



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

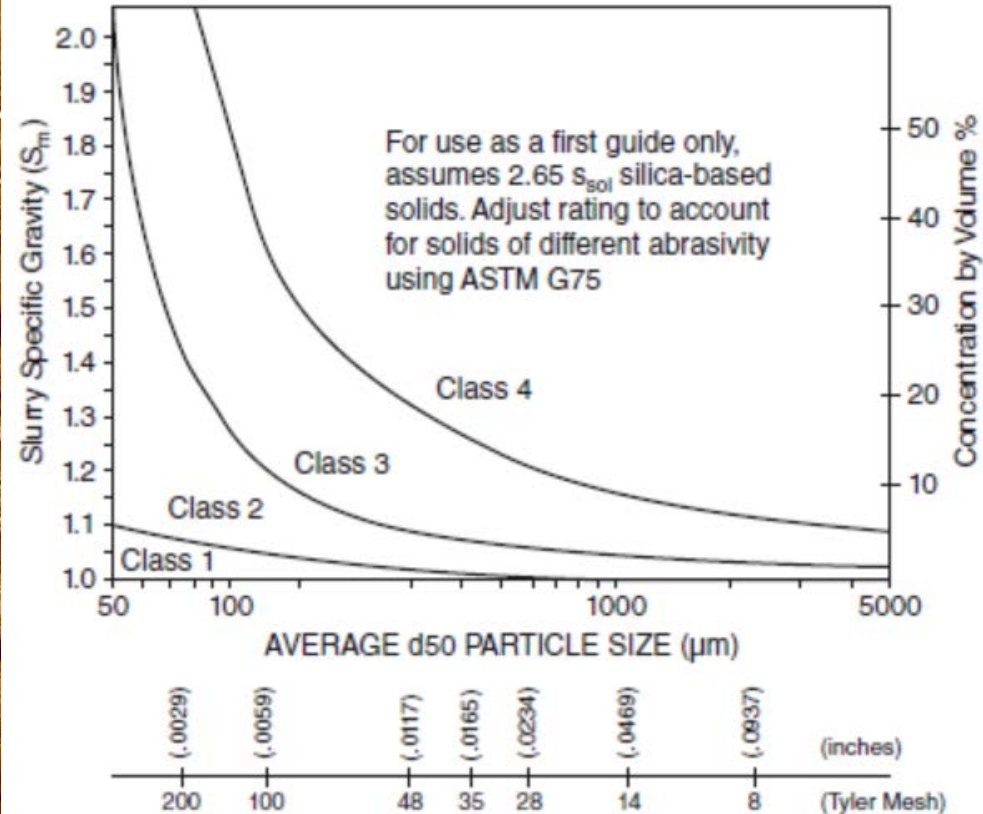


Figure 12.3.4.2a – Service class chart for slurry pump erosive wear

- 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.

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.

Table 12.3.5a — Recommended service limitations for acceptable wear

	Service class			
	1	2	3	4
Head per stage: m (ft)	105 345	73 240	55 180	40 130
Impeller peripheral speed: All-metal pump m/s (ft/min)	46 9000	38 7500	33 6500	28 5500
Rubber-lined pump	Head generated by impellers made of natural rubber is generally limited to 40 m (130 ft) per stage, which corresponds to peripheral speed of 28 m/s (5500 ft/s). Synthetic elastomers may allow higher limits.			

