

SULZER

Sulzer Pumps

AHLSTAR End Suction Single Stage Centrifugal Process Pumps



The Heart of Your Process

Sulzer Pumps

Sulzer Pumps is a leading global supplier of reliable products and innovative pumping solutions for end users. Our active research and development, detailed process and application knowledge, together with a comprehensive understanding of market demands, keep us consistently at the leading edge of technical development. Our global network of modern manufacturing and packaging facilities together with sales offices, service centers and representatives located close to major markets provide fast responses to customer needs.

Sulzer Pumps has a long history of providing innovative pumping solutions to business partners in the following industries:

- Oil and Gas
- Hydrocarbon Processing
- Pulp and Paper
- Power Generation
- General Industry
- Chemical Process Industry
- Water

AHLSTAR Global Manufacturing Facilities



Sulzer Pumps Dalian, China



Sulzer Pumps Easley, USA



Sulzer Pumps Kotka, Finland

Excellent Performance with Unique Method

Sulzer Pumps has more than 177 years experience in demanding industrial pumping applications. We have broad and deep knowledge of the requirements of a full variety of pumping applications. Through this experience and our tradition of the research we have developed exceptional know-how and understanding of design and hydraulics for centrifugal pumps in many different applications.

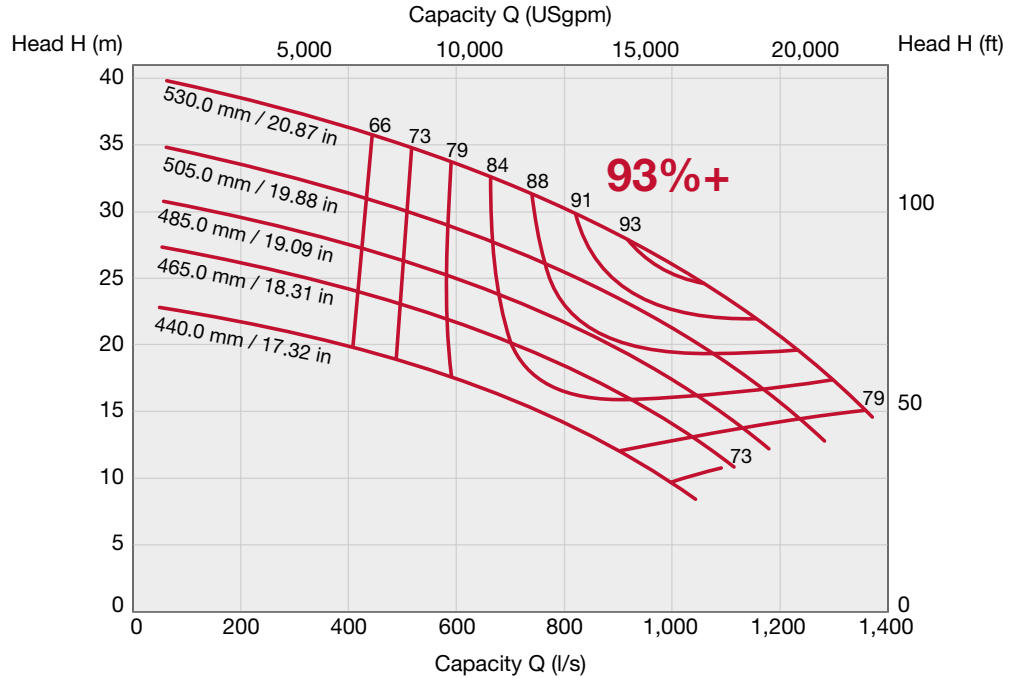
Sulzer Pumps has developed revolutionary and innovative methods to improve pumping performance, including more reliable and effective hydraulics with higher efficiency and suction capability. Sulzer Pumps has developed effective simulation tools help quickly analyze various hydraulic designs. With our own full-scale laboratory, we can test the final design options in real operational conditions.



Sulzer Pumps full-scale laboratory in Kotka, Finland

Exceeding Standard Requirements

The AHLSTAR range is designed according to international ISO 5199 and ISO 2858 standards, and go beyond the minimum requirements to help ensure performance and customer satisfaction. From the first design of the range in the mid-1980s to the latest updates, we have delivered more than 130,000 AHLSTAR pumps worldwide, all designed to exceed standard requirements.



Suitable for the Most Demanding Applications

The large and tight hydraulic coverage of AHLSTAR pumps is designed to satisfy the most demanding requirements of industrial pumping applications. The capability to work with all types of liquids, makes this pump range particularly desirable for challenging pumping operations.

Liquid	Temperature up to 260 °C / 500 °F	Pressure up to 1.6/2.5 MPa / 230/360 psi	Gas Content up to 70%	Liquid Position Below or Above the Pump	Corrosion pH from 0 to 14
Clean and Lightly Contaminated Liquids	✓	✓	✓	✓	✓
Viscous Liquids	✓	✓	✓	✓	✓
Fibrous Slurries	✓	✓	✓	✓	✓
Non-fibrous Slurries	✓	✓	✓	✓	✓
Large Solids Containing Liquids	✓	✓	✓	✓	✓

Superior Design Minimizes the Life Cycle Costs

Sulzer EnerSave™ Impellers

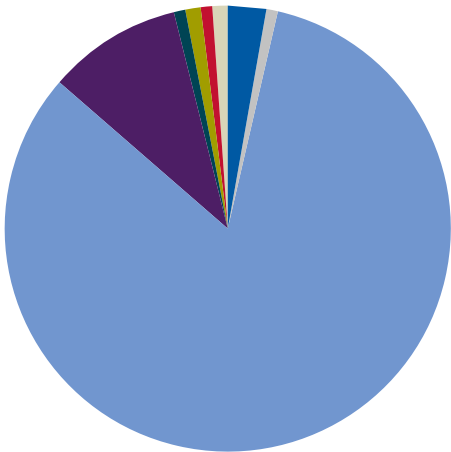
- Our versatile selection of reliable, high-efficiency impellers for demanding applications reduce life-cycle costs, especially costs for energy, operation and downtime.








- The patented, strong, reliable Rotokey impeller mounting enables an easy and quick dismantling and assembly and helps minimize maintenance costs. Rotokey is self-locking and reverse rotation safe. It is not sensitive to axial loads created during pump operation.

