

SNS  
end-suction  
single-stage  
centrifugal pumps



# Main industries and applications

Sulzer's new SNS pump range has been designed to exceed the highest energy efficiency regulations across all industries and also the design requirements of ISO 5199 international standard. The innovative design makes the pump more reliable while significantly reducing total cost of ownership.

The SNS pump range has been designed to meet the process requirements in versatile general and industrial applications to pump

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



Oil and gas



Hydrocarbon processing



Power generation



Pulp, paper and board



General industry



Chemical process industry



Water and wastewater

## Key customer benefits

The SNS pump range has been designed using our long experience and in-depth knowledge of how to maximize value for our customers. Key benefits include:

### Maximum efficiency

- The process pump with the highest efficiency on the market provides clear savings in energy consumption
- Exceeding EU's (European Union) requirements for energy-related products (ErP)
- Highest efficiency across the whole pump range, exceeding the benchmark efficiency index MEI 0.7 (Minimum Efficiency Index)



### Improved reliability

- Optimized shaft sealing chamber and innovative patent pending balancing holes guarantee improved conditions for the shaft seal maximizing its life time
- Reliable integrated patent pending Sulzer mechanical seals for trouble free shaft sealing reducing unexpected shutdowns and minimizing operation and maintenance costs
- Heavy-duty, rigid and compact bearing units with long bearing life and leakage free construction minimizing unexpected shutdowns and reducing maintenance costs



### Minimized total cost of ownership (TCO)

- Higher hydraulic power to increase flow and provide a higher head than conventional pumps
- Low energy consumption due to high efficiency
- Low operational cost due to trouble-free Sulzer seals, rigid bearings and minimized service
- Low spare part costs due to high standardization
- Low installation and maintenance costs due to easy installation and innovative design



# Materials

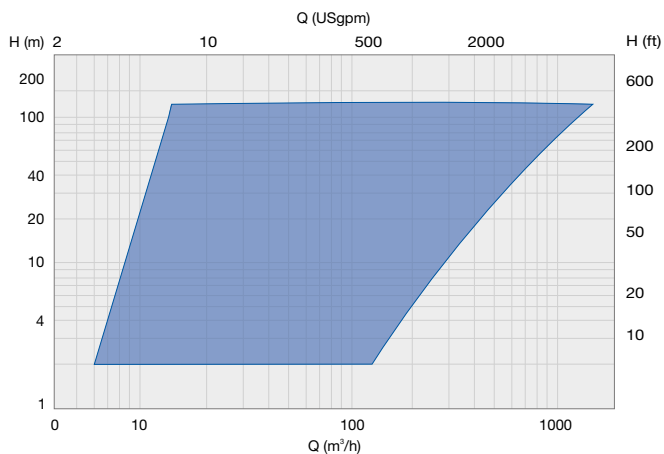
Standard material options	Material			Sulzer code
Duplex SS	ASTM	A890	Grade 3A	(41)
Austenitic	ASTM	A743	Grade CF-8M	(42)

# Operating data

	50 Hz	60 Hz
Capacities	up to 1'400 m <sup>3</sup> /h	up to 6'000 USgpm
Heads	up to 160 m	up to 525 ft.
Pressures	up to 16 bar	up to 230 psi
Temperatures	up to 120°C	up to 250°F
Maximum speed of rotation	up to 3'600 rpm	up to 3'600 rpm

Liquid	Temperature up to 120°C / 250°F	Pressure up to 16 bar / 230 psi	Corrosion pH from 0 to 14
Clean and slightly contaminated liquids	✓	✓	✓
Viscous liquids	✓	✓	✓
Fibrous slurries	✓	✓	✓

