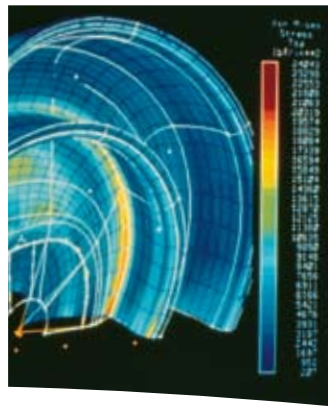




VTP
Vertical Turbine, Wet-Pit Pump



Experience In Motion



Pump Supplier to the World

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® Pumps

Flowserve® Pumps

IDP® Pumps

Jeumont-Schneider™ 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

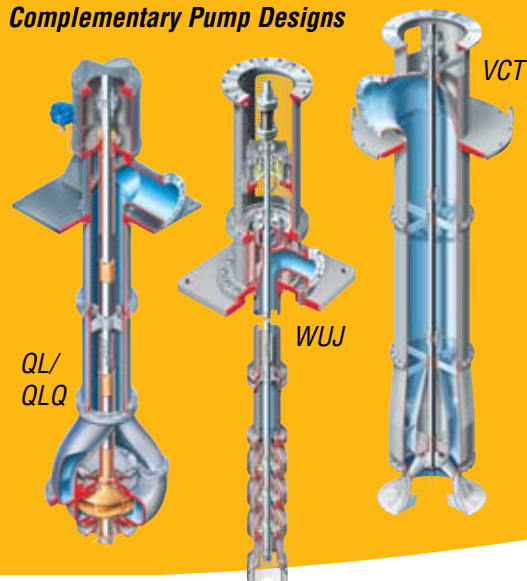
Worthington® Pumps

Worthington Simpson® Pumps

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Complementary Pump Designs



Unequaled Hydraulic Coverage and Design Flexibility

The Flowserve VTP is a single casing, diffuser type vertical turbine pump. Flowserve VTP pumps are installed in wet-pit or deep well applications where NPSH available is ample. Flowserve manufactures one of the world's most comprehensive lines of mixed flow vertical turbine pumps to ensure the best pump selection for a wide variety of services.

Engineered Flexibility

VTP pumps are available in a wide variety of configurations, constructions and materials to suit application requirements. Among the options are:

- Open or enclosed lineshaft construction
- Enclosed or semi-open impellers, keyed or collet mounted
- Bowl and enclosed impeller wear rings
- Cast iron or fabricated steel discharge heads
- Sealing configurations for open lineshaft construction
 - Packed box with flexible graphite packing
 - Single or dual mechanical seal
- Sealing configurations for enclosed lineshaft construction
 - Enclosing tube tension assembly for oil lubrication
 - Water injection packing assembly
- Above ground or below ground discharge flanges
- Multiple drivers
 - Electric motors, solid or hollow shaft
 - Engines with right angle gear drives
 - Steam turbines
- Separate axial thrust bearing assembly
- Standard and ISO 13709/API 610 (VS1), latest edition configurations

Applications

- Municipal water
- Irrigation
- General industrial
- Snow making
- Power generation
- Oil and gas production
- Hydrocarbon processing
- Mining
- Storm water
- Sump service

Rebowl Services

Flowserve can revitalize the performance of aged VTPs and reduce total operating costs. Whether for competitor or Flowserve pumps, upgrades will reduce power consumption, downtime and maintenance costs while extending the pump life.

Complementary Pumps

Flowserve also offers these complementary pumps:

- VCT vertical mixed flow pumps
- QL and QLQ single casing, double suction, twin volute pumps
- WUJ ISO 13709/API 610 (VS1) vertical, multistage single casing process pump
- AFV vertical axial flow pump
- VPC vertical turbine, double casing pump
- LNN between bearing, axially split, single stage, double suction pump

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Product Lubrication

The VTP is a single casing, diffuser type, single or multiple stage vertical turbine pump designed for continuous duty in a variety of wet-pit and deep well applications. Its extraordinarily broad hydraulic coverage is well complemented by its versatility.

