

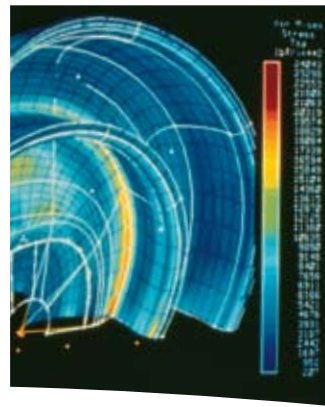


***QL Series  
Vertical, Double-Suction,  
Twin-Volute Turbine Pumps***

QL – QLQ – QLC – QLQC



***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*

*Cameron® Pumps*

*Durco® Pumps*

*Flowserve® Pumps*

*IDP® Pumps*

*Jeumont-Schneider™ 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*

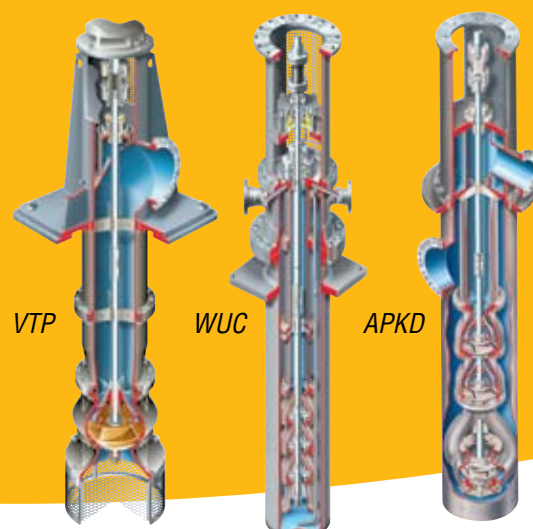
*Worthington Simpson® Pumps*

**QL, QLQ, QLC  
and QLQC**

**Engineered, Vertical,  
Double-Suction,  
Twin-Volute,  
Turbine Pumps**



**Complementary Pump Designs**



**Double-Suction Design Reduces  
NPSHr and Operating Costs**

The FlowsERVE QL Series vertical, double-suction pumps minimize operating and maintenance problems associated with typical vertical turbine pumps. Available in single- and double-casing designs, QL Series pumps feature an innovative, double-suction impeller that produces more flow and higher head at lower NPSHr and can operate at higher speeds than conventional vertical turbine models. In addition, QL Series pumps require less maintenance and repair than comparably performing turbine pumps.

**Engineered Flexibility**

QL Series pumps are available in multiple configurations to suit application needs and promote life cycle cost savings:

- QL single stage, wet-pit
- QLQ multistage, wet-pit
- QLC single stage, double-casing
- QLQC multistage, double-casing

**Performance Benefits**

- Stable hydraulic performance for multiple pump systems or varying capacity needs
- Low axial thrust for longer thrust bearing life
- Twin-volute design with low radial loads for extended pump bearing life
- Flush line to suction bearings for prolonged life

**Operating Parameters**

- Flows to 25 000 m<sup>3</sup>/h (110 000 gpm)
- Heads to 500 m (1600 ft)
- Pressures to 70 bar (1000 psi)
- Temperatures from -45°C (-50°F) to 205°C (400°F)
- Column sizes from 100 mm (4 in) to 1500 mm (60 in)

**Typical Applications**

- Raw water intake
- Fresh water supply and distribution
- Irrigation
- Fire protection (NFPA 20)
- Cooling water tower
- Condensate extraction, heater drain
- API 610 process services
- Transfer, loading and unloading
- Steel mill cooling and quench services
- Mine dewatering and acid leaching
- Secondary effluent
- Brine recirculation and blow down for MSF desalination

**Complementary Pump Designs**

- VTP vertical turbine, wet pit pump
- VPC general service and API 610 (VS6) double-casing, turbine pumps
- WUC API 610 (VS6) vertical, multistage double-casing process pump
- WUJ API 610 (VS1) vertical line shaft, multistage process pump
- APKD vertical, double-suction, multistage double-casing pump



