

TECHNOSTEEL

making mining easier.

Baker Hughes 
Official channel partners

TECHNOSTEEL

making mining easier.

We know that the life cycle of industrial pumps are often at the center of your decision making process. That is why Baker Hughes is your partner for the long run. We carefully consider the life cycle operating efficiencies, power consumption, environmental impact and reliability of our pumps to ensure they will meet your needs now and in the future.

Baker Hughes 
Official channel partners

Improved surface pumping solutions

The drive for long-lasting, highly-reliable, environmentally friendly pumping solutions has led many customers to appreciate our HPump™ Horizontal Pump Systems.

The HPump™ pump systems provide versatile, low-maintenance alternatives to many high-speed integral gear-driven centrifugal (OH6), positive displacement (PD) and vertical-turbine pump (VTP) pump models.

Pre-packaged units

Our HPump™ pumps are available in gas, electric or diesel powered models and can handle up to 2,500 gpm (85,000 BFPD) and discharge pressures up to 6000 psi.

HPump™ systems are delivered to the job site pre assembled—only requiring suction flange, discharge flange and power hookups.

The HPump™ frame is prewired with instrumentation and cabling terminated in a central junction box. This frame paired with the versatile design of our pumps, allows for easy on-site installation and maintenance with minimal preparation.

Trouble-free service

The HPump™ pump is designed for years of trouble-free operation. There are no V-belts or packing to service. Routine maintenance consists of a quarterly lubricant change and component check. HPump™ units generate little no vibration-related wear or stress on piping components and they are available with a variety of mechanical seal options (Including API 682 seals).

The modular design makes HPump™ units suitable for a wide variety of applications, from routine water injection to mine dewatering and leaching operations. The Baker Hughes HPump™ pump is very reliable, highly efficient and easily modified in the field, saving you maintenance time.

Pump

The drive for long-lasting, highly reliable, environmentally friendly pumping solutions has led many customers to appreciate our HPump™ Surface Pumping Systems. Our HPump™ pump systems provide versatile, low maintenance alternatives to many API-style and positive displacement (PD) models.

Mechanical Seal

All units feature an optimized mechanical seal and stub shaft with silicon carbide faces that operates at suction pressure. Seals are available up to 3000 PSI. Options include API-682 cartridge type, as well as API flush and quench plans. The patented Front Pull-Out™ design allows for rapid change-out of the seal and/or stub shaft without disturbing the bearing frame and flexible motor coupling, thus avoiding realignment or the spacer coupling requirement.

Dual Access™ Thrust Chamber

The bearing-frame thrust chamber is an easily interchangeable module that is compatible with other HPump units regardless of the pump size. It features a low number of rotating parts for long, trouble free life, requires minimal maintenance, optimizes oil dispersion and reduces operating temperatures using an oil-ring lubrication system, and includes a thermocouple to provide temperature monitoring and shutdown protection. Labyrinth shaft seals protect the internals from the environment without wearing the shaft surface.

Flexible Coupling

A standard spacer-style coupling provides for long life and minimizes maintenance requirements. Other coupling types are available on request.

Motor/Prime Mover

An industry standard 2-pole NEMA and IEC foot-mounted electric motor is used in configurations to suit local requirements for enclosure type, voltage, frequency, insulation class, hazardous area, etc. Other drive options include gas or diesel engine via a speed increaser.

Benefits

- Lower initial and whole life cost
- Short construction lead times
- Increased reliability and runtime
- Low noise and vibration levels
- Easy installation
- Remote monitoring and diagnostic capability
- Worldwide support

Applications

- Borehole mining
- CO2 injection/booster
- CO2 sequestration
- Condensate transfer
- Crude oil boosting/transfer
- Dust suppression
- Geothermal
- Hydraulic power fluid boosting
- Jet pumping
- Lean amine circulation
- Mine dewatering
- NGL boosting/transfer
- Offshore facilities fluid handling
- Pipeline boosting
- Process fluids transfer
- Produced water disposal/injection
- Water recycle/reuse
- Salt dome leaching
- Seawater disposal/waterflooding

Pipe-work Height

The fixed pipe-work height minimizes pipe-work changes in the event of possible system reconfigurations. Should the pump or motor require changing for any reason; the pump, bearing frame, suction, discharge and motor shaft are maintained at the same level.

