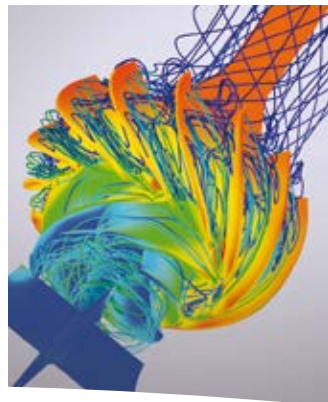




SIHI®
*Engineered Vacuum and
Compressor Systems*



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 provides pumping solutions that 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 initial 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 bearings single-stage
- Between bearings multistage
- Vertical
- Submersible motor
- Positive displacement
- Vacuum & Compressor
- 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

INNOMAG® Sealless Pumps

Lawrence Pumps®

Niigata Worthington™ Pumps

Pacific® Pumps

Pleuger® Pumps

Scienco™ Pumps

Sier-Bath® Rotary Pumps

SIHI® Pumps

TKL™ Pumps

United Centrifugal® Pumps

Western Land Roller™ Irrigation Pumps

Wilson-Snyder® Pumps

Worthington® Pumps

Worthington Simpson™ Pumps

Typical Applications

- Distillation
- Degassing
- Drying
- Condenser exhaust
- Evaporation
- Gas compression
- Filtration
- Solvent recovery
- Central vacuum
- And many more



More than a pump...

Design and manufacture of high quality vacuum pumping systems for almost 100 years strengthens the ability of SIHI® to provide customer-centric engineered solutions on a global scale.

Application knowledge and consultation form the basis of optimised product selection, simple process integration, and long-term reliability.

Life-Cycle Cost understanding is a fundamental consideration when matching products with processes. Power consumption, integration, reliability, and maintainability are all considered throughout the concept-to-integration process.

Ongoing innovation guarantees that the strong client base benefits from the latest proven technology. Importantly, customer satisfaction is the mechanism that drives the continual improvement program.

Cross Border Project Competence

Competence centres have been strategically appointed to lead the customised systems procedure on a global level. The result is local service, on a worldwide basis, that has the capability of providing high-end service to our customers. Engineering excellence, project management, and communication supports an on-time product that complies with legislation and operational guide-lines.

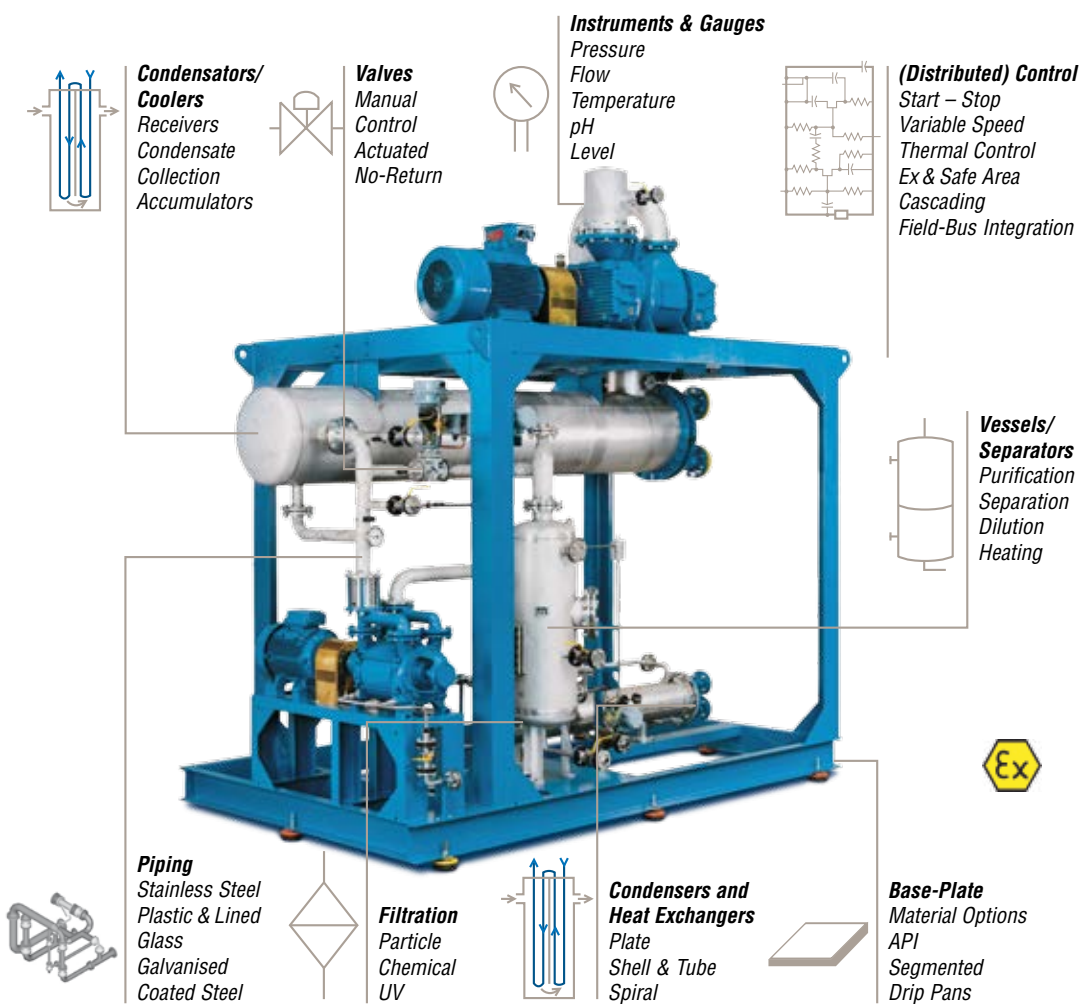
Customised high-quality systems range from small water boosting skids through to extensive recovery systems complete with onerous FAT testing, documentation, and site commissioning.

