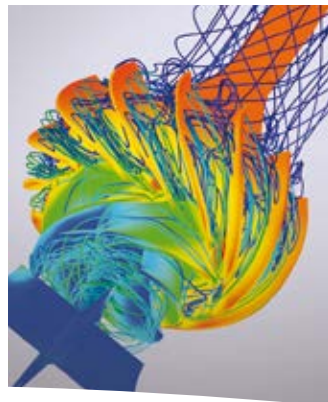




***SIHI® SuperNova
Modular Industrial Pumps***



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

- Cooling
- Heating
- Irrigation
- Water supply
- Solvent transfer
- Acid & Alkali transfer
- Effluent
- Filter cleaning
- Deluge
- Pressure boosting



SIHI® SuperNova – Robust, Reliable, Efficient ...

Broad application suitability underpins the SIHI® SuperNova range of end-suction centrifugal pumps. Demanding temperature profile, hydraulic efficiency, low NPSH make this range a perfect choice for those making an ecologically balanced decision. Designed with consideration of ISO 5199, assures long-term reliability, process consistency, and simple maintenance.

Three configurations of the SIHI® SuperNova range combine modularity with application fit. The general purpose end-suction design is complemented by two additional models for hot water and hot oil. All three designs are fundamentally different in which to match the different demands of each application.

Developed in accordance with some strict ISO, DIN, and EN standards guarantees the quality and market interchangeability of the SIHI® SuperNova. Highly effective seal chamber design is at the heart of this range, where seal face lubrication is of paramount importance for reliability.

Overhung single-stage impeller permits only one set of bearings, one seal configuration, one set of wear-rings, and back pull-out together with the other benefits of end-suction.

Multiple volutes with diffuser are employed in the larger machines in which to distribute radial forces, improve performance, and improve the life of the pump. Over 50 hydraulic sizes are available long or close-coupled, horizontal or vertical, in various materials, and with multiple sealing options.

Industries/Markets

- Chemical
- Pharmaceutical
- Food
- Metal manufacture
- Rubber & Plastic
- Marine
- Paper & Pulp
- Tank Farm Storage
- Building services
- Textile

Performance Range

- Capacity: max. 1800 m³/h (7926 Us gpm)¹⁾
- Head: max. 140 m (459 ft)²⁾
- Speed: max. 3600 rpm
- Casing pressures: max. 40 bar (580 psi)
- Temperatures: max. + 350 °C (662 °F)³⁾

¹⁾ For higher capacities up to 2200 m³/h (9687 Us gpm) we recommend the SIHI® CBT range

²⁾ For higher heads up to 1600 m (5249 ft) we recommend the SIHI® Multi range

³⁾ For higher temperatures up to 400 °C (752 °F) we recommend the SIHI® ISOchem range

Materials

- Cast iron
- SG iron
- Cast steel
- Stainless steel

Sealing options

- Mechanical seal
- Gland packing
- Lip seals


General Purpose Pumps



Horizontal End Suction Volute Casing Pumps according to EN 733




170 °C
338 °F



ZLN long-coupled design with single or double mechanical seal, or packed gland. Optional possibilities include seal quench, cooling, heating, flushing, and throttling.

120 °C
248 °F



ZLK close-coupled design with single mechanical seal.