Operating Parameters

- Flows to 13 600 m³/h (60 000 gpm)
- Heads to 700 m (2300 ft)
- Pressures to 100 bar (1450 psi)
- Temperatures from -45°C (-50°F) to 200°C (400°F)
- Sizes 150 mm (6 in) to 1375 mm (55 in)
- Settings to 365 m (1200 ft)

Product Lubrication utilizes open lineshaft construction allowing lineshaft bearings to be lubricated by pumped liquid

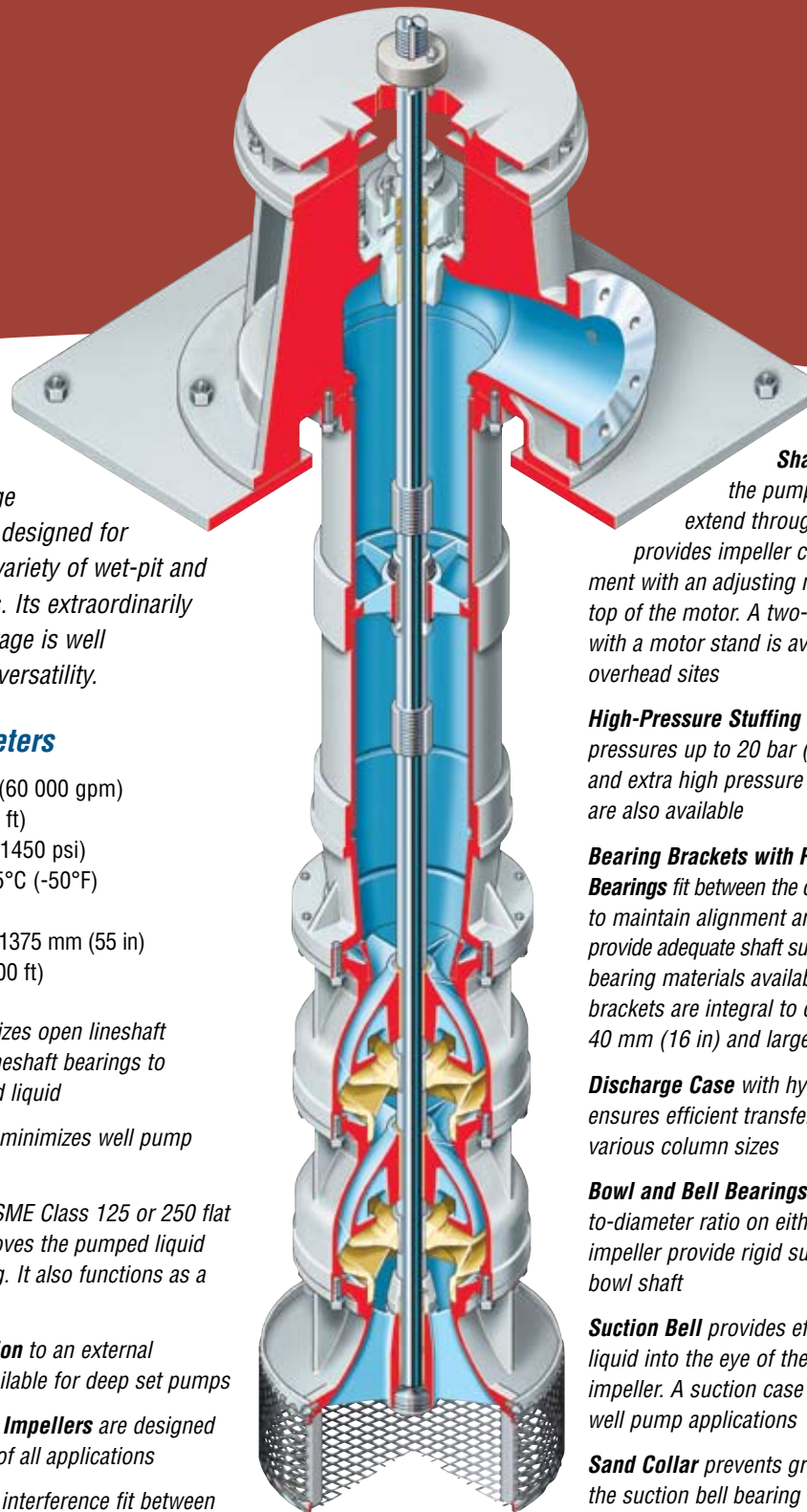
Threaded Column Pipe minimizes well pump casing diameter

