

SULZER

LENNTECH
WATER TREATMENT SOLUTIONS

CPE end-suction single-stage centrifugal pumps ASME B73.1



CPE process pumps – efficiency by design

Sulzer's new CPE ANSI pumps are specifically designed to exceed the strictest energy regulations for all industries as well as the requirements of ASME B73.1. With revolutionary hydraulics and high efficiency, they offer the lowest life cycle costs.

Main applications

Sulzer CPE pumps meet the process requirements in a variety of industrial applications and are suitable for use with:

- clean or slightly contaminated liquids
- viscous liquids of up to 3'000 cSt
- fibrous slurries of up to 6% consistency

Key customer benefits

Based on Sulzer's decades of experience and in-depth knowledge of pumping technology, the CPE pumps help you maximize value in your operation. Key benefits include maximum energy efficiency, improved performance reliability and minimized total cost of ownership.

Maximum efficiency

- The highest available efficiency on the ANSI pump market means clear savings in energy consumption.
- Efficiency that exceeds the requirements of the U.S Department of Energy (DOE) regulations taking effect in 2020. These pumps meet or exceed the Pump Energy Index (PEI) values set by the regulations.

Improved reliability

- Optimized shaft seal life thanks to improved sealing chambers and Sulzer's innovative, patent-pending impeller balancing holes
- Reduced risk of unplanned shutdowns as a result of trouble-free shaft sealing with Sulzer's mechanical seals
- Heavy-duty rigid bearing units ensure long bearing life, leakage-free construction and further protection against unexpected shutdowns.

Minimized total cost of ownership (TCO)

- Dramatic long-term energy savings thanks to high efficiency
- Low operational cost due to trouble-free Sulzer seals, rigid bearings and minimized service
- Reduced inventory as a result of high interchangeability
- Reduced installation and maintenance costs due to easy installation and innovative design



CPE end-suction single-stage centrifugal pumps



Oil and gas



Hydrocarbon processing



Power generation



Pulp, paper and board



General industry



Chemical process industry

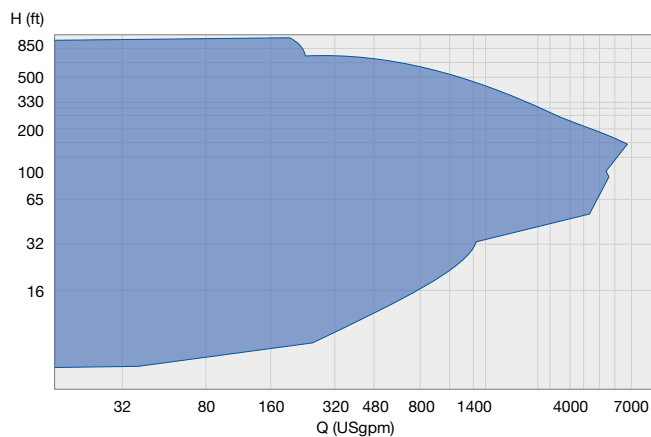


Water and wastewater

Operating data

60 Hz		50 Hz
up to 7'000 USgpm	Capacities	up to 1'650 m ³ /h
up to 900 ft	Heads	up to 275 m
up to 400 psi	Pressures	up to 27.5 bar
up to 500°F	Temperatures	up to 260°C
up to 3'600 rpm	Maximum speed of rotation	up to 3'000 rpm

Performance range



Liquid	Temperature up to 500°F / 260°C	Pressure up to 400 psi / 27.5 bar	Corrosion pH from 0 to 14
Clean and slightly contaminated liquids	✓	✓	✓
Viscous liquids	✓	✓	✓
Fibrous slurries	✓	✓	✓

The optimal materials for your applications

Sulzer ANSI pumps are used in a wide range of chemical process applications as well as in general industry including clean water. Selecting the best material according to specific process requirements is important for maximizing pump life, especially for aggressive processes where resistance to corrosion and abrasion is vital. Sulzer offers a large variety of material options for our ANSI pumps, ensuring you get the optimal pump for your process.

Sulzer material offering

Stainless steel design			Nominal chemical composition %					
			C max	Cr	Ni	Mo	Cu	N
Duplex	ASTM A890 3A (CD6MN)	41	0.06	24.0-27.0	4.0-6.0	1.75-2.5	-	0.15-0.25
	ASTM A890 1B (CD4MCuN)	4L	0.04	24.5-26.5	4.7-6.0	1.7-2.3	2.7-3.3	0.10-0.25
	ASTM A890 5A (CE3MN)	4T	0.03	24.0-26.0	6.0-8.0	4.0-5.0	-	0.10-0.30
Austenitic	ASTM A743 (CN-7M)	43	0.07	19.0-22.0	27.5-30.5	2.0-3.0	3.0-4.0	-
	AVESTA 654 SMO®*	4U	0.025	23.0-25.0	21.0-23.0	7.1-7.5	0.3-0.7	0.45-0.55
Martensitic	ASTM A747 (CB7Cu-2 H900)	4E	0.07	14.0-15.5	4.5-5.5	-	2.5-3.2	-
Nickel alloy	ASTM A494 (CW-6M)	4J	0.07	17.0-20.0	balance	17.0-20.0	-	-

Carbon, low-alloy cast steel, cast iron design			Nominal chemical composition %					
			C	Cr	Ni	Mo	Cu	Si
Ductile iron	ASTM A395 60-40-18	5H	-	-	-	-	-	-

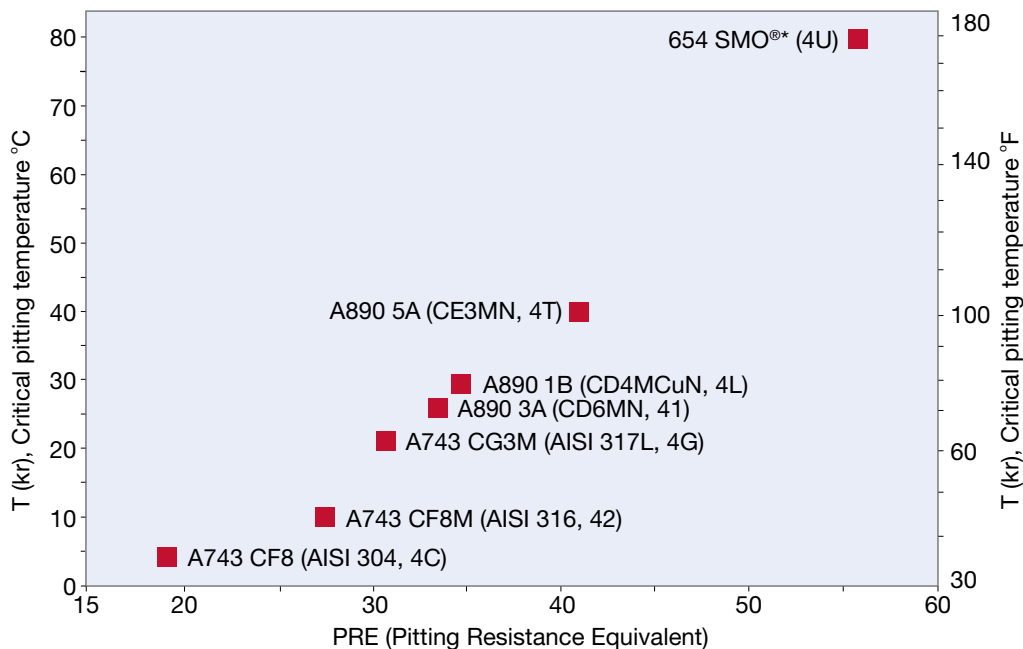
Material alternatives for other parts			
Gasket material	Aramid fiber-elastomer	Y6	Used in temperature range -40°C/-40°F...+160°C/+320°F and pH 2-12
	PTFE/Glass	84	Used in temperature range -190°C/-310°F...+240°C/+464°F and pH 0-14
	Flexitallic™ Sigma 511	-	Used in temperature range up to +260°C/+500°F
O-ring material	EPDM	92	Used in temperature range -58...+300°F/ -50...+150°C
	PTFE	94	Used in temperature range -325...+500°F/ -200...+260°C