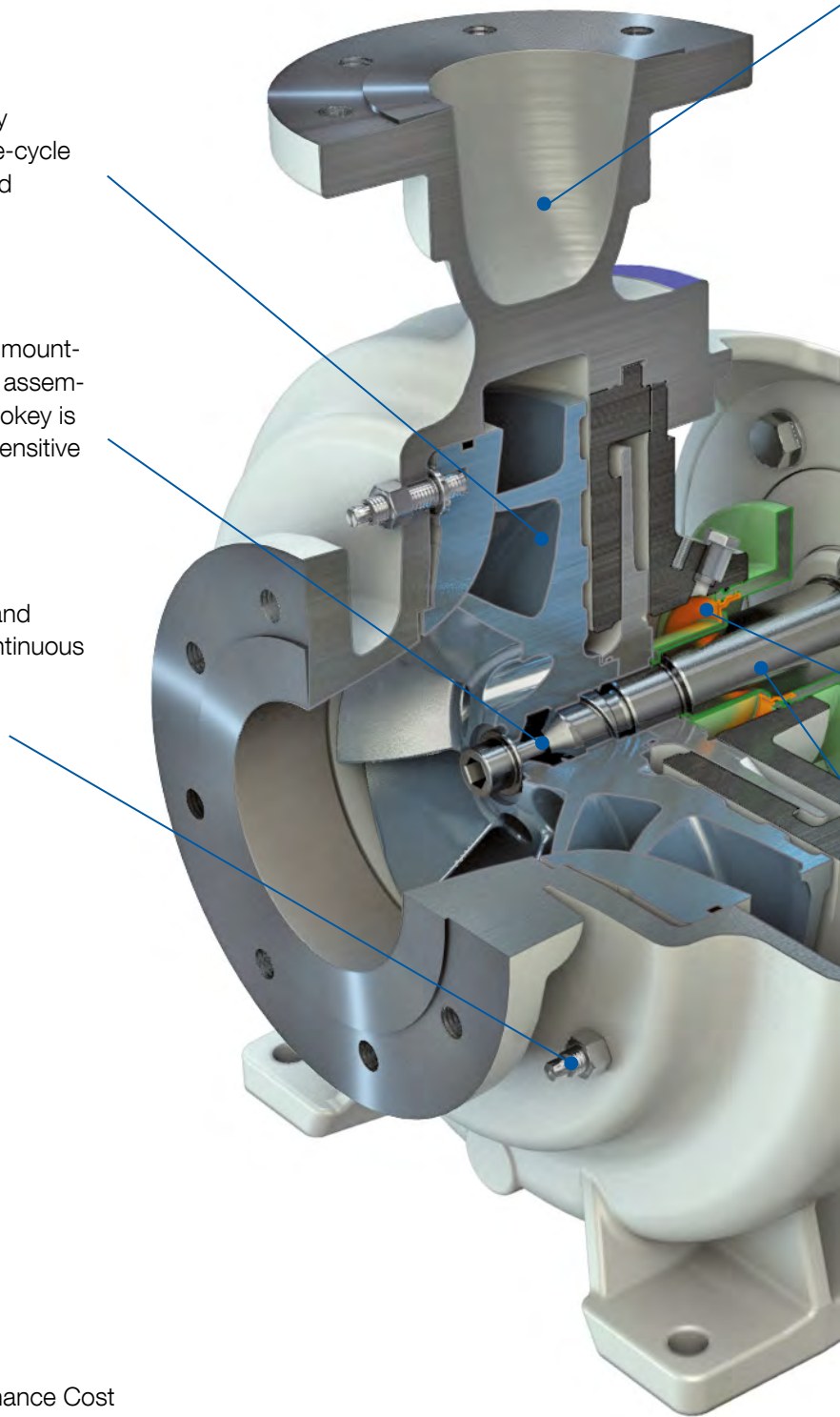


- The externally adjusted side plate allows easy and quick impeller clearance setting to maintain continuous high efficiency and minimize life-cycle cost.



Typical distribution of life-cycle costs

 Initial Cost	 Maintenance Cost
 Installation Cost	 Downtime Cost
 Energy Cost	 Environmental Cost
 Operation Cost	 Decommissioning Cost

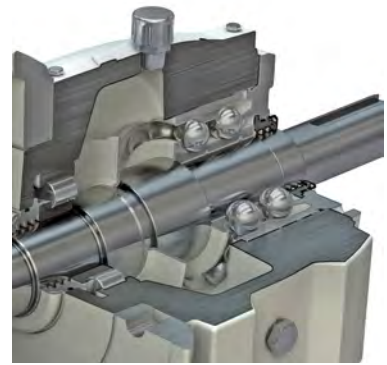


- A double volute casing in larger pumps reduces radial forces and shaft deflection to maximize the life of the bearing and shaft seals, thereby lowering life-cycle costs.



Sulzer Reliable Bearing Units

- Reliable, simplified, heavy-duty bearing unit minimizes unexpected shutdowns and reduces shutdown and maintenance costs.



- The bearing unit includes oil and grease lubrication for the full range of performance needs: Grease lubrication for applications up to 120 °C / 250 °F; oil lubrication for up to 180 °C / 355 °F.



- Heavy-duty shaft minimizes deflection at stuffing box to less than 0.05 mm / 0.002 in, which helps to extend the shaft seal lifetime and reduce unexpected shutdowns and maintenance costs.



- Innovative, non-contacting bearing isolators at both ends of the bearing house have three elements: deflector, lip seal and labyrinth. This triple bearing protection prevents lubricant leaks and keeps outside contaminants entering the bearing house. This innovative protection solution extends the bearing unit lifetime, minimizing unexpected shutdown and maintenance costs.



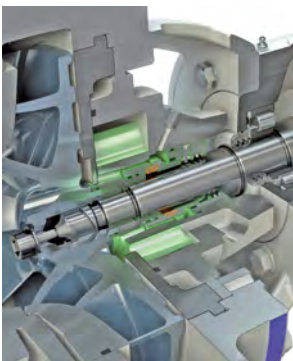
Sulzer WaterLess™ Shaft Seals

- Versatile, reliable, zero or less sealing water demanding shaft seal options reduce the life-cycle costs by minimizing operation and downtime costs. The simple design of the shaft seal enables easy and quick dismantling and assembly, and helps minimize maintenance costs.

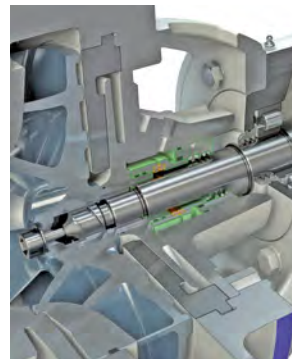


Sulzer Innovative Degassing and Self-priming Units

Our innovative and reliable integrated degassing systems works in a variety of applications and with difficult liquids.



- The integrated vacuum pump is designed to help the centrifugal pump start when the liquid level is below the pump in self-priming applications.



- The integrated gas separator helps the centrifugal pump to pump high gas containing liquids and slurries.



Versatile, Reliable, High-Efficiency Hydraulics for Your Demanding Applications

Reliable and high-efficiency hydraulics for your demanding pumping applications help reduce process shutdowns, limit maintenance needs and lower energy costs, thereby minimizing total life-cycle costs.

