

**Slurry
Without the Worry!**

API Fully-Lined Pump



Safe, Reliable Pumping of High Temperature Abrasive Slurries

We meet heavy oil challenges everyday.

Heavy oils and synthetic fuels require higher process temperatures and expose pumps to higher levels of coke, catalyst, sand, ash, coal, shale, and other abrasive minerals.

By using a “pump within a pump” concept, the Lawrence Pumps API Fully-Lined Slurry Pump provides improved reliability and a means to safely handle abrasive solids at elevated temperatures without dangerous erosion of the pump casing.

We have the lowest life cycle cost of any FCC bottoms pump on the market today.

Our impellers last two to three times as long as standard API pump parts in similar services and our casing liners last almost five times as long. Additionally, our casing liners are a fraction of the replacement cost of an API pump pressure casing.

Reduced wear rates translate to longer operational cycles, reduced maintenance, and increase efficiency, all of which save time and money.

Our pumps can provide for future debottlenecking without modification to existing foundations or piping.

The Lawrence Pumps API Fully-Lined Slurry Pump is designed so that multiple hydraulic sizes are available for each pressure shell. That means that the capacity of the pump can be increased without modification of the piping or foundations.

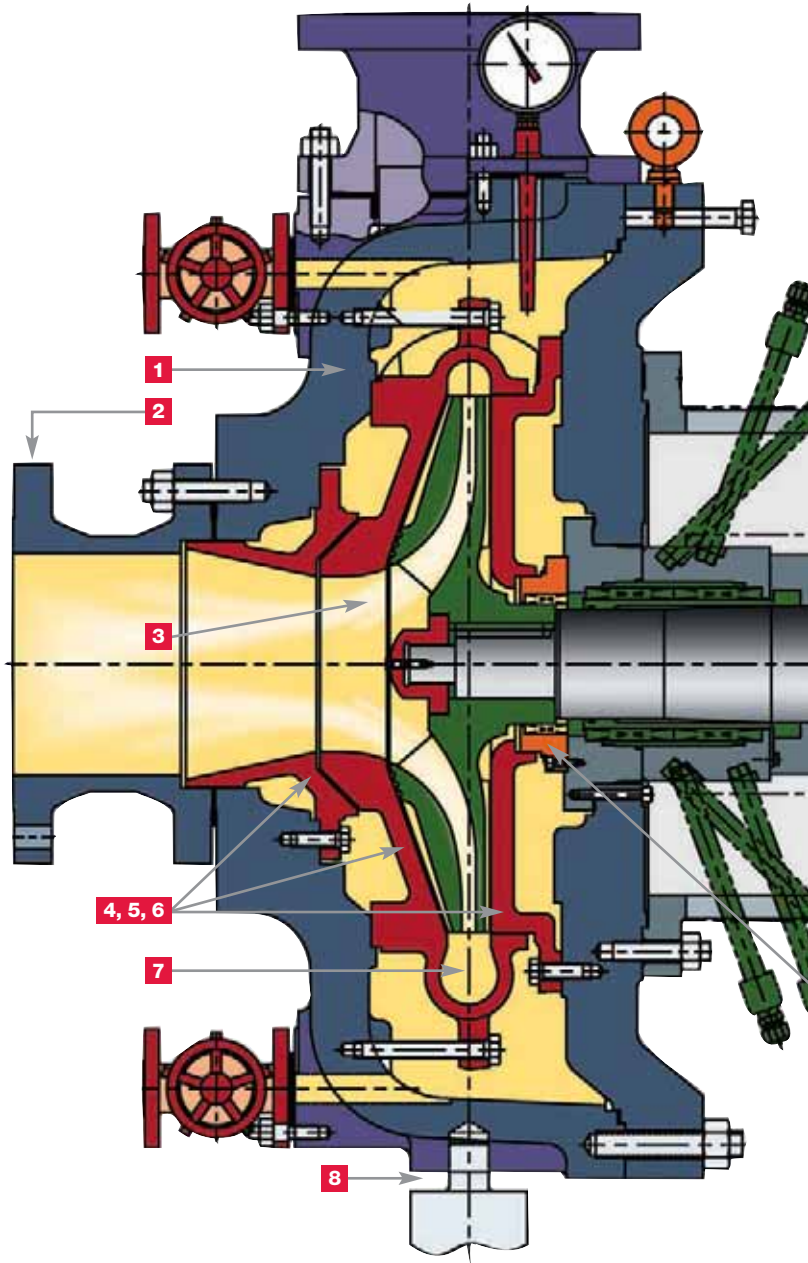
We pride ourselves in being accessible.

Managing cost and delivering on schedule require clear and concise communications. Lawrence Pumps provides an international staff of highly skilled and experienced engineers — who are directly accessible and available to all of our customers around the globe and around the clock.



Solutions engineered to last.