In-Line Volute Casing Pumps based on EN 733



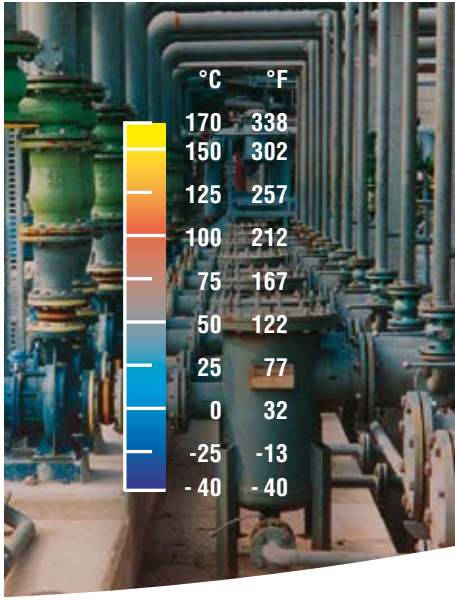
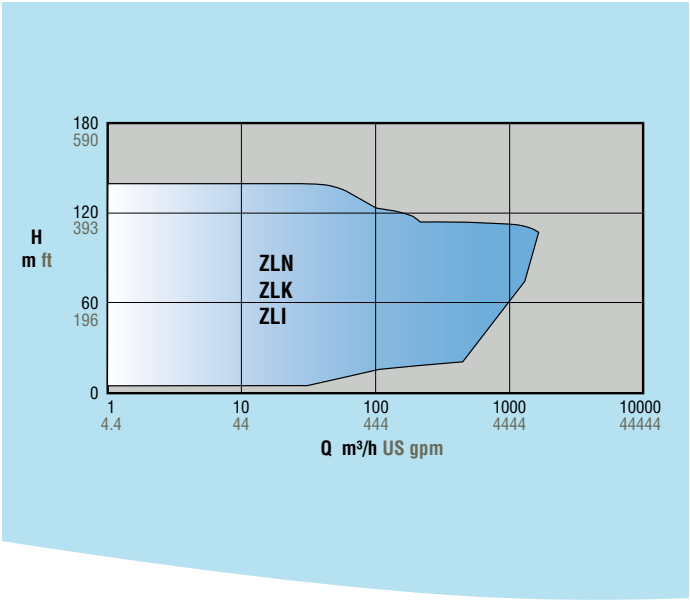
120 °C
248 °F



ZLI close-coupled design with single mechanical seal.

General Purpose Pumps	Capacity (maximum)	Head (maximum)	Speed (maximum)	Temperature (maximum)	Casing Pressure	Sealing	Materials
ZLN	1800 m ³ /h (7926 US gpm)	140 m (459 ft)	3600 rpm	170 °C (338 °F)	16 bar (232 psi)	Mechanical seal, gland packing	Cast iron, stainless steel
ZLK	740 m ³ /h (3258 US gpm)	90 m (295 ft)	3600 rpm	120 °C (248 °F)	16 bar (232 psi)	Mechanical seal	Cast iron, stainless steel
ZLI	280 m ³ /h (1233 US gpm)	60 m (197 ft)	3600 rpm	120 °C (248 °F)	16 bar (232 psi)	Mechanical seal	Cast iron, stainless steel

Design Features



ZLN

Long lasting efficiency

- Closed impeller permitting ‘neck’ wear-rings to be retrofitted

Suitable for temperatures up to 170 °C (338 °F), this diverse range of general purpose pumps offers the user a low life-cycle cost solution. Capital cost, power consumption, maintenance, reliability, and waste, have all been considered during the extensive development phase.

