

Control Valve Selection by Application

Metals and Minerals Processing

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The metals and mineral processing industries are extremely diverse, as are applications within these industries. A complete representation of these applications is beyond the scope of this catalog. Some other industry applications such as chemical, power, and difficult fluids effectively cover applications with service conditions similar to those found in metals and mineral processing.

Please consult these other sections to find product selection guidelines for non-erosive conditions that can be categorized as general, corrosive, or severe service.

Erosive service is a particular challenge within the metals and mineral processing industry. Be-

low are general product suggestions for erosive services. Following the erosive service table are tables covering some specific applications in metals and mineral processing.

Refer to section 5 for more complete product information.

Erosive Service

Valve Style	Features Required or Application	Valve Type	Comments
Rotary control valve	Pressures to Class 600 (Design V200 valve) Temperatures to 538°C or 1000°F Shearing shutoff action Equal percentage flow characteristic High rangeability Skirted V-notch ball	V150, V200, V300 Vee-Ball® valves	Alloy 6 HD seal; Chrome oxide coating or alloy 6 overlay of internal body surfaces; Chrome-plated ball with alloy 6 v-notch; Forward or reverse flow; Sizes 1 through 20 inches
	Precise control of low flows		Micro-Notch ball in alloy 6 or ceramic trim 1-inch size only
	Eccentric plug Streamlined flow passages Reversible seat	V500 eplug™ valve	Alloy 6 or VTC ceramic trim; Reverse flow; Hardened body insert near seat; Might require sacrificial spool pipe downstream; Sizes 1 through 10 inches
	Cammed V-notch ball High capacity Streamlined flow passages Reversible seat	CV500 eplug™ valve	Alloy 6 trim; Reverse flow recommended; Hardened body insert near seat; Might require sacrificial spool pipe downstream; Sizes 3 through 12 inches

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Metals and Minerals Processing

Erosive Service (Continued)

Valve Style	Features Required or Application	Valve Type	Comments
Heavy-duty globe valve	Pressures to Class 2500 Temperatures to 593°C or 1100°F Dirty service with cavitation	EH, HP	DST (dirty-service trim) HP: to 6 inches EH: to 20 inches
	Pressures to API 10,000 Temperatures to 232°C or 450°F Severe and erosive service	D, DA	VTC ceramic trim; Tungsten carbide plug tip and seat ring insert; Sizes 1 and 2 inches
Sweep angle-style globe valve	Pressures to Class 2500 Self-cleaning outlet with liner Cylinder-guided contour plug Erosive service with flashing (autoclave)	461	Tungsten carbide or ceramic trim; Sizes 2 through 6 inches
Slurry butterfly valve	Pressures to Class 300 Temperatures to 204°C or 400°F Erosion resistance for highly abrasive slurries Cost-effective WCB body Field-replaceable liner and disk Protective shaft sleeve	SBV (Contact your Fisher sales office)	High-chrome white cast iron, tungsten carbide, or ceramic disk and liner; No stops or seal Sizes 3 through 16 inches
High-performance butterfly valves	Pressures to Class 1500 Temperatures to 816°C or 1500°F (A11) Alloy construction High capacity; large sizes	A11, A31, A41, A61D POSI-SEAL® valve 8532, 8560 edisc® valves	Alloy 6 overlay on disk and internal body surfaces might be used in some constructions; Sizes 2 to 48 inches and larger, depending on type; Fire-safe seals (some constructions)
Lined butterfly valve	Pressures to Class 300 Temperatures to 121°C or 250°F Nitrile liner Class VI shutoff	9500	Conventional or Fishtail disk Sizes 2 through 12 inches
	PFA liner	PFA-lined butterfly valve (Contact your Fisher sales office)	Sizes 3 through 54 inches
Lined or sleeved plug valve	Cage located within plug Reduced turbulence	Cage control valve (Contact your Fisher sales office)	Sizes 1 through 8 inches
	Pressures to Class 600 Temperatures to 204°C or 400°F PTFE sleeve (alloy plug; sleeve in body)	Sleeved plug valve (Contact your Fisher sales office)	Sizes 1/2 through 18 inches
	Pressures to Class 300 Temperatures to 204°C or 400°F (PFA) PFA or FEP liner (lined plug and body)	Lined plug valve (Contact your Fisher sales office)	Sizes 1/2 through 8 inches
Lined ball valve	Pressures to Class 150 Temperatures to 204°C or 400°F PFA liner material	Full-port lined ball valve (Contact your Fisher sales office)	---
Diaphragm or pinch valve	---	Diaphragm valve (Contact your Fisher sales office)	---
Ceramic-lined, full-bore ball valves	Pressures to Class 2500 Temperatures to 816°C or 1500°F	Full-bore ball valve (Contact your Fisher sales office)	Tungsten carbide, chromium carbide, chrome oxide, and ceramic thermal spray coatings Sizes 3/4 through 24 inches

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Metal Processing Applications

