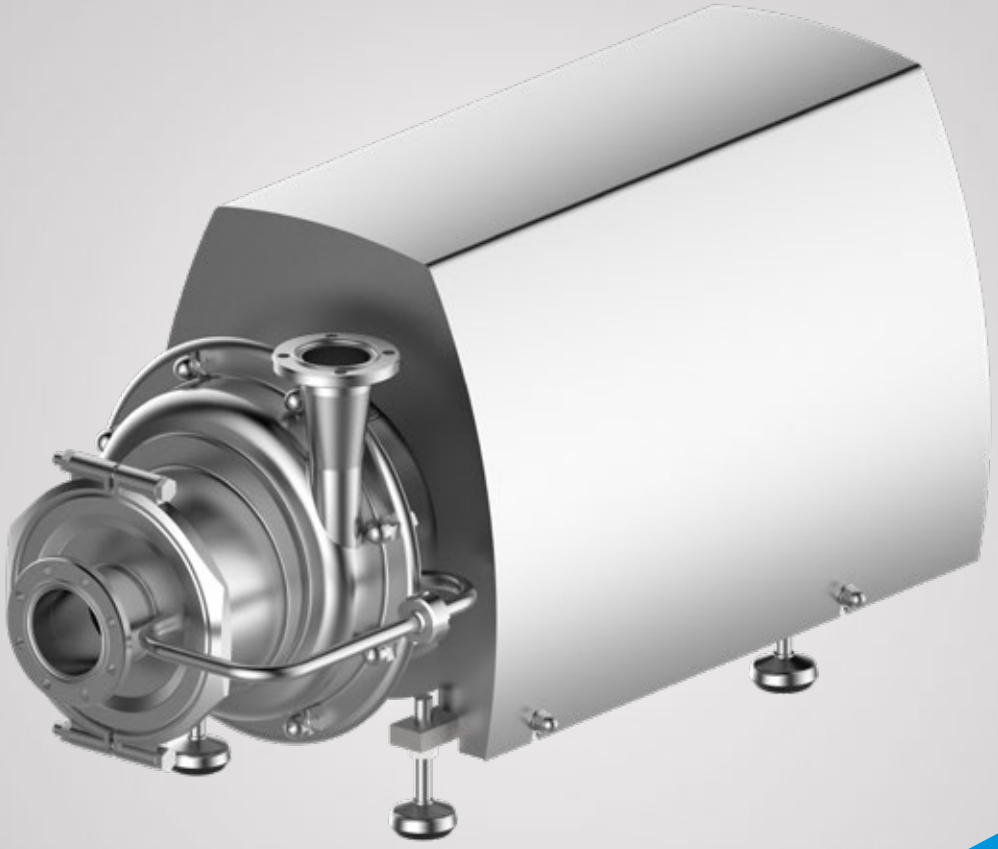
GEA SMARTPUMP



GEA Hilge TPS

Single-stage Self-priming Centrifugal Pumps
Catalog

engineering for
a better world

gea.com

Legal notice

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VAT-ID: DE 812589019, Tax No.: 105/5857/1004

Flow Components

Hygienic Pumps

GEA Hilge TPS Pumps

2-pole, 50 HZ

2-pole, 60 HZ

Appendix

Regardless of the application – for our customers product quality and profitability are what matters. This is what GEA Flow Components is known for. Our engineers are specialists in everything that flows.

Around one quarter of the milk processed is handled by GEA equipment

Roughly every second liter of beer is brewed using GEA equipment and solutions

Every fourth liter of human blood is handled by GEA equipment

Approx. one in three instant coffee lines has been built by GEA

GEA Group

GEA is one of the largest technology suppliers for food processing and a wide range of other industries. The global group specializes in machinery, plants, as well as process technology and components. GEA provides sustainable solutions for sophisticated production processes in diverse end-user markets and offers a comprehensive service portfolio.

GEA Flow Components

In addition to our hygienic pump portfolio, our range of sophisticated process components also includes hygienic and aseptic valves as well as cleaning technology.

All components and services are available worldwide through the interntional GEA sales network.

GEA Hilge Hygienic Pumps – The heart of every process

GEA Hilge offers a versatile range of centrifugal and positive displacement pumps for a wide variety of sensitive applications in the beverage, food and pharmaceutical industries.

Our pumps with their sophisticated design ensure particularly gentle conveyance of the respective medium, offer lasting reliability and are characterized by economic efficiency. After all, hygienic pumps are used in processes that directly affect the product and production. They are the heart of every process.

State-of-the-art pump technology, made to our customers' preferences

At the GEA Hilge Hygienc Pumps Center of Competence in Bodenheim we develop innovative pumps and processes together with our customers. Our decades of up-close experience with operations and systems at our customers' production sites ensure optimum selection and configuration of the right pumps for every application (e.g. food and dairy, brewery and beverage, pharmaceutical and biotech, personal and home care).

Maximum efficiency

Two product lines, GEA VARIPUMP and GEA SMARTPUMP, enable our customers to choose from a highly versatile pump range with a multitude of smart adaption options to achieve simpler operation, higher-quality production, and reduced consumption of valuable resources. Special construction features of our many types of pumps provide for exceptionally gentle product handling, delivering top-quality products to consumers.

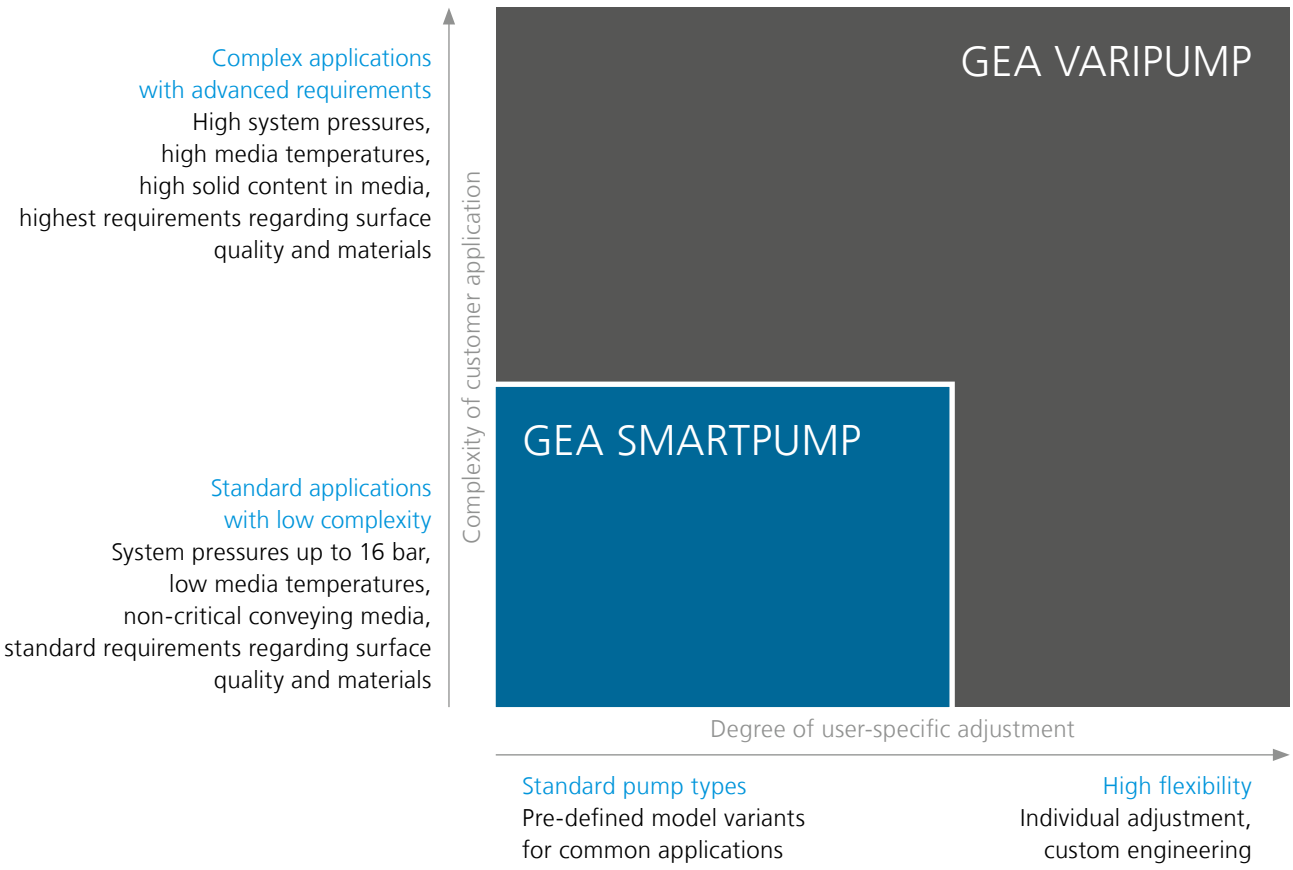
Maximum reliability

Our customers rely on the safe, continuous operation of their production processes without unplanned breaks or disturbances. That is why GEA pumps are optimized for uncompromising reliability in all applications. Thanks to their robust design and long service life, they are known as "workhorses" for their ease of maintenance and outstanding service, proven over decades, and for the great number of pumps currently in operation. Of course, GEA pumps also comply with all relevant hygiene standards and norms with continuous documentation and up-to-date certifications safely ensuring judicial security.

Two modern pump lines for maximum efficiency

Two product lines, GEA VARIPUMP and GEA SMARTPUMP, form a highly versatile pump range with a multitude of adaption options to ensure simpler operation, higher-quality production, and reduced consumption of valuable resources.

Selecting and configuring the right pump requires a high level of experience. The selection matrix provides initial guidance.



GEA VARIPUMP

The pump series in the GEA VARIPUMP line have been conceived for extreme application demands. The pumps are individually optimized by GEA for each task.

GEA VARIPUMP models are made entirely without die-cast components, offering high-quality surfaces and materials that meet stringent demands even in the sensitive pharmaceutical industry, further ensured by complementing services, e.g. Witnessed Factory Acceptance Test (FAT).

With a great variety of set-up and customizing options the pumps can be adapted individually to any production process, for lower operational costs and maximum system efficiency.

- Developed for advanced application conditions
- Project-specific customization
- Surface roughness up to $R_a \leq 0.4$ µm
- Product-wetted materials according to specific requirements (e.g. no cast parts, $F_e \leq 1$ % optional)

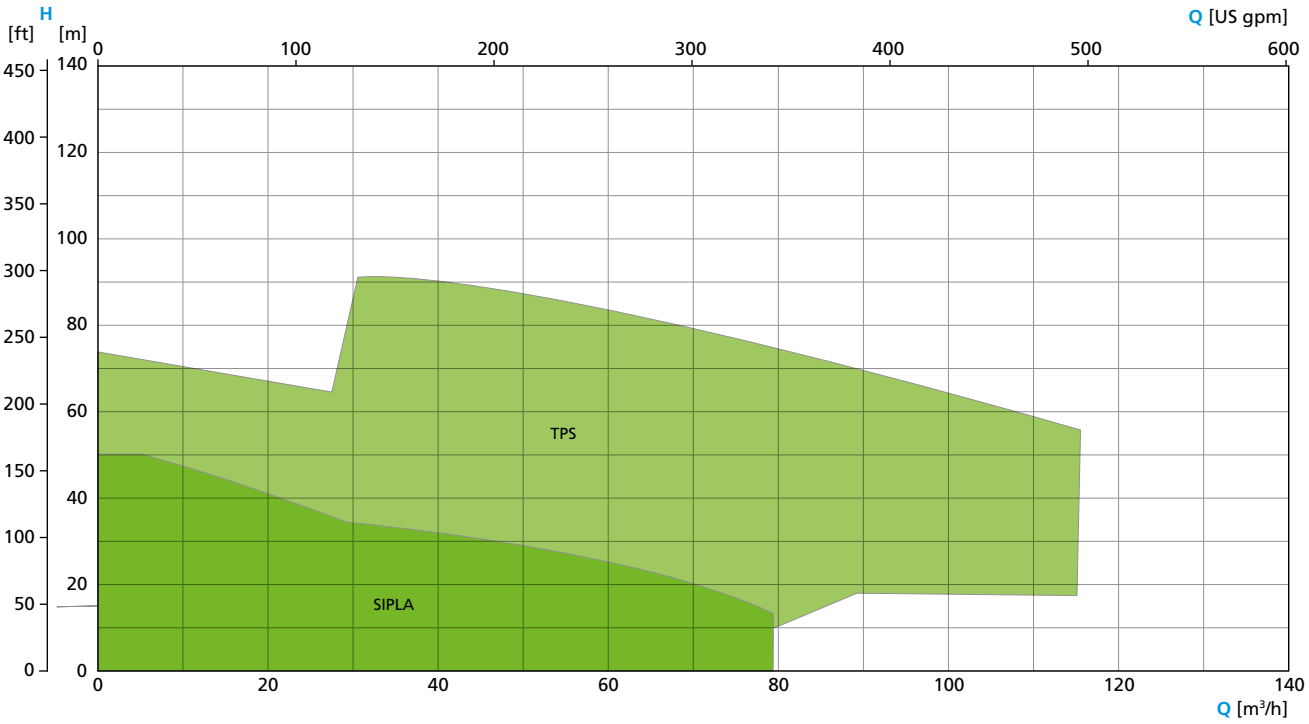
GEA SMARTPUMP

The GEA SMARTPUMP line comprises highly standardized and attractively priced pump series for common, often-used applications at standard conditions. The pumps are easy to select and ready for fast delivery. Within pre-defined parameters, the standard models can be configured to individual tasks.

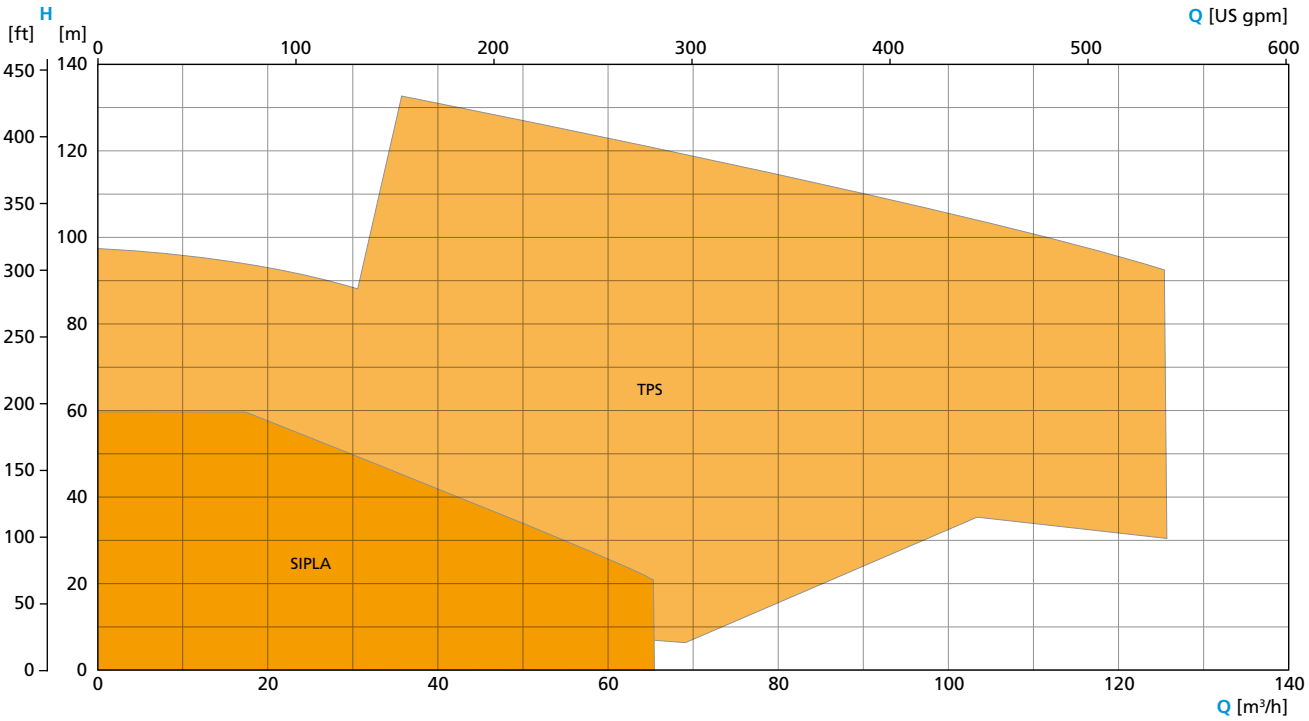
The modular construction using high-value materials, the proven “Hygienic Design” and easy-to-apply standardized spare parts all recommend GEA SMARTPUMP pumps for use in cost-critical production systems – at no compromise in terms of quality.

- Application for common and clearly defined “standard” process tasks
- Simple selection and configuration
- Fast delivery
- Standardized spare parts