**QL and QLQ**  
**Single-Casing,**  
**Double-Suction,**  
**Vertical Turbine**  
**Pumps**

The Flowserve QL and QLQ vertical, turbine pumps feature double-suction (first-stage) impellers in true twin-volute designs. Providing reliable, economical performance in difficult wet-pit services, QL and QLQ pumping systems are installed worldwide. Their optional enclosed lineshaft construction makes them ideal for use in open sumps as well as numerous industrial applications containing silt or abrasive solids. Also available in an ISO 13709/API 610 (VS2) compliant design to meet varying industry demands.

**Double-Suction (First-Stage) Impeller** features large passageways and produces balanced hydraulic thrust for a stable performance curve with low shut-off pressure. The double-suction design on multistage pumps permits higher head and operating speed than vertical turbine models while maintaining excellent suction attributes

**Heavy Walled, Twin-Volute Casing** with robust transition diffuser moves liquid from casing to column through large waterways at low liquid velocity, minimizing corrosion, erosion and radial loads on bearings

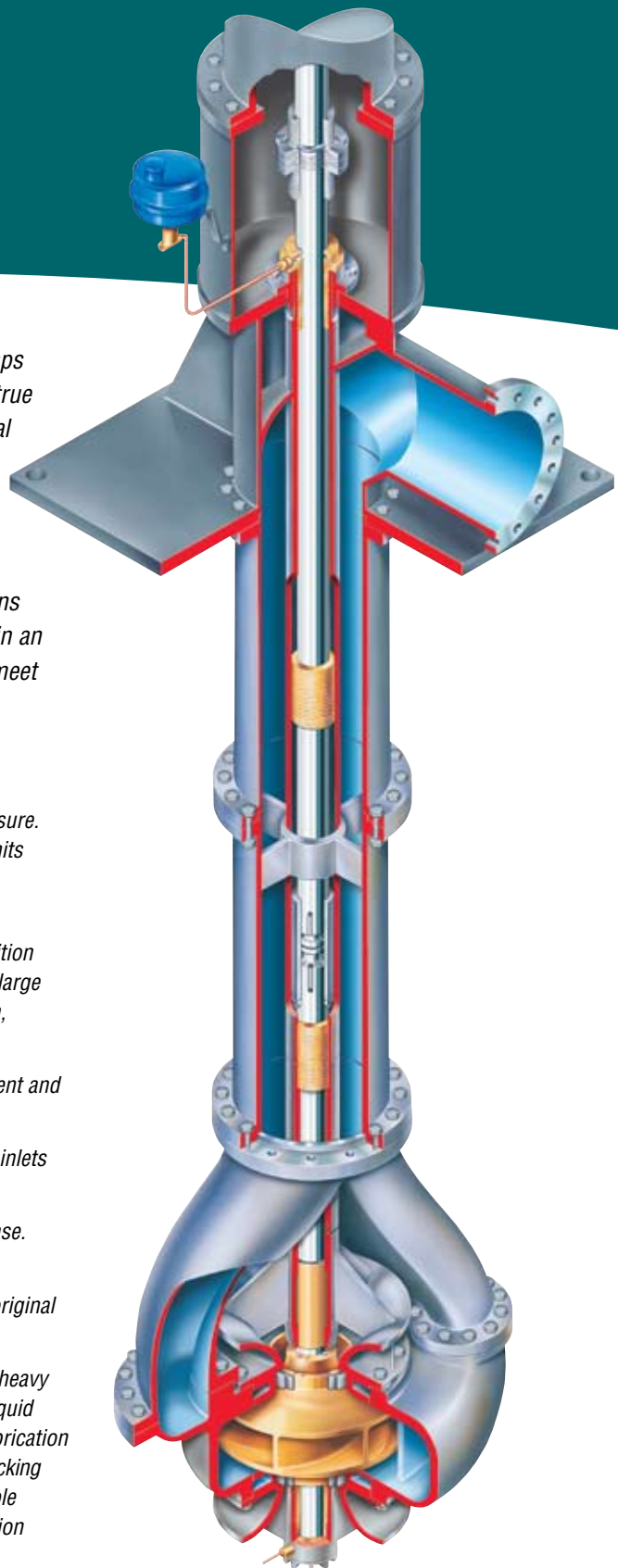
**Heavy-Duty Discharge Head** maintains motor alignment and provides liquid end column support

