

Schlumberger



REDA HPS G3

Horizontal multistage surface pumping system

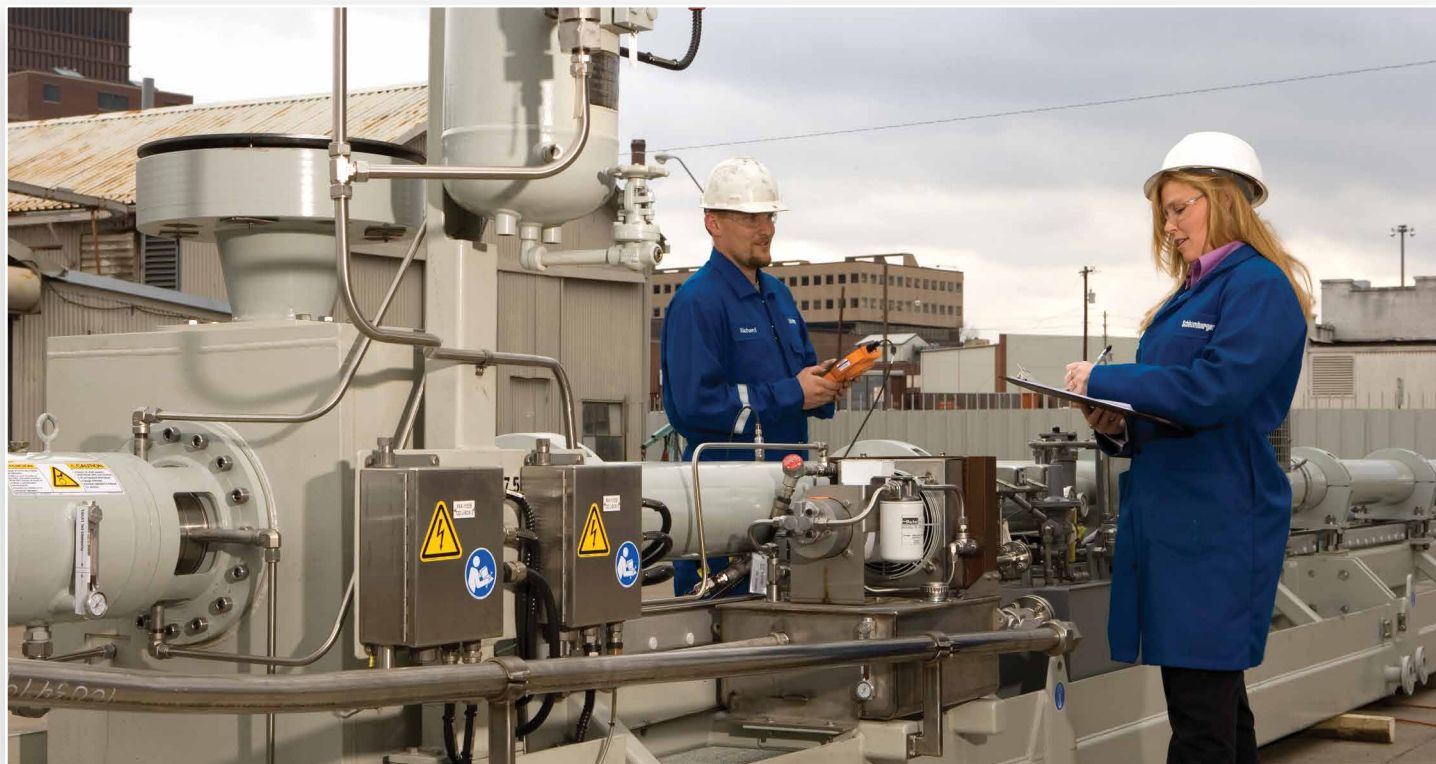
More Than 70 Years of Dependability

The REDA HPS G3 horizontal multistage surface pumping system is a low-maintenance, cost-effective surface pumping solution—customizable for your specific needs.

Dating back to the 1940s, the REDA HPS* pump series has a rich history of continuous product improvement. This is due largely to quality assurance practices that were put in place after the first-generation REDA* electric submersible pump system was awarded the original patent for ESPs worldwide. The pump series has been a reliable, flexible alternative to conventional pumping systems ever since.

The first REDA HPS unit was bought as a replacement for triplex pumps used for shipping crude. Frustrated with constant pump-packing leakage and vibration-induced pipeline spills, the customer embraced a cost-effective alternative. That revolutionary unit ran for 7 years with zero equipment failure until the field was abandoned.