*Trademark by Outokumpu Oyj

Optimized casting material selection according to applications

Pitting and crevice corrosion that occur in metals are of particular interest in stainless steel.

Typical materials used in chemical process industry and general industry



Pitting in pumps refers to small, deep cavities that can form randomly on wetted surfaces. Crevice corrosion, as the name suggests, occurs in narrow crevices into which a solution can penetrate, but where it is not flushed away during the normal course of operation as happens in more open areas of the pump.

By calculating the sum of the most important alloys in a weighed form, it is possible to identify the susceptibility of specific alloys to pitting and crevice corrosion.

This calculated parameter is called the Pitting Resistance Equivalent (PRE), commonly expressed as $PRE = Cr \% + 3.3 \times Mo \% + 16 \times N \%$. The values in the graph above have been calculated using this formula, with the higher PRE number representing greater resistance to pitting and crevice corrosion.

*Trademark by Outokumpu Oyj

Minimizing Total Cost of Ownership (TCO)

Total Cost of Ownership (TCO) refers to the true, full cost of your pump – from purchase and installation to lifetime maintenance and operational expenditures. In engineering the new range of CPE pumps, we at Sulzer have considered numerous factors that can potentially influence the TCO of a process pump. The result is an innovative, superior design that makes it possible to achieve remarkable annual savings.

Your initial purchase is only a small part of the entire life cycle price for industrial pumps. Understanding the various elements that go into the TCO for your pump makes it easier to see how you can dramatically reduce energy, operational, and maintenance costs.

The diagram below demonstrates just how great a role energy consumption plays in determining the long-term costs of pumping systems. The right pump technology, properly sized for a specific application, offers an important step for reducing energy consumption and thereby the overall lifetime cost of the pump.

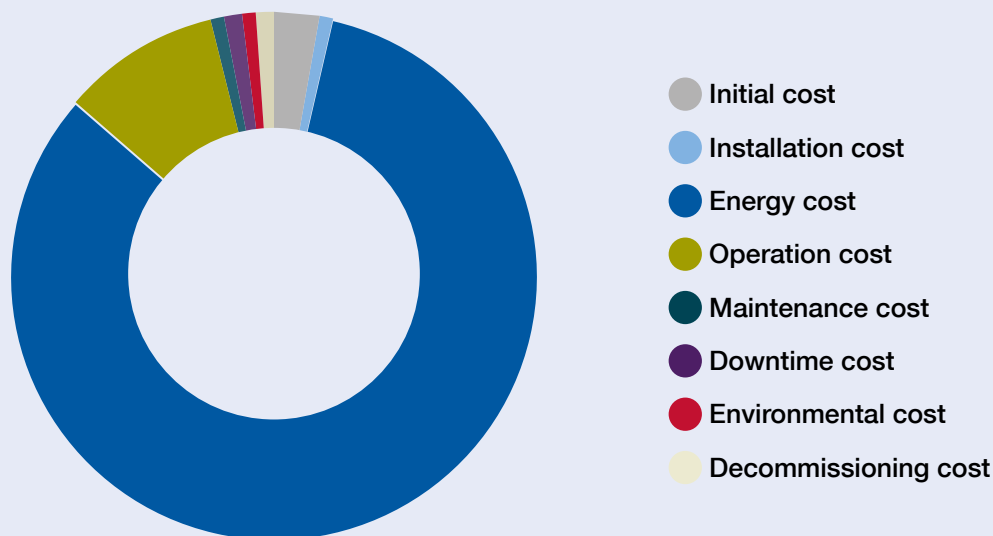
With the market's most efficient hydraulics for ANSI pumps, Sulzer's new CPE pump creates new opportunities for significant, direct savings in energy consumption. The range's wide selection, open and closed impeller options, and available low-flow

capabilities make it easy to select the optimal pump for your specific processes. With the right pump for the application, you ensure maximum efficiency for maximum savings.

Selecting the optimal pumping system for your operation also helps to minimize vibrations which can cause mechanical stress. Along with the high standardization in the design of the new CPE range, this enables you to dramatically bring down costs related to maintenance and spare parts.

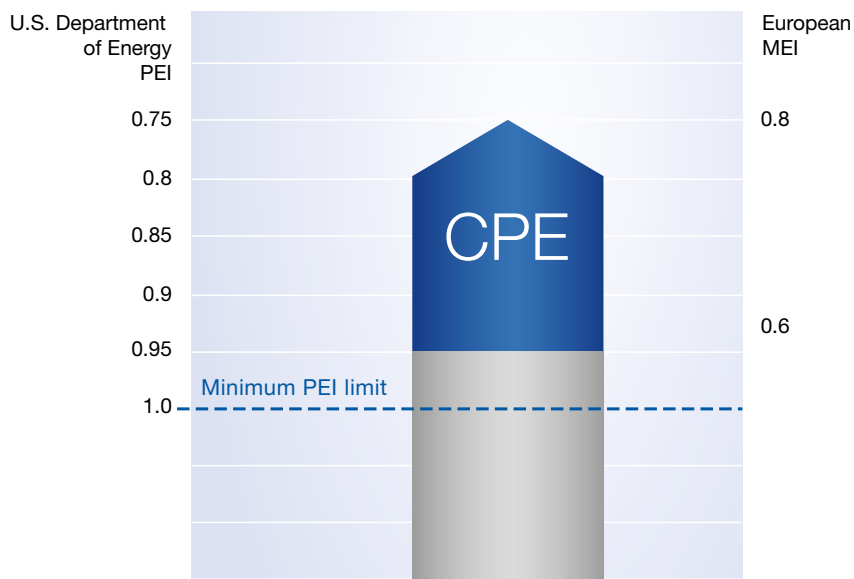
But that's just the beginning. As the result of Sulzer's extensive research and development, the new CPE pumps include several features designed to help your business keep costs down. Learn more about the ways in which the CPE range helps lower your TCO on the following pages.

