

#### How to Choose the Best Slurry Pump for My Application



**GIW® Minerals** 

### Choose the the right tool for the job.





# Gather Information

- Basic information for pump selection:
- Flow Rate
- Head (or pipeline info)
- Specific Gravity of Slurry
- Particle size: d50, d80
- These are required to get a basic pump size and calculate motor power.





#### Specific Gravity and Particle Size

- Slurry type based on ANSI/HI standards
- Slurry SG and particle size (D50) are used to classify different slurries.
- Class 1 slurry is the least aggressive.
- Class 4 slurry is the most aggressive.





Table 12.3.5a - Recommended service limitations for acceptable wear

	r						
		Service class					
	1	2	3	4			
Head per stage:							
m	105	73	55	40			
(ft)	345	240	180	130			
mpeller peripheral speed: All-metal pump m/s	46	38	33	28			
(ft/min)	9000	7500	6500	5500			
Rubber-lined pump	Head gener rubber is ge	ated by impe nerally limite	llers made of d to 40 m (13	natural 0 ft) per			

allow higher limits.

28 m/s (5500 ft/s). Synthetic elastomers may

## Head

- The Slurry Class is used to provide recommended limits for Head.
- Head recommendation is based on acceptable erosive wear.
- Higher heads result in higher wear rate.
- Limits are based on head (per stage) or peripheral velocity limits.





## Flow

- The Slurry Class is used for recommended flow ranges.
- Flow recommendations vary for different hydraulic designs.
- Flow ranges are given as a percentage of the Best Efficiency Point.
- Low flow causes excess recirculation resulting in higher wear.





### Pump Performance Curve

- Graphical representation of pump performance.
- Best Efficiency Point (BEP)
- Stay within allowable head and flow ranges (if possible)





### Additional Information for Pump Selections

- NPSHa
- Slurry PH, Chloride Content, Temperature
- Suction Pressure
- Air Content



## **Net Positive Suction Head Available**

- Centrifugal pumps require sufficient pressure at the inlet.
- Pumps will cavitate without sufficient NPSHa.







# PH, Chloride Content, Slurry Temp

- Determine if special materials are need
- GIW's 28G High chrome white iron is very versatile and can typically be used from a PH of 4.5 to 12
- We also have a range of other alloy's that can be used for various chemical applications.





## **Suction Pressure**

Required to get a pump with the correct pressure rating

# Air Content

- Air can cause major problems if not accounted for.
  - Critical information





# **Mechanical Requirements**

- Slurry pumps must have a robust bearing assembly that can meet the demands:
  - Large overhung loads
  - Bearing life
  - Shaft deflection





# Slysel Pump Selection Software

 GIW has one of the best pump selection software programs in the industry.





# Slysel

 Once information is entered Slysel evaluates factors such as slurry type, solids effects, pipeline friction, efficiency, wear, mechanical performance and other operational factors.



