
<td>.125&quot;</td>
<td>300 psi</td>
</tr>
<tr>
<td>3&quot; &amp; 4&quot;</td>
<td>.076&quot;</td>
<td>450 psi</td>
</tr>
</tbody>
</table>

**Note:** Maximum Pressure Rating for UL Listed 33ATD = 300 psi

### Air Release Capacity

During pressurized pipeline operation, small pockets of entrapped air will be released through the float actuated 0.076 or .125 inch orifice. Use chart to determine discharge capacity.

#### When Ordering, Please Specify

1. Catalog No.
2. Valve Size
3. Pressure Rating
4. Materials

---

**Dimensions (In Inches)**

<table>
<thead>
<tr>
<th>Valve Size</th>
<th>1&quot;</th>
<th>2&quot;</th>
<th>3&quot;</th>
<th>4&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure Class 300 Lb Threaded</td>
<td>11.81</td>
<td>16.50</td>
<td>18.50</td>
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<td>Pressure Class 150 Lb Flanged (INLET)</td>
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<tr>
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<td>18.00</td>
<td>22.00</td>
<td>23.75</td>
<td>-</td>
</tr>
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</table>

**When ordering please specify**

1. Catalog No.
2. Valve Size
3. Pressure Rating
4. Materials

---

**Materials of Construction**

- Nickel Aluminum Bronze (NAB) - ASTM B148 Alloy C95800
- Monel - QQ-N-288 Comp B - ASTM A494 Grade M30H
- Cast Steel - ASTM A216 Grade WCB
- 316 Stainless Steel - ASTM A743 Grades CF3M and CFM8
- Super Austenitic Stainless Steel - ASTM A351 Grade CK3MCuN (SMO 254)
- Super Duplex Stainless Steel - ASTM A890 Grade 5A (CE3MN)
Series 580

Silent Wafer Check Valve

Product Advantages
• Operates Horizontally or Vertically
• Watertight Metal-to-Metal Seating
• Field Replaceable Parts
• Factory Mutual Approved – 4 through 10-inches
• Optional Resilient Seat

The Cla-Val Series 580 Silent Wafer Check Valve has a spring-loaded poppet that allows the valve to close before flow reversal occurs, resulting in a silent, non-slam closure. It is a truly silent check valve. For ease of installation, the valve can be installed in vertical or horizontal positions with flow up or flow down. The short lay length of the valve allows for a space-saving design. Silent Wafer Check Valves are available in sizes 1” to 10”, with either a 125/150# or 250/300# pressure class rating.

Constructed of an epoxy coated ductile iron body with stainless steel trim, the Cla-Val Silent Wafer Check Valve offers watertight shutoff with metal-to-metal seating. For special applications, Buna-N® resilient seats are available as options. All materials conform to ASTM specifications, ensuring long lasting reliable performance. As a confirmation of Cla-Val’s commitment to quality, all Series 580 125/250# class valves are Factory Mutual approved except those supplied with Buna-N® resilient seats.

Approvals & Certifications
• 125/150 Class Valves 4 - 10-inches - FM Approved
• 125/150 & 250/300 Class Valves 1 - 10-inches meet Federal Mandate for Lead Content Limits

Pressure Ratings
• 125/150 (Rated to 250 psi)
• 250/300 (Rated to 640 psi)

Materials
Valve Body:
Ductile Iron - ASTM 536 65-45-12

Disc & Seat:
304 Stainless Steel - SS ASTM A276 T304

Spring:
316 Stainless Steel; Stone
Tumbled and Stress Relieved - SS ASTM A276 T16

Note:
Standard offering is two-part epoxy coating interior and exterior
**125/150 & 250/300 Class Silent Wafer Check Valve: 1 thru 6-inches**

The silent wafer check valve shall consist of a heavy ductile iron body, stainless steel seat, disc, and steel spring. The valve disc shall be center guided at both ends with an integral shaft and shall be spring loaded for silent operation. The spring shall be helical or conical and stone tumbled to achieve a micro-finish to resist mineral deposits. For ease of maintenance, the seat and disc shall be replaceable in the field.

Check valve shall be capable of silent operation when installed in vertical or horizontal positions with either flow up or flow down. The flow area through the body shall be equal to or greater than the cross-section area of the equivalent pipe size.