Clean and Lightly Contaminated Liquids



Closed Impeller
for clean liquids applications



Low Flow Impeller
for clean liquids and low flow applications



Open Impeller
for liquids containing randomly larger contaminants



Special Open Impeller
for liquids containing randomly larger contaminants



Low Pulse Impeller
for clean and low pressure pulsation applications

Viscous Liquids



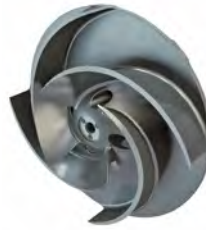
Closed Impeller
for viscous liquids up to 250 cSt*



Low Flow Impeller
for viscous liquids up to 250 cSt*



Open Impeller
for viscous liquids up to 4,000 cSt*



Special Open Impeller
for viscous liquids up to 4,000 cSt*



Low Pulse Impeller
for viscous liquids up to 4,000 cSt* and low pressure pulsation applications

*Depending on liquids

Fibrous Slurries



Closed Impeller
for up to 1% consistency fibrous slurries



Low Flow Impeller
for up to 1% consistency fibrous slurries



Open Impeller
for up to 8% consistency fibrous slurries containing randomly larger contaminants



Special Open Impeller
or up to 8% consistency fibrous slurries containing randomly larger contaminants



Low Pulse Impeller
for fibrous slurries up to 8% consistency and low pressure pulsation applications

Large Solids Containing Liquids



High Efficiency Non-Clogging Vortex Impeller
for large and long solids containing liquids



Non-Clogging Vortex Impeller
for large and long solids containing liquids



Non-Clogging Closed (channel type) Impeller
for large but not long solids containing liquids

Non-Fibrous Slurries



Wear-Resistant Closed Impeller
for fine non-fibrous slurries up to 70% concentration



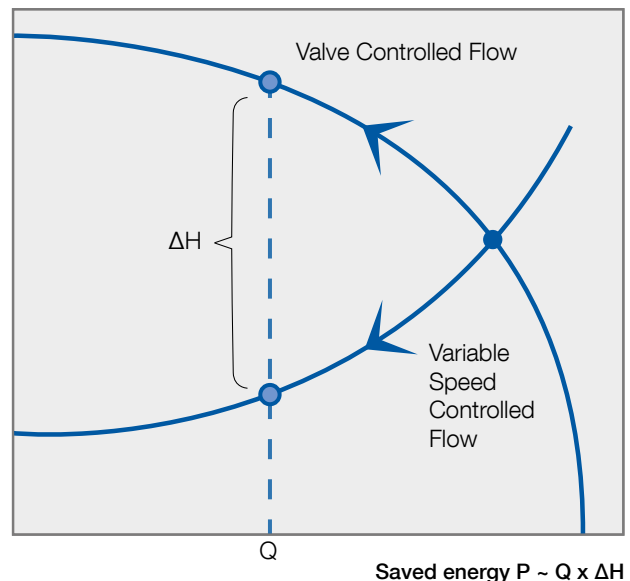
Wear-Resistant Special Open Impeller
for non-fibrous slurries up to 70% containing randomly large contaminants concentration



Wear-Resistant Non-Clogging Vortex Impeller
for non-fibrous slurries up to 70% containing randomly large contaminants concentration

The Variable Speed Controlled Pumps Can Save up to 60% Energy

Traditional pumping operations include a constant speed drive motor and a flow control valve to adjust the flow of the pump. However, up to 60% energy can be saved by controlling the speed of the pump. With variable speed control, the pump runs smoothly without recirculation and there is less vibration and noise due to the low internal hydraulic loads. The result is longer pump life, fewer unexpected shutdowns and lower maintenance costs, minimizing total life-cycle costs.



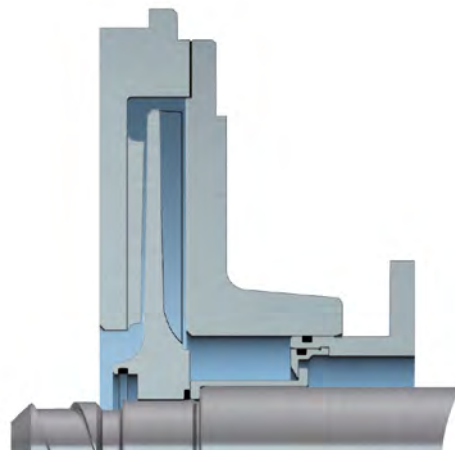
Reliable Operation and Reduced Cost with Sulzer's Innovative Shaft Sealing Solutions

Reliable shaft seals selected for the pumped liquids and applications help minimize downtime costs by reducing operation costs and unexpected shutdowns. Because our shaft seals require less water, or no water at all, they help further reduce operation and environmental costs. Simple designs allow for faster repair and maintenance, lowering installation and maintenance costs.

Patented impeller balancing holes secure the right condition behind the impeller and in the optimal seal chamber. The balancing holes and impeller back vanes allow good liquid circulation and prevent clogging behind the impeller.

Trusted Sulzer Dynamic Seal

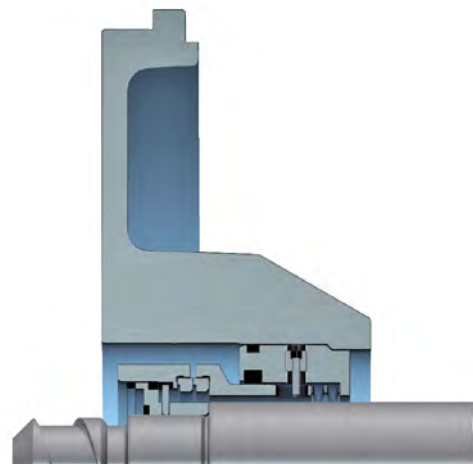
The dynamic seal is specially-designed for fibrous slurries, but also fits well for clean, viscous, non-fibrous slurries and liquids containing large solids. The dynamic seal doesn't need external sealing water and does not leak. Sulzer's dynamic seal is suitable for applications where the pump inlet head is positive and the temperature is below boiling point in atmospheric pressure. More than 50,000 dynamic seals have been put in place since 1987, providing reliable operations for customers all over the world.



Optimal Bore Sulzer Single Mechanical Seal

The single mechanical seal with the optimal bore seal chamber is specifically designed for use with fibrous slurries up to 8% consistency without flushing water when pump suction head is positive and the impeller is equipped with special patented balancing holes. Sulzer's single mechanical seal also is suitable for clean, viscous and liquids containing large solids.