Discharge Head with ASME Class 125 or 250 flat face flange smoothly moves the pumped liquid into the discharge piping. It also functions as a driver mounting base

Prelubrication Connection to an external lubrication source is available for deep set pumps

Enclosed or Semi-open Impellers are designed for maximum coverage of all applications

Lock Collets provide an interference fit between the bowl shaft and impeller to hold the impeller securely in place. Keyed impellers are standard for 500 mm (20 in) and larger models and optional on other sizes



Vertical Hollow Shaft Motor allows the pump headshaft to extend through the motor and provides impeller clearance adjustment with an adjusting nut located at the top of the motor. A two-piece headshaft with a motor stand is available for low overhead sites

High-Pressure Stuffing Box for working pressures up to 20 bar (300 psi). Low and extra high pressure stuffing boxes are also available

Bearing Brackets with Rubber Lineshaft Bearings fit between the column sections to maintain alignment and are spaced to provide adequate shaft support. Alternative bearing materials available. Bearing brackets are integral to column pipes 40 mm (16 in) and larger

Discharge Case with hydraulic adapter ensures efficient transfer of flow to various column sizes

Bowl and Bell Bearings with high length-to-diameter ratio on either side of the impeller provide rigid support for the bowl shaft

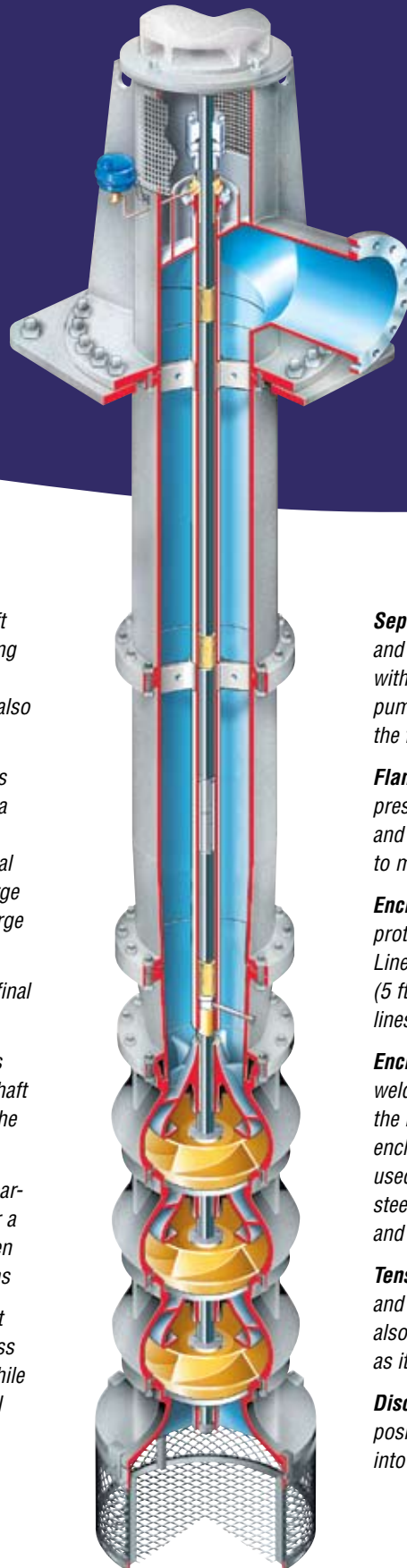
Suction Bell provides efficient flow of liquid into the eye of the first stage impeller. A suction case is provided for well pump applications

Sand Collar prevents grit from entering the suction bell bearing

Basket Strainer exceeds Hydraulic Institute parameters. Cone strainers are provided for deep well installations

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Enclosed Oil Lubrication



Enclosed Oil Lubrication isolates the lineshaft and bearings from the pumped liquid minimizing maintenance in abrasive services. Alternative lubricants such as clean water or grease can also be used with enclosed lineshaft construction

Heavy-Duty Discharge Head with ASME Class 150, 300 or 600 raised face flanges provides a rigid and stable support for high horsepower drivers. The mitered elbow reduces the internal friction loss and turbulence. Cast iron discharge heads are available to 500 mm (20 in) discharge

Alignment Screws allow positioning of larger frame size motors on the discharge head for final alignment of the pump and motor shafts

