Valve Design

General

- Valve bodies through 100,000 psi are high tensile Type 316 stainless steel, 150,000 psi valve bodies are 17-4 PH stainless steel.
- Stem assemblies have non-rotating tips to prevent galling with valve seats.
- Packing is located below the stem threads to prevent contact with media (liquid or gas).
- Packing glands are equipped with locking devices or lock nuts.
- Six valve patterns (see chart on page 7).
- Tubing connections are: 1/16", 1/8", 1/4", 3/8", 3/16", 1" and 1/8".
  Pipe connections include: 1/8", 1/4", 3/8", 1/2", 3/4", and 1" NPT.
- Remote control air operators are available for most valves.

Slotted Stem: Non-rotating slotted stems are standard on AF4, AF6, LF4, LF6, LF9, HF6, HF4, and HF9 (30,000 psi) HF2, HF4, HF6, HF9 (60,000 psi) for on-off service and ensure long life on valve seats. Regulating tip stems are available for all valves at no additional cost, add -REG to part number.

Rolled Style Stem: This simple two-piece design is also non-rotating and is ideal for smaller valves and for valves made from exotic materials. The standard lower section stem is manufactured from hardened 17-4 PH stainless steel. It is affixed to a one-piece upper stem requiring no periodic adjustment. The two stem components are free to rotate independently of each other, thereby minimizing rotation of the lower stem against the valve seat.

The Rolled Style Stem is standard for all AF1, AF2, NFA, NFB, LF4, LF6 valves, 30,000 psi HF2, XF4, and XF6 valves, as well as most valves requiring stems made from exotic materials. It is optional for any valve normally supplied with a Positive Guide Stem.

Pinned Stem Design: This variation on the Rolled Style Stem is a three-piece design in which the lower stem is pinned into a freely-rotating stem guide. It has all of the advantages of the rolled style stem, with the additional benefit of a replaceable lower section stem.

The Pinned Stem Design is standard for all NFC, NFD, NFF, NFH, LF9, LF12, LF16, and HF16 valves.
# Quick Selector Guide to Standard Valves

