



Vertical Pumps for the Oil & Gas Industry



ITT

ENGINEERED FOR LIFE

ITT – API Expert

ITT Commitment

ITT is committed to the Oil and Gas market, which is the largest segment of our business. We have been investing in technology to continuously improve our products to meet increasingly demanding industry requirements.

Proven API Leadership

ITT Goulds Pumps is a proven leader in API pumps: Over 28,000 units installed:

- Over 18,000 OH2 / OH3s
- Over 3,500 BB1 / BB2 / BB3 pumps
- Over 6,500 VS1/ VS4 / VS6 / VS7 pumps

40+ years of API expertise participating member on API 610, API 676 and API 682 committees.

Complete Portfolio of API Pumps

ITT Goulds Pumps and Bornemann have a complete portfolio of proven API pumps:

- Overhung pumps
- Single and two-stage between-bearing pumps
- Multistage between-bearing pumps – axially split
- Barrel Multi-Stage pumps
- Vertical, double casing pumps
- Specialty pumps
- Twin screw pumps
- Multiphase pumps
- Positive displacement pumps

Global Coverage

ITT's family of industrial brands - Goulds Pumps, Bornemann, PRO Services, Engineered Valves, Compact, Turn-Act, and C'treat have the global coverage needed to serve multi-national companies in any region.

Industry Leading Hydraulic Coverage

We offer extensive hydraulic coverage to meet your process needs. Better hydraulic fits can mean improved efficiency, and long-term reliability and parts life.

8000 HP / 6000 kW Testing Capability

Our expanded test facility can meet any of your test requirements. This allows us to test at rated speeds, which is critical to assess the impact of dynamic conditions including vibration.

API Engineering Expertise

We are experts in packaging engineered pumps that meet your demanding applications – with true conformance to the latest API specifications. ITT is a world leader in technology and engineering, including hydraulics, materials science, mechanical design and fluid dynamics. We have extensive experience in nearly every type of driver, bearing, seal, piping configuration, nozzle configuration, flange and baseplate design to meet your application needs.

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Applications

Offshore Platforms

- Sea Water Lift
- Fire Water



Features

- Duplex / Super Duplex Materials
- Fiberglass Columns
- Stabilizers for Caisons
- Engine Drives
- NFPA 20 Compliance
- Submersible Motors

Cooling Water

- Fresh Water & Sea Water Cooling
- Raw Water Feed



Features

- High Flow Rates
- Cast Iron / Bronze / Duplex Construction
- Solids Handling
- Enclosed Line Shaft

Light Hydrocarbons

- Pipeline Booster
- Tank Farms
- NGLs



Features

- No NPSH Available
- Double Suction First Stage
- High Suction Pressure
- Radial Flow Impellers
- Venting
- Thrust Pots
- Low Temperature
- Customs Testing & QA

Sump Pumps

- Open Sump and Tank Mounted
- VS1 & VS4
- API & Non API



Features

- ASME Mounting Plates
- Depth to 500 ft (150 m)

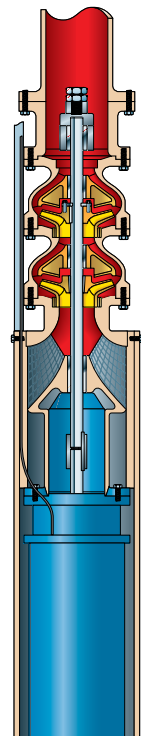
Models VIT, VIC, VIS, 3171

Vertical Industrial Turbine Pump Model VIT (API VS1, VS2)

Vertical Industrial Can-Type Pump Model VIC (API VS6, VS7)

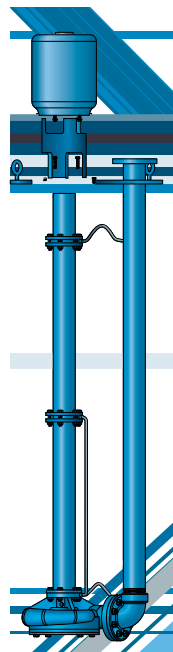
Vertical Industrial Submersible Pump Model VIS

- Flows to 70,000 GPM (15,900 m³/Hr)
- Heads to 3,500 feet (1,060 m)
- Pressures to 2,500 psi (76kg/cm²)
- Bowl sizes from 6" to 55" (152.4 mm to 1,400 mm)
- Temperatures to 500° F (260° C)
- Horsepower to 5,000 HP (3,730 KW)