Typical distribution of Total Cost of Ownership (TCO)



Energy efficiency that exceeds legislative requirements

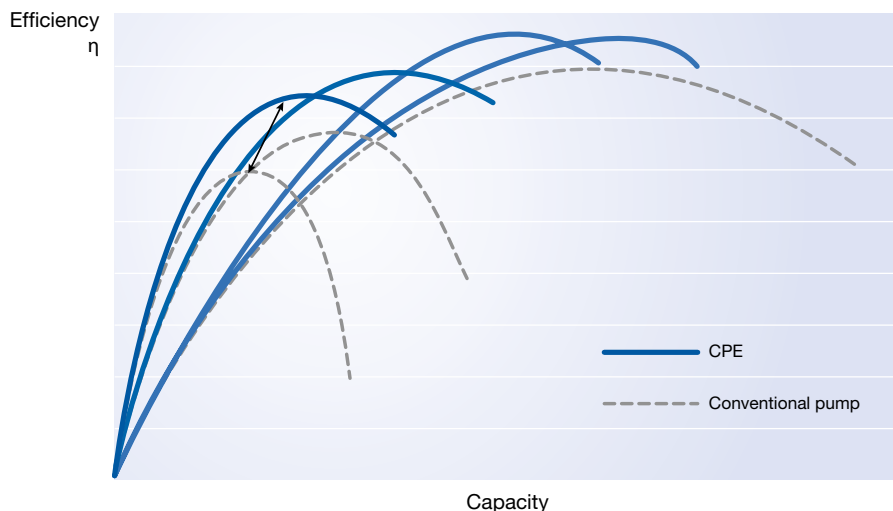
Energy efficiency is a hot topic in the industry. So important that many authorities worldwide are preparing regulations for that. The European Union (EU) was the first and created the Energy-Related Products Regulations and now the U.S. Department of Energy (DOE) has done the same. They specify the Pump Energy Index (PEI) for clean water pumps, with the target of reducing energy consumption. From 2020, only pumps in range 1-200 HP, which satisfy the PEI requirements, may be sold.



PEI, the Pump Energy Index for clean water pumps, was set up to be ≤ 1.0 from the beginning of 2020. The standard will remove the worst performing 25% of the pumps from the market. The Sulzer CPE pump range is truly ahead of the game.

The CPE process pump range not only meets the criteria, but breaks all records by even reaching the PEI 0.77 values.

Excellent performance achieved through advanced hydraulic knowledge and unique design methods



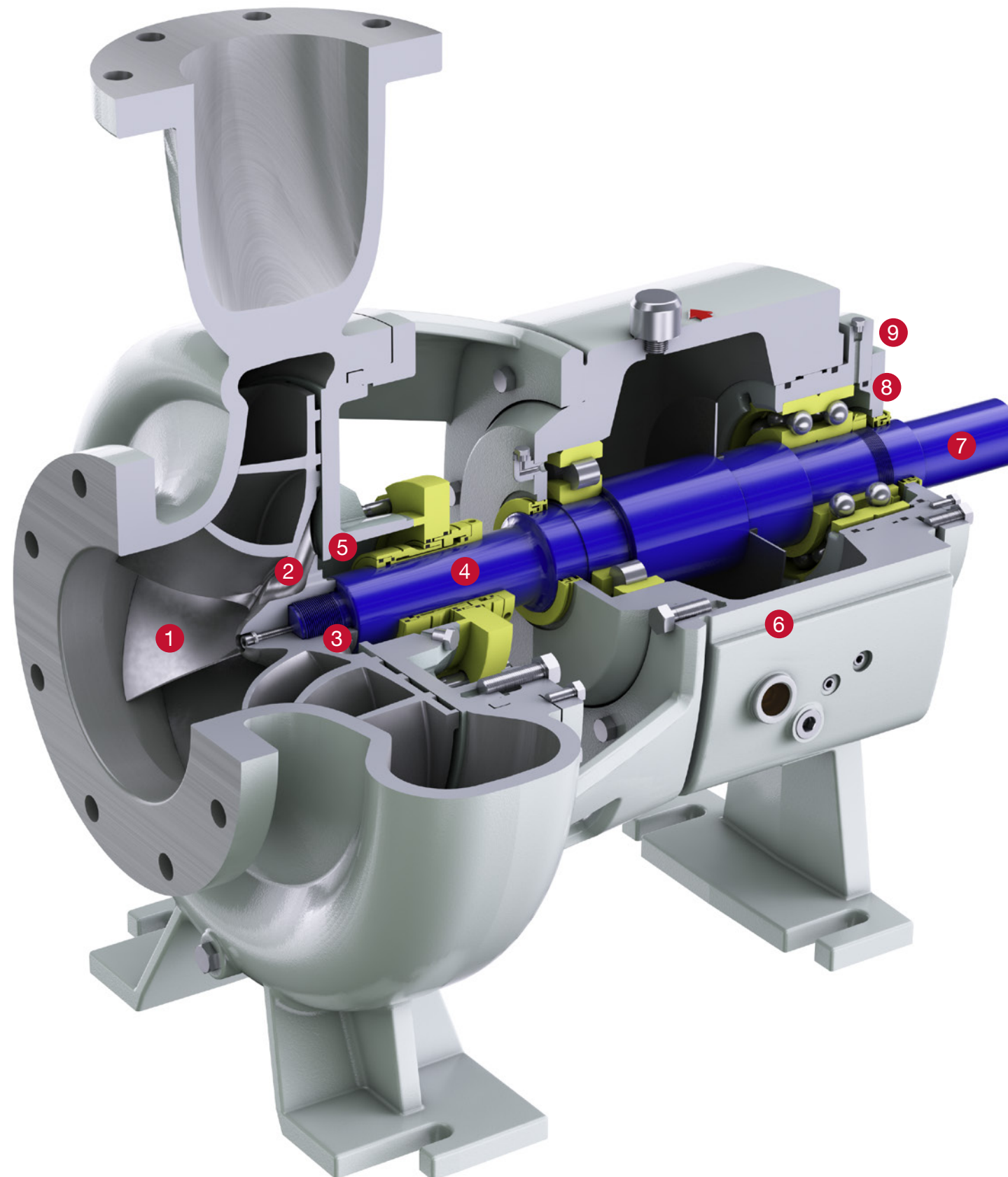
The entire CPE pump range represents a major breakthrough in energy efficiency. The cost savings are substantial thanks to the many innovations in the design process and Sulzer's unique hydraulic expertise:

- Groundbreaking engineering methods improve pumping performance.
- Effective simulation tools provide quick analyses of various hydraulic designs.
- Full-scale research center allows testing of pumps in real operational conditions.



