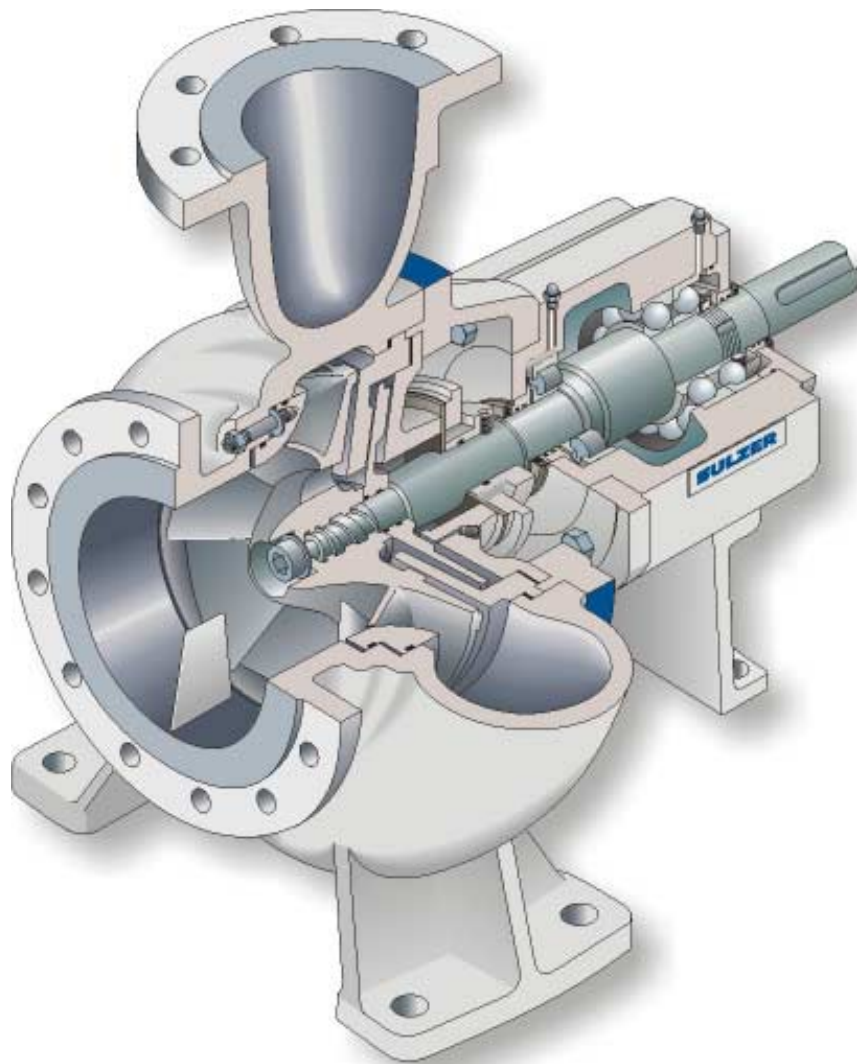


AHLSTAR™ Process Pumps



Sulzer Pumps – Striving to Serve You Better!

For over 135 years Sulzer Pumps has been providing innovative pumping solutions for a number of different industry segments. Today we are a leading global supplier of pumps to these targeted markets.

Through our commitment to understanding the customers' process and specific needs, we have consistently been at the leading edge of technical developments in providing pumping solutions. We strive to meet your application requirements through the use of state-of-the-art technology and advanced research & development facilities. In addition we offer the pump industry's most extensive network of Customer Service Centers to support and service our products.



A Reputation for Excellence

Sulzer Pumps has earned its reputation for providing advanced pumping solutions that meet the critical demands of our customers and business partners. Attention to detail and an insistence on quality are paramount to all phases of our operations.

Through having our own foundries, we are able to ensure optimum pump material selection for each particular application. Our 14 manufacturing plants are strategically located throughout the world, and our production processes are ISO 9001 and ISO

14001 certified. Each and every pump is rigorously tested before shipment, and regardless of where in the world our pumps are made, the commitment to quality is unrelenting.



Lifetime Service Solutions for the AHLSTAR™ Pump

High pumping performance comes as a result of the availability, reliability and the quality of the right pump. Genuine spare parts and proper maintenance ensure the high performance of AHLSTAR™ process pumps in complex production operations.

We support our customers with an extensive range of pumping services, from spare parts to remote monitoring.

Additionally we offer various types of service agreements in which spare parts and service solutions can be combined.



PumpsOnline

Customers can benefit from our new eBusiness solution, Pumps Online. This enables instant online access to product documentation, electronic ordering of spare parts and installed pump base at the mill.

Spare Part Solutions

We offer an exchange unit service and newly developed service kits for all AHLSTAR™ process pumps. This enables fast and easy servicing and reduces downtime.

Service Solutions

To maintain and improve the high performance of AHLSTAR™ process pumps, customers can select from a wide range of available service solutions. All service work is carried out by qualified, experienced technicians using state-of-the-art equipment.



Expanded AHLSTAR™ Process Pumps Features and Benefits

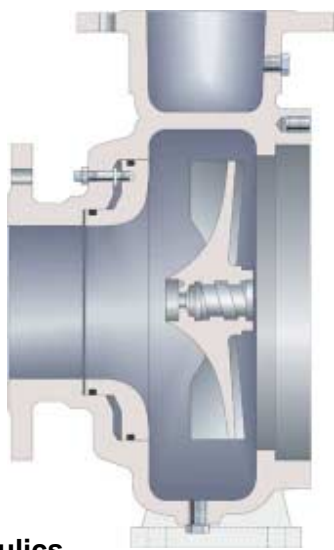
A double volute casing in larger AHLSTAR™ pumps reduces radial forces and shaft deflection.

The self-venting, top centerline casing prevents air-lock in the top of the casing.

The sideplate is adjusted externally to maintain a constant impeller clearance and continuous high efficiency.

A Hydraulics

Designed for pumping clean, abrasive or corrosive liquids especially stocks of various kinds.