# Performance ranges



# Superior design features

- 1 Innovative, high efficiency, low NPSHr (Net Positive Suction Head required) impeller**
  - Reduced total cost of ownership, especially energy consumption and operational downtime costs
- 2 Innovative patent pending impeller balancing holes**
  - Secure optimum liquid circulation behind the impeller and in the seal chamber
  - Guaranteed improved conditions for shaft seal thus reducing unexpected shutdowns and minimizing operation and maintenance costs
- 3 Strong polygon impeller mounting with maximum torque capability**
  - Reliable operation
  - Easy and quick assembly and dismantling
  - Minimizes maintenance costs
- 4 Innovative patent pending Sulzer mechanical shaft seals**
  - Single and double mechanical seals
  - Reliable and trouble-free operation
  - Easy and quick assembly and dismantling
  - Reduces total cost of ownership by minimizing maintenance and downtime costs
- 5 Reliable heavy-duty bearing unit**
  - Compact and heavy-duty bearing unit with oversized bearing design minimizes unexpected shutdowns and reduces maintenance costs
  - Includes oil and grease lubrication for all performance needs for applications up to 120°C / 250°F
  - Exceeds many times ISO 5199 demand of life cycle 17'500 hours



## 6 Heavy-duty shaft

- Short overhang shaft
- Minimizes deflection at shaft sealing to much less than 0.05 mm / 0.002 in.
- Extends the shaft seal lifetime and reduces unexpected shutdowns and maintenance costs

## 7 Innovative, non-contacting bearing protection isolators

- Prevents lubricant leaks
- Extends bearings lifetime
- Prevents outside contaminants from entering the bearing housing
- Minimizes unexpected shutdowns and maintenance costs