Discharge Head

Standard flanges are ANSI-B16.5 class 300 through 2,500, lap joint type to allow for alignment with pipe work. Other connections/flange standards are available.

Frame Extension

The frame can easily accommodate changing duty conditions or the re-deployment of an existing HPump™ unit for an entirely different application. Additionally, where limited site access (i.e., underground mines) exists, multiple component skids can be provided to facilitate portability and assembly.

EMF™ Frame

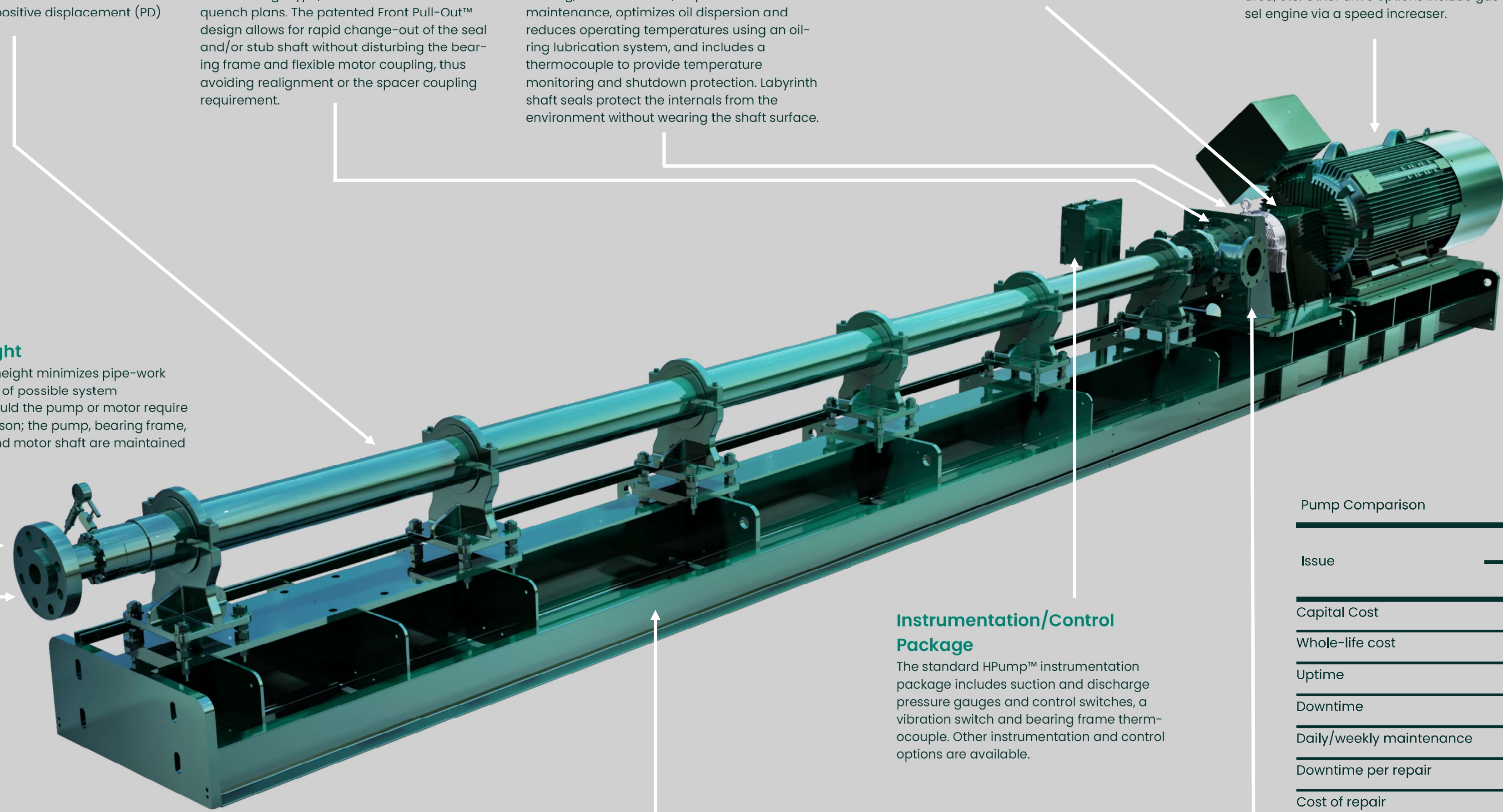
The frame features a rigid base for low vibration. Installation is simplified through the use of integral lifting lugs. The motor plate is predrilled and will support virtually all available motor options. Various other mounting features allow easy implementation of API seal flush plans, various electrical equipment, or other customer requests.