Rigid, Adjustable Flanged Coupling provides accurate impeller clearance adjustment and shaft stability. A spacer coupling allows access to the mechanical seal without removing the motor

Enclosed Impeller provides close running clearance with the bowl to maintain efficiency over a broad operating range. Full range of semi-open impellers is available for particular applications

Keyed Impellers positively locked to the shaft eliminate shaft to impeller movement. Stainless steel slotted keys prevent radial movement while the stainless steel split-ring keys prevent axial movement. Collet mounting is standard for impellers up to 460 mm (18 in)

Separate Steel Soleplate allows grouting and leveling of the pump discharge head without permanently anchoring it. The pump can be removed without disturbing the foundation

Flanged Column Pipe contains the pressure being generated by the pump and has a rabbet fit between the flanges to maintain alignment

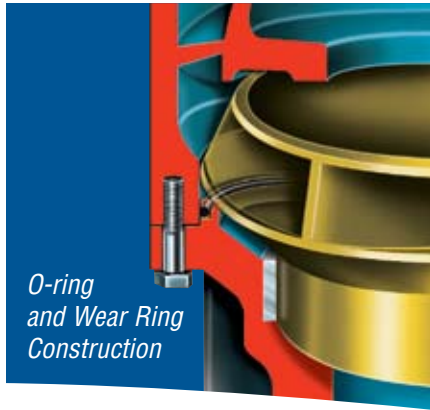
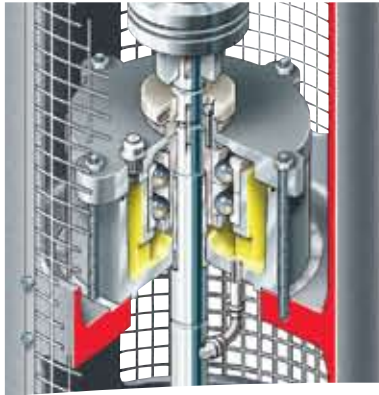
Enclosing Tube provides lineshaft protection from the pumped liquid. Lineshaft bearings are spaced at 1.5 m (5 ft) intervals to provide adequate lineshaft support

Enclosing Tube Stabilizer is integrally welded to the column pipe to maintain the rigidity and the alignment of the enclosing tube. Rubber stabilizers are used on column sizes to 355 mm (14 in); steel stabilizers for 400 mm (16 in) and larger

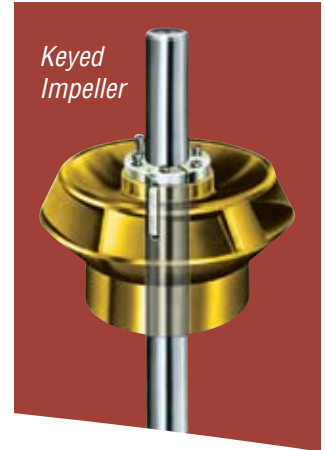
Tension Bearing holds the enclosing tube and lineshaft bearings in alignment. It also provides a chamber for the lubricant as it enters the enclosing tube

Discharge Case With Bypass Port allows positive flow of lineshaft bearing lubricant into the enclosing tube

Options and Technical Data



O-ring and Wear Ring Construction



Keyed Impeller

Integral Axial Thrust Bearing Assembly

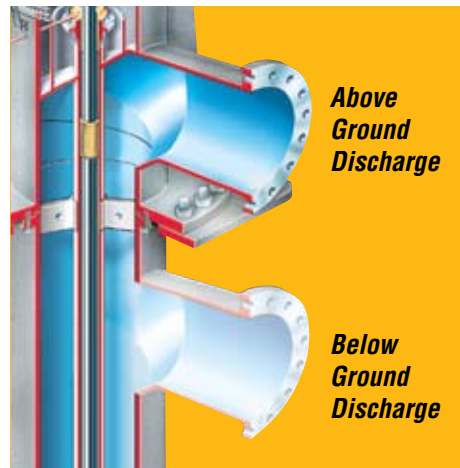
The axial thrust bearing assembly withstands the total hydraulic thrust as well as the rotor weight. Self-lubricating anti-friction bearings are utilized for standard applications. The integral axial thrust bearing assembly is available on VPC pumps with IEC motors.