**Specifications**

<table>
<thead>
<tr>
<th>Valve Size (inches)</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>2.75</td>
<td>2.06</td>
<td>1.25</td>
<td>0.06</td>
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<tr>
<td>1.50</td>
<td>3.63</td>
<td>2.38</td>
<td>1.81</td>
<td>0.09</td>
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<tr>
<td>2</td>
<td>4.25</td>
<td>2.63</td>
<td>2.38</td>
<td>0.00</td>
</tr>
<tr>
<td>2.50</td>
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<td>3</td>
<td>5.75</td>
<td>3.13</td>
<td>3.38</td>
<td>0.06</td>
</tr>
<tr>
<td>4</td>
<td>7.00</td>
<td>4.00</td>
<td>4.75</td>
<td>0.06</td>
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<tr>
<td>5</td>
<td>8.38</td>
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<td>6</td>
<td>9.75</td>
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<td>6.50</td>
<td>0.88</td>
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</table>

<table>
<thead>
<tr>
<th>Valve Size (mm)</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
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<td>69.9</td>
<td>52.4</td>
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<td>32</td>
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<td>52.4</td>
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<td>0</td>
</tr>
<tr>
<td>40</td>
<td>92.1</td>
<td>60.3</td>
<td>46.0</td>
<td>2.4</td>
</tr>
<tr>
<td>50</td>
<td>108.0</td>
<td>66.7</td>
<td>60.3</td>
<td>0</td>
</tr>
<tr>
<td>65</td>
<td>127.0</td>
<td>73.0</td>
<td>73.0</td>
<td>0</td>
</tr>
<tr>
<td>80</td>
<td>146.1</td>
<td>79.4</td>
<td>85.7</td>
<td>1.6</td>
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<tr>
<td>100</td>
<td>177.8</td>
<td>101.6</td>
<td>120.7</td>
<td>1.6</td>
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<td>125</td>
<td>212.7</td>
<td>117.5</td>
<td>139.7</td>
<td>12.7</td>
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<tr>
<td>150</td>
<td>247.7</td>
<td>139.7</td>
<td>165.1</td>
<td>22.2</td>
</tr>
</tbody>
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**Note:** Dimensions are the same for both 125/150 and 250/300 Class Valves.
125/150 Class Silent Wafer Check Valve: 8 & 10-inches

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250/300 Class Silent Wafer Check Valve: 8 & 10-inches

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Note: Dimensions are the same for both 125/150 and 250/300 Class Valves.
# 580 Series Silent Wafer Check Valve Technical Data

## Item Breakdown

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## Typical Applications

Cla-Val 580 Series Silent Wafer Check Valves are used anywhere a quick, quiet closure is desired and in the majority of pump applications, including the following:

- Fire Pump Applications
- Vertical Turbine Pumps
- Booster Pump Stations in High Rise Buildings
- House Pump Applications

## Maximum Non-Shock Service Pressure, PSI/kPa

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Series 581

Silent Globe Check Valve

Product Advantages
- Operates Horizontally or Vertically
- Watertight Metal-to-Metal Seating
- Field Replaceable Parts
- Factory Mutual Approved – 4 through 12-inches
- Optional Resilient Seat

The Cla-Val Series 581 Silent Globe Check Valve has a spring-loaded poppet that allows the valve to close at 1/4 psi before flow reversal occurs, resulting in a silent, non-slam closure.

Constructed of a ductile iron body with stainless steel trim, the Cla-Val Silent Globe Check Valve offers watertight shutoff with metal-to-metal seating. Buna-N® resilient seats are available as an option for special applications.

Specifications
The silent globe check valve shall consist of an epoxy-coated ductile iron body, stainless steel seat, disc and spring. The valve disc shall be center guided at both ends with an integral shaft and shall be spring loaded for silent operation. The spring shall be helical or conical and stone tumbled to achieve a micro-finish to resist mineral deposits. For ease of maintenance, the seat and disc shall be replaceable in the field.

Check valve shall be capable of silent operation when installed in vertical or horizontal positions with either flow up or flow down. The flow area through the body shall be equal to or greater than the cross-section area of the equivalent pipe size. Sizes 2 1/2” to 10” shall allow bolting a wafer style butterfly valve directly to the outlet flange without a spool piece.