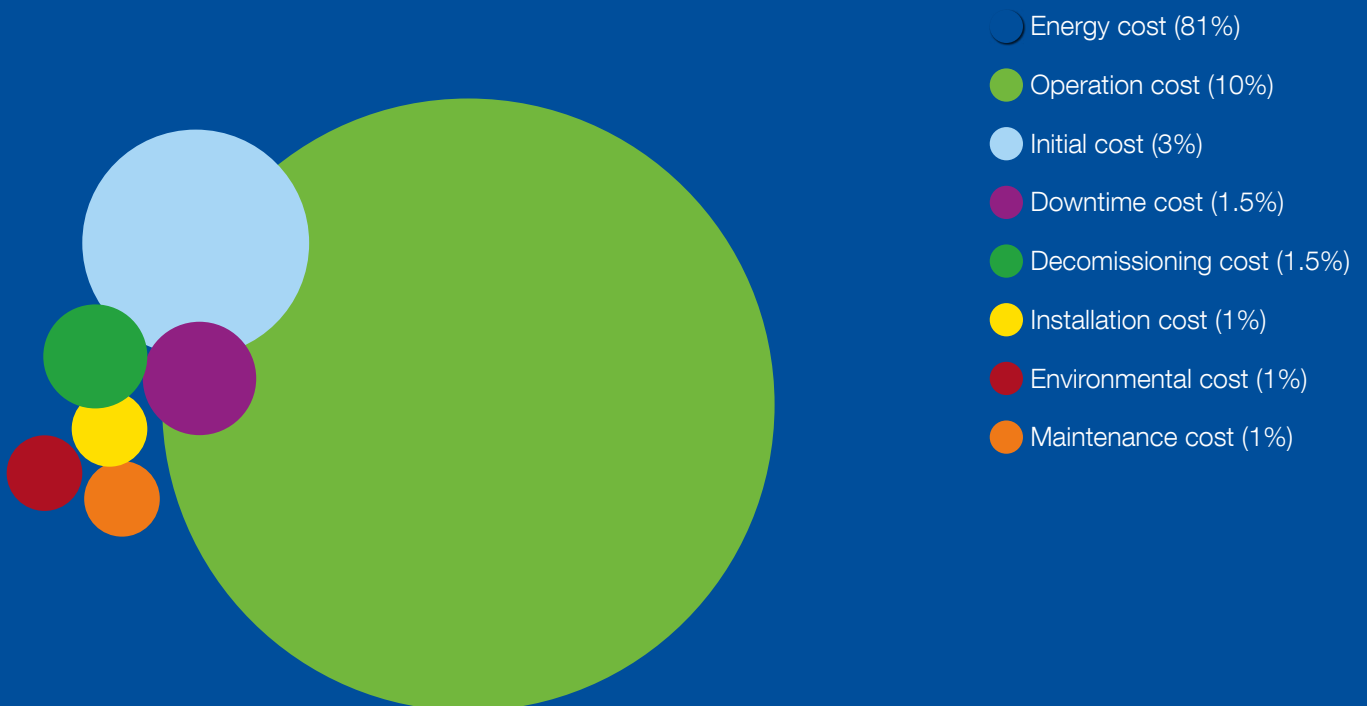
## 8 Steel base plate

- Easy and fast to install
- Savings in installation costs

## 9 Highly standardized pump design

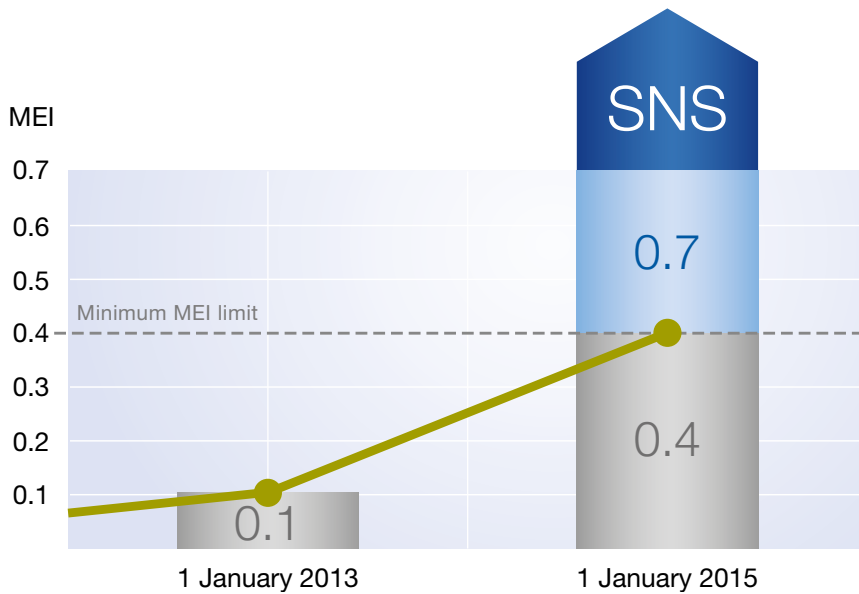
- Minimizes spare parts inventory and saves maintenance costs

# Typical distribution of Total Cost of Ownership (TCO)



# Highest efficiency, exceeding MEI 0.7

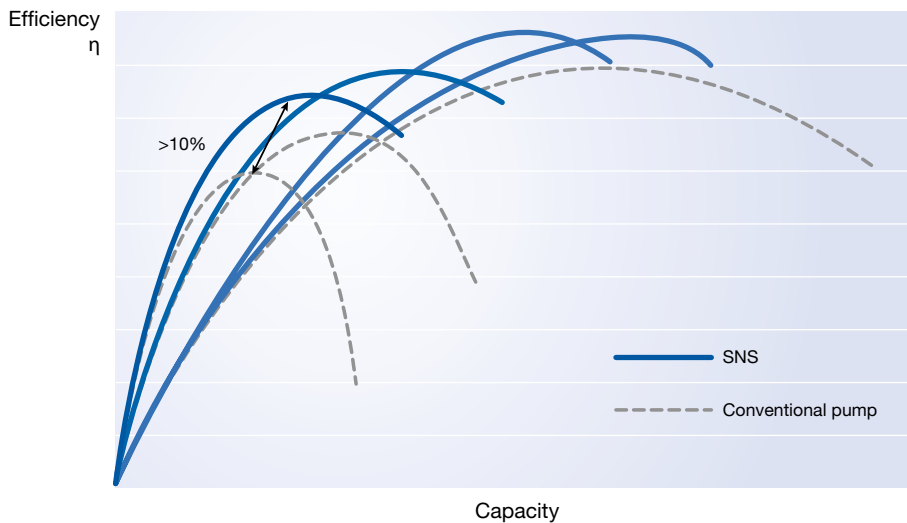
Energy efficiency is a hot topic in industry. So important that the European Union (EU) has created ErP (Energy-related Products) regulations specifying minimum efficiency values for water pumps, with the target of reducing energy consumption. From now on, only pumps and motors which satisfy the energy efficiency requirements of the EU's ErP Directive may be sold.