Superior design features of Sulzer CPE pumps

- 1 High-efficiency, low NPSHr (Net Positive Suction Head required) impeller**
 - Lowers energy consumption and downtime-related expenses for reduced total cost of ownership
- 2 Innovative patent-pending impeller balancing holes**
 - Optimum liquid circulation behind the impeller and in the seal chamber
 - Improved conditions for shaft seal, thus reducing the risk of unexpected shutdowns as well as minimizing operational and maintenance costs
- 3 Optimal impeller mounting**
 - Reliable operation
 - Provides easy and quick assembly and dismantling
 - To secure the impeller in back flow situations, an optional impeller bolt is available
- 4 Various sealing options including Sulzer mechanical seals**
 - Ensure reliable and trouble-free operation
 - Provides easy and quick assembly and dismantling
 - Reduce total cost of ownership by minimizing maintenance and downtime-related costs
- 5 Various seal chamber options**
 - Allow optimal seal chamber selection for your specific process needs
 - Reduce total cost of ownership by minimizing maintenance and downtime
- 6 Heavy-duty bearing unit with oversized bearing design**
 - Minimizes risk of unexpected shutdowns and reduces maintenance costs
 - Available in either oil or grease lubrication
 - Exceeds ASME B73.1 requirements for bearing life
 - Provides interchangeability with previous ANSI model (CPT)
 - Includes magnetic drain plug
- 7 Heavy-duty, robust overhung shaft**
 - Minimizes deflection at shaft sealing to less than 0.002 in / 0.5 mm
 - Extends the shaft seal lifetime, reduces the risk of unexpected shutdowns and lowers maintenance costs
 - Duplex stainless steel material is standard



- 8 Non-contacting bearing protection isolators**
 - Prevent lubricant leaks
 - Extend bearing lifetime
 - Prevent outside contaminants from entering the bearing housing
 - Minimize the risk of unexpected shutdowns and lower maintenance costs
- 9 Impeller clearance adjustment**
 - Ensures easy-to-use, accurate operation
 - Enables maximized efficiency during entire pump lifetime
 - Offers substantial savings in total cost of ownership
- 10 Various baseplate options**
 - Provide optimal selection for all industries and applications
 - Ensure easy and fast installation
 - Offer savings in installation costs
- 11 Highly standardized pump design**
 - Minimizes spare parts inventory and lowers maintenance costs

Impeller

The efficiency, stability and reliability of the pump are based on the design. Sulzer CPE pumps feature an innovative impeller designed in tandem with the volute case and sealing chamber. The result is the market's most efficient hydraulics with improved shaft sealing for higher reliability. Semi-open and closed impellers offer versatility for various liquids, maximizing standardization to minimize your need for spare parts.

Semi-open impeller for clean, fibrous and viscous liquids

- Extremely high efficiency
- Low Net Positive Suction Head required (NPSHr)
- Capability for low-flow applications
- Full back shroud
- Sturdy and strong design
- Optimized balancing holes



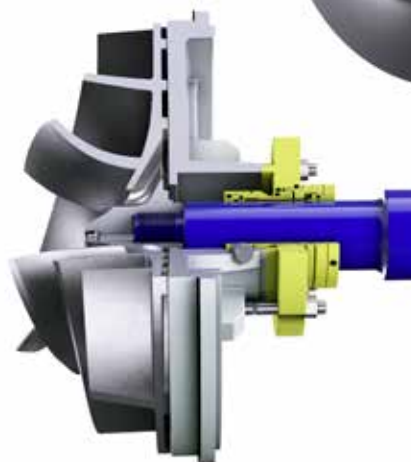
Closed impeller for clean and viscous liquids

- Extremely high efficiency
- Low Net Positive Suction Head required (NPSHr)
- Optimized for low-flow applications
- Sturdy and strong design



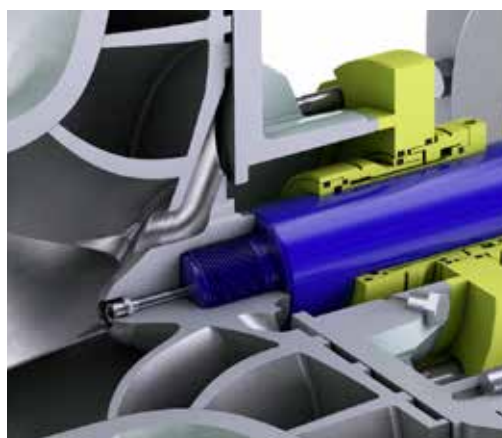
Unique, patent-pending balancing holes

- Dry running of the single mechanical seal is eliminated for the entire pump operating range.
- Optimized flow and pressure in the shaft sealing area
- Increased reliability, reduced risk of downtime and lower maintenance costs



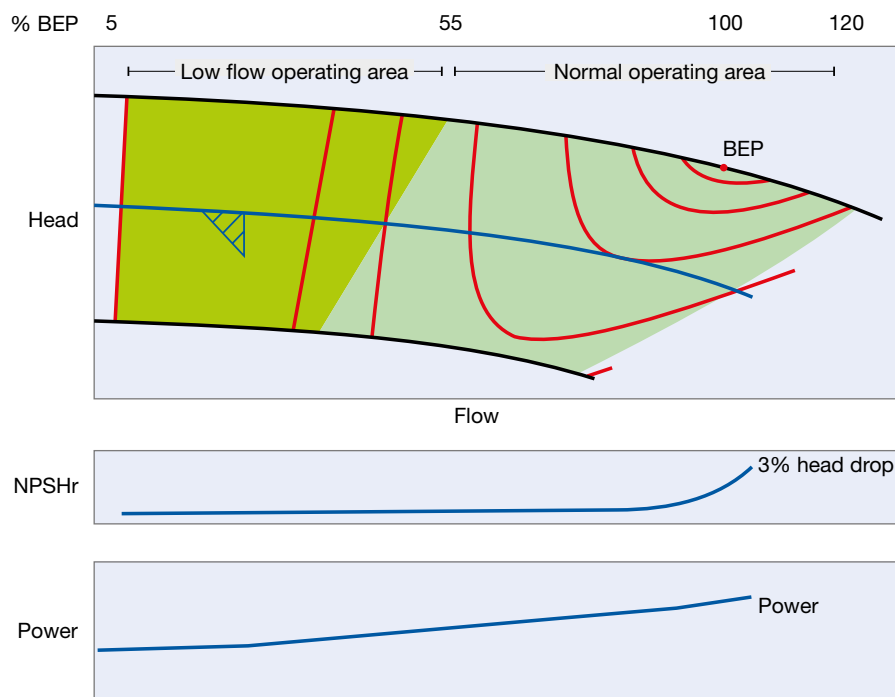
Reliable impeller mounting

- Impeller threaded to the shaft according to ASME B73.1 standard
- Optional impeller locking bolt is available.
- High mechanical strength
- Reliable and easy installation
- Minimized downtime and reduced maintenance costs