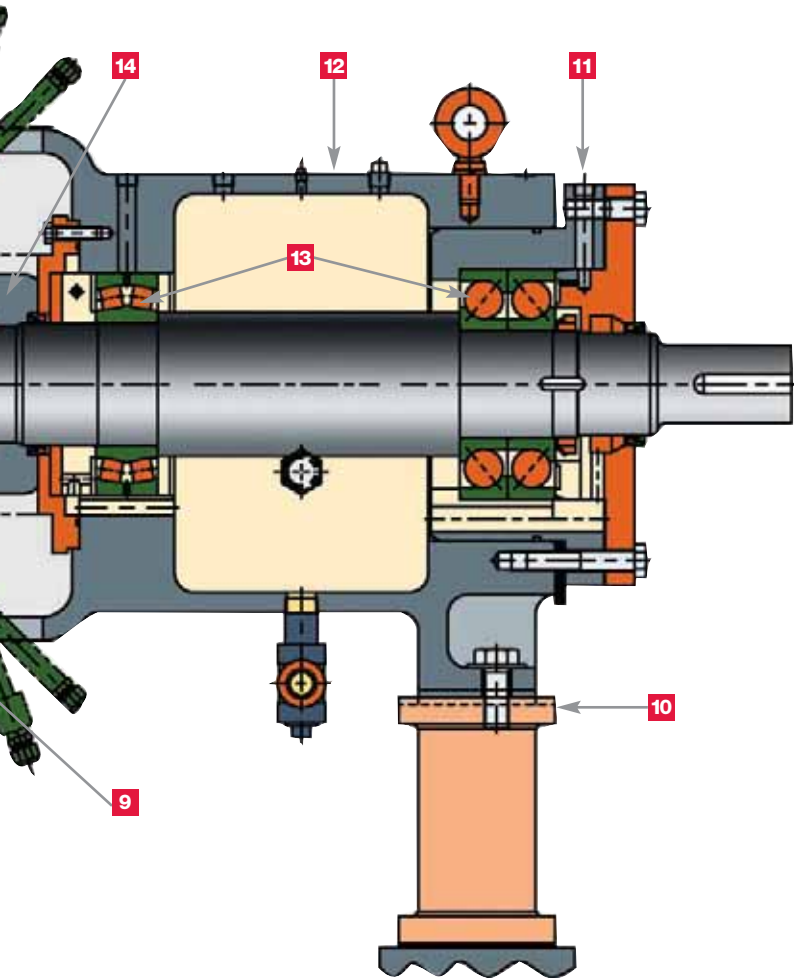
- 1 Outer pressure shell is completely protected from erosive wear by easily replaceable bolted liners, eliminating a safety hazard found on all standard unlined or partially lined API pumps.
- 2 Pump nozzle penetrations, including the casing vents and drains, are protected from erosive wear by the renewable liners, eliminating safety hazards and costly repairs common to standard API process pumps. Flanges can be machined to client specifications.
- 3 True slurry components are designed with heavy-walled sections that extend the life of components beyond that found in standard API pumps.
- 4 Heavy-walled renewable liners are a fraction of the replacement cost of a process pump pressure casing.
- 5 Liners are available in a broad spectrum of abrasion resistant alloys and surface treatments to meet any process or operational requirements.
- 6 Adjustable liners are renewable to restore operating clearances, optimize efficiency and reduce operating costs.
- 7 Deep adjustment channels reduce or eliminate vortices that cause alligator-skin erosion patterns on volute surfaces and extend the wear life of the volutes. Slurry design eliminates the formation of horseshoe vortex erosion adjacent to the cutwaters preventing premature part replacement.
- 8 Pump is designed to maintain driver alignment under 2X API nozzle loads.



The outer pressure casing on a Lawrence pump will not wear out — we guarantee it.

Fluid velocity is contained within renewable hard metal wear liners. At no time is the outer shell exposed to high velocity fluid streams. The pressure casing in an ordinary API pump is completely exposed to wear that can quickly compromise safety and result in unplanned and expensive repairs. We warranty our API Fully-Lined Slurry Pump pressure casings against erosive wear-through for the life of the equipment.





- 9** Labyrinth throat bushing isolates the seal chamber from the pumpage extending seal life.
- 10** Keyed foot support to allow for axial growth without disrupting coupling alignment.
- 11** Impeller clearance adjustment can be made externally with the pump at full operating temperature ensuring optimum performance without guesswork.
- 12** Extended bearing frame design supports an extra severe duty rotor design that optimizes bearing loads, reduces shaft deflection and helps maintain a stable seal environment during process upset conditions.
- 13** High performance rolling element or optional hydrodynamic bearings provide an L-10 life in excess of 100,000 hours at rated flow conditions, providing the durability required for operational upsets and extended operating life.
- 14** Separate seal chamber can accommodate seals of any manufacturer and simplifies seal removal and installation. The cartridge canister design can be hydrostatically and mechanically bench tested prior to installation to minimize start-up risks.

Pump Out Vane



Pump out vanes efficiently control slurry recirculation and axial thrust, eliminating radial wear ring and balance hole erosion as well as costly wear ring flush requirements found on API process pumps.