High efficiency & low power

- Advanced fluid dynamic design

Low NPSH

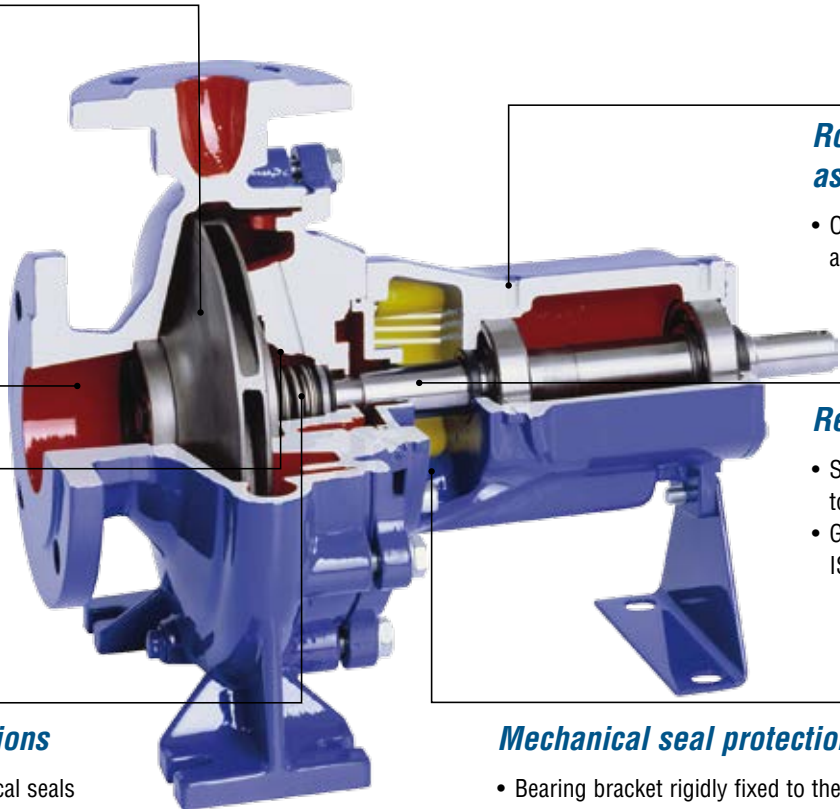
- High quality impeller and suction profile

Extended seal life

- Vortex breakers and modern seal chamber
- Low shaft deflection

Flexible sealing options

- Single or double mechanical seals
- Cartridge or component seals
- Packed gland



Robust rotating assembly

- Oversized ball bearings and shaft diameter

Reliability

- Seal area shaft deflection to ISO 5199
- General consideration of ISO 5199

Mechanical seal protection

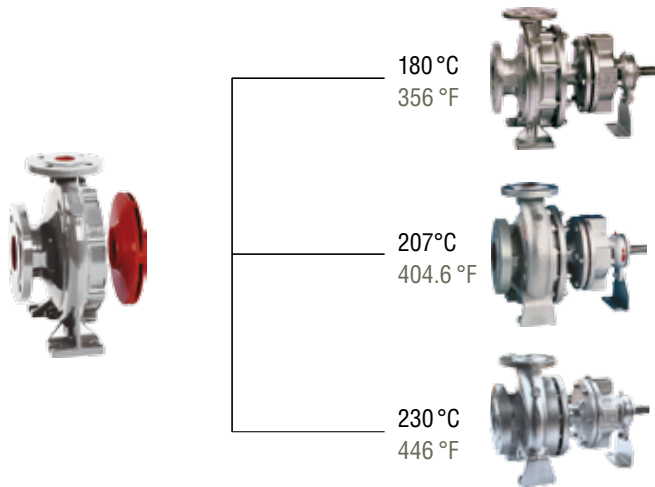
- Bearing bracket rigidly fixed to the casing cover for stable back pull-out transportation

Hot Water Pumps
up to 230 °C
(446 °F)



Horizontal End Suction Volute Casing Pumps

according to EN 733 or EN 22858

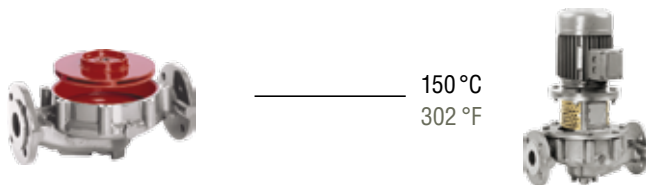


ZHN long-coupled. Designed specifically for use with pressurised high-temperature water without the need to cool the single mechanical seal. Main dimensions in accordance with EN 733.

ZDN long-coupled. Designed specifically for use with pressurised high-temperature water without the need to cool the single mechanical seal. Main dimensions in accordance with EN 22858.

ZEN long-coupled. Designed specifically for use with pressurised high-temperature water without the need to cool the single mechanical seal. Main dimensions in accordance with EN 22858.

