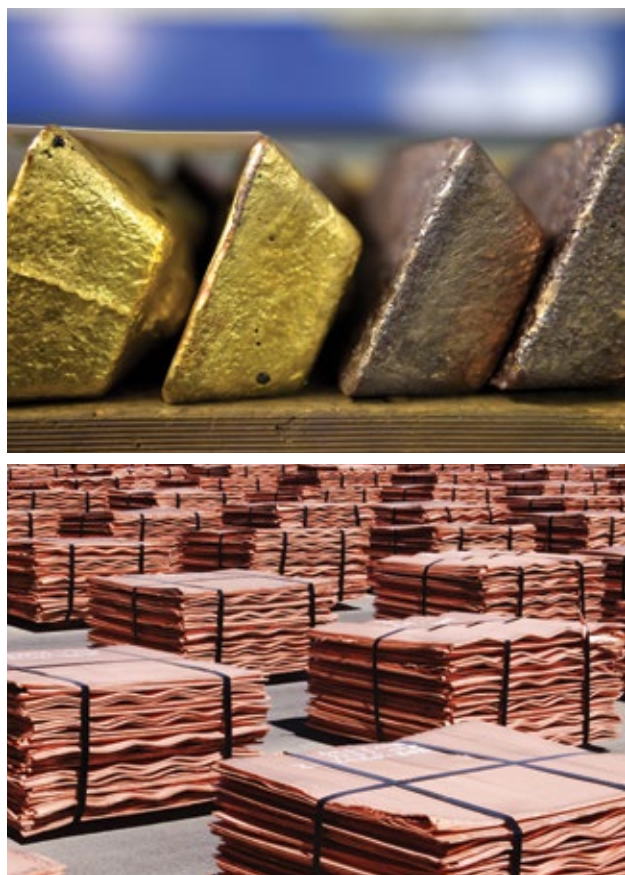








VALVE SOLUTIONS FOR MINING APPLICATIONS



Mine Pump Station Expertise

Let the experts at DeZURIK analyze your pump station and provide a custom report that takes into account pumping costs (head loss), valve budgetary pricing and relative maintenance costs of various valve types to provide the most cost effective solution over the lifetime of your mine.



Criteria for Optimal Pump Station Performance and Safety				
Critical Station Requirements	Pump Reversal, Backspin, Water Hammer Prevention	Pipe Burst & Vacuum Prevention	2nd Option: Water Hammer Prevention	Surge Protection
Product				
	PEC/PEF Pump Check Valves	ASU Combination Air Valves	CVS Swing Check Valves	SRA Surge Relief Angle Valves
Important Product Capabilities	<ul style="list-style-type: none"> • Start up/shut down surge protection • Low head loss • Open & close speed control 	<ul style="list-style-type: none"> • Combination air/vacuum valve • Slow closing - adaptable to pump characteristics 	<ul style="list-style-type: none"> • Fast closure • Low head loss • Non-slam capability 	<ul style="list-style-type: none"> • Opens quickly on pressure surge event • Adjustable closing speed control

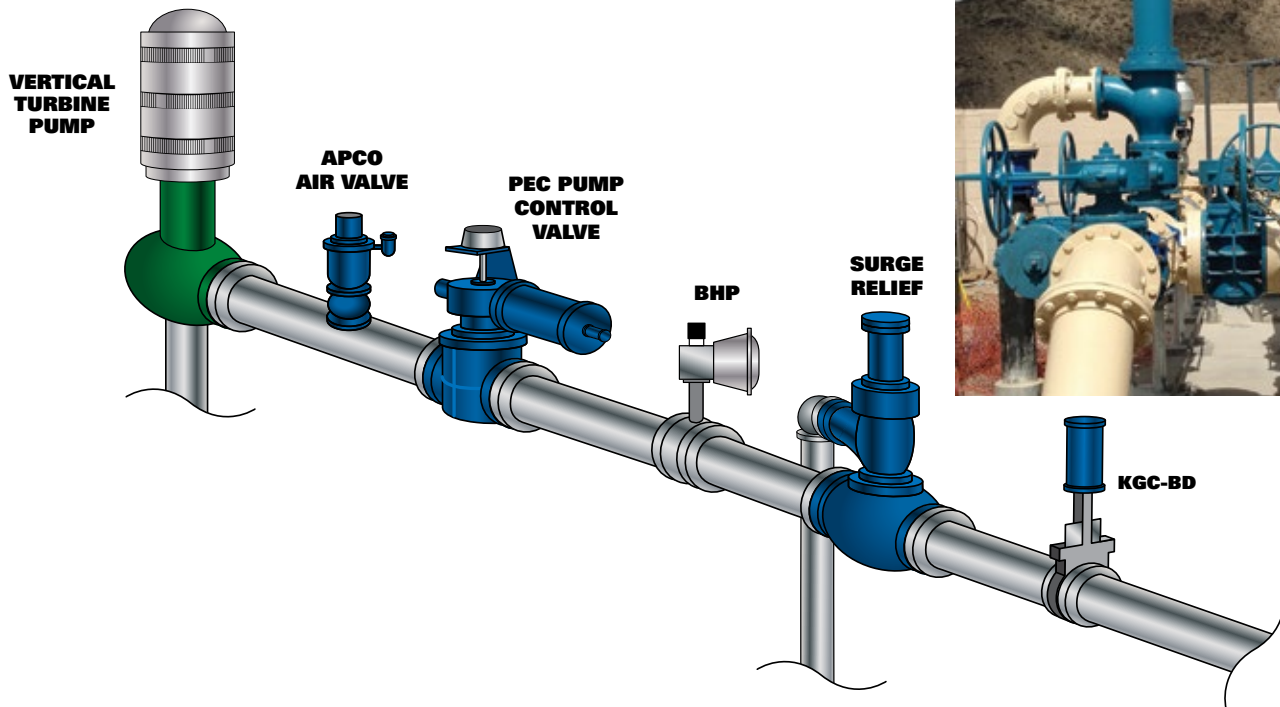







Request DeZURIK's Surge Investigation and Valve Suggestions Report by visiting www.dezurik.com or scan:



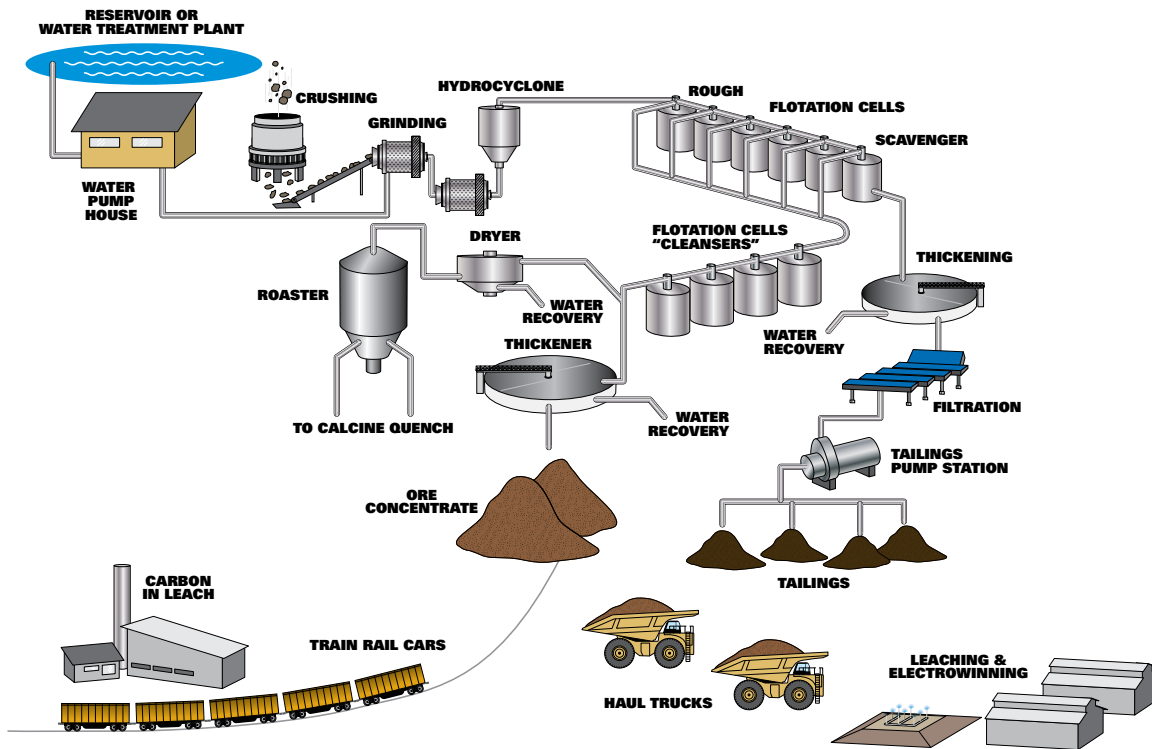
Report includes maximum surge pressure potential, the surge period, line velocity, surge wave speed, pipeline constant, and total system head potential during a surge event.