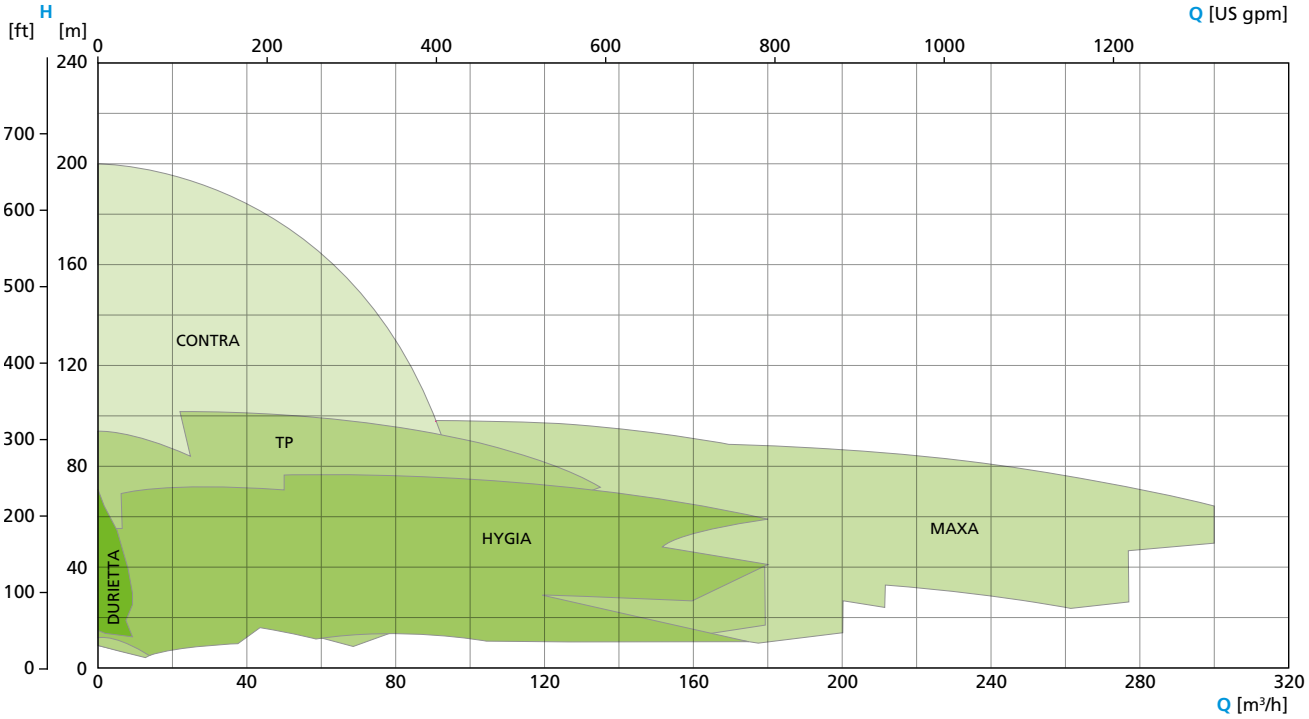
Self-priming Pumps
50 Hz



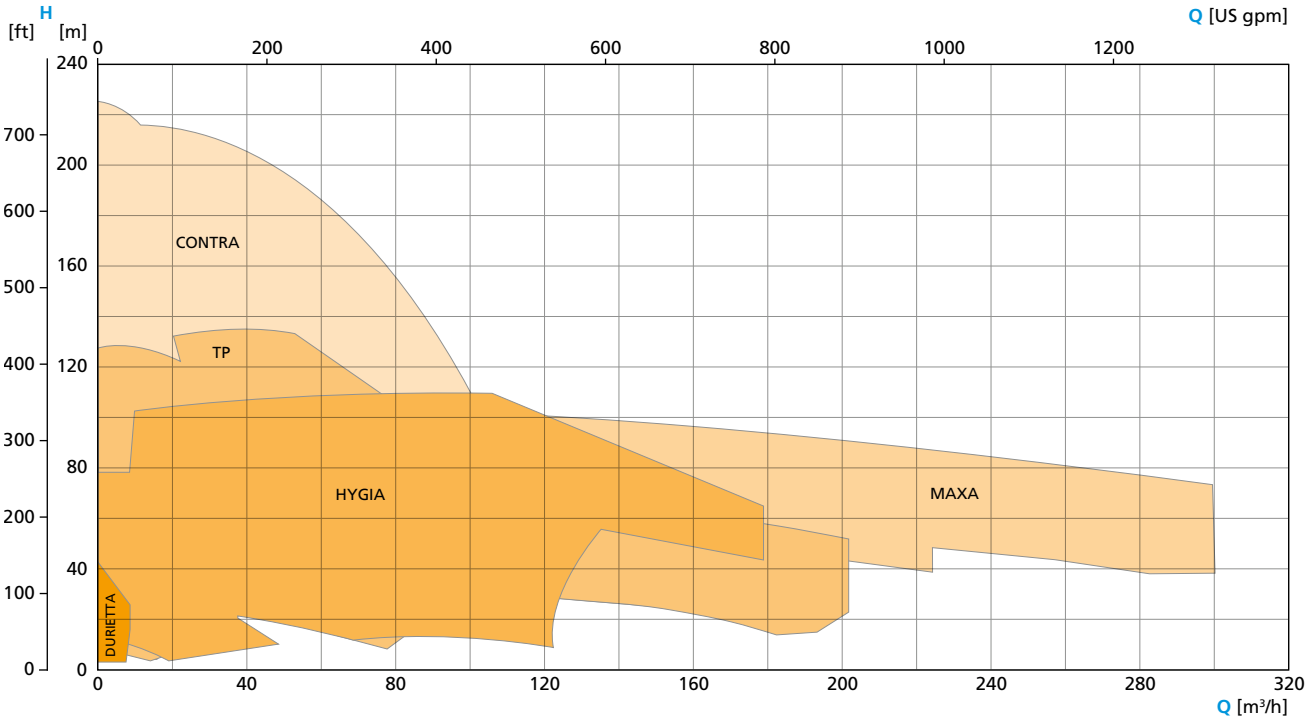
Self-priming Pumps
60 Hz



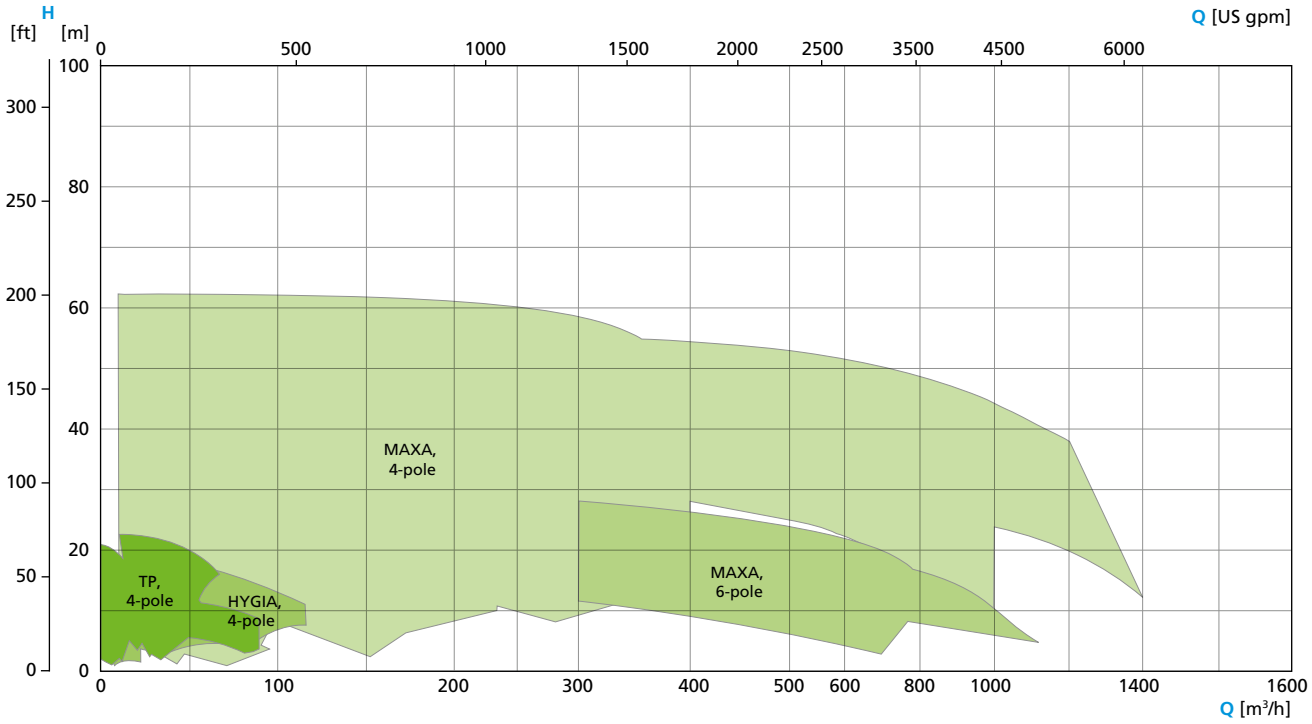
Centrifugal Pumps
2-pole, 50 Hz



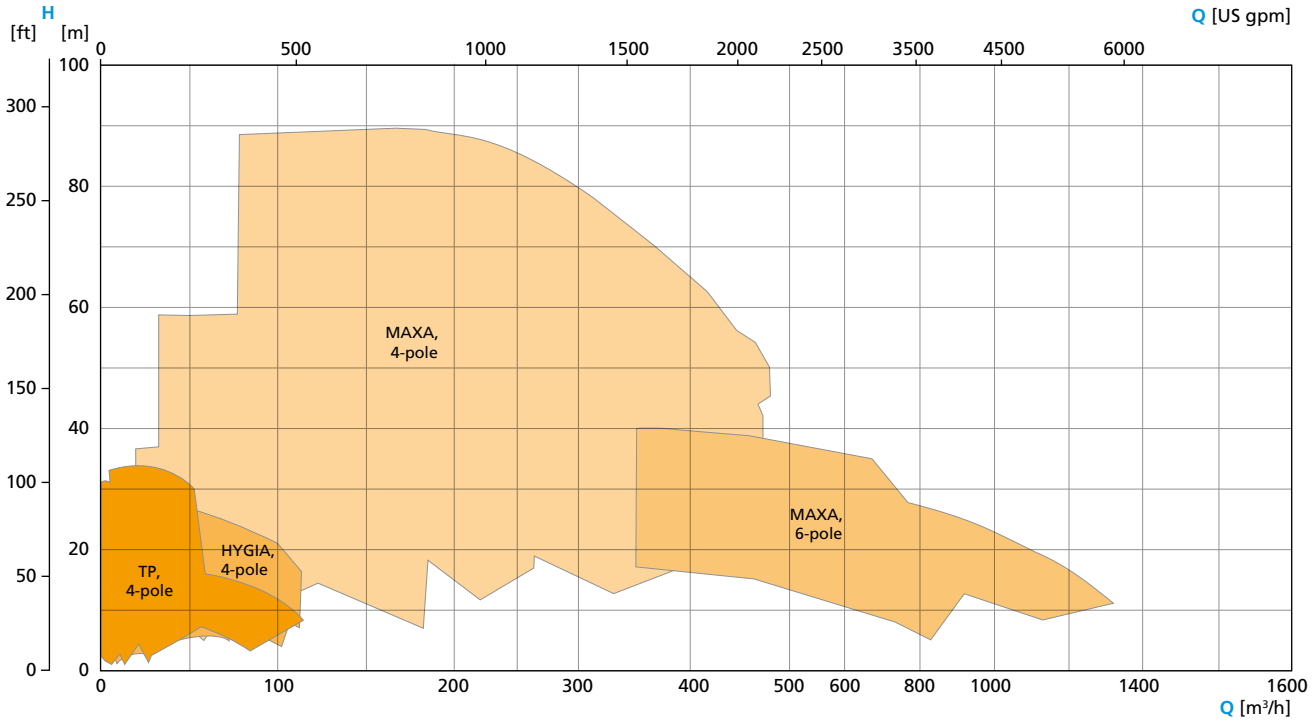
Centrifugal Pumps
2-pole, 60 Hz



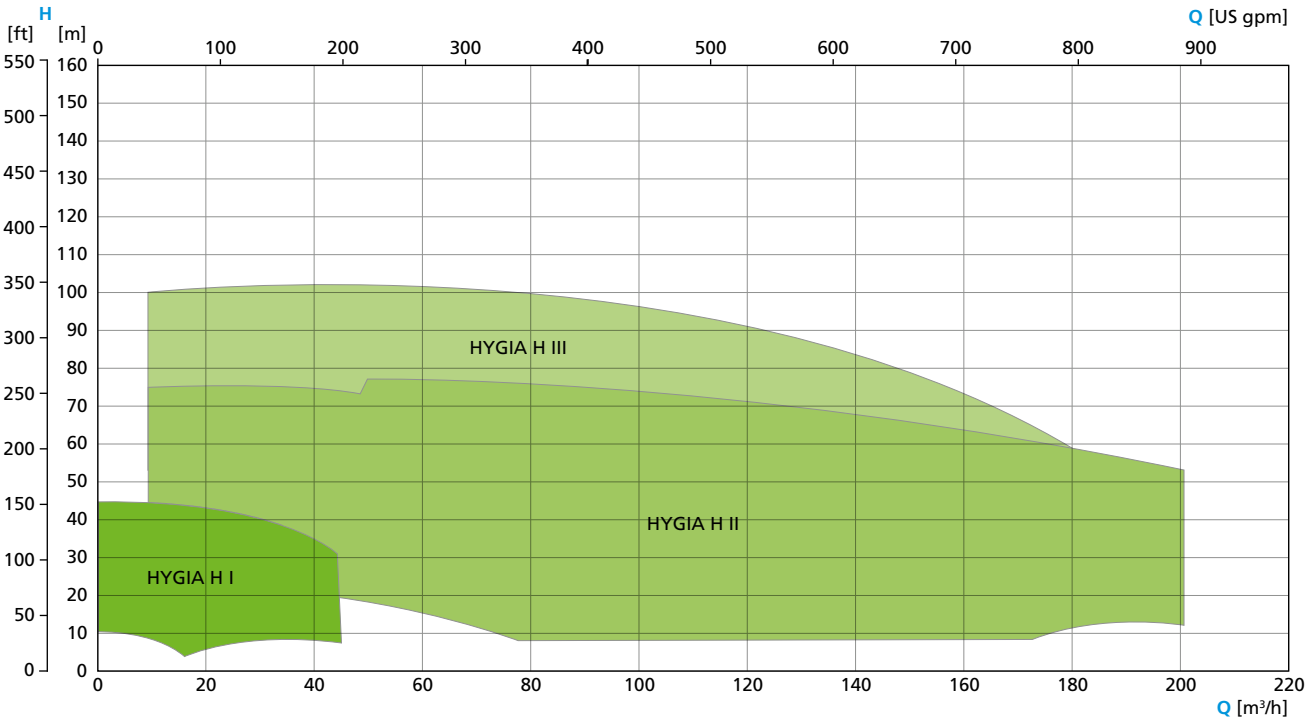
Centrifugal Pumps
4-/6-pole, 50 Hz



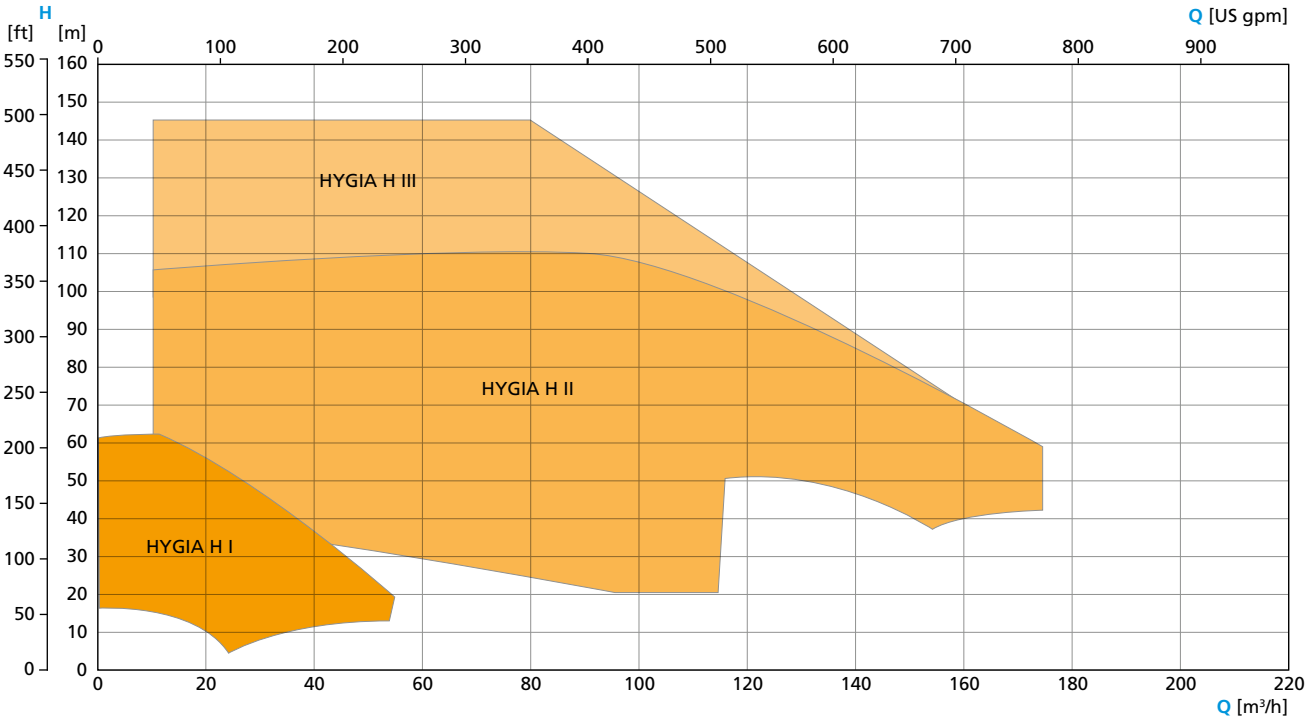
Centrifugal Pumps
4-/6-pole, 60 Hz



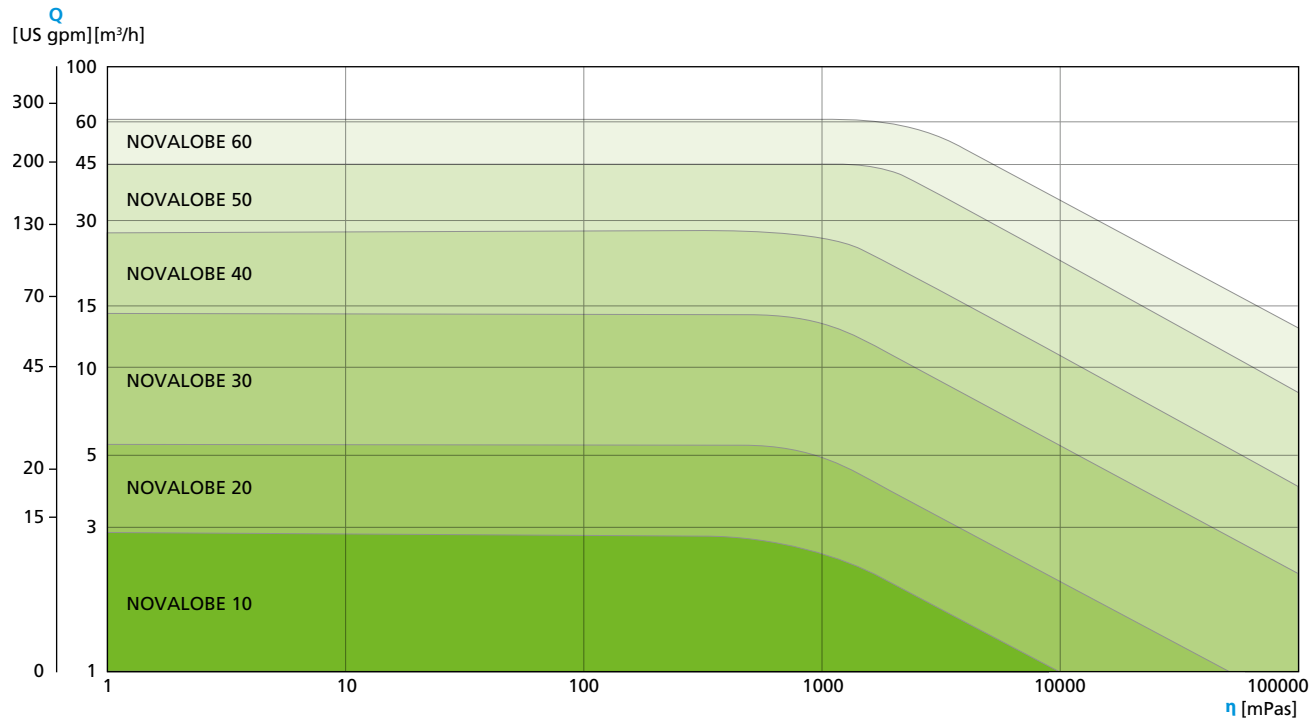
High-pressure Pumps
50 Hz



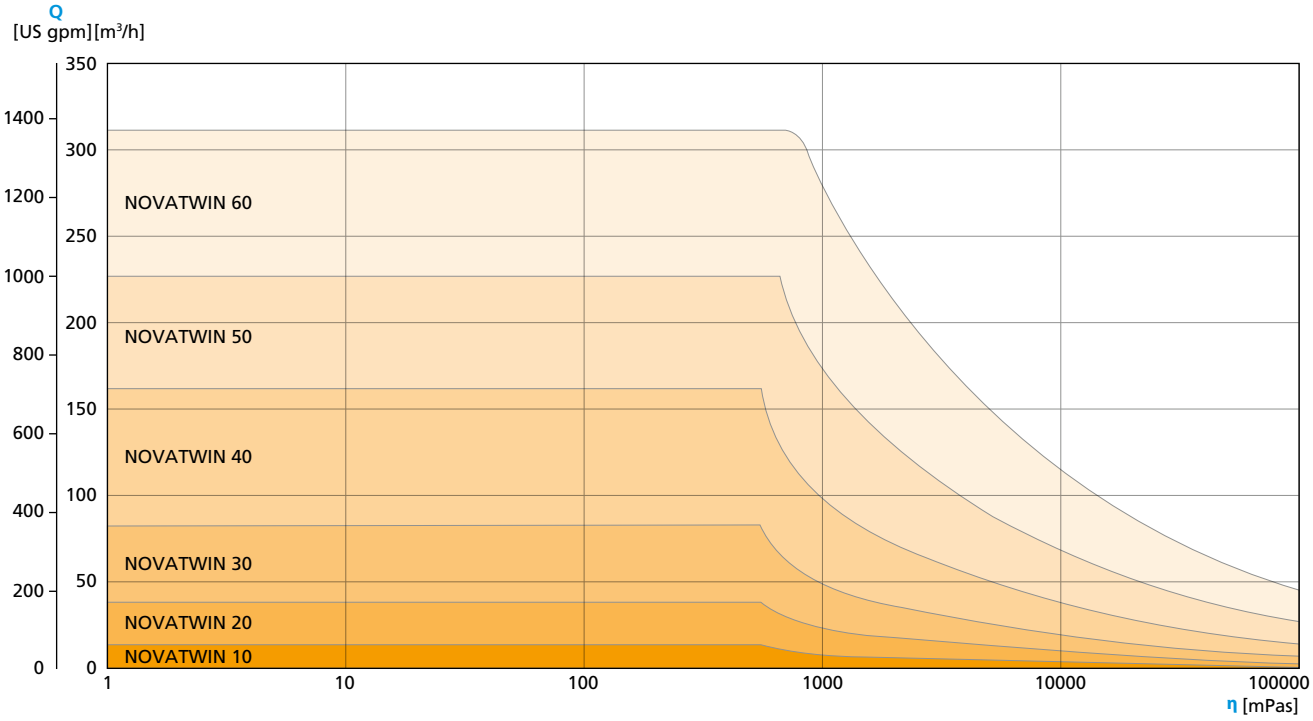
High-pressure Pumps
60 Hz



Rotary Lobe Pumps



Twin Screw Pumps



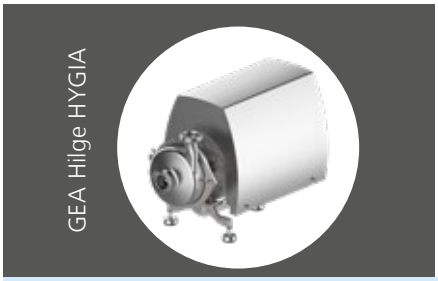
GEA VARIPUMP
Wide model range with numerous variants.
Customization to specific customer requirements

GEA SMARTPUMP
Clearly defined list of models, limited to standard requirements no other variants

GEA Hilge HYGIA/HYGIA H

The "Swiss Knife" among the hygienic pumps. Premium quality and highest flexibility of customization ensure successful application in the food, beverage, and pharma industries.