MEI, the minimum efficiency index for standardized water pumps, was set up to be  $\geq 0.4$  since beginning of 2015. This means that presently 40% of the pumps on the market do not comply. The Sulzer SNS pump range is truly ahead of the game.

The SNS process pump range not only meets the criteria, but breaks all records by exceeding even the benchmark efficiency index MEI 0.7!

# Excellent performance through innovations



SNS range represents a major breakthrough in terms of energy efficiency across the whole pump range. The cost savings are substantial, thanks to the many groundbreaking innovations that have been incorporated into this Sulzer high efficiency pumping concept.

- Innovative engineering methods to improve pumping performance
- Effective simulation tools help with quick analyses of various hydraulic designs
- Full-scale research center allowing testing of final design options in real operational conditions

# Impeller

The efficiency, stability and reliability of the pump are based on the design. Innovative impeller is designed in tandem with the casing and shaft sealing. The result is the most efficient hydraulics with improved shaft sealing ensuring higher reliability. The open impeller is designed to suit versatile liquids maximizing standardization and minimizing the need for spare parts.

## Design

- Open impeller for clean, fibrous and viscous liquids
- Extremely high efficiency
- Low net positive suction head required (NPSHr)
- Full back shroud
- Sturdy and strong design
- Optimized balancing holes