Process & System Water (Pump Station)











Pump Control	Isolation Shut Off Valves		Surge Relief Valve	Air Valves
				
PEC/PEF Pump Check Valves	BHP High Performance Butterfly Valves	KGC-BD Bi-Directional Knife Gate Valves	SRA Surge Relief Angle Valves	ASU Combination Air Valve
<ul style="list-style-type: none"> Serves as both pump check & control valve Adaptable to pump characteristic – specify operating point on pump curve DI Body, integral nickel seat NBR, EPDM or FKM seal 	<ul style="list-style-type: none"> Lugged 316 stainless steel body RTFE seat 2205 or 17-4 PH shaft Handwheel or cylinder operation 	<ul style="list-style-type: none"> 316 stainless steel body 316 stainless steel gate NBR, EPDM or FKM seal Handwheel or cylinder operation 	<ul style="list-style-type: none"> Body ASME B16.42 ASTM A536 ductile iron Stainless body seat NBR EPDM FKM seal Self-contained hydraulic seal Stroke counter 	<ul style="list-style-type: none"> Dual chamber 5/16" orifice Valve size based on fill rate or vacuum condition Double-acting throttling device (DAT) for surge protection

Mining Process & Product Overview



Systems	KNIFE GATE VALVES					SLURRY KNIFE GATE VALVES		URETHANE LINED KNIFE GATE VALVES
								
	KGN RSB	KGC-HD	KGC-ES	KGC-BD	KGC-MD	KSL-SD	KSL-LA	KUL
Grinding								✓
Hydrocyclone						✓	✓	✓
Flotation-Column Cell						✓	✓	✓
Flotation-Supercell						✓	✓	✓
Thickening Filtration						✓	✓	✓
Roasting		✓	✓					
Tailings	✓	✓	✓		✓	✓	✓	✓
CIL (Carbon In Leach)						✓	✓	✓
Electrowinning Leaching						✓	✓	



Systems	SEVERE SERVICE KNIFE GATE VALVES			COMBINATION AIR VALVES	CHECK VALVES	ECCENTRIC PLUG VALVES	HIGH PERFORMANCE BUTTERFLY VALVES	CONTROL VALVES
								
	H-290-B	KSV	KSV-DBB	ASU	CRF	PEC	BHP	RCV/VPB
Grinding		✓		✓			✓	✓
Hydrocyclone								
Flotation-Column Cell		✓				✓	✓	
Flotation-Supercell		✓					✓	
Thickening Filtration		✓				✓		
Roasting	✓						✓	
Tailings		✓	✓	✓	✓	✓		
CIL (Carbon In Leach)		✓				✓	✓	
Electrowinning Leaching				✓			✓	

Seat & Seal Materials

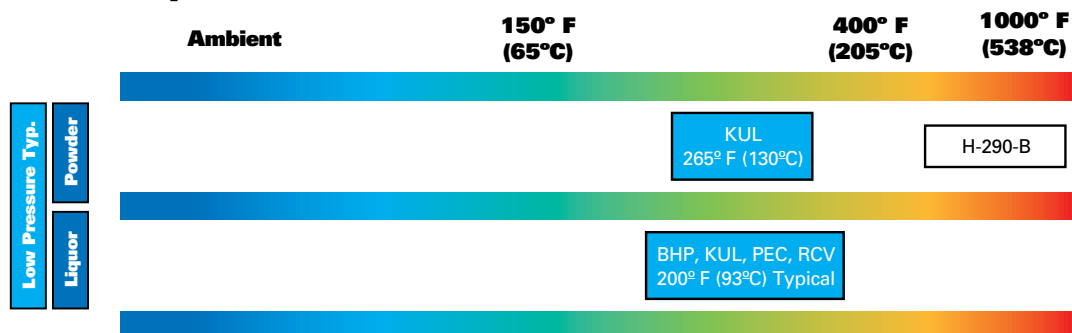
KUL Seat & Seal Materials

Seat Characteristic	Description	Type	Color	Sulfuric Acid	Sodium Cyanide	Wear Abrasion Resistance	Temperature Range
EU	Urethane, General Water Service	Polyether	Black	Not Used	Good	Excellent	-20 to 175° F (-29 to 79° C)
AUCO	Urethane, Oil Service	Polyester	Clear	Not Used	Good	Excellent	0 to 175° F (-18 to 79° C)
EUCW	Urethane, Water Service	Polyether	Clear	Not Used	Good	Excellent	-20 to 210° F (-29 to 99° C)
EUHT	Urethane, High Temp Service	Polyether	Red	Not Used	Good	Good	-20 to 265° F (-29 to 130° C)
BRPA	Urethane, Phosphoric Acid Service	Polybutadiene	Green	Good	Good	Fair	5 to 200° F (-15 to 93° C)



KSV Seat Seal & KSL Sleeve Materials

Seat Seal or Sleeve Characteristic	Description	Valve Type	Sulfuric Acid	Sodium Cyanide	Wear Abrasion Resistance	Temperature Range
NBR	Acrylonitrile-Butadiene	KSV	Not Used	Excellent	Excellent	to 180° F (82° C)
FKM	Fluoro Rubber	KSV	Good	Excellent	Fair	to 400° F (204° C)
CR	Chloroprene	KSV	Not Used	Excellent	Good	to 180° F (82° C)
VGF	Fluorinated Hyrdro Carbon Fluoro Rubber	KSV	Fair	Excellent	Fair	to 400° F (204° C)
EPDM	Terpolymer of Ethylene, Propylene & a Diene	KSV & KSL	Fair	Excellent	Good	to 250° F (122° C)
HNBR	Hydrogenated Nitrile	KSV & KSL	Excellent	Excellent	Good	to 300° F (150° C)
NR	Natural Rubber	KSL	Not Used	Good	Excellent	to 177° F (80° C)

Dry Powder & Liquor Guide



Slurry Guide

Highest Abrasion Resistance/ Pressure										
										
Broad Application Range										
										
Economy										
Models	KGN Standard Knife Gate	PEC Eccentric Plug Valve	BHP High Performance Butterfly Valve	KGC Heavy Duty Knife Gate	KUL Urethane Lined	KSL-SD Wafer Slurry Valve	KSL-LA Long Body Slurry Valve	KSV Severe Service	Hilton H-200B	Hilton H-290B
Standard CWP to:	150 psi	450 psi	740 psi	150 psi	250 psi	150 psi	100 psi	740 psi	Over 740 psi	150 psi
Temperature up to:	400°F (204°C)	450°F (232°C)	to 700°F (370°C)	1000°F (540°C)	265°F (130°C)	300°F (150°C)	300°F (150°C)	450°F (232°C)	2000°F (1050°C)	2000°F (1050°C)

Valve Style	Media					
	Raw Water	Dirty Liquids	Light Slurry 0 - 15% Solids	Medium Slurry 15 - 30% solids	Heavy Slurry 30% Solids or More	Extreme Abrasion
KGN	May Be Used	May Be Used	May Be Used			
PEC	Typical Application	Typical Application	Typical Application	Typical Application	May Be Used	May Be Used
BHP	Typical Application	Typical Application	May Be Used	May Be Used		
KGC	Typical Application	Typical Application	Typical Application	May Be Used	May Be Used	
KUL	Typical Application	Typical Application	Maximum Performance	Typical Application	May Be Used	
KSL-SD	May Be Used	May Be Used	Typical Application	Maximum Performance	Maximum Performance	
KSL-LA	May Be Used	May Be Used	Typical Application	Maximum Performance	Maximum Performance	
KSV	May Be Used	May Be Used	Maximum Performance	Maximum Performance	Maximum Performance	Maximum Performance
HILTON H-200B	Typical Application	Typical Application	Typical Application	May Be Used	May Be Used	May Be Used
HILTON H-290B	May Be Used	May Be Used	May Be Used	Typical Application	Typical Application	May Be Used

Rating System:

May Be Used: Thoroughly evaluate the application before selecting this valve. Though this valve maybe the low initial cost, it would seldom provide the lowest total cost of ownership.

