



1. API 600

Steel Gate Valve Design

Covers design, materials, construction details, pressure ratings, and general requirements for steel gate valves.



2. API 602

Compact Gate / Globe / Check Valves

Covers design and construction of compact forged steel gate, globe, and check valves.



3. API 603

Corrosion-Resistant Gate Valves

Covers design and construction of corrosion-resistant gate valves for severe environments.



4. API 6D

Applicable Pipeline Valve Configurations

Covers valve requirements for pipeline service, including end connections and testing.



5. API 598

Valve Inspection and Testing

Specifies inspection, test procedures and acceptance criteria for industrial valves.



6. ASME B16.34

Pressure-Temperature / Materials / Construction

Defines pressure-temperature ratings, material requirements and construction rules.



Flanged End Interface

Bolted flange connection per ASME B16.5. Provides a detachable joint for easy assembly and maintenance.



7. ASME B16.10

Face-to-Face / End-to-End Dimensions

Establishes face-to-face and end-to-end dimensions for valve-to-valve and valve-to-pipe.

Butt-Welding End Interface

Welded-end connection per ASME B16.25. Provides a permanent, leak-tight joint for pipeline service.



Gate valve design is governed by multiple industry standards that collectively control design, dimensions, materials, testing, and end-connection interfaces to ensure safe, reliable, and consistent valve performance.



1. Body / Bonnet

Carbon steel, low-temperature steel, alloy steel, or stainless steel.

Selection drivers:

- Pressure-temperature service
- Medium compatibility
- Corrosion environment



2. Gate

Matching steel / specified trim system.

Selection drivers:

- Shutoff duty
- Seat contact
- Wear resistance

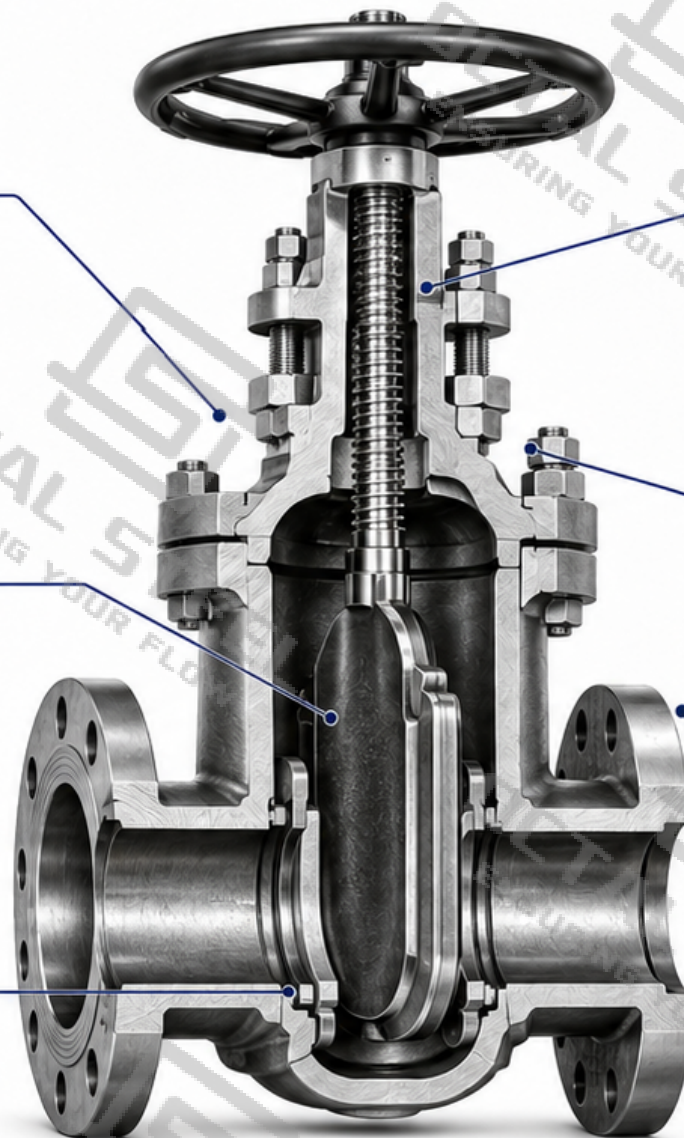


4. Seat Rings

Metallic seating / specified hardfacing where required.

Selection drivers:

- Sealing performance
- Wear
- Pressure differential
- Service medium



3. Stem

Stainless or alloy steel according to design.

Selection drivers:

- Strength
- Corrosion resistance
- Operating load



5. Packing / Gasket

PTFE, graphite, or project-specific sealing system.

Selection drivers:

- Temperature
- Leakage control
- Media compatibility



6. Bolting

Project- and temperature-appropriate bolting.

Selection drivers:

- Joint integrity
- Pressure
- Temperature



Pressure

+



Temperature

+



Medium

+



Corrosion

+



Shutoff
Requirement



Material / Trim Selection

1 General Process Isolation



Isolating non-corrosive fluids or gases in refineries, chemical plants and utilities.