**Suction Bells** efficiently direct liquid into the impeller inlets with minimum resistance

**Bottom Liquid End Bearing** is sealed for life with grease. An optional lubricating line is also available

**Optional Impeller Wear Rings** enable restoration of original clearances for increased efficiency

**Optional Enclosed Lineshaft Construction** features a heavy walled enclosing tube that isolates the lineshaft and liquid end bearings from the pumped fluid. The enclosed lubrication stuffing box is maintenance free, without a traditional packing arrangement or a mechanical seal to maintain. Available lubrication systems include oil drip, fresh water injection and grease packed



**QLC and QLQC**  
**Double-Casing,**  
**Double-Suction,**  
**Vertical Turbine**  
**Pumps**

The QLC and QLQC are double-casing, double-suction, vertical turbine pumps. Available in single or multi-stage units and featuring true twin-volutes, QLC and QLQC pumps incorporate the proven hydraulics of the QL and QLQ into a double-casing configuration. Design flexibility makes these pumps ideal for process applications. Standard and ISO 13709/API 610 (VS7) compliant designs are available to meet varying industry demands. For the power industry, the standard pump design offers the advantage of multistage construction for reliable condensate extraction service. ISO/API compliant pumps are ideal for the aggressive pipeline, storage and transfer applications found within the oil and gas industry.

**Versatile Seal Chamber** accommodates installation of cartridge style single, dual unpressurized and dual pressurized mechanical seals to meet safety and environmental requirements

**Suction Can** creates optimum hydraulic conditions through the suction flange inlet into the suction bell

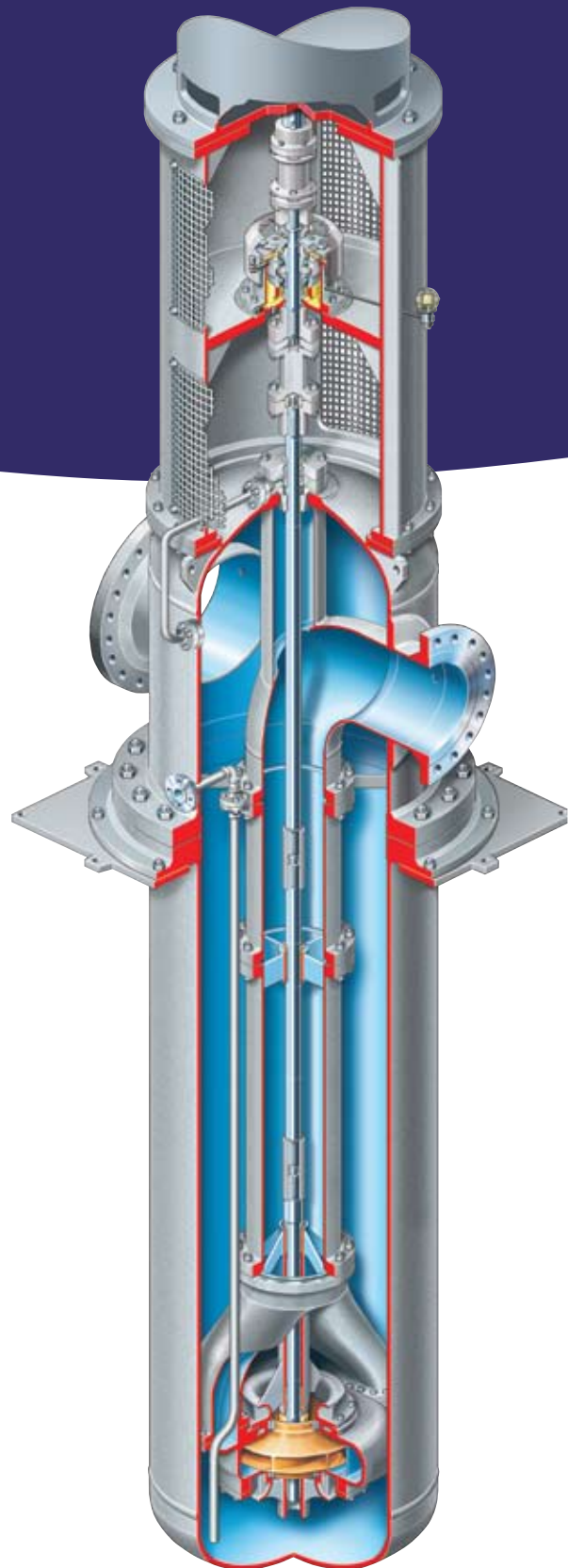
**Keyed Impeller** design provides ease of maintenance