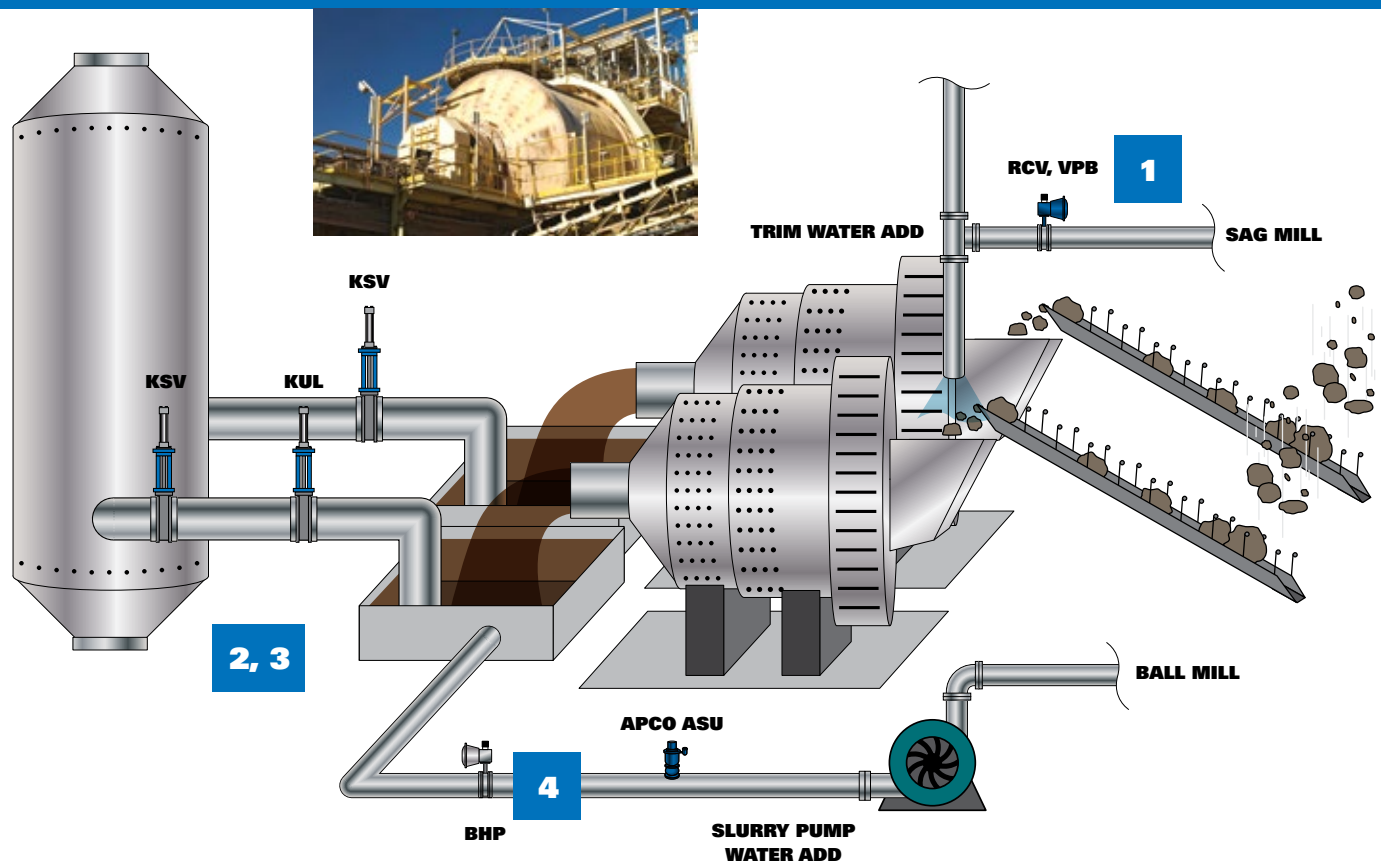
Typical Application: Based on experience, it is very common to install this valve in the stated application.





Maximum Performance: The valve listed as a Maximum Performance has been specifically designed for the stated application in most cases. Although the initial cost will be higher than other valves, the total cost of ownership is typically much lower. This valve selection chart is designed to provide you with a quick reference on valve style capabilities. The chart considers both cost and performance factors for a specific application when determining whether a valve style is rated Maximum Performance, Typical or May Be Used.

When evaluating a valve for any application, primary considerations are pressure rating, temperature limitations and fluid compatibility. Other considerations include importance of leak-free packing, seat leakage, and frequency of valve operation. Other factors include, but are not limited to fluid velocity, cycle frequency, speed of operation, dimensions and accessibility for installation or maintenance.

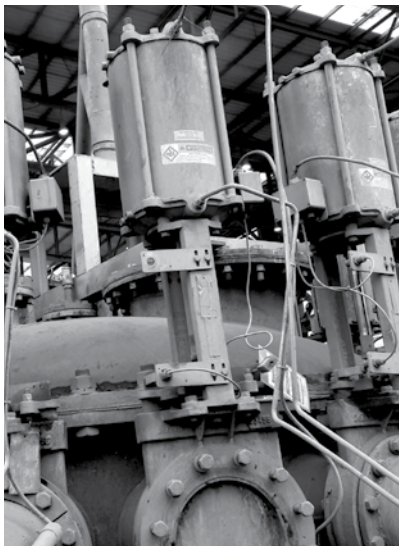
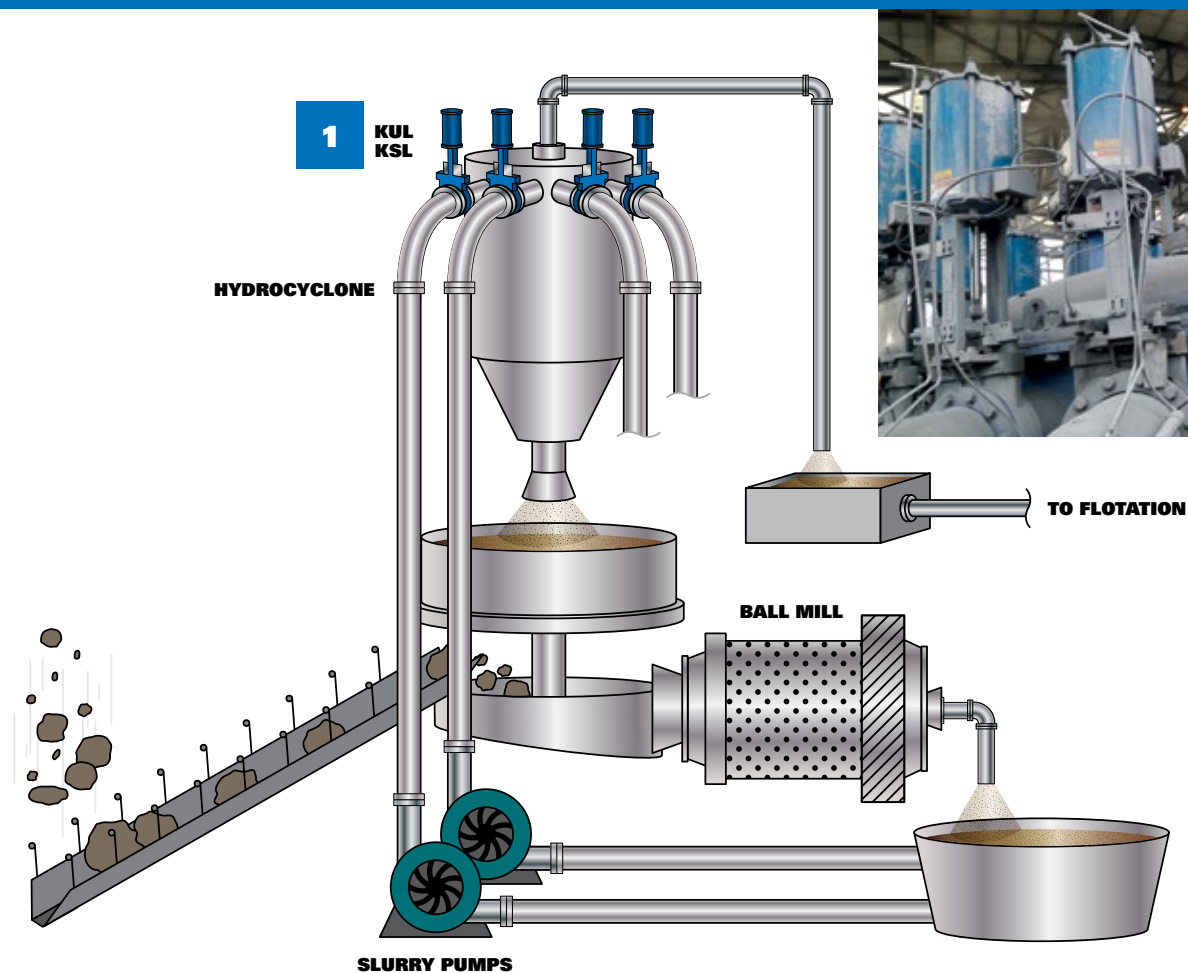
For more information, contact DeZURIK, Inc. or your local representative with your specific application requirements.