Flow

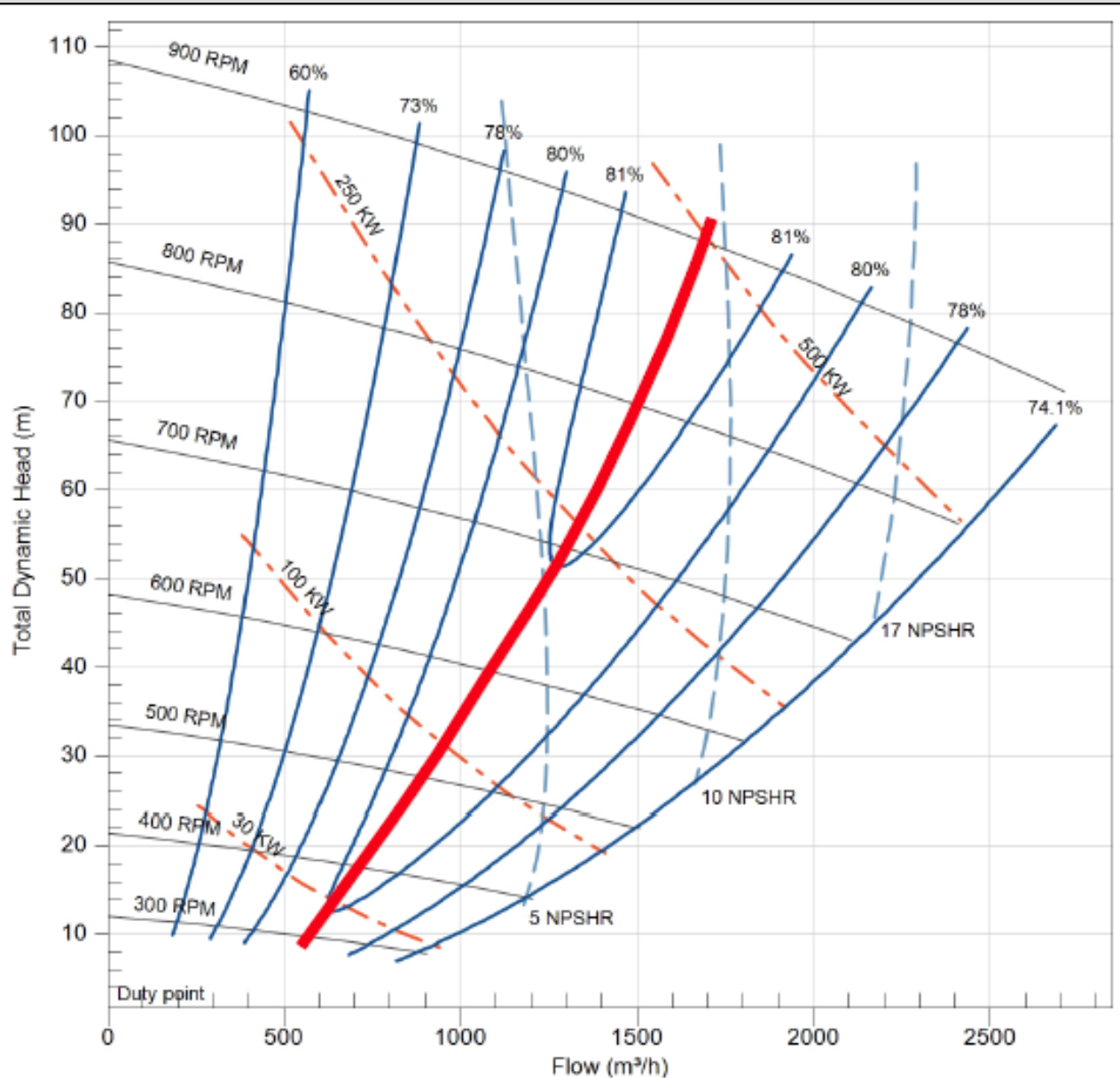
- The Slurry Class is used for recommended flow ranges.
- Flow recommendations vary for different hydraulic designs.
- Flow ranges are given as a percentage of the Best Efficiency Point.
- Low flow causes excess recirculation resulting in higher wear.

12.3.5b

Recommended flow limits

Operating Limits	Casing Type	Service Class			
		1	2	3	4
Recommended percent range of BEP flow rate	Annular	20-120%	30-110%	40-100%	50-90%
	Semivolute	30-130%	40-120%	50-110%	60-100%
	Near volute	50-140%	60-130%	70-120%	80-110%