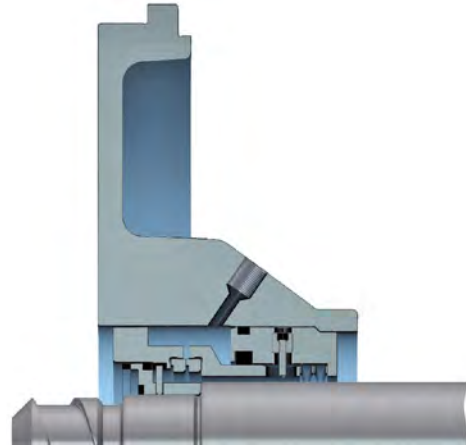
Single Mechanical Seal is suitable for applications where liquid temperature is 10 °C / 20 °F below the boiling point in atmospheric pressure.



Self-venting Throttling Seal Chamber Sulzer Single Mechanical Seal

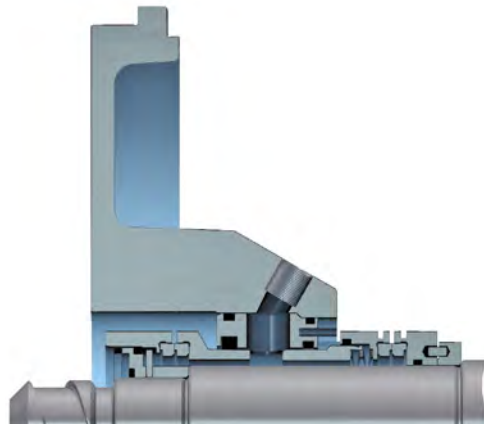
Single seal with self-venting throttling seal chamber and pumped liquid recirculation flushing from the discharge pipe connection is optimal for clean liquids applications with negative pump suction head or high temperatures up to 140 °C / 285 °F. The impeller can be equipped with or without balancing holes.

This seal, with external sealing liquid flushing, can be used for non-fibrous slurries to avoid abrasive particles entering between the mechanical seal faces. The external flushing is mixed into pumped liquids. Seal can be used up to 180 °C / 355 °F.



Optimal Bore Sulzer Double Mechanical Seal

Patented double seal with optimal bore seal chamber is designed for all consistencies and concentrations of clean, viscous, fibrous slurries, non-fibrous slurries and liquids containing large solids. The pump suction head can be negative or positive and the impeller can be equipped with or without balancing holes. In applications where abrasive non-fibrous and large solids containing liquids are pumped, the impeller typically does not have balancing holes. The double seal is suited for temperatures up to 180 °C / 355 °F.

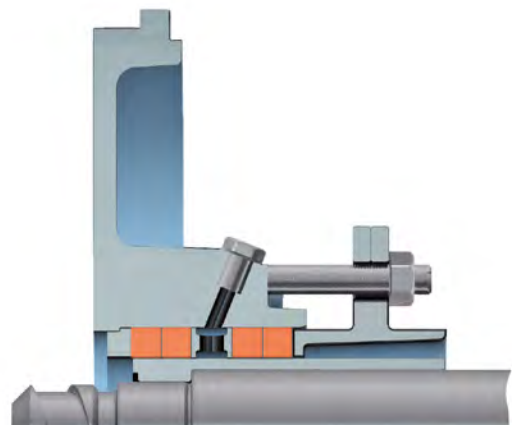


Classic Gland Packing

The gland packing shaft seal without sealing liquid is designed for clean liquids when pump suction head is positive. The impeller needs to be equipped with balancing holes. The seal leaks to secure it's proper operation. This means high operational and environmental costs.

Gland packing shaft seals with pumped liquid recirculation flushing from the discharge pipe connection can also be used with pumped liquid recirculation flushing from the discharge pipe connection when the pump suction head is negative or the temperature is over boiling point up to 140 °C / 285 °F. The impeller doesn't need balancing holes.

For viscous, fibrous and non-fibrous slurries and liquids containing large solid particles, the gland packing requires external sealing liquid to prevent pumped liquid from entering the sealing area.



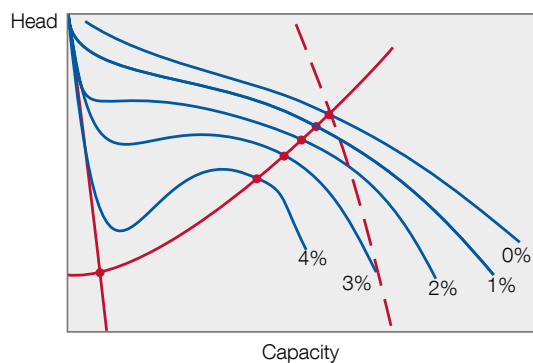
Other Classic Mechanical Seals

Ready fitted, single and double seals, cartridge single and double, according to ISO and API standards, or element single and double mechanical seals, according to ISO and API standards can be also fitted into the pump.

Innovative and Reliable Degassing and Self-Priming Units

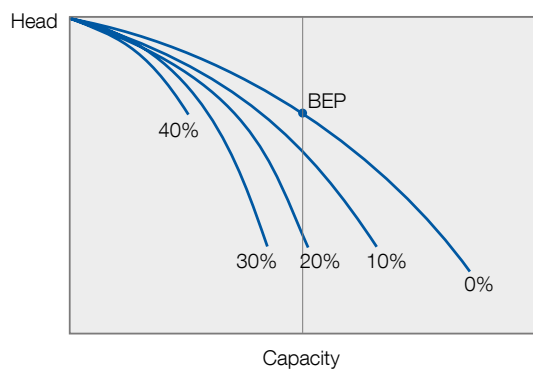
The AHLSTAR pump can be fitted with the self-priming or degassing units to start the pump with the inlet pipe empty, or to help the pump operate with liquid containing high gas content, where the normal centrifugal pumps fail to pump.

All conventional centrifugal pumps, with all impeller types, can operate with gas content below 4%. Gas bubbles collected in the impeller eye impair pumping and will reduce the capacity and head. At a gas content of above 4%, the duty point remains approximately between 10 ...100% of the best efficiency point (BEP). Pumping is very unstable and varies heavily and requires excessive over-dimensioning of the pump.



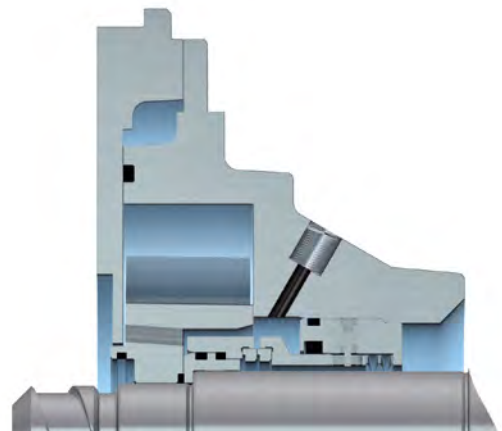
Conventional pump has unstable operation with a gas content of 0...4%

Using AHLSTAR Degassing and Self-Priming units, such as LM Liquid ring pump and GM or GS Gas separator units, will stabilize centrifugal pump operation with liquids with up to 40% weakly bonded gases or liquids with up to 70% strongly bonded gases.