API, NACE, ASME, ISO, and DIN are all examples of technical standards and directives that can be employed.

Industries/Markets

- Chemicals
- Pharmaceuticals
- Petrochemicals
- Food
- Power
- Water treatment
- Surface coating
- Beverage
- Bio fuels
- Healthcare

Engineered Vacuum and Compressor System



LPHX-Vacuum



LEM-Vacuum



KPH-Compressor

Application fit



	Evaporation	Distillation	Condenser Exhaust	Degassing	Recovery Systems (Gas & Vapor)	Central Vacuum	Drying	Flare gas	Extraction	Packaging	Freeze drying	Coating & Crystal Pulling	Sterilization
Food	X			X		X	X		X	X	X		
Beverage		X		X		X			X	X			
Chemical	X	X		X	X	X	X	X	X	X			
Pharmaceutical	X	X		X	X	X	X		X	X	X		
Petrochemical		X		X	X			X					
Edible oils	X	X		X	X	X				X			
Bio Ethanol		X			X	X							
Reverse Osmosis				X					X				
Water purification		X		X		X							
Bottle filling				X									
Bio Mass			X				X						
Power			X	X									
Solar / Photovoltaic						X						X	
Rubber & Plastic				X	X	X				X		X	
Health care				X		X				X			X
Nuclear				X			X						
Effluent & Waste				X		X			X				
Refineries		X		X	X		X	X					
Gas Plants					X		X	X					

Flexible options

- Variable speed drive
- Condition monitoring IPS Detect
- Exotic materials
- Magnetically driven
- Mechanically sealed
- High end sealant systems
- Distributed Control System (DCS)
- ...



WNH-Roots Blower

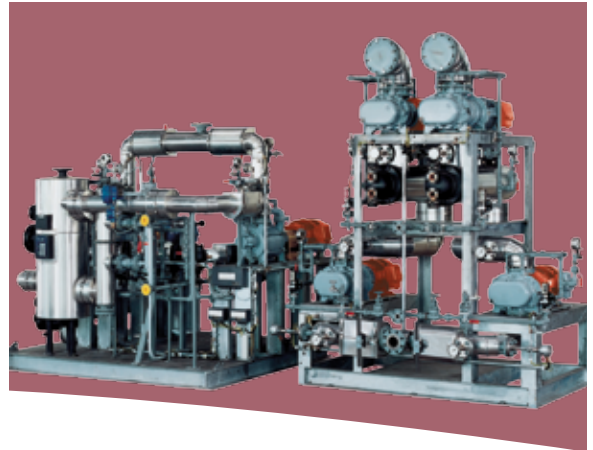


GPV-Ejector



SIHI® Dry-Vacuum

*Liquid ring vacuum system
...cool, robust and
cost effective*



Reliability, that has stood the test of time, ensures this generation of vacuum machine is positioned to tackle the most demanding applications.

