

VANTEC

ENGINEERING DESIGN & SELECTION GUIDE

Valve Selection • Flow & Sizing • Pressure & Temperature • Materials • Connections • Engineering Reference

A practical engineering reference intended to support preliminary product selection and system design. Product-specific VANTEC datasheets, approved drawings and project specifications shall take precedence where applicable.

1. VALVE SELECTION & APPLICATION GUIDE

Function / Application	Recommended Product	Selection Considerations
On/Off isolation - water networks	Gate Valve / Butterfly Valve	Select by DN, PN, available space, operating frequency and project standard.
Compact isolation / large diameters	Butterfly Valve	Low weight and compact face-to-face; verify liner/disc material and actuator requirements.
Flow regulation / throttling	Globe Valve / Control Valve	Standard gate valves should not normally be used for throttling.
Backflow prevention	Check Valve	Select swing, dual-plate or other design according to velocity, orientation and system dynamics.
Hydronic balancing	DRV / Balancing Valve	Select using design flow, pressure drop and commissioning requirements.
Pressure-independent flow control	PICV / BICV	Verify design flow, available differential pressure, actuator and control signal.
Debris protection	Y-Strainer / Suction Diffuser	Consider screen size, allowable pressure drop and maintenance access.
Air removal	Automatic Air Vent	Locate according to system design at appropriate air collection/high points.
Water-hammer mitigation	Water Hammer Arrestor	Selection and location depend on pipework, flow, pressure and transient conditions.
Movement / vibration isolation	Rubber Expansion Joint	Verify elastomer, pressure, temperature, movement, anchors and guides.

2. FLOW, Kv / Cv & VALVE SIZING REFERENCE

Parameter	Engineering Reference
Kv	Metric flow coefficient: water flow in m ³ /h at approximately 1 bar differential pressure under defined reference conditions.
Cv	US customary flow coefficient: water flow in US gpm at 1 psi differential pressure under defined reference conditions.
Flow & ΔP	For water-like fluids, flow varies approximately with the square root of differential pressure. Use certified product Kv/Cv data.
Control / Balancing Valve Sizing	Do not select solely by pipe diameter. Verify design flow, valve pressure drop, available ΔP and controllability.
PICV / BICV	Confirm design flow lies within the valve setting range and available differential pressure lies within the product operating range.
Valve Authority	For modulating control applications, valve authority should be considered as part of overall control-valve sizing and system design.

3. PRESSURE, TEMPERATURE & UNIT REFERENCE

Item	Reference
1 bar	100 kPa = 0.1 MPa ≈ 14.504 psi
1 MPa	10 bar
1 m ³ /h	≈ 4.403 US gpm
1 US gpm	≈ 0.2271 m ³ /h
Temperature Conversion	°F = (°C × 9/5) + 32
PN Ratings	Common European designations include PN6, PN10, PN16, PN25 and PN40.
ASME Classes	Common classes include 125, 150, 300 and higher depending on product/material.
Important	PN and ASME Class are different rating systems and are not direct numerical equivalents.

Item	Reference
Pressure-Temperature Limits	Allowable pressure may be limited by body material, seat, elastomer, packing, connection and temperature.

4. MATERIAL SELECTION GUIDE

Material	Typical Strengths / Use	Important Considerations
Ductile Iron	Water networks, HVAC and general valve bodies; good strength and toughness.	Verify coating, pressure rating, medium and potable-water requirements.
Grey Cast Iron	General lower-stress water/HVAC applications where specified.	Lower ductility than ductile iron; use only within product/application limits.
Bronze / Gunmetal	Threaded valves, water service and corrosion-resistant components.	Verify exact alloy and water-quality/application requirements.
Brass	Compact threaded valves and fittings.	Verify alloy, temperature, pressure and dezincification risk.
DZR Brass	Potable-water and applications where dezincification resistance is required.	Use certified DZR grade and applicable potable-water approvals where specified.
Stainless Steel 304	General corrosion resistance for trim, stems and components.	Not as resistant to chlorides as 316.
Stainless Steel 316 / 316L	Enhanced corrosion resistance, especially in more aggressive environments.	Final suitability depends on chloride level, temperature and service.
Carbon / Cast Steel	Higher-pressure / temperature industrial valve construction where applicable.	Requires suitable corrosion protection and service-specific material selection.