Grinding



	1. Trim Water Control	2. SAG Mill Isolation	3. Ball Mill Isolation	4. Sump Water Control
				
	RCV/VPB Rotary or V-Port Control Valves	KSV Severe Service Knife Gate Valves	KUL Urethane Lined Knife Gate Valves	BHP High Performance Butterfly Valves
Aqueous Chemistry pH	Neutral	May Be Low pH, if Naturally-Occuring Sulfide (Sulfuric) in the Ore		Neutral
Temperature	Ambient	Ambient		Ambient
Pressure	100 – 150 psi (690-1034 kPa)	5 psig (35 kPag)		150 - 300 psig (1034-2068 kPag)
Particle Size	N/A Water	Ball Mill = Medium to Small	SAG Mill = Medium to Large	N/A Water
% Solids Content (By Weight)	N/A Water	60%		N/A Water
Seats / Liner	316 Stainless Steel / PTFE	HNBR	EU	RTFE Seat
Gate Material	N/A	17-4 pH or Stainless Steel with Hardened Nickel Coating	Stainless Steel, Heat Treated	N/A
Body Material	316 Stainless Steel	Carbon Steel	Ductile Iron	Carbon Steel Lugged

Hydrocyclone



1. Cyclone Diverter Valves



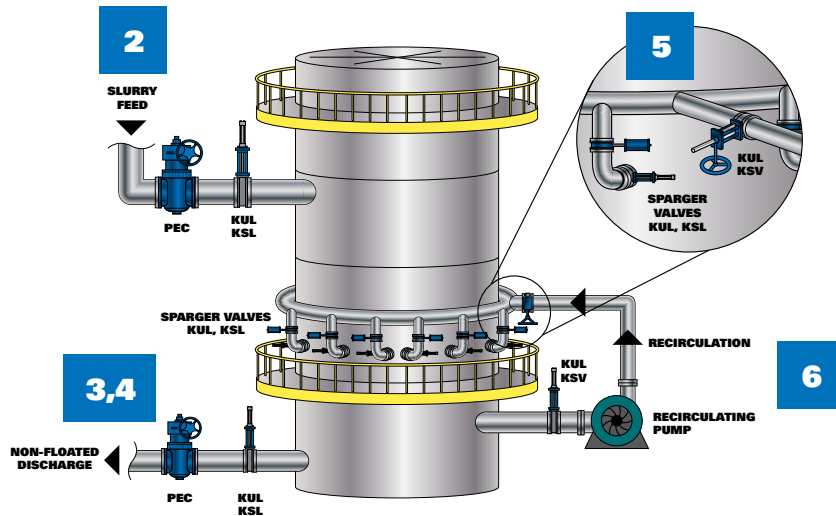
KUL Urethane Lined Knife Gate Valves



KSL Slurry Knife Gate Valves

Aqueous – Chemistry pH	May Be Low pH, if Naturally-Occurring Sulfide (Sulfuric) in the Ore	
Temperature	Ambient	
Pressure	>150 psi (1034 kPa) Pump Discharge	
Particle Size	Small to Medium (First Process After Ball Mill)	
% Solids Content (by Weight)	40%	
Seats / Liner	EU or BRPA	Natural Rubber or HNBR
Gate Material / Body Material	2205, 17-4 pH or Stainless Steel with Hardened Nickel Coating / DI	2205, or 17-4 pH or Stainless Steel with Hardened Nickel Coating / DI

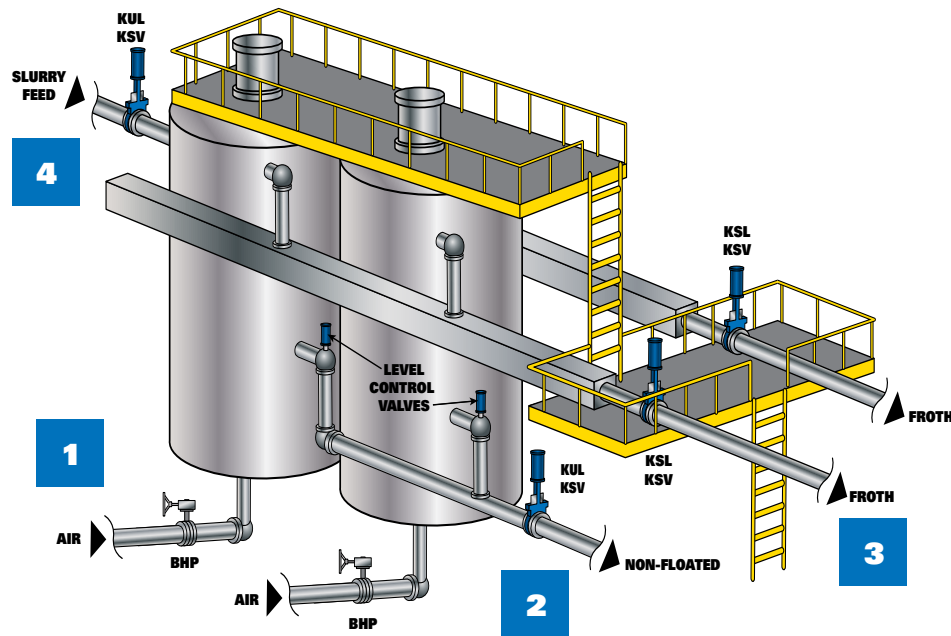
Flotation - Column Cell






1. Air Control	2. Slurry Feed	3. Non-Floated discharge	4. Non-Floated Tank Isolation	5. Sparger Bypass	6. Slurry Recirculation
BHP High Performance Butterfly Valves	KSL/KUL Slurry or Urethane Lined Knife Gate Valves	PEC Eccentric Plug Valves	KUL Urethane Lined Knife Gate Valves	KUL Urethane Lined or KSL Slurry Knife Gate Valves	KUL/KSV Urethane Lined or Severe Service Knife Gate Valves