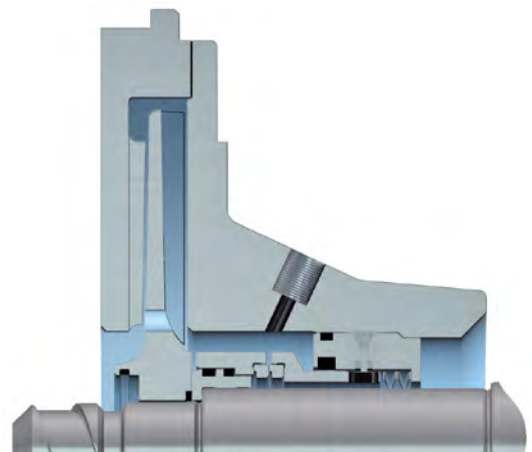


AHLSTAR gas removal pump has stable operation with a gas content of 0...40%

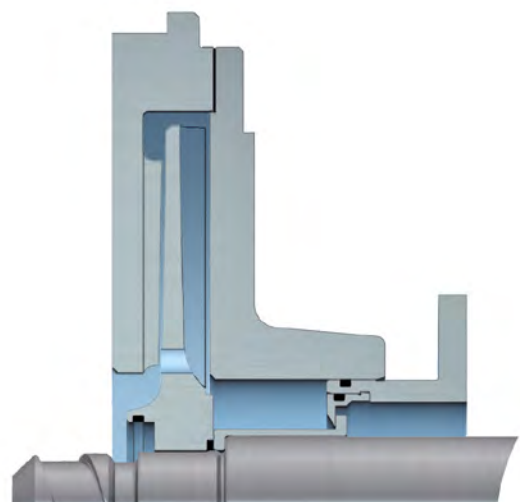
The pressure difference between the pump inlet and outlet of the degassing removes gas bubbles in the internal liquid ring pump. Removing the gas bubbles from the impeller stabilizes the system and greatly increases pumping efficiency.



LM liquid ring pump with single mechanical seal

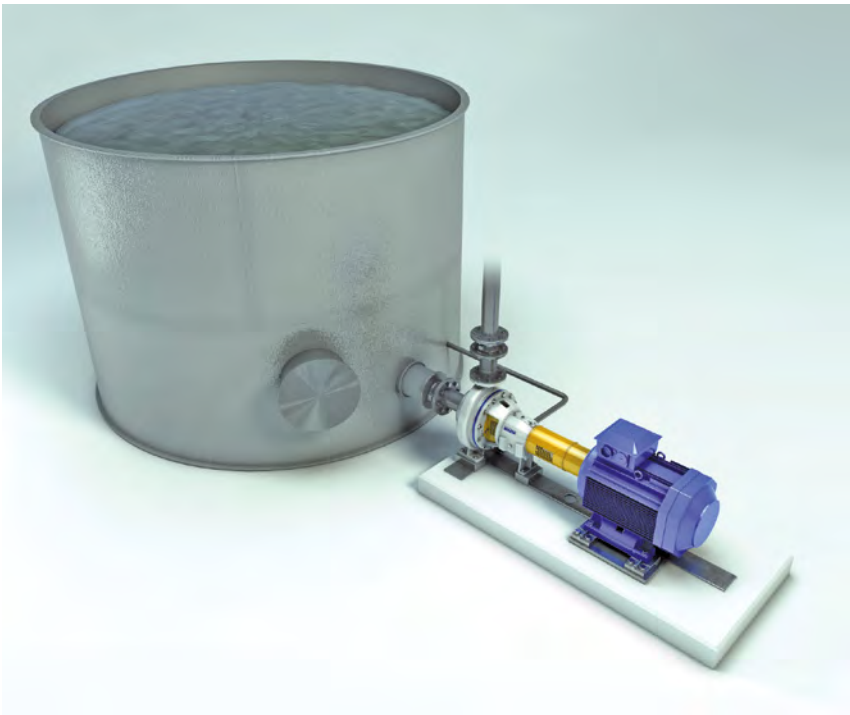


GM gas separator with single mechanical seal



GS gas separator with static seal

Versatile Solutions for Degassing Applications

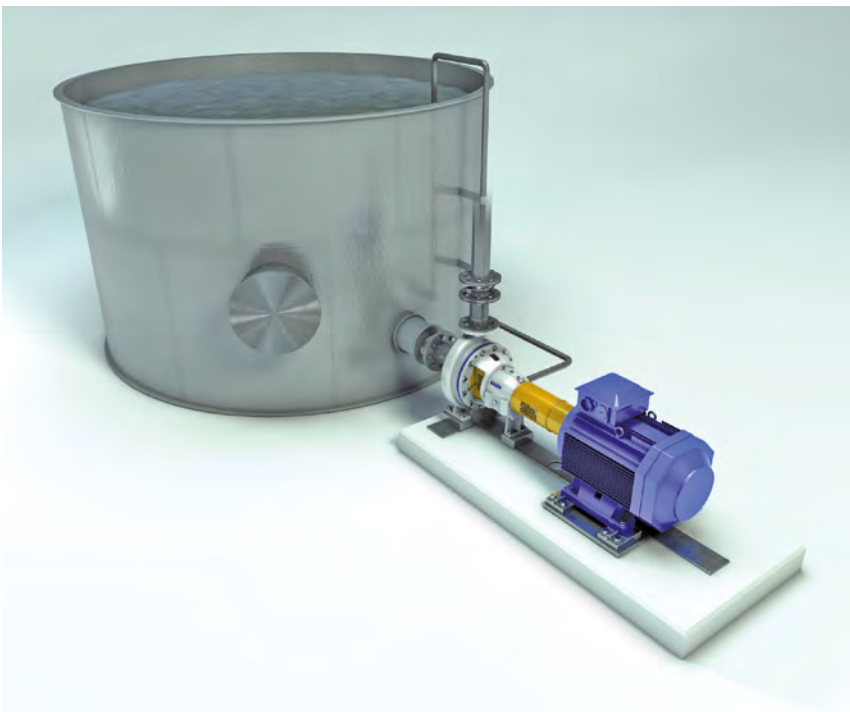


Positive Inlet Head

When pumping gas containing liquids in unstable inlet head applications, the AHLSTAR pump with LM integrated liquid ring pump degassing unit secures reliable pumping.

- Single mechanical seal with recirculation flushing for clean liquids.
- Single mechanical seal with external flushing for fibrous and non-fibrous slurries and liquids containing large solids.
- Double mechanical seal can also be utilized.

