

VALSTOM - VALVE SELECTION TECHNICAL NOTES

1. Purpose

This document provides practical technical guidance for selecting industrial valves based on service conditions, operating parameters, and applicable international standards. It is intended as a reference for engineers, project teams, procurement specialists, and inspection personnel involved in oil & gas, petrochemical, power, and industrial process applications.

2. Key Factors in Valve Selection

2.1 Service Media

The type of fluid being handled has a direct impact on valve design and material selection. Important considerations include:

- Clean fluids, dirty fluids, or slurry service
- Corrosive, erosive, or toxic media
- Gas, liquid, or multiphase flow
- Presence of solids, scale, or contaminants

Valve internals must be compatible with the service medium to avoid corrosion, erosion, leakage, or premature failure.

2.2 Pressure Rating

Valve pressure class must be selected based on:

- Maximum allowable working pressure (MAWP)
- Design pressure including system upsets
- Applicable pressure-temperature rating as per ASME B16.34

Pressure class selection shall consider the worst-case operating condition, not normal operating pressure alone.

2.3 Temperature Range

Operating temperature affects:

- Body material strength
- Seat and sealing performance
- Packing integrity

High temperatures may require metal-to-metal seating and special alloys, while low temperatures (cryogenic service) require materials with adequate impact toughness and specialized sealing systems.

2.4 Flow Characteristics

The required flow control behavior determines valve type selection:

- **On/Off service** – Gate, Ball, Plug valves
- **Throttling service** – Globe, Control valves
- **Isolation with tight shutoff** – Ball, Butterfly valves

Incorrect selection for throttling or isolation duties can lead to excessive wear and unstable operation.

2.5 End Connection & Installation

Valve end connections shall match piping design and standards:

- Flanged (ASME B16.5 / B16.47)
- Butt-weld (ASME B16.25)
- Socket-weld or threaded (ASME B16.11)

Installation orientation, maintenance accessibility, and space constraints should also be considered during selection.

3. Valve Type Overview (Application-Based)

- **Gate Valves**

Suitable for full open or full close service with minimal pressure drop. Not recommended for throttling.

- **Globe Valves**

Preferred for throttling and flow regulation due to linear flow characteristics.

- **Ball Valves**

Provide tight shutoff and quick operation. Suitable for on/off service and automation.

- **Butterfly Valves**

Compact design, suitable for large diameters and moderate pressure/temperature applications.

- **Check Valves**

Used to prevent reverse flow. Selection depends on flow velocity, orientation, and service conditions.

4. Standards & Compliance

Valve selection should comply with relevant international standards, including but not limited to:

- API 600 / 602 / 603 / 608 / 609
- ASME B16.34
- ISO 5208
- API 598 (testing and inspection)

Compliance ensures interchangeability, safety, and acceptance across global projects.