

Slurry pump solutions for the oil and gas industry

Weir Minerals Hazleton

Excellent
Minerals
Solutions

WEIR
MINERALS



22216 Prats Dairy Road
Abita Springs, LA 70420

P: 985.871.5173



Weir Minerals is committed to delivering long term solutions to the petroleum industries' most difficult pumping needs.

When the petroleum industry expose their pumping systems to erosive materials, such as coke, catalyst, sand, ash, coal or shale the pumps selected need to be durable, reliable, and of the highest quality. Since 1916, Weir Minerals has supplied long term slurry pumping solutions focused on longevity and reliability to meet the demands of challenging applications for the petroleum industry.

The petroleum industry demands performance and pump reliability. Weir Minerals specializes in slurry systems and has been able to exceed the robust demands of the petroleum industry. Our Engineered-To-Order slurry pumps are designed with longevity in mind to deliver reduced process down time and maintenance costs by extending mean times between planned maintenance intervals.

To meet the customer's requirements Hazleton slurry pumps are engineered to order for each application and incorporate design features and standards that not only ensure durability and reliability, but also differentiate us from the competition. Some of which include:

- Hydraulic design incorporates unique "Controlled Diffusion" process to minimize erosive vortices and reduce volute velocities for longer wear life
- Utilization of materials and specialty coatings to achieve maximum wear life
- Wear life requirements can be designed into the pump at the forefront of the design process
- Thick cast cross-sections include built in wear allowances three times those of typical process pumps
- Back pullout and front pullout design allows in-place inspection & maintenance
- "True Slurry Pump" design utilizes front & rear impeller pumpout vanes to eliminate the need for radial wear rings
- Field adjustable impeller clearances allows for quick setting without the need to remove the pump from service
- Improved efficiencies versus the competition is typically 3-5% higher
- Pumps are designed to achieve the lowest vibration during operation
- Conformance to API 610 10th Editions, when required
- Large diameter shafts and bearings for superior reliability
- Design to customer specifications
- Quick design / delivery

Weir Minerals has a team of committed hydraulic, metallurgical and application engineers to work with our customers from system design, installation and commissioning. We not only pride ourselves not only on our Hazleton pump life cycle but also our ability to deliver the finished product within our customer's delivery expectations. Weir Minerals has been able to rapidly develop, design, engineer, and ship completely new engineered to order pump designs in order to meet our customer's accelerated project schedules.

Hazleton's specialty slurry pumps are quickly becoming the pump of choice in a growing number of refinery systems. This is due in part to our commitment to fulfilling the customer's requirements and taking a flexible approach to the development, design, and rapid delivery of engineered to order slurry pump solutions.

Typical Services

Horizontal pumps

- Fractionator bottoms and transfer pumps
- Desalter sludge pumps
- FCCU wet gas scrubber circulation pumps
- Quench pre scrubber pumps
- FCCU overflow surge vessel pumps
- Coke slurry pumps
- Sludge / mud injection
- Filter backwash slurry
- Decant oil pumps
- Quench oil recirculation pumps
- Waste oil sludge pumps
- Delayed coker – fines removal pump
- Sludge recirculation pumps
- Thickener underflow
- Filtrate service

Vertical / Submersible

- Delayed coker dewatering sumps
- Slop oil pits
- FCCU area process sumps
- Produced water pumps
- Solvent and bitumen sumps
- Dump pond sumps
- Oil / sand slurry sumps
- Barge supply pumps
- Conveyor washdown sumps
- Rail car, truck, and barge loading sumps
- Dilute fine tails ponds
- Storm water / oil separation sumps
- Platform drilling / production collection sumps
- Grit sumps



From left: Hazleton slurry pumps are used in a variety of oil and gas applications

End Users

- Shell Oil
- BP Arco
- Amoco Oil Co.
- Fina Oil
- Pemex
- Chevron/Texaco
- Koch Oil
- Occidental Petroleum
- Petro-Canada Refinery, Edmonton
- CNRL Horizon Oil Sands
- Suncor
- Syncrude
- Exxon Mobil
- Conoco Phillips
- CITGO
- Valero
- Sunoco
- Albion Sands
- Aera Energy



Left: High pressure slurry pump up to eight stages

Below: FCCU Wet Gas Scrubber slurry pumps

Below right: Coke fines vertical slurry pumps



Proven design horizontal, vertical and submersible slurry pumps

In critical applications where the cost of ownership often out weighs capital cost as a priority, we help our customers address issues such as longevity and capacity, efficiency of operation and ease of maintenance.