When inlet head is stable GS and GM gas separator degassing units give reliable and high efficiency pumping. Single and double mechanical seal or static seal can be selected.



Low or Negative Inlet Head

When pumping gas containing liquids in low or negative inlet head applications, the AHLSTAR pump with integrated liquid ring pump LM provides the most reliable pumping system.

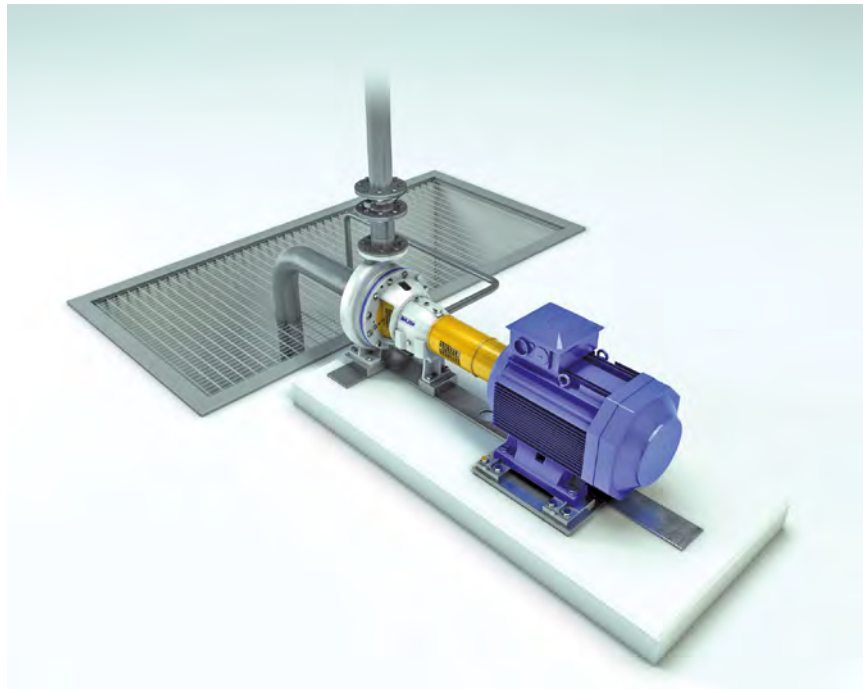
- Single mechanical seal with external flushing for clean, viscous, fibrous and non-fibrous slurries and liquids containing large solids.
- Double mechanical seal can also be used when pumped liquid is suitable for liquid ring flushing.

GM or GS gas separator degassing units cannot be used due to low or negative inlet head.

Reliable Solutions for Self-Priming Pumping Applications

When starting the pump inlet pipe empty, the AHLSTAR pump with the LM integrated liquid ring pump degassing unit secures quick and reliable pump start-up and continuous pumping.

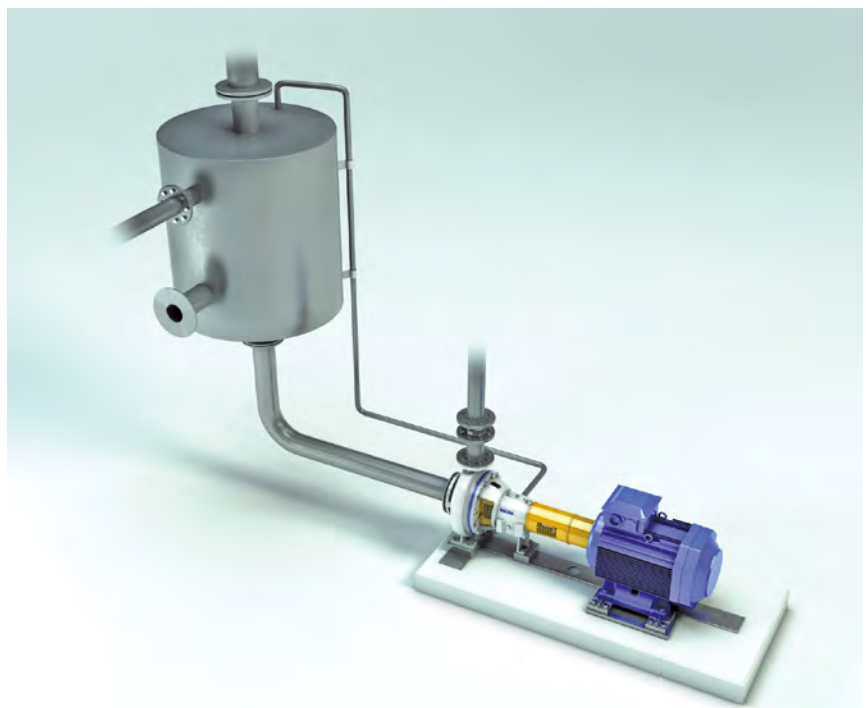
- Single mechanical seal with recirculation flushing for clean liquids. Goose neck type inlet pipe is required.
- Single mechanical seal with external flushing for fibrous and non-fibrous slurries and liquids containing large solids.



Replacing the Barometric Leg

The AHLSTAR pump with a GM gas separator unit simplifies the high cost classic barometric leg pumping system and secures even and reliable pumping. Deep well or high building and long pipes with vertical or submersible pump and liquid level control system can be avoided to minimize the initial costs.

- Single mechanical seal with recirculation flushing for clean liquids.
- Single mechanical seal with external flushing for fibrous and non-fibrous slurries.
- Double mechanical seal can also be used for fibrous and non-fibrous slurries.



Reliable, Simplified and Heavy-Duty Bearing Units Reduce Downtime Costs

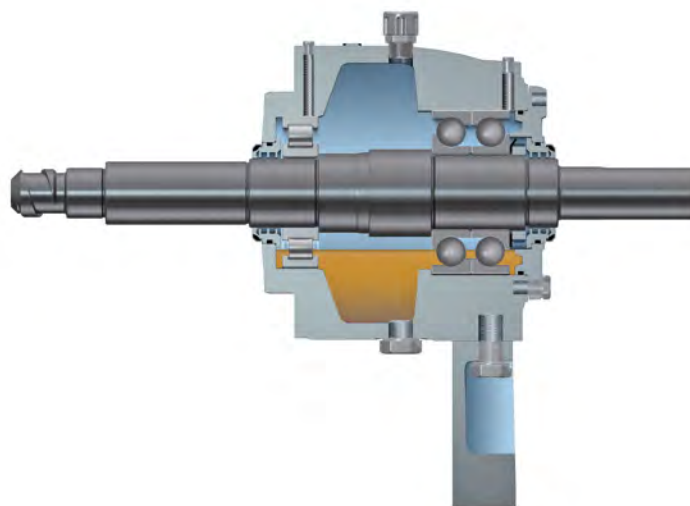
Sulzer's reliable, simplified, heavy-duty AHLSTAR bearing unit minimizes unexpected shutdowns and thereby reduces downtime and maintenance costs.