Key Engineering Drivers

- Reliable shutoff and bubble-tight sealing
- Wide material availability
- Maintainability and total cost of ownership
- Standards compliance and testability

2 Corrosive Medium



Handling acids, chlorides, or aggressive chemicals where corrosion resistance is critical.

Key Engineering Drivers

- Corrosion resistance of wetted parts
- Isolation of stem from process media
- Protection against crevice and erosion
- Long-term reliability in corrosive service

3 High-Temperature Service



Service where elevated temperature affects material strength and sealing performance.

Key Engineering Drivers

- High-temperature material capability
- Thermal cycling and oxide resistance
- Bonnet and packing temperature rating
- Seat integrity under thermal exposure

4 Pipeline Through-Conduit Requirement



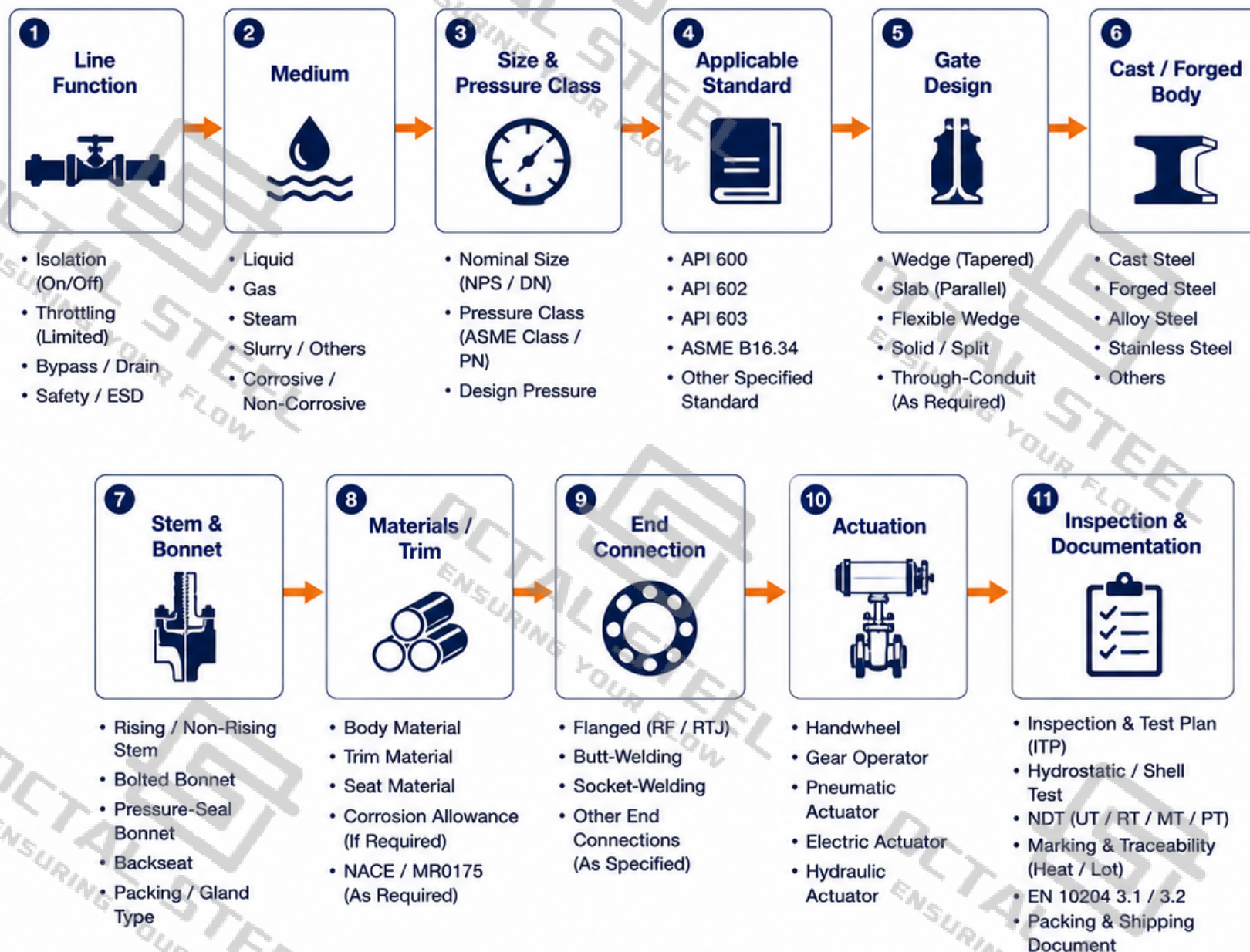
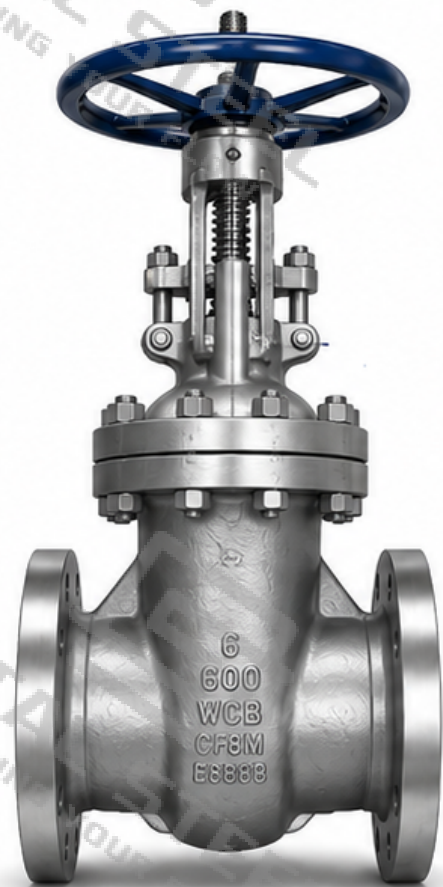
Pipeline isolation where minimum flow restriction and clean-through bore are required.