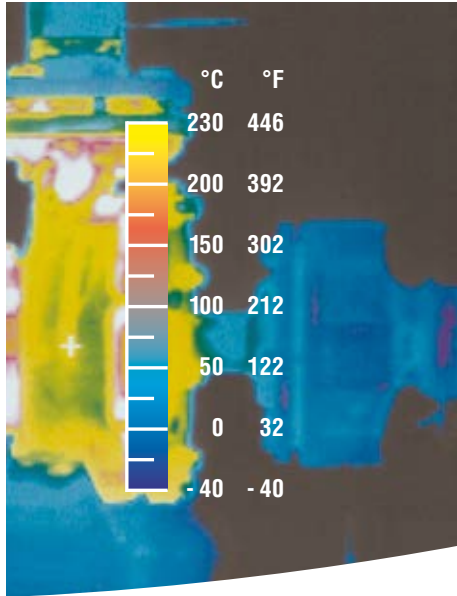
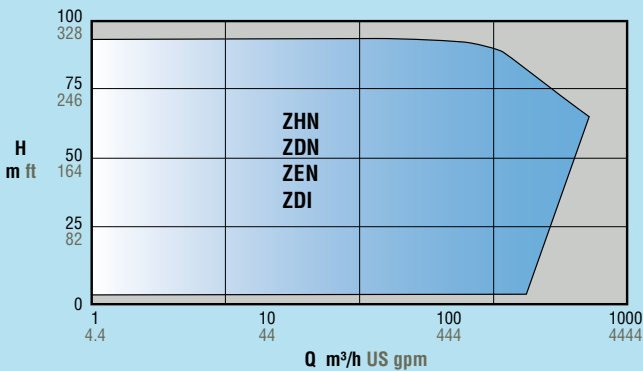
In-Line Volute Casing Pumps based on EN 733



ZDI close-coupled design with single mechanical seal that does not need to be cooled.

Hot Water Pumps	Capacity (maximum)	Head (maximum)	Speed (maximum)	Temperature (maximum)	Casing Pressure	Sealing	Materials
ZHN	600 m ³ /h (2642 US gpm)	90 m (295 ft)	3600 rpm	180 °C (356 °F) un-cooled	16 bar (232 psi)	Mechanical seal	SG iron
ZDN	600 m ³ /h (2642 US gpm)	90 m (295 ft)	3600 rpm	207 °C (404 °F) un-cooled	25 bar (362 psi)	Mechanical seal	SG iron
ZEN	600 m ³ /h (2642 US gpm)	90 m (295 ft)	3600 rpm	230 °C (446 °F) un-cooled	40 bar (580 psi)	Mechanical seal	SG iron, cast steel
ZDI	140 m ³ /h (616 US gpm)	60 m (196 ft)	3600 rpm	150 °C (302 °F) un-cooled	25 bar (362 psi)	Mechanical seal	SG iron

Design Features



ZHN

Superior hot water circulation, up to 230 °C (446 °F) with a standard un-cooled mechanical seal, gives the unique ability to minimise life-cycle cost. Internal separation and removal of undesirable vapour (steam) enhances mechanical seal face lubrication and improves reliability. High-level hydraulic efficiency ensures that running costs are predictably low.

