

FLOWAY® PUMPS

Vertical Turbine Pumps

Mining and mineral processing

Excellent
Minerals
Solutions

WEHR
MINERALS



Meeting customer specifications is simply the first step in delivering whole life cycle performance. From design and installation, through service, maintenance and upgrade, we ensure continuity of excellence.

The specific application of our products allows Weir Minerals Floway Pumps to become industry leaders in enhancing process efficiency. We are committed to providing a **strong technological and engineering resource** dedicated to minimizing downtime and preventing disruption to the customer's operation.

Product durability reduces downtime and keeps the routine replacement of parts to a minimum. Product capacity maximises flow, accelerating processes. After ensuring the design for process is right and

The heart of **your operation**

When designing and manufacturing the Floway® vertical turbine pump we keep in mind that the pump is the heart of the mining operation and the entire project depends on it. This is why the Floway® pump product line is designed to be the most versatile, reliable and long lasting on the market.

Unlike our competitors, Floway® Pumps unparalleled pump product is manufactured all under one roof. That means that every step from designing to manufacturing and the finished product is controlled in our state of the art facility in Fresno, California, USA.

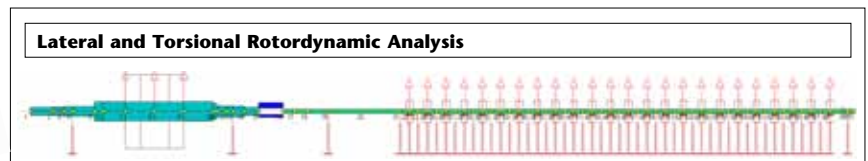
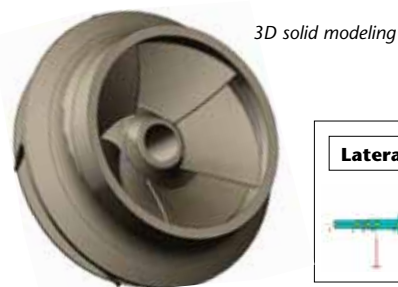
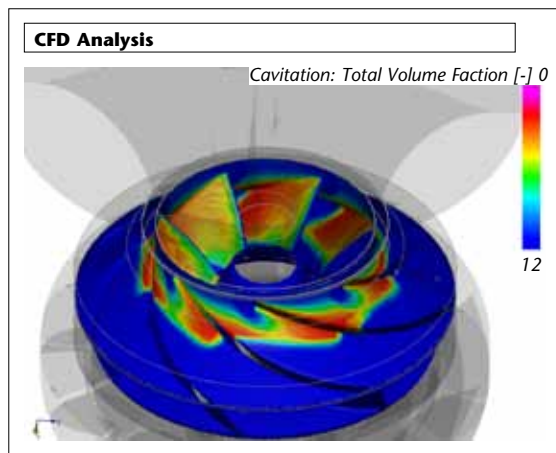
Commitment to extending operating life

Floway® Pumps is dedicated to pumping excellence. That means using our experience in the industry to produce products with long life cycles and unparalleled performance.

Excellent engineering solutions

Floway® Pumps utilizes an in-house staff of licensed professional engineers to ensure maximum control over design specifications. Engineering capabilities include:

- 3D solid modeling
- In-house hydraulic design
- Products engineered to customer specifications
- Special material selection
- Computational Fluid Dynamics (CFD) analysis
- Stress and deflection analysis using Finite Element Analysis (FEA)
- Lateral and torsional rotor dynamic analysis
- Structural natural frequency analysis (using FEA) and design for VFD operation
- Design for low vibration



the manufacturing quality is right, our ability to put someone on site, on request, is a key benefit to our customers.

We can increase that benefit by offering a range of complementary products conducive to our portfolio of branded pumps. By using Weir Minerals valves, mill-liners and cyclones in conjunction with pumps, customers can consolidate maintenance and service programmes, reducing the frequency of interruptions to production.

- Unparalleled vertical pump product
- Commitment to extending operating life and efficiency
- Customer-focused product development
- Worldwide network of support

Typical Services

Water Supply – Typically well pumps that supply the mine with their primary source of water

Process Pumps – Pumps that move solutions throughout the mining processes such as raffinate, pregnant leach solution (PLS), thickener, acid water, cooling water, organic solvent, electrolyte, and dump leach

Tailings Pumps – Post-processed solution is collected in tailings ponds to allow the solid particles to settle out. This liquid is then usually pumped to a treatment facility and recycled back into the process.