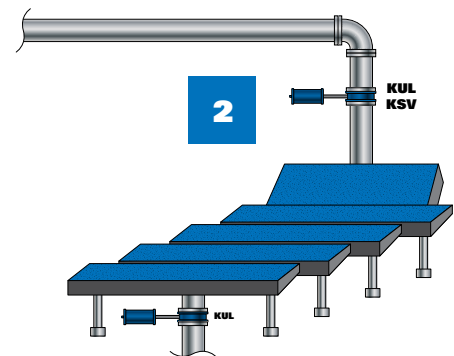
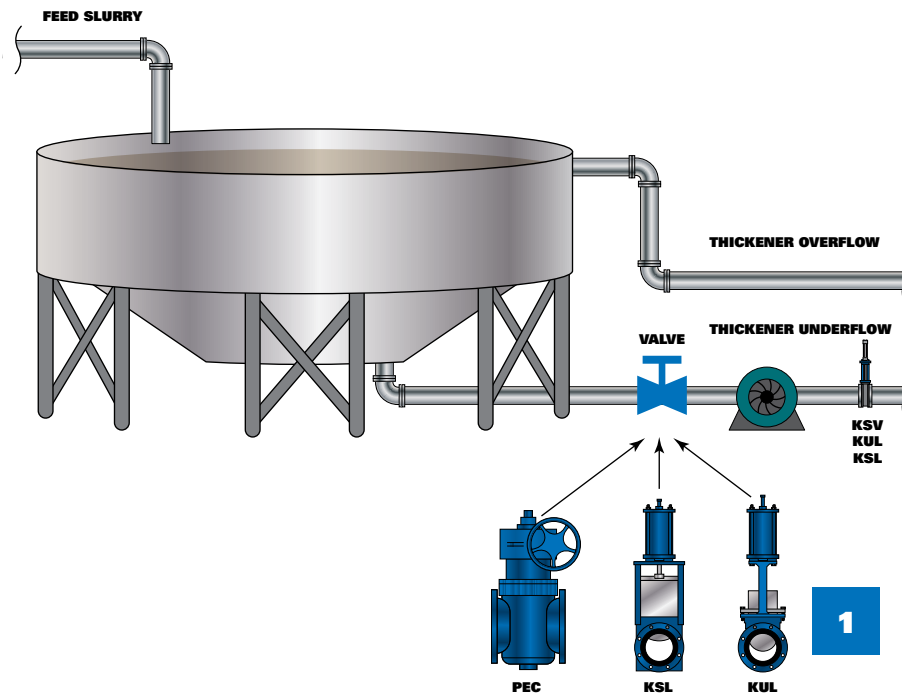
Aqueous Chemistry pH	Air	Lower pH (Trace Sulfides & Reagents)				
Temperature	Ambient					
Pressure	100 psi (690 kPa)	Column Height in Feet X 2.31 = psi X 6.89 = kPa				> 150 psi (> 1030 kPa)
Particle Size	N/A	Small / Medium				
% Solids Content (by Weight)	N/A	45-60%				
Seats / Liner	RTFE	KSV = HNBR	NR	EU	KUL = EU	KUL = EU
		KUL = EU			KSL = NR	KSV = Carbon Steel Seat Ring
Gate Material / Body Material	NA / Carbon Steel Lugged	KSV = Carbon Steel or 17-4 pH or Stainless Steel with Hardened Nickel Coating / CS (LCC)	NA / DI Rubber Lined	2205 or Stainless Steel with Hardened Nickel Coating / DI	KUL = 2205 or Stainless Steel with Hardened Nickel Coating / DI	KUL = 2205 or Stainless Steel with Hardened Nickel Coating / DI
		KUL = 2205 or Stainless Steel with Hardened Nickel Coating / DI			KSL = 2205 / DI	KSV = Carbon Steel or 17-4 pH or Stainless Steel with Hardened Nickel Coating / CS (LCC)






Flotation - Tank / Super Cell



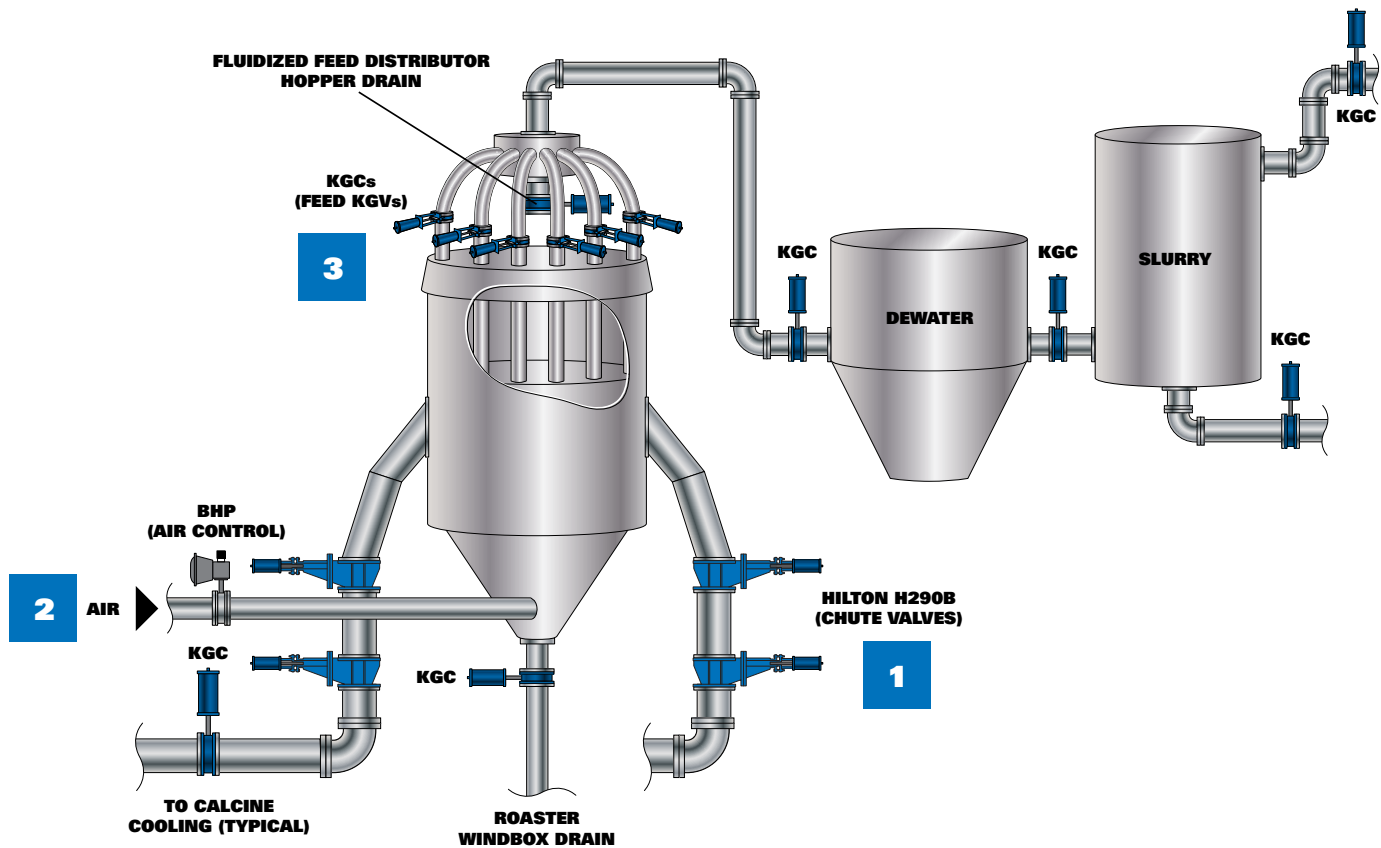
1. Tank Air Feed	2. Non-Floated Tank Isolation	3. Froth Tank Isolation	4. Slurry Feed
			
BHP High Performance Butterfly Valves	KUL Urethane Lined Knife Gate Valves	KSL/KSV Slurry or Severe Service Knife Gate Valves	KSV/KUL Severe Service or Urethane Lined Knife Gate Valves
Air	Lower PH (Trace Sulfides & Reagents)		
Ambient			
100 psi (690 kPa)	Column Height in Feet X 2.31 = psi X 6.89 = kPa		Cyclone Pump Discharge
N/A	Small / Medium		
N/A	45-60%		
RTFE	EU	KUL = EU	KUL = EU
		KSL = NR	KSV = Carbon Steel Seat Ring
NA / Carbon Steel Lugged	2205 or Stainless Steel with Hardened Nickel Coating / DI	KUL = 2205 or Stainless Steel with Hardened Nickel Coating / DI	KUL = 2205 or Stainless Steel with Hardened Nickel Coating / DI
		KSL = 2205 / DI	KSV = Carbon Steel or 17-4 pH or Stainless Steel with Hardened Nickel Coating / CS (LCC)