Key Engineering Drivers

- Full-conduit flow and minimum pressure drop
- Inline maintainability and pigability
- Robust body and seat design
- Leak-tight isolation in both directions

Engineering Variable	1 General Process Isolation	2 Corrosive Medium	3 High-Temperature Service	4 Pipeline Through-Conduit Requirement
Gate Design	Solid wedge or flexible wedge with guided alignment.	Solid or split wedge with corrosion-resistant facing / overlay options.	Solid wedge with thermal-stable geometry and anti-galling provisions.	Full-bore wedge with minimal flow obstruction.
Body / Trim Materials	Carbon steel or low alloy steel with applicable trim.	Stainless steel, duplex, super duplex or corrosion-resistant alloys.	High-temperature steels or alloys suitable for elevated temperature.	Carbon steel or low alloy pipeline steel with compatible trims.
Bonnet	Bolted bonnet (standard) with gasketed joint.	Extended bonnet or bellows seal to isolate stem from medium.	Extended bonnet / yoke and temperature-rated packing.	Bolted or pressure-seal bonnet per applicable standard.
Seat Surface	Resilient or metal seated per pressure class.	Metal seated or overlay seats for corrosion and erosion resistance.	Metal seated with hardfacing for high-temperature stability.	Metal seated for bubble-tight shutoff and bi-directional sealing.
End Connection	Flanged RF or RTJ per required class.	Flanged RF/RTJ or welded; material matching critical for corrosion control.	Flanged RF/RTJ or BW; gasket and bolting per temperature service.	Butt-welding preferred for pipeline continuity and integrity.
Actuation	Handwheel, gear operator, or actuator as required.	Actuation with corrosion protection and reliable sealing of stem.	Actuation with temperature-appropriate grease and materials.	Gear or actuator for frequent or remote operation.

Gate Valve Project Selection Flow



Each project has unique requirements. Confirm all variables with the project specification and applicable standards.



This selection path is a typical engineering approach. Final configuration shall be confirmed against project specification, applicable code, and service conditions.

MANUFACTURING AND INSPECTION PROCESS FLOW



MANUFACTURING HIGHLIGHTS



Process Control

Documented procedures for machining, assembly and testing.



Dimensional Control

Critical dimensions controlled to ensure interchangeability and sealing.



Surface Finish

Sealing faces finished to appropriate roughness for reliable performance.



Traceability

Component traceability maintained through the entire manufacturing route.

INSPECTION DETAIL – KEY AREAS

PACKING AND GLAND AREA

Packing compresses around the stem to prevent leakage to atmosphere. Gland follower adjusts packing load.

STEM RETENTION

The stem is positively retained by the yoke/bonnet structure to prevent blow-out under pressure.

GATE–SEAT CONTACT

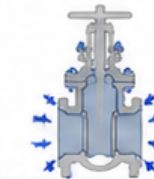
Metal-to-metal or resilient seat contact provides tight shutoff when the gate is fully closed.

BODY–BONNET JOINT

Gasketed joint between body and bonnet maintains pressure integrity. Bolting is controlled to ensure uniform loading and sealing performance.

PRESSURE TESTING OVERVIEW

SHELL TEST (Body)



Internal pressure is applied to the valve body to verify structural integrity and joint tightness.

SEAT TEST (Closure)



Internal pressure is applied from the upstream side to verify seat sealing with the valve closed.



Inspection and testing activities shall be carried out in accordance with applicable standards and project specifications. All records shall be retained for full traceability.

1 Pipeline Block Isolation



2 Refinery Process Piping



3 High-Pressure / High-Temperature Service



4 Plant Maintenance Isolation



Project Release Checklist		
	Valve Type / Gate Design	☒
	Size & Class	☒
	Materials / Trim	☒
	End Connection	☒
	Actuation	☒
	Inspection / Pressure-Test Record	☒
	Marking / Documentation	☒



Material Identity



Manufacturing Record



Inspection Record



Pressure-Test Record



Marking



Project Release

i Final project release shall confirm valve configuration, materials, inspection records, and documentation against project requirements.