**Renewable Impeller Wear Rings**, when fitted, enable the restoration of original clearances and promote high operating efficiency. Casing wear rings are standard

**Line Shaft Bearings** are spaced to ensure the first critical speed of the rotor is well above running speed. Sleeves are provided under bearings for additional shaft protection

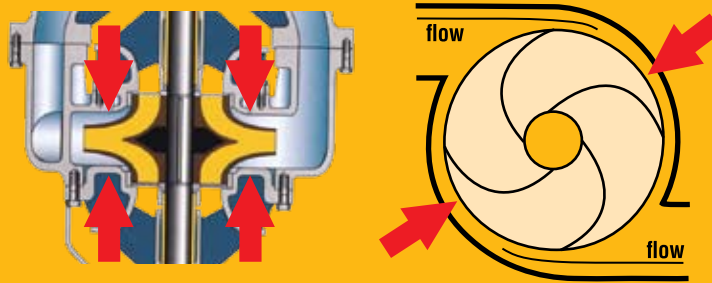
**Line Shaft Bracket** is integral to column and assures concentricity and alignment of the shaft for longer bearing life

**Keyed Line Shaft Couplings** ease dismantling for maintenance



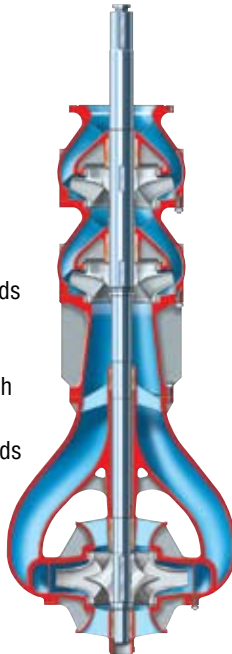
**Options and Technical Data**

**Low Axial and Radial Thrust Loads**



**Designed to Perform**

- Stable hydraulic performance
  - Relatively flat, continuously rising total head to shut-off is ideal for multiple pump systems and services with widely varying capacity needs
  - Low shut-off head (< 125% of rated head) is well suited for systems sensitive to high shut-off pressure
- Low axial and radial thrust loads
  - Extended bearing life
  - Reduced parts and maintenance costs
- Available multistage designs to meet high differential head