Performance range:

- up to 100 000 m³/h (58 858 cfm)
- 10⁻³ mbar (7 x 10⁻⁴ Torr) up to atmospheric pressure

Optimisation:

- Condensers & heat exchangers
- Lobular boosters
- Gas & steam ejectors
- Valves & instrumentation
- Vessels & pipe-work
- DCS Integration
- Scrubber systems and solvent recovery

- Exotic materials
- Engineered sealant systems
- Seal-less, magnetically driven versions

Packaged systems are supplied on a rigid base frame and provide easy integration into your process.

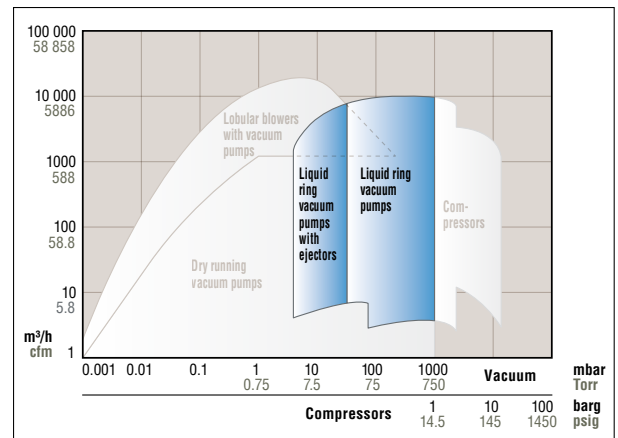
Water, power, effluent, and pollution are all considered during system design.

Benefits

- Extremely robust
- Cool operation
- Superior liquid, vapour and solids handling
- High Volumetric flow-rate
- Simple maintenance
- Effective heat exchanger
- ATEX Category 1 without flame-arresters

**Water doesn't need to be the
Liquid Ring...**

- Water is conventional, clean, and accessible
- Oil can run hotter, and resist internal condensation
- Hydrocarbons can be chilled to promote process-condensation for subsequent recovery



*Dry vacuum systems
...simple, dry, and
reliable*



No oil lubrication, mechanical seals, gearbox, or rotor coating underpin the reasons why the SIHI® Dry is so simple to operate and maintain.

A calm and quiet appearance illustrates just how easy this machine tackles today's advanced applications.

Performance range:

- up to 10 000 m³/h (5886 cfm)
- < 10⁻³ mbar (7 x 10⁻⁴ Torr) without Booster

Optimisation:

- Condensers & heat exchangers
- Lobular boosters
- Valves & instrumentation
- DCS Integration
- Scrubber systems and solvent recovery
- CIP (Clean in Place)

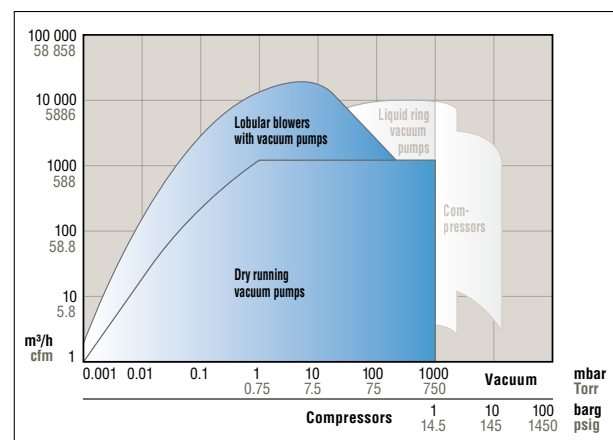
Service & repair must be easy...