Low-flow applications

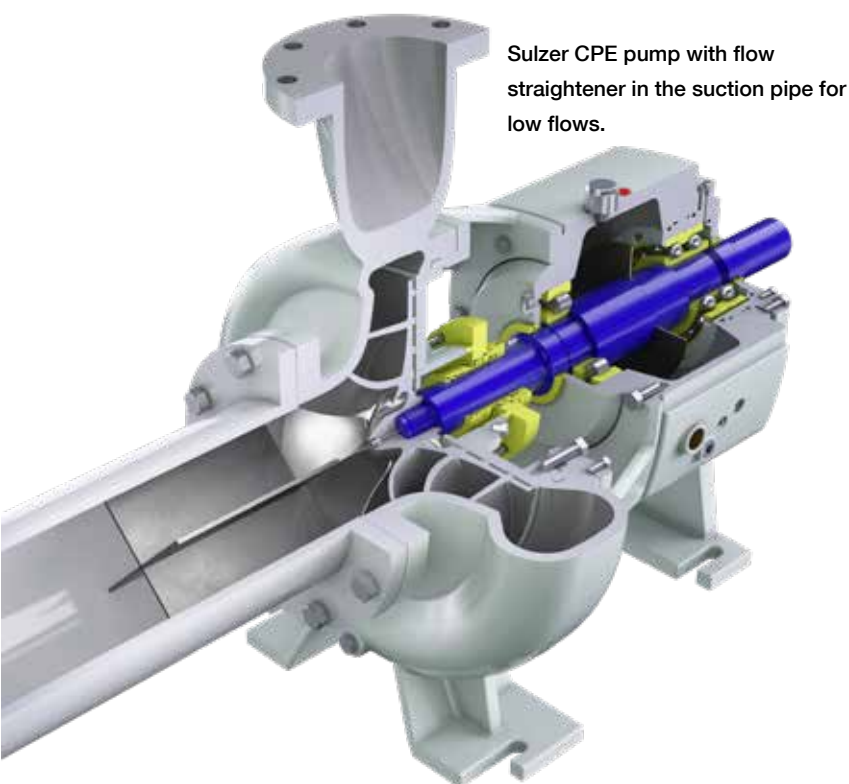
Now you do not need a special pump or impeller to run low flows! The innovative design of Sulzer's CPE pump hydraulics is optimized to run low flows with a standard impeller.



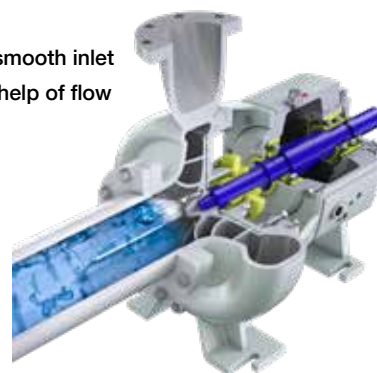
The CPE pump range provides optimal low-flow performance without any mechanical risks. You can run the pump with a wide range starting from 5% of BEP flow (Best Efficiency Point).

If you are running low flows (between 5 and 55% of BEP flow), it is recommended to install a flow straightener in the suction pipe to ensure stable, trouble-free operation with the highest possible efficiency.

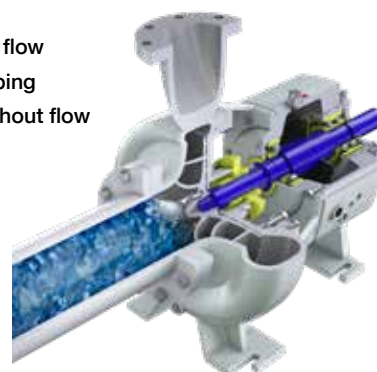
Sulzer can provide flow straighteners with complete delivery to ensure fast and easy installation and reliable, long-term performance.



Straight and smooth inlet flow with the help of flow straightener.



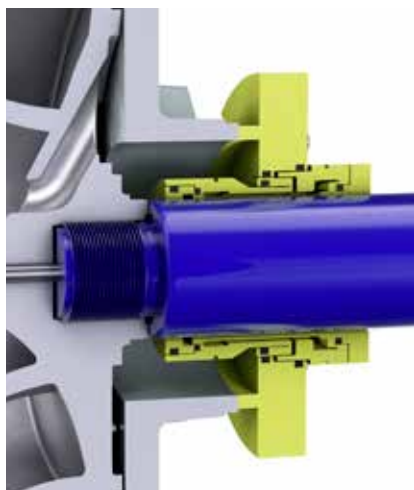
Rotating inlet flow causing pumping problems (without flow straightener).



Shaft sealing

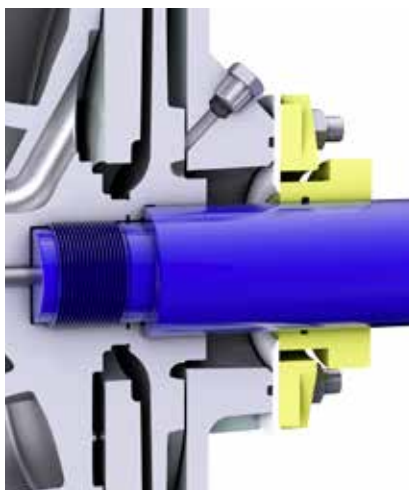
Shaft sealing has a great influence on pump reliability. Therefore it is essential to select the best technical solution for your specific application. For the CPE pump range, Sulzer offers a comprehensive selection of seals and seal chamber options to make sure your pump is fully optimized to your process for the highest possible uptime.

Available shaft sealing types



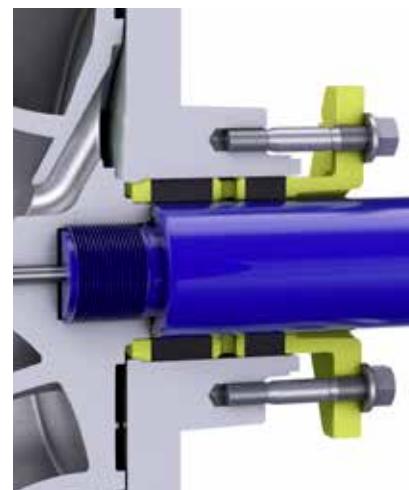
Mechanical seal

- Single and double seals available
- Flushing options: no flushing, internal flushing, external flushing
- Suitable for all applications compatible with the CPE range
- Reliable and strong Sulzer mechanical seals available



Sulzer dynamic seal

- Dynamical seal needs no water
- Suitable for applications with positive pump inlet head and a temperature below boiling point under atmospheric pressure
- Suitable for clean liquids, viscous and fibrous slurries and liquids containing large solids



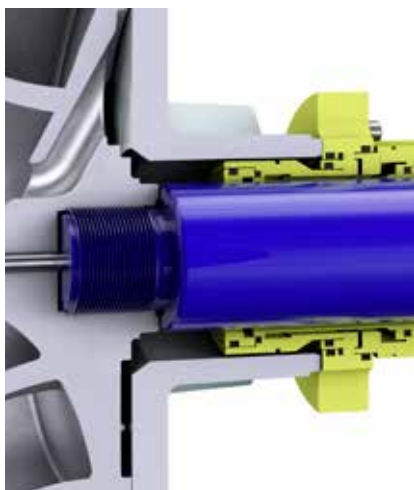
Gland packing

- Suitable for light-duty applications, including those with clean or slightly contaminated liquids