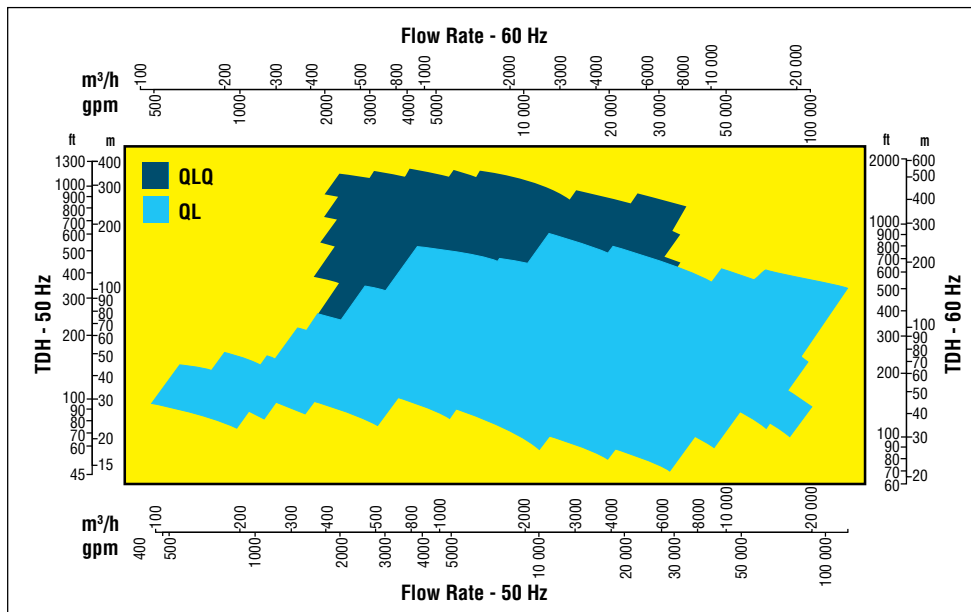
**Axial Thrust Bearing Assembly**

The axial thrust bearing assembly can be integral to the motor or installed in the pump head. The bearing assembly withstands the total hydraulic thrust as well as the rotor weight. Self-lubricated anti-friction or tilting pad bearings can be utilized.

**Additional Options**

- Sealing configurations
  - Packed box (with Plan 13 for 7+ bar [100+ psi] applications)
  - Single, dual and split seals
- Multiple drivers
  - Electric motors, solid or hollow shaft
  - Variable frequency drives
  - Engines with right angle gears
  - Steam turbines