Instrumentation/Control Package

The standard HPump™ instrumentation package includes suction and discharge pressure gauges and control switches, a vibration switch and bearing frame thermocouple. Other instrumentation and control options are available.

Suction Chamber

This chamber can be rotated in 45° increments. Standard flanges are ANSI-B16.5 class 150 through 2500. Other connections/flange standards are available.



Pump Comparison

Issue	Pump Type		
	HPump™	PD	BB3/4
Capital Cost	Low	Low	Moderate
Whole-life cost	Low	High	High
Uptime	High %	Low %	Moderate %
Downtime	Low %	High %	High %
Daily/weekly maintenance	No	Yes	No
Downtime per repair	Low	Moderate	Moderate
Cost of repair	Low	Moderate	High
Noise Level	Low	High	High
Vibration	Low	High	Low
Pulsation	Nil	High	Nil
Seal(qty)	Mechanical(1)	Packing(3 or 5)	Mechanical(1)
Environmental Leakage	Virtually Nil	High	Virtually Nil
Flow/pressure flexibility	High	Moderate	Low

PD= positive displacement reciprocating pump
BB3/4= 3 or 4 stage API-style between bearing pump

High Flow Low NPSHr HPump™

Overview

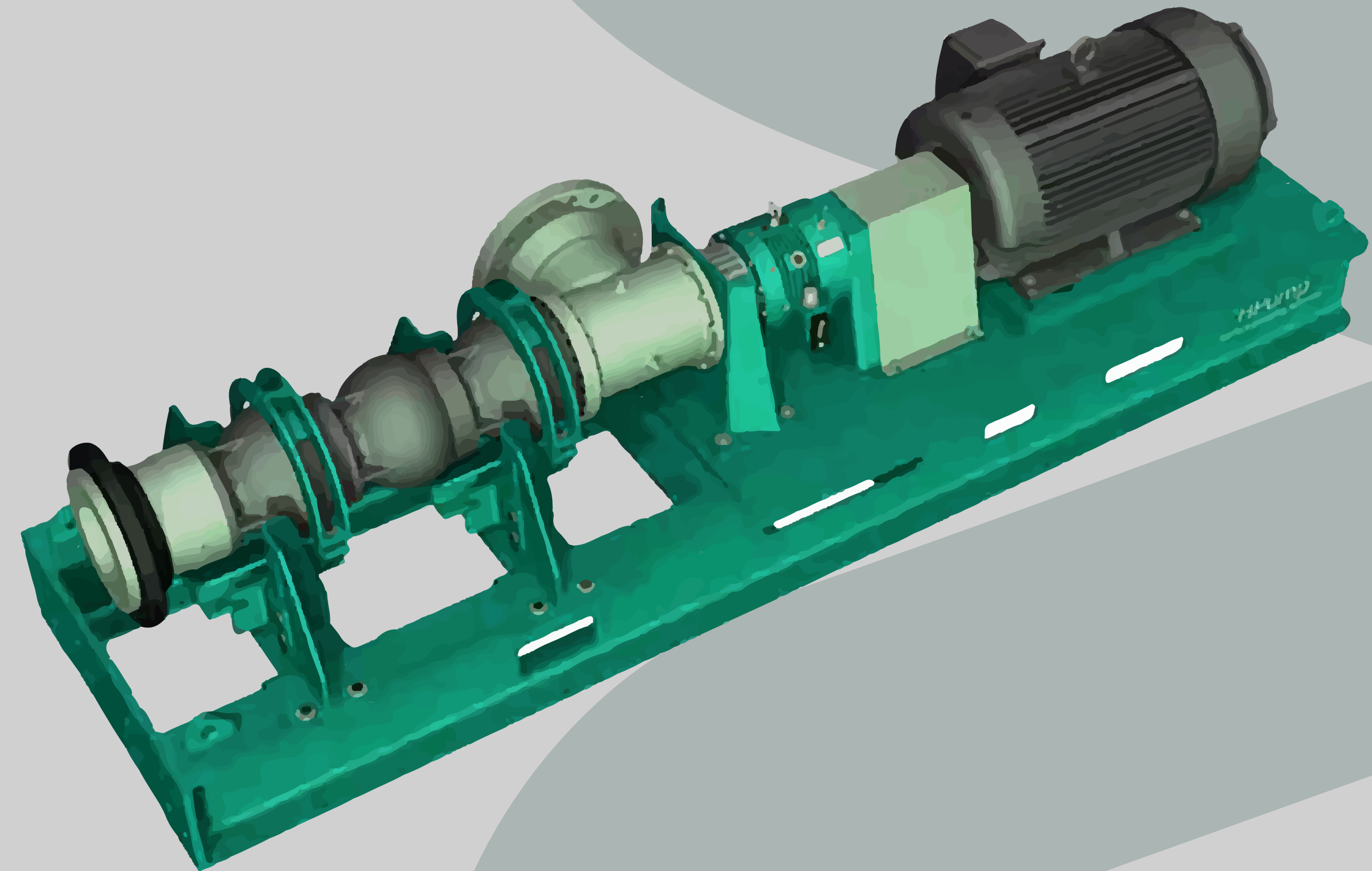
- integration of traditional API610 pumps and a typical surface ESP.