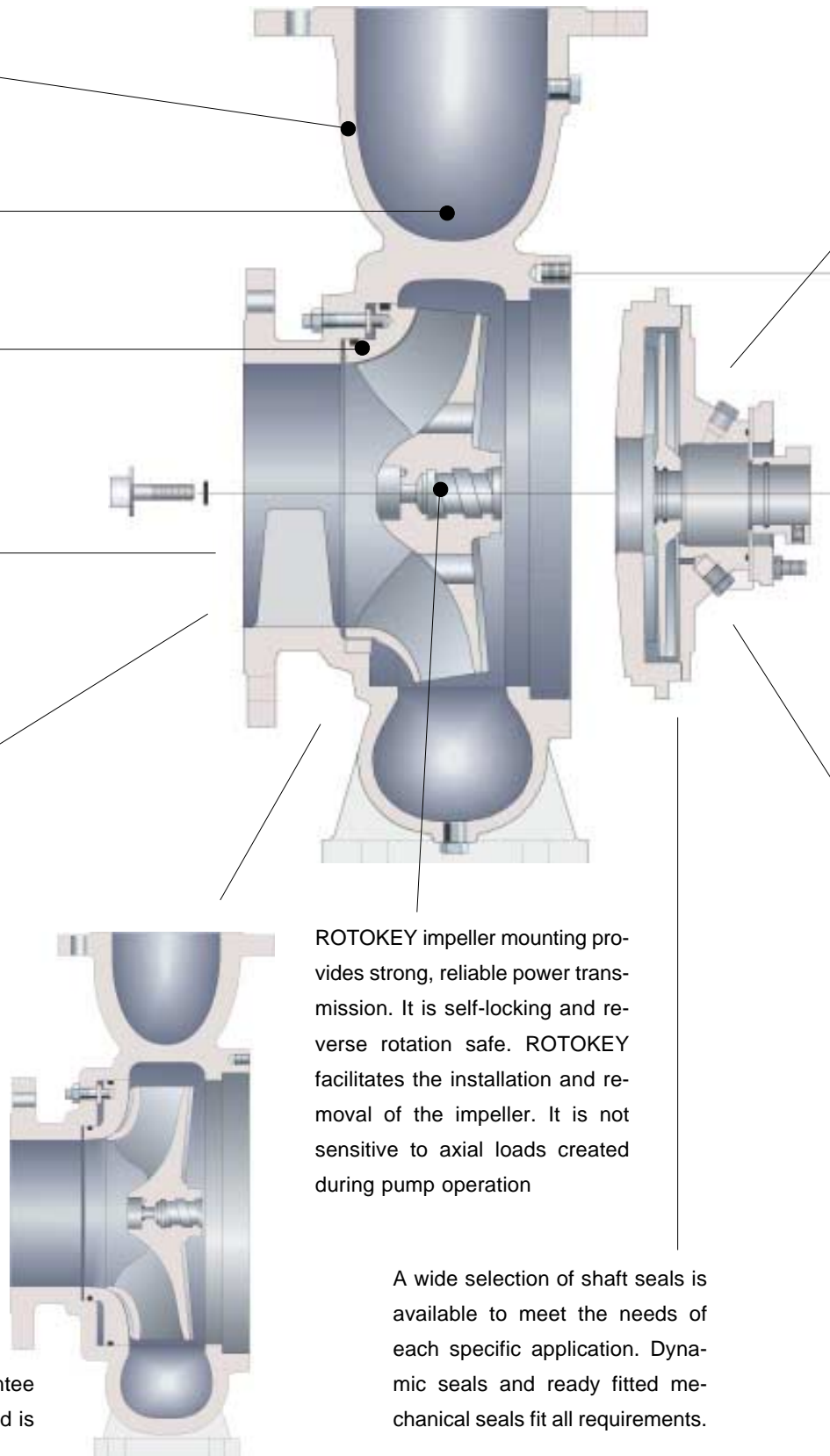


N Hydraulics

Non-clogging process pumps are the right solutions when the liquid contains large or long particles.

W Hydraulics

Wear resistant pumps guarantee reliable pumping when the liquid is very corrosive and/or abrasive.



ROTOKEY impeller mounting provides strong, reliable power transmission. It is self-locking and reverse rotation safe. ROTOKEY facilitates the installation and removal of the impeller. It is not sensitive to axial loads created during pump operation

A wide selection of shaft seals is available to meet the needs of each specific application. Dynamic seals and ready fitted mechanical seals fit all requirements.

Self Priming S

Self priming pumps with internal vacuum pump are designed for self priming purposes and to pump gas containing liquids.

Bearing Unit

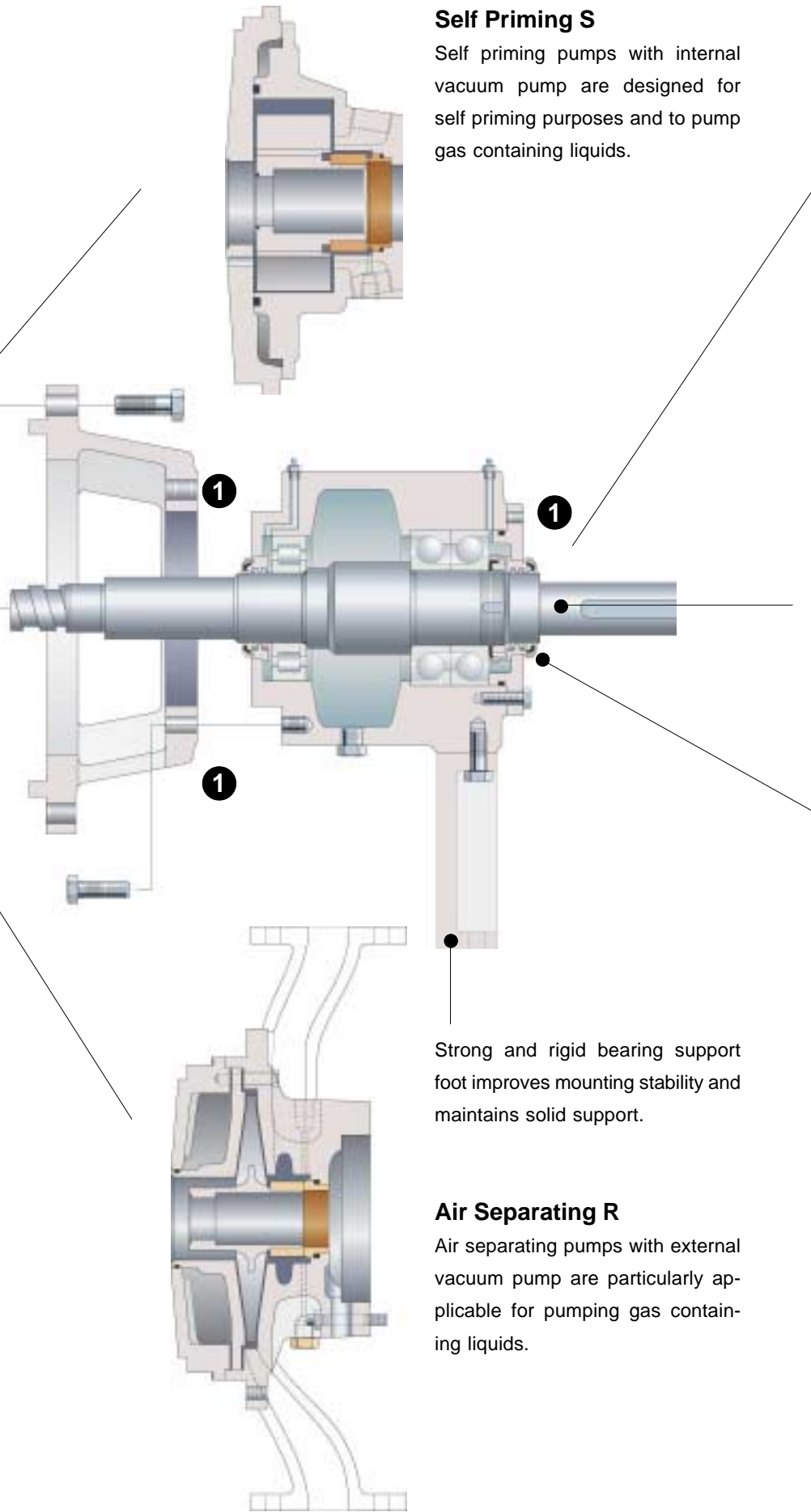
Simplified heavy-duty bearing unit design ensures reliability.