Horizontal Slurry Pumps

- Specialized Heavy Duty designs
- Wide range of material options for maximum wear life
- Replaceable wear plates
- “True Slurry” design without radial wear rings
- Optional centerline support for high temperatures (up to 800°F/427°C)
- High Pump efficiencies up to 87-90%
- Optional recessed impeller designs for large solids up to 8” (2000mm) diameter
- Hazleton units are used as the primary recirculation pumps in FCCU Wet Gas Scrubbers. They are designed to handle the highly erosive, catalyst laden liquor that cleans the airstream of SOx and/ or NOx.
 - API seal piping plans
 - Various bearing lubrication options
 - Abrasive and temperature resistant material coatings

Multistage Slurry Pumps

- Designed for 1800 rpm speeds to handle dirty liquids
- Up to 14” (350mm) discharge and heads to 2,000 ft (620m)
- Abrasion / corrosion resistant materials
- Up to 8 stages



Left: High temperature overhung slurry pump

Vertical Slurry Pumps

Various vertical slurry designs to suit a variety of applications and sump depths

- Cantilever shaft design up to 9ft (3M)
- Submerged bearing design, for deep sumps
- Optional casing designs with balanced thrust and radial loads:
 - Triple volute
 - Twin volute
 - Single volute
- High volume and high head designs
- High temperature designs
- Great for sumps with solids, chemicals and high temperatures
- Proven design in difficult applications that competitors can not match
- Severe duty design to withstand very high hydraulic forces
- Recessed impeller options available
- Line shaft with intermediate journal bearings
- Tail pipe available for draw down
- Erosive and corrosive design
- Replaceable wear parts
- Wear adjustment located above the baseplate to maximize pump life
- Barge mounted designs available



Above: Heavy duty coke fine vertical pump, triple volute with high pressure sparge pipe system

Submersible Slurry Pumps

The design process for Hazleton submersible pumps has made extensive use of our finite element stress analysis and state of the art solids modeling to ensure rugged and dependable solids handling capability at the lowest possible cost.

Our broad range of submersible pumps combines the ultimate in abrasion resistant metallurgy with a heavy duty motor housing all designed and built by Weir Minerals. Heavy duty pump ends, standard high chrome iron construction coupled with heavy section thickness, provides the ultimate wear life in heavy slurries

- Explosion proof rated pump models available
- Easy maintenance access with T-Bolt construction
- Mechanical seals, incorporates Weir Minerals proven balanced double seal arrangement in which rotating faces are enclosed in the oil reservoir
- Temperature and moisture sensors are fitted to ensure the motor is protected
- High thrust load bearings and shaft to handle high specific gravity slurries
- Barge mounted designs available
- High heads to 650ft (198m)
- High flow rates to 15,000gpm (3,400 m³/hr)
- Chemical slurry design options for corrosive applications
- Sparge ring designs for applications that require improved sump removal of larger solids by spraying high pressure liquid back to the sump
- Various discharge fittings, bracketing, and installation configurations are available
- Submersible pumps engineered to order to suit site and application requirements



Left: 800hp engineered to order heavy duty submersible pump, twin volute



Right: Heavy duty SHW submersible pump, single volute

Through continuous improvements to materials, product design, engineering and manufacturing, we minimize downtime and reduce the risk of disruption to our oil and gas customers' operations.