System	Application	Valve Type	Comments
ALUMINUM PROCESSING			
Alumina refining	Bauxite/hydrate slurry	SBV (Contact your Fisher sales office)	For erosive service, use ceramic liner and disk
	Sweetener injection (bauxite digester)		
	Evaporator		Use tungsten carbide or ceramic trim
	Red mud	SBV (Contact your Fisher sales office), V500 ēplug™ valve	Use VTC ceramic trim
	Pregnant liquor		
Calcinated limestone			
Aluminum rod mill	Grind liquor	V500 ēplug valve	For erosive service, use trim 4 (VTC ceramic plug and seat)
COPPER CONCENTRATING			
Water to SAG (semi autogeneous) mills	Water	V150, V200 Vee-Ball valves, V260	Use HD (heavy duty) seal and stainless body with attenuator for cavitating service
Primary cyclone			
Second cleaner column feed distributor			
Regrind cyclone feed tank			
Fresh water from well			
Additives to SAG (semi autogenous) mills	Primary and secondary collector, frother	CP, 24000SF	Low Cv required; 316 stainless steel body
Air to flotation cell	Air	A41/1035 POSI-SEAL® valve	On-off service
Water to flotation cell	Water	PSP POSI-SEAL package	On-off or throttling service
COPPER ELECTROWINNING AND LEACHING			
Treated water main line to electrolyte filters for backwash	Water	8532 edisc® valve	317 stainless steel body and trim Sizes 14 inches and larger
Electrolyte outlet line	Electrolyte	8532, 8560 edisc valves	317 stainless steel body and trim
Outlet line (loaded organic from coalescer tank)	Loaded organic	8532 edisc valve, A31 POSI-SEAL® valve	317 stainless steel or Hastelloy C body and trim
H ₂ SO ₄ to cluster drum	Sulfuric acid 96%	CP	Alloy 20 body and trim if temperature and H ₂ SO ₄ concentration allow
Leaching irrigation	Raffinate/ILS	V200, V300 Vee-Ball valves	254 SMO body and trim if temperature, H ₂ SO ₄ concentration and chlorine content allow
PLS (pregnant leach solution) feed to extraction	PLS solution	8560, 8532 edisc valves	
Poor electrolyte to washer	Lean electrolyte	CP	Stainless steel body and Trim
Rich electrolyte to column cell	Rich electrolyte	8532 edisc valve	Usually 317 stainless steel or Hastelloy C body and trim
Fuel tank	Fuel oil	V150 Vee-Ball valves CP	WCC steel body and trim
COPPER SMELTING			
Reverb oxygen gas burners	Oxygen	8560 edisc valve	---
Fuel oil	Fuel oil 6	8560 edisc valve, 24000SF	Fast stroking speeds required
Cooled water	Water	V200 Vee-Ball valves, CP	---
NICKEL REFINING			
Autoclave	Feed and discharge	V150 Vee-Ball valve	Use alloy 6 trim; Do not use ceramic trim in hydrogen service (possible sparking hazard)

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Metal Processing Applications (Continued)

System	Application	Valve Type	Comments
STEEL PROCESSING			
Continuous caster	Mold water control	V150 Vee-Ball ® valve	Cavitating: use HD (heavy duty) seat and stainless steel body with attenuator.
Continuous caster	Caster zone cooling	V200 Vee-Ball valve	Vee-Ball valve for rangeability ASCO-167A solenoid valve for lock-in-last on air or power loss.
Wire mill	Quench box water	YD	Fast stroking speed required Oversized Nitronic 50 stainless steel stem
Rolling mill	Bearing oil feed	EZ easy-e ® valve	Use linear trim with booster for low end response
Water treatment	Cooling water bypass	V150 Vee-Ball valve	Cavitating: use HD (heavy-duty) seal and stainless steel body with attenuator; Use double check aspirator Sizes 2 through 6 inches
		A31, A41 POSI-SEAL ® valves	A41: 8 through 12 inches A31: 14 through 12 inches Cavitating service; use Novex seat and stainless steel body Use double check aspirator

Generic Mineral Processing Applications

Application	Valve Type	Comment
Raw water supply and distribution	8560, 8532 edisc ® valve V150, V200, V300 Vee-Ball ® valves ES easy-e ® valve	Use anti-cavitation trim
Potable water	V150, V200, V300 Vee-Ball valves, ED, EZ easy-e ® valves	Use anti-cavitation trim
Reclaimed process water distribution	8560, 8532 edisc valves V150 Vee-Ball valve	Somewhat erosive service; use alloy 6 trim or overlay
	V500, CV500 eplug ™ valves	Very erosive service; use alloy 6 or VTC ceramic trim
Lime mud and milk of lime pH additive	V500, CV500 eplug valves, V150 Vee-Ball valve, Diaphragm valve (Consult your Fisher sales office)	Erosive service; use VTC ceramic plug and seat
Mineral recovery and sulfuric acid pH Additives	24000S, EZ easy-e valve, V150 Vee-Ball valve	Alloy 20 for concentrated H ₂ SO ₄
Mineral pulp and concentrate slurry	V500, CV500 eplug valves	Very erosive service; use VTC ceramic plug and seat
Lean electrolyte solution	CP, V150 Vee-Ball valve	Use alloy body and trim
Raffinate, pregnant leach, loaded organic, or rich electrolyte solution	8560, 8532, edisc valves V150 Vee-Ball valve	---
Mineral recovery aeration		
Fuel oil supply	V150 Vee-Ball valve, ES easy-e valve	Fast stroking speeds required
Autoclave compartment high-pressure quench water	ES, EZ easy-e valves	Use Cavitrol ® trim
Autoclave compartment oxygen		Use Whisper Trim ® cage
Autoclave blowback trap oxygen	CP, EZ easy-e valve	---
Autoclave slurry/steam letdown	461	Use tungsten carbide or ceramic plug tip, seat, and liner