Hydraulics

- Up to 6000 GPM (205kBPD)
- ~350 PSI Operating Discharge Pressure
- 25 feet + Margin NPSH
- Up to 1250 HP
- 1800 RPM (4 poles)
- XDTC
- 20 or 24 inch diameter pump
- Vacuum Primer included

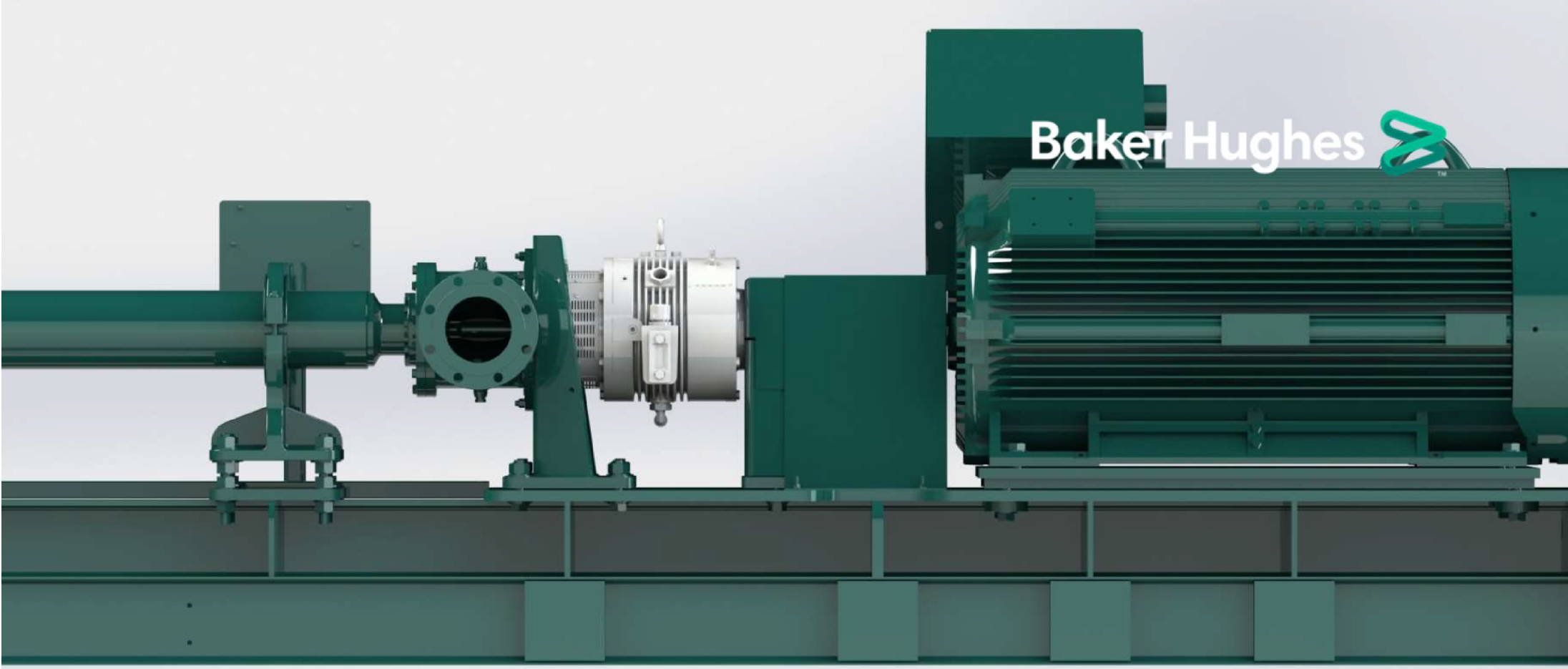
Advantages

- Disruptive and First to Market
- Low initial cost to test market
- Eliminates inefficiencies/redundancy in current surface pumping transfer systems, incumbents are single stage overhung (Gornman Rupp, Pioneer, and Cornell primarily)
- Less expensive and shorter lead times than API610 pumps
- More efficient and higher volumes than traditional ESP pumps
- Reduces NPSHr with lower operating speeds
- Incremental revenue for HPump Product Line.