Technical data	50 Hz	60 Hz
Max. flow rate	200 m³/h	175 m3/h
Max. head	100 m	145 m
System pressure	16 / 25 / 64 bar	



GEA Hilge MAXA

A single-stage centrifugal pump designed for heavy-duty operation in industrial processes. The major dimensions and characteristics of these pumps correspond to DIN EN 733 and DIN EN 22858.

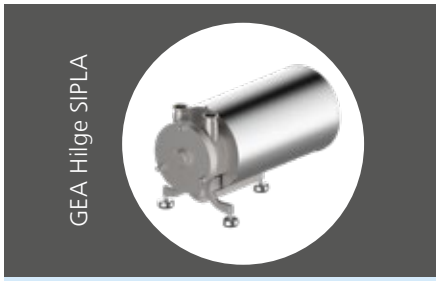
Technical data	50 Hz	60 Hz
Max. flow rate	1,450 m³/h	1,320 m³/h
Max. head	100 m	100 m
System pressure	10 bar	

Single-stage end-suction centrifugal pumps

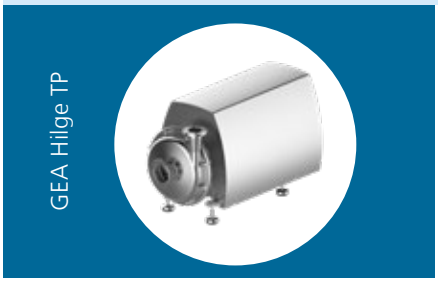
GEA Hilge SIPLA

A single-stage self-priming side channel pump, especially suited for SIP/CIP return systems and applications with high gas content. Right- and left-hand rotation can be freely adjusted for additional application options.

Technical data	50 Hz	60 Hz
Max. flow rate	78 m³/h	64 m³/h
Max. head	47 m	60 m
System pressure	10 bar	



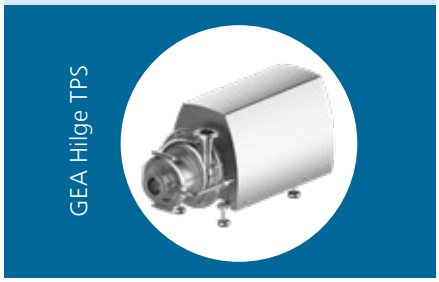
Single-stage self-priming centrifugal pumps



GEA Hilge TP

The GEA Hilge TP is the smart solution for standard applications. The single-stage centrifugal pump suits a wide range of applications and offers uncompromising hygiene and quality.

Technical data	50 Hz	60 Hz
Max. flow rate	170 m³/h	205 m³/h
Max. head	90 m	135 m
System pressure	16 bar	



GEA Hilge TPS

This self-priming centrifugal pump is the solution of choice especially for emptying tanks as well as for conveying products containing gas, e.g. CIP return systems.

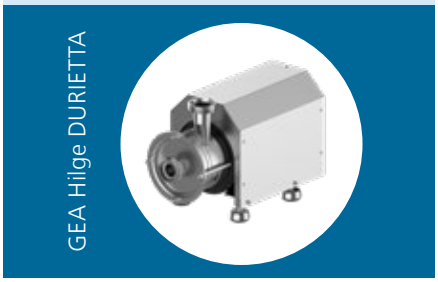
Technical data	50 Hz	60 Hz
Max. flow rate	115 m³/h	125 m³/h
Max. head	95 m	138 m
System pressure	16 bar	

GEA Hilge CONTRA

Single- and multi-stage centrifugal pumps are available in this series. The hygienic design in every detail provides perfect solutions to numerous tasks in sterile and hygienic processes.

Technical data	50 Hz	60 Hz
Max. flow rate	100 m³/h	100 m³/h
Max. head	200 m	230 m
System pressure	25 bar	

Multi-stage centrifugal pumps



GEA Hilge DURIETTA

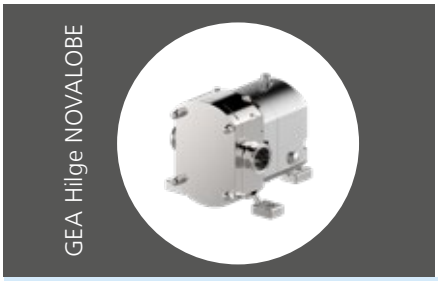
This end-suction single- or multi-stage centrifugal pump in a very compact design has been created for applications with low flow rates at high flow heads.

Technical data	50 Hz	60 Hz
Max. flow rate	8 m³/h	8 m³/h
Max. head	72 m	41 m
System pressure	8 bar	

GEA Hilge NOVALOBE

This rotary lobe pump has been specifically designed for highly viscous media – and for applications where gentle pumping is required. The pump is fully drainable with vertical ports.

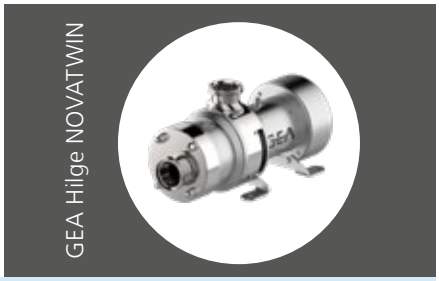
Technical data	50 / 60 Hz
Max. displacement	2.1 l/rev
Max. differential pressure	16 bar
System pressure	10/16 bar



GEA Hilge NOVATWIN

The GEA Hilge NOVATWIN is a flexible twin screw pump. It fulfills the highest hygienic standards for gentle product handling as well as CIP with one pump only.

Technical data	50 / 60 Hz
Max. flow rate	310 m³/h
Max. differential pressure	25 bar
System pressure	up to 30 bar



Rotary-lobe pumps

Twin-screw pumps

Positive displacement pumps

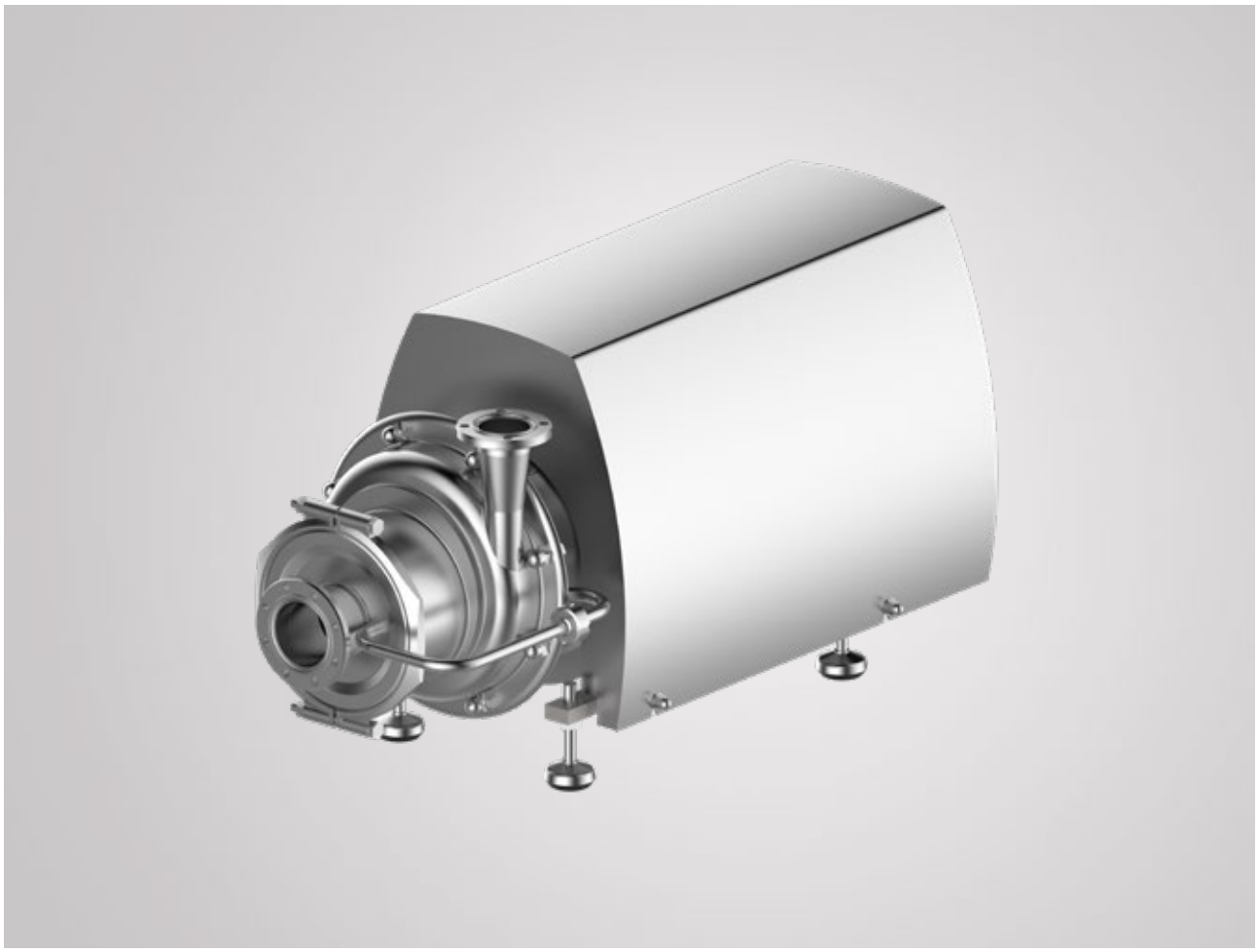
The certificates listed here are valid for corresponding GEA pump models. Pumps conforming to the requirements of the European Hygienic Engineering and Design Group (EHEDG) as well as 3-A Sanitary Standards, Inc. (3-A SSI) are available for numerous fields of application.

EHEDG certificates apply only to the specific pump type as listed. However, they may be transferred to specific other pump types, owing to identical housing designs and flow path geometries.

Moreover, independent, standardized tests have confirmed the efficient, problem-free cleaning ability of numerous pumps – for optimum safety and economic gain.

Document	GEA Hilge HYGIA / HYGIA H	GEA Hilge TP / TPS	GEA Hilge CONTRA	GEA Hilge MAXA	GEA Hilge DURIETTA	GEA Hilge SIPLA	GEA Hilge NOVALOBE	GEA Hilge NOVATWIN
3-A Sanitary Standard	•**	•						•
EHEDG certificate	•*	•*	•*				•*	•*
FDA declaration of conformity	•	•	•	•	•	•	•	•
Declaration of compliance with the order 2.1 acc. to EN 10204	•		•	•	•	•	•	•
Test report 2.2 acc. to EN 10204	•	•	•	•	•	•	•	•
Inspection certificate 3.1 acc. to EN 10204	•	•	•	•		•	•	•
EAC-Certificate	•*	•	•	•	•	•	•	•
Surface roughness test report	•	•	•	•			•	•
Delta ferrite test report	•		•				•	•
Acoustic measurement test report	•	•	•	•	•	•	•	•
USP Class VI – declaration of conformity	•	•	•			•	•	•
Certificate in acc. with the regulation (EG) No. 1935/2004	•	•	•	•	•	•	•	•
Certificate DIN EN ISO 9001:2015	•	•	•	•	•	•	•	•

Many more certificates on request
Subject to change without notice.
* registered for certification/recertification
** HYGIA H III registered for certification



GEA Hilge TPS on Stainless Steel Adjustable Feet

Features and benefits

- 2 in 1: self-priming pump for CIP process and product transfer lead to lower investment cost
- Good efficiency and duty point precise sizing through finely graduated impeller diameters or operation at the frequency converter
- Covers large capacity range: suitable for large plants and long pipelines
- Process safety and optimal cleanability through Hygienic Design
- Smooth rotation results in quiet operation compared to side channel pumps
- Modular design system allows adaptation to changed requirements (e.g. to other impeller sizes or other mechanical seal)
- Low spare parts inventory due to modular pump (same sealing concept as TP)

GEA Hilge TPS

By combining the existing TP series with an upstream screw rotor stage a new generation of hygienic self-priming centrifugal pumps has been created. The GEA Hilge Centrifugal Pump TPS is a self-priming pump for viscosities of up to 500 mPas. The pump is used for CIP return applications, for emptying tanks as well as for conveying products containing gas. The TPS is characterized by a low sound power level, highest efficiency and excellent cleaning properties. The TPS series also permits evacuation of pipes on the suction side – so that just one pump is required for CIP return and product conveying!

Technical Data

	50 Hz	60 Hz
Flow rate	115 m³/h	125 m³/h
Head	95 m	138 m
Operating pressure	16 bar	16 bar
Operating temperature	95 °C	95 °C
Sterilization temperature	140 °C (SIP)	140 °C (SIP)
Max. pump efficiency	71 %	72 %

Applications

The GEA Hilge TPS pump range is suitable for the following application areas and products, due to the hygienic design and material selection:

Food and beverage industry
- Breweries (beer, wort, mash, yeast, etc.)
- Dairies (milk, milk-based mixed beverages, cheese manufacturing, etc.)
- Soft drinks (fruit juice, lemonade, mineral water, etc.)
- Wine and champagne cellars
- Food manufacturing (marinades, brine, cooking oil, etc.)
- Cleaning In Place systems (CIP)

Pharmaceutical and biotechnology
- Pure-water systems (WFI)
- Infusion
- Culture medium
- Blood plasma
- Lotions
- Perfumes

Design

GEA Hilge TPS pumps are single-stage, self-priming, centrifugal pumps, designed to meet the hygienic requirements of sterile process technology.

The pump casing is made of heavy-duty, rolled and deep drawn CrNiMo steel 1.4404/1.4435, the equivalent of AISI 316L. The pumps have a mechanical seal and a fan-cooled asynchronous motor to enclosure class IP55.

The pumps are available in eleven sizes with a variety of flexible versions. The pumps are CIP- and SIP-capable in compliance with the DIN EN 12462 performance criteria. The design fulfills the following requirements:
- 3-A Sanitary Standard
- EHEDG (registered for recertification)
- EAC
- GMP regulations

Certification

Pump connections

GEA Hilge offers the following standard connections for the GEA Hilge TPS pump range:
- Aseptic flange DIN 11853-2

Additional connections such as sterile connections in accordance with DIN 11853, SMS, RJT, IDF, DIN or ISO clamp connections are available on request.

Selected connections also available with drain port. You can find additional information in the connection selection guide from page 26 to 28.

ATEX

For use in potentially explosive areas, GEA Hilge TPS 2030 and 3050 are available. These pumps, which possess an EC declaration of conformity in accordance with the ATEX guideline 2014/34/EU, correspond to device categories 2 or 3, and can be used in zone 1 or 2.

ATEX-Symbol

For explanation see chapter certificates on page 18.

Open impeller design

- All parts stainless steel, wetted components made of 1.4404 or 1.4409 (AISI 316L)
- Surface roughnesses of $R_a \leq 0.8$ µm can be achieved by mechanical treatment of the surface

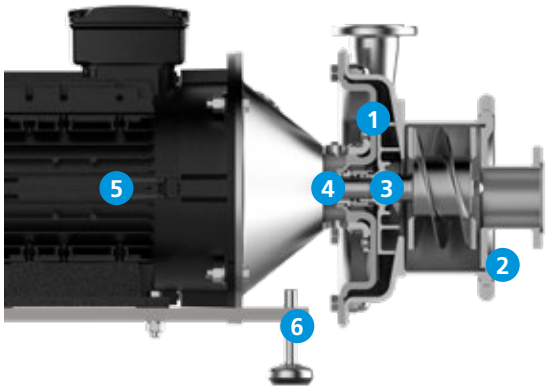
Semi-open impeller

The electro-polished, stainless steel, semi-open impeller is available in two versions, according to the application.

Impeller version	Surface finish
Cast	$R_a \leq 3.2$ µm
Milled	$R_a \leq 0.8$ µm

The impeller is suitable for low-viscosity liquids and liquids containing gas and low content of particles.

Materials



Material overview GEA Hilge TPS

Item	Component	Material	No.
1	Impeller	CrNiMo steel	316L (1.4404/1.4435)
2	Pump casing	CrNiMo steel	316L (1.4404/1.4435)
3	Seal	Single mechanical seal carbon/stainless steel or SiC/SiC other versions available on request	
4	Pump shaft	CrNiMo steel	316Ti (1.4571)
5	Motor	Rolled steel, cast iron	
6	Foot	Iron/stainless steel	

Coating

Components not made of stainless steel are provided with one of the following coatings, depending on the design:

Version	Paint/coating	Coating thickness
Primer	2K epoxy resin	30–60 µm
	KTL coating	15–20 µm
Top coating	2K epoxy resin	50–70 µm
	2K polyurethane color	60 µm
	KTL coating	15–20 µm

Surface design

Selected components are electro-polished in order to improve the surface and protect it against corrosion.

Surface	Electro-polished components
$R_a \leq 3.2$ µm	Casing
$R_a \leq 0.8$ µm	All liquid-touched components

Lantern (motor stool) and cast impeller not electro-polished.

Casing design

Clamp ring
- System pressure up to 16 bar
- Freely selectable discharge port position

Sealing according to the VARIVENT® principle

The special groove ensures that the seal is kept reliably in place at all times. The shape of the groove is based on FEM analyses. The metallic stop allows a defined compression of the seal, ensuring gap-free sealing against the product chamber without dead corners.

O-ring sealing between pump housing and cover

Mechanical seal

GEA Hilge offers the following seal designs:
- Single-acting mechanical seal
- Single-acting flushed mechanical seal (Quench)
- Double-acting mechanical seal

The pumps of the GEA Hilge TPS range are equipped with single internal mechanical seals optimally arranged in the pump.

This ensures efficient lubrication and cooling of the mechanical seal. CIP and SIP-capability is fulfilled according to hygienic design criteria.