Thickening Filtration



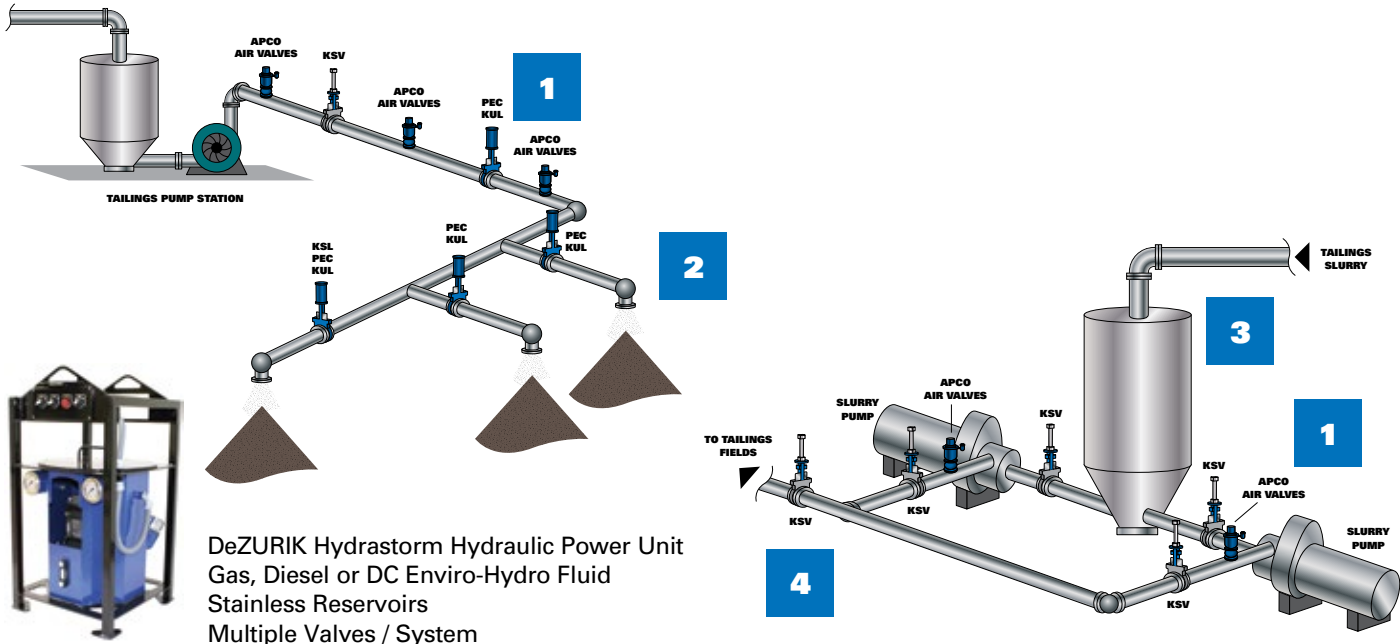
	1. Underflow Thickening Discharge			2. Filtration Bypass	
					
	PEC Eccentric Plug Valves	KUL Urethane Lined Knife Gate Valves	KSL Slurry Knife Gate Valves	KSV Severe Service Knife Gate Valves	KUL Urethane Lined Knife Gate Valves
Aqueous Chemistry pH	Higher pH (Lime & Trace Reagents)				
Temperature	Ambient			Ambient	
Pressure	Gravity - (Head) 15 psi (105 kPa) Approx.			<100 psi (<690 kPa)	
Particle Size	Fine			Fine to Coarser Materials	
% Solids Content (by Weight)	45-60%			45-60%	
Seats / Liner	NR	EU	NR	HNBR	EU
Gate Material / Body Material	NA / Cast Iron or Ductile Iron (Rubber Lined)	2205 or Stainless Steel with Hardened Nickel Coating / Ductile Iron	2205 or Stainless Steel with Hardened Nickel Coating / Ductile Iron	Carbon Steel or 17-4 pH or Stainless Steel with Hardened Nickel Coating / Carbon Steel (LCC)	2205 or Stainless Steel with Hardened Nickel Coating / Ductile Iron







Roasting



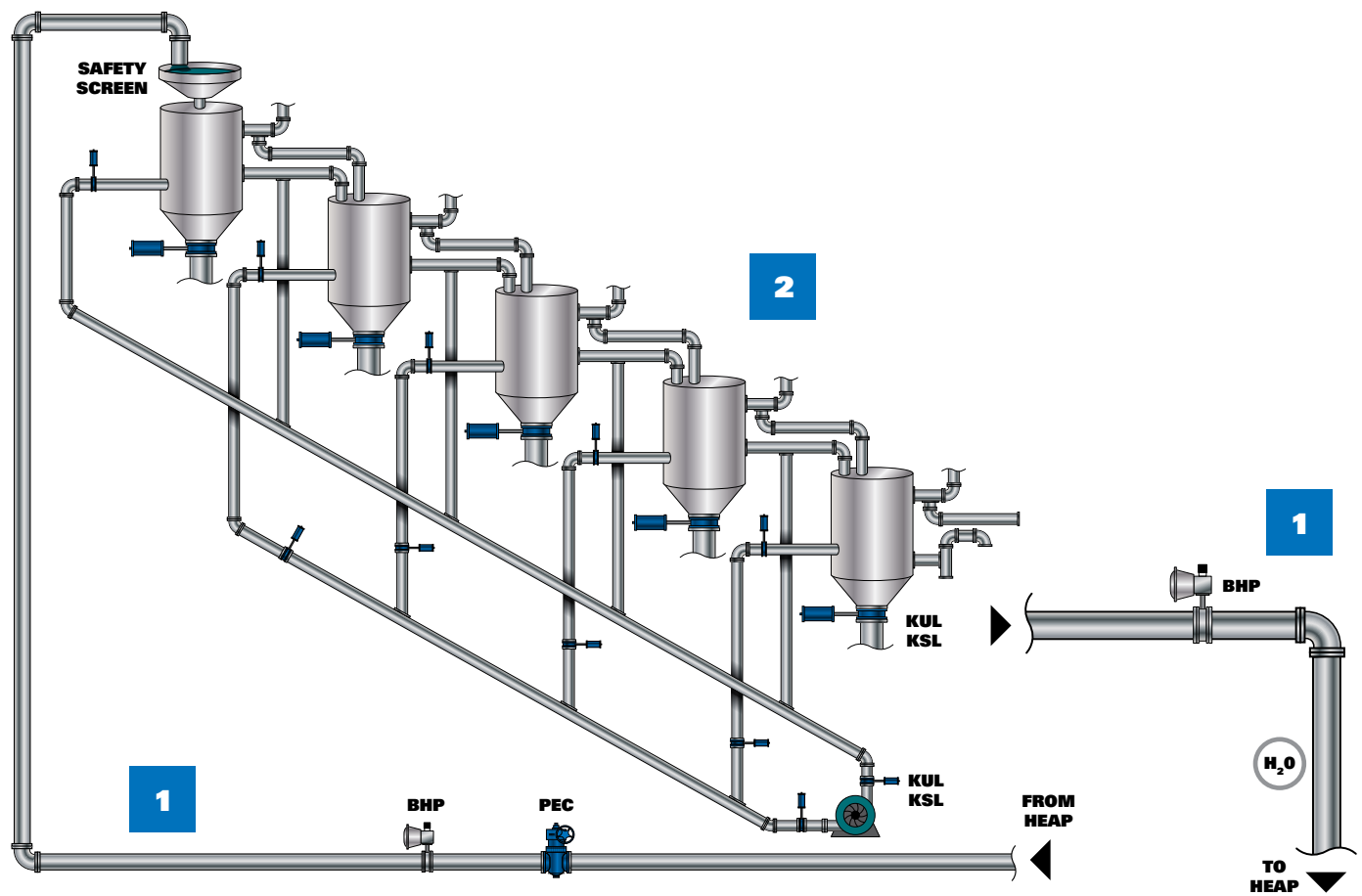
	1. Chute Valves	2. Fluidizing Air to Roaster	3. Feed Distributor & Hopper Bottom Valves
			