AHLSTAR bearing units have plenty of design features and benefits to minimize the life-cycle costs.

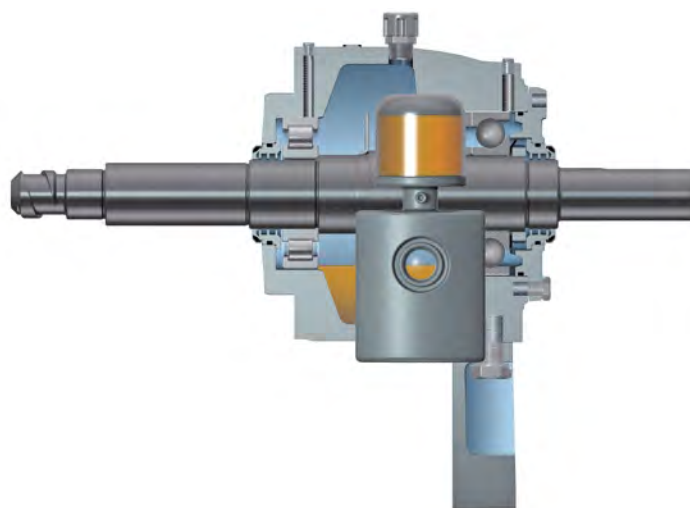
- The basic design has a minimum number of components, making the assembly easy and quick minimizing downtime and maintenance costs.
- Heavy-duty shaft minimizes deflection at stuffing box less than 0.05 mm / 0.002 in thereby extending the shaft seal lifetime and reducing unexpected shutdown and maintenance costs.
- The bearing unit has the oil bath, oil splash, and grease lubrication for the versatile applications. Oil bath or oil splash lubrication for applications up to 180 °C / 355 °F. Grease lubrication up to 120 °C / 250 °F.

Innovative, non-contacting bearing isolators at the both ends of the bearing house have three elements: deflector, lip seal and labyrinth. This triple bearing protection prevents lubricant leaks from the bearing house and keeps contaminants out. Because the lip seal does not contact the shaft when pump is rotating there is no wear. This innovative triple bearing protection solution extends the bearings unit lifetime, minimizes unexpected shutdowns and lower maintenance costs.

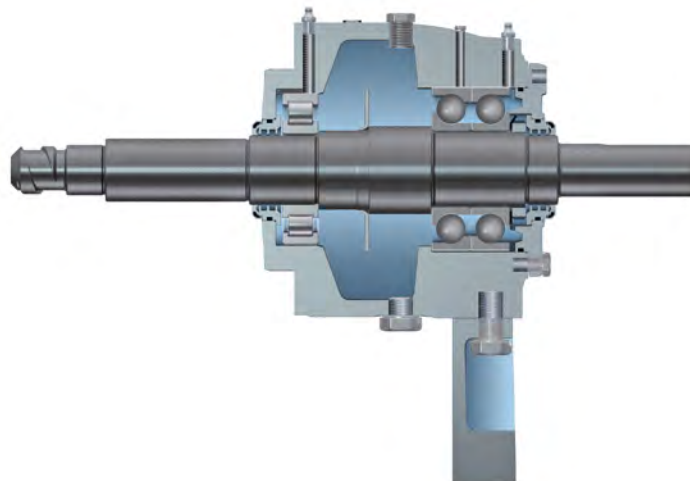
- Strong, over-sized bearing arrangement goes far beyond the ISO 5199 standard lifetime of 17,500 hours.
- Sturdy bearing support foot provides solid mounting and prevents changes in the coupling alignment.



Oil bath lubrication



Oil splash lubrication



Grease lubrication

Quick and Easy Installation Concept

The rigid, distortion-free, hot-dip galvanized baseplate is easy to install and grout into the concrete foundation. With various installation options, the AHLSTAR pump helps minimize the life-cycle costs.

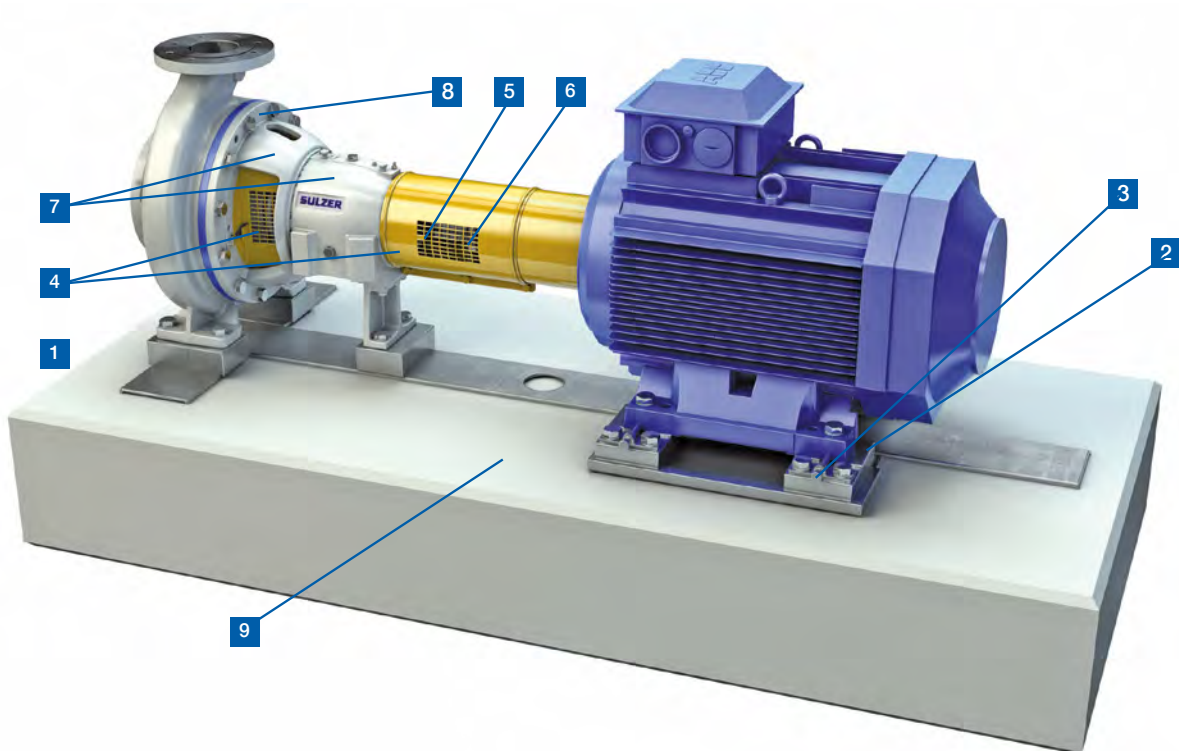
- 1 The optimized frame size and standardization reduces concrete needs up to 30 %. The resulting strong, rigid foundation significantly dampens vibration, reducing wear and tear and extending the lifetime of the pumps, seals and motors.