The standard material for the mechanical seals is carbon/stainless steel with EPDM elastomers. Other executions and materials are available on request.

For further information on mechanical seals, see page 29.

Design variants

Standard version	Description
GEA Hilge TPS	Horizontal installation, plug-in shaft, standard motor
GEA Hilge TPS-Super	Horizontal installation, plug-in shaft, standard motor, with stainless steel shroud

GEA Hilge TPS
on Motor Foot

GEA Hilge TPS
on Stainless Steel Adjustable Feet

GEA Hilge TPS-Super
on Stainless Steel Adjustable Feet

GEA Hilge TPS
on Trolley

Also available as 3-A version
(please see separate US- catalog)

Designs

Terminal box position
This terminal box position is possible for all pumps without shroud.

up

Possible terminal box positions

Noise emissions

Measured values according to DIN EN ISO 3746 for pump units, measurement uncertainty 3 dB(A).

Type	Lpfa [dB (A)]
TPS 2030	80
TPS 3050	83
TPS 8050	84
TPS 8080	88

The noise emissions of a pump are significantly affected by the given application. The values given here therefore serve only as a guide. Please contact GEA Hilge for more detailed information.

Motors

GEA Hilge TPS

P2 [kW]	2-pole [frame size]
2.2	90L
4.0	112M
5.5	132S
7.5	132S
11.0	160M
15.0	160M
18.5	160L
22.0	160L
30.0	200L
37.0	200L
45.0	200L

Motor protection
Three-phase motors should be connected to a motor-protective circuit breaker.

All three-phase mains-operated standard motors can be connected to an external frequency converter. When a frequency converter is connected, the motor isolation is often overloaded, making the motor louder than during normal operation. In addition, large motors will be exposed to bearing currents caused by the frequency converter.

The following should be taken into account when operating a frequency converter:
- In the event of special noise protection requirements, motor noise can be reduced by using a dU/dt filter between the motor and the frequency converter. For noise-sensitive environments, we recommend using a sinus filter.
- The length of the cable between motor and frequency converter affects the motor load. For this reason, check whether the cable length corresponds to the specifications issued by the supplier of the frequency converter.
- For supply voltages between 500 and 690 V, fit either a dU/dt filter to reduce voltage peaks, or use a motor with reinforced insulation.
- For supply voltages of 690 V, use a motor with reinforced insulation, and fit a dU/dt filter.

Design
The motors are totally enclosed, fan-cooled standard motors with main dimensions according to IEC and DIN standards. Electrical tolerances according to IEC 60034.

Pump range	Design – IEC 60034-7 Horizontal installation
GEA Hilge TPS	IM 3001 (IM B5) IM 2001 (IM B35)

Relative air humidity: Max. 95 %
Enclosure class: IP55
Insulation class: F according to IEC 85
Ambient temperature: Max. 40 °C (standard motor)

In humid locations, the lowest drain hole in the motor must be opened. In such cases, the motor enclosure class is IP44.

Power [kW]	Motor approval		IE Class		
	CEL China Energy	INMETRO Brazil	50 Hz	60 Hz	PTC
1.1		•	3	3	
1.5	•	•	3	3	
2.2	•	•	3	3	
3.0	•	•	3	3	•
4.0	•	•	3	3	•
5.5	•	•	3	3	•
7.5	•	•	3	3	•
11.0	•	•	3	3	•
15.0	•	•	3	3	•
18.5	•	•	3	3	•
22.0	•	•	3	3	•
30.0	•	•	3	3	
37.0	•	•	3	3	
45.0	•	•	3	3	

Selecting according to the application

The table below is intended as a general guide. Selection of connection often depends on on-site conditions.

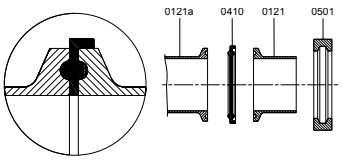
Connection		Application																
		Beverages					Food				Industrial applications						Cleaning	
Type		Beer	Wine	Juice	Alcohol	Soft drinks	Confectionery	Dairy products	Frying oil	Syrup	Glue and paint	Purification products	Chemical products	Industrial wastewater and efflux	Surface treatment products	Biofuel	CIP	SIP
Clamps	ASME/ DIN 32676 tri-clamp	•	•	•	•	•	•	•		•							•	•
Flanges	Flange VARIVENT® FN	•	•	•	•	•	•	•		•							•	•
	Aseptic flange DIN 11864-2/11853-2	•	•	•	•	•	•	•	•	•							•	•
	Flange DIN EN 1092-1	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Threads	Threaded connection SMS	•	•	•	•	•	•	•	•	•							•	
	Threaded connection DIN 11851	•	•	•	•	•	•	•	•	•							•	
	Threaded connection IDF	•	•	•	•	•	•	•	•	•							•	
	Threaded connection RJT	•	•	•	•	•	•	•	•	•							•	
	Aseptic threaded connection DIN 11864-1/ 11853-1	•	•	•	•	•	•	•	•	•							•	•

• Commonly used connections

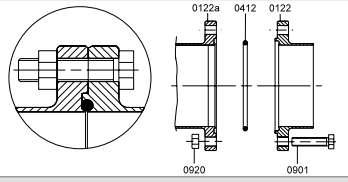
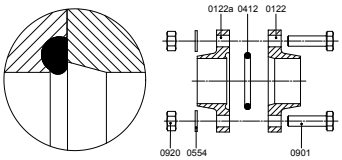
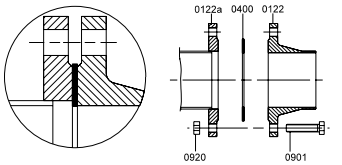
Design

The following tables show the design of the different connection types.

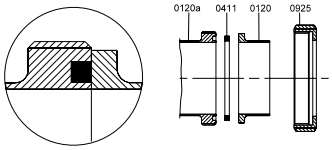
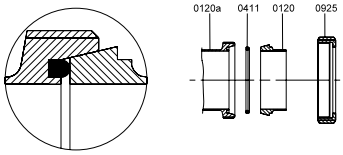
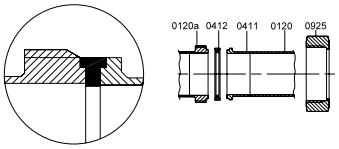
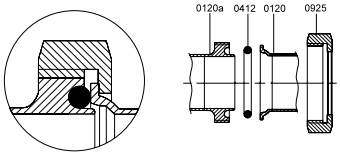
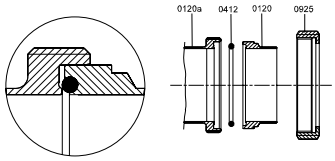
Clamps

Applications	Standard	Design	Description of the components
• Beverage Industry • Food Industry • Cosmetic Industry • Cleaning System (CIP/SIP)	DIN 32676 Class C (Tri-Clamp® / ASME BPE)		0121a: Clamp connection at pump casing 0121: Clamp connection 0410: Profile gasket 0501: Clamp ring

Flanges

Applications	Standard	Design	Description of the components
Aseptic Flange			
• Food Industry • Beverage Industry • Cosmetic Industry • Cleaning System (CIP/SIP)	DIN 11864-2/ 11853-2 Form A		0122a: Flanged connection at pump casing 0122: Flanged connection 0412: O-ring 0901: Hexagon head screw 0920: Hexagon nut
Flange			
• Food Industry • Beverage Industry • Cleaning System (CIP/SIP)	VARIVENT®		0122a: Flanged connection at pump casing 0122: Flanged connection 0412: O-ring 0554: Washer 0901: Hexagon head screw 0920: Hexagon nut
• Industrial Applications	DIN EN 1092-1 (fixed)		0122a: Flanged connection at pump casing 0122: Flanged connection 0400: Gasket 0901: Hexagon head screw 0920: Hexagon nut

Threads

Applications	Standard	Design	Description of the components
Thread			
• Beverage Industry • Food Industry	SMS (ISO 2037 DS 722)		0120a: Threaded connection at pump casing 0120: Threaded connection 0411: Joint ring 0925: Grooved union nut
• Beverage Industry • Cleaning System (CIP) • Food Industry	DIN 11851		0120a: Threaded connection at pump casing 0120: Threaded connection 0411: Joint ring 0925: Grooved union nut
• Beverage Industry • Cleaning System (CIP) • Food Industry	IDF (BS 4825-4)		0120a: Threaded connection at pump casing 0120: Threaded connection 0411: Joint ring 0412: O-ring 0925: Grooved union nut
• Beverage Industry • Cleaning System (CIP) • Food Industry	RJT (BS 4825-5)		0120a: Threaded connection at pump casing 0120: Threaded connection 0412: O-ring 0925: Grooved union nut
Aseptic Thread			
• Beverage Industry • Cleaning System (CIP) • Food Industry	DIN 11864-1/ 11853-1		0120a: Threaded connection at pump casing 0120: Threaded connection 0412: O-ring 0925: Grooved union nut

In order to ensure correct operation (depending on the application and the medium), single or single mechanical flushed seal systems can be supplied. The mechanical seal is optimally placed inside the pump. This ensures efficient lubrication and cooling of the mechanical seal, while also ensuring CIP (Cleaning In Place) and SIP (Sterilization In Place) capability. The standard material for the mechanical seals are carbon/stainless steel or SiC/SiC with EPDM or FKM (Viton) elastomers.

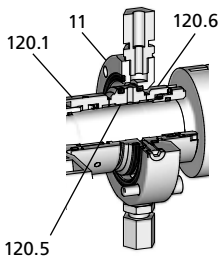
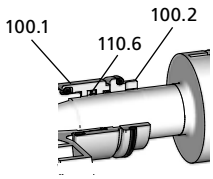
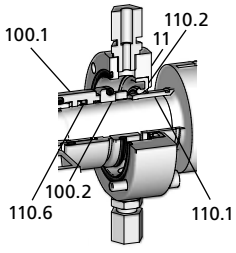
Mechanical seals

The operating range of the seal depends on the liquid, the type of seal, the operating pressure and the liquid temperature. The seal types described below are standard seal types; other seals are available on request.

Version	Material pairs stationary seal face/O-rings	Max. pressure	Max. temperature
Encapsulated spring	silicon carbide /silicon carbide /EPDM silicon carbide /silicon carbide /FKM carbon/stainless steel/EPDM carbon/stainless steel/FKM carbon/SiC/EPDM carbon/SiC/FKM	16 bar	–5 to 200 °C

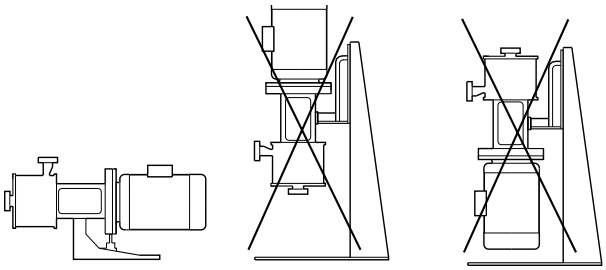
Special seals available in different materials up to 25 bar.

Mechanical seal arrangements

Arrangement	Design	Components
Double-acting mechanical seal		11: Slide ring holder 120.1: Face seal ring, primary 120.5: Stationary seal ring 120.6: Face seal, secondary
Single-acting mechanical seal		100.1: Face seal ring 100.2: Stationary seal ring 110.6: Spring
Single-acting mechanical seal, flushed		11: Slide ring holder 100.1: Face seal ring 100.2: Stationary seal ring 110.1: Shaft protection sleeve 110.2: Shaft seal 110.6: Spring

Mechanical installation

GEA Hilge TPS
Never install the pump vertically!

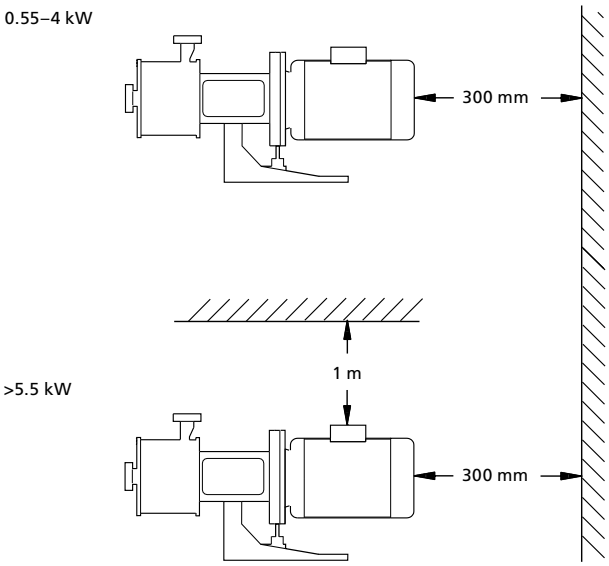


Installation

Space requirements

Horizontal installation

- Pumps fitted with motors up to and including 4 kW require an 300 mm clearance behind the motor.
- Pumps fitted with motors of 5.5 kW and up require at least a 1 meter clearance above the motor and 300 mm behind it to allow the use of lifting equipment.



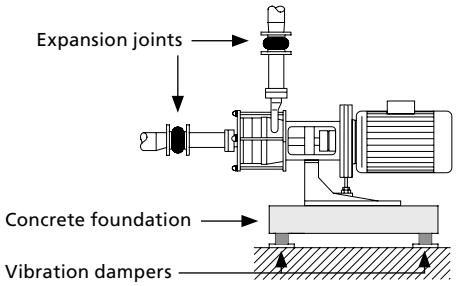
Horizontal installation

Elimination of noise and vibrations

In order to achieve optimum operation and minimum noise and vibration, consider vibration dampening of the pump. Generally, always consider this for pumps with motors above 11 kW. Smaller motors, however, may also cause undesirable noise and vibration.

Noise and vibration are generated by the rotation in the motor and pump and by the flow in the pipework and fittings. The effect on the environment is subjective and depends on correct installation and the state of the remaining system.

Foundation
Vibration dampening is best achieved by installing the pumps on a plane and rigid concrete foundation.



Example of a pump foundation

As a guideline, the weight of the concrete foundation should be 1.5 times the pump weight.

Vibration dampers
To prevent vibrations from being transmitted to the building, we recommend that you isolate the pump foundation from buildings by means of vibration dampers.

The selection of the correct vibration dampers requires the following data:
- Forces that will be transmitted through the vibration dampers
- Motor speed, taking speed control into account as needed
- Required dampening in % (suggested value is 70 %).

The right damper varies from installation to installation, and the wrong damper may increase the vibration level. Vibration dampers should therefore be sized by the supplier.

Expansion joints

If the pump is installed on a pedestal with vibration dampers, expansion joints must always be fitted on the pipeline connections. This is important to prevent the pump from "hanging" in the connections.

Install expansion joints in order to
- absorb expansion/contractions in the pipework caused by variable liquid temperatures
- reduce mechanical strains that occur in connection with pressure surges in the plant
- isolate mechanical structure-borne noise in the pipework (only rubber bellows expansion joints).

Note: Do not install expansion joints to compensate for inaccuracies in the pipework such as center displacement of flanges.

Fit expansion joints at a distance of at least 1 to 1.5 times the nominal flange diameter away from the pump on the suction as well as on the discharge side. This will prevent the development of turbulence in the expansion joints, resulting in better suction conditions and a minimum pressure loss on the discharge side.

We always recommend expansion joints with limiting rods for flanges larger than DN 100/4".

The pipes should be anchored so that they do not stress the expansion joints and the pump. Follow the supplier's instructions and pass them on to advisers or pipe installers.

The values for density and viscosity given here are ratios and can deviate in practice.

Application beer

				Mechanical seal* material product side / atmospheric side		
Subgroup	Temperature [°C]	Density [kg/m³]	Viscosity [mPas]	Single	Quench	Tandem
Altbier Beer Beer mix Berliner Weisse Bock beer Craft beer Export beer Full beer (Vollbier) Green beer Herb beer Lager Light beer Martzen (Märzen) Non-alcoholic beer Pils Pilsener Ringed (Kräusen) Wheat beer	< 100	1,000	1	aeE (up to 10 bar), aiH (from 10 bar)	–	–
Cold wort Original wort	< 40	< 1,050	< 5	aeE (up to 10 bar), aiH (from 10 bar)	–	–
Hop extract (dissolved) Lees Mash (beer)	< 100	< 1,050	< 5	–	kiE/WDR	kiE/aeE
Lauter wort	40–90	< 1,050	< 5	–	kiE/WDR	kiE/aeE
Hot wort	40–115	< 1,050	< 5	–	kiE/WDR	kiE/aeE
Crop yeast Pitching yeast Yeast	< 20	< 1,050	< 100	aeE	–	–
Enzymes (watery dissolution)	< 60	< 1,050	< 5	aeE	–	–
Lactic acid, con. < 50 % ($C_3H_6O_3$)	< 100	< 1,100	< 5	kiV (up to 16 bar), kiI (up to 25 bar)	–	–
Lactic acid, con. > 50 % ($C_3H_6O_3$)	< 100	< 1,210	< 5	kiV (up to 16 bar), kiI (up to 25 bar)	–	–

Application water

				Mechanical seal* material product side / atmospheric side		
Subgroup	Temperature [°C]	Density [kg/m³]	Viscosity [mPas]	Single	Quench	Tandem
Iced water	–4 to +3	< 1,000	1	kiE (up to 10 bar), kiH (from 10 bar)	–	–
Cold water Demineralized water (Not for sterile applications) Drinking water Flushing water Hot water Mineral water Process water Service water Water	< 110	< 1,000	1	aeE (up to 10 bar), aiH (from 10 bar)	–	–

Application wine/sparkling wine

				Mechanical seal* material product side / atmospheric side		
Subgroup	Temperature [°C]	Density [kg/m³]	Viscosity [mPas]	Single	Quench	Tandem
Champagne Cherry wine Cider Cidre Dry sparkling wine Fruit wine Prosecco Red wine Rosé Sparkling wine Strawberry wine White wine Wine Young wine	< 35	< 1,000	1	aeE (up to 10 bar), aiH (from 10 bar)	–	–
Dessert wine Dessert wine, late-harvest wine Drape must (w/o. particles) Ice wine	< 35	< 1,050	15	aeE (up to 10 bar), aiH (from 10 bar)	–	–
Wine lees Wine yeast	< 35	< 1,050	100	aeE (up to 10 bar), aiH (from 10 bar)	–	–
Mash (wine)	< 35	< 1,050	5	aeE (up to 10 bar), aiH (from 10 bar)	–	–

Application coffee/tea/cocoa

				Mechanical seal* material product side / atmospheric side			
Subgroup	Temperature [°C]	Density [kg/m³]	Viscosity [mPas]	Single	Quench	Tandem	Encapsulated seal for vacuum application
Coffee	< 125	1,000	1	aeE	–	–	
Coffee extract	< 80–100	< 1,200	< 250	–	–	kiV/aeV	x
Tea	< 125	1,000	1	aeE	–	–	
Fruit tea / flavored tea	< 125	1,000	1	aeE	–	–	
Cocoa drink	< 40	1,020	< 10	aeE	–	–	

* aeE: carbon/stainless steel/EPDM, aeV: carbon/stainless steel/Viton, aiH: carbon/SIC/EPDM (USP-Class VI), kiE: SIC/SIC/EPDM, kiH: SiC/SiC/EPDM (USP-Class VI), kil: SIC/SIC/Viton (USP Class VI), kiV: SIC/SIC/Viton, WDR: lip seal. The elastomer of the static seals equals the elastomer of the mechanical seals.