Long lasting efficiency

- Closed impeller permitting ‘neck’ wear-rings to be retrofitted

High efficiency & low power

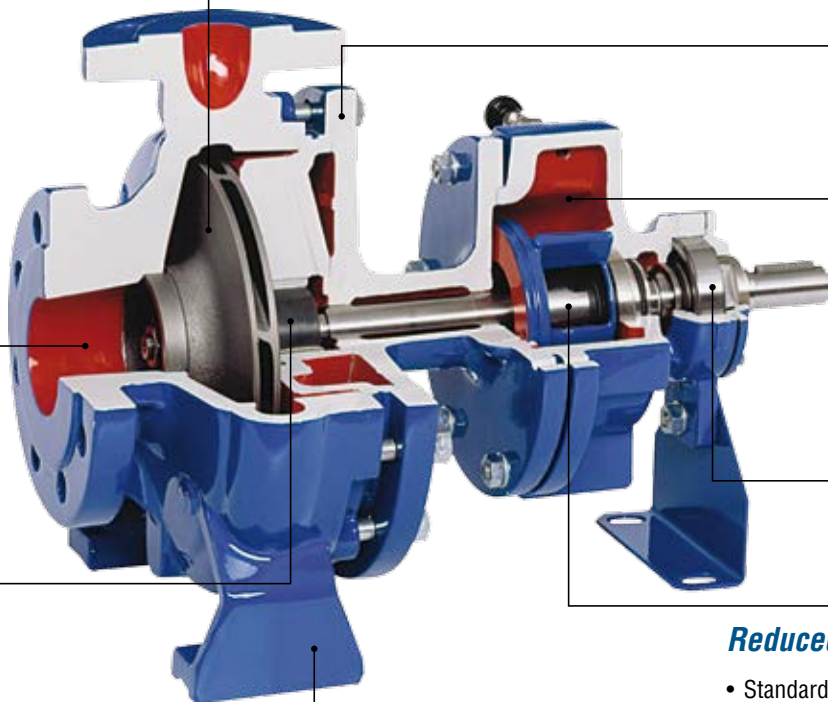
- Advanced fluid dynamic design

Low NPSH

- High quality impeller and suction profile

Robust rotating assembly

- Long-life ball bearing
- Sleeve bearing



Simple removal

- Back pull-out design

Un-cooled seal

- Vapour separation and removal in this unique seal chamber
- Large volume seal chamber located at cool drive-end
- Low shaft deflection

Long life

- Anti-friction bearing

Reduced spare parts cost

- Standard mechanical seal to DIN 24960

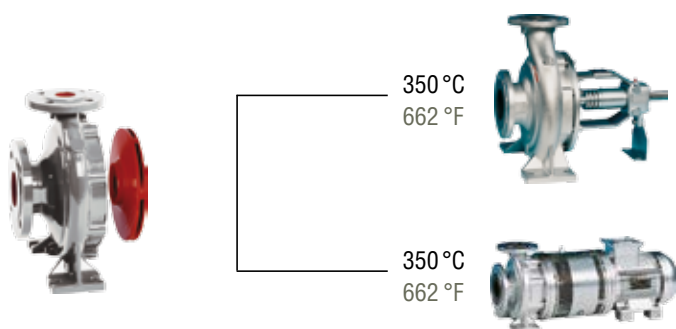
Stable with temperature fluctuations

- Provision for thermal expansion

**Thermal Oil Pumps
up to 350 °C
(662 °F)**



Horizontal End Suction Volute Casing Pumps according to EN 733



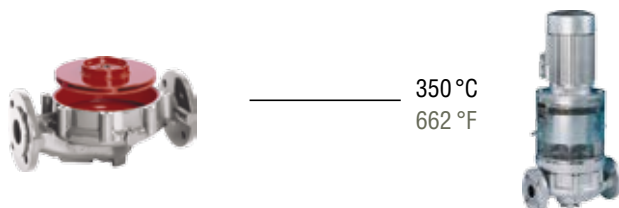
350 °C
662 °F

350 °C
662 °F

ZTN long-coupled. With auxiliary seal security, these units are designed specifically for use with high-temperature thermal oils. Main dimensions in accordance with EN 733.

ZTK close-coupled. The addition of a shaft mounted air-cooling fan, together with the auxiliary seal security, makes the ZTK a perfect solution for high-temperature thermal oils. Main dimensions in accordance with EN 733.