Pump Performance Curve



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

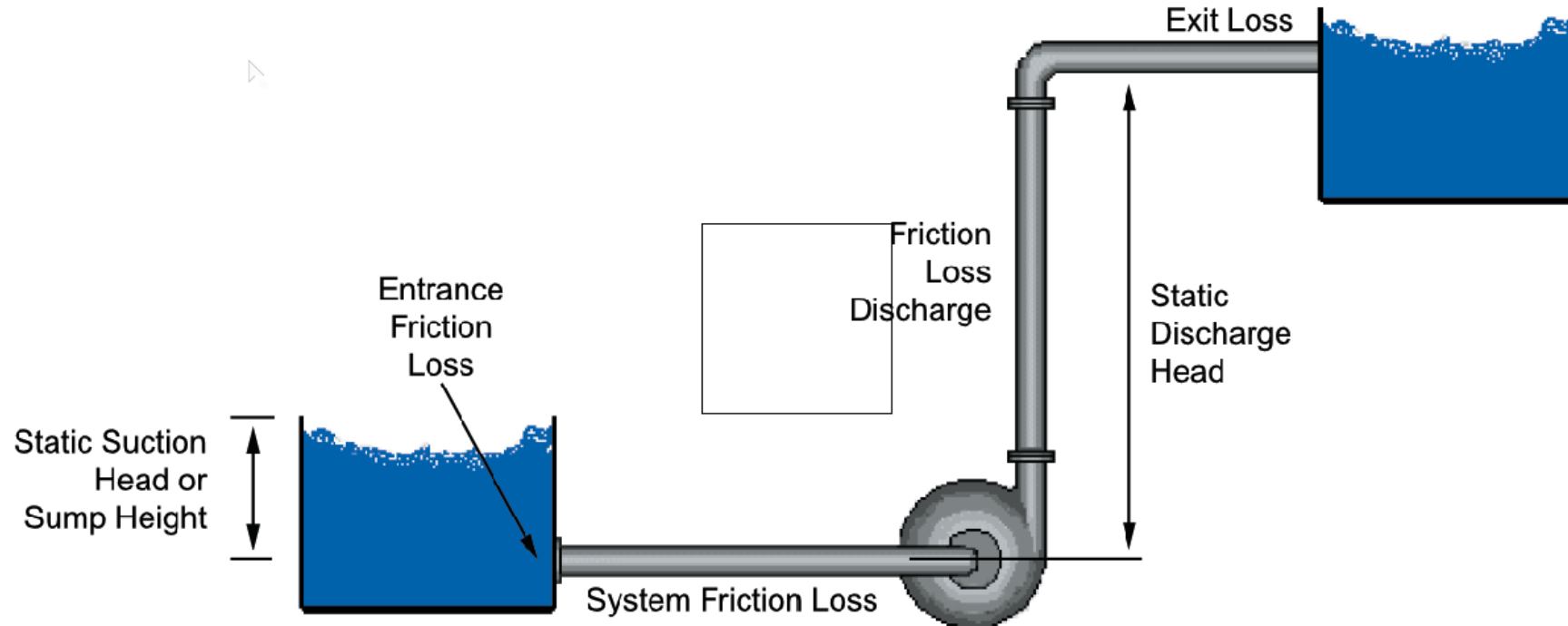


Additional Information for Pump Selections

- 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.