Materials
Valve Body:
Ductile Iron - ASTM 536 65-45-12

Disc & Seat:
304 Stainless Steel - SS ASTM A276 T304

Spring:
316 Stainless Steel; Stone Tumbled and Stress Relieved - SS ASTM A276 T16

Note:
Standard offering is two-part epoxy coating interior and exterior

Approvals & Certifications
- 125/150 and 250/300 Class Valves 4 through 12-inches - FM Approved
- 125/250 & 250/300 Class valves 3 through 42-inches meet Federal Mandate for Lead Content Limits

Pressure Ratings
- 125/150 (Rated to 250 psi)
- 250/300 (Rated to 640 psi)

Series 581 Pressure Loss Curve
(Typical)

Pressure Loss PSI vs. Fluid Velocity / FPS

Pressure Loss psi

Fluid Velocity / FPS
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<th>G</th>
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Cla-Val 581 Series Silent Globe Check Valves are used anywhere a quick, quiet closure is desired and in the majority of pump applications, including the following:

- Fire Pump Applications
- Vertical Turbine Pumps
- Booster Pump Stations in High Rise Buildings
- House Pump Applications
The Cla-Val Series 582SWS Two-Door Wafer Check Valve has torsion springs that force the two doors to shut before flow reversal, reducing the water hammer potential that normally occurs with single-door swing check valves. To help reduce water hammer, the two-door design also reduces the travel distance from open to shut-off for a quicker response. Extremely short in lay length, the valve is both a compact and an economical solution. Two-Door Wafer Check Valves are available in sizes 6" to 24" with either a 125 lb. or 250 lb. pressure class rating.

Although lighter in weight than globe style swing check valves, Cla-Val Two-Door Wafer Check Valves are designed for heavy-duty applications. For ease of installation, valves 6" and larger are supplied with a tapped hole for installing a lifting eye bolt. All materials conform to ASTM specifications, ensuring long lasting reliable performance. As a confirmation of Cla-Val’s commitment to quality, 6" to 24" 125 lb. class Series 582SWS valves are Factory Mutual approved.

Typical Application

Seawater Service Pressure Relief Valve

582SWS Check Valve

33A Air Valve

Offshore Platform
## Series 582SWS Two-Door Wafer Check Valve

### Dimensions (In Inches)

<table>
<thead>
<tr>
<th>Size</th>
<th>Model</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
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<td>8&quot;</td>
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### Plain Ends Two-Door Wafer Check Valve for Seawater Service

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<th>D</th>
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<td>24 1/4</td>
<td>23</td>
</tr>
</tbody>
</table>

* FM Approved

### Part No.  Name          Material
1 Body          Aluminum Bronze ASTM B148, Alloy 95200
2 Door          Aluminum Bronze ASTM B148, Alloy 95200
3 Torsion Springs       Inconel X750, ASTM B637 Alloy N04400
4 Door Hinge Pin       Monel ASTM B164, Alloy N04400
5 Door Stop Pin       Monel ASTM B164, Alloy N04400
6 Door Thrust Bearing  Monel ASTM B164, Alloy N04400
7 Hinge Pin Retainer   Monel 400
8 Stop Pin Retainer    Monel 400
9 Stabilization Sphere Buna-N®
10 Spacer (2" - 12" Sizes)  Monel ASTM B164, Alloy N04400
The two-door wafer check valve shall be compact wafer design, to fit between flanges or grooved ends. The check valve doors shall be spring-loaded closed, by means of one or more stainless steel torsion springs. Flow shall cause the doors to open and upon pump shut down, the torsion spring shall shut the doors, before reverse flow, for anti-slam closure. Seating shall be resilient Buna-N®, watertight and molded to the body. Valves 6" and larger shall be supplied with an eye bolt for lifting. The valve shall be a Cla-Val Series 582W 2"-12" having alignment wings for mounting between ANSI 125, ISO PN10 or PN16 flanges or Series 582 (14"-60") for mounting between ANSI 125 or 150 flanges or Series 582G (2"-16") with grooved ends for mounting between grooved end piping. All materials of construction shall conform to ASTM specifications as follows:

**Valve Body:**
- Series 582W & 582G 2" - 12"
- Ductile Iron ASTM A536
- Series 582 14" - 16"
- Cast Iron ASTM A126, Class B

**Doors:**
- 2" - 12" Bronze ASTM B584
- 14" - 60" Aluminum Bronze ASTM B148

**Sealing Element:** Buna-N®

**Torsion Spring:** 316

**Hinge:** 316 Stainless Steel

**Stop:** 316 Stainless Steel

**Sizes:** 2" to 60"

All Cla-Val Series 582 Two-Door Check Valves utilize a torsion springs that very quickly shut the valve, before flow reversal. To minimize Slam / Water Hammer typically experienced with conventional swing check valves. Basically Two Door design valves, halves the travel distance from open valve to shut-off vs swing check valves and is the reason for the Anti-slam / Minimum Water Hammer feature. With extremely short laying lengths series 582W and Series 582 are space savings & an economical solution. The Series 582G with grooved ends provides for ease of installation and removal from pipelines. Although lighter in weight than conventional swing check valves, Cla-Val Two-Door Wafer Check Valves are designed for heavy-duty applications. For ease of installation, valves 6" and larger are supplied with lifting eye bolts. All materials conform to ASTM specifications, ensuring long lasting reliable performance.
## Dimensions (In Inches)