RO Treatment Pumps – Reverse osmosis water treatment facilities. Feed pumps, low pressure RO feed pumps, filter backwash pumps, recycle pumps, sea water RO pumps, and spray/flush pumps.

Dewatering Pumps – Sump pump design or deep well turbine design

Seepage Water Pumps - Sump pump design or can/booster design

Reclaim Water Pumps - Sump pump design

Overflow Water Pumps - Sump pump design



1: 2000 HP raffinate pumps



2: Reclaim water pumps



3: Tailing water pumps

Weir Minerals is at the forefront of the industry in developing a truly global supply capability.

This enables us to provide major minerals producers worldwide with consistent products and standards of service.

For customers with operations in diverse regions, the operational advantages of **global supply** are clear. Standardized processes permit the transfer of best practice. Efficiencies realized on one site can be repeated elsewhere. As customers move their people around the world, they will encounter familiar equipment and processes, and be able to call on the same team for technical support.

Global supply, **local support**

- Application expertise
- Installation supervision and support
- Ease of maintenance
- 24 hour availability of support
- Understanding the customers' processes
- Local aftercare and engineering service
- Local solutions backed by global design resource

Closer to the customer

Clearly, local engineering support and the ability to have someone on site are vital for our customers' process efficiency. Weir is synonymous with engineering expertise, and our close customer relationships are based on the fact that we have historically delivered that expertise locally, on site, day or night.

None of this has been discarded in our drive for globalization. On the contrary, we have expanded the offering of local operations, providing access to a global product portfolio and the pooled engineering expertise of the entire Weir Group. In this way, we can support our customers' ambitions worldwide.

Emerging markets

Weir Minerals has operations across North America, South America, Europe, Africa and Australasia. By working closely with our customers, we are able to mirror their movements into emerging markets with our own. Our strategy for global expansion in China, India, and Eastern Europe is already under way.



At the same time, all our customers require **rapid response, on-site support** from someone who understands the local conditions. Weir Minerals' geographical footprint plays a major role in establishing our closeness with customer operations.

Our business model allows us to service **global and local** customers simultaneously, effectively. By centralising shared functions such as materials research, testing, purchasing, marketing and administration, we are able to support regional and local engineering.

"The mining industry is characterized by large scale, complex operations in remote and inaccessible locations. Through our companies around the world we have responded to the challenge by offering tailored solutions to their problems and a basket of Weir products, including vertical turbine, slurry, and clear liquid pumps, and other handling equipment."



"In 1997 the first integrated package was offered to Minera Collahuasi. This developed into the supply of most of the slurry and clear water equipment required, and was extended into a full maintenance service contract, under which Weir engineers remain on site 24 hours a day, 7 days a week. We also supply and maintain all the rubber linings, cyclones and related products. The same concept has been duplicated and repeated in mining operations throughout the world."

"For the customer, the arrangement offers real benefits in terms of reduced downtime, increased plant life and improved throughput. The key elements of this success are a very close relationship with our customers and the 'can-do' attitude of all Weir people."

Ricardo Garib
Weir Vulco SA, Chile



- 1: Installing two vertical turbine pumps in the field
- 2: Vulco service facility in Chile
- 3: Installing vertical turbine pump on a MULTIFLO® barge
- 4: A Weir Minerals on site service facility
- 5: Service and support is available 24 hours a day

Weir Minerals has an advanced product range incorporating market leading brands covering virtually any application, in any environment. Our products account for 19% of market share worldwide.

We own a valuable portfolio of intellectual property, which is continually being extended through research and development in materials and technology to enhance the wear life of our products. As a result, our global leadership in mining pump applications is combined with innovative designs in an expanded product range of mill liners, hydrocyclones and slurry valves.

Meeting the needs of customers worldwide

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.

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 grow into emerging markets alongside our customers. This includes specific plans for expansion in Asia.