In-Line Volute Casing Pumps based on EN 733

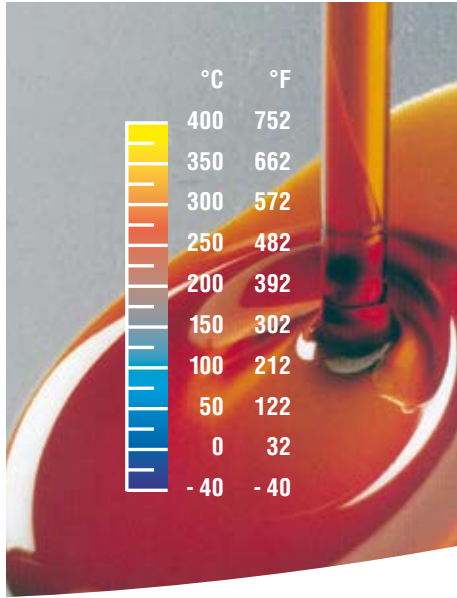
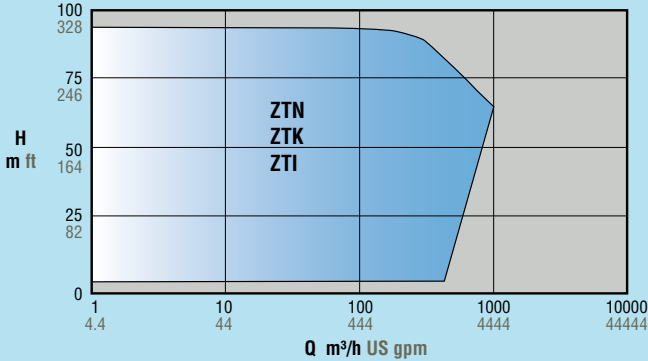


350 °C
662 °F

ZTI close-coupled. The addition of a shaft-mounted air-cooling fan, together with the auxiliary sealing options, makes the ZTI an ideal selection for high-temperature thermal oils where space is at a premium.

Thermal Oil Pumps	Capacity (maximum)	Head (maximum)	Speed (maximum)	Temperature (maximum)	Casing (maximum)	Sealing Pressure	Materials
ZTN	1000 m ³ /h (4403 US gpm)	90 m (295 ft)	3600 rpm	350 °C (662 °F) un-cooled	16 bar (232 psi)	Mechanical seal, lip seals	SG iron
ZTK	200 m ³ /h (880 US gpm)	60 m (196 ft)	3600 rpm	350 °C (662 °F) un-cooled	16 bar (232 psi)	Mechanical seal	SG iron
ZTI	200 m ³ /h (880 US gpm)	60 m (196 ft)	3600 rpm	350 °C (662 °F) un-cooled	16 bar (232 psi)	Mechanical seal	SG iron