Vertical Sump Pump Model 3171 (API VS4)

- Capacities to 3180 GPM (722 m³/h)
- Heads to 525 feet (160 m)
- Temperatures to 450° F (232° C)
- Pit Depths to 20 feet (6 m)
- Single Stage Design
- API 610 11th Edition Compliant



Bowl Assembly

Pump Bowl Assembly

The bowl assembly is the heart of the vertically suspended pump. The impeller and diffuser type casing are designed to deliver the head and capacity that your system requires in the most efficient way possible. The fact that the vertical pump can be multistaged (single - or double - first stage) allows maximum flexibility both in the initial pump selection and in the event that future system modifications require a change in the pump rating. Submerged impellers allow pump to be started without priming.

The double suction configuration in the first stage impeller reduces the pump length from its low NPSH requirement, excellent for oil pipeline applications. Reduces the hydraulic thrust loading in the pump while maintaining a reliable operation of the rotor in tension. The double suction also allows the handling of fluids with high concentration of suspended solids without bearing wear concerns. The impeller design has an innovative isolating ring to prevent premature bearing failures due to unstable rotor dynamics.

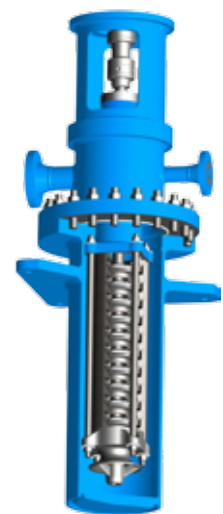
A variety of material options allows the selection of a pump best suited for even the most severe services. The many bowl assembly options available ensure that the vertical turbine pump satisfies the users' needs for safe, efficient, reliable and maintenance-free operation.

Standard Design Features

- **Suction Bell** - Allows smooth entry of liquid into first stage impeller eye, minimizes foundation opening.
- **Suction Bell Bearing** - Provided for shaft stability.
- **Sand Collar** - Prevents solids from entering suction bearing.
- **Impeller** - Semi-open or enclosed for appropriate service.
- **Pump Shaft** - Heavy duty 416SS standard, other alloys available for strength and corrosion resistance.
- **Wear Rings** - Replaceable impeller and casing wear rings
- **Flanged Bowls** - Registered fits ensure positive alignment, ease of maintenance.
- **Diffuser Bowl** - Available in variety of cast materials (cast iron, carbon steel, duplex stainless steel)
- **Sleeve Type Bearing** - Provided at each stage to assure stable operation.
- **Keyed Impellers** - Standard on 18" and larger sizes; furnished on all pumps for temperatures above 180° F (82° C) and on cryogenic services. Regardless of size, keyed impellers provide ease of maintenance and positive locking under fluctuating load and temperature conditions.



Double suction multistage pump



VICR

Radial impeller bowl assembly

Discharge Heads / Column

Discharge Heads

The discharge head functions to change the direction of flow from vertical to horizontal and to couple the pump to the system piping in addition to supporting and aligning the driver. Discharge head accommodates all types of driver configurations. Optional sub-base can be supplied. Goulds offers three basic types for maximum flexibility.

VIT DISCHARGE HEAD

Suitable for all service conditions such as high or low temperature or corrosive services. Various materials available. Segmented elbow available for efficiency improvement. Access ports for easy access to seals and couplings. Base flange can be machined to match ANSI tank flange.



VIC DISCHARGE HEAD

VIC can also be supplied with the pump suction in the can.



BELOW GROUND DISCHARGE HEAD

Use whenever VIT pump is required to adapt to an underground discharge system.

- Finite Element Analysis is typically recommended on this configuration to evaluate the pump's dynamic behavior and capability to withstand the loads
- Robust design as a result of the cantilever load distribution applied to the foundation and anchor bolts
- Customized design to minimize the foundation opening



FAN AIR COOLED THRUST POT

- Cast steel body meeting API standard
- 25,000-hour L10 bearing life
- Two or three bearing configurations
- Momentary up-thrust capability
- Inpro seals - prevent oil contamination
- Vibration and temperature monitoring are standard provisions
- Oil lubricated thrust bearings & permanently-lubricated radial bearings
- No water supply is required under most extreme weather conditions.