Options

Abrasion Resistant Alloy Inducer



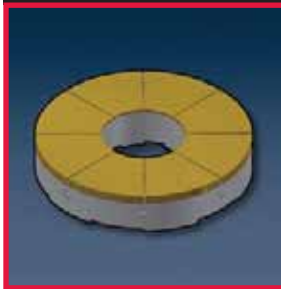
Inducers are designed for specific low NPSHA conditions optimizing equipment life and operational flexibility

Coke Breakers



A variety of coke breaker designs are available to avoid costly repairs related to impeller and heat exchanger fouling

Hydrodynamic Bearings



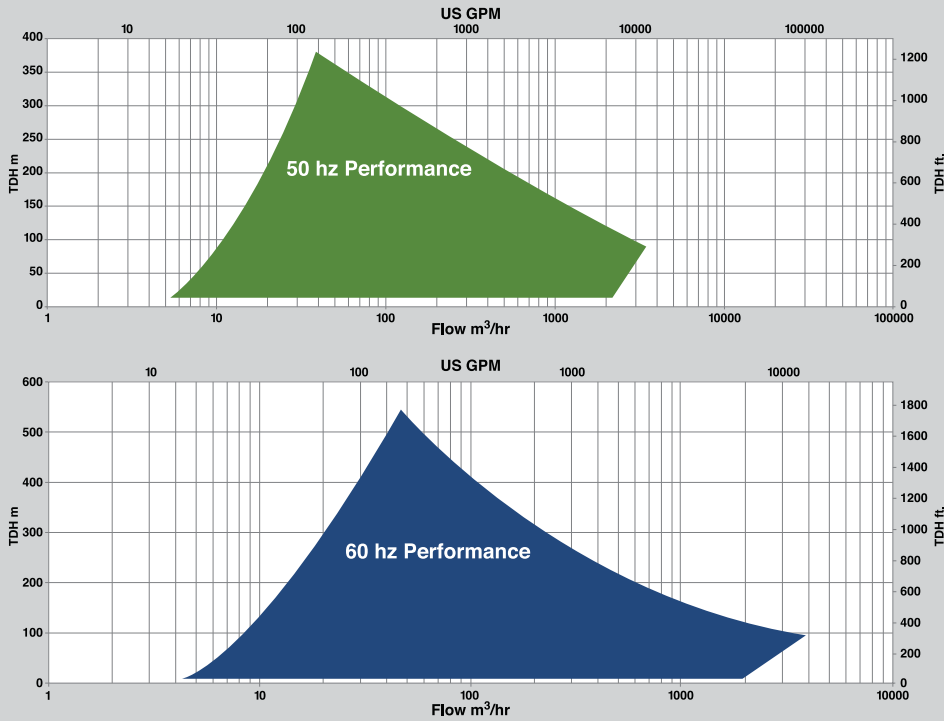
Hydrodynamic bearings for high suction & differential pressures

Spring Mounted Base Plate



Spring mounting allows for thermal growth and reduces piping loads

Performance Range

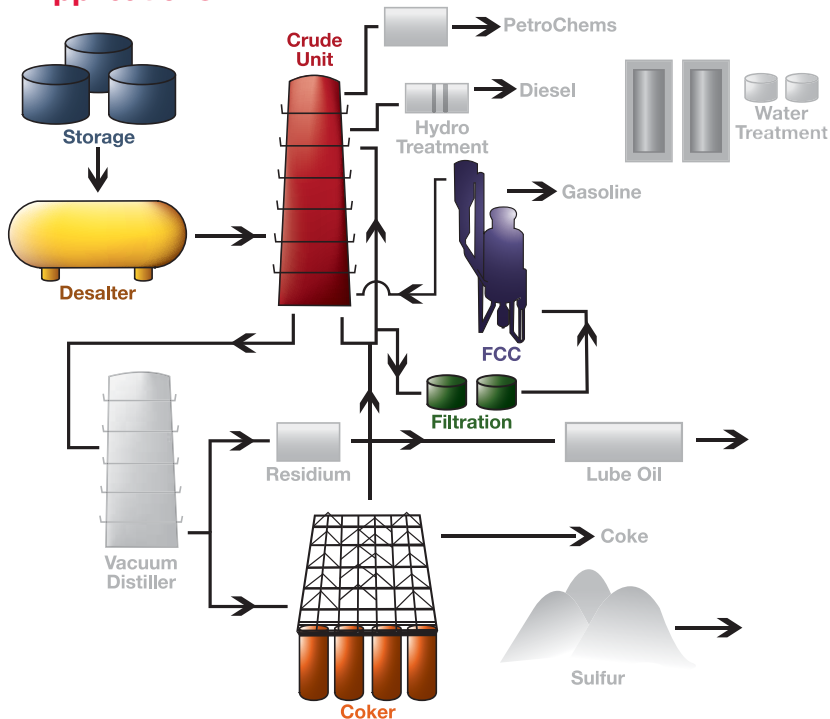


Design Information

Temp	425°C	(800°F)
Pressure	175 kPa	(2,500 PSIG)
Flow	4,500 m³/hr	(20,000 gpm)
TDH	275 m	(900 ft)



Applications



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