Design Features



ZTN

Long lasting efficiency

- Closed impeller permitting ‘neck’ wear-rings to be retrofitted

High efficiency & low power

- Advanced fluid dynamic design

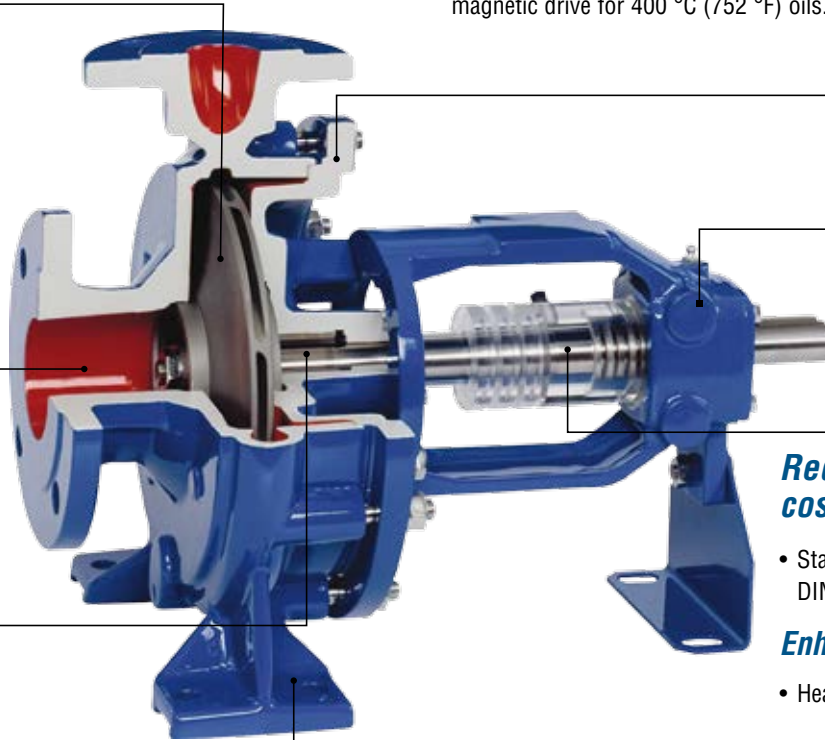
Low NPSH

- High quality impeller and suction profile

Robust rotating assembly

- Long-life ball bearing
- Sleeve bearing

Operational safety, environmental concern, and long-term reliability, are the three aspects which make this pump an ideal choice for thermal oils up to 350 °C (662 °F). High-end hydraulic efficiency is complimented by almost maintenance-free operation, in which to give a low Life-Cycle cost solution. Shaft sealing can be either a combination of mechanical and secondary lip seals, or seal-less magnetic drive for 400 °C (752 °F) oils.



Simple removal

- Back pull-out design

Triple protection

- Mechanical seal backed by lip seals and bearing assembly

Reduced spare parts cost

- Standard mechanical seal to DIN 24960 and basic lip seals

Enhanced seal life

- Heat dissipation with air-fin cooling

Stable with temperature fluctuations

- Provision for thermal expansion

Features

- High efficiency
- Seal area deflection to ISO 5199
- Low NPSH
- Modular family
- Back pull-out
- Global service network
- ATEX



Benefits

- Reduced power consumption
- High reliability & extended MTBF
- Reduced installation costs
- Low inventories, short delivery times
- Ease of maintenance
- Local and rapid support
- Suitable for explosive atmospheres

Horizontal End Suction Volute Casing Pumps

according to EN 733



General Purpose Pumps



ZLN long-coupled design
up to 170 °C (338 °F)



ZLK close-coupled design
up to 120 °C (248 °F)

Hot Water Pumps



ZHN long-coupled design
up to 180 °C (356 °F)



ZDN long-coupled design
up to 207 °C (404.6 °F)



ZEN long-coupled design
up to 230 °C (446 °F)

Thermal Oil Pumps



ZTN long-coupled design
up to 350 °C (662 °F)



ZTK close-coupled design
up to 350 °C (662 °F)

In-Line Volute Casing Pumps

based on EN 733



General Purpose Pumps



ZLI close-coupled design
up to 120 °C (248 °F)

Hot Water Pumps



ZDI close-coupled design
up to 150 °C (302 °F)

Thermal Oil Pumps



ZTI close-coupled design
up to 350 °C (662 °F)