Baker Hughes 

Official channel partners



Dual Access™ thrust chamber design

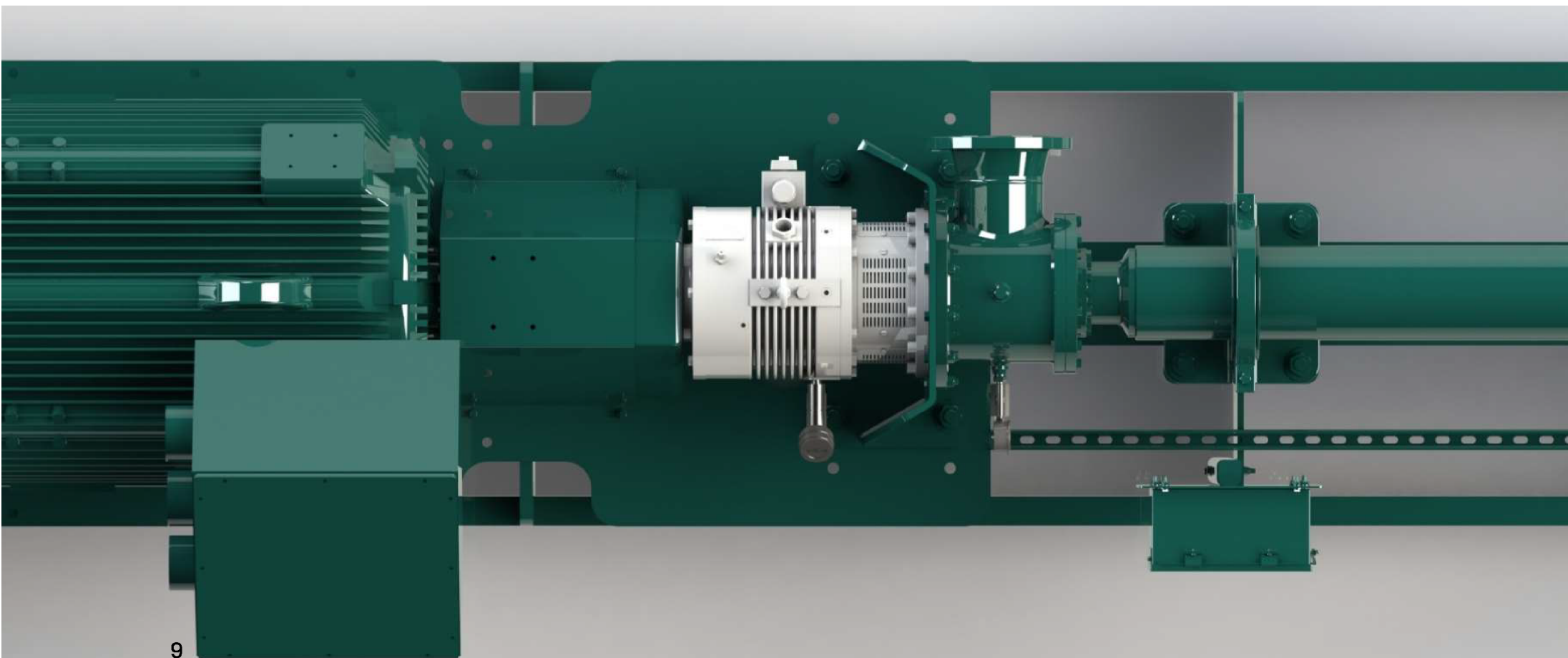
Benefits

Flexibility

Only Baker Hughes offers a patented Dual Access™ design. This allows you to easily access and service your mechanical seal in two ways:

- Through the suction
- From the motor or engine side

- Industry leading ease of service
 - Easily access your mechanical seal
 - Easily change your thrust chamber
- Minimize downtime with timely repairs when needed
- Proven reliability
- Lowest cost of ownership



HPump™ Surface Pumping Systems



Applications



Water recovery - Toquepala Mine, Perú.



Dewatering - Caverna Mine, Ecuador.

Mining, Municipal, Industrial, and Geothermal

Effective water management is critical in mining and salt dome leaching operations. Our HPump™ pumps are available to the MMIG industry as portable skid-mounted units, trailer-mounted units and as multiple pumps in fixed installations at main pump stations and can be used in the following applications:

- * Seawater transfer (to mines for processing)
- * Mine de-watering
- * Cavern (salt-dome) leaching
- * Open pit and shaft mining
- * Borehole mining

Case study: Perú

HPump horizontal surface pumping system doubled rock capacity per day and reduced the use of fresh water

A mine operator in Peru contacted Baker Hughes to expand a new copper concentrate plant, with the goal of increasing processed raw copper rock capacity and decreasing the use of fresh water required in the process.

Using the HPump™ horizontal surface pumping system, Baker Hughes engineers helped the operator increase processed rock capacity from 60,000 metric tons of rocks per day to 120,000 metric tons per day. Net copper production also increased 12.5% within a quarter, and the company achieved record earnings for the year. This is the first use case of a high-flow pump for a high-pressure/high-temperature mining application.