<table>
<thead>
<tr>
<th>Tubing Size O.D.</th>
<th>I.D.</th>
<th>Two Way Straight</th>
<th>Two Way Angle</th>
<th>Three Way Two Press</th>
<th>Three Way One Press</th>
<th>Three Way Two Stem</th>
<th>Replaceable Seat</th>
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<tbody>
<tr>
<td><strong>Taper Seal Valves</strong></td>
<td></td>
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<tr>
<td>10,000 psi</td>
<td>¼&quot; ½&quot;</td>
<td>10-11AF4 10-12AF4</td>
<td>10-13AF4</td>
<td>10-14AF4</td>
<td>10-15AF4</td>
<td>10-12AF4-R</td>
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<tr>
<td>15,000 psi</td>
<td>¼&quot; ½&quot;</td>
<td>10-11AF6 10-12AF6</td>
<td>10-13AF6</td>
<td>10-14AF6</td>
<td>10-15AF6</td>
<td>10-12AF6-R</td>
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<td><strong>NPT Valves</strong></td>
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</tr>
<tr>
<td>10,000 psi</td>
<td>¼&quot;</td>
<td>10-11NFA 10-12NFA</td>
<td>10-13NFA</td>
<td>10-14NFA</td>
<td>10-15NFA</td>
<td>10-12NFA-R</td>
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<tr>
<td>½&quot;</td>
<td>10-11NFB 10-12NFB</td>
<td>10-13NFB</td>
<td>10-14NFB</td>
<td>10-15NFB</td>
<td>10-12NFB-R</td>
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<td>1&quot;</td>
<td>10-11NFD 10-12NFD</td>
<td>10-13NFD</td>
<td>10-14NFD</td>
<td>10-15NFD</td>
<td>10-12NFD-R</td>
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<tr>
<td>1 1/4&quot;</td>
<td>10F-11NFF 10F-12NFF</td>
<td>10F-13NFF</td>
<td>10F-14NFF</td>
<td>10F-15NFF</td>
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<td><strong>Medium Pressure Valves</strong></td>
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<tr>
<td>10,000 psi</td>
<td>1/4&quot; 3/8&quot;</td>
<td>10-11LF12 10-12LF12</td>
<td>10-13LF12</td>
<td>10-14LF12</td>
<td>10-15LF12</td>
<td>10-12LF12-R</td>
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<td>1&quot;</td>
<td>10-11LF16 10-12LF16</td>
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<td>10-15LF16</td>
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<td><strong>High Pressure Valves</strong></td>
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<td>20-11LF4 20-12LF4</td>
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<td>1/2&quot;</td>
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<td>1&quot;</td>
<td>20-11LF12 20-12LF12</td>
<td>20-13LF12</td>
<td>20-14LF12</td>
<td>20-15LF12</td>
<td>20-12LF12-R</td>
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<td><strong>Ultra High Pressure Valves</strong></td>
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<tr>
<td>30,000 psi</td>
<td>1/8&quot;</td>
<td>0.040&quot; 0.083&quot;</td>
<td>30-11HF2 30-12HF2</td>
<td>30-13HF2 30-14HF2</td>
<td>30-15HF2 30-12HF2R</td>
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<tr>
<td>1/4&quot;</td>
<td>0.063&quot; 0.125&quot;</td>
<td>30-11HF4 30-12HF4</td>
<td>30-13HF4 30-14HF4</td>
<td>30-15HF4 30-12HF4R</td>
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<tr>
<td>1/2&quot;</td>
<td>0.075&quot; 0.150&quot;</td>
<td>30-11HF6 30-12HF6</td>
<td>30-13HF6 30-14HF6</td>
<td>30-15HF6 30-12HF6R</td>
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<tr>
<td>3/4&quot;</td>
<td>0.090&quot; 0.180&quot;</td>
<td>30-11HF9 30-12HF9</td>
<td>30-13HF9 30-14HF9</td>
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<tr>
<td>1&quot;</td>
<td>.043&quot; 0.087&quot;</td>
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<tr>
<td>60,000 psi</td>
<td>1/8&quot;</td>
<td>0.020&quot; 0.040&quot;</td>
<td>60-11HF2 60-12HF2</td>
<td>60-13HF2 60-14HF2</td>
<td>60-15HF2 60-12HF2R</td>
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<tr>
<td>1/4&quot;</td>
<td>0.030&quot; 0.060&quot;</td>
<td>60-11HF4 60-12HF4</td>
<td>60-13HF4 60-14HF4</td>
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<tr>
<td>1/2&quot;</td>
<td>0.040&quot; 0.080&quot;</td>
<td>60-11HF6 60-12HF6</td>
<td>60-13HF6 60-14HF6</td>
<td>60-15HF6 60-12HF6R</td>
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<tr>
<td>3/4&quot;</td>
<td>0.050&quot; 0.100&quot;</td>
<td>60-11HF9 60-12HF9</td>
<td>60-13HF9 60-14HF9</td>
<td>60-15HF9 60-12HF9R</td>
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<tr>
<td><strong>Ultra High Pressure Valves</strong></td>
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<tr>
<td>100,000 psi</td>
<td>1/8&quot;</td>
<td>0.010&quot; 0.020&quot;</td>
<td>100-11XF4 100-12XF4</td>
<td>100-13XF4 100-14XF4</td>
<td>NA 100-12XF4R</td>
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<tr>
<td>150,000 psi</td>
<td>1/8&quot;</td>
<td>0.010&quot; 0.020&quot;</td>
<td>150-11XF6 150-12XF6</td>
<td>150-13XF6 150-14XF6</td>
<td>NA 150-12XF6R</td>
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</tbody>
</table>
# Catalog Numbering System

**Pressure Series**
- 10 = 10,000 psi
- 15 = 15,000 psi
- 20 = 20,000 psi
- 30 = 30,000 psi
- 40 = 40,000 psi
- 60 = 60,000 psi
- 100 = 100,000 psi
- 150 = 150,000 psi