- 2 Galvanized riser blocks allow the installation of the next frame size of motor.

- 3 Alignment blocks of stainless steel permit fast and easy motor movement when aligning the coupling.

Alternative foundation bolt designs are welded, grouted and chemical anchors.

The standard fabricated steel baseplate can be installed directly on the floor as free-standing baseplate on machine feet or on a rubber sheet. No grouting at site is needed. The baseplate provides reinforcement in the advanced grouted concrete design. The construction is designed to pass the pipe loads through the fabricated steel baseplate to the base.



Designed for Safe Operation, and Easy Maintenance and Service

- 4 Guards for the rotating parts are designed according to stringent safety regulations.

- 5 Windows on both sides of the guards allow for safe and easy stroboscope inspection of the coupling during operation.

- 6 Various flexible coupling with spacer for quick service.

- 7 Back pull-out design facilitates fast and easy access for servicing.

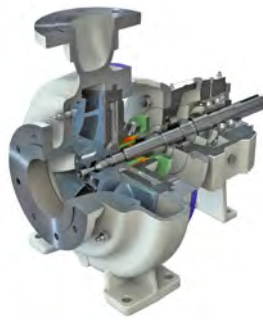
- 8 Jackscrews for simple disassembly of main parts of the pump.

- 9 Classic ISO, API standard baseplate for applications where standard installation is required.

AHLSTAR Performance Ranges and Material Options

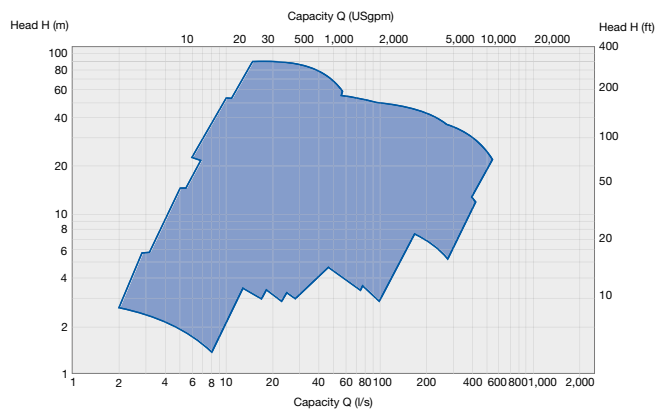
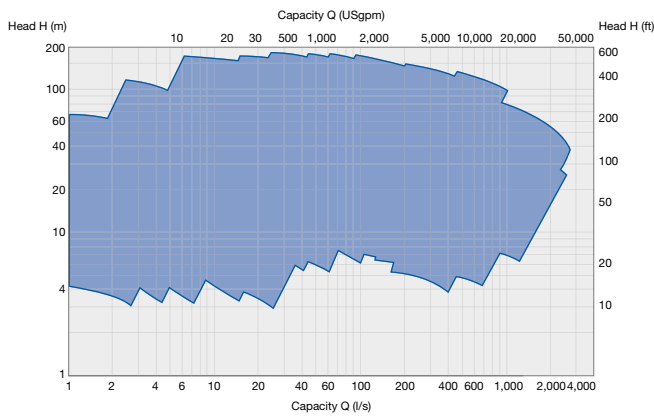
A Performance

Head up to 160 m / 525 ft
 Capacity up to 2,500 l/s / 40,000 USgpm
 Temperature max. 180 °C / 355 °F
 Frequency 50 or 60 Hz
 Pressure up to 1.6/2.5 MPa / 230/360 psi, depending on material and size.
 Closed, low flow, open, special open, low pulse and high efficiency non-clogging vortex impellers.



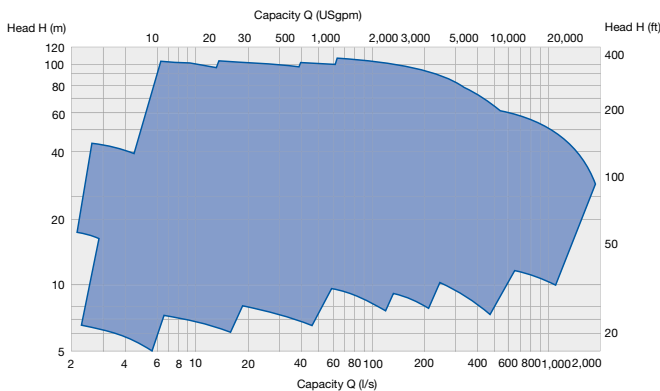
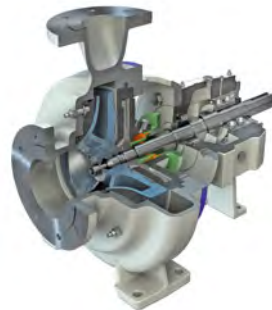
N Performance

Head up to 90 m / 295 ft
 Capacity up to 550 l/s / 8,700 USgpm
 Temperature max. 180 °C / 355 °F
 Frequency 50 or 60 Hz
 Pressure up to 1.6 MPa / 230 psi, depending on material and size.
 Non-clogging closed and non-clogging vortex impellers.



W Performance

Head up to 110 m / 360 ft
 Capacity up to 2,000 l/s / 32,000 USgpm
 Temperature max. 180 °C / 355 °F
 Frequency 50 or 60 Hz
 Pressure up to 1.6 MPa / 230 psi, depending on material and size.
 Wear-resistant closed, wear-resistant special open and wear-resistant non-clogging vortex impellers.



Material Options

Duplex SS	ASTM	A890	Grade 3A	(41)
Duplex SS	ASTM	A890	Grade 1B	(4L)
Duplex SS	ASTM	A890	Grade 5A	(4T)
Austenitic SS	ASTM	A743	Grade CF-8	(4C)
Austenitic SS	ASTM	A743	Grade CG-3M	(4G)
Austenitic SS	ASTM	A743	Grade CN-7M	(43)
Austenitic SS	AVESTA	654 SMO*		(4U)
Martensitic SS	ASTM	A747	Grade CB7Cu-2	(4E)
Nickel Alloy	ASTM	A494	CW-6M	(4J)
Titanium	ASTM	B367	C-3	(75)
Cast Iron	ASTM	A48	CL 35 B	(53)
Ductile Iron	ASTM	A395	60-40-18	(5H)
Carbon Steel	ASTM	A216	WCB	(46)
Chromium Iron	ASTM	A532	IIIA	(5B)

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