Grease Lubrication

- temperature of pumped liquid max. 120 °C

Oil Lubrication

- temperature of pumped liquid max. 180 °C (EPP 210°C)



Heavy-duty shaft. Deflection at stuffing box less than 0.05 mm. High strength duplex stainless steel is standard shaft material.

Non-contacting bearing protection for the combined advantages of labyrinth ring, deflector and lipseal. Lipseal protects in standstill position.

Strong and rigid bearing support foot improves mounting stability and maintains solid support.

Others

AHLSTAR™ hydraulics are utilized also in NVP Non-Clogging Vertical Process Pumps and NKP/WKP Non-Clogging Cantilever Pumps.

Air Separating R

Air separating pumps with external vacuum pump are particularly applicable for pumping gas containing liquids.

EPP Hot Liquid Pumps for industrial processes where the system pressure is high and pressure or temperature strokes occur.

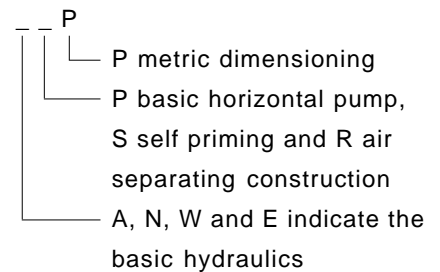
1 Jackscrews for simple disassembly.

Standardization

AHLSTAR™ Interchangeability of main parts	Volute casing	Impeller	Casing cover	Adapter	Bearing unit
APP					
ARP					
ASP					
EPP					
NPP					
NRP					
NSP					
WPP					
WRP					
WSP					

All AHLSTAR™ pumps have the same basic design using the same components.

- 246 pumps
- 80 casing covers
- 6 common bearing units
- 6 common shaft seal sizes
- common sealing water equipment
- common coupling and coupling guard
- common baseplates



Common parts
shown in columns.



Hydraulic Design

The AHLSTAR™ product line offers a wide range of hydraulic sizes to guarantee minimum power consumption. Pump hydraulics, casings and impellers are designed to optimize fluid handling capabilities. Stocks are pumped like water. Particles in sludges do not accumulate in the pump, or slurries are effectively channelled so as not to cause wear.

The back vanes of the impeller keep the area between the impeller and the casing cover clean, and reduce the axial load on the bearings.

Balance holes in the impeller are used to stabilize the pressure in the seal chamber. The balance holes can be plugged to optimize the shaft seal environment, should the application demand it.

The impeller hub design ensures a smooth flow and helps to avoid spinning and plugging.

The reverse sides of same size impellers on the APP, NPP and WPP pumps are of equal dimensions. It is possible, therefore, to use the same casing covers for all impellers. This reduces the number of spare parts required.

An Impeller Tailored to Each Liquid

Closed Impeller

is used for pumping clean liquids or liquids containing some impurities.

APP
EPP



Open Impeller

is designed for liquids containing solid particles, abrasive liquids or stock up to 8 % consistency.

APP
ARP
ASP
EPP



Special Open Impeller

is suitable for liquids containing bigger solid particles and long fibers, abrasive liquids or stock up to 8 % consistency.

APP
ARP
ASP



Low Pulse Impeller

is designed and manufactured to minimize pressure pulsations.

APP



Non-clogging Closed Impeller

is used for sludges or slurries containing big solid particles.

NPP
NRP
NSP



Vortex Impeller

is suitable for liquids containing big or long solid particles or abrasive liquids.

NPP
NRP
NSP
WPP
WRP
WSP



Wear Resistant Closed Impeller

is used for pumping both erosive and corrosive liquids or slurries containing solid particles.

WPP
WRP
WSP



Wear Resistant Open Impeller

is suitable for liquids with bigger solid particles and long fibers, abrasive liquids or stock up to 8% consistency.

WPP
WRP
WSP



Gas Handling Systems

AHLSTAR™ Gas Removal Pumps for Various Applications

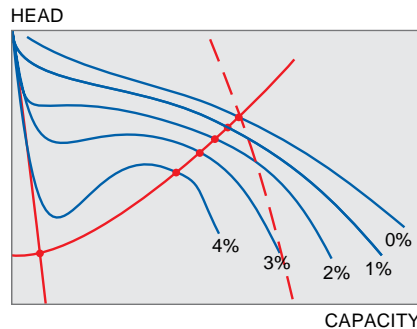
The patented AHLSTAR™ Self Priming gas removal pumps are designed to pump liquids containing gas, and for use where the inlet pipe is empty. These are situations where conventional centrifugal pumps fail.