Seal chambers

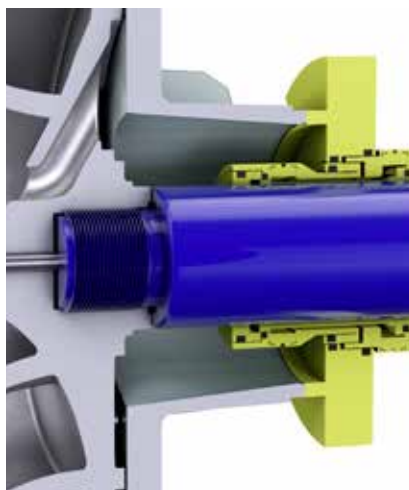
A complete variety of seals and various seal chamber options is available for the CPE pump range to ensure optimal shaft sealing, maximizing operational reliability and minimizing downtime costs.

Seal chamber options



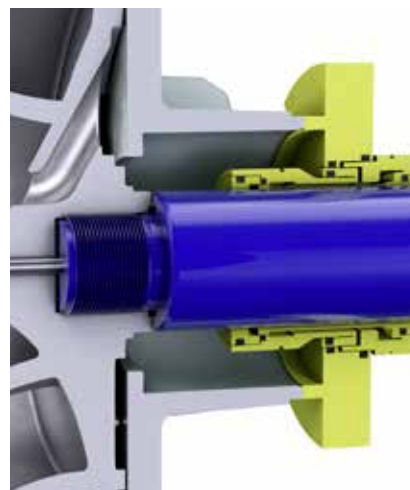
Standard bore

- For clean liquids, liquids containing particles and slurries
- For single or double mechanical seals and gland packing



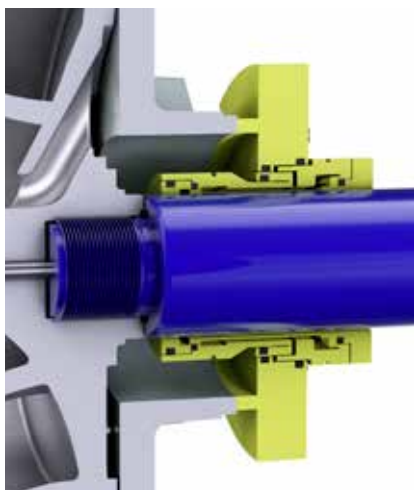
Tapered bore

- For clean and demanding liquids
- For single or double mechanical seals



Large bore

- For clean liquids, liquids containing particles and slurries
- For single or double mechanical seals
- The oversized chamber helps reduce running temperatures while improving lubrication and circulation



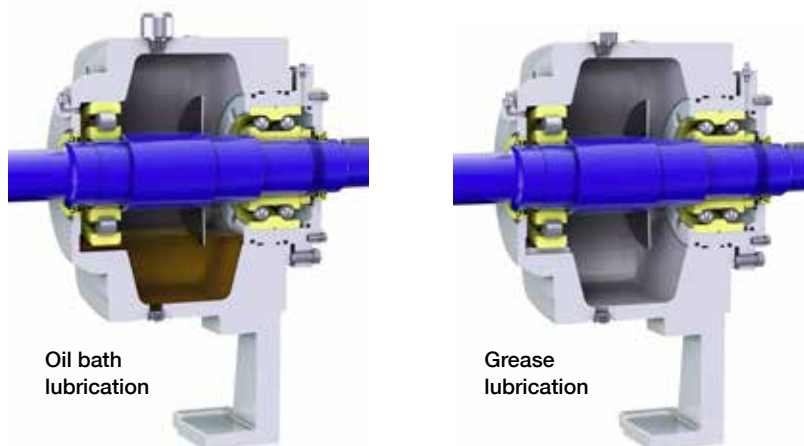
Universal bore

- For clean liquids
- For single or double mechanical seals

Compact heavy-duty bearing units

CPE bearing units are reliable, leakage-free and heavy-duty, resulting in minimized unexpected shutdowns and reduced downtime and maintenance costs.

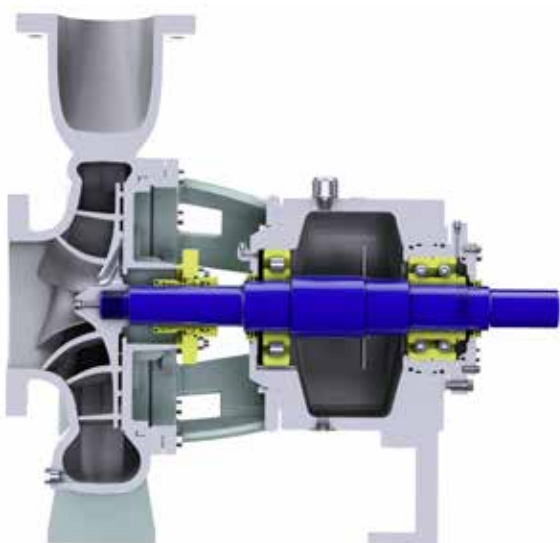
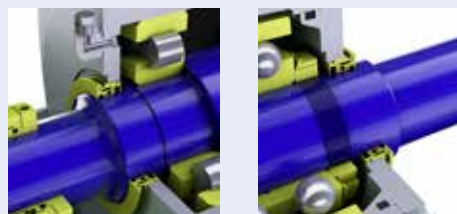
- Heavy-duty overhung shaft minimizes deflection at stuffing box to less than 0.002 in / 0.05 mm, thereby extending the lifecycle of the shaft seal.
- Oil bath lubrication equipped with an oil slinger, oil mist lubrication, and grease lubrication are available for versatile applications with temperatures of the pumped liquid of up to 500°F/260°C
- The same bearing unit can be used for oil and grease lubrication without changing or adding any internal parts.
- Bigger oil volume for even better lubrication with lower operating temperatures
- Features a magnetic drain plug
- Large oil sight glasses enable easy oil level monitoring on both sides of bearing unit.
- The strong, over-sized bearing design exceeds the ASME B73.1 standard bearing life.
- A sturdy support foot provides a solid base and prevents coupling alignment changes.
- Interchangeable with original Sulzer CPT pump bearing unit



Reliable bearing isolators

Non-contacting bearing isolators at both ends of the bearing housing with strong and reliable construction prevent lubricant leaks and keep contaminants out.

The isolators are easy to install and always stay in the correct position.



Impeller clearance adjustment

Externally adjustable impeller to front casing clearance allows restoring the pump to its original efficiency. This helps further minimize long-term energy consumption and maintenance costs.

- Ensures quick, easy and accurate impeller adjustment without the use of a feeler gauge or removal of the pump from the piping.
- Ensures concentricity and bearing alignment throughout the impeller's adjustment range.
- Restores pump efficiency for direct savings in energy and spare parts costs.