Application milk

				Mechanical seal* material product side / atmospheric side		
Subgroup	Temperature [°C]	Density [kg/m³]	Viscosity [mPas]	Single	Quench	Tandem
Buttermilk	< 55	< 1,050	< 10	aeE (up to 10 bar), aiH (from 10 bar)	–	–
	> 55 – < 100	< 1,050	< 5	–	aeE/WDR (up to 10 bar), aiH/WDR (from 10 bar)	aeE/aeE (up to 10 bar), aiH/aeE (from 10 bar)
UHT milk	< 55	< 1,050	< 10	aeE (up to 10 bar), aiH (from 10 bar)	–	–
	> 55 – < 100	< 1,050	< 5	–	aeE/WDR (up to 10 bar), aiH/WDR (from 10 bar)	aeE/aeE (up to 10 bar), aiH/aeE (from 10 bar)
Yoghurt milk	< 55	< 1,050	< 10	aeE (up to 10 bar), aiH (from 10 bar)	–	–
	> 55 – < 100	< 1,050	< 5	–	aeE/WDR (up to 10 bar), aiH/WDR (from 10 bar)	aeE/aeE (up to 10 bar), aiH/aeE (from 10 bar)
Kefir	< 55	< 1,050	< 10	aeE (up to 10 bar), aiH (from 10 bar)	–	–
	> 55 – < 100	< 1,050	< 5	–	aeE/WDR (up to 10 bar), aiH/WDR (from 10 bar)	aeE/aeE (up to 10 bar), aiH/aeE (from 10 bar)
Cheese milk	< 55	< 1,050	< 10	aeE (up to 10 bar), aiH (from 10 bar)	–	–
	> 55 – < 100	< 1,050	< 5	–	aeE/WDR (up to 10 bar), aiH/WDR (from 10 bar)	aeE/aeE (up to 10 bar), aiH/aeE (from 10 bar)
Skimmed milk	< 55	< 1,050	< 10	aeE (up to 10 bar), aiH (from 10 bar)	–	–
	> 55 – < 100	< 1,050	< 5	–	aeE/WDR (up to 10 bar), aiH/WDR (from 10 bar)	aeE/aeE (up to 10 bar), aiH/aeE (from 10 bar)
Skimmed milk concentrate	< 55	< 1,050	< 10	aeE (up to 10 bar), aiH (from 10 bar)	–	–
	> 55 – < 100	< 1,050	< 5	–	aeE/WDR (up to 10 bar), aiH/WDR (from 10 bar)	aeE/aeE (up to 10 bar), aiH/aeE (from 10 bar)
Milk	< 55	< 1,050	< 10	aeE (up to 10 bar), aiH (from 10 bar)	–	–
	> 55 – < 100	< 1,050	< 5	–	aeE/WDR (up to 10 bar), aiH/WDR (from 10 bar)	aeE/aeE (up to 10 bar), aiH/aeE (from 10 bar)
Milk concentrate	< 55	< 1,050	< 10	aeE (up to 10 bar), aiH (from 10 bar)	–	–
	> 55 – < 100	< 1,050	< 5	–	aeE/WDR (up to 10 bar), aiH/WDR (from 10 bar)	aeE/aeE (up to 10 bar), aiH/aeE (from 10 bar)
Lactic culture	< 55	< 1,050	< 10	aeE (up to 10 bar), aiH (from 10 bar)	–	–
	> 55 – < 100	< 1,050	< 5	–	aeE/WDR (up to 10 bar), aiH/WDR (from 10 bar)	aeE/aeE (up to 10 bar), aiH/aeE (from 10 bar)
Milk mix	< 55	< 1,050	< 10	aeE (up to 10 bar), aiH (from 10 bar)	–	–
	> 55 – < 100	< 1,050	< 5	–	aeE/WDR (up to 10 bar), aiH/WDR (from 10 bar)	aeE/aeE (up to 10 bar), aiH/aeE (from 10 bar)
Whey	< 55	< 1,050	< 10	aeE (up to 10 bar), aiH (from 10 bar)	–	–
	> 55 – < 100	< 1,050	< 5	–	aeE/WDR (up to 10 bar), aiH/WDR (from 10 bar)	aeE/aeE (up to 10 bar), aiH/aeE (from 10 bar)
Raw milk	< 55	< 1,050	< 10	aeE (up to 10 bar), aiH (from 10 bar)	–	–
	> 55 – < 100	< 1,050	< 5	–	aeE/WDR (up to 10 bar), aiH/WDR (from 10 bar)	aeE/aeE (up to 10 bar), aiH/aeE (from 10 bar)
Pre-stirred yoghurt	< 55	< 1,050	< 10	aeE (up to 10 bar), aiH (from 10 bar)	–	–
	> 55 – < 100	< 1,050	< 5	–	aeE/WDR (up to 10 bar), aiH/WDR (from 10 bar)	aeE/aeE (up to 10 bar), aiH/aeE (from 10 bar)
Sour milk	< 55	< 1,050	< 10	aeE (up to 10 bar), aiH (from 10 bar)	–	–
	> 55 – < 100	< 1,050	< 5	–	aeE/WDR (up to 10 bar), aiH/WDR (from 10 bar)	aeE/aeE (up to 10 bar), aiH/aeE (from 10 bar)
Sour cream with thickening agents	< 55	< 1,050	< 10	aeE (up to 10 bar), aiH (from 10 bar)	–	–
	> 55 – < 100	< 1,050	< 5	–	aeE/WDR (up to 10 bar), aiH/WDR (from 10 bar)	aeE/aeE (up to 10 bar), aiH/aeE (from 10 bar)

				Mechanical seal* material product side / atmospheric side		
Subgroup	Temperature [°C]	Density [kg/m³]	Viscosity [mPas]	Single	Quench	Tandem
Full cream milk	< 55	< 1,050	< 10	aeE (up to 10 bar), aiH (from 10 bar)	–	–
	> 55 – < 100	< 1,050	< 5	–	aeE/WDR (up to 10 bar), aiH/WDR (from 10 bar)	aeE/aeE (up to 10 bar), aiH/aeE (from 10 bar)
Coffee cream	< 55	< 1,100	< 40	aeV (up to 10 bar), ail (from 10 bar)	–	–
	> 55 – < 100	< 1,100	< 20	–	aeV/WDR (up to 10 bar), ail/WDR (from 10 bar)	aeV/aeV (up to 10 bar), ail/aeV (from 10 bar)
Whipping cream	< 55	< 1,100	< 40	aeV (up to 10 bar), ail (from 10 bar)	–	–
	> 55 – < 100	< 1,100	< 20	–	aeV/WDR (up to 10 bar), ail/WDR (from 10 bar)	aeV/aeV (up to 10 bar), ail/aeV (from 10 bar)
Sour cream	< 55	< 1,100	< 40	aeV (up to 10 bar), ail (from 10 bar)	–	–
	> 55 – < 100	< 1,100	< 20	–	aeV/WDR (up to 10 bar), ail/WDR (from 10 bar)	aeV/aeV (up to 10 bar), ail/aeV (from 10 bar)
Cream	< 55	< 1,100	< 40	aeV (up to 10 bar), ail (from 10 bar)	–	–
	> 55 – < 100	< 1,100	< 20	–	aeV/WDR (up to 10 bar), ail/WDR (from 10 bar)	aeV/aeV (up to 10 bar), ail/aeV (from 10 bar)
Condensed milk	< 55	< 1,100	< 40	aeV (up to 10 bar), ail (from 10 bar)	–	–
	> 55 – < 100	< 1,100	< 20	–	aeV/WDR (up to 10 bar), ail/WDR (from 10 bar)	aeV/aeV (up to 10 bar), ail/aeV (from 10 bar)

Application vinegar / sauces / marinade

				Mechanical seal* material product side / atmospheric side		
Subgroup	Temperature [°C]	Density [kg/m³]	Viscosity [mPas]	Single	Quench	Tandem
Soy sauce	5–95	1,250	25	kiE	–	–
	95.1–125	1,250	25	–	kiE/WDR	kiE/aeE
Cider vinegar Herb-flavored vinegar Vinegar Wine vinegar	60	1,020	1	aeE	–	–
Vinegar essence	60	1,050	1	aeV	–	–

* aeE: carbon/stainless steel/EPDM, aeV: carbon/stainless steel/Viton, aiH: carbon/SIC/EPDM (USP-Class VI), aiI: carbon/SIC/Viton (USP-Class VI), kiE: SIC/SIC/EPDM, WDR: lip seal. The elastomer of the static seals equals the elastomer of the mechanical seals.

Application non-alcoholic drink

				Mechanical seal* material product side / atmospheric side			
Subgroup	Temperature [°C]	Density [kg/m³]	Viscosity [mPas]	Single	Quench	Tandem	Encapsulated seal
Apple juice	< 70	1,040	< 50	aeE	–	–	
	< 70	1,040	< 50	aeE	–	–	x
	< 70	1,040	< 50	kiE	–	–	x
	> 70 – < 95	1,040	< 10	–	kiE/WDR	kiE/aeE	
	> 70 – < 95	1,040	< 10	–	kiE/WDR	kiE/aeE	x
Apricot-mango juice	< 70	1,040	< 50	aeE	–	–	
	< 70	1,040	< 50	aeE	–	–	x
	< 70	1,040	< 50	kiE	–	–	x
	> 70 – < 95	1,040	< 10	–	kiE/WDR	kiE/aeE	
	> 70 – < 95	1,040	< 10	–	kiE/WDR	kiE/aeE	x
Cherry juice	< 70	1,040	< 50	aeE	–	–	
	< 70	1,040	< 50	aeE	–	–	x
	< 70	1,040	< 50	kiE	–	–	x
	> 70 – < 95	1,040	< 10	–	kiE/WDR	kiE/aeE	
	> 70 – < 95	1,040	< 10	–	kiE/WDR	kiE/aeE	x
Cola	< 100	1,040	< 5	aeE	–	–	
	< 100	1,040	< 5	aeE	–	–	
Concentrated lemon juice, without pulp and granules	< 70	1,040	25	kiV	–	–	
Cranberry juice	< 70	1,040	< 50	aeE	–	–	
	< 70	1,040	< 50	aeE	–	–	x
	< 70	1,040	< 50	kiE	–	–	x
	> 70 – < 95	1,040	< 10	–	kiE/WDR	kiE/aeE	
	> 70 – < 95	1,040	< 10	–	kiE/WDR	kiE/aeE	x
Fruit juice, with granules	< 70	1,040	< 50	kiE	–	–	x
Fruit juice, with pulp		1,040	< 50	aeE	–	–	x
Fruit juice, with pulp and with granules	> 70 – < 95	1,040	< 10	–	kiE/WDR	kiE/aeE	x
Fruit juice, without pulp	< 70	1,040	< 50	aeE	–	–	
	> 70 – < 95	1,040	< 10	–	kiE/WDR	kiE/aeE	
Grape juice	< 70	1,040	< 50	aeE	–	–	
	< 70	1,040	< 50	aeE	–	–	x
	< 70	1,040	< 50	kiE	–	–	x
	> 70 – < 95	1,040	< 10	–	kiE/WDR	kiE/aeE	
	> 70 – < 95	1,040	< 10	–	kiE/WDR	kiE/aeE	x
Iced tea	< 100	1,040	< 5	aeE	–	–	
Lemon juice, with pulp and granules	< 70	1,040	25	kiV	–	–	x
Lemon juice, without pulp and granules	< 70	1,040	25	aeV	–	–	
Lemonade	< 100	1,040	< 5	aeE	–	–	
	< 100	1,040	< 5	aeE	–	–	
Mineral water	< 100	1,040	< 5	aeE	–	–	
	< 100	1,040	< 5	aeE	–	–	
Multivitamin juice	< 70	1,040	< 50	aeE	–	–	
	< 70	1,040	< 50	aeE	–	–	x
	> 70 – < 95	1,040	< 10	–	kiE/WDR	kiE/aeE	
	> 70 – < 95	1,040	< 10	–	kiE/WDR	kiE/aeE	x
Orange juice	< 70	1,040	< 50	aeE	–	–	
	< 70	1,040	< 50	aeE	–	–	x
	< 70	1,040	< 50	kiE	–	–	x
	> 70 – < 95	1,040	< 10	–	kiE/WDR	kiE/aeE	
	> 70 – < 95	1,040	< 10	–	kiE/WDR	kiE/aeE	x
Peach- / passion fruit juice	< 70	1,040	< 50	aeE	–	–	
	< 70	1,040	< 50	aeE	–	–	x
	< 70	1,040	< 50	kiE	–	–	x
	> 70 – < 95	1,040	< 10	–	kiE/WDR	kiE/aeE	
	> 70 – < 95	1,040	< 10	–	kiE/WDR	kiE/aeE	x
Raspberry- / Strawberry juice	< 70	1,040	< 50	aeE	–	–	
	< 70	1,040	< 50	aeE	–	–	x
	< 70	1,040	< 50	kiE	–	–	x
	> 70 – < 95	1,040	< 10	–	kiE/WDR	kiE/aeE	
	> 70 – < 95	1,040	< 10	–	kiE/WDR	kiE/aeE	x

				Mechanical seal* material product side / atmospheric side			
Subgroup	Temperature [°C]	Density [kg/m³]	Viscosity [mPas]	Single	Quench	Tandem	Encapsulated seal
Vegetable juice, with pulp and granules	< 70	1,050	< 50	kiV	–	–	x
	> 70 – < 95	1,050	< 10	–	–	kiV/aeV	x
Vegetable juice, without pulp and granules	< 70	1,050	< 50	aeV	–	–	
	> 70 – < 95	1,050	< 10	–	–	kiV/aeV	

Application concentrated fruit juice

					Mechanical seal* material product side / atmospheric side		
Subgroup	Temperature [°C]	Density [kg/m³]	Viscosity [mPas]	Concentration [Brix]	Single	Quench	Tandem
Concentrated fruit juice	5–90	1,150	related to temperature	to 25°	aeE (up to 10 bar), aiH (from 10 bar)	–	–
	5–40	1,200		26–49°	aeE (up to 10 bar), aiH (from 10 bar)	–	–
	40.1–90	1,200		26–49°	–	aeE/WDR	aeE/aeE
	15–40	1,230		50°	aeE (up to 10 bar), aiH (from 10 bar)	–	–
	40.1–90	1,230		50°	–	aeE/WDR	aeE/aeE
	15–40	1,260		55°	aeE (up to 10 bar), aiH (from 10 bar)	–	–
	40.1–90	1,260		55°	–	aeE/WDR	aeE/aeE
	15–40	1,290		60°	aeE (up to 10 bar), aiH (from 10 bar)	–	–
	40.1–90	1,290		60°	–	aeE/WDR	aeE/aeE
	15–40	1,320		65°	aeE (up to 10 bar), aiH (from 10 bar)	–	–
	40.1–90	1,320		65°	–	aeE/WDR	aeE/aeE
	20–40	1,350		70°	aeE (up to 10 bar), aiH (from 10 bar)	–	–
	40.1–90	1,350		70°	–	aeE/WDR	aeE/aeE

* aeE: carbon/stainless steel/EPDM, aeV: carbon/stainless steel/Viton, aiH: carbon/SIC/EPDM (USP-Class VI), kiE: SIC/SIC/EPDM, kiH: SiC/SiC/EPDM (USP-Class VI), kiV: SIC/SIC/Viton, WDR: lip seal. The elastomer of the static seals equals the elastomer of the mechanical seals.

Application oil

				Mechanical seal* material product side / atmospheric side		
Subgroup	Temperature [°C]	Density [kg/m³]	Viscosity [mPas]	Single	Quench	Tandem
Cocoa butter Coconut oil / copra oil Corn oil Cotton seed oil Linseed oil Olive oil Palm oil Peanut oil Pumpkin seed oil Rape oil / rapeseed oil Safflower oil Sesame oil Soy oil / soy bean oil Sunflower oil Walnut oil Wheat germ oil	10–30 30.1–125	940 920	< 80 < 40	aeV aeV	– –	– –
Chip fat	< 170	900	10		–	–
Butter oil (liquid)	> 45–120	860	45	aeV	–	–
Lard (liquid)	> 45–120	860	45	aeV	–	–
Liquid butter	> 35–120	860	45	aeV	–	–
Fish oil	10–125	950	< 100	aeV	–	–
Whale oil	10–125	950	< 100	aeV	–	–
Cod liver (cod-liver oil)	10–125	950	< 100	aeV	–	–
Mineral oil Motor oil Petroleum	10–100			aeV	–	–
Derv Diesel oil	10–100	850	< 15	aeV	–	–
Oil-in-water emulsion	0–100	1,000	< 50	aeV	–	–

Application spirits

					Mechanical seal* material product side / atmospheric side		
Subgroup	Temperature [°C]	Density [kg/m³]	Viscosity [mPas]	Concentration [%]	Single	Quench	Tandem
Spirits	40	< 1,000	< 5		aeE (up to 10 bar), aiH (from 10 bar)	–	–
	< 50	< 1,150	< 150		–	aeE/WDR	kiE/aeE
	< 100	< 1,150	< 100		–	aeE/WDR	kiE/aeE
	< 78	< 1,000	1	< 10	aeE (up to 10 bar), aiH (from 10 bar)	–	–
	< 78	900	1	< 50	aeE (up to 10 bar), aiH (from 10 bar)	–	–
	< 78	800	1	< 98	aeE (up to 10 bar), aiH (from 10 bar)	–	–

Application cleaning in place CIP

					Mechanical seal* material product side / atmospheric side		
Subgroup	Temperature [°C]	Density [kg/m³]	Viscosity [mPas]	Concentration [%]	Single	Quench	Tandem
CIP liquid (concentration approx. 5 %)	< 100	1,050	< 5	< 5	aeE (up to 10 bar), aiH (from 10 bar)	–	–

Application sugar syrup

					Mechanical seal* material product side / atmospheric side		
Subgroup	Temperature [°C]	Density [kg/m³]	Viscosity [mPas]	Concentration [Brix]	Single	Quench	Tandem
Sugar syrup without crystals	5–90	1,150	related to temperature	to 25°	aeE (up to 10 bar), aiH (from 10 bar)	–	–
	5–40	1,200		26–49°	aeE (up to 10 bar), aiH (from 10 bar)	–	–
	40.1–90	1,200		26–49°	–	aeE/WDR	aeE/aeE
	15–40	1,230		50°	aeE (up to 10 bar), aiH (from 10 bar)	–	–
	40.1–90	1,230		50°	–	aeE/WDR	aeE/aeE
	15–40	1,260		55°	aeE (up to 10 bar), aiH (from 10 bar)	–	–
	40.1–90	1,260		55°	–	aeE/WDR	aeE/aeE
	15–40	1,290		60°	aeE (up to 10 bar), aiH (from 10 bar)	–	–
	40.1–90	1,290		60°	–	aeE/WDR	aeE/aeE
	15–40	1,320		65°	aeE (up to 10 bar), aiH (from 10 bar)	–	–
	40.1–90	1,320		65°	–	aeE/WDR	aeE/aeE
	20–40	1,350		70°	aeE (up to 10 bar), aiH (from 10 bar)	–	–
	40.1–90	1,350		70°	–	aeE/WDR	aeE/aeE
	20–40	1,360		72,7°	aeE (up to 10 bar), aiH (from 10 bar)	–	–
	40.1–90	1,360		72,7°	–	aeE/WDR	aeE/aeE
	5–90	1,150		to 25°	kiE (up to 10 bar), kiH (10 – 16 bar)	–	–
	5–40	1,200		26–49°	kiE (up to 10 bar), kiH (10 – 16 bar)	–	–
	40.1–90	1,200		26–49°	–	kiE/WDR	kiE/aeE
	15–40	1,230		50°	kiE (up to 10 bar), kiH (10 – 16 bar)	–	–
	40.1–90	1,230		50°	–	kiE/WDR	kiE/aeE
	15–40	1,260		55°	kiE (up to 10 bar), kiH (10 – 16 bar)	–	–
	40.1–90	1,260		55°	–	kiE/WDR	kiE/aeE
	15–40	1,290		60°	kiE (up to 10 bar), kiH (10 – 16 bar)	–	–
	40.1–90	1,290		60°	–	kiE/WDR	kiE/aeE
	15–40	1,320		65°	kiE (up to 10 bar), kiH (10 – 16 bar)	–	–
	40.1–90	1,320		65°	–	kiE/WDR	kiE/aeE
	20–40	1,350		70°	kiE (up to 10 bar), kiH (10 – 16 bar)	–	–
	40.1–90	1,350		70°	–	kiE/WDR	kiE/aeE