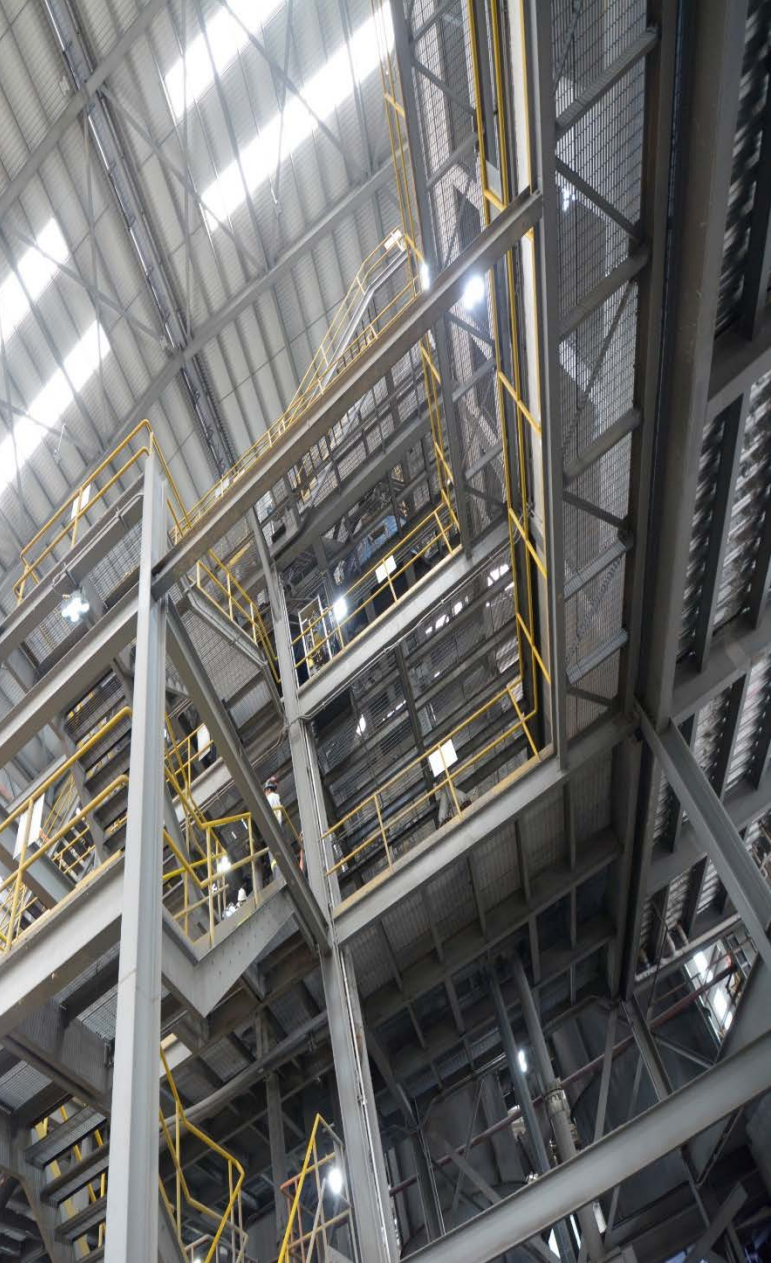
Suction Pressure

- 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.

Slurry Project Pipeline **Pump duty** Pump Results

Slurry

Type: Settling
 Model: Four component
 Service class: Class 3

Carrier Fluid

pH: 6.70
 Chlorides: 0 ppm
 Temperature: 70.0 °F
 Use water as fluid: ☒
 Dynamic viscosity: 0.975 cP
 Fluid S.G.: 0.999

Solids Concentration Delivered

Mixture S.G.: 1.250
 Cvd, by volume: 15.2 %
 Cwd, by weight: 32.2 %

Solids Properties

Solids S.G.: 2.650
 Particle shape: Angular
 Miller number (G75): 112
 Abrasivity: 1.00

Particle Size Distribution

Show particle size distribution plot

Fines (<74 µm): 18.8 %
 Extrapolate fines: ☒
 D50: 200 µm
 Ratio: 2.30
 D85: 460 µm
 Extrapolate tosize: ☒
 Toplevel: 1340 µm

Slurry effect model:

GIW
 Product filter
 LCC, LSA, MEGA, Custom

Hydraulic Duty

☐ Use pipeline system head

Flow: 5000.0 GPM
 Head: 100.00 ft
 Pump speed: 0 RPM
 NPSHA: 0.00 ft
 NPSHR margin: 3.00 ft
 Pump quantity: 1

Best select

☐ Include CP pumps in results

Pump filter
 Title

Pump class: Any
 Discharge: Any
 Suction: Any
 Impeller diameter: Any
 Max motor power: 0.00 HP
 Operating pressure: 0.00 psi
 Sphere size: 0.00 in
 Reset

Select a single pump

Solve for:

Pump: Search...

Impeller diameter: 0.00 in Reset

Full size: 0.00 in

Pump slurry solids effect

Effect on head: 0.00 %
 Effect on efficiency: 0.00 %
 Effect on NPSHR: 0.00 %

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

Project Pipeline Pump duty **Pump Results**

▲ Slurry

Type

Model

Service class

▲ Carrier Fluid

pH

Chlorides

Temperature

Use water as fluid ☒

Dynamic viscosity

Fluid S.G.

▲ Solids Concentration Delivered

Mixture S.G.

Cvd, by volume

Cwd, by weight

▲ Solids Properties

Solids S.G.