Weir Minerals has operations across:

- North America
- South America
- Africa
- Europe & UK
- Australasia
- Former Soviet Union



1: Weir Minerals has the global capabilities to service all customer operations

2: Reclaim water pumps

WARMAN® Centrifugal Slurry Pumps

GEHO® PD Slurry Pumps

LINATEX® Rubber Products

VULCO® Wear Resistant Linings

CAVEX® Hydroclones

FLOWAY® PUMPS Vertical Turbine Pumps

ISOGATE® Slurry Valves

MULTIFLO® Mine Dewatering Pumps

HAZLETON® Specialty Slurry Pumps

LEWIS® PUMPS Vertical Chemical Pumps

WEIR MINERALS SERVICES™

Customer Profile

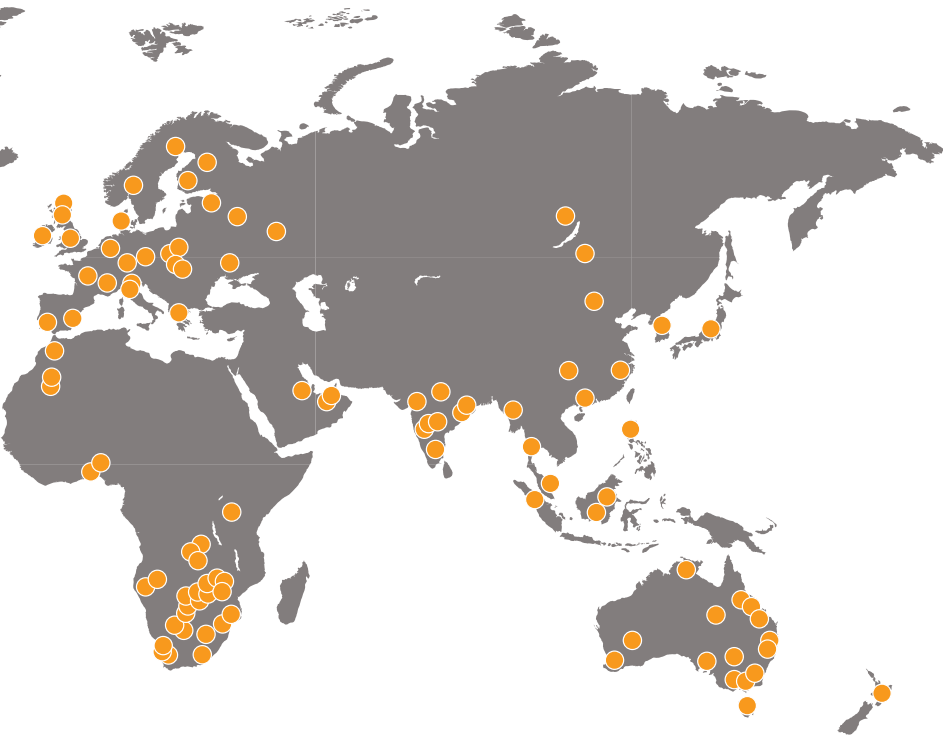
Our customers range from the world's largest minerals and mining multinationals to single site coal producers.

Weir Minerals capability supports an array of customer specifications with products easily adaptable to meet specific process requirements.

We build close, long term partnerships through which we are able to help customers achieve process efficiencies.

Our customers include:

- Alcoa
- Barrick
- BHP-Billiton
- Newmont
- Rio Tinto Alcan
- CVRD
- Grupo Mexico
- WMC
- Freeport McMoran
- Anglo American
- Xstrata
- IAMGOLD
- Codelco
- SQM Salar
- Teck Comico
- Gold Fields
- Dofasco
- Iron Ore
- Consolidated Thompson
- Kennecott Copper



Reclaim water pumps

Floway® Pumps is dedicated to manufacturing pumps with industry leading low vibration levels.

Optional features:

- Premium machined and balanced motor
- Specially toleranced motor coupling machined by Floway® Pumps
- Jacking posts for precise motor/pump shaft alignment
- Impellers balanced per API 610
- Reduced run-out on motor base

Minimum downtime, minimum disruption to process

1: Machining
discharge head



2: Super duplex impellers



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

Wear/corrosion resistant materials

To increase pump longevity and enhance efficiency, Floway® pumps are constructed with wear/corrosion resistant materials such as duplex and super duplex stainless steels.