The system's success continued on for decades, creating a solid reputation of dependability. The low-maintenance centrifugal pumps also offer competitive pricing and fast delivery times, making them an obvious solution for an array of applications.





A Wealth of Worldwide Applications

The REDA HPS systems are a proven cost-effective alternative to split-case, vertical turbine, and positive displacement pumps. Today's third generation of REDA horizontal multistage surface pumps, the REDA HPS G3 system features product enhancements that lessen downtime in demanding applications. Pumping challenging liquids in some of the world's harshest environments, the system is used in a wide range of applications, including simple water injection and disposal, offshore crude oil transfer, and refinery service.

From the deserts of the Middle East to the tundra of Siberia, from the underground mines of Canada to the jungles of South America, REDA HPS G3 systems are working round-the-clock to provide industry-leading, dependable service.

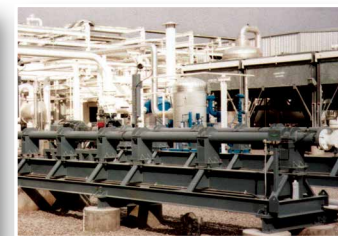
The REDA HPS pumping system totals more than 3,500 installations and continues to be delivered across the globe.

- Lean amine recirculation
- Crude oil pipeline
- CO₂ injection
- Mine dewatering
- Natural gas liquids (NGL) pipeline
- Water injection
- Salt dome leaching
- Salt water disposal
- High-pressure wash for refineries
- Boiler feed
- Geothermal injection
- Industrial high-pressure facilities



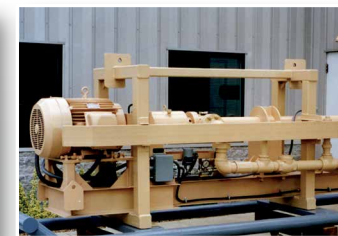
Water disposal

With increasing water cuts worldwide, volumes for disposal are continually rising. The REDA HPS systems pictured have been pumping 1.18-sg brine with 3% H₂S and a light suspended solids load for 7 years nonstop. These units get an inspection weekly, a greasing quarterly, and an oil change biannually. Minimal maintenance is required, in comparison with the previously used positive displacement pumps, which required daily maintenance and rebuilds twice a year.



Pipeline boosting

REDA HPS systems are commonly used as replacements for split-case pumps in oil and NGL pipeline services, both on shore and offshore. Many major pipeline companies in the Eagle Ford Shale and Gulf of Mexico have implemented REDA HPS systems to meet their project requirements. Easily customized and delivered quickly, these streamlined systems have slashed capital costs, cut installation time by months, and improved overall reliability of numerous pipelines.



Mine dewatering

REDA HPS systems work in open cut and underground mines to alleviate production problems and provide a safer working environment. A single high-pressure pump at the bottom of the pit eliminates the need for multiple lower pressure units, which ultimately cuts costs and minimizes downtime.



NGL pipeline

In 2006, an NGL plant in Carthage, Texas, installed a 23-stage REDA HPS pump with a variable speed drive for handling varying pipeline pressures. It delivers 13,500 bbl/d of NGL.

In 2009, a second plant was brought into operation, which uses two REDA HPS pumps in a series to deliver 5,300 bbl/d of NGL. These pumps have been in continuous operation since they were installed at the two plants, without any downtime, other than regularly scheduled oil changes.

REDA HPS G3 Component Details

A. Motor

- Standard 5–2,500 hp electric and engine drive units available
- Electric motor options, including multiple enclosure styles, area classification compliances, bearing systems, and various upgrades
- Engine drives (either diesel or gas fuel systems) with configuration options, including starting system variants, temperature modifications, and instrumentation complexity

B. Motor adjustment lugs

C. G3 bearing assemblies

- Horizontal thrust-bearing assembly redesigned for cooler operating temperatures and increased down-thrust load capabilities
- Modular oil-cooling package for high-temperature or high-load applications; can be retrofitted into older REDA HPS designs
- Factory-aligned bearing assembly in skid-mounting bracket
- Cartridge and noncartridge seals accommodated

D. Thrust chamber

- Designed for increased reliability, seal support, and mean time between failures
- Single, double, or triple thrust-bearing designs within one housing
- Load capacity up to 80.068 N [18,000 ft.lbf]