Engineering capabilities

Weir Minerals products utilize in-house staff of licensed professional engineers to ensure maximum control over design specifications. Engineering capabilities include but are not limited to:

- 3D CAD modeling
- In-house hydraulic design
- Products engineered to customer specifications
- Custom slurry pump solutions
- Special material selection
- Flow analysis
- Intake design review
- Stress, torsional and seismic analysis
- Natural frequency analysis and construction for VFD operation
- Finite Element Analysis (FEA)

In-house manufacturing capabilities

Fabrication - Our fabrication facilities are staffed by ASME Boiler Code Section IX certified welders.

Machining - Computer controlled lathes, large boring mills, and individual production equipment ensure an efficient and flexible manufacturing process.

Balancing - Dynamic and static balancing of rotating elements ensure low vibration performance

Final Assembly - All pump components are assembled to customer specifications for top efficiency, long service life, and high quality appearance.

Quality assurance

- Occupational Safety and Health Administration VPP "Star" Site
- Environmental Management System - ISO 14001: 2004
- Occupational Health and Safety Management System - OHSAS 18001: 2007



Above: Slurry pump mounted on API base plate



Left and below: Witness testing a 20-30 CTC slurry pump



Left: Pump components manufactured and machined locally in Hazleton, PA, USA

Above: API oil lubrication skid

Above right: Vertical slurry pumps CD4MCu and high chrome construction

Performance testing

A major engineering function of any pump manufacturer is hydraulic flow testing under a variety of operational conditions. Testing ensures that pump performance matches specifications and that all components are operating properly.

Testing and analysis capabilities include:

- Two testing pits for flows to 40,000 gpm (9,085 m3/hr)
- Hydrostatic testing equipment for pressures to 2,000 psi (136 Bars)
- NPSH testing equipment available for flows to 30,000 GPM (6,814 M3/HR)
- Pressures to 1,000 psi (68 Bars)
- Electrical power through 2,500 HP (1864 KW). All pressure flow measuring equipment calibrated on a scheduled basis with traceability to National Bureau of Standards

- Vibration monitors available including full spectrum real time analysis. Proximity probes available for measuring dynamic shaft run-out
- Capable of testing a complete engine driven pump
- Variable frequency driven pump testing up to 2,000 hp with VFD. Higher HP testing available upon request
- Non-Destructive testing, NDT includes dye penetrant, magnetic particle, radiography and ultrasonic
- Both 50 Hz and 60 Hz power available

Geographical footprint

Weir Minerals has the geographical presence to service all the major minerals markets around the world. This global supply capability provides a competitive advantage in this relatively fragmented market.

Weir Minerals has operations across:

- North America
- South America
- Africa
- Russia
- Europe
- Australia
- Asia

Customer profile

Our customers range from the world's largest minerals and mining multinationals to single pumpset operators.

We support customer operations worldwide with consistent products and local engineering expertise. As part of the Weir Group, we have the reach and resource to build close, long term relationships with all our customers, helping them to achieve ...

The Lowest Cost of Ownership

Service and support

This global capability with our own dedicated service teams combined with the service centres of our sister companies within the Weir Group and those of our strategic partners provide support in virtually every developed market.

WARMAN® Centrifugal Slurry Pumps
GEHO® PD Slurry Pumps
VULCO® Wear Resistant Linings
CAVEX® Hydrocyclones
FLOWAY® PUMPS Vertical Turbine Pumps
ISOGATE® Slurry Valves
MULTIFLO® Mine Dewatering Pumps
HAZLETON® Specialty Slurry Pumps
LEWIS PUMPS™ Vertical Chemical Pumps
BEGEMANN PUMPS™ Centrifugal Process Pumps

For further information on any of these products, service or support services contact your nearest sales office or visit:

www.weirminerals.com



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Weir Minerals Hazleton

225 N Cedar Street
PO Box 488
Hazleton, PA 18201

Tel.: +01 570 455 7711
Fax.: +01 570 459 2852
hazletonsales@weirminerals.com
www.weirminerals.com

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