**QL Series 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

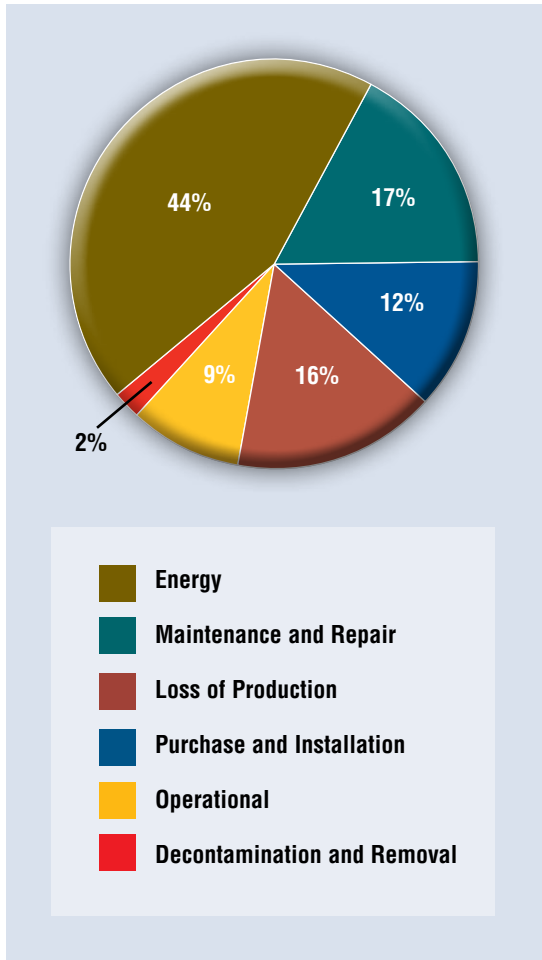
### Operating Expenses

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

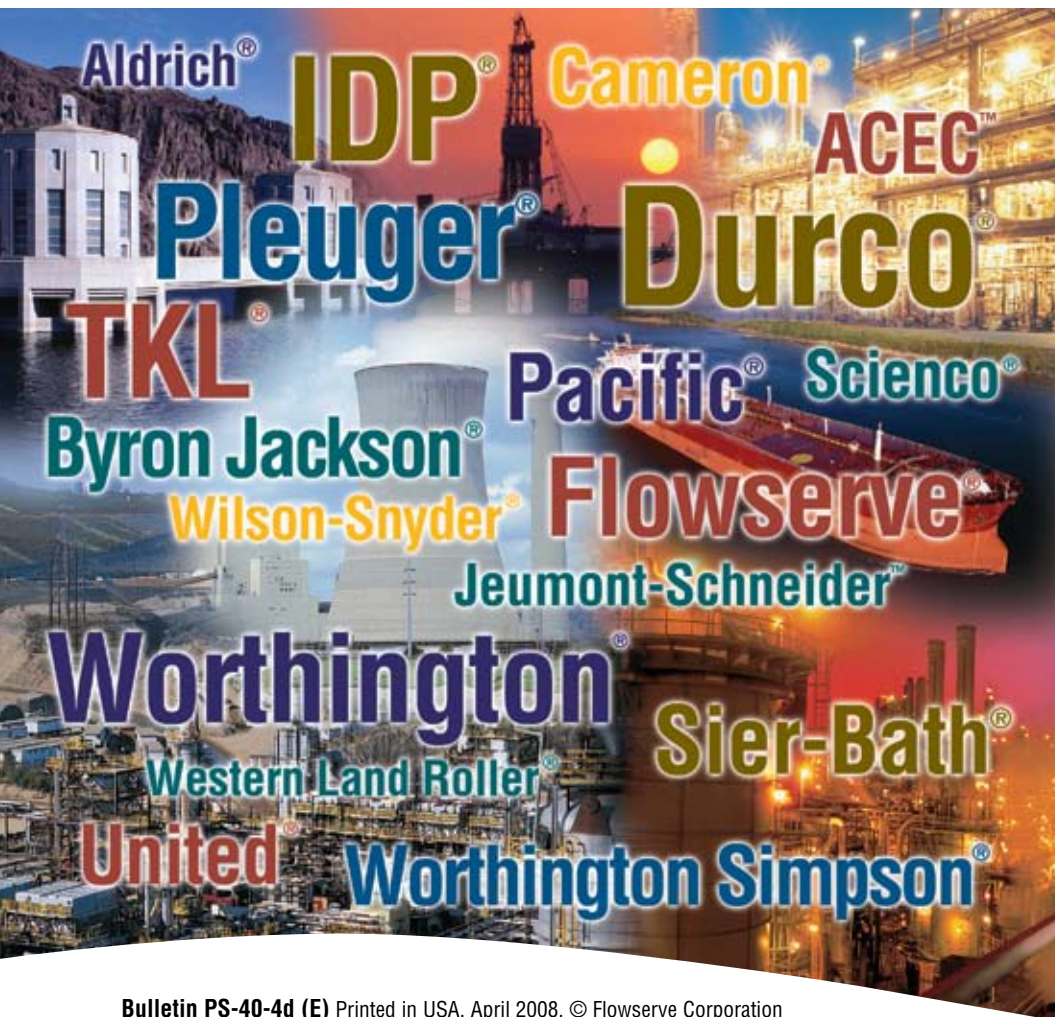
### Innovative Life Cycle Cost Solutions

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

### Typical Pump Life Cycle Costs<sup>1</sup>



<sup>1</sup> 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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