E. Spacer coupling

- API 610 7-in spacer coupling allows rapid seal replacement without disconnecting pump or flanges from process piping

F. Discharge flange and suction flange

- Availability in materials, sizes, pressures, and temperature ratings suitable for its application
- API 610-specification-compliant suction and discharge connections available
- Redesigned pump intake assembly for improved hydraulic and nozzle loading characteristics

G. Back pullout seal

- Back pullout bearing section for easy access during seal repair

H. Mechanical seal

- Only one seal assembly required, at the low-pressure end of the pump
- High- and low-pressure sealing systems available
- Intake pressures up to 4,000 psi [27,579 kPa] with body, elastomeric, and face materials to suit the application requirements
- Barrier systems for fugitive emission control

I. API flush plan pressure containment system

- API-specification-compliant sealing and flush systems available; common designs including API plans 11, 21, 31, 32, 52, 53, 54, 65 (liquid leakage detection), 74, 75, and 76

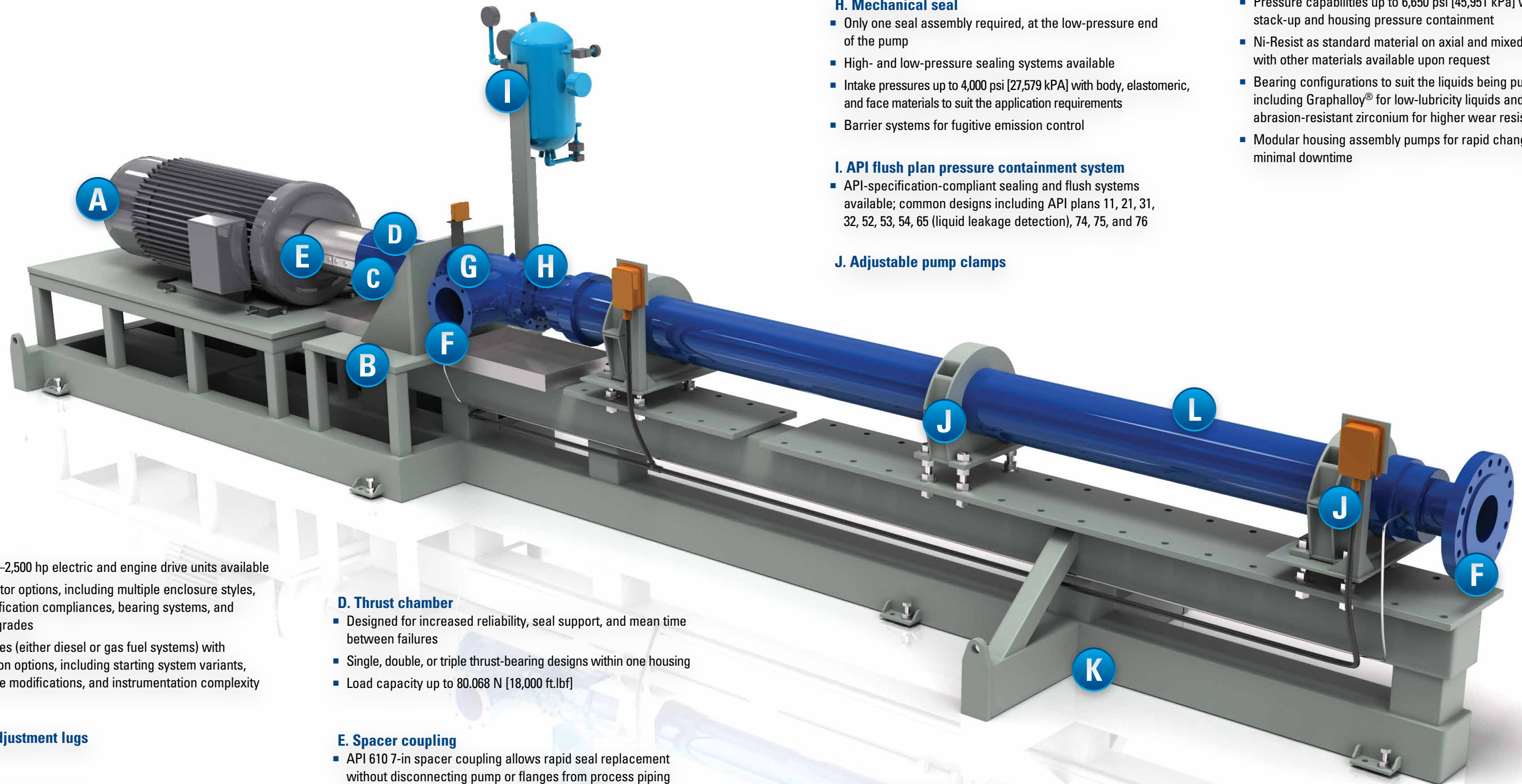
J. Adjustable pump clamps

L. Pump

- Stage flow capabilities of 40–1,850 gal/min [218–10,084 m³/d] in the standard configuration, and more with specialized designs
- Pressure capabilities up to 6,650 psi [45,951 kPa] with multistage stack-up and housing pressure containment
- Ni-Resist as standard material on axial and mixed flow stages with other materials available upon request
- Bearing configurations to suit the liquids being pumped, including Graphalloy[®] for low-lubricity liquids and ARZ abrasion-resistant zirconium for higher wear resistance
- Modular housing assembly pumps for rapid changeout and minimal downtime

K. G3 heavy duty skid

- Increased rigidity that allows larger motors to be fitted, resulting in reduced vibration and flexing
- Lower pump center line, resulting in improved pump suction characteristics, reduced vibration, and easier equipment maintenance
- Special motor-based, factory-milling process assures precise alignment
- Bearing assembly in a fixed location for all skid and seal designs
- Adjustment lugs and hoist mounting points for easier equipment maintenance



Reliable Design, Flexible Operation

The REDA HPS system incorporates flexible features and API 610 designs that maximize overall pump run life and minimize downtime. The prepackaged units are provided as a whole system from a single-source vendor and delivered preassembled to the site.

Designed for years of trouble-free service, the REDA HPS Series requires no daily maintenance. There are no V-belts or packing to service, and a typical routine maintenance

schedule is a quarterly lubricant change and component check. Its modular design of factory-aligned components permits easy maintenance and minimal downtime when it is required. All major components can be exchanged within 2 to 3 hours, and, with the exception of the motor, will not require realignment before the pump is restarted.

