PHL
PHL-MAG

Heavy-Duty API Process Pump

Innovative Design
Fully in accordance with API 610 (OH2) design, the PHL is a horizontal shaft, single stage, overhung design pump. The PHL pump line offers exceptionally deep standardization, with 150 hydraulic configurations supported by only four shaft and two bearing housing designs.

Hydraulics are custom tuned for the actual duty point by project-specific design of the multi-channel diffuser.

The PHL and PHL-MAG design also offers broad performance and operating benefits resulting from its many years of engineering and installation experience combined with its highly regarded and innovative diffuser technology.

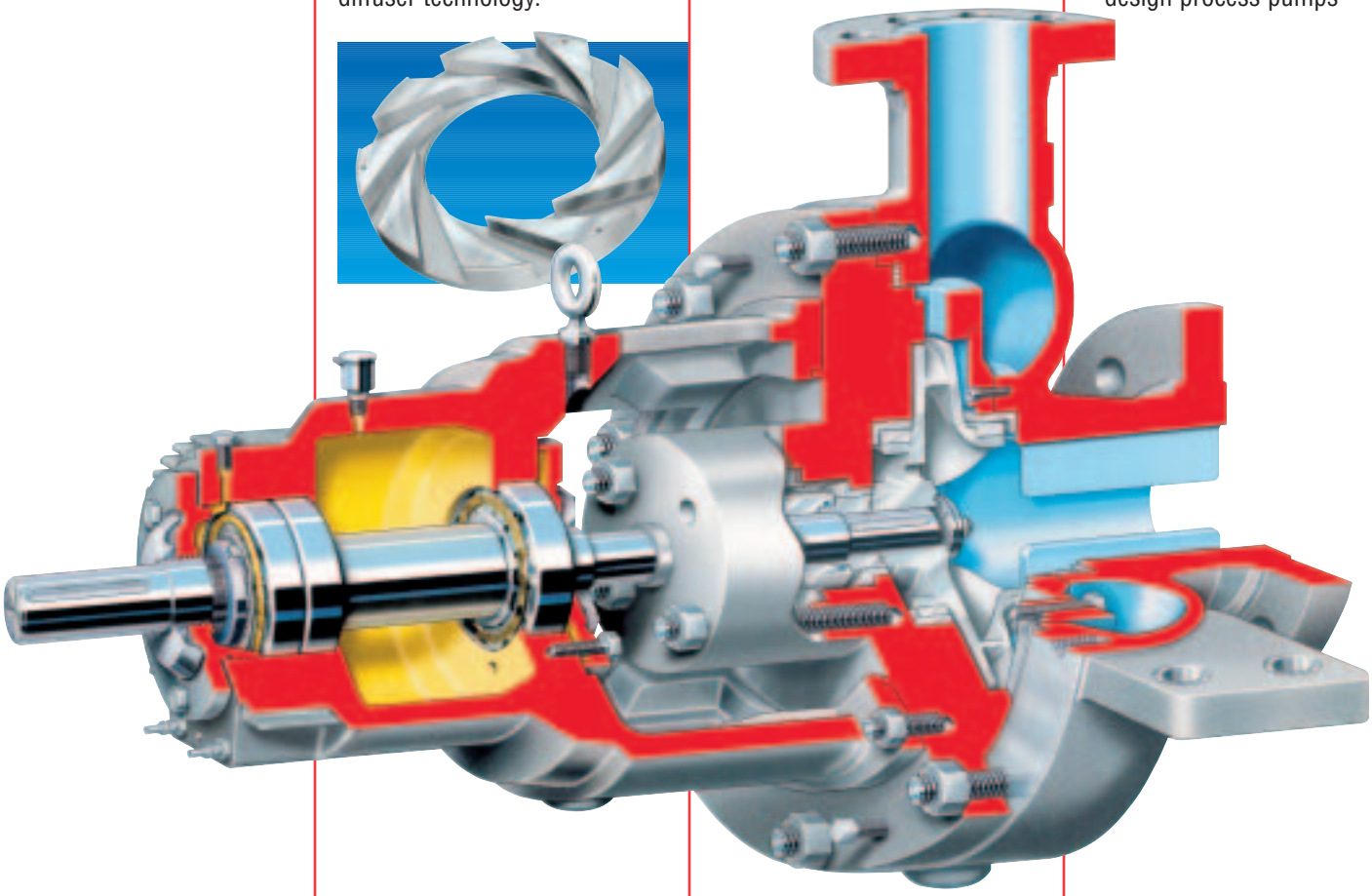
Flowserve's PHL design offers extremely low total cost of life based on:
- Long MTBF and low maintenance cost
- Low seal emission and long mechanical seal life
- Low vibration level
- Low energy consumption

These benefits, as recognized by Dow Chemical with their Energy Award to Flowserve, are achieved by applying state-of-the-art diffuser technology.