Water needs to be mixed with chemicals to spray down the ore and crushed rock to extract the concentrate. To decrease the amount of fresh water being used from the lake, Baker Hughes' engineers recirculated and recycled the water with the HPump system.

Challenges

- Reduce the use of freshwater
- Recirculate production water from the reservoir to the top of the mine
- Move high flow of water through 20.2 miles (32.5 km) of pipe
- Move high flow of water from 4,183 feet above sea level (1,275 m over sea level [MOSL]) to 10,662 feet (3,250 MOSL)

Baker Hughes 

Official channel partners

Case study: Perú

Because of the mine sits at an altitude of 10,662 feet, adjustments needed to be made to provide enough pressure to move the production water to the mine. As a result of the flexibility, power, and design of the HPump system, Baker Hughes reduced the stage count by one and still produced the needed power to push the high flow of water up to the mine.

The process required fewer overall motors, because the HPump system generates more pressure and can push water farther. The HPump system also requires fewer overall lines, because it can push more fluid through a given line. Competitor pumps can run in parallel, but the HPump system can fit better to the target flow, depending on the customer's needs, and provide the flexibility to turn up or back off flow as needed.

The HPump system generated less vibration than the typical competitor pump—providing savings on maintenance, spare parts, and cost. The HPump system helped to double the rock capacity and decrease the use of fresh water, creating a successful new application for high-flow pumps.

Results

- New application of technology introduced to the mining market
- Doubled the capacity of the rocks processed
- Increased new copper production by 12.5%
- Recorded record net sales for the mining operation

Thank you!

TECHNOSTEEL
making mining easier.

Baker Hughes 
Official channel partners