With standard centrifugal pumps, gas bubbles formed in the impeller eye impair pumping. With the AHLSTAR™ pump, these gas bubbles are removed by an internal or external vacuum pump, or through sufficient inlet pressure. By removing the gas bubbles from the impeller, the operation of the pump system is stabilized and efficiency is greatly increased.

The Effect of Gas Content in Conventional Centrifugal Pumps

- Almost all impeller types can operate with a gas content below 4%. However, the capacity and head will be reduced.
- At gas content level above 4% , the duty point remains approximately 10 ... 100% from BEP (Best Efficiency Point). Pumping is unstable since the duty point varies heavily and excessive over-dimensioning of the pump becomes necessary.

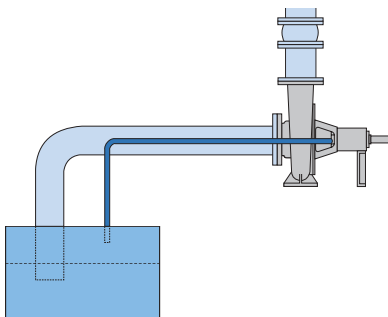
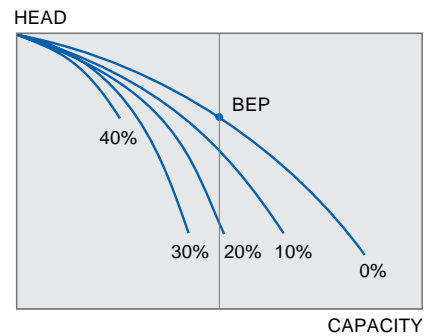
Conventional pump has unstable operation with gas content 0...4%



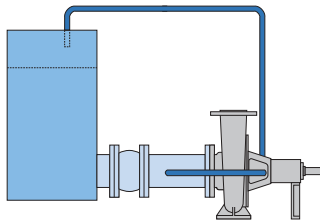
The Effect of Weakly Bound Gas Content in the AHLSTAR™ Gas Removal Pump

- Pump operation is stable.
- For weakly bound gases, the absolute maximum value is 40 %. For strongly bound gases it is up to 70%.

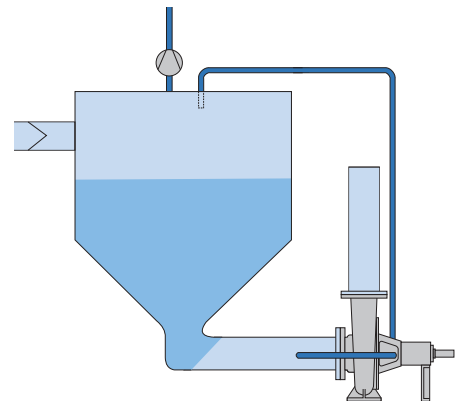
AHLSTAR™ Gas Removal Pump has stable operation with gas content 0...40%.



Self priming application.



Gas containing liquid pumping.

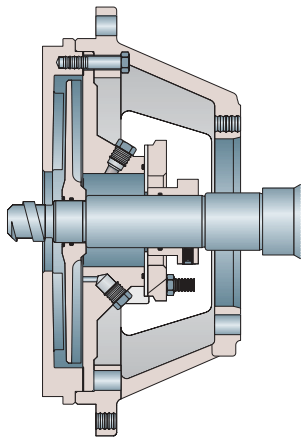


Water separator application.

Shaft Sealing

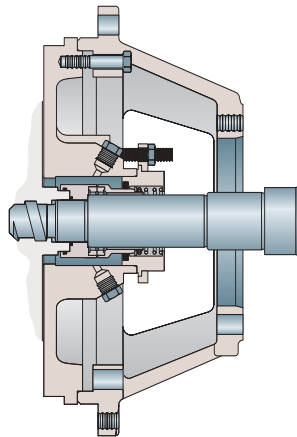
Dynamic Seal

Dynamic Seal is specially designed for fibrous liquids such as paper stock and other difficult liquids. The Dynamic Seal requires no external sealing water. It is essentially maintenance-free and offers outstanding reliability.



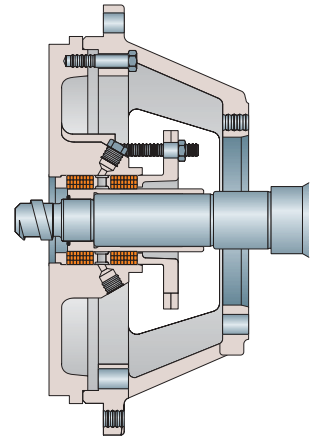
Mechanical Seals

Various mechanical seal configurations are available. For difficult applications "ready-fitted" seals are especially recommended. For extremely corrosive applications, a ready-fitted seal can be selected with the same exact construction material as the pump casing itself.



Gland Packings

A gland packing with external flushing prevents the pumped liquid from precipitating into the sealing housing. The flushing liquid is mixed with the pumped liquid. Alternatively the external flushing has an outlet connection.



New Options for the Dynamic Seal

The well proven and highly successful Dynamic Seal has been given a new generation of additional properties. With the latest construction, we are able to enlarge its operational limits, and low or occasionally high liquid level pump suction and even light vacuums, can now be handled. This new development permits pumping liquid temperatures in excess of boiling point.

Materials

Standard Material Combinations

Stainless Steel Design			Nominal Chemical Composition %					
			C max.	Cr	Ni	Mo	Cu	N
Duplex SS	ASTM A890 Grade 3A	41	0.06	24.0-27.0	4.0-6.0	1.75-2.50	-	0.15-0.25
	ASTM A890 Grade 1B	4L	0.04	24.5-26.5	4.75-6.00	1.75-2.25	2.75-3.25	-
	ASTM A890 Grade 5A	4T	0.03	24.0-26.0	6.0-8.0	4.0-5.0	-	0.10-0.30
Austenitic SS	ASTM A743 Grade CG-3M	4G	0.03	18.0-21.0	9.0-13.0	3.0-4.0	-	-
	ASTM A743 Grade CN-7M	43	0.07	19.0-22.0	27.5-30.5	2.0-3.0	3.0-4.0	-
	AVESTA 654 SMO ¹⁾	4U	0.025	23.0-25.0	21.0-23.0	7.1-7.5	0.3-0.7	0.45-0.55
Martensitic SS	ASTM A747 Grade CB7Cu-2	4E	0.07	14.0-15.5	4.5-5.5	-	2.5-3.2	-
Other Design			C max.	Cr	Ni	Mo	Cu	N
Nickel Alloy	A494CW-6M	4J	0.07	17.0-20.0	balance	17.0-20.0	-	-
Cast Iron Design			C	Cr	Ni	Mo	Cu	Si
Cast Iron	ASTM A48 CL 35 B	53	3.1-3.4	-	-	-	0.5-1.0	1.5-2.1
Chromium Iron ^{*)}	A532 IIIA	5B	2.0-3.3	23.0-30.0	2.5 max.	3.0 max.	1.2 max.	1.5 max.
Material alternatives for other parts								
Gasket material	Klinger SIL C-4430	83	Used in temperature range -40...+160 °C and pH 2-12					
	PTFE/Glass	84	Used in temperature range -190...+240 °C and pH 0-14					
O-ring material	EPDM	92	Used in temperature range -50...+150 °C					
	FKM	96	Used in temperature range -20...+210 °C					