Key design features – installation, operation and maintenance

1 Various baseplate options

- Easy to install and grout into the concrete foundation
- Lower vibration and reduced wear and tear

2 Riser blocks for motor

- Allow the installation of bigger motor sizes without baseplate modification
- Ease installation and minimize maintenance costs

3 Optional alignment blocks

- Ensure fast and easy alignment to reduce maintenance costs

4 Guards for the rotating parts

- Designed according to stringent safety regulations
- Ensure safe and reliable operation

5 Visual access on both sides of the guards

- Provides safe and easy stroboscope inspection of the coupling during operation

6 Flexible coupling with spacer

- Provides quick and easy maintenance

7 Back pull-out design

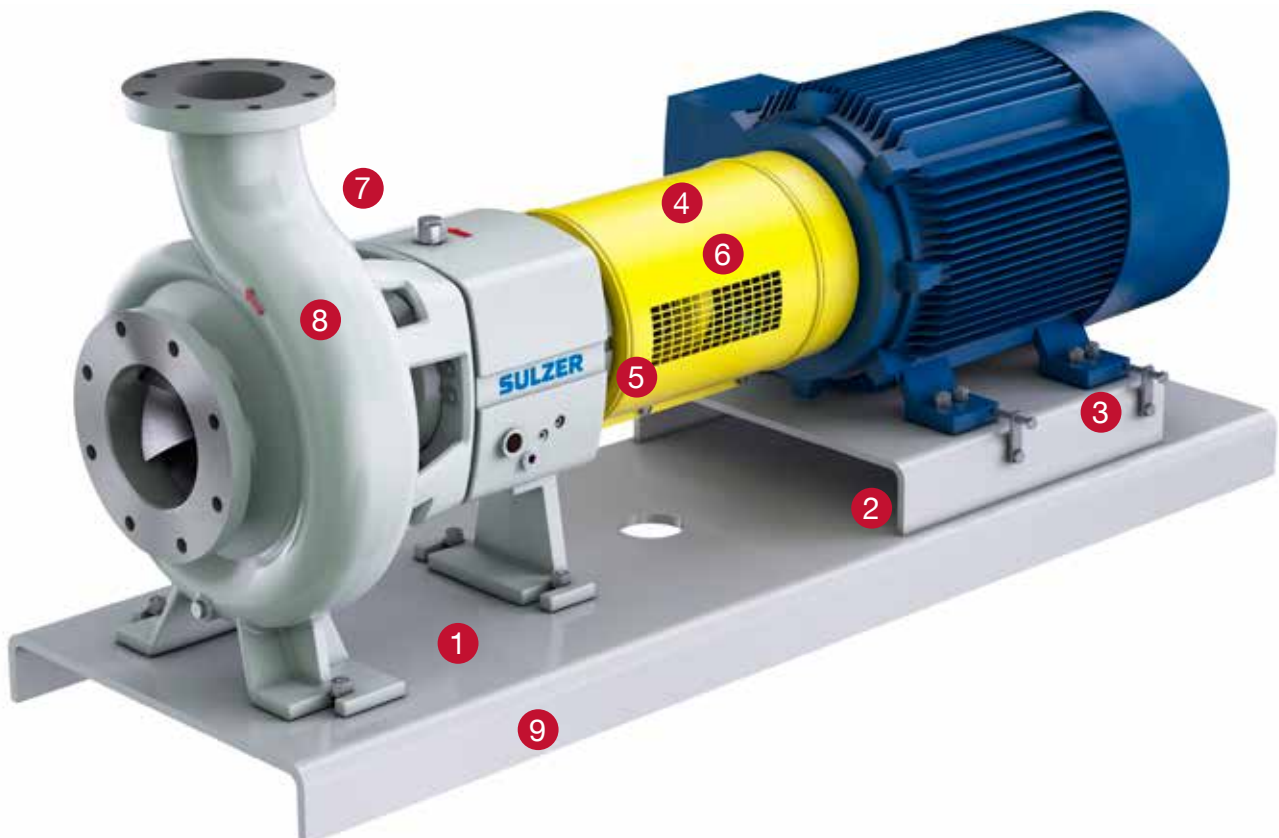
- Facilitates quick access for servicing

8 Jackscrews

- Enable simple disassembly of the main parts of the unit while minimizing maintenance costs

9 Foundation bolts according to preferred installation method

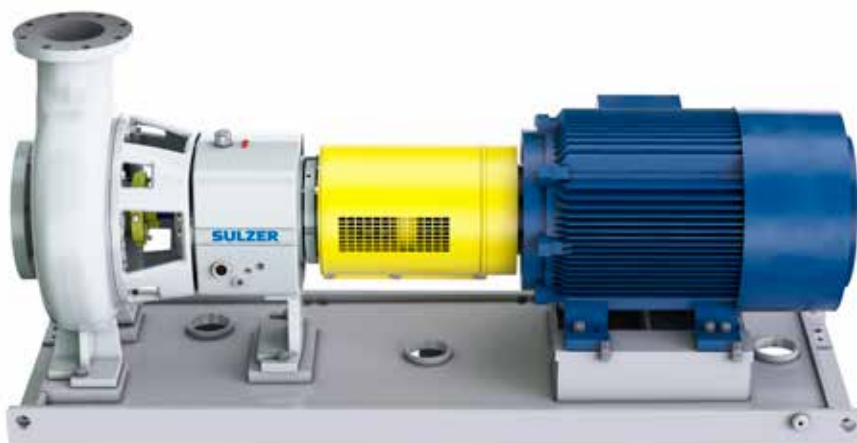
- Can be welded, grouted or installed with chemical anchors



Baseplate options

Various baseplate options are available to meet any needs. Sulzer baseplates are robust and rigid, designed for easy and quick installation of a pump-motor combination.

Riser blocks enable the installation of larger drive motor frames on the same baseplate without further modifications. Aligning the motor is easy with the help of alignment blocks.



Standard baseplate

Sulzer standard formed steel baseplates meet ANSI specifications for pump/motor mounting. A single grout hole and epoxy paint are standard. Options include a stainless steel drip pan and 100% stainless steel construction.



Drip-lip baseplate

The drip-lip baseplate with welded end caps includes a sloped drainage channel to a welded drain connection making this an excellent upgrade to the standard baseplate. Options include motor adjustment bolts, additional grout vent holes and 100% stainless steel construction.



PIP baseplate

This baseplate is designed to current PIP requirements and comes standard with a grout hole, raised mounting pads, motor alignment bolts, additional welded supports, a sloped full-drain pan, lifting lugs and continuous welded steel construction. Options include leveling stilt and spring mounting and 100% stainless steel construction.



Non-metallic baseplate

Nothing compares to the Sulzer polymer composite baseplate design. The polymer baseplate features a standard guaranteed surface flatness of 0.015" or 0.005" end-to-end, SS inserts, leveling holes and polymer riser blocks. The polymer baseplate is the best value in the industry.



