Flowserve is the driving force in the global industrial pump marketplace. No other pump company in the world has the depth or breadth of expertise in the successful application of pre-engineered, engineered and special purpose pumps and systems.

**Life Cycle Cost Solutions**

Flowserve is providing pumping solutions which permit customers to reduce total life cycle costs and improve productivity, profitability and pumping system reliability.

**Market Focused Customer Support**

Product and industry specialists develop effective proposals and solutions directed toward market and customer preferences. They offer technical advice and assistance throughout each stage of the product life cycle, beginning with the inquiry.

**Broad Product Lines**

Flowserve offers a wide range of complementary pump types, from pre-engineered process pumps, to highly engineered and special purpose pumps and systems. Pumps are built to recognized global standards and customer specifications.

Pump designs include:
- Single stage process
- Between bearing single stage
- Between bearing multistage
- Vertical
- Submersible motor
- Rotary
- Reciprocating
- Nuclear
- Specialty

**Product Brands of Distinction**

ACEC™ Centrifugal Pumps
Aldrich™ Pumps
Byron Jackson® Pumps
Calder™ Energy Recovery Devices
Cameron™ Pumps
Durco® Process Pumps
Flowserve® Pumps
IDP® Pumps
Lawrence Pumps®
Niigata Worthington™ Pumps
Pacific® Pumps
Pleuger® Pumps
Scienco™ Pumps
Sier-Bath® Rotary Pumps
TKL™ Pumps
United Centrifugal® Pumps
Western Land Roller™ Irrigation Pumps
Wilson-Snyder® Pumps
Worthington® Pumps
Worthington Simpson™ Pumps
Maximum Mechanical and Hydraulic Design Flexibility

The ERPN is the pump of choice for severe chemical, petrochemical, refining and heavy-duty industrial service where full compliance with API 610 is not required. This pump provides users with the important mechanical, hydraulic, emissions control and safety components required by ISO 13709/API 610 latest edition.

The ERPN is an API type OH2, horizontal, end-suction, top discharge, centerline mounted pump. The ERPN is available in all API 610 material combinations and can be equipped with special features for demanding services, including:

- High-suction pressure casing
- Inducer for low NPSH applications

Typical Applications

- Petroleum refining, production and distribution
- Petrochemical processing
- Heavy-duty chemical processing
- Gas industry services
- Boiler circulation
- Water services
- High-temperature applications
- General industrial

Complementary Pump Designs

The ERPN may be used with other Flowserve models of API design. These include:

- Single- and two-stage, between bearings pumps
- Multistage, between bearings pumps
- Vertical, double-casing pumps
- Specialty pumps
Established on the engineering and safety parameters of ISO 13709/API 610, the Flowserve ERPN pump provides maximum mechanical and hydraulic design flexibility. With customization for individual applications, this pump is available in a variety of optional configurations, including:

- Closed impeller with front and back wear rings for standard services
- Inducer design for low NPSHA service requirements
- Semi-open impeller design with back vanes for liquids containing solids

**Operating Parameters**

- Rated flows to 1100 m³/h (4800 gpm)
- Heads to 230 m (755 ft)
- Temperatures to 350°C (660°F)
- Working pressures to 60 bar (870 psi)
- Suction pressures to 35 bar (500 psi)

**Features and Benefits**

**Centerline Supported Pump Casing** accommodates nozzle loads in accordance with ISO 13709/API 610 design requirements, minimizing shaft misalignment and extending rotor, bearing and seal life.

**Precision Cast Impeller** is dynamically balanced to limit vibration and assure smooth operation over a wide flow range. The impeller is positively secured by a set screw and a locknut, the threads of which are not exposed to the pumped liquid.

**Flanges** are in accordance with ASME B16.5 Class 300 RF standard or 600 RF optional.

**Pump Casing and Cover** feature metal-to-metal fit with fully confined, controlled compression gasket to ensure proper sealing and alignment. A double volute design is used on all large pump sizes.