	Hilton H-290B Chute Valve	BHP High Performance Butterfly Valves	KGC Stainless Steel Knife Gate Valve
Aqueous – Chemistry pH	Arsenic & Sulfide, Sulfur Compound	Air	Arsenic & Sulfide, Sulfur Compound
Temperature	1500° F (815° C)	110° F (43° C)	Up to 1500° F (815° C)
Pressure	<100 psi (<690 kPa)	5 psig (35 kPag)	5 psig (35 kPag)
Particle Size	Small	NA	Small
% Solids Content (by Weight)	30–60%	NA - Air	30–60%
Seats / Liner	310 Stainless Steel	RTFE	310 Stainless Steel
Gate Material / Body Material	310 / 310 Stainless Steel	NA / Lugged Carbon Steel	310 Stainless Steel = Gate, Body & Bonnet





Tailings



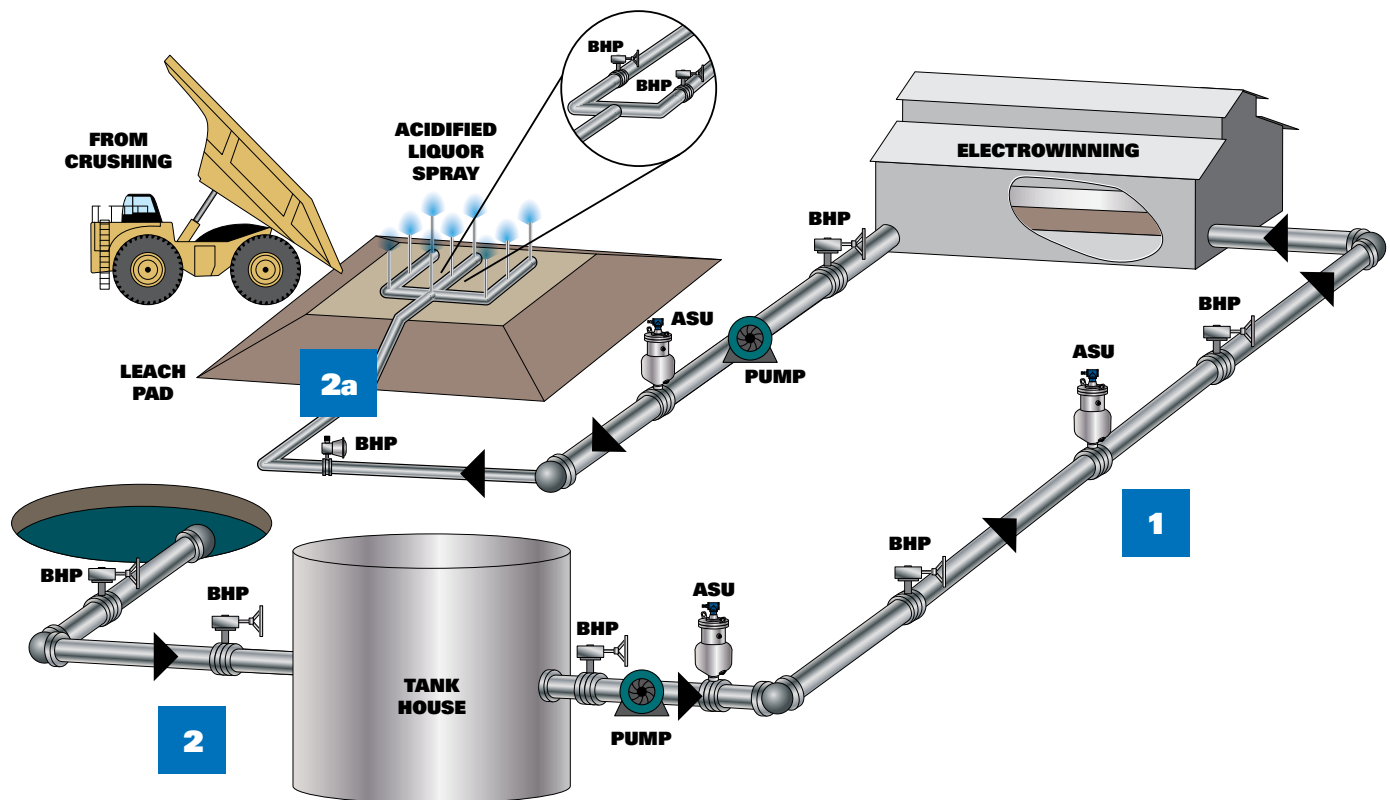
1. Pipe Burst / Vacuum Protection	2. Tailings Run / Tailings Dam			3. Pump Bypass High Pressure	4. Pump Station
					
ASU Combination Air Valves	KUL Urethane Lined Knife Gate Valves	KSL Slurry Knife Gate Valves	PEC Eccentric Plug Valves	KSV Severe Service Knife Gate Valves	KUL Urethane Lined Knife Gate Valves
Non Acidic – pH is Elevated (Lime) Aqueous or Water Content is Minimized					
Ambient				Ambient	
< 250 psi (1720 kPa)				> 300 psi (2068 kPa) for Pump Isolation Discharge* <250 psi (1720 kPa) OK for KUL	
Small				Small	
45%-70%				30%	
NBR	EU	NR	NR	Carbon Steel with Hard welded overlay / HNBR	EU
NA / 316 Standard Size for Vacuum Protection	2205 (28 Rc Scale) Harder than 316 / Ductile Iron	2205 or Stainless Steel with Hardened Nickel Coating / Ductile Iron	NA / Cast Iron or Ductile Iron (Rubber Lined)	17-4 pH Stainless Steel with Hardened Nickel Coating / Carbon Steel (LCC)	2205 (28 Rc Scale) Harder than 316 / Ductile Iron

Carbon in Leach



	1. Water From / To Heap		2. Tank Isolation / Carbon Advance	
				
	BHP High Performance Butterfly Valves	PEC Eccentric Plug Valves	KSL Slurry Knife Gate Valves	KUL Urethane Lined Knife Gate Valves
Aqueous – Chemistry pH	Water From Heap May Be Dirty, Particle Entrained Pond Water		Tank Isolation and Carbon Advance Slurry is a Sodium Cyanide Aqueous Base	
Temperature	45-90° F (32° C)		95-200° F (93° C)	
Pressure	<100 psi (690 kPa)		<100 psi (690 kPa)	
Particle Size	Water - Debris		Small – Medium	
% Solids Content (by Weight)	Depends on Source Dirt – Flotsam Possible		23% - 40% Note: If Running at 23% = Process Problem	
Seats / Liner	Clean	Entrained	NBR	EU
	RTFE	NR		
Gate Material / Body Material	NA / Carbon Steel Lugged	NA / Ductile Iron	2205 / Ductile Iron	2205 / Ductile Iron

Leaching – Copper Electrowinning (SXEW)