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<th>Wafer</th>
<th>Grooved</th>
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## Dimensions (mm)

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<thead>
<tr>
<th>Cla-Val Series 582 Two-Door Wafer Check Valve ANSI CLASS 125</th>
<th>Wafer</th>
<th>Grooved</th>
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### INSTALLATION

Install the Cla-Val Series 582 Two-Door Wafer Check Valve between standard flanges in the horizontal or in the vertical, flow up, position.

### NOTE:

For horizontal flow this valve MUST Be installed with disc hinge pin in the VERTICAL position for proper operation.
### Flange Dimensions and End Details

All flanged Cla-Val valves are furnished faced and drilled unless otherwise specified. The dimensions and drilling of end flanges conform to standards of the American National Standards Institute. The ANSI tables are given here for your convenience. When ANSI standards call for 1/16" raised face, this face is included in the dimensions for the thickness of flange. All dimensions are given in inches.

#### Ductile Iron Valves* Class 150 and 300 (ANSI B16.42 — 1987)

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<th>Nominal Pipe Size</th>
<th>Diameter of Flange</th>
<th>Thickness of Flange</th>
<th>Diameter of Raised Face</th>
<th>Diameter of Bolt Circle</th>
<th>Diameter of Bolts</th>
<th>Diameter of Bolt Holes</th>
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<td>72.50</td>
<td>300.00</td>
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#### Cast Iron Valves* Class 125 and 250 (ANSI B16.1 — 1989)

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<th>Diameter of Bolt Circle</th>
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#### Bronze Valves* Class 150 and 300 (ANSI 16.24 — 1979)

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<th>Nominal Pipe Size</th>
<th>Diameter of Flange</th>
<th>Thickness of Flange</th>
<th>Diameter of Raised Face</th>
<th>Diameter of Bolt Circle</th>
<th>Diameter of Bolts</th>
<th>Diameter of Bolt Holes</th>
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#### Cast Steel Valves* Class 150 and 300 (ANSI 16.5 — 1988)

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<td>88.00</td>
</tr>
</tbody>
</table>

*Cla-Val valves can be furnished in aluminum.
CLA-VAL WARRANTY

3 Year Warranty on Cla-Val Quality Products

This is a Limited Warranty

Automatic valves and controls as manufactured by Cla-Val are warranted for three years from date of shipment against manufacturing defects in material and workmanship that develop in the service for which they are designed, provided the products are installed and used in accordance with all applicable instructions and limitations issued by Cal-Val. Electronic components manufactured by Cla-Val are warranted for one year from the date of shipment. We will repair or replace defective material, free of charge which is returned to our factory, transportation charges prepaid, provided that after inspection the material is found to have been defective at time of shipment. The warranty is expressly conditioned on the purchaser’s giving Cla-Val immediate written notice upon discovery of the defect.

Components used by Cla-Val, but manufactured by others, are warranted only to the extent of that manufacturer’s guarantee.

This warranty shall not apply if the product has been altered or repaired by others, and Cal-Val shall make no allowance or credit for such repairs or alterations unless authorized in writing by Cla-Val.

Disclaimer of Warranties & Limitation of Liability

The foregoing warranty is exclusive and in lieu of all other warranties and representations whether expressed, implied, oral or written, including but not limited to, any implied warranties or merchantability or fitness for a particular purpose. All such other warranties and representations are hereby cancelled.

Cla-Val shall not be liable for any incidental or consequential loss, damage or expense arising directly or indirectly from the use of the product. Cla-Val shall not be liable for any damages or charges for labor or expense in making repairs or adjustments to the product. Cla-Val shall not be liable for any damages or charges sustained in the adaptation or use of its engineering data and services.

No representative of Cla-Val may change any of the foregoing or assume any additional liability or responsibility in connection with the product.

The liability of Cla-Val is limited to material replacements F.O.B. Newport Beach, California.

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When protecting life and property, depend on Cla-Val.