FLOW DATA
Cv Values for DJ Series Butterfly Valves

Flow Characteristics (Static Clean Water)

Flow Rate Cv* Values

<table>
<thead>
<tr>
<th>SIZE Inch</th>
<th>10°</th>
<th>20°</th>
<th>30°</th>
<th>40°</th>
<th>50°</th>
<th>60°</th>
<th>70°</th>
<th>80°</th>
<th>90°</th>
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<td>576</td>
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</tbody>
</table>

* Cv is defined as the flow in GPM that a valve will carry with a pressure drop of 1.0 psi, when the media is 60°F water.

LIQUID FLOW:

\[ Q = \frac{Cv}{\sqrt{\Delta P/S}} \]

- Liquid flow rate (gallons per minute)
- \( \Delta P \) = pressure drop across valve (psi)
- \( S \) = specific gravity of the pipeline media
- Cv is defined as the flow in GPM that a valve will carry with a pressure drop of 1.0 psi when the media is water at 60º.

GAS FLOW:

\[ Q = 1360 \times \frac{Cv}{\sqrt{\Delta P/P_1/ST}} \]

- Gas flow rate (SCFH — std. cu. ft./hr.)
- \( S \) = specific gravity of gas (air = 1.0)
- \( T \) = temp. - degrees rankin (ºF + 460)
- \( P_1 \) = upstream pressure (psia) absolute

Note that \( \Delta P \) must be less than .5 (Flow is critical when \( \Delta P \) is greater than .5 \( P_1 \)).

Example: Throttling Service

**Given:**
- \( Q = 975 \) GPM (Flow)
- \( \Delta P = 1.50 \) (Pressure Drop)
- \( S = \) (Specific Gravity)

\[ 1) \quad Cv = Q \times \frac{S}{\Delta P} = 975 \times \frac{1.50}{1.0} \]

2) From Cv table:
- 8" Valve Cv Flow Rate
- Open range 30 - 60°: 230 - 1050

3) Velocity - \( V = \frac{S \times 0.321}{A} \)

\[ 975 \times 0.321 \]

\[ \frac{50.3}{102} = 6.22 \text{ ft./sec.} \]

6.22 ft./sec. is within the limits. So for given conditions, an 8" valve should be used.

VALVE SIZING

- **On/Off Service**
  - Simply select a valve which is the same as the piping system.

- **Throttling Service**
  - Select Cv data from above table: 30 - 60°
  - and follow these steps:
    1) Define:
        - \( Q \) - System flow requirements
        - \( \Delta P \) - Maximum allowable pressure drop
        - \( S \) - Specific gravity of the pipeline media
    2) Calculate Cv using above formula
    3) Select valve size between (30 - 60°)
    4) Do not exceed maximum velocity:
        - **Liquids:** 20 ft./second
        - **Gases:** 15,000 ft./minute
        \[ V = \frac{S \times 0.321}{A} \text{ (liquid only)} \]
        \[ A = \text{Area of pipe in square inches} \]