**Suction Nozzle Guide Vane** on larger sizes reduces inlet vortexing and ensures uniform flow into the impeller to achieve a reliable NPSH margin.

**Back Pull-Out Design** simplifies maintenance as neither the motor nor the piping is disturbed.

**Renewable Casing and Impeller Wear Rings** reduce maintenance costs and keep the clearance between wear surfaces in compliance with API 610 standards.
**Heavy-Duty Bearing System**

The bearing housing of the ERPN is made of heavy-duty carbon steel. Standard labyrinth type oil seals retain oil and exclude atmospheric contaminants and moisture. Optional bearing isolators are available.

As standard, the ERPN is equipped with roller type radial bearings and single row, 40° angular contact back-to-back mounted thrust bearings. High-suction pressure bearing arrangements are available.

**ISO 21049/API 682 Seal Chamber**

The ERPN pump features an ISO 21049/API 682 compliant seal chamber which accommodates a wide variety of seal configurations including dual pressurized and unpressurized cartridge types for the most severe services.

Additionally, the ERPN is available with a full complement of API 610 seal flush piping plans.

**Special Configurations**

**ERP-N-O: Semi-Open Impeller**

Incorporating a semi-open impeller and a replaceable front wear plate, the ERPN-O is recommended when pumping hydrocarbons containing solids.

**ERP-N-S: High-Suction Pressure Design**

The ERPN-S incorporates a bearing arrangement able to support suction pressures up to 35 bar (500 psig) and an option for maximum working pressures to 60 bar (870 psig).
Optional Inducer

For applications with low NPSH, the ERPN can be fitted with an optional inducer (ERPN-IND). This high-suction specific speed, axial flow pumping device provides significant improvement in suction performance by reducing pump NPSHR.

API Material Combinations

The ERPN is available in all ISO 13709/API 610 materials combinations, including:

- S-5: Carbon steel with carbon steel internals
- S-6: Carbon steel with 12% chrome internals
- S-8: Carbon steel with 316 SS internals
- C-6: 12% chrome with 12% chrome internals
- A-8: 316 SS with 316 SS internals
- D-1: Duplex with duplex internals
- D-2: Super duplex with super duplex internals

The ERPN also is available in low-temperature carbon steel as well as NACE MR0175 and MR0103 compliant materials.

Bearing System Options

Numerous bearing system options are available with the ERPN pump:

- Oil mist and oil purge for continuous bearing lubrication
- Fan cooling for high operating or high ambient temperature applications
- Water cooled bearing housing for efficient water cooling

Available Baseplate Designs

- Drain pan design
  - Welded and fabricated carbon steel
  - Sloping drain pan with drain connection
- Drain rim design
  - Drain rim provided along baseplate perimeter
  - Drain pan provided below complete unit

ERPN Range Chart

The chart illustrates the range of flow rates and total dynamic head (TDH) for the ERPN pump at 60 Hz and 50 Hz, with options for 2 pole and 4 pole configurations.
Typically, 90% of the total life cycle cost (LCC) of a pumping system is accumulated after the equipment is purchased and installed. Flowserve has developed a comprehensive suite of solutions aimed at providing customers with unprecedented value and cost savings throughout the life span of the pumping system. These solutions account for every facet of life cycle cost, including:

**Capital Expenses**
- Initial purchase
- Installation

**Operating Expenses**
- Energy consumption
- Maintenance
- Production losses
- Environmental
- Inventory
- Operating
- Removal

**Innovative Life Cycle Cost Solutions**
- New Pump Selection
- Turnkey Engineering and Field Service
- Energy Management
- Pump Availability
- Proactive Maintenance
- Inventory Management

**Typical Pump Life Cycle Costs**

- Energy: 44%
- Maintenance and Repair: 17%
- Loss of Production: 12%
- Purchase and Installation: 9%
- Operational: 16%
- Decontamination and Removal: 2%

1 While exact values may differ, these percentages are consistent with those published by leading pump manufacturers and end users, as well as industry associations and government agencies worldwide.