Particle shape

Miller number (G75)

Abrasivity

▲ Particle Size Distribution

Show particle size distribution plot

Fines (<74 µm)

Extrapolate fines ☒

D50

Ratio

D85

Extrapolate tosize ☒

Topsite

Hydraulic Configurations

Description	Speed (RPM)	Efficiency (%)	BEPQ (%)	NPSHR (ft)	Sphere... (in)	Power (HP)	Basis curve
8 x10 32 C H 8- 1/ 4/ 3ME	571	78	116	17.0	4.6	203.0	B 29 -07
8 x10 32 C H 8- 1/ 4/ 3ME	581	77	116	17.3	4.6	206.1	B 24A-04
8 x10 32 C 8- 1/ 4/ 4ME	549	75	114	20.8	3.5	209.5	B 20C-93
8 x10 32 C H 8- 1/ 4/ 4ME	549	79	112	13.9	3.9	199.4	B 29B-05
8 x9 28 C H 7- 3/ 8/ 5ME	644	74	111	15.4	2.9	212.8	B 8 -14
8 x10 32 C H 8- 1/ 4/ 4ME	549	79	110	13.8	3.9	199.4	B 30A-07
10x12 32 A H10- 1/ 4/ 4ME	535	75	101	9.4	4.2	209.4	B 19C-07
10x12 26 C H 8- / / 3ME	694	79	100	9.9	5.0	199.4	B312B-93
10x12 26 C H 8- / / 3ME	694	81	100	9.9	5.0	195.8	B311B-93
8 x10 25 C H 8- 1/ 4/ 4ME	732	77	96	17.3	3.4	205.4	B 12A-05
8 x10 32 C H 8- 1/ 4/ 5ME	540	76	94	13.8	3.2	206.3	B 2A-10
8 x10 32 C H 8- 1/ 4/ 5ME	549	78	94	13.9	3.2	202.9	B 33B-05
10x12 36 C H10- 1/ 4/ 4ME	466	75	76	6.4	4.0	209.1	B 29C-93
10x12 32 C H10- 1/ 4/ 4ME	529	76	75	9.0	4.2	207.3	B 30C-05
10x12 36 A H10- 1/ 4/ 5ME	461	71	74	10.2	3.5	222.5	B 1 -05

Pump Assemblies

Tag	Type	Shaft...	Pressu... (psi)	Assembly Number	Shaft	Plug si...	Casing	Impeller	Stuffing Box	Bearing Assembly
SC	LSA	5 7/16	485	9593D-00	4267C	2C4.5	5776D	5397C-00	5442D	5816C

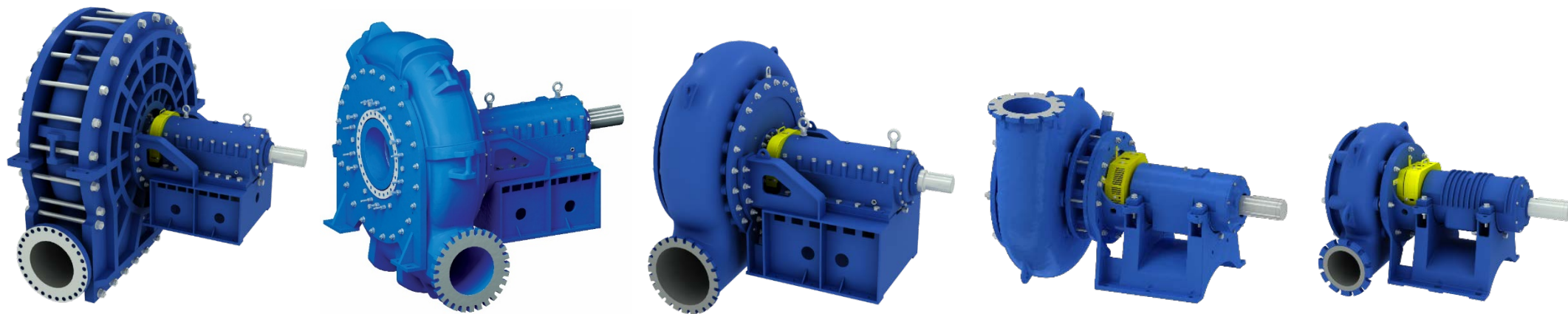
Slysel

- 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.