Materials:

- Austenitic-304L (J92500)
- 316L (J92800)
- Super Austenitic-904L (N08925)
- AL6XN (J94651)
- 317LM (J93000)
- Duplex SS-2205 (J92205)
- 255 (S32550)
- CD4MCu (J93370)
- Super Duplex SS-2507 (J93380)
- Alloy 20 (J08020)
- Super Austenitic 254SM0 (J31254)
- Compatible wrought alloys are available for above cast materials

Manufactured to meet global certifications and standards:

Electrical standards

- NEMA
- IEEE
- IEC

Construction standards

- ANSI B16.5 Class 150 through 1500 flange ratings
- Welding to ASME section IX on all listed materials
- ASTM standards met for all materials supplied - castings, forgings, and wrought materials
- Stress relief carbon steel to ASME Section VIII
- DIN
- BS
- Hydraulic Institute
- CE Marking
- API 610

Quality assurance

Quality control never ends at Floway® Pumps. It begins with the quotation phase and continues throughout the order process, manufacturing phase, warranty period, customer follow-up and service. This dedication to quality has given us the reputation for having one of the finest products in the vertical turbine pump industry. Certifications include:

- ISO 9001:2008 Quality Management Systems
- ISO 14001:2004 Environmental Management Systems
- OHSAS: 18001:2007 Occupational Health and Safety Management Systems

Welding and fabrication

Weir Minerals Floway Pumps utilizes in-house fabrication staffed with welders certified to ASME Code Section IX on all listed materials.

Performance testing

A major engineering function of any pump manufacturer is hydraulic performance 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:

- Three testing pits for flows to 45,000 GPM (10,220 m³/hr)
- Hydrostatic testing equipment for pressures to 5,000 PSI (345 Bars)
- NPSH testing equipment available for flows to 30,000 GPM (6,814 m³/hr)
- Pressures to 2,500 PSI (172 Bars)
- Electrical power through 3,000 HP (2,235 KW)
- All measuring equipment calibrated on a scheduled basis with traceability to National Institute of Standards and Technology (NIST)
- Vibration testing available including spectrum analysis (FFT) with multiple simultaneous channels. Proximity probes available for measuring dynamic shaft vibration
- Impact testing available to determine the structural natural frequencies (Reed Critical Frequency) of the pump/motor structure
- Capable of testing a complete engine driven pump
- Both 50 Hz and 60 Hz power available
- Pump testing using a Variable Frequency Drive (VFD) available upon request
- Coating spark test (low voltage/high voltage)
- Pump thrust testing
- Noise testing

Non-Destructive Testing (NDT)

- Dye Penetrant (LP)
- Magnetic Partical Inspection (MP)
- Radiography Exam (RT)
- Ultrasonic Testing (UT)
- Positive Material Identification (PMI)
- Hardness Testing (Rockwell and Brinell)
- CMTR upon request
- AWS Certified Welding Inspection (CWI)



1: Test lab

2: Fabrication of stainless steel discharge head

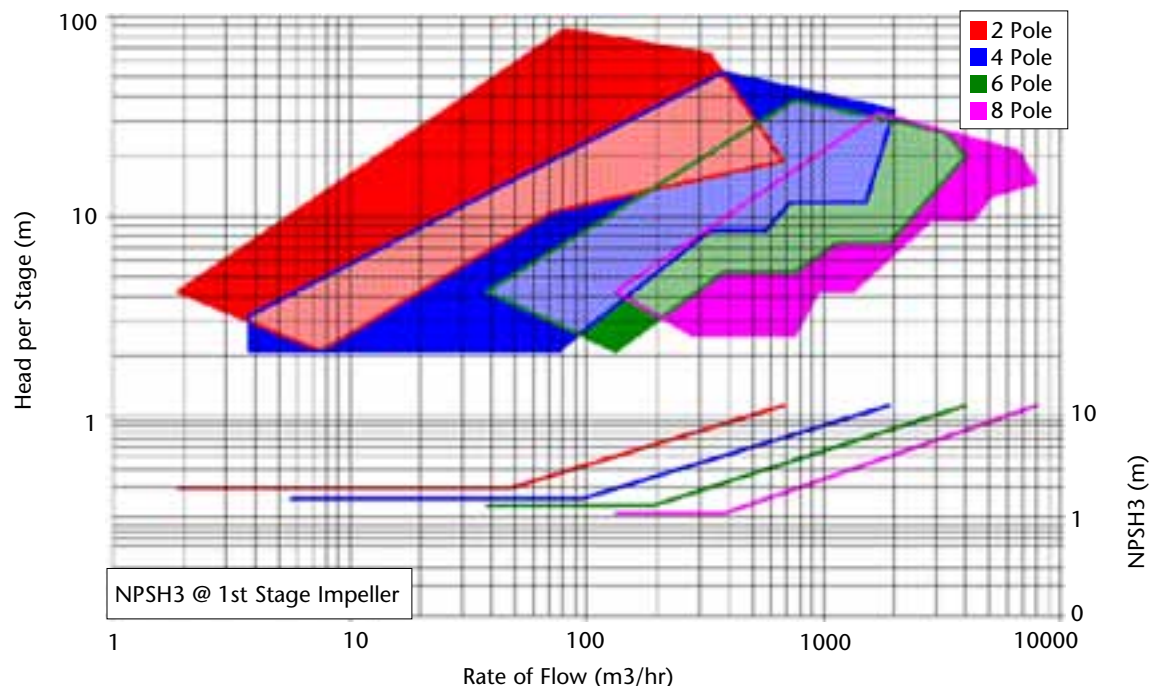
3: The manufacturing facility is ISO 9001 and 14001 certified