5. ELASTOMER & SEALING MATERIAL SELECTION

Material	Water / HVAC	Oil	Weather / Ozone	Typical Use
EPDM	Excellent	Poor	Excellent	Water valve seats, liners, O-rings, expansion joints.
NBR	Good	Excellent	Moderate / Poor	O-rings, seals, oil-service components.
Neoprene / CR	Good	Good	Excellent	Expansion joints, gaskets and flexible connections.
FKM / FPM	Good	Excellent	Excellent	Higher-temperature / chemical-resistant special seals.
PTFE / RPTFE	Excellent	Excellent	Excellent	Ball-valve seats, packing and chemically resistant sealing.
Graphite	Application-specific	Application-specific	N/A	High-temperature packing and gaskets.

Note: Elastomer suitability is compound-specific. Always verify actual medium, concentration, temperature, pressure and required potable-water approvals.

6. CONNECTION SELECTION GUIDE

Connection	Reference / Type	Typical Selection Notes
Flanged	BS EN 1092-1 / 1092-2; ASME B16.5 / B16.47 as applicable	Common for larger valves and removable pipeline equipment; verify PN/Class, facing and drilling.
Wafer	Butterfly / check valve body installed between mating flanges	Compact installation; verify flange compatibility and disc clearance.
Lug	Threaded-lug butterfly body	Allows bolting to each flange; verify dead-end service capability if required.
BSPP	BS EN ISO 228-1 parallel thread	Sealing generally requires an appropriate sealing face/gasket arrangement depending on connection design.
BSPT	BS EN 10226-1 / ISO 7-1 taper thread	Pressure-tight threaded system where correctly assembled and sealed.
NPT	ASME B1.20.1 taper thread	American tapered thread system; not interchangeable with BSP systems.
Grooved	AWWA C606 where applicable	Fast mechanical joining; verify groove dimensions, coupling and gasket compatibility.

7. QUALITY, TESTING & CERTIFICATION REFERENCE

Topic	Engineering Reference
Shell Test	Verifies pressure-containing body integrity at the applicable test pressure.
Seat Leakage Test	Verifies shut-off performance according to the applicable valve/test standard.
Backseat Test	Applicable to valve designs provided with a backseat feature.
Hydrostatic / Pneumatic Testing	Use the method and pressure required by the applicable product/project standard.

Topic	Engineering Reference
Coating Inspection	Verify coating type, thickness and integrity where specified.
Material Certification	Use certified material documentation where required by project specifications.
WRAS / Potable Water	Approval applies only to the certified product/material configuration and scope.
UL / FM	State only for the exact product and configuration carrying the applicable listing/approval.

8. WATER HAMMER & AIR MANAGEMENT

Condition	Engineering Guidance
Trapped Air	Can cause noise, reduced hydraulic performance and unstable system operation. Air-release devices should be located according to system design.
Water Hammer	A transient pressure event caused by rapid velocity change, fast valve closure, pump events or other hydraulic disturbances.
Automatic Air Vent	Used to release accumulated air; it does not replace a water hammer arrestor.
Water Hammer Arrestor	Used to absorb/mitigate specific transient pressure effects; selection and location must suit the system.
System-Level Mitigation	May also require controlled valve closure, surge vessels, check-valve selection, pump controls or other surge-analysis measures.

9. ENGINEERING SYMBOLS & ABBREVIATIONS

Abbreviation	Meaning
DN	Nominal Diameter
PN	Nominal Pressure designation
ΔP	Differential Pressure
Kv	Metric flow coefficient
Cv	US customary flow coefficient
DZR	Dezincification Resistant
FBE	Fusion Bonded Epoxy
EPDM	Ethylene Propylene Diene Monomer
NBR	Nitrile Butadiene Rubber
CR	Chloroprene Rubber / Neoprene
PTFE	Polytetrafluoroethylene
PICV	Pressure Independent Control Valve
BICV	VANTEC balanced / pressure-independent control valve designation, as defined by the relevant product documentation
DRV	Double Regulating / Balancing Valve
FCU	Fan Coil Unit
BSPP	British Standard Pipe Parallel
BSPT	British Standard Pipe Taper
NPT	National Pipe Taper
WRAS	Water Regulations Approval Scheme

GENERAL ENGINEERING NOTICE

This guide is intended as a general engineering reference for preliminary selection and catalogue use. Final product selection shall be verified against the applicable VANTEC product datasheet, approved drawing, project specification, operating medium, pressure, temperature, flow conditions, required approvals and applicable standards. Product-specific numerical limits and certified performance data shall always take precedence over general guidance.