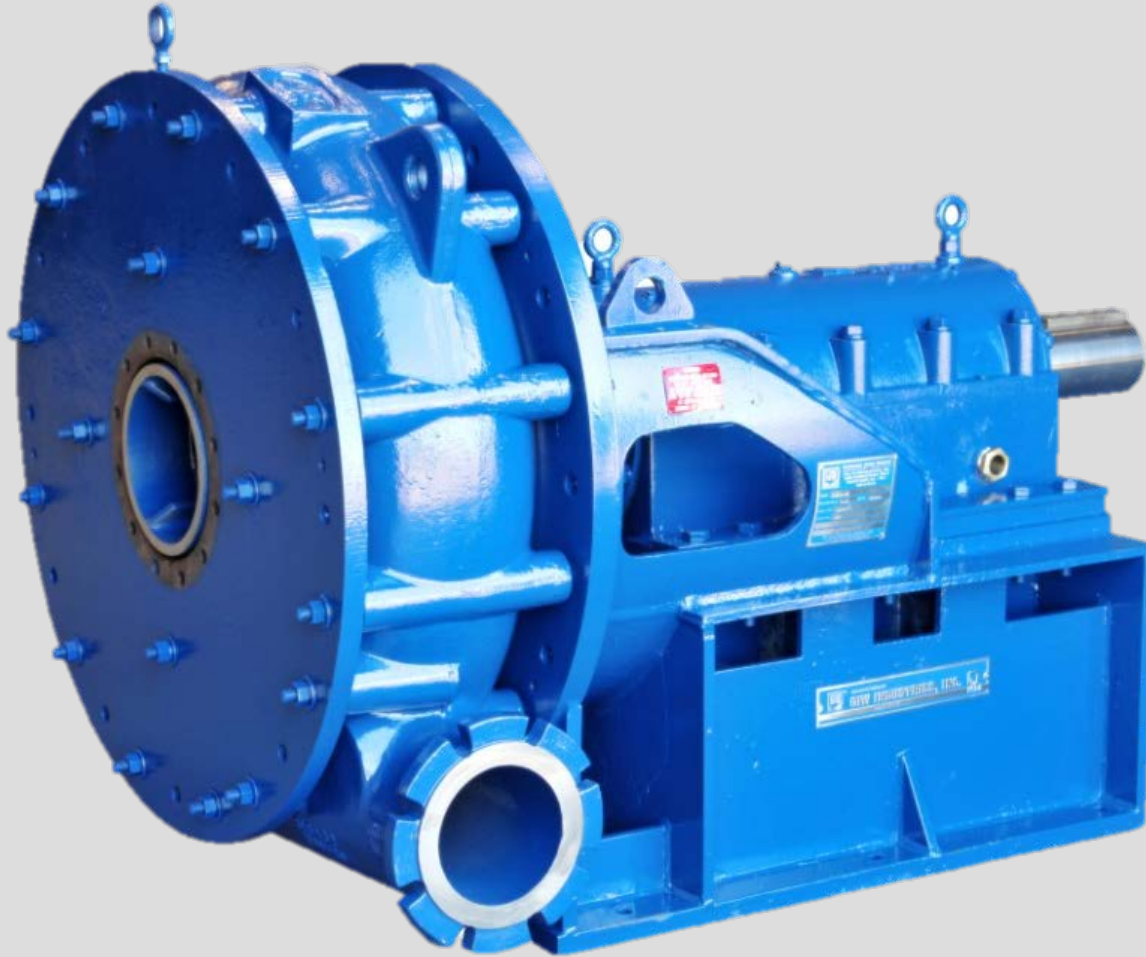
Slurry Pumps





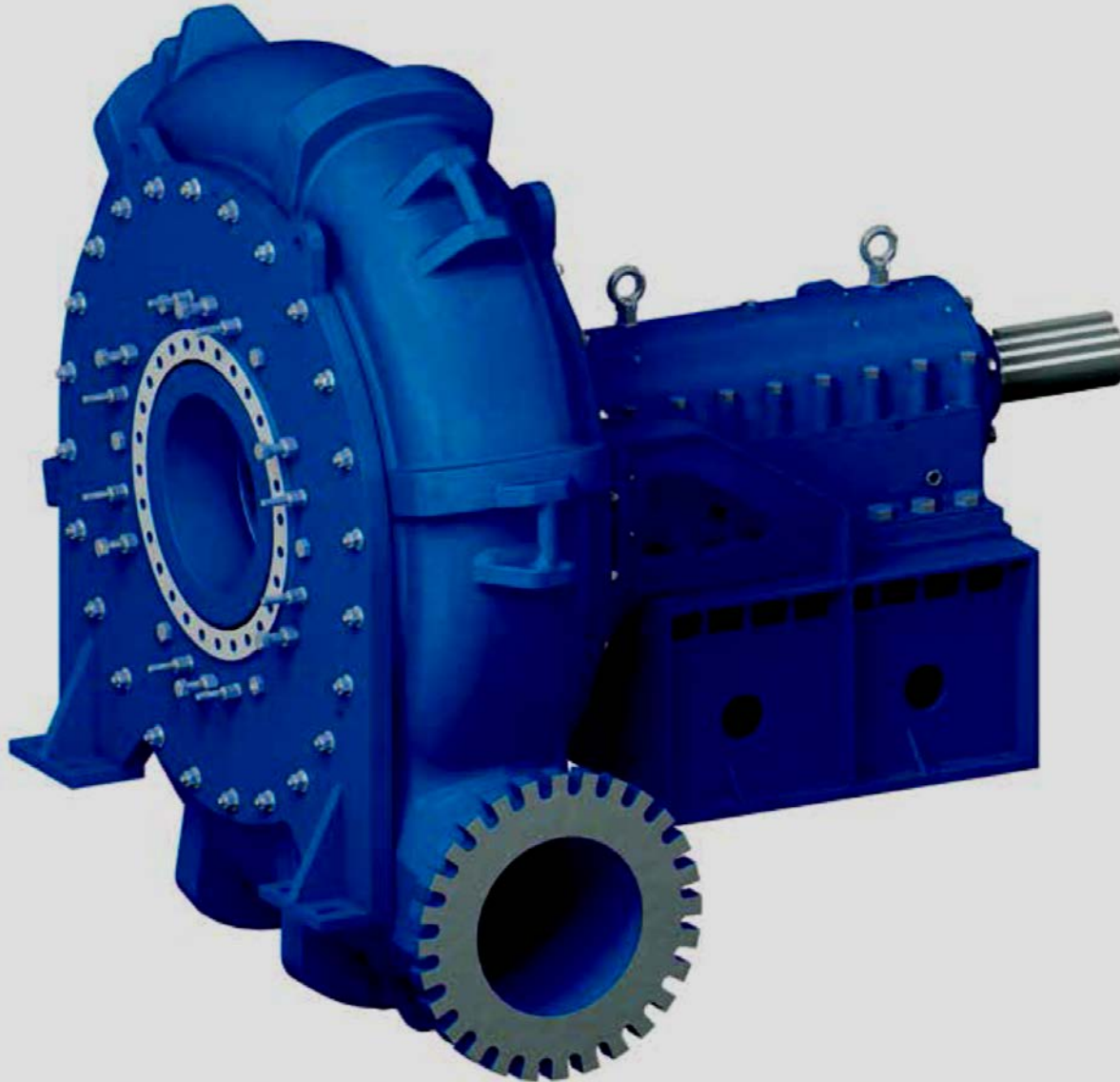
LCC Pumps

- High efficiency and excellent wear characteristics over a broad operating range up to 15,000 gallons per minute (3405 m³/hr).
- Rubber and metal wet end options allow best material choice for any application