Other corrosion resistant cast steels available on special request.

¹⁾ AVESTA 654SMO is a trademark owned by AVESTA Sheffield which has granted Sulzer Pumps licence to produce this material.

^{*)} For W-construction

Corrosion Resistant Thinking

To ensure maximum reliability against corrosion we offer material selection options from our own steel foundries.

- All parts in contact with the pumped liquid can be produced from the same construction material as the pump casing. Materials available for this option are 41, 4L, 4T, 4G, 43, 4U and 4J

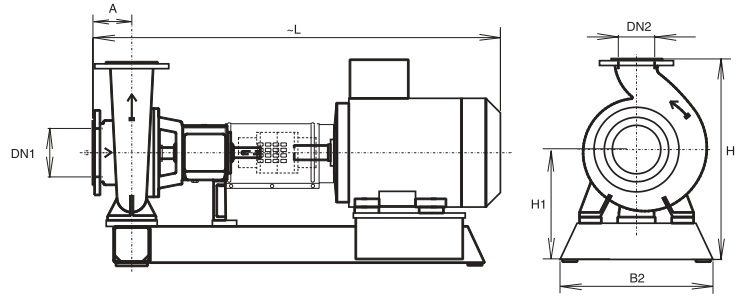
- All stainless steel structure for extremely corrosive situations. All parts including the adapter and bearing unit are made of stainless steel.
- Additionally, stainless steel can be selected for the bearing unit auxiliary equipment to give longer operating life in corrosive environments.



Main Dimensions

AHLSTAR™ Series

Dimensions ISO 2858 (up to size 44–200)
 Specifications ISO 5199
 Stuffing box ISO 3069
 Flange drilling Several flange drilling options according to valid standards.



	Size	DN1	DN2	B2 ¹⁾	H ¹⁾	L ¹⁾	A	H1	Weight kg ²⁾
S E R I E S	11-32	50	32	500	480	1240	80	300	125
	11-40	65	40	500	480	1260	100	300	125
	11-50	80	50	630	540	1330	100	340	160
	21-65	100	65	630	640	1580	100	415	230
	21-80	125	80	630	665	1600	125	415	240
	22-32	50	32	630	620	1490	100	395	230
	22-40	65	40	630	670	1710	100	445	250
	22-50	80	50	630	640	1600	125	415	235
	22-65	100	65	720	730	1820	125	480	275
	22-80	125	80	720	760	1820	125	480	280
	23-40	65	40	630	740	1700	125	460	280
	23-50	80	50	720	800	2020	125	520	350
	31-100	125	100	730	835	2290	140	555	420
	31-125	150	125	730	910	2290	140	555	430
	31-150	200	150	630	840	1670	160	465	340
	32-65	100	65	730	835	2270	125	555	420
	32-80	125	80	730	870	2270	125	555	410
	32-100	125	100	730	915	2400	140	600	480
	32-125	150	125	730	955	2400	140	600	500
	33-100	125	100	720	820	1780	140	465	370
33-125	150	125	720	900	1860	140	500	400	
41-200	250	200	730	980	2100	200	530	510	
41-300	300	300	730	1175	2150	225	615	630	
42-150	200	150	730	930	2100	160	530	460	
42-200	250	200	730	980	2100	180	530	500	
43-250	300	250	830	1175	2600	225	615	660	
43-300	350	300	880	1365	2700	250	735	870	
44-150	200	150	830	1005	2350	160	555	570	
44-200	250	200	880	1175	2650	180	675	740	
51-250	300	250	880	1295	2850	200	735	840	
51-300	350	300	1160	1440	2900	250	770	1060	
52-350	400	350	880	1645	2900	280	845	1190	
52-400	400	400	1160	1770	2900	280	920	1420	
53-100	200	100	880	1185	2700	180	685	740	
53-150	250	150	880	1185	2800	180	685	780	
53-200	250	200	1160	1330	2800	180	770	1000	
53-250	300	250	1160	1400	2850	200	770	1060	
53-300	350	300	1160	1590	3100	250	920	1110	
54-400	500	400	1160	1850	3000	355	1000	1600	
54-500	500	500	1160	2000	3000	355	1000	1780	
55-100	200	100	1160	1330	2850	250	770	1130	
55-200	300	200	1160	1415	2820	200	785	1250	
55-250	300	250	1160	1495	2850	225	785	1330	
55-300	400	300	1160	1645	2870	250	845	1410	
61-500	500	500	1340	2100	3180	400	1100	2350	
61-600	600	600	1340	2280	3180	420	1100	2350	
62-400	500	400	1340	1960	3135	355	1010	2020	

