Valve Applications for the Water Industry: Which one to use, Where and When.

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Siewert Equipment
Most Common Valves found in the Water Industry

- Gate Valves
- Butterfly Valves
- Ball Valves
- Plug Valves
- Regulating
- Air Valves
Common Valve Functions

• Shut off flow of water
• Control the flow of water – Pressure and Flow
• Release air from the water system
Gate Valves:
The most common valve found in the Distribution Systems
Characteristics of a Gate Valve

- Fully Ported – Flow and cleaning
- Easily Installed and maintained
- Stops flow in both directions
- Gate materials
- Many configurations
- Economical
Gate Valve Configurations
Evaluation Criteria of Gate Valves

• Advantages of Gate Valves

1. Closing feature is very good

2. These valves can be used to close in two directions

3. They provide laminar flow, pressure loss is minimum
Disadvantages of Gate Valves

- They cannot be opened and closed quickly
- Assembly, start-up and maintenance require large space
- Has allowable leakage rate
Butter fly Valves
Butterfly Valve Characteristics

- 90 degree rotary motion using a disc for closure
- Very low head loss
- In larger sizes significantly lighter and shorter laying length
- Cost effective for diameters 16” and larger
- Low torque requirements
- Can stop flow in both directions -- check
Butterfly Valves
Comparison of Gate and Butterfly Valves

**Butterfly Valve**
- Bubble tight
- *Weighs* Less
  - 36” BFV 2552 lbs.
- Compact size
  - 36” BFV 12” F to F
- Cost
  - 36” BFV $10,000
- Lower operating torque

**Gate Valve**
- Allowable leakage
- Weighs more
  - 36” GV 8500 lbs.
- Large size
  - 36” GV 32” F to F
- Cost
  - 36” GV $30,000
- Higher torque
Make Sure the Butterfly Valves are Designed, Manufactured, and Tested in Strict Accordance with AWWA Standard C504
# Shaft Diameters

**AWWA 150# Butterfly Valve vs. Typical 150# Industrial Butterfly Valve**

<table>
<thead>
<tr>
<th>Valve Size</th>
<th>Industrial</th>
<th>AWWA</th>
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<tbody>
<tr>
<td>12”</td>
<td>1.113</td>
<td>1.5</td>
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<tr>
<td>16”</td>
<td>1.63</td>
<td>2.0</td>
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<tr>
<td>24”</td>
<td>1.88</td>
<td>3.0</td>
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<tr>
<td>30”</td>
<td>2.25</td>
<td>3.625</td>
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<tr>
<td>36”</td>
<td>2.88</td>
<td>4.375</td>
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Metal Seated Ball Valve
Ball Valves

• 100% flow area (full port)
• Highest Cv of any valve
• Ideal for pump check service
• Seat -- rubber or metal-to-metal
Rubber Seated Ball Valve
DESIGN DETAILS

1 2 3 4 5
6 7 8 9 10
Selection Considerations of Ball Valves

- They provide leak-proof service
- Low Headloss – Full Ported
- Open and close more quickly (vs. gate valve)
- Small dimensions compared to gate valves
- Lighter compared than gate valves
- Multi-way design flexibility which does not exist in gate or butterfly valves. Reduces the number of valves needed
- Operated with less torque compared to gate valves
Plug Valves
Applications for Plug Valves in Wastewater Treatment Plants

- Raw sewage intake
- Grit chamber
- Primary treatment
- Sludge
- Scum
Multi-ported valves
Advantages of Plug Valves

- Simple design with few parts
- Open and close easily (except large dimensions)
- Maintenance and repair can be done in place
- Low head loss
- Drip tight closure
- Multi port configuration available

Disadvantages of Plug Valves

- High friction, first movement (opening-closing) requires a large amount of torque
- More expensive than ball valves
Regulating Valve

- Designed to reduce the flow/pressure
- High head loss
- Designed to be maintained in place
- Multiple control scenarios
Types of Regulating Valves

**Diaphragm Style:**
- Basic design - suitable for a variety of low-pressure applications.
- Often made with thin ductile iron walls and 1/4” copper tubing, to reduce cost
- Estimated life: 10 - 25 years.

**Piston Style:**
- Rugged step-up design - offers a variety of seat options for precise control
- Heavy-duty construction includes ANSI 250 cast iron body and rigid 1/2” brass piping and fittings.
- Estimated life: 50+ years.

**WaterTamer:**
- Top-of-the-line design - prolongs valve life in extreme operating conditions
- All the benefits of the Piston Style, with an added stainless steel anti-cavitation feature
Piston Valve
Regulating Valve Criteria

- How great is the pressure differential
- What is required flow rate
- How much head loss can be tolerated
- Maintenance
- Provide for maintenance and service access
Air/Vacuum Release Valves

- Releases air during filling and testing of pipe
- Allows air into pipe during draining
- Vents air continuously – after filling
- Releases air that naturally accumulates in pipes
- Ensures pipeline carrying capacity
- Proper location of valve releases all air
Air Valve Types

Air Release

Air/Vacuum Release
Sample Pipeline Profile Illustrating Valve Locations
Questions ?