For Abrasive, Corrosive, and Erosive Applications

Fine Ceramic Valves
COSMIX™

Made in Japan
COSMIX Fine Ceramic Ball Valves

Ceramic materials offer greater hardness and excellent abrasion and corrosion resistance. Cosmix Ball Valves feature fine ceramics in all wetted parts.

Features
- Excellent durability due to ceramic materials.
- Excellent flow control performance.
- Floating ball structure, especially useful in slurry applications.
- Simple construction, lightweight and compact.
- Easy maintenance.

Performance

<table>
<thead>
<tr>
<th>Item</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Operating Pressure</td>
<td>0.98 MPa</td>
</tr>
<tr>
<td>Maximum Operating Differential Pressure</td>
<td>0.98—0.49 MPa</td>
</tr>
<tr>
<td>Maximum Operating Temperature</td>
<td>200 °C</td>
</tr>
<tr>
<td>Seat Leakage</td>
<td>1/10000 of Maximum Cv Value</td>
</tr>
<tr>
<td></td>
<td>(ANSI B 16.4 CLASS IV)</td>
</tr>
<tr>
<td>Valve Size</td>
<td>1/2&quot;—6&quot;</td>
</tr>
<tr>
<td>Rangeability</td>
<td>15:1</td>
</tr>
<tr>
<td>Flange Connection</td>
<td>DIN PN 10, ANSI 150, GOST PN10, JIS 10K</td>
</tr>
</tbody>
</table>
Applications

For flow control and on-off service of abrasive and corrosive fluids

**Coal-Fired Thermal Power Plants**

**Flue Gas Desulphurization Plants**

- Limestone slurry
- Gypsum slurry
- Fly ash slurry
- Waste water
- Coal powder

---

**Pulp & Paper Mills**

- Green liquor
- White liquor
- Black liquor
- Lime mud
- Talc
- Clay

**Chemical Plants**

- Hydrogen fluoride
- Phosphoric acid
- Caustic soda

**Alumina Refining**

- Caustic soda
- Alumina powder

**Steel Plants**

- Dry dust remover
- Coal powder
COSMIX
Fine Ceramic Ball Valves
For Flow Control & On-Off Service of Abrasive and Corrosive Fluids

Structure

Features
1. Excellent durability for abrasive and corrosive fluids. Wetted parts are made from solid fine ceramics.
2. Excellent flow controllability:
   Each valve size offers 3-4 equal percentage (EQ%) triangular ports for precise flow control and a round hole ball for on-off service.
3. Floating ball structure.
4. Low seat leakage.
5. Small number of parts.
6. Simple structure, lightweight and compact.
7. Good maintainability.

Accessories
Actuator
Pneumatic Actuator
Standard: EL-O-MATIC

Electric Actuator
AUMA

ROTORK

Positioner

Regulator

Standard: SSS

Cv Curves

Cv Table

Picture of Cv Curves

Picture of Cv Table

Manual Operated Type Dimension Table

<table>
<thead>
<tr>
<th>VALVE SIZE</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>L</th>
<th>N</th>
<th>Q</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2&quot;</td>
<td>12</td>
<td>40</td>
<td>60.5</td>
<td>95</td>
<td>1</td>
<td>7</td>
<td>106</td>
<td>71</td>
<td>UNC 1/2</td>
<td>4</td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>17</td>
<td>48</td>
<td>69.9</td>
<td>100</td>
<td>1</td>
<td>7</td>
<td>109</td>
<td>79.5</td>
<td>UNC 1/2</td>
<td>4</td>
</tr>
<tr>
<td>1&quot;</td>
<td>23</td>
<td>56</td>
<td>79.3</td>
<td>125</td>
<td>1.5</td>
<td>7</td>
<td>143</td>
<td>85</td>
<td>UNC 1/2</td>
<td>4</td>
</tr>
<tr>
<td>1½&quot;</td>
<td>36</td>
<td>76</td>
<td>98.6</td>
<td>140</td>
<td>1.5</td>
<td>9</td>
<td>158</td>
<td>111</td>
<td>UNC 1/2</td>
<td>4</td>
</tr>
<tr>
<td>2&quot;</td>
<td>44</td>
<td>94</td>
<td>120.7</td>
<td>155</td>
<td>1.5</td>
<td>9</td>
<td>164</td>
<td>120</td>
<td>UNC 58</td>
<td>4</td>
</tr>
<tr>
<td>2½&quot;</td>
<td>56</td>
<td>104</td>
<td>140.0</td>
<td>175</td>
<td>1.5</td>
<td>9</td>
<td>172</td>
<td>140</td>
<td>UNC 58</td>
<td>4</td>
</tr>
<tr>
<td>3&quot;</td>
<td>72</td>
<td>124</td>
<td>152.4</td>
<td>199</td>
<td>1.5</td>
<td>9</td>
<td>179</td>
<td>164.5</td>
<td>UNC 58</td>
<td>4</td>
</tr>
<tr>
<td>4&quot;</td>
<td>89</td>
<td>148</td>
<td>190.5</td>
<td>229</td>
<td>1.5</td>
<td>9</td>
<td>193.5</td>
<td>193.5</td>
<td>UNC 58</td>
<td>8</td>
</tr>
<tr>
<td>6&quot;</td>
<td>134</td>
<td>212</td>
<td>241.3</td>
<td>310</td>
<td>2.5</td>
<td>9</td>
<td>250</td>
<td>250</td>
<td>UNC 34</td>
<td>8</td>
</tr>
</tbody>
</table>