	Size	DN1	DN2	B2 ¹⁾	H ¹⁾	L ¹⁾	A	H1	Weight kg ²⁾
S E R I E S	31-65	100	65	755	780	1790	140	465	390
	31-100	150	100	795	820	1830	160	465	400
	32-100	150	100	875	965	1910	175	555	480
	41-150	200	150	940	1000	2010	195	590	530
	41-200	250	200	1010	1105	2070	200	640	600
	42-150	200	150	1010	1100	2100	195	640	600
	42-200	250	200	1050	1155	2520	200	640	650
	42-250	300	250	1150	1230	2640	220	657	760
	43-100	150	100	1010	1100	2040	175	640	660
	43-150	200	150	1050	1150	2510	195	640	690
	52-350	400	350	1600	1950	3160	355	1100	2560
	53-100	200	100	1200	1240	2870	195	740	1000
	53-200	250	200	1200	1305	2870	220	740	1030
	53-250	300	250	1200	1360	2870	220	740	1100
	53-300	350	300	1350	1420	3040	220	800	1300
	54-300	350	400	1480	1590	3080	270	870	1550
	54-500	500	500	1600	1980	3180	355	1100	2960
	55-300	400	300	1480	1620	3090	270	870	200
	61-500	500	500	1800	2260	3260	400	1200	3550
	N S E R I E S	21-50	80	50	720	680	1820	125	480
21-80		100	80	720	705	1865	160	480	270
22-50		80	50	720	705	1830	125	480	275
22-80		100	80	630	715	1785	160	465	260
31-100		150	100	720	745	1835	180	465	310
32-80		100	80	720	760	1875	160	480	335
32-100		150	100	730	870	2365	180	555	440
33-80		100	80	730	910	2140	160	555	480
33-100		150	100	730	910	2355	180	555	480
42-150		200	150	880	1070	2710	200	670	680
42-200		200	200	880	1120	2710	210	670	720
44-150		200	150	880	1070	2710	200	670	710
44-200	200	200	880	1125	2710	210	675	740	
53-250	250	250	1160	1370	2950	240	770	1125	
W S E R I E S	22-32	80	50	630	640	1600	125	415	265
	22-50	80	50	630	640	1600	125	415	265
	23-50	80	50	720	800	2020	125	520	390
	32-80	125	80	730	870	2270	125	555	460
	32-100	125	100	730	915	2400	140	600	535
	32-125	150	125	730	955	2420	160	600	555
	33-100	125	100	720	820	1780	140	465	435
	44-150	200	150	830	1005	2350	160	555	655
	44-200	250	200	880	1175	2650	180	675	840
	53-100	200	100	880	1185	2700	180	685	845
	53-150	250	150	880	1185	2800	180	685	895
53-200	250	200	1160	1330	2800	200	770	1150	
53-250	300	250	1160	1400	2850	225	770	1230	
54-400	500	400	1160	1850	3000	355	1000	1910	
55-300	400	300	1160	1645	2870	250	845	1700	
61-600	600	600	1340	2280	3180	420	1100	3185	

1) Max. dimensions for biggest IEC-motor required in standard operation

2) With biggest steel baseplate and coupling but without motor.

AHLSTAR™ is available with both metric and US standard dimensions with compatible fasteners and fittings. NOTE! Dimensions not to be used for construction.

Design Features and Installation Advantage

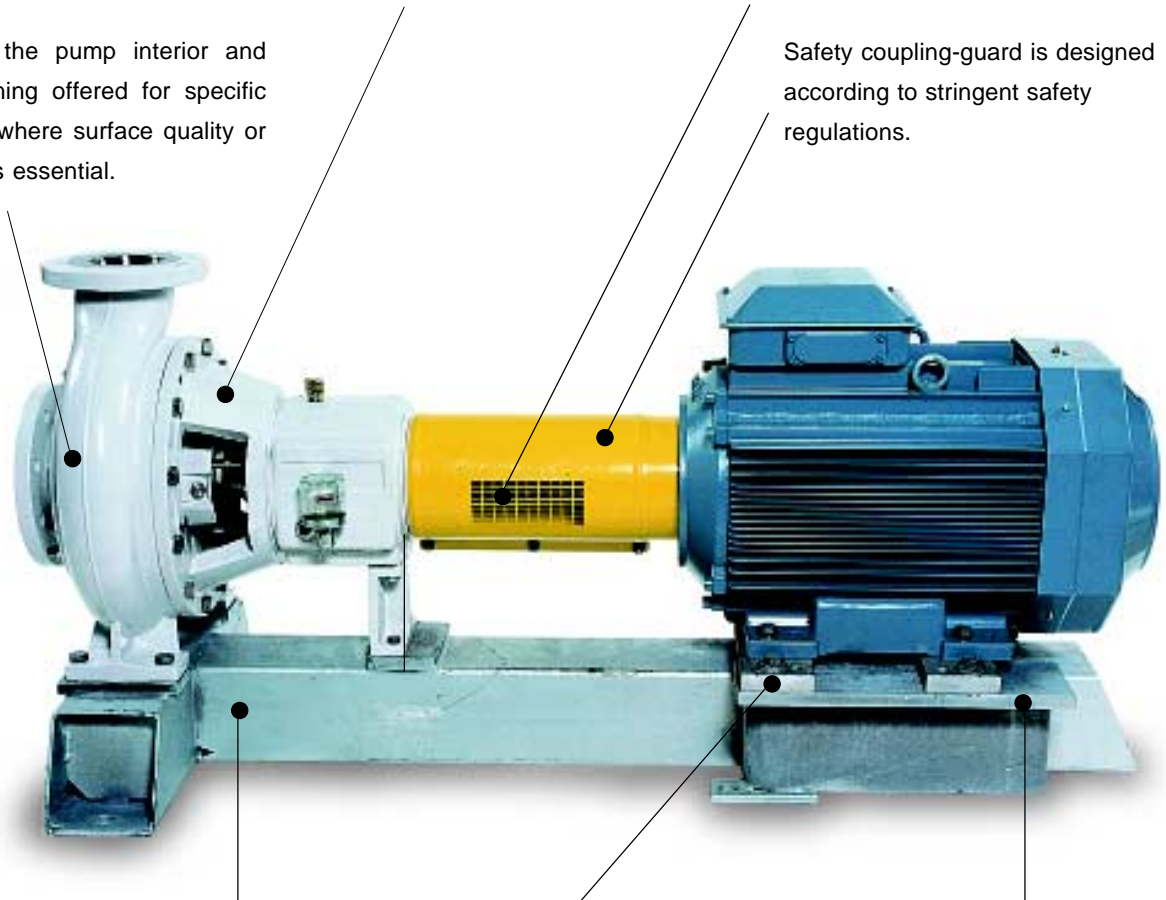
Various options are available for painting the pump.

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

Flexible coupling with spacer for quick service.

Grinding of the pump interior and special cleaning offered for specific applications where surface quality or cleanliness is essential.

Safety coupling-guard is designed according to stringent safety regulations.