The Floway® Vertical Mining Pump - VMP Series

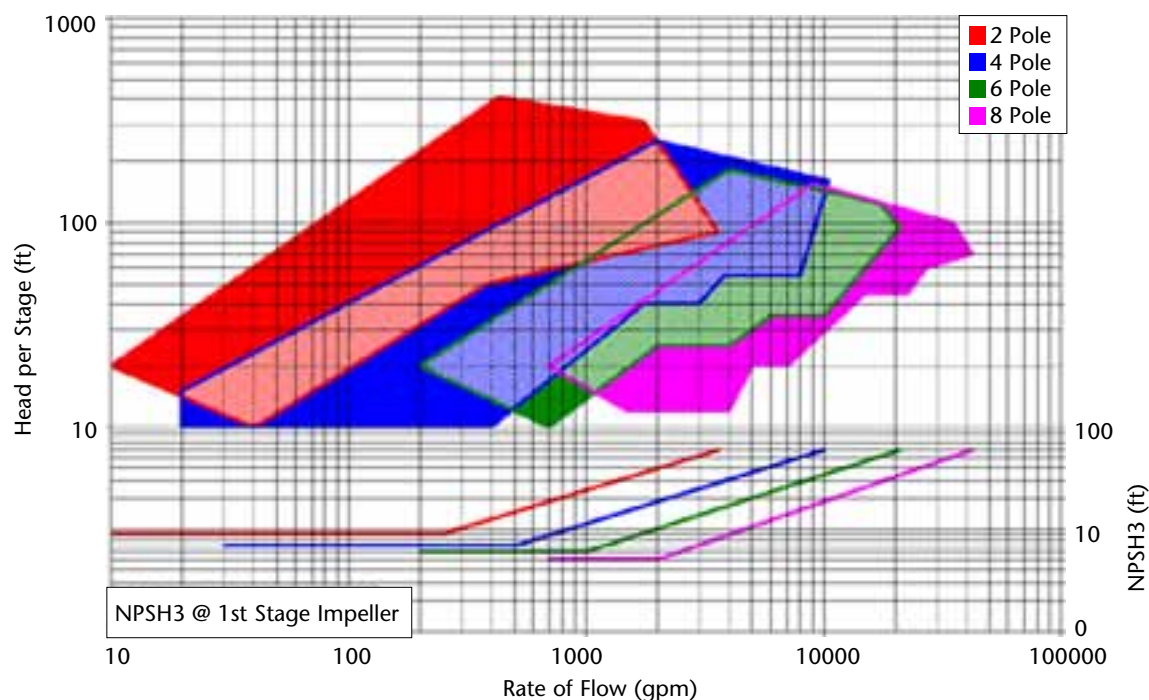
VMP Wet Pit and Barrel Can design features

- Pump configuration - vertically suspended close coupled single or multi- staged turbine within a closed suction system.
- Capacity - to 35,000 USGPM (8,000 M3/HR)
- Pressure - Wet Pit to 1,500 PSI (100 bars) and Barrel Can to 3,000 PSI (200 Bars)
- Liquid Handled - Water, Raffinate, PLS, Thickener, Tailings, Brine, & Other Various Mining Applications
- Temperature range - to 175 Deg F (80 Deg C)
- HP range - to 2,500 HP (1,850 KW)
- Drivers - Engine and gear drive, electric motor with or without thrust pot, used with or without a VFD

Floway® Coverage Chart 50Hz



Floway® Coverage Chart 60Hz



Performance data shown is approximate. For actual pump performance contact your local Floway representative or visit Floway's online pump selector website at www.weirminerals.com.