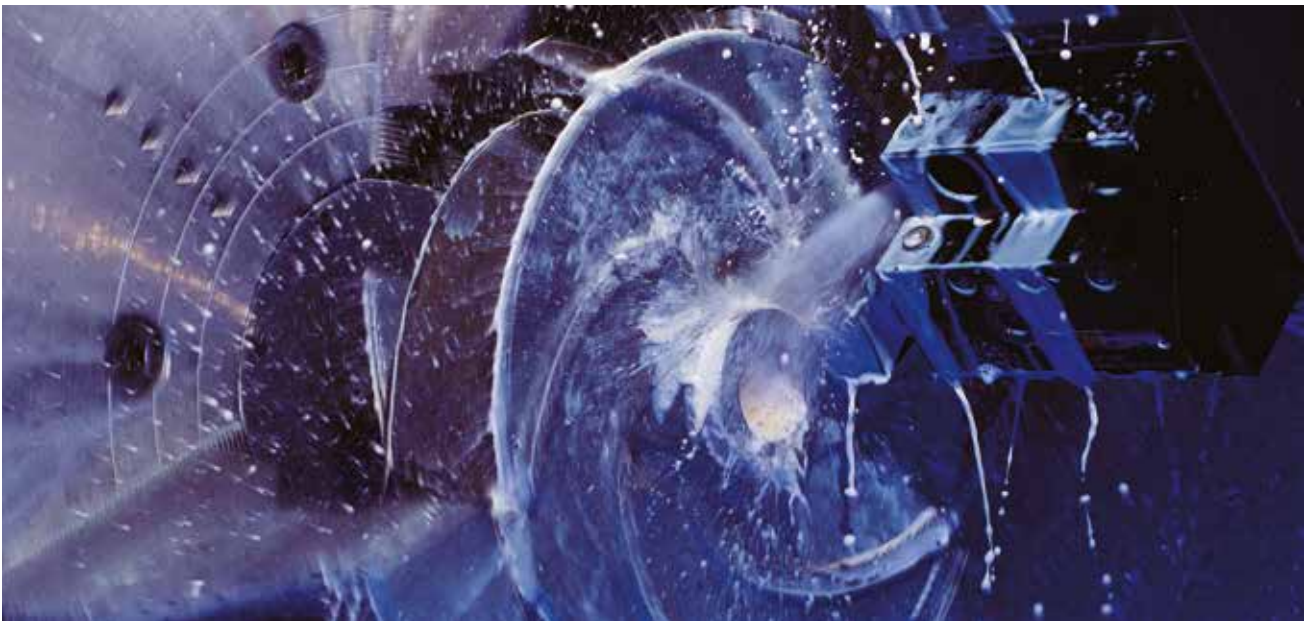


Unique patent pending balancing holes guarantee optimized flow and pressure in the shaft sealing area

- Dry running of the single mechanical seal is eliminated across a wide operating area
- Increased reliability and lower downtime and maintenance costs

## High torque capability polygon impeller mounting

- Extremely high torsional strength
- Allows reverse rotation
- Minimizes downtime and maintenance costs



# Shaft seals

Innovative Sulzer mechanical shaft seals for maximizing operational reliability and minimizing downtime costs. As Sulzer shaft seals require little or no water, they minimize operational and environmental costs. Innovative patent pending impeller balancing holes, together with the impeller back vanes, improve liquid circulation and prevent clogging, creating ideal conditions behind the impeller and shaft seal chamber.

## Innovative, patent pending optimal bore Sulzer integrated single mechanical seal

- Impeller balancing holes and positive inlet pressure are required
- The seal faces are lubricated by the pumped liquid flowing through the impeller balancing holes into the seal chamber
- Suitable for clean and slightly contaminated liquids, viscous liquids, fibrous slurries
- Temperature 10°C / 20°F below the boiling point of the pumped liquid at atmospheric pressure, max 120°C / 250°F



## Optimal bore Sulzer integrated single mechanical seal with throttling seal chamber and recirculation flushing or external clean flushing

- The seal faces are lubricated by the pumped liquid circulated through a pipe from the discharge pipe into the seal chamber (recirculation) or clean flushing liquid fed through a pipe from an external source into the seal chamber (external flushing)
- Suitable for clean liquids, water and condensates (recirculation)
- Suitable for clean and slightly contaminated liquids, viscous liquids and fibrous slurries (external flushing)
- Temperatures up to 120°C / 250°F



## Optimal bore Sulzer integrated single mechanical seal with grease lubrication

- The seal faces are lubricated by the pumped liquid and grease between the seal and the shaft
- Suitable for clean and slightly contaminated liquids, viscous liquids and fibrous slurries
- Temperatures up to 120°C / 250°F



## Optimal bore Sulzer integrated double mechanical seal with external sealing liquid or seal pot flush plans

- The seal faces are lubricated by non-pressurized (quench) or pressurized (barrier) external clean sealing liquid fed through a pipe from an external source into the seal between the seal face pairs (external sealing liquid)
- The seal faces are lubricated by closed sealing liquid (seal pot) system
- Designed for all consistencies and concentrations of clean, viscous or fibrous slurries
- Negative or positive pump suction head
- Temperatures up to 120°C / 250°F





# Sealing water equipment

Sealing water equipment regulates the volume and pressure of external sealing water for optimum shaft seal performance. The equipment is attached directly to the supply connection using a hose.