Slurry <	P	roject	Pipelin	e Pur	np duty	Pump Resu	lts					
▲ Slurry ^	Hydr	aulic Co	nfigurations	;								
Type Settling	Desc	ription			Speed (RPM)	Efficiency (%)	BEPQ (%)	NPSHR (ft)	Sphere (in)	Power (HP)	Basis curve	
Model Four component	8 x10	32 C	H 8- 1/ 4/ 3	ME	571	78	116	17.0	4.6	203.0	B 29 -07	^
Service class 3	8 x10	32 C	H 8- 1/ 4/ 31	ME	581	77	116	17.3	4.6	206.1	B 24A-04	
▲ Carrier Fluid	8 x10	) 32 C	8-1/4/4N	1E	549	75	114	20.8	3.5	209.5	B 20C-93	
	8 x10	) 32 C	H 8- 1/ 4/ 4	ME	549	79	112	13.9	3.9	199.4	B 29B-05	
рн 6.70	8 x9	28 C H	47-3/8/5N	ΛE	644	74	111	15.4	2.9	212.8	B 8-14	
Chlorides 0 ppm	8 x10	32 C	H 8- 1/ 4/ 4	ME	549	79	110	13.8	3.9	199.4	B 30A-07	
Temperature 70.0 °F	10x1	2 32 A	H10- 1/ 4/ 4	4ME	535	75	101	9.4	4.2	209.4	B 19C-07	
Use water as fluid 🗸	10x1	2 26 C	H 8- / / 3N	/IE	694	79	100	9.9	5.0	199.4	B312B-93	
	10x1	2 26 C	H 8- / / 3N	ИE	694	81	100	9.9	5.0	195.8	B311B-93	
	8 x10	) 25 C	H 8- 1/ 4/ 4	ME	732	77	96	17.3	3.4	205.4	B 12A-05	
Fluid S.G. 0.999	8 x10	0 32 C	H 8- 1/ 4/ 5	ME	540	76	94	13.8	3.2	206.3	B 2A-10	
Solids Concentration Delivered	8 x10	) 32 C	H 8- 1/ 4/ 5	ME	549	78	94	13.9	3.2	202.9	B 33B-05	
Mixture S.G. 1.250	10x1	2 36 C	H10- 1/ 4/ 4	1ME	466	75	/6	6.4	4.0	209.1	B 29C-93	
Cod burghers 15.2.%	10x1	2 32 C	H10-1/4/4		529	70	/5	9.0	4.2	207.3	B 30C-05	
CVd, by volume 15.2 %	TOXI	2 30 A	H10- 1/ 4/ :	DIVIE	401	/1	/4	10.2	5.0	222.5	B I -05	v
Cwd, by weight 32.2 %	Pump Assemblies											
▲ Solids Properties	Tag	Туре	Shaft 🔺	Pressu (psi)	Assembly	Shaft	Plug si	Casing	Impeller	Stuffing Box	Bearing Assembly	
Solids S.G. 2.650	SC	ISA	57/16	485	9593D-00	) 4267C	204.5	5776D	5397C-00	5442D	5816C	
Particle shape Angular 💙		2011	2 1/20	100			20115	51100		51125	50100	
Miller number (G75) 112												
Abrasivity 1.00												
▲ Particle Size Distribution												
Show particle size distribution plot												
Fines (<74 µm) 18.8 %												
Extrapolate fines 🗸												
D50 <mark>200 μm</mark>												
Ratio 2.30												
D85 460 µm												
Extrapolate topsize												
Topsize 1340 µm												

## Slysel

- Slysel generates a list of pump options suitable for the supplied duty conditions.
- Any given set of duty conditions may yield many very different pumps to choose from





# Evaluate the Options

- Technical skill and experience is needed to sort thru the various possibilities to find the Best Pump for My Application
- What is the end users goal? Efficiency, wear life, commonality, etc.
- Understand the options available.



# **Slurry Pumps**







#### **LCC Pumps**

- High efficiency and excellent wear characteristics over a broad operating range up to 15,000 gallons per minute (3405 m<sup>3</sup>/hr).
- Rubber and metal wet end options allow best material choice for any application





#### LSA Pumps

- Wear resistant pumps for severe duties.
- Larger impellers for slower turning pumps.
  - LCC 8X10-24 vs LSA 8X10-32
- Flows up to 60,000 gallons per minute (14,000 m3/hr)





#### **MDX Pumps**

- Mill Duty pump for the most extreme duty conditions.
- Thicker cross sections
- Adjustable suction liner
- Slurry diverter
- Flow rates up to 61,650 gallons per minute (14,000 m3/hr)





#### **TBC Pumps**

- Severe duty conditions in high head/high pressure applications.
- Special tie bolt construction
- Operating flows from 5,000
  80,000 gallons per minute (1.135 - 18.200 m3/hr).





#### **HVF Pumps**

- High Volume Froth Pump
- Hydraulic design removes air from the impeller eye while the pump is running.

![](_page_21_Picture_4.jpeg)

# **Slurry Pumps**

![](_page_22_Picture_1.jpeg)

Additional pump features can be found at GIWIndustries.com

![](_page_22_Picture_3.jpeg)

![](_page_23_Picture_0.jpeg)

# Trust the Experts

- Ideally pump selections would be based on a pump that runs at BEP.
- That isn't always the case.
- Pumps may run at a range of duty conditions
- Selections may be based on NPSHa restrictions, sphere passage requirements, wear life, or other items.

![](_page_23_Picture_6.jpeg)

![](_page_24_Picture_0.jpeg)

# Trust the Experts

- Some pump selections are a tradeoff between Capital Cost and Maintenance Cost.
- GIW can provide pumps that are upgradeable with wet end conversion options.
- The GIW team can provide solutions for today's needs and tomorrow's possibilities!

![](_page_24_Picture_5.jpeg)

#### **Contact and Copyright**

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Publisher

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![](_page_25_Picture_6.jpeg)