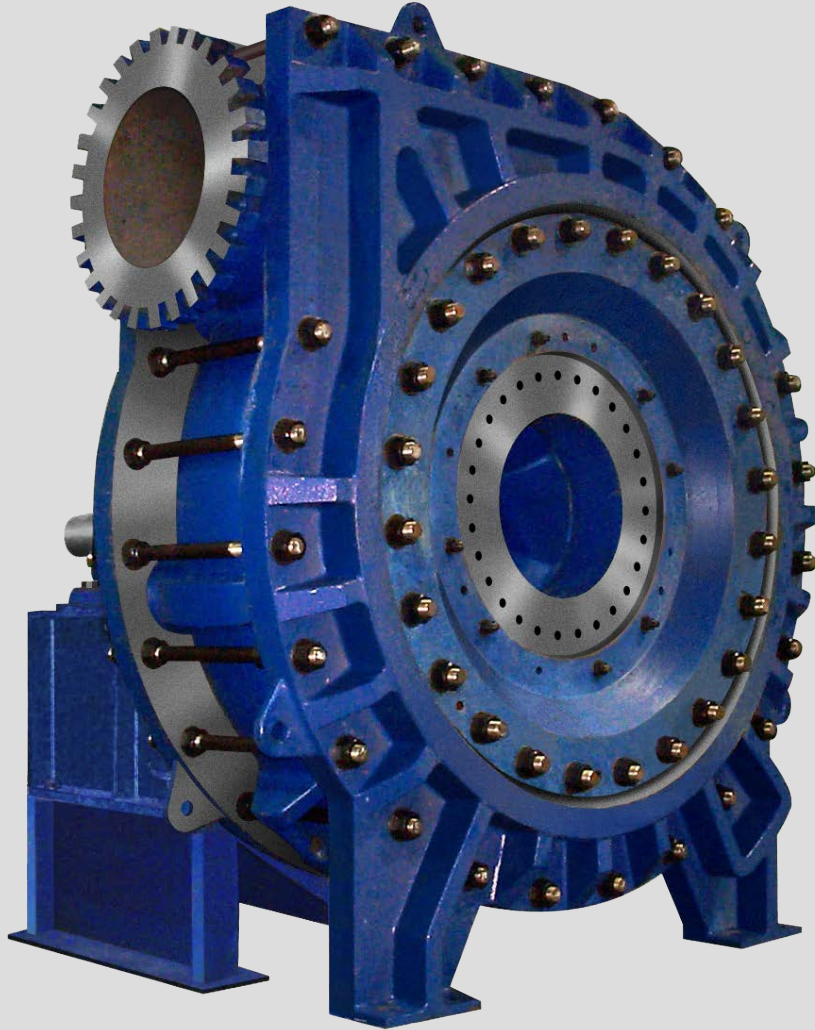
LSA Pumps

- 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

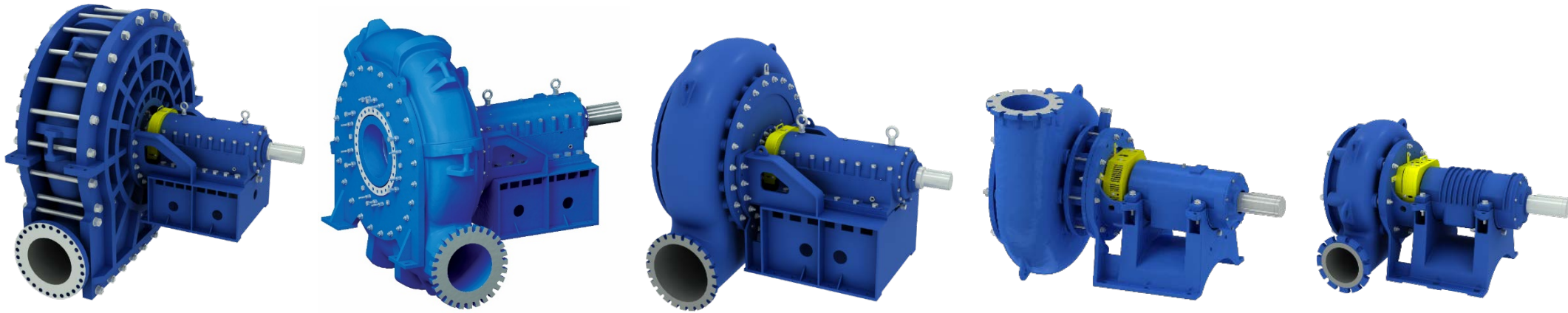
- Severe duty conditions in high head/high pressure applications.
- Special tie bolt construction
- Operating flows from 5,000 - 80,000 gallons per minute (1.135 - 18.200 m³/hr).



HVF Pumps

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

Slurry Pumps



- Additional pump features can be found at GIWIndustries.com



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.



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!

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