Please consult with Fujikin for assistance with specifications.

(unit: mm)

Picture of Accessories
Characteristics of Fine Ceramic Materials

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>99.5% Alumina (A-479M)</th>
<th>99.5% Alumina (A-479SS)</th>
<th>99.9% Alumina (A-601D)</th>
<th>Y Zirconia (Z-201N)</th>
<th>Mg Zirconia (Z-220)</th>
<th>Silicon Carbide (SC-221)</th>
<th>Silicon Nitride (SN-220)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color</td>
<td>White</td>
<td>White</td>
<td>White</td>
<td>Ivory</td>
<td>Yellow</td>
<td>Black</td>
<td>Black</td>
</tr>
<tr>
<td>Bulk Density (%)</td>
<td>3.8</td>
<td>3.8</td>
<td>3.9</td>
<td>3.9</td>
<td>3.9</td>
<td>3.9</td>
<td>4.1</td>
</tr>
<tr>
<td>Water Absorbency (%)</td>
<td>0.8</td>
<td>0.8</td>
<td>0.9</td>
<td>0.9</td>
<td>0.9</td>
<td>0.9</td>
<td>0.9</td>
</tr>
<tr>
<td>Vickers Hardness, 500g Test</td>
<td>1650</td>
<td>1700</td>
<td>1750</td>
<td>1250</td>
<td>1100</td>
<td>2400</td>
<td>1450</td>
</tr>
<tr>
<td>KPa</td>
<td>16.2</td>
<td>16.7</td>
<td>17.2</td>
<td>12.8</td>
<td>10.8</td>
<td>23.5</td>
<td>14.2</td>
</tr>
<tr>
<td>Flexural Strength (Bending Strength)</td>
<td>304</td>
<td>323</td>
<td>490</td>
<td>980</td>
<td>686</td>
<td>490</td>
<td>588</td>
</tr>
<tr>
<td>KPa</td>
<td>44</td>
<td>47</td>
<td>71</td>
<td>143</td>
<td>100</td>
<td>71</td>
<td>86</td>
</tr>
<tr>
<td>Compressive Strength</td>
<td>220</td>
<td>240</td>
<td>-</td>
<td>580</td>
<td>-</td>
<td>500</td>
<td>390</td>
</tr>
<tr>
<td>KPa</td>
<td>2157</td>
<td>2353</td>
<td>-</td>
<td>5686</td>
<td>-</td>
<td>4902</td>
<td>3824</td>
</tr>
<tr>
<td>Thermal Conductivity at 20ºC (cal-cm/cm²-sec ºC)</td>
<td>0.06</td>
<td>0.06</td>
<td>0.08</td>
<td>0.009</td>
<td>0.008</td>
<td>0.17</td>
<td>0.04</td>
</tr>
<tr>
<td>Fracture Toughness (MPa/m²k)</td>
<td>3.4</td>
<td>3.4</td>
<td>3.4</td>
<td>6.0</td>
<td>11.5</td>
<td>3.1</td>
<td>3.9</td>
</tr>
<tr>
<td>Maximum Use Temperature (ºC)</td>
<td>1600</td>
<td>1400</td>
<td>1750</td>
<td>200</td>
<td>800</td>
<td>1400</td>
<td>1200</td>
</tr>
<tr>
<td>Thermal Shock Resistance ºC</td>
<td>200</td>
<td>250</td>
<td>250</td>
<td>300</td>
<td>450</td>
<td>350</td>
<td>550</td>
</tr>
<tr>
<td>Reduction</td>
<td>392</td>
<td>482</td>
<td>482</td>
<td>572</td>
<td>642</td>
<td>662</td>
<td>1022</td>
</tr>
<tr>
<td>Cast Comparison (%)</td>
<td>100</td>
<td>150</td>
<td>200</td>
<td>200</td>
<td>700</td>
<td>350-400</td>
<td>600-700</td>
</tr>
</tbody>
</table>