Standard API 682 seal chambers accommodate a wide variety of seal configurations including dual pressurized and unpressurized types for the most severe services.

Broad Application
- Oil production and transportation
- Hydrocarbon processing
- Petrochemical and chemical processing
- General industry

Complementary Pump Designs
PHL pumps may be used with other Flowserve design pumps. In addition to the permanent magnets driven PHL-MAG these include:
- PVML and PVML-MAG API 610 vertical in-line pumps
- HPX horizontal overhung volute design API 610 (OH2) pumps
- ERPN overhung volute design process pumps



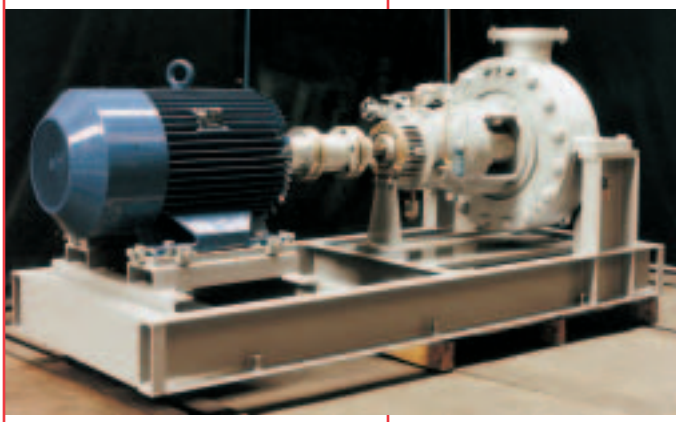
Operating Parameters
- Flows to 900 m^3/h (4000 gpm)
- Heads to 400 m (1300 ft)
- Pressures to 40 bar (600 psi)
- PHL temperatures to 450°C (840°F)
- PHL-MAG temperatures to 200°C (400°F)

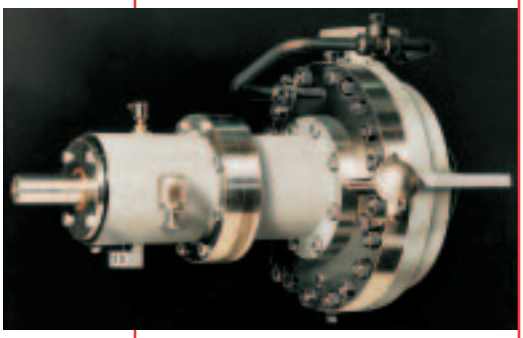
Bulletin PSS-10-5.2a (E)

Options and Technical Data

Features and Benefits

- Specific diffuser tuning maximizes pump efficiency, widens operational flow window and minimizes radial hydraulic thrust at any flow.
- Low shaft vibration at any flow results in longer L_{10h} bearing life.
- Low shaft deflection at any flow assures optimal mechanical seal life in the PHL design.
- Diffuser design permits 10 to 20% of BEP minimum continuous flow, compared to 20 to 35% for volute pump design.
- Replaceable and custom-tuned diffusers are available for future and different head-flow duty.
- Low noise level, at least 3 dB(A) below volute pump designs, helps reduce plant sound levels.
- Air fan or water jacketed cooling of bearing housing allows operating temperatures to 450°C (840°F) in the PHL model.
- End or top suction nozzle orientation is available to suit site piping systems.





Mag-Drive Design

All pumps can be equipped with a heavy-duty 40 bar (580 psi) permanent magnets drive.

- 100% leak-free, sealless design
- No contamination of pumped liquid
- Up to 110 kW (145 hp) motor size at 3000 rpm
- Up to 132 kW (175 hp) motor size at 3600 rpm
- 60 bar (900 psi) hydrotest pressure Hastelloy® C276 containment shell
- Product lubricated silicon carbide material slide bearings

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PHL and PHL-MAG Range Chart