API 610 Compliant Features

- Weld neck flanges
- Precision, rigid adjustable flanged spacer coupling
- Seal chamber with jackscrews
- Studs and nuts
- O-ring construction
- One-piece pump shaft up to 6 m (20 ft)
- Dynamically balanced, keyed enclosed impellers
- Pinned wear rings
- API 610 forces and moments

Discharge Configurations

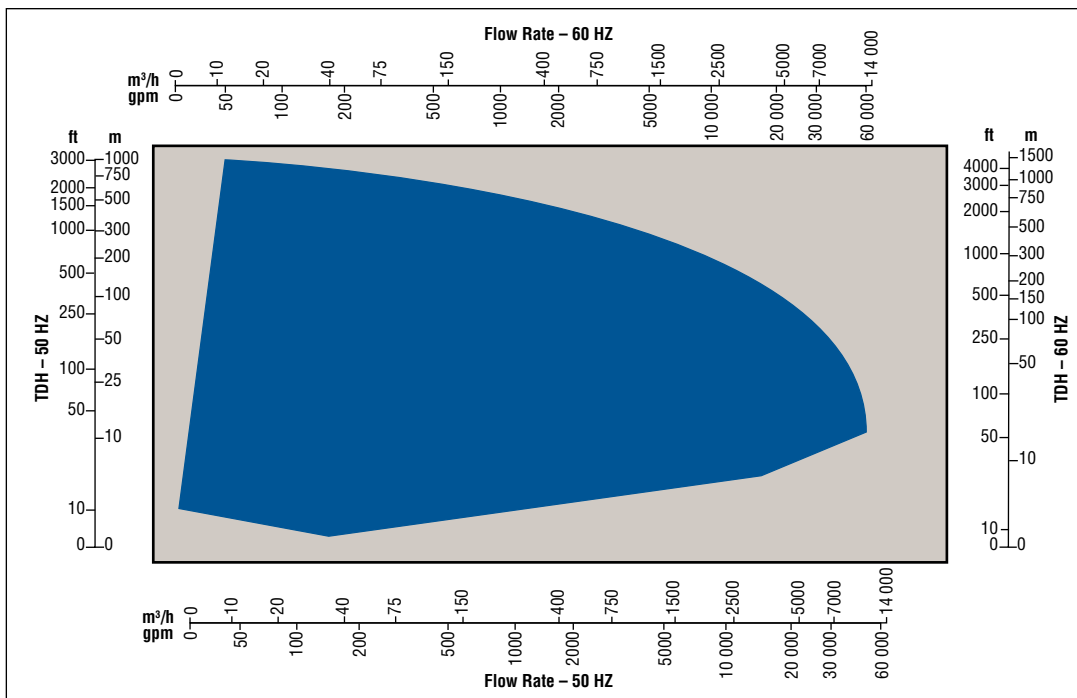
When using a fabricated discharge design, VTP pumps are available with above or below ground discharge flanges to suit site conditions.