API baseplate

This baseplate is designed according to API requirements for pump/motor mounting. Possible leaks are collected on the baseplate. Standard riser blocks enable the installation of larger drive motor frames as required. Motor adjustment bolts are included to facilitate fast, simple adjustment of the motor when aligning the coupling.



High standardization and interchangeability

The Sulzer CPE pump range is standardized, using common modules and components for maximum interchangeability, easy installation and maintenance. Fewer parts mean lower inventory costs and greater process reliability.



High standardization lowers
your spare parts inventory

Common components and modules in the CPE range with all options include:

- 40 wet-end hydraulics
- 2 impeller types
- 4 shaft seal bore types
- 3 shaft seal sizes
- 3 bearing unit sizes
- sealing water equipment
- couplings and coupling guards
- baseplates

Sulzer CPE pumps are interchangeable with older CPT pumps, and the CPE hydraulics can also be installed on an existing CPT bearing unit. By upgrading an existing CPT pump with high-efficiency CPE hydraulics, you get direct savings as a result of improved energy efficiency. In addition, the CPE bearing unit is fully interchangeable with existing CPT bearing units.

Size	Sealing and bearing unit	Size	Sealing and bearing unit
11-1	1	21-1.5	2
11-1.5		21-2	
11-2		21-3	
12-1		22-1	
12-1.5		22-1.5	
		22-2	
31-6	3	22-3	
31-8		22-4	
32-4		24-1.5	
32-6		24-2	
32-8		24-3	
33-4		24-4	
33-6			
33-8			

Service kits for CPE pumps

When your pump needs service, you should not have to worry about spending valuable time searching for the right parts – or even worse, finding out that some small but vital parts are missing. With Sulzer CPE service kits, you get everything you need in one package.

Tailor-made service solution

Sulzer offers four tailored service kits for CPE pumps to help and simplify service tasks. Kits are available for impeller, bearing unit, dynamic seal and gland packing service. All the required O-rings and other small parts are in one package for specific service.

Easy to order and use

One unique item code covering all the items in the kit makes purchasing quick and convenient. Sturdy packaging protects the individual items from damage and can be recycled after use.

Key customer benefits

- All the necessary parts in one package
- Easy to order
- Easy to identify and use
- Reduced inventories
- Original spare parts ensure compatibility, reliability and reduced lifecycle costs.

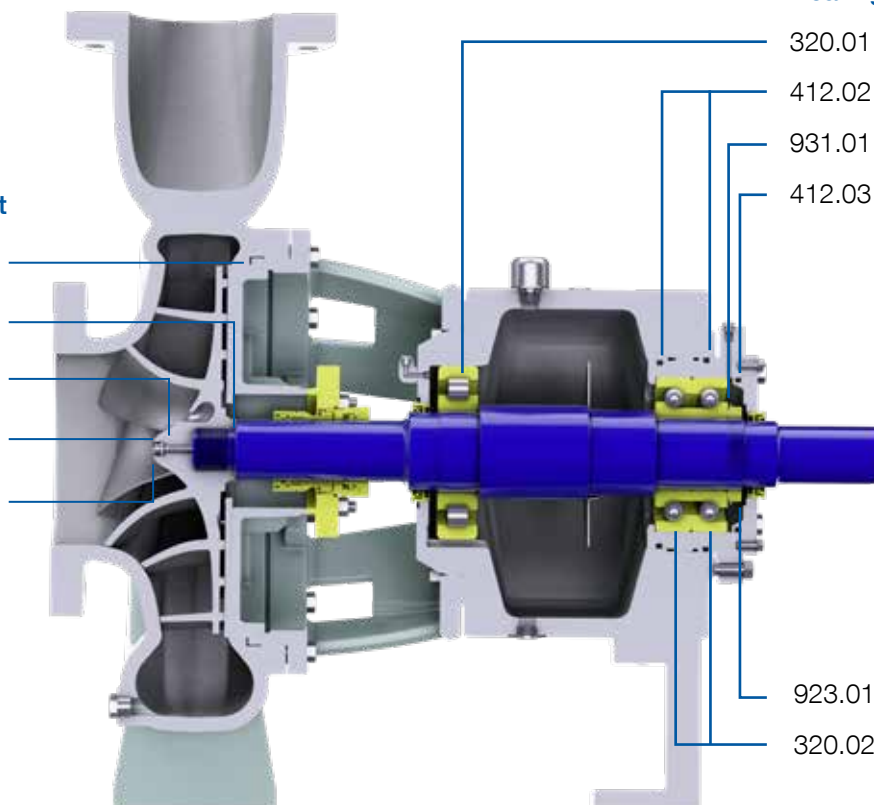
Impeller service kit

- 400.01 Gasket
- 412.01 O-ring
- 412.08 O-ring *
- 554.11 Washer *
- 914.03 Screw *

* optional

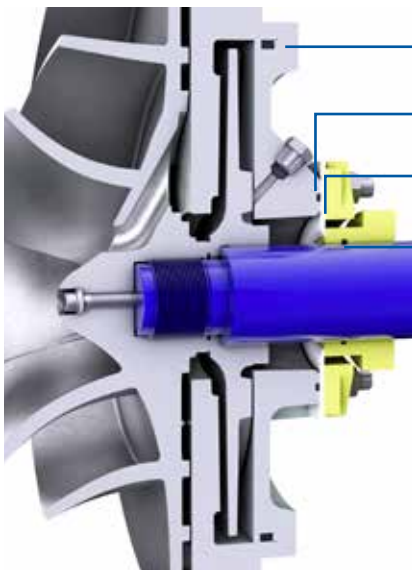
Bearing unit service kit

- 320.01 Antifriction bearing
- 412.02 O-rings
- 931.01 Lock washer
- 412.03 O-ring
- 923.01 Bearing nut
- 320.02 Antifriction bearings





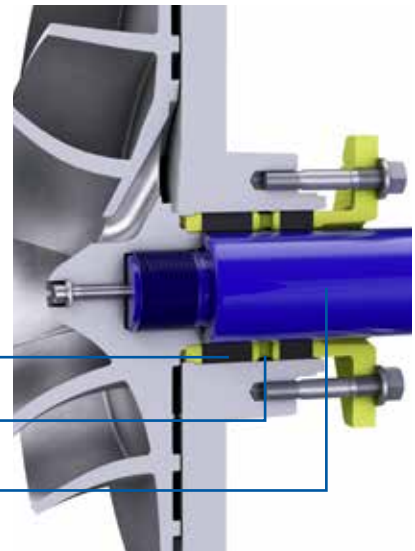
Dynamic seal service kit



- 412.04 O-ring
- 412.06 O-ring
- 435.01 Static seal
- 412.05 O-ring

Gland packing service kit

- 461.01 Packing
- 458.01 Lantern ring
- 524.01 Shaft sleeve





info@lennotech.com Tel. +31-152-610-900
www.lennotech.com Fax. +31-152-616-289