- Simple Condition-Based (self) diagnostic checks
- Clean-in-place approach to internal deposits
- Simple component replacement if necessary

Attention to detail is illustrated by the style of the SIHI® Dry systems. Embedded touch-screen control can be integrated through WIFI for remote access and off-site diagnostic checks. Award winning technology for a better future!

Benefits

- Superior vacuum
- Lubrication-free
- Low energy (power) costs
- Extremely quiet
- ATEX Category 1 and 2
- Very tolerant to carry-over
- Simple maintenance
- Remote Self-Diagnostics



*Compressor systems
...cool, simple, and
tough*



Dependable compression, even when faced with some of the fiercest and thermally unstable processes, makes Liquid-Ring technology invaluable.

Performance range:

- up to 10 000 m³/h (5886 cfm)
- Atmospheric up to 12 barg (174 psig)

Optimisation:

- Condensers & heat exchangers
- Valves & instrumentation
- Vessels & pipe-work
- DCS Integration
- Scrubber systems and solvent recovery
- Exotic materials
- Engineered sealant systems
- Seal-less, magnetically driven versions

Packaged systems are supplied on a rigid base frame and provide easy integration into your process.

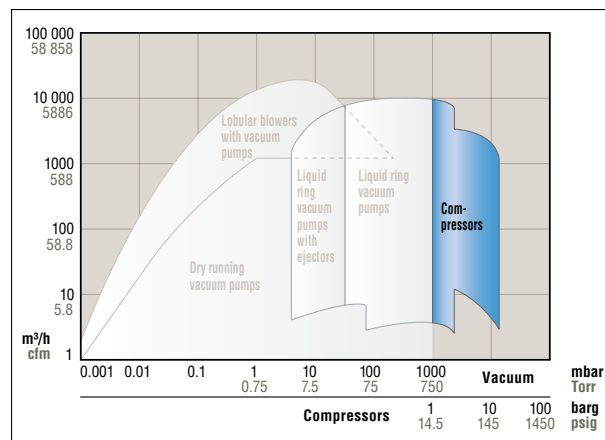
Thermal sensitivity, water, power, and effluent are all considered during system design..

Benefits

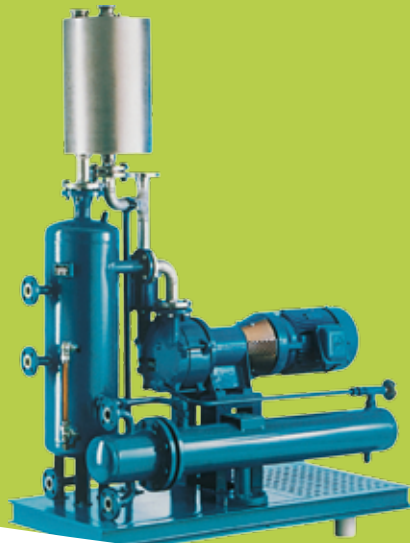
- Cool Operation
- Highly corrosion resistant
- Extremely Robust
- Superior liquid, vapour and solids handling
- Simple maintenance
- Effective heat exchanger
- ATEX

**Water doesn't need to be the
Liquid Ring...**

- Water is conventional, clean, and accessible
- Oil can run hotter, and resist internal condensation
- Hydrocarbons can be chilled to promote process-condensation for subsequent collection



**Vapour recovery
membrane cells
...compact, perpetual,
simple**



Whether its purpose is for recycling of process vapours or VOC emission control, this simple cell holds the answer to safe and reliable recovery. Highly effective separation ensures that a pure substance is recovered without the need for regeneration and/or cleaning. The desired element readily permeates through the membrane, and can be recovered, while clean inert gas passes freely over to atmosphere.

How does the membrane work?

The SIHI® membrane materials are designed to efficiently separate a process media from inert gas for the purpose of recycling or recovery.

Mixed process gasses and/or vapours are passed over a special polymeric material. The desired element readily permeates through the membrane, and can be recovered, while inert gas passes freely over to atmosphere.