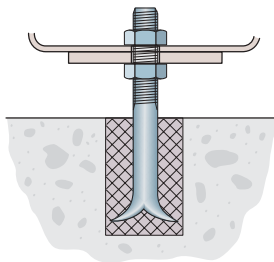


RIGBASE baseplates are steel or concrete with 3-point fastening. Distortion-free and easy to install. EPP centerline mounted.

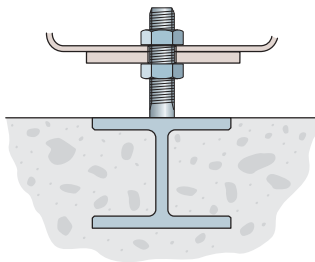
Removable adjusting screws permit fast and simple alignment of the coupling.

Riser blocks allow the installation of the next frame size of motor.

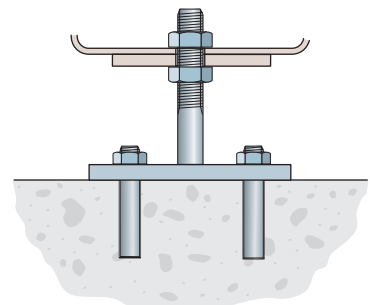
Foundation Screws



Grouted



Welded



A smaller pump and motor can be installed with adjustable support feet.

Baseplates



Steel baseplate

A steel baseplate for pump and motor grouted at site. A short baseplate is also available.



Concrete baseplate

The concrete baseplate can be mounted on rubber sheeting, various mounting beams, vibration dampers, etc.



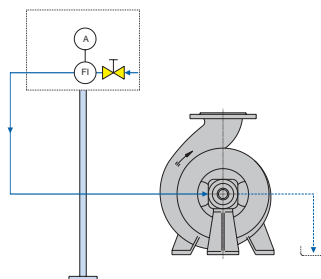
Belt Drive

Belt drive construction is also available.

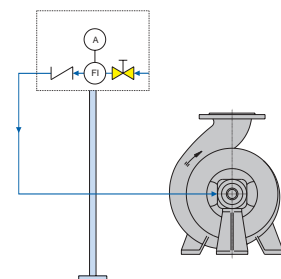
Sealing Water Equipment

The concept for sealing water equipment meets all the requirements demanded by the pumped liquid or the shaft seal. All general pumping solutions can be covered by just four different options. Special materials to take into account corrosive environments ensure reliable operation in extreme circumstances.

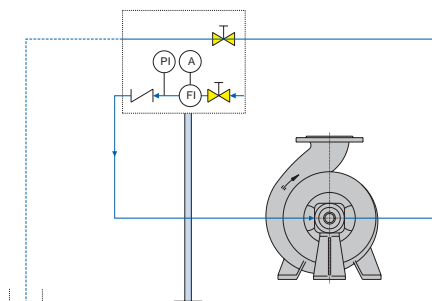
Non Pressurized Fluid in/out



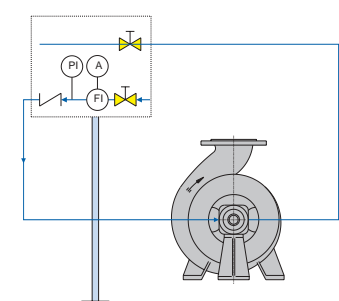
Pressurized Fluid in



Flowing Pressurized Fluid in/out



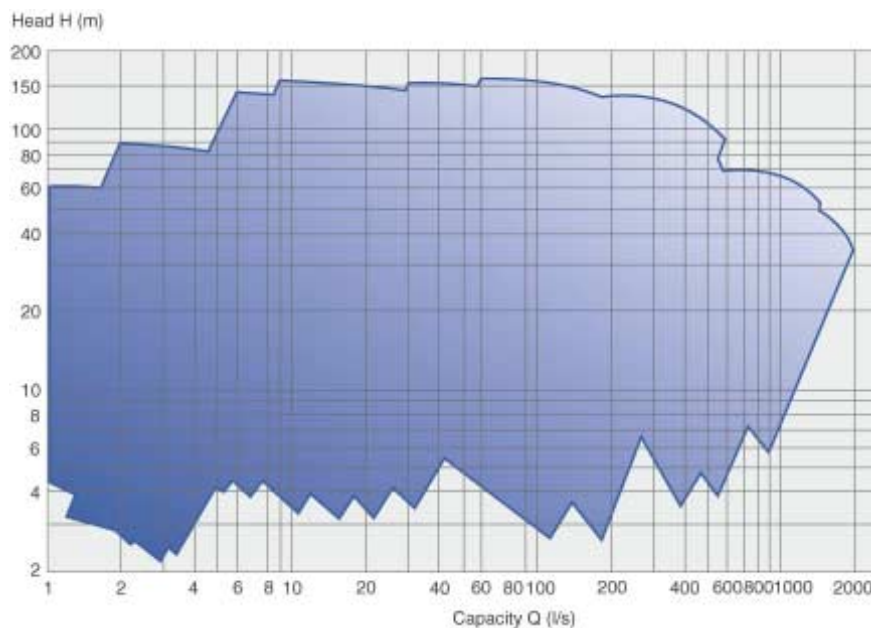
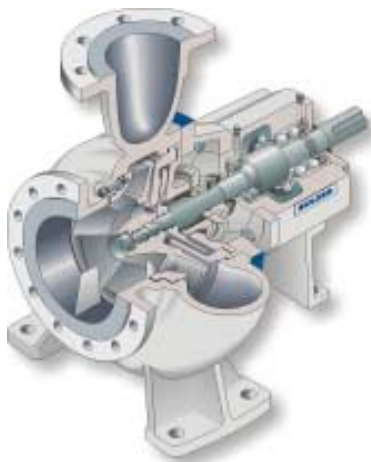
Non Flowing Pressurized Fluid in (out)