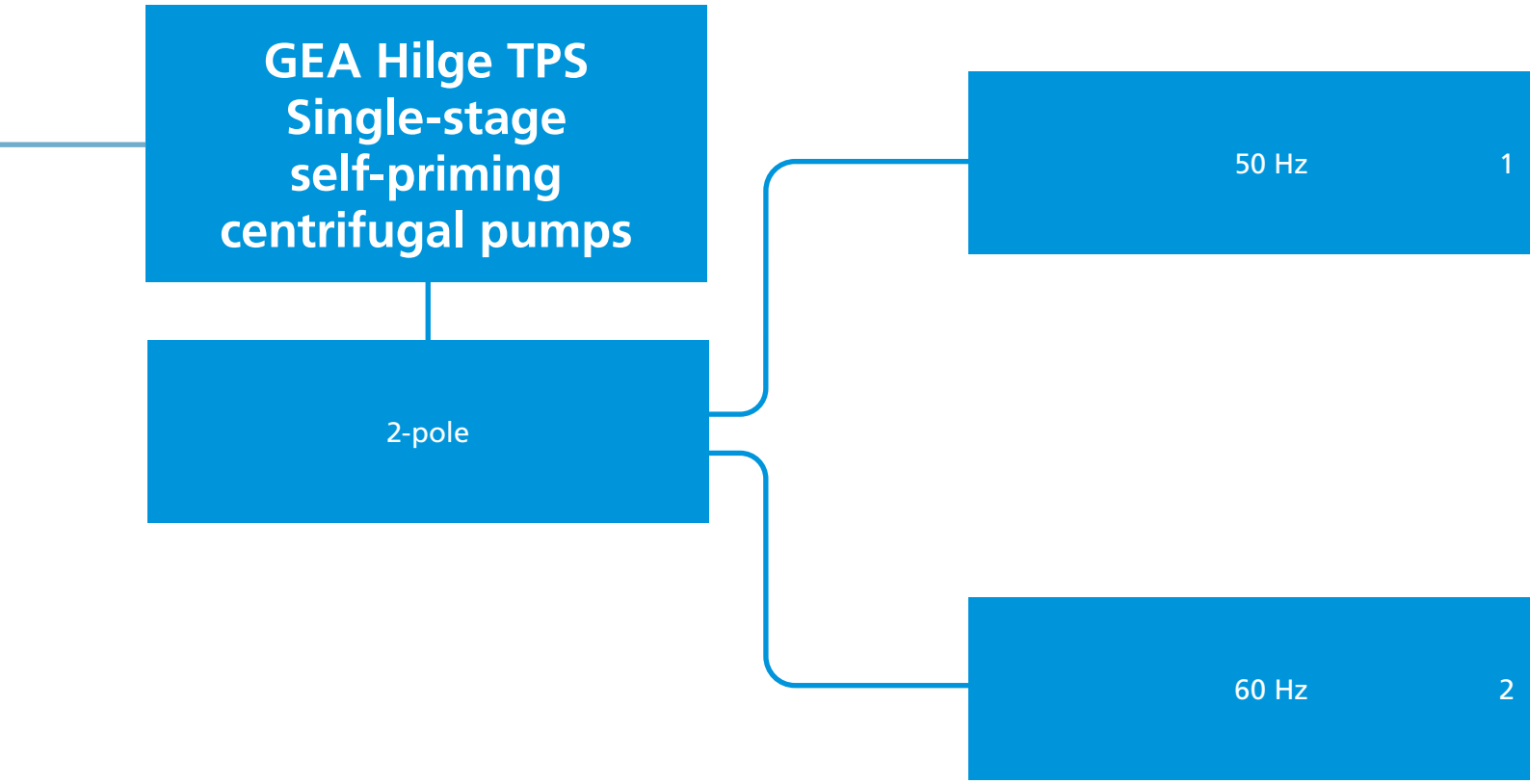
* aeE: carbon/stainless steel/EPDM, aeV: carbon/stainless steel/Viton, aiH: carbon/SIC/EPDM (USP-Class VI), kiE: SIC/SIC/EPDM, kiH: SiC/SiC/EPDM (USP-Class VI), WDR: lip seal. The elastomer of the static seals equals the elastomer of the mechanical seals.

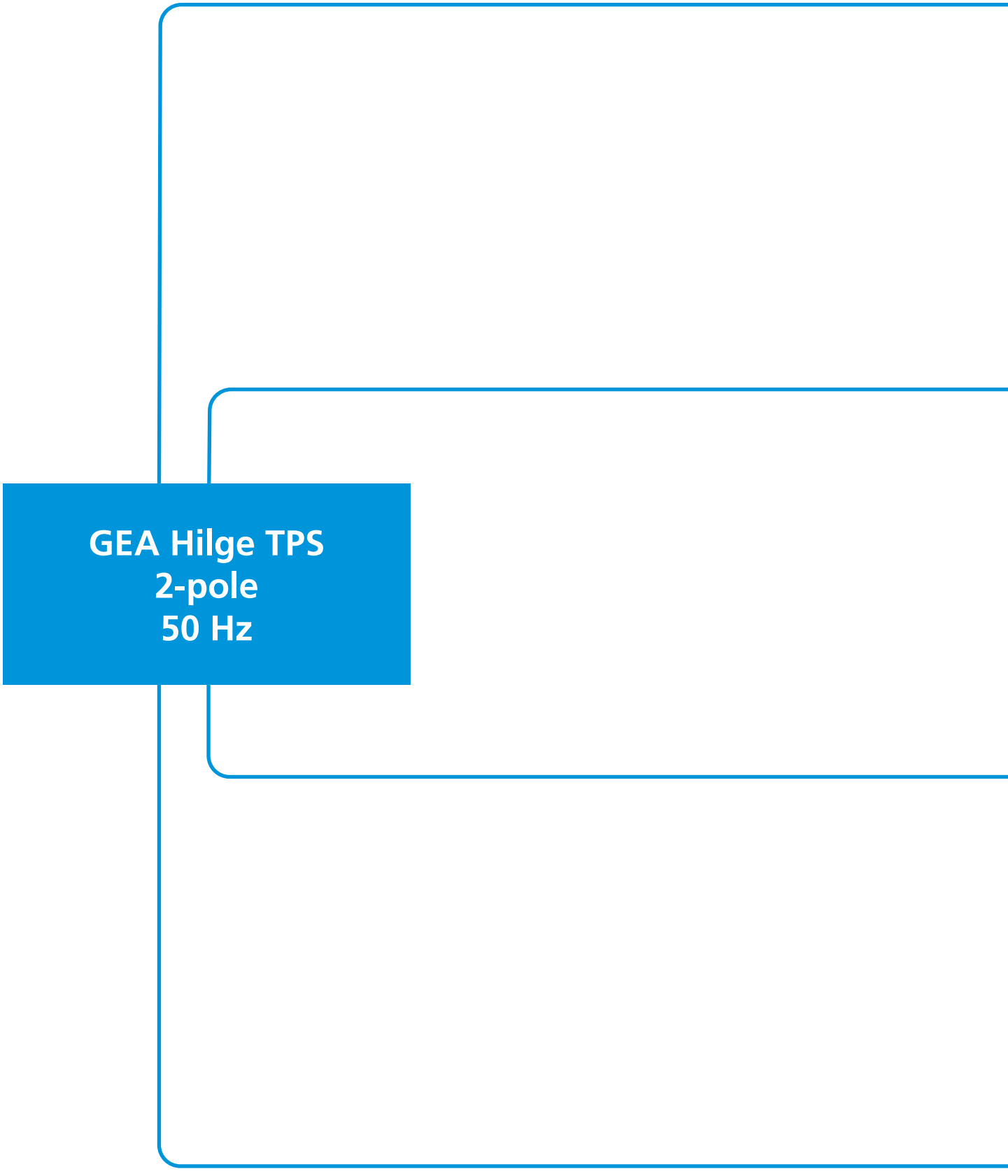
Application chemicals

					Mechanical seal* material product side / atmospheric side		
Subgroup	Temperature [°C]	Density [kg/m³]	Viscosity [mPas]	Concentration [%]	Single	Quench	Tandem
Caustic soda (NaOH)	< 60	= related to concentration		< 15	kiE	–	–
	< 60	= related to concentration		> 15 – < 50	–	kiE/WDR	kiE/aeE
	> 60 – < 101	= related to concentration		< 12	kiE	–	–
	> 60 – < 101	= related to concentration		< 12 – < 50	–	kiE/WDR	kiE/aeE
Phosphoric acid (H_3PO_4)	< 40	1 % = 1,004 5 % = 1,026 10 % = 1,053 20 % = 1,114 35 % = 1,216 45 % = 1,293	< 5	< 15	kiV	–	–
	> 40 – < 85		< 5	< 15	–	kiV/WDR	kiV/aeV
	< 85		< 5	> 15 – < 45	–	–	kiV/aeV
Nitric acid (HNO_3)	0–20	1 % = 1,004 10 % = 1,055 20 % = 1,115 30 % = 1,180 40 % = 1,245	5	0–10	kiV	–	–
	20.1–40		5	0–10	–	kiV/WDR	kiV/aeV
	0–40		5	10.1–20	–	kiV/WDR	kiV/aeV
	40.1–85		5	0–20	–	–	kiV/aeV
	0–85		5	20.1–40	–	–	kiV/aeV
High test peroxide (H_2O_2) Hydrogen peroxide	< 90	< 1,050	2	2–3	aeV	–	–
	< 90	< 1,150	2	< 40	kiV	–	–
	< 90	< 1,300	2	< 60	kiV	–	–
	< 60	< 1,450	2	< 100	–	–	kiV/aeV
Brine solution Common salt solution Sodium chloride (NaCl)	< 30	< 1,050	< 5	< 5	aeE	–	–
	30.1–40	< 1,050	< 5	< 5	kiE	–	–
	< 40	< 1,080	< 5	5.1–10	kiE	–	–
	< 40	< 1,200	< 25	10.1–25	–	kiE/WDR	kiE/aeE
Curing brine (butchery)	< 40	1,200	< 300	< 20	kiE	–	–
Salting brine (cheese dairy)	< 40	1,300	< 60	20–30	–	kiE/WDR	kiE/aeE
Ammonia/ammoniac (NH_3)	< 40	800	< 5		–	aeE/WDR	aeE/aeE
Caustic potash (KOH) Potassium hydroxide	< 60	< 1,100	< 5	< 10	kiE	–	–
	< 60	< 1,200	< 5	< 20	kiE	–	–
Glycerol Propanetriol	80	< 1,100	< 5	0–40	aeV	–	–
	80	< 1,160	< 20	40.1–60	aeV	–	–
	80	< 1,200	< 50	60.1–75	aeV	–	–
	80	< 1,220	< 100	75.1–85	aeV	–	–
Propylene-glycol ($C_3H_8O_2$)	0–80	1,010	< 5	1–20	kiV	–	–
	–5–80	1,020	< 20	20.1–50	kiV	–	–
	–10–80	1,040	< 150	50.1–75	kiV	–	–
	–10–0	1,060	< 255	75.1–100	kiV	–	–
	0.1–80	1,050	< 150	75.1–100	kiV	–	–
Ethanediol Ethylene-glycol ($C_2H_6O_2$)	0–80	1,030	< 5	1–20	kiE	–	–
	–5–80	1,060	< 20	20.1–50	kiE	–	
	–10–80	1,090	< 40	50.1–75	kiE	–	–
	–10–0	1,120	< 100	75.1–100	kiE	–	
	0.1–80	1,110	< 65	75.1–100	kiE	–	–
Citric acid ($C_6H_8O_7$) Natural citric acid	5–80	1 % = 1,005 10 % = 1,020	< 15	<10	kiV	–	–
	5–80	10.1 % = 1,020 20 % = 1,050 30 % = 1,100 50 % = 1,260	< 15	10.1–50	kiV	–	–
Acetic acid ($C_2H_4O_2$)	5–80	1,010	1	< 10	aeE	–	–
	5–100	1,050	1	10.1–100	–	–	aeK/aeE

* aeE: carbon/stainless steel/EPDM, aeK: carbon/stainless steel/FFKM, aeV: carbon/stainless steel/Viton, kiE: SIC/SIC/EPDM, kiV: SIC/SIC/Viton. The elastomer of the static seals equals the elastomer of the mechanical seals.


Catalogs
Hygienic Valve Technology
Catalogs
Hygienic Pump Technology
Catalog
Aseptic Valve Technology
Catalog
Cleaning Technology
GEA VARIPUMPS
GEA Hilge HYGIA
GEA Hilge MAXA
GEA Hilge SIPLA
GEA Hilge CONTRA
GEA Hilge NOVALOBE
GEA SMARTPUMPS
GEA Hilge TP
GEA Hilge TPS
GEA Hilge DURIETTA


GEA Hilge TPS
Single-stage
self-priming
centrifugal pumps
2-pole
50 Hz
1
60 Hz
2


GEA Hilge TPS
2-pole
50 Hz

GEA Hilge TPS 2030

GEA Hilge TPS 3050

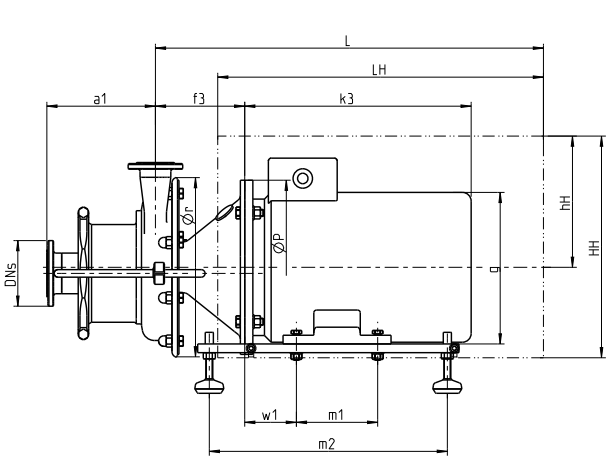
GEA Hilge TPS 8050

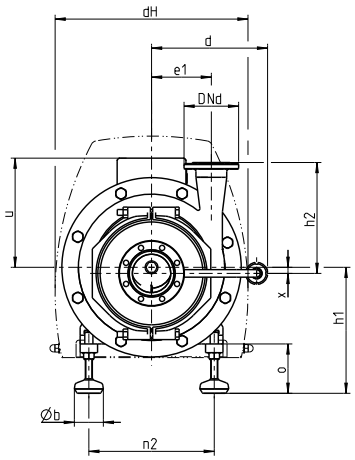
GEA Hilge TPS 8080

Technical data of the standard version	
Materials	Pump housing deep-drawn: Stainless steel 316L (1.4404) Impeller: Precision casting 316L (1.4409)
Connections	Flange DIN 11853-2
Nominal width of connections	Suction side DN 65, pressure side DN 40–50
Mechanical seal	Single-acting, material C / SIC / EPDM
Static seals	EPDM (FDA, USP Class VI)
Motor	Standard motor: IEC-Motor, 3 phase 400 V, IM B35, IP 55, ISO-Class F, incl. thermistor, IE3
Documentation	Operating instructions, declaration of conformity
Flow rate	Max. 30 m³/h
Pump head	Max. 38 m
Housing pressure	Max. 16 bar
Certificates	CERTIFIED* EHEDG TYPE EL - CLASS I

Further options see page 64 (Composition of Order Code)

* registered for recertification



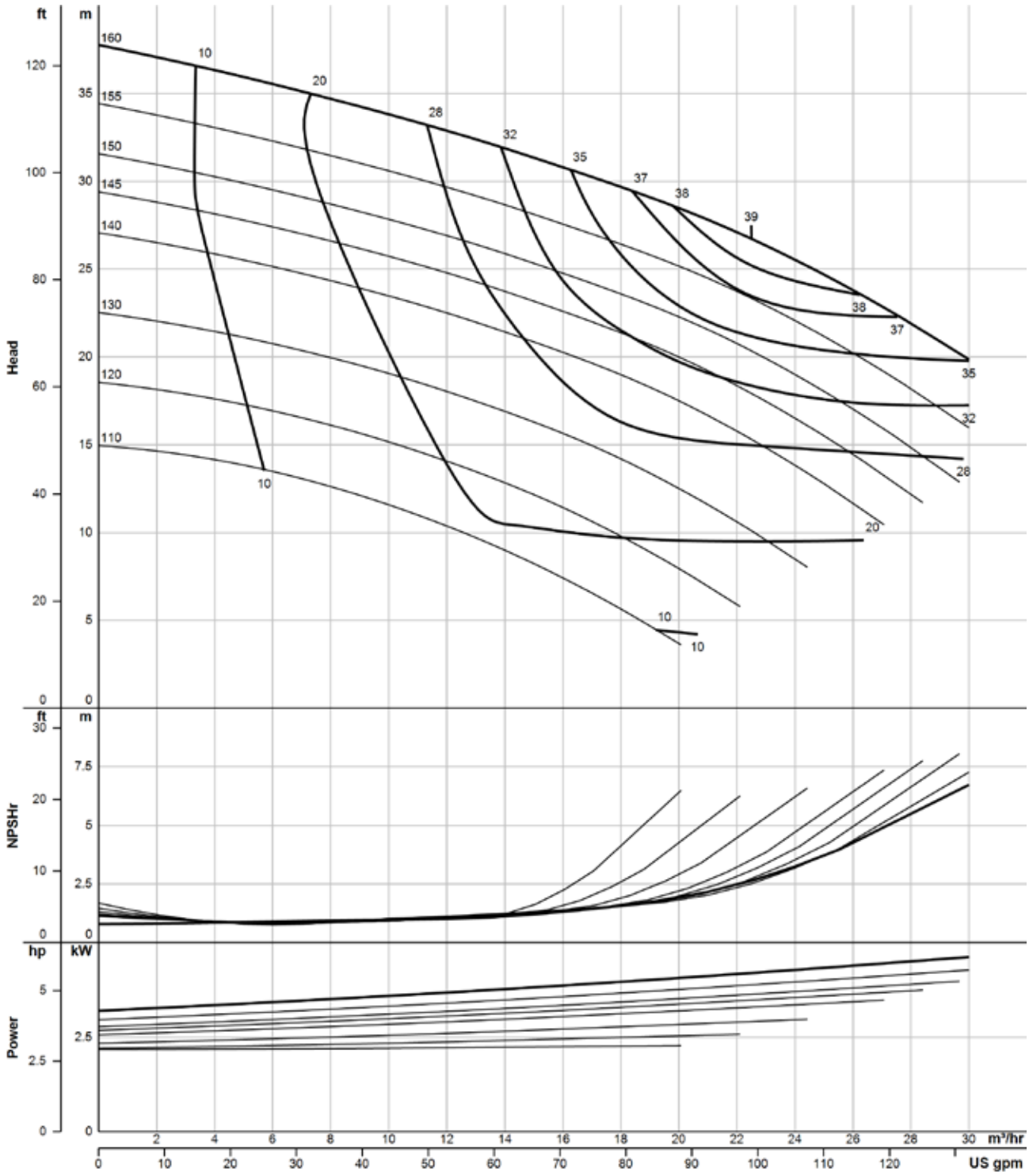


e1 = 85.1 mm
Ør = 259 mm
x = 9.9 mm
d = 176 mm

Dimensions																		
P2 [kW]	IEC-size	L [mm]	hH [mm]	LH [mm]	HH [mm]	dH [mm]	u [mm]	Øb [mm]	Øp [mm]	f3 [mm]	k3 [mm]	w1 [mm]	m1 [mm]	m2 [mm]	n2 [mm]	o [mm]	h1 [mm]	Weight [kg]
2.2	90L	519	179	431	290	228	147	50	200	122	310	56	125	285	140	82	162	46
3.0	100L	559	217	471	340	278	149	50	250	132	360	63	140	335	160	85	175	62
4.0	112M	566	205	471	340	278	175	50	250	132	333	70	140	335	190	85	187	66
5.5	112M	566	205	471	340	278	175	50	250	132	333	70	140	335	190	85	187	72
7.5	112M	566	205	471	340	278	175	50	250	132	375	70	140	335	190	85	187	78
9.2	132M	667	225	561	380	332	195	50	300	152	410	89	178	410	216	85	207	108
11.0	132M	667	225	561	380	332	195	50	300	152	410	89	178	410	216	85	207	108
15.0	132M	667	225	561	380	332	195	50	300	152	410	89	178	410	216	85	207	109