**Type of Components**
- 2 = Gland, Collar or Sleeve
- 3 = Anti-Vibration Assembly
- 7 = Plug
- 11 = 2-Way Straight Valve
- 12 = 2-Way Angle Valve
- 13 = 3-Way Valve with Two Pressure Connections
- 14 = 3-Way Valve with One Pressure Connection
- 15 = 3-Way, 2-Stem Valve
- 16 = Ball Valve (Floating)
- 21 = Coupling or Adapter
- 22 = Elbow
- 23 = Tee
- 24 = Cross
- 41 = Check Valve
- 51 = Line Filter
- 61 = Safety Head (Straight)
- 63 = Safety Head (Tee Type)
- 71 = 2-Way Ball Valve *
- 72 = 3-Way Ball Valve 180° *
- 73 = 3-Way Ball Valve Diverter *
- 74 = 2-Way Ball Valve *
- 75 = 3-Way Ball Valve 180° *
- 76 = 3-Way Ball Valve Diverter *
- 77 = 3-Way Mini Ball Valve \( \frac{1}{8} \) NPT
- 80 = 2-Way Ball Valve *
- 81 = 3-Way Ball Valve 180° *
- 82 = 3-Way Ball Valve Diverter *

* (Trunion)

**Connection(s)**
- Female
- Male

### Options

- **-V** = Micro Control Metering Assembly
- **-HT** = High Temperature Stem Extension (Up to 1,000° F)
- **-SGS** = Sour Gas (H₂S) Service
- **-NO** = Normally Open
- **-NC** = Normally Closed
- **-K** = With Antivibration Collars and Glands
- **-REG** = Regulating Tip
- **-TSR8** = Ball Valve Actuator
- **-TDA8** = Ball Valve Actuator Double Acting
- **-WO** = Without Collars and Glands
- **-LT** = Low Temperature Stem Extension (to -320°F)
- **-MPO-NO** = Medium Duty Piston Operator Normally Open
- **-MPO-NC** = Medium Duty Piston Operator Normally Closed
- **-HPO-NO** = Heavy Duty Piston Operator Normally Open
- **-HPO-NC** = Heavy Duty Piston Operator Normally Closed
- **-EHPO-NO** = Extra Heavy Piston Operator Normally Open
- **-EHPO-NC** = Extra Heavy Piston Operator Normally Closed
- **-OC** = Oxygen Cleaning
- **-HL** = Handle Lock (Ball Valve Only)
- **-MHNO** = Mini Hippo Normally Open
- **-MHNC** = Mini Hippo Normally Closed
- **-LS** = Limit Switch

### How to Order Valves and Fittings

Simply indicate catalog number and specify option or special requirement.

**Examples:**
- 30-11HF4 = 30,000 psi Straight Valve for \( \frac{1}{4} \) O.D. tubing
- 60-23HF4 = 60,000 psi Tee for \( \frac{1}{4} \) O.D. tubing
- 15-21AF2 = 15,000 psi Straight Coupling for \( \frac{1}{4} \) O.D. tubing, Taper Seal connections
- 15-21AF2NMB = 15,000 psi Adapter with one end \( \frac{1}{4} \) O.D. Female Taper Seal and opposite end Male \( \frac{1}{4} \) NPT Pipe
- 30-11HF6-HT = 30,000 psi Straight Valve for \( \frac{3}{8} \) O.D. tubing with High Temperature Extension
- “HIPCO” 10-12NFB (N/C) = 10,000 psi Angle Valve for \( \frac{1}{4} \) NPT Pipe with “Hippo” Air Operator, Normally Closed
- “HIPPO” 15-11A4F (N/C) = 10,000 psi Angle Valve for \( \frac{1}{4} \) Taper Seal with “Hippo” Piston Operator, Normally Closed
- 60-21HF4 (Hastelloy C-276) = 60,000 psi Straight Coupling for \( \frac{1}{4} \) O.D. tubing, made from Hastelloy C-276 material