1. Pipe Burst / Vacuum Protection



ASU Combination Air Valves

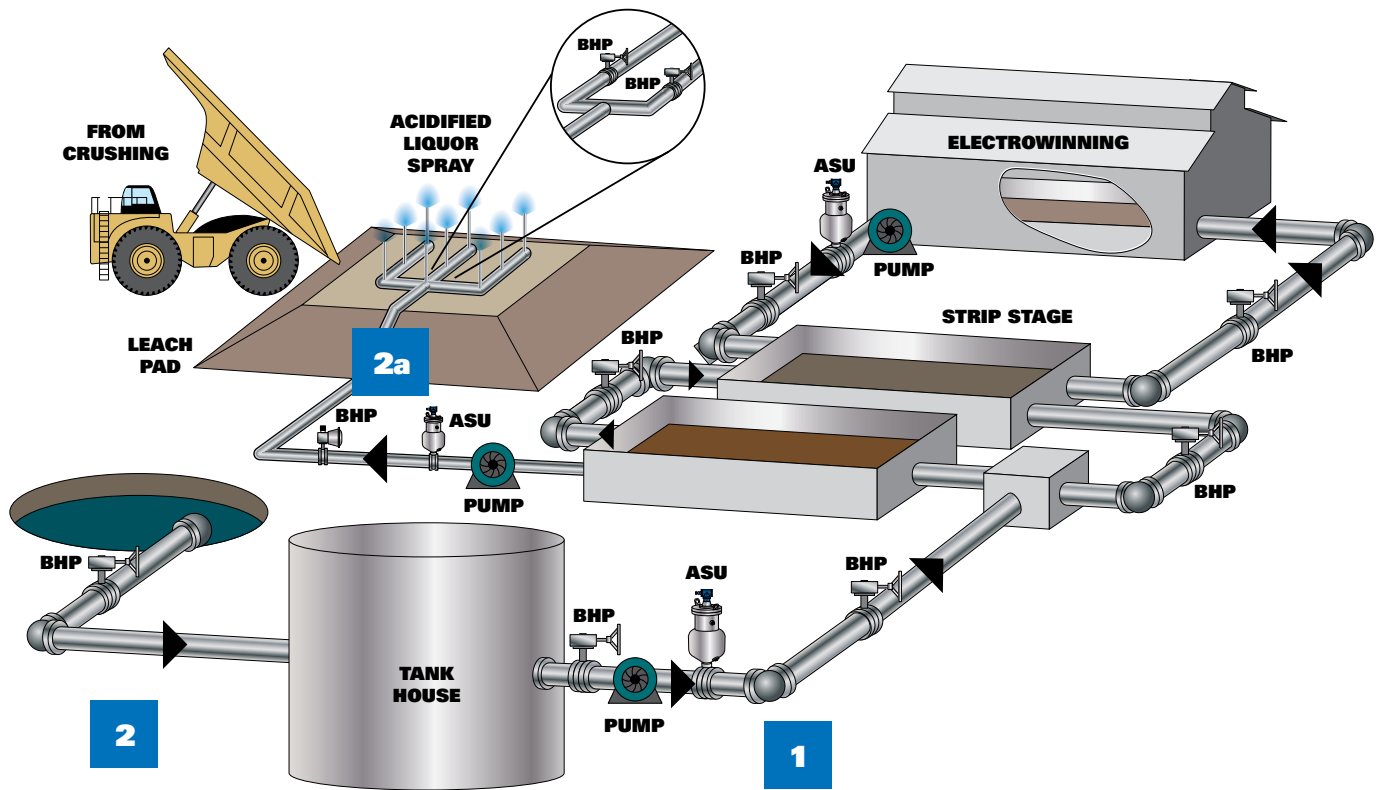
2. SXEW 2a. Pump Discharge



BHP High Performance Butterfly Valves

Aqueous – Chemistry pH	*PLS is Sulfuric Acid Based – Becomes Raffinate Liquor – Kerosene May be Added to Remove Dirt / Earthen Material	
Temperature	Ambient	
Pressure	< 100 psi (690 kPa) > 300 psi pump discharge (2068 kPa)	
Particle Size	Liquor	
% Solids Content (by Weight)	N/A	N/A
Seats / Liner	HNBR	RTFE for BHP
Gate Material / Body Material	NA / 316 Standard Size for Vacuum Protection	NA / 316 Stainless Steel Lugged

Leaching – Gold Electrowinning (SXEW)



1. Pipe Burst / Vacuum Protection



ASU Combination Air Valves

2. SXEW 2a. Pump Discharge











BHP High Performance Butterfly Valves

Aqueous – Chemistry pH	PLS (Pregnant Leach Solution) is Sodium Cyanide Based	
Temperature	Ambient	
Pressure	< 100 psi (690 kPa) > 300 psi Pump Discharge (2068 kPa)	
Particle Size	Liquor	
% Solids Content (by Weight)	N/A	N/A
Seats / Liner	HNBR	RTFE for BHP
Gate Material / Body Material	NA / 316 Standard Size for Vacuum Protection	NA / 316 Lugged or Carbon Steel









Product Selection Guide General Media and Mining Process



	KNIFE GATE VALVES					SLURRY KNIFE GATE VALVES		URETHANE KNIFE GATE VALVES
Temperatures up to	400°F (204°C)	1000°F (540°C)	1000°F (540°C)	400°F (204°C)	500°F (260°C)	300 °F (150°C)	300 °F (150°C)	265°F (130°C)
Pressures up to	150 psi	150 psi	150 psi	150 psi	150 psi	150 psi	100 psi	250 psi
Media / Process								
	KGN RSB	KGC-HD	KGC-ES	KGC-BD	KGC-MD	KSL-SD	KSL-LA	KUL
Slurries – Light Thickening	May Be Used	Typical	Typical	May Be Used	Typical	Typical	Typical	Typical
Slurries – Medium Grinding / Tailings	Limited	May Be Used	May Be Used	Limited	May Be Used	Typical	Typical	Typical
Slurries – Heavy SAG Grinding / Tailings	Limited	Limited	Limited	Limited	Limited	Limited	Typical	May Be Used
Corrosive Media / Sulfuric Acid / CIL Copper	Typical	Typical	Typical	Typical	Typical	May Be Used	May Be Used	Typical
Corrosive Media / Sodium Cyanide / CIL Gold	Typical	Typical	Typical	Typical	Typical	May Be Used	May Be Used	Typical
Steam Autoclave / Autoclave Vent	Limited	Limited	Limited	Limited	Limited	Limited	Limited	Limited
Supply & Wash Water	Typical	Typical	Typical	Typical	Typical	May Be Used	May Be Used	Typical
Water Treatment Disposal	Typical	Typical	Typical	Typical	Typical	May Be Used	May Be Used	Typical
Dry Materials Roasting	Typical	Typical	Typical	Limited	Typical	May Be Used	May Be Used	Typical
Dry Material Column Handling Roasting	Limited	Limited	Limited	Limited	Limited	Limited	Limited	Limited
Gasses	May Be Used	May Be Used	May Be Used	May Be Used	May Be Used	May Be Used	May Be Used	May Be Used

Product Selection Guide General Media and Mining Process



	HILTON CHUTE VALVES	SEVERE SERVICE KNIFE GATE VALVES		COMBINATION AIR VALVES	RUBBER FLAPPER CHECK VALVES	ECCENTRIC PLUG VALVES	HIGH PERFORMANCE BUTTERFLY VALVES	ROTARY OR V-PORT CONTROL VALVES
Temperatures up to	2000°F (1050°C)	450°F (232°C)	450°F (232°C)	180°F (82°C)	425°F (218°C)	450°F (232°C)	700°F (370°C)	1000°F (540°C)
Pressures up to	150 psi	740 psi	740 psi	150 psi	250 psi	450 psi	740 psi	740 psi
Media / Process								
	H-290-B	KSV	KSV-DB	ASU	CRF	PEC	BHP	RCV / VPB
Slurries – Light Thickening	Typical	Typical	Typical	Typical	Typical	Typical	May Be Used	Typical
Slurries – Medium Grinding / Tailings	Typical	Typical	Typical	Typical	Typical	Typical	Limited	Typical
Slurries – Heavy SAG Grinding / Tailings	May Be Used	Typical	Typical	May Be Used	May Be Used	May Be Used	Limited	May Be Used
Corrosive Media / Sulfuric Acid / CIL Copper	May Be Used	Typical	Typical	Typical	Typical	Typical	Typical	May Be Used
Corrosive Media / Sodium Cyanide / CIL Gold	May Be Used	Typical	Typical	Typical	Typical	Typical	Typical	May Be Used
Steam Autoclave / Autoclave Vent	Limited	Limited	Limited	Limited	Limited	Limited	Typical	Typical
Supply & Wash Water	May Be Used	Typical	Typical	May Be Used	Typical	Typical	Typical	Typical
Water Treatment Disposal	May Be Used	Typical	Typical	Typical	Typical	Typical	Typical	Typical
Dry Materials Roasting	Typical	Limited	Limited	Limited	Limited	May Be Used	Limited	May Be Used
Dry Material Column Handling Roasting	Typical	Limited	Limited	Limited	Limited	Limited	Limited	Limited
Gasses	May Be Used	May Be Used	May Be Used	May Be Used	May Be Used	Typical	Typical	Typical

Facilities



DeZURIK Corporate Headquarters and Manufacturing Facility,
Sartell, MN USA
Established in 1928, 420,000 sq. ft.



DeZURIK Cambridge, Ontario, Canada
Established in 1961, 50,000 sq. ft.



Rapid Fulfillment Center, Houston, TX, USA
Established in 2018, 43,000 sq. ft.



DeZURIK, Redmond, WA, USA
Established in 1952, 25,000 sq. ft.

Sales and Service

For information about our worldwide locations, approvals, certifications and local representative:
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