	Connections								
DN 65/40 2½"/1½" OD 60.3/48.3	11853-2 flange	VARIVENT® flange	1092-1 flange	DIN 32676 clamp	DIN 11851 thread	SMS thread	IDF thread	RJT thread	11853-1 thread
a1	166.0	165.5	182.5	168.5	180.5	164.5	162.0	166.8	176.5
h2	160.5	160.0	177.0	156.5	170.0	155.0	156.5	161.3	166.0

Motor dimensions depend on the motor manufacturer and execution. The shown motor dimensions indicate the size for the standard motor
Weight: net-weight without packaging

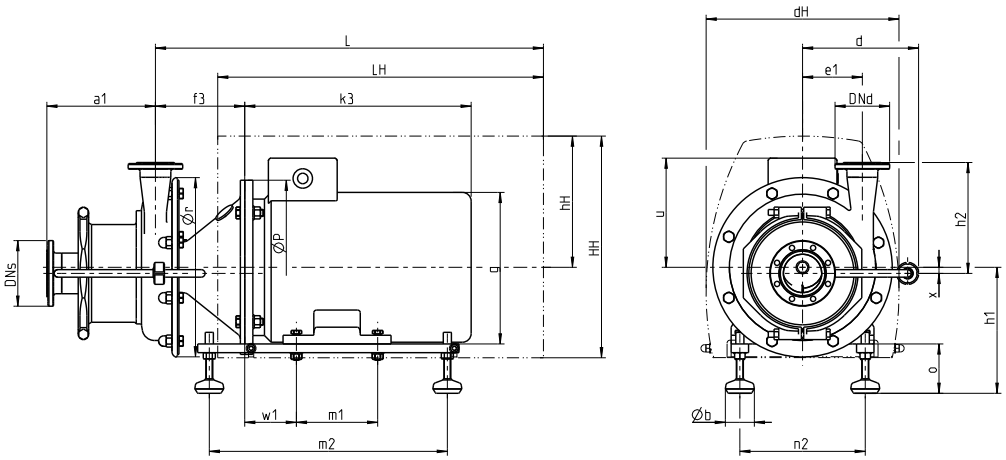


The flow charts are based on water, temperature 20 °C

Technical data of the standard version	
Materials	Pump housing deep-drawn: Stainless steel 316L (1.4404) Impeller: Precision casting 316L (1.4409)
Connections	Flange DIN 11853-2
Nominal width of connections	Suction side DN 65, pressure side DN 50
Mechanical seal	Single-acting, material C / SIC / EPDM
Static seals	EPDM (FDA, USP Class VI)
Motor	Standard motor: IEC-Motor, 3 phase 400 V, IM B35, IP 55, ISO-Class F, incl. thermistor, IE3
Documentation	Operating instructions, declaration of conformity
Flow rate	Max. 48 m³/h
Pump head	Max. 68 m
Housing pressure	Max. 16 bar
Certificates	CERTIFIED* EHEDG TYPE EL - CLASS I

Further options see page 64 (Composition of Order Code)

* registered for recertification

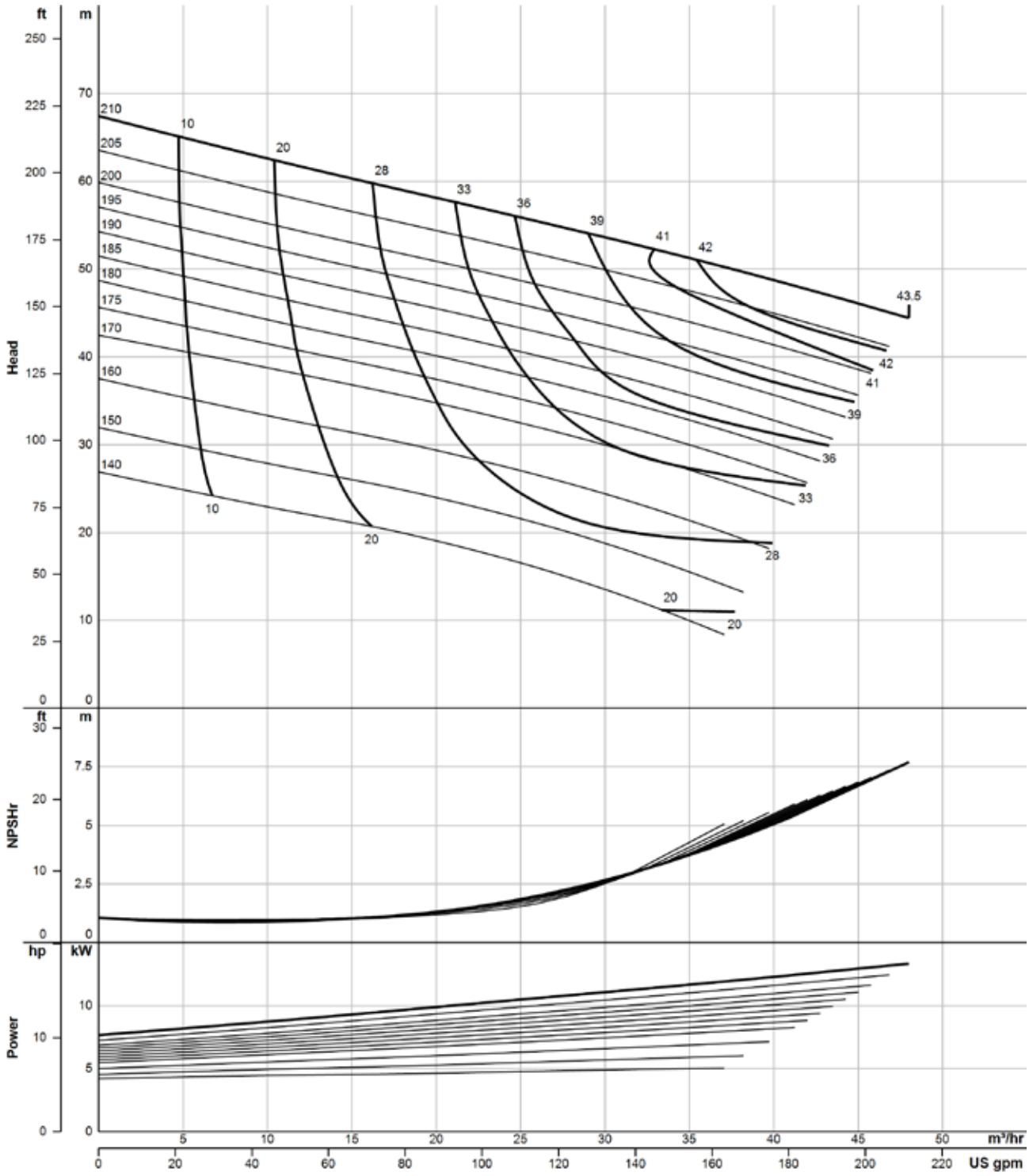


e1 = 103.1 mm
Ør = 309 mm
x = 10.4 mm
d = 200 mm

Dimensions																		
P2 [kW]	IEC-size	L [mm]	hH [mm]	LH [mm]	HH [mm]	dH [mm]	u [mm]	Øb [mm]	Øp [mm]	f3 [mm]	k3 [mm]	w1 [mm]	m1 [mm]	m2 [mm]	n2 [mm]	o [mm]	h1 [mm]	Weight [kg]
3.0	100L	559	217	471	340	278	149	50	250	133	360	63	140	335	160	85	187	68
4.0	112M	566	205	471	340	278	175	50	250	133	333	70	140	335	190	85	187	74
5.5	112M	566	205	471	340	278	175	50	250	133	333	70	140	335	190	85	187	81
7.5	112M	566	205	471	340	278	175	50	250	133	375	70	140	335	190	85	187	87
9.2	132M	667	225	561	380	332	195	50	300	153	410	89	178	410	216	85	207	115
11.0	132M	667	225	561	380	332	195	50	300	152	410	89	178	410	216	85	207	124
15.0	132M	667	225	561	380	332	195	50	300	152	435	89	178	410	216	85	207	125
18.5	160L	877	325	736	510	412	222	75	350	183	524	108	254	640	254	110	260	167
22.0	160L	877	325	736	510	412	222	75	350	183	554	108	254	640	254	110	260	204

	Connections								
DN 65/40 2½"/2" OD 60.3/48.3	11853-2 flange	VARIVENT® flange	1092-1 flange	DIN 32676 clamp	DIN 11851 thread	SMS thread	IDF thread	RJT thread	11853-1 thread
a1	187.0	186.5	203.5	189.5	201.5	185.5	183.0	187.8	197.5
h2	180.5	180.0	197.0	176.5	190.0	175.0	176.5	181.3	186.0

Motor dimensions depend on the motor manufacturer and execution. The shown motor dimensions indicate the size for the standard motor
Weight: net-weight without packaging

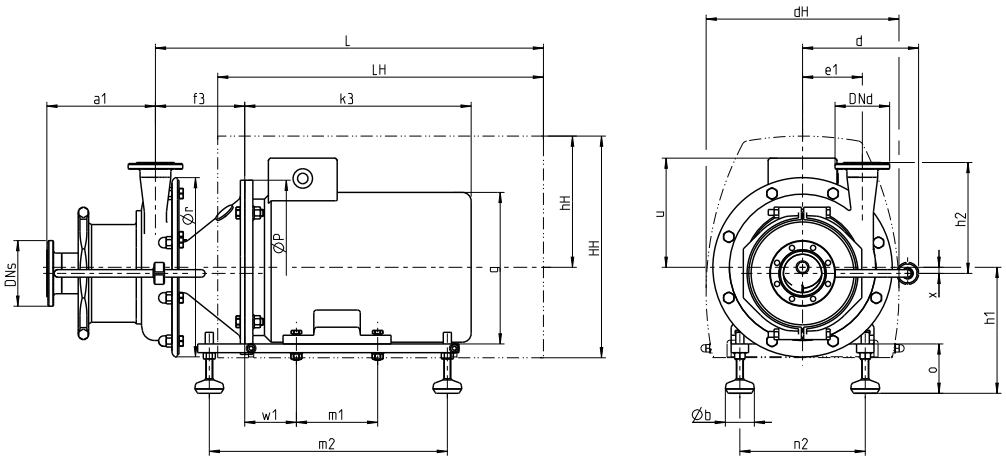


The flow charts are based on water, temperature 20 °C

Technical data of the standard version	
Materials	Pump housing deep-drawn: Stainless steel 316L (1.4404) Impeller: Precision casting 316L (1.4409)
Connections	Flange DIN 11853-2
Nominal width of connections	Suction side DN 80, pressure side DN 65–80
Mechanical seal	Single-acting, material C / SIC / EPDM
Static seals	EPDM (FDA, USP Class VI)
Motor	Standard motor: IEC-Motor, 3 phase 400 V, IM B35, IP 55, ISO-Class F, incl. thermistor, IE3
Documentation	Operating instructions, declaration of conformity
Flow rate	Max. 90 m³/h
Pump head	Max. 50 m
Housing pressure	Max. 16 bar
Certificates	CERTIFIED* EHEDG TYPE EL - CLASS I

Further options see page 64 (Composition of Order Code)

* registered for recertification

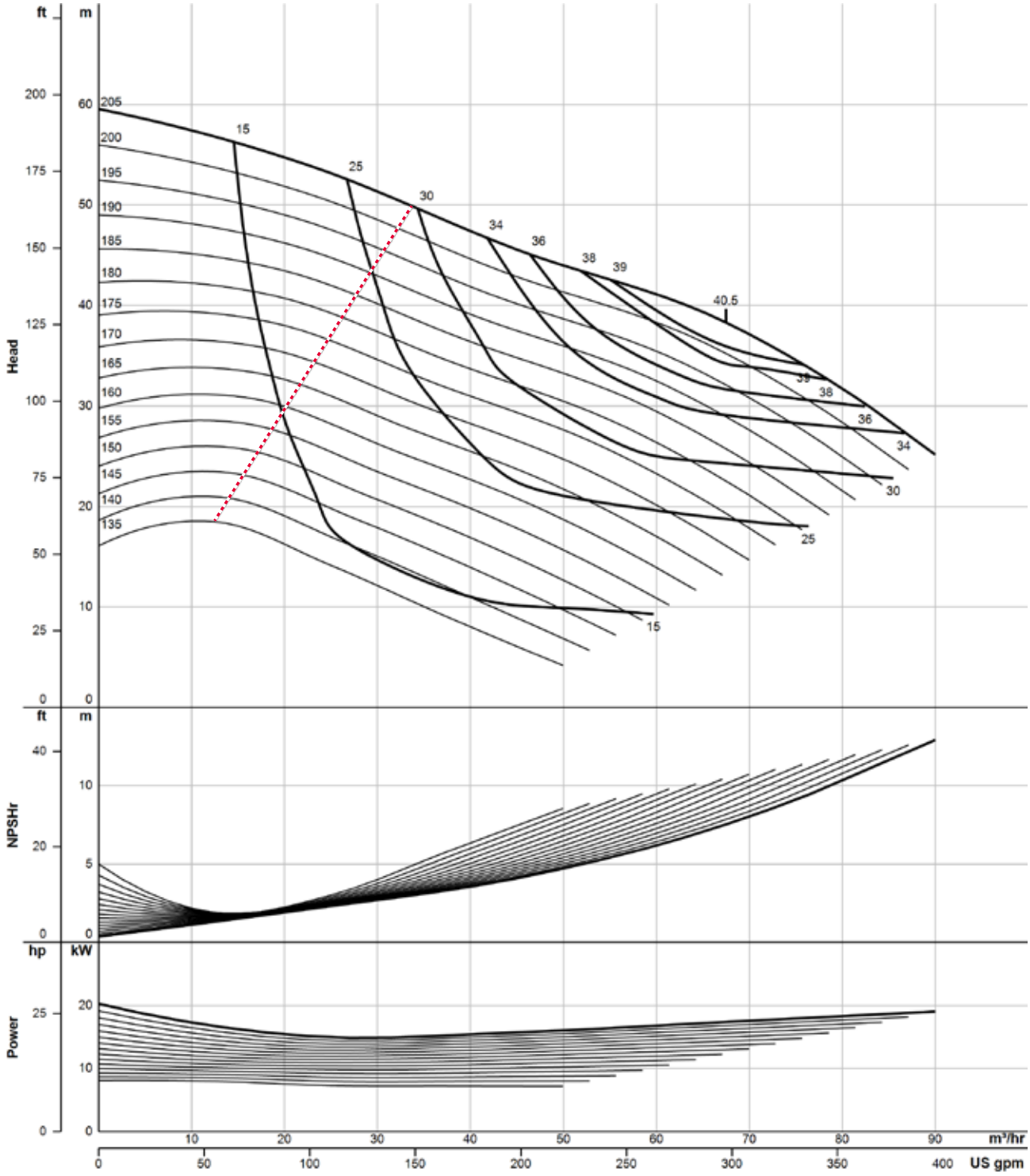


e1 = 114.1 mm
Ør = 432 mm
x = 12.5 mm
d = 222 mm

Dimensions																		
P2 [kW]	IEC-size	L [mm]	hH [mm]	LH [mm]	HH [mm]	dH [mm]	u [mm]	Øb [mm]	Øp [mm]	f3 [mm]	k3 [mm]	w1 [mm]	m1 [mm]	m2 [mm]	n2 [mm]	o [mm]	h1 [mm]	Weight [kg]
7.5	132S	667	225	561	380	332	195	50	300	150.0	365	89	140	410	216	86	208	117
9.2	132M	667	225	561	380	332	195	50	300	150.0	410	89	178	410	216	86	208	125
11.0	160M	877	325	736	510	412	222	75	350	183.5	498	108	210	640	254	110	270	138
15.0	160M	877	325	736	510	412	222	75	350	183.5	524	108	210	640	254	110	270	177
18.5	160L	877	325	736	510	412	222	75	350	183.5	524	108	210	640	254	110	270	187
22.0	160L	877	325	736	510	412	222	75	350	183.5	554	108	210	640	254	110	270	212
30.0	200L	975	352	821	580	472	292	100	400	187.5	648	133	305	810	318	115	315	255

	Connections								
DN 80/65 3"/2½" OD –	11853-2 flange	VARIVENT® flange	1092-1 flange	DIN 32676 clamp	DIN 11851 thread	SMS thread	IDF thread	RJT thread	11853-1 thread
a1	244.0	243.5	265.5	246.5	263.5	242.5	240.0	244.8	254.5
h2	298.0	297.5	314.5	300.5	312.5	296.5	294.0	298.8	308.5

Motor dimensions depend on the motor manufacturer and execution. The shown motor dimensions indicate the size for the standard motor
Weight: net-weight without packaging

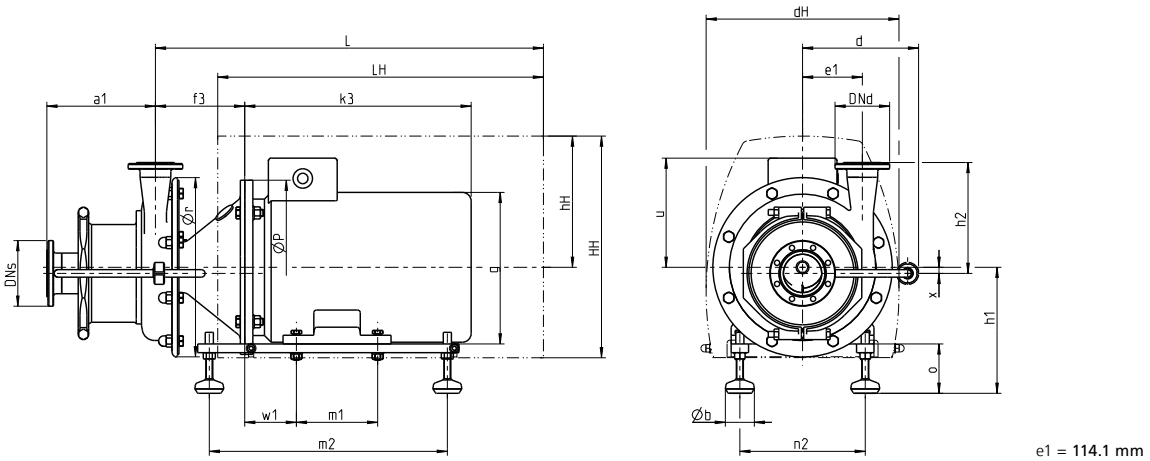


Lowest allowable duty points
The flow charts are based on water, temperature 20 °C

Technical data of the standard version	
Materials	Pump housing deep-drawn: Stainless steel 316L (1.4404) Impeller: Precision casting 316L (1.4409)
Connections	Flange DIN 11853-2
Nominal width of connections	Suction side DN 80, pressure side DN 65–80
Mechanical seal	Single-acting, material C / SIC / EPDM
Static seals	EPDM (FDA, USP Class VI)
Motor	Standard motor: IEC-Motor, 3 phase 400 V, IM B35, IP 55, ISO-Class F, incl. thermistor, IE3
Documentation	Operating instructions, declaration of conformity
Flow rate	Max. 115 m³/h
Pump head	Max. 95 m
Housing pressure	Max. 16 bar
Certificates	CERTIFIED* EHEDG TYPE EL - CLASS I