Above Ground Discharge

Below Ground Discharge

VTP Range Chart



Global Service and Technical Support



Life Cycle Cost Solutions

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

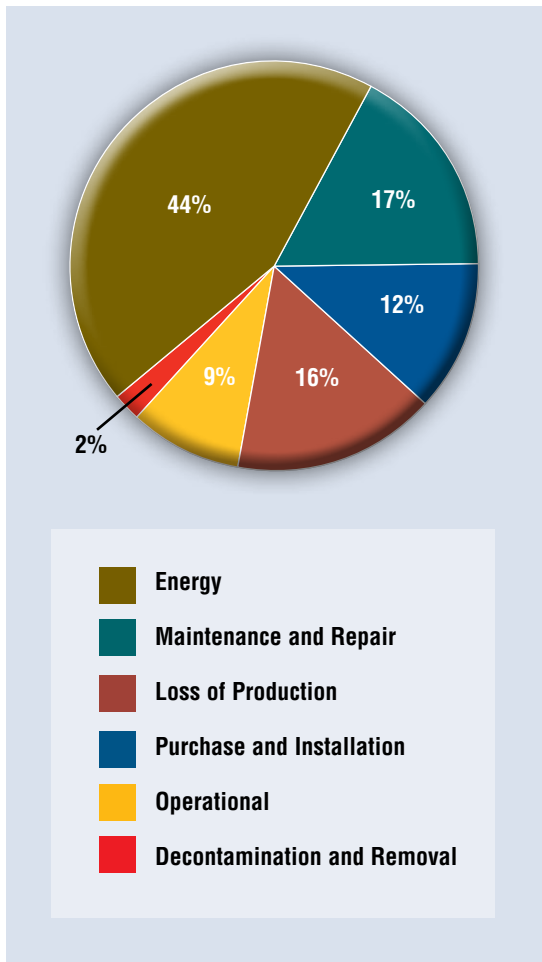
Operating Expenses

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

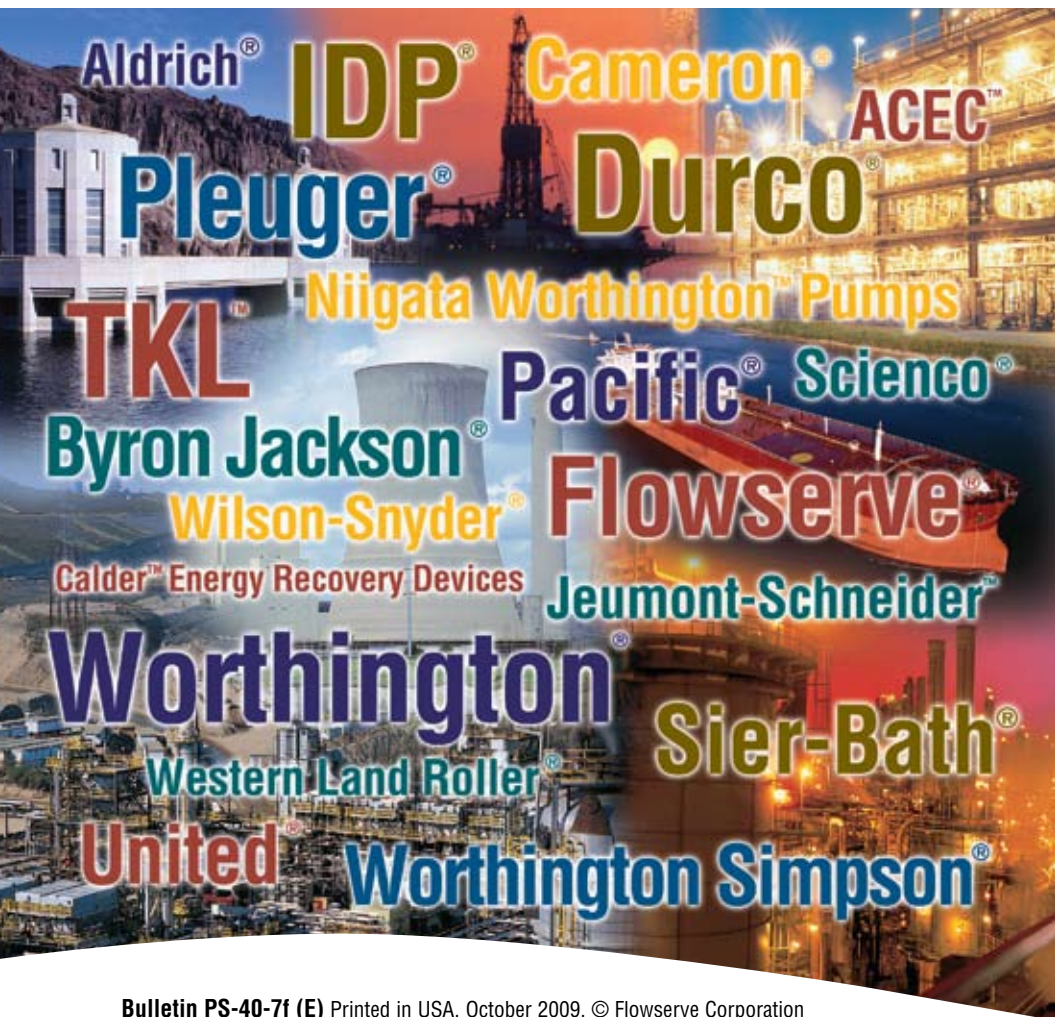
Innovative Life Cycle Cost Solutions

- New Pump Selection
- Turnkey Engineering and Field Service
- Energy Management
- Pump Availability
- Proactive Maintenance
- Inventory Management

Typical Pump Life Cycle Costs¹



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.



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