Smooth-running performance extends equipment life and greatly reduces the

chance of leakage from associated piping. Quiet operation makes the horizontal pumping system an ideal choice for urban and environmentally sensitive locations.

The REDA HPS pumping system can deliver up to 2,500 hp in a single unit. Alternatively, multiple units can be configured in series or parallel to provide redundancy, additional volume, or pressure.

With the REDA HPS G3 unit, Schlumberger offers a complete pumping system that is delivered quickly and is flexible enough to be modified in the field.



Powerful pumping system

- Numerous API 610-specification-compliant features
- Simple, quick reconfiguration of pumps and motors
- Ease of commissioning and piping alignment
- Low life-cycle cost, thanks to minimal downtime, low-maintenance requirements, and increased mean time between failures (MTBF)
- Great application flexibility with design features permitting multiple uses with common components
- New bearing sections with enhanced pump-pressure capabilities and less heat generation
- Increased reliability with new skid designs, helping reduce vibration and improve suction characteristics



The Schlumberger Team

115,000 people

140 nationalities

85 countries

65 research and engineering facilities



- Assembly, repair, and testing center
- Technology center
- Manufacturing center

Quality at the Source

Schlumberger Artificial Lift maintains **five** technology centers, **two** manufacturing centers, and **26** assembly, repair, and testing centers around the globe. With an emphasis on quality, cost, and delivery, these facilities trim costs and reduce production lead times. Using generators capable of 4 MW, certain centers can assemble and test units up to 2,500 hp at full load. Upon rigorous testing of the REDA HPS G3 pumps, the system proved to not only meet design specifications but to exceed all industry standards.



The Singapore Integration Center serves as the artificial lift headquarters for Schlumberger. It is the largest engineering, manufacturing, and sustaining facility for Schlumberger artificial lift products. The 550,000-ft² plant has a full suite of manufacturing operations, from producing castings for pumps to full quality control testing of all equipment. The total workforce consists of more than 900 professionals, including designers and engineers, with a focus on continuous improvement and new product development.

REDA HPS G3

Schlumberger offers industry-leading systems for any application, well, or environment. In addition to cost-effective surface pumping, we offer the widest range of ESP components, state-of-the-art variable speed drives, expert engineering services, and real-time monitoring to optimize lift operations.



slb.com/hps

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