Seals & Couplings

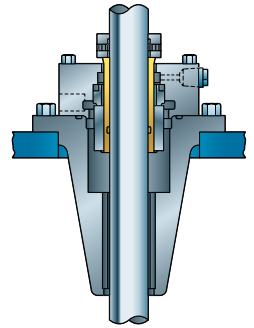
Seal Plans

All API seal plans are available.



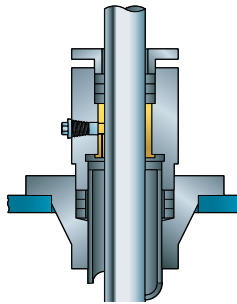
Single Seal

Most popular method — used for low to medium pressures. Cartridge style for ease of installation and maintenance.



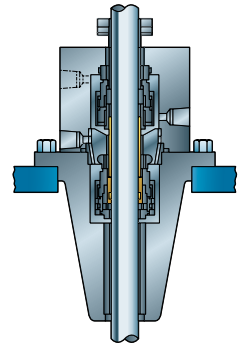
Water Flush or Oil Lubricated Enclosed Lineshaft

Water flush tube connection is supplied when pressurized water is introduced into the enclosing tube for bearing protection on abrasive services.



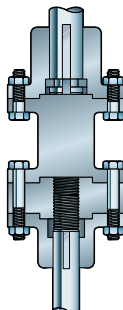
Dual Seals (API 682)

Two seals mounted in-line. Chamber between seals can be filled with a buffer liquid and may be fitted with a pressure sensitive annunciating device for safety.



Adjustable Spacer Coupling (Type AS) (API 671)

Same function as Type A coupling with addition of spacer. Spacer may be removed for mechanical seal maintenance without removing the driver.

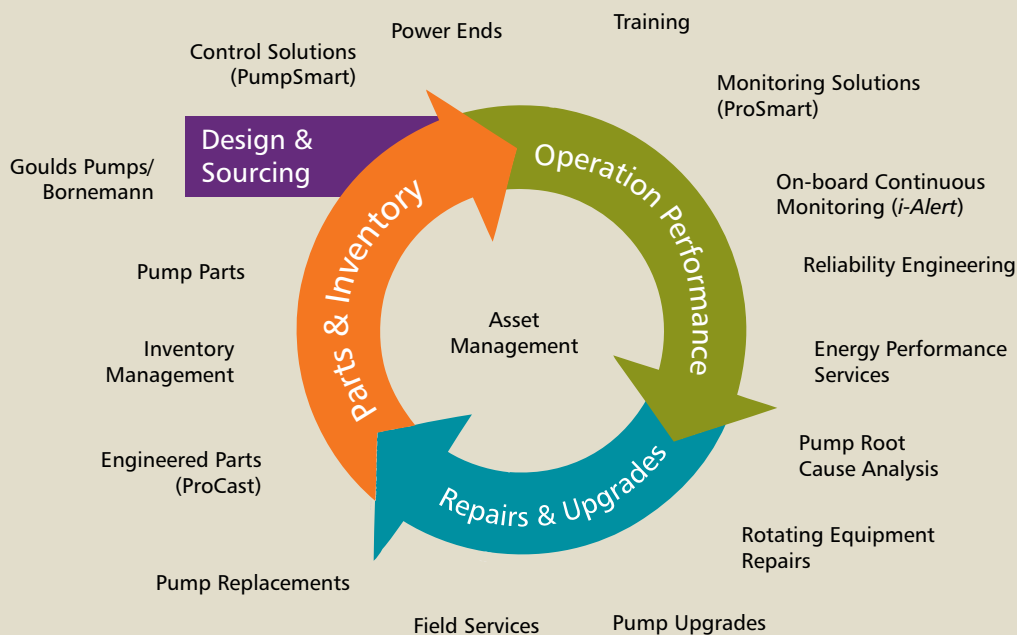




Reliability has no quitting time.

Building on over 160 years of Goulds Pumps experience, **PRO Services** provides an array of services focused on reducing equipment total cost of ownership (TCO) and increasing plant output, including predictive monitoring, maintenance contracts, field service, engineered upgrades, inventory management, and overhauls for pumps and other rotating equipment.

Your total Solution For Equipment Life Cycle Optimization



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