The Floway® vertical turbine pump is specially designed to reduce vibration levels and improve corrosive and abrasive resistance.

VMP - Wet Pit (VS1)



VMP - Barrel/Can (VS6)



Flexible coupling spacer for ease of thrust bearing and mechanical seal removal

Coupling guards

Thrust Bearing - Tandem DB angular contact for continuous up and down extends mechanical seal life
Constant level oil and guard

Discharge head

Sleeve mounted mechanical seal

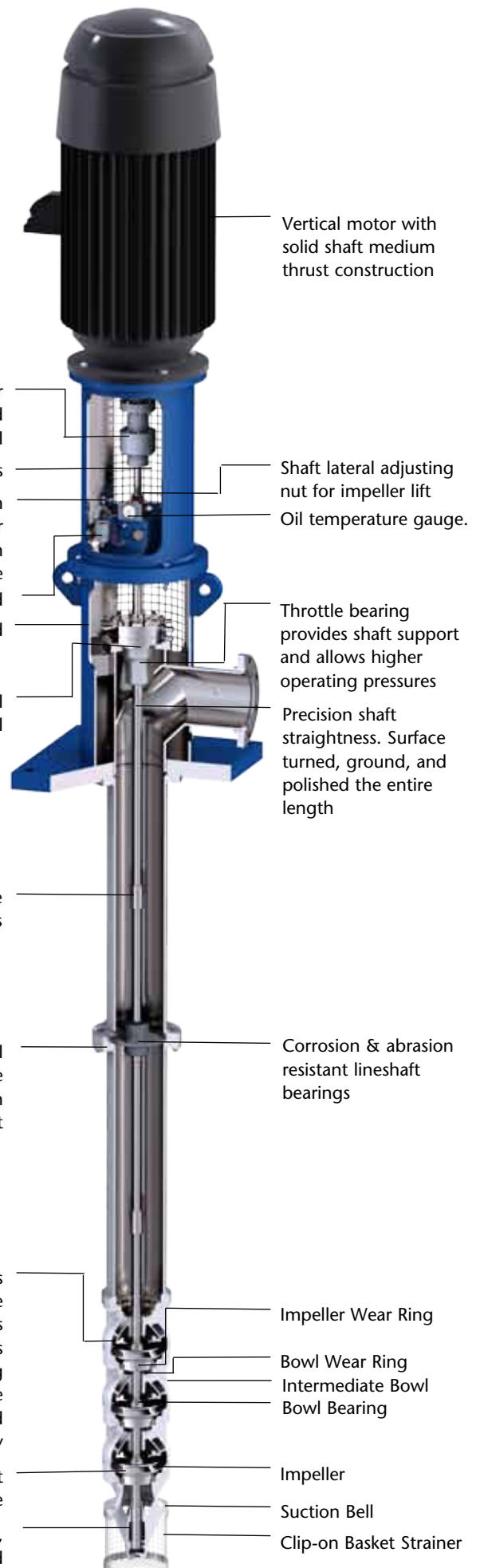
Threaded or keyed type lineshaft couplings

Flange face, metal-to-metal contact with close tolerance register for precision alignment

Radial hydraulic forces equalized by multi-vane bowl diffuser, reduces rotor loading and provides exceptional sleeve bearing life. Low energy per stage bowl assembly allows broad range of hydraulic stability

Optional Low NPSHR 1st stage impeller available

Maintenance free, permanently grease packed suction bearing



Vertical motor with solid shaft medium thrust construction

Shaft lateral adjusting nut for impeller lift
Oil temperature gauge.

Throttle bearing provides shaft support and allows higher operating pressures

Precision shaft straightness. Surface turned, ground, and polished the entire length

Corrosion & abrasion resistant lineshaft bearings

Impeller Wear Ring

Bowl Wear Ring
Intermediate Bowl
Bowl Bearing

Impeller

Suction Bell

Clip-on Basket Strainer

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
- Latin America
- Africa
- Former Soviet Union
- 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
LINATEX® Rubber Products
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
WEIR MINERALS SERVICES™



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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