Key Features
1. Greater hardness
2. Greater compressive strength
3. Stronger chemical resistance
4. Higher maximum temperature
5. Smaller bulk density

Fine Ceramic Reducers, Pipes and Orifices

Reducer
Straight Pipe Spool
Restriction Orifice Plate
Flange Adapter
COSMIX
Fine Ceramic Plug Valves
For Precise, Small-Cv Flow Control of Abrasive and Corrosive Fluids

Structure

Features
1. Excellent durability for abrasive and corrosive fluids. Wetted parts are made from solid fine ceramics.
2. Excellent flow controllability:
   Each valve size offers 3-6 equal percentage (EQ%) triangular ports for precise flow control.
3. Low seat leakage.

Performance

Positioner (EP/PP)

Regulator

Accessories

Cv Curves

Rated Cv Value

Cv Table

Dimensions

<table>
<thead>
<tr>
<th>SIZE</th>
<th>Rated Cv Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/8</td>
<td>5  3.5 1.5 0.7 0.5 0.35</td>
</tr>
<tr>
<td>1/4</td>
<td>7  5  3.5 1.5 0.7 0.35</td>
</tr>
<tr>
<td>1/2</td>
<td>17 7 3 – – –</td>
</tr>
<tr>
<td>1</td>
<td>– – – – – –</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SIZE</th>
<th>L</th>
<th>A</th>
<th>H</th>
<th>ANSI 150</th>
<th>ANSI 300</th>
<th>DIN PN15-16</th>
<th>Item No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/8</td>
<td>6</td>
<td>35</td>
<td>507</td>
<td>60.5</td>
<td>47</td>
<td>75</td>
<td>M12 4</td>
</tr>
<tr>
<td>1/4</td>
<td>75</td>
<td>40</td>
<td>515</td>
<td>68.9</td>
<td>60.5</td>
<td>75</td>
<td>M12 4</td>
</tr>
<tr>
<td>1/2</td>
<td>122</td>
<td>45</td>
<td>530</td>
<td>78.3</td>
<td>68.9</td>
<td>85</td>
<td>M12 4</td>
</tr>
<tr>
<td>1</td>
<td>174</td>
<td>55</td>
<td>727</td>
<td>96.6</td>
<td>114.3</td>
<td>110</td>
<td>M16 4</td>
</tr>
</tbody>
</table>
Fujikin’s Osaka Plant is ISO 9001 certified.

AWARDS

Vaaler Award
- Chemical Processing, U.S.A.

24th 10 Best New Products Award
- The Business & Technology Daily News, JAPAN

9th Researcher Achievement Award
- Ministry of Science and Technology, JAPAN

Invention Grand Prize
- Japan Institute of Invention and Innovation
- The Business & Technology Daily News, JAPAN

Best Products Award
- Society of Chemical Engineers
- Japan Management Association, JAPAN

CE Marking

Fujikin’s Cosmix fine ceramic ball valve’s main application is flue gas desulphurization. For this application, or any other application for which the working fluid is a liquid from Fluid Group 2 (i.e., a non-hazardous liquid), COSMIX falls within the range of Table 9 on the category graphs of the PED. Taking the maximum operating pressure and nominal size of the valve into account and referring to Table 9, COSMIX comes under the scope of Article 3, Paragraph 3 (referred to as Sound Engineering Practices) of the PED.

Article 3 of the PED states that “pressure equipment covered in this category must be designed using The SEP, must be accompanied by adequate instructions for safe use and must bear a mark which allows identification of the manufacturer.”

Pressure equipment covered under Article 3, Paragraph 3 of the PED does not carry the CE mark, and therefore Cosmix valves do not bear the CE mark.