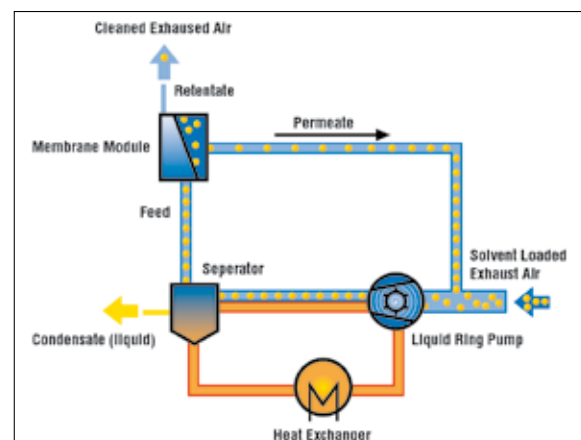
Typical solvents that can be recovered:

- Methylene Chloride
- Vinyl Chloride Monomer
- Ethylene and Propylene derivatives
- Hydrocarbon (VOC) solvents

The result is a very simple and highly effective means of recovery and emission control. One example would be the recovery of a Volatile Organic Solvent, such as Hexane, from air or nitrogen.

Benefits

- Simple, small, compact
- Very long lifetime
- Highly effective
- No regeneration necessary
- Pure substance recovery
- No power required
- Versatile for most Solvents, Monomers, Esters, Aldehydes, Nitriles, Aromatics or Aqua.



*Your process partner
Committed to
engineering excellence*



Understanding the process

- 100 years of experience
- Staff trained to communicate at all levels
- Deep application knowledge
... Solutions with minimal customer effort

Optimum product range

- Unique process can be treated with simplicity
- Reduced cost of design, manufacture, and documentation
- Predictable site testing and commissioning
... Customised solutions for standard capital costs

Design

- Advanced design tools
- Highest level of machine efficiency
- Long lasting reliability
... Reduced energy, maintenance, and environmental costs

Manufacturing

- Centre of excellence structure
- High level of skill and competence
Ongoing people and process development
... Reduced integration costs

Testing & Documentation

- Factory and Site Acceptance Tests
- Certified documentation
- Witnessed customised testing
... Reduced validation and commissioning costs

Quality assurance

- Total Quality Management
- ISO9000
- Rigorous health and safety culture
... Long term security

Aftermarket – a local approach

- Dedication to process uptime
- Locally positioned service & technical centres
- Easy access to support, on a worldwide level
... Highest level of customer care

Features

- One Supplier
- Compact Design
- Customised Solution
- High-End Quality
- Project Management
- FAT Testing
- International & EU Standards

Benefits

- Low Handling Cost
- Simple Installation
- Optimised Process
- Reliability
- On-Time Production
- Successful Integration
- Compliance