## Sealing water equipment for external flushing

- Single mechanical seals
- Incoming water supply pressure must be at least 0.5 bar / 7 psi higher than in the seal chamber
- The volume of sealing water can be regulated via the control valve on the sealing water equipment, typical value is 0.5 – 3 l/min / 0.15 – 0.8 USgpm



## Sealing water equipment for non-pressurized (quench) sealing water

- Double mechanical seals
- Incoming water supply pressure must be positive
- The volume of sealing water can be regulated via the control valve on the sealing water equipment, typical value is 0.5 - 3 l/min / 0.15 – 0.8 USgpm



## Sealing water equipment for pressurized sealing water

- Double mechanical seals
- Incoming water supply pressure must be at least 0.5 bar / 7 psi higher than in the seal chamber
- The volume and pressure of sealing water can be regulated via the control valve on the sealing water equipment, typical value is 0.5 - 3 l/min / 0.15 – 0.8 USgpm



## Seal pot sealing water equipment for double mechanical seals

- Closed sealing liquid circulation loop enabling up to 96% water savings compared to an external seal flush arrangement
- Keeps the seal lubricated and cooled, prevents dry run, and extends the lifetime of the seal
- The pressure of the sealing system must be 0.5 bar / 7 psi or higher than the pressure in the seal chamber. Pressure can be arranged with the hand pump, connecting to pressurized water network or pressurized gas network



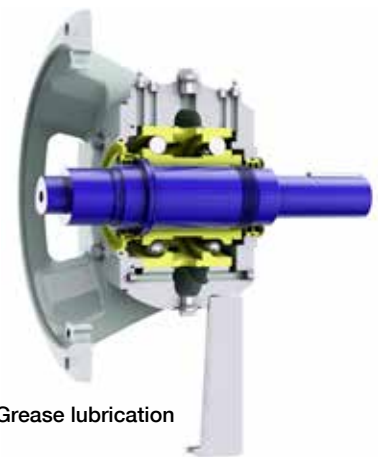
# Compact heavy-duty bearing units

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

- Heavy-duty short overhang shaft minimizes deflection at stuffing box < 0.05 mm / 0.002 in, thereby extending the life cycle of the shaft seal
- With oil bath, and grease lubrication for versatile applications up to 120°C / 250°F
- The same bearing housing can be used for oil and grease lubrication without changing or adding any internal parts
- Large oil sight glass enables easy oil level monitoring
- The strong, over-sized bearing design exceeds many times the ISO 5199 standard life cycle of 17'500 hours
- A sturdy support foot provides a solid base and prevents coupling alignment changes



Oil bath lubrication



Grease lubrication



## Innovative bearing isolators

Sulzer's innovative, non-contacting bearing isolators at the both ends of the bearing house consist of three elements: a deflector, a lip seal and a labyrinth. This triple bearing protection prevents lubricant leaks from the bearing house and keeps contaminants out. No contact between the lip seal and shaft when the pump is rotating also means no wear, which extends the lifecycle of the unit.