**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

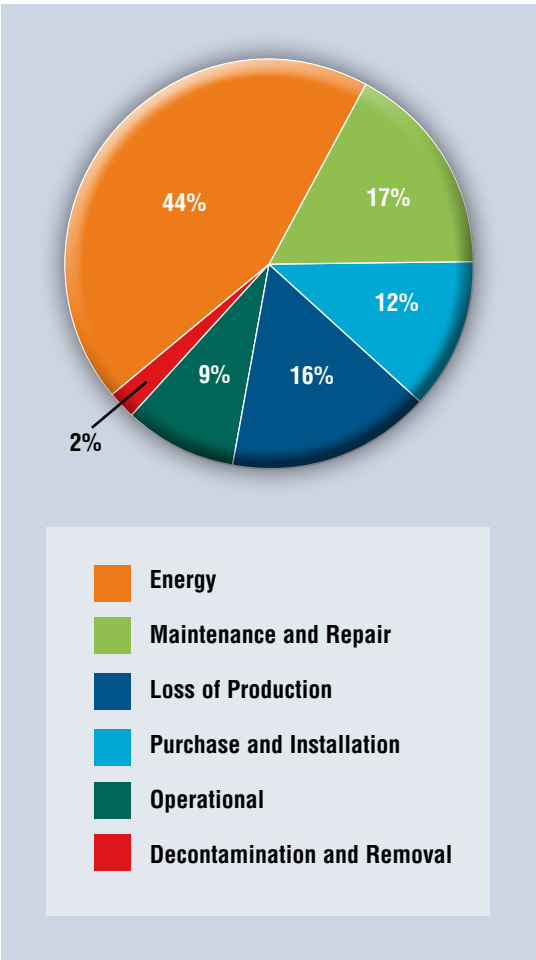
Operating Expenses

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

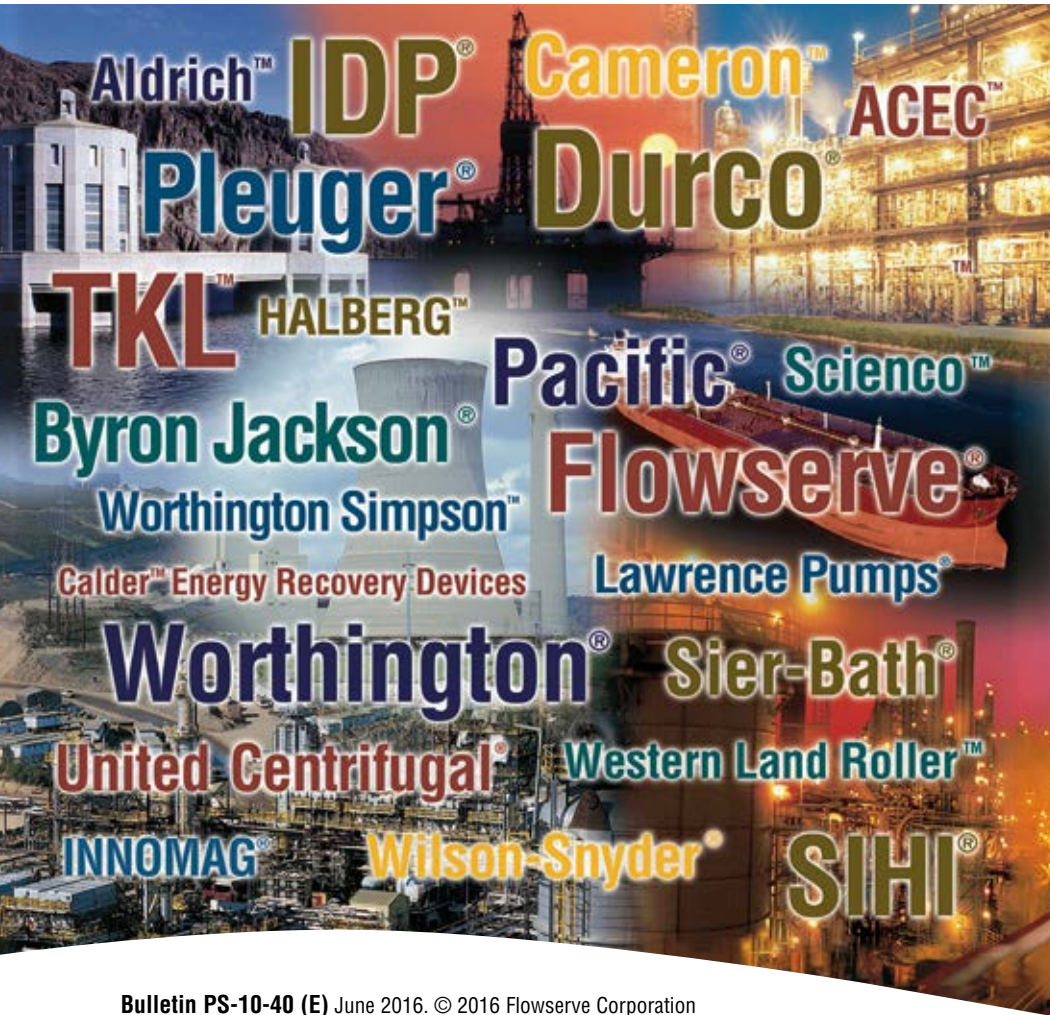
Innovative Life Cycle Cost Solutions

- 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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