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

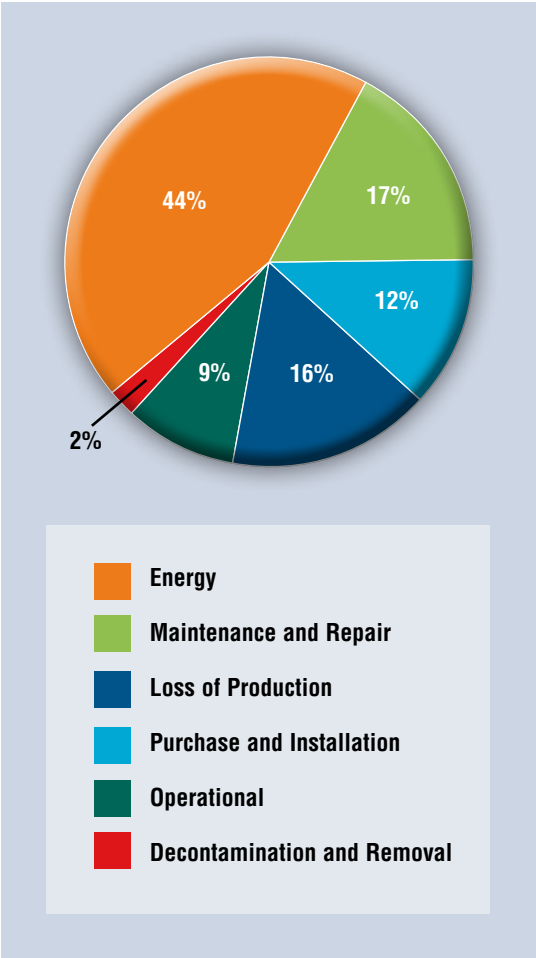
Operating Expenses

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

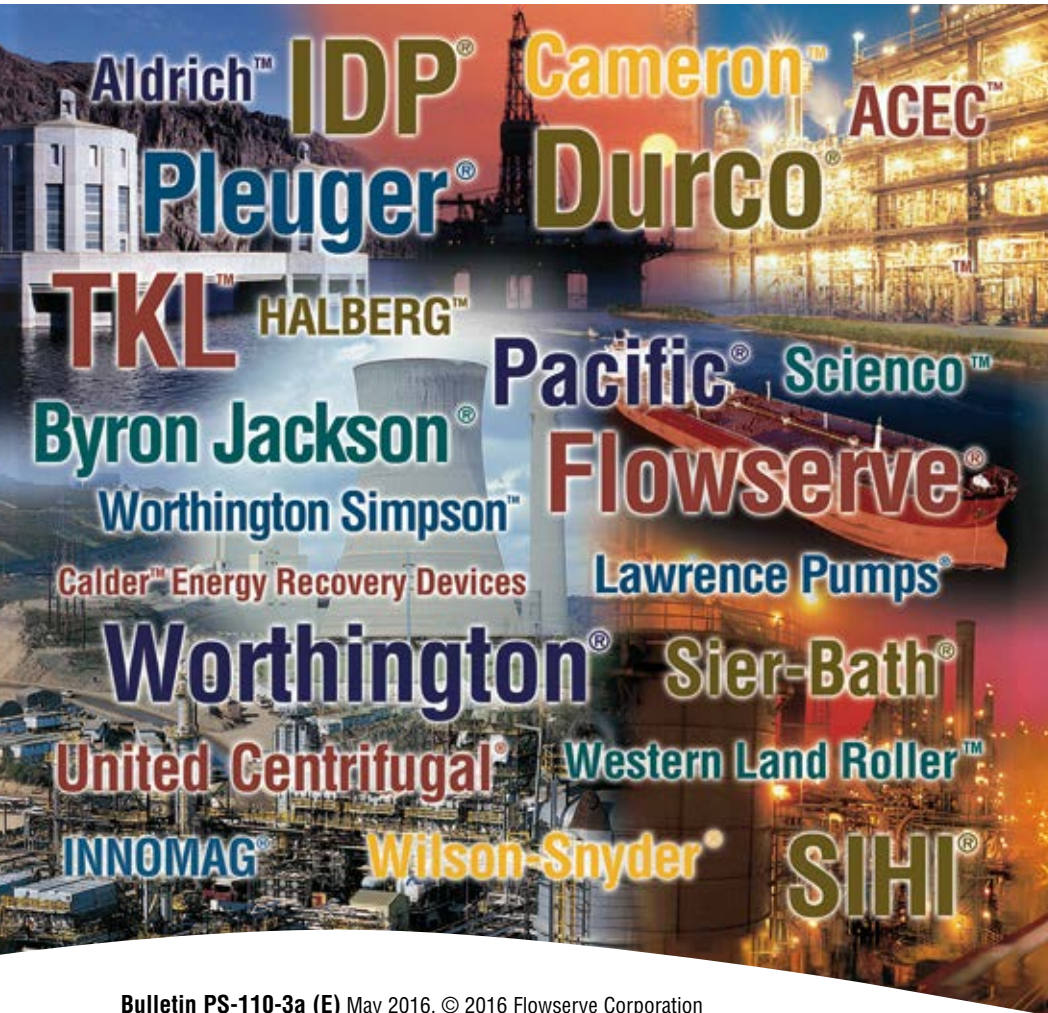
Innovative Life Cycle Cost Solutions

- 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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