Wide Hydraulic Coverage

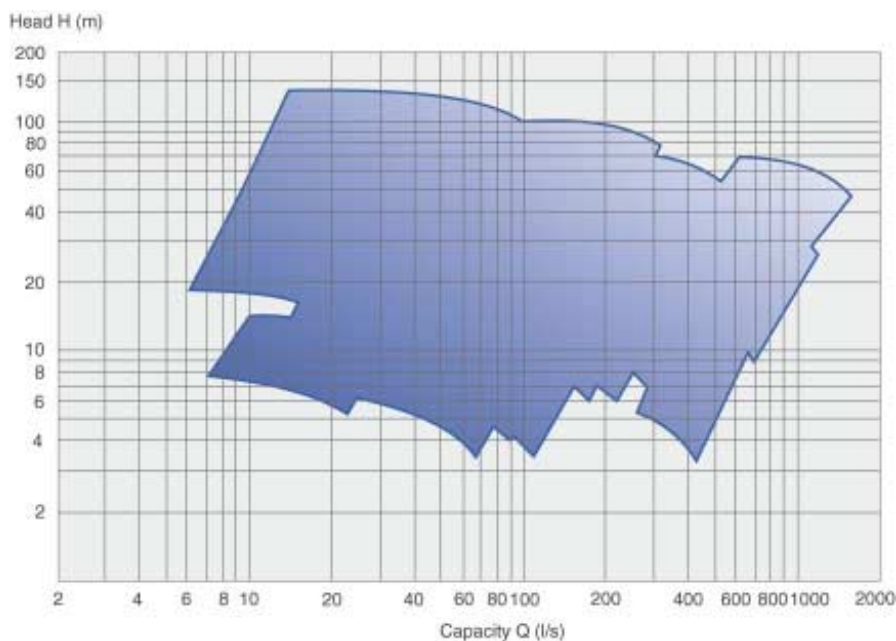
A Performance

Head up to 160 m.
Temperature max. 180 °C.
Capacity up to 2000 l/s.
Operating frequencies 50 or 60 Hz.
Pressure up to 1.6 MPa,
depending on material and size.



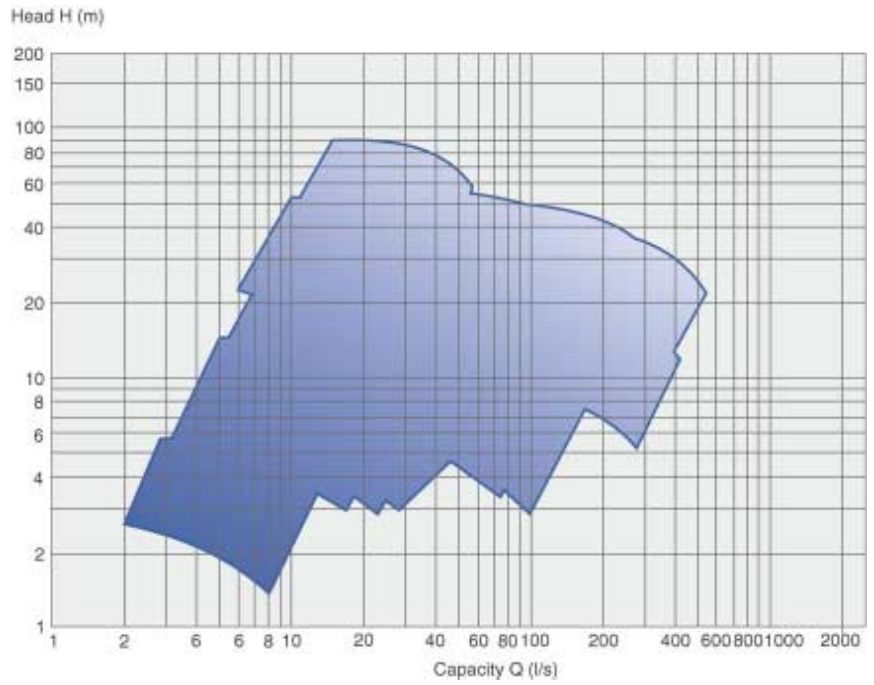
E Performance

Head up to 140 m.
Temperature max. 210 °C.
Capacity up to 1700 l/s.
Operating frequencies 50 or 60 Hz.
Pressure up to 2.5 MPa.



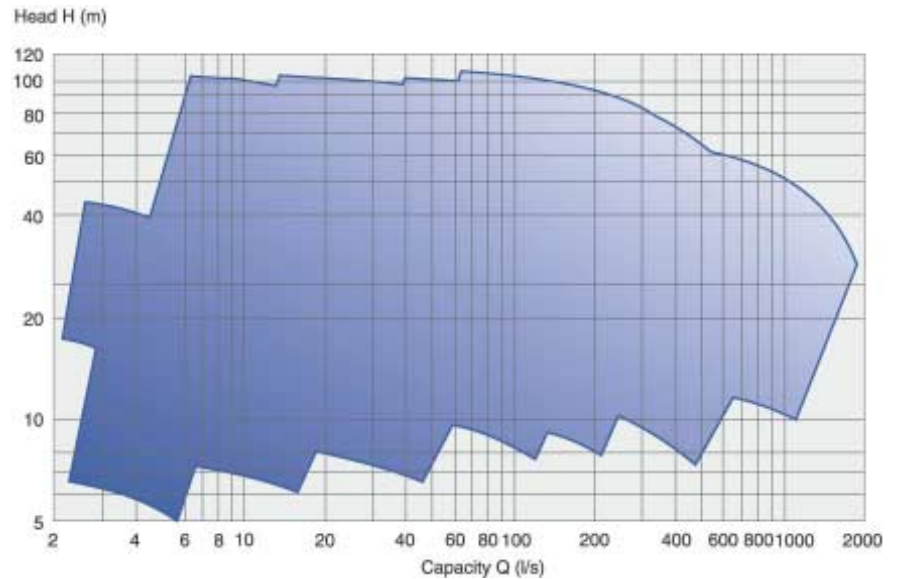
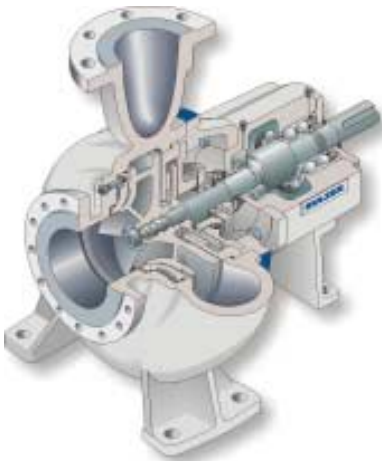
N Performance

Head up to 90 m.
Temperature max. 180 °C.
Capacity up to 550 l/s.
Operating frequencies 50 or 60 Hz.
Pressure up to 1.6 MPa,
depending on material and size.



W Performance

Head up to 110 m.
Temperature max. 180 °C.
Capacity up to 2000 l/s.
Operating frequencies 50 or 60 Hz.
Pressure up to 1.6 MPa,
depending on material and size.





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