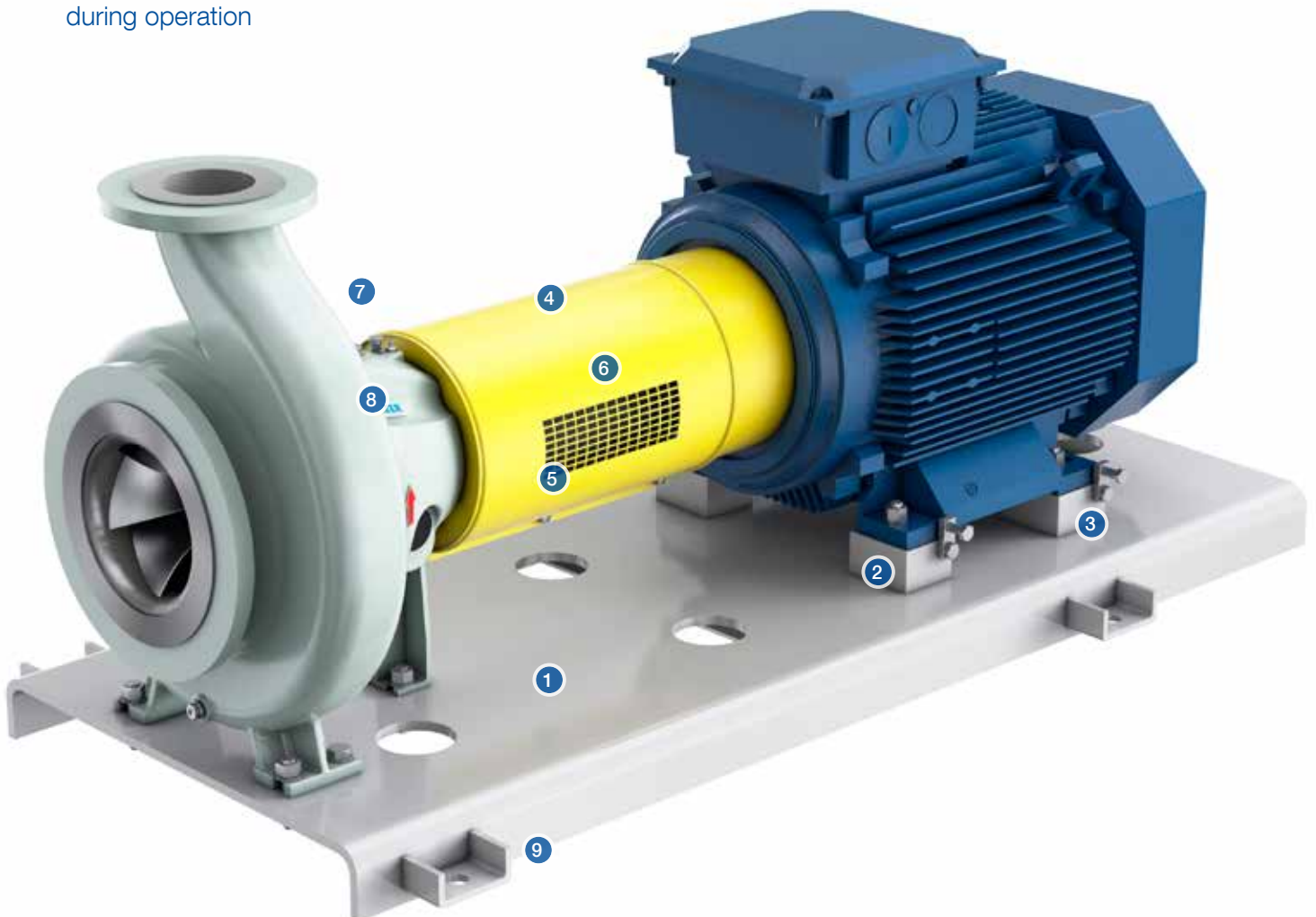
# High standardization lowers spare part inventory

All pumps in the SNS range have been standardized, using common modules and components, for maximum interchangeability. 32 pump sizes, but only four bearing units, seal and casing cover sizes covering the whole pump range. Fewer parts means lower inventory and maintenance costs, and greater process reliability.

Size	Sealing	Bearing	Size	Sealing	Bearing	Size	Sealing	Bearing	Size	Sealing	Bearing
1-25			2-25			3-25			4-25		
1-32			2-32			3-32			4-32		
1-40			2-40			3-40			4-40		
1-50			2-50			3-50			4-50		
1-65	1	1	2-65	2	2	3-65	3	3	4-65	4	4
1-80			2-80			3-80			4-80		
1-100			2-100			3-100			4-100		
1-125			2-125			3-125			4-125		

# Key design features – installation, operation and maintenance

- 1 Hot dip galvanized or painted steel base plate
  - Easy to install and grout into the concrete foundation
  - Lowers vibration and reduces wear and tear
- 2 Riser blocks for motor allows the installation of bigger motor sizes without base plate modification
  - Eases the installation and minimizes maintenance costs
- 3 Alignment blocks for the coupling alignment enable fast and easy motor movement further reducing maintenance costs
- 4 Guards for the rotating parts are designed according to stringent safety regulations
  - Ensures safe and reliable operation
- 5 Windows on both sides of the guards for 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 Founding bolts according to preferred installation method
  - Welded
  - Grouted
  - Chemical anchors





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