Further options see page 64 (Composition of Order Code)

* registered for recertification

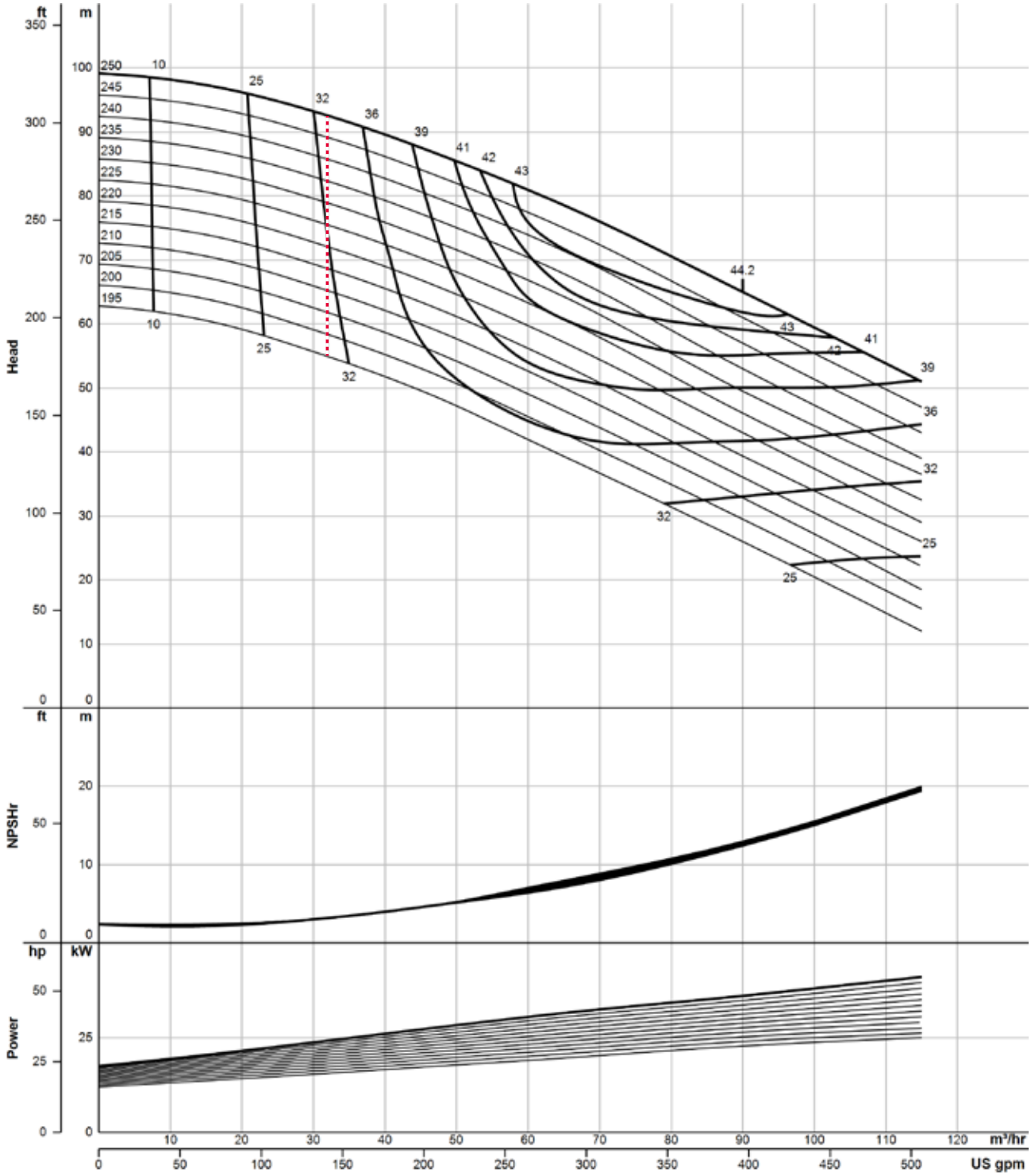


e1 = 114.1 mm
Ør = 432 mm
x = 12.5 mm
d = 222 mm

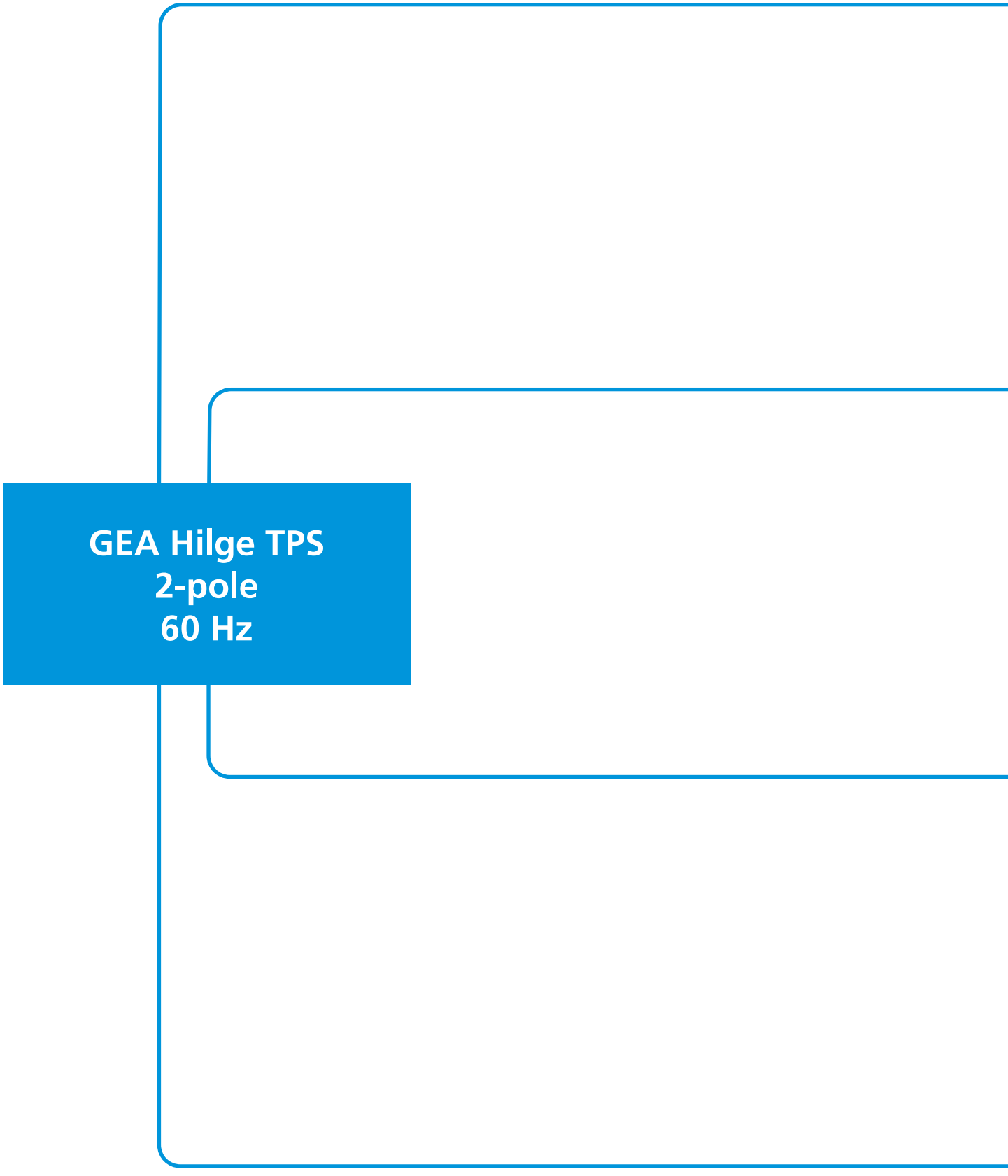
Dimensions																		
P2 [kW]	IEC-size	L [mm]	hH [mm]	LH [mm]	HH [mm]	dH [mm]	u [mm]	Øb [mm]	Øp [mm]	f3 [mm]	k3 [mm]	w1 [mm]	m1 [mm]	m2 [mm]	n2 [mm]	o [mm]	h1 [mm]	Weight [kg]
15.0	160M	877	325	736	510	412	222	75	350	191	524	108	210	640	254	110	270	155
18.5	160L	877	325	736	510	412	222	75	350	191	524	108	210	640	254	110	270	176
22.0	160L	877	325	736	510	412	222	75	350	191	554	108	210	640	254	110	270	212
30.0	200L	975	352	821	580	472	292	100	400	195	648	133	305	810	318	115	315	267
37.0	200L	975	352	821	580	472	292	100	400	195	648	133	305	810	318	115	315	292
45.0	45.0	975	352	821	580	472	292	100	400	195	678	133	305	810	318	115	315	374

	Connections								
DN 80/65 3"/2½" OD –	11853-2 flange	VARIVENT® flange	1092-1 flange	DIN 32676 clamp	DIN 11851 thread	SMS thread	IDF thread	RJT thread	11853-1 thread
a1	243.0	242.5	264.5	245.5	262.5	241.5	239.0	243.8	259.5
h2	288.0	287.5	304.5	290.5	302.5	286.5	284.0	288.8	298.5

Motor dimensions depend on the motor manufacturer and execution. The shown motor dimensions indicate the size for the standard motor
Weight: net-weight without packaging



Lowest allowable duty points
The flow charts are based on water, temperature 20 °C


GEA Hilge TPS
2-pole
60 Hz

GEA Hilge TPS 2030

GEA Hilge TPS 3050

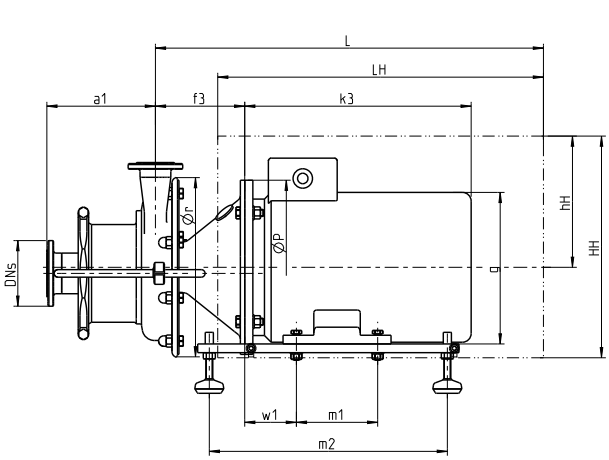
GEA Hilge TPS 8050

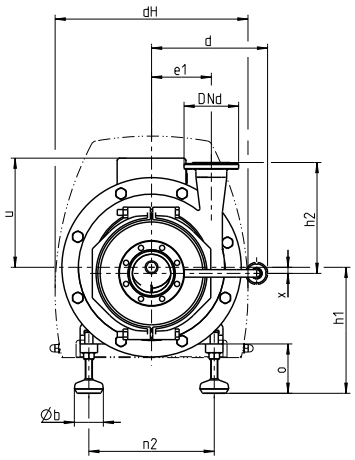
GEA Hilge TPS 8080

Technical data of the standard version	
Materials	Pump housing deep-drawn: Stainless steel 316L (1.4404) Impeller: Precision casting 316L (1.4409)
Connections	Flange DIN 11853-2
Nominal width of connections	Suction side DN 65, pressure side DN 40–50
Mechanical seal	Single-acting, material C / SIC / EPDM
Static seals	EPDM (FDA, USP Class VI)
Motor	Standard motor: IEC-Motor, 3 phase 400 V, IM B35, IP 55, ISO-Class F, incl. thermistor, IE2
Documentation	Operating instructions, declaration of conformity
Flow rate	Max. 35 m³/h
Pump head	Max. 55 m
Housing pressure	Max. 16 bar
Certificates	CERTIFIED* EHEDG TYPE EL - CLASS I

Further options see page Seite 64 (Composition of Order Code)

* registered for recertification



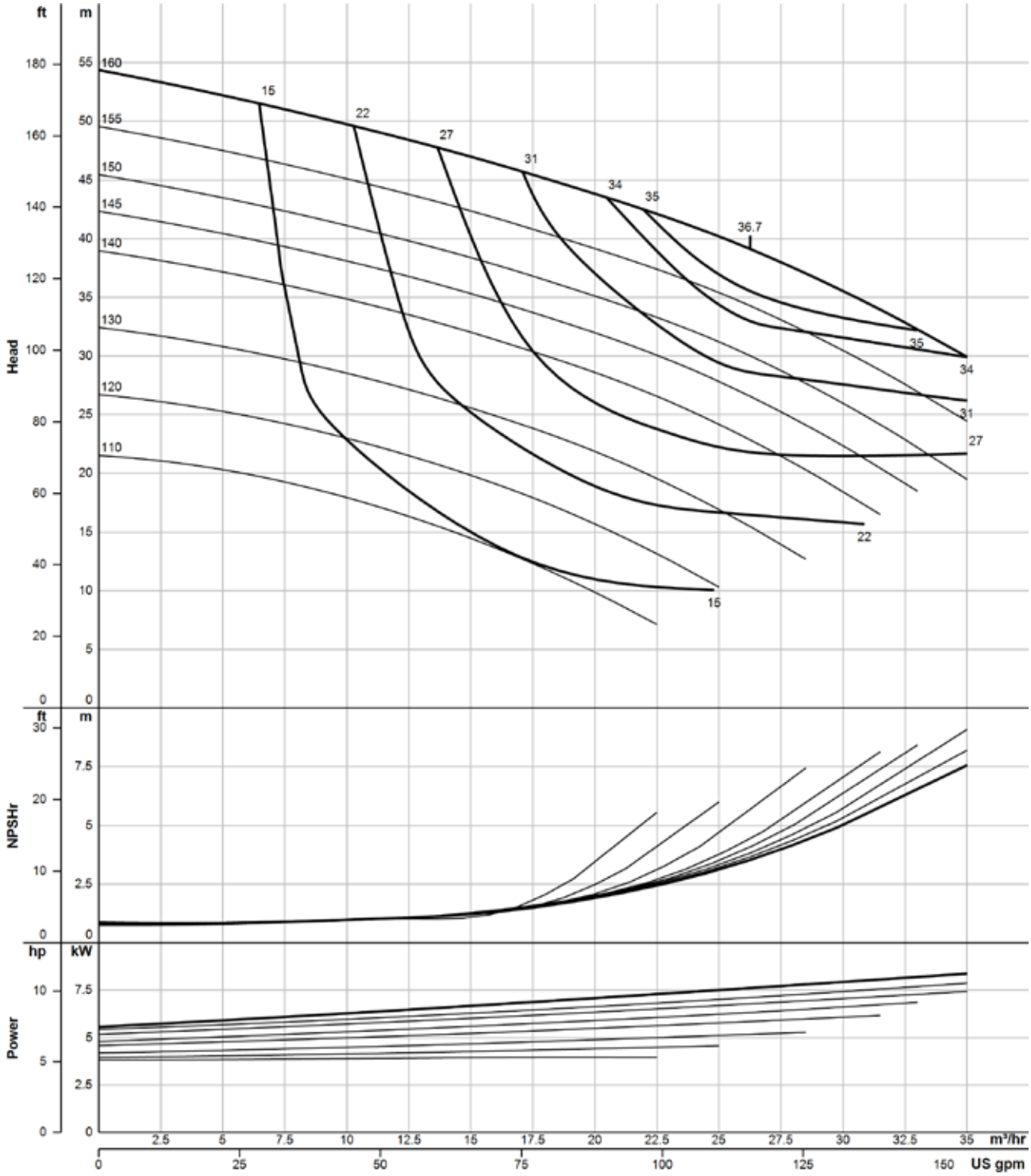


e1 = 85.1 mm
Ør = 259 mm
x = 9.9 mm
d = 176 mm

Dimensions																		
P2 [kW]	IEC-size	L [mm]	hH [mm]	LH [mm]	HH [mm]	dH [mm]	u [mm]	Øb [mm]	Øp [mm]	f3 [mm]	k3 [mm]	w1 [mm]	m1 [mm]	m2 [mm]	n2 [mm]	o [mm]	h1 [mm]	Weight [kg]
2.2	90L	519	179	431	290	228	147	50	200	122	310	56	125	285	140	82	162	46
3.0	100L	559	217	471	340	278	149	50	250	132	360	63	140	335	160	85	175	62
4.0	112M	566	205	471	340	278	175	50	250	132	333	70	140	335	190	85	187	66
5.5	112M	566	205	471	340	278	175	50	250	132	333	70	140	335	190	85	187	72
7.5	112M	566	205	471	340	278	175	50	250	132	375	70	140	335	190	85	187	78
9.2	132M	667	225	561	380	332	195	50	300	152	410	89	178	410	216	85	207	108
11.0	132M	667	225	561	380	332	195	50	300	152	410	89	178	410	216	85	207	108
15.0	132M	667	225	561	380	332	195	50	300	152	410	89	178	410	216	85	207	109

Connections									
DN 65/40 2½"/1½" OD 60.3/48.3	11853-2 flange	VARIVENT® flange	1092-1 flange	DIN 32676 clamp	DIN 11851 thread	SMS thread	IDF thread	RJT thread	11853-1 thread
a1	166.0	165.5	182.5	168.5	180.5	164.5	162.0	166.8	176.5
h2	160.5	160.0	177.0	156.5	170.0	155.0	156.5	161.3	166.0

Motor dimensions depend on the motor manufacturer and execution. The shown motor dimensions indicate the size for the standard motor
Weight: net-weight without packaging

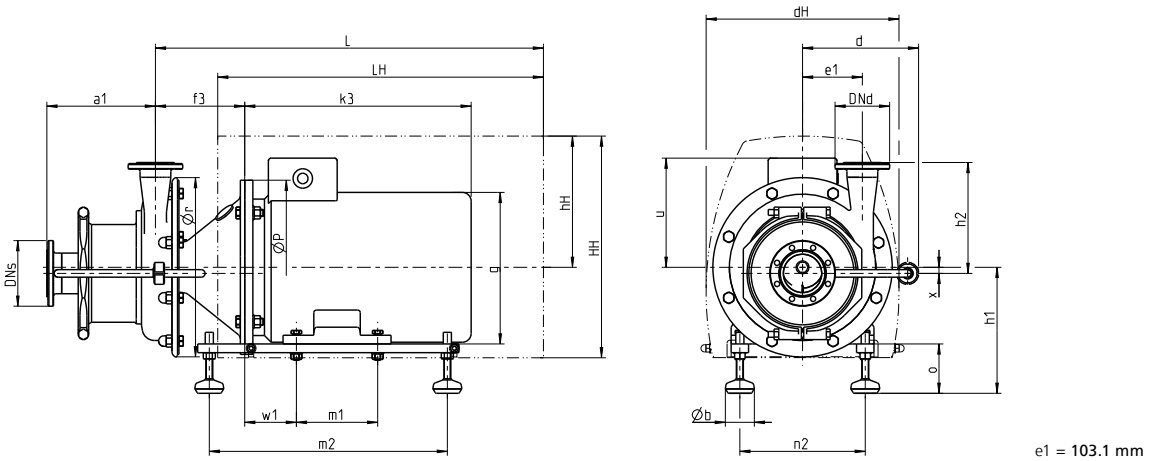


The flow charts are based on water, temperature 20 °C

Technical data of the standard version	
Materials	Pump housing deep-drawn: Stainless steel 316L (1.4404) Impeller: Precision casting 316L (1.4409)
Connections	Flange DIN 11853-2
Nominal width of connections	Suction side DN 65, pressure side DN 50
Mechanical seal	Single-acting, material C / SIC / EPDM
Static seals	EPDM (FDA, USP Class VI)
Motor	Standard motor: IEC-Motor, 3 phase 400 V, IM B35, IP 55, ISO-Class F, incl. thermistor, IE2
Documentation	Operating instructions, declaration of conformity
Flow rate	Max. 57 m³/h
Pump head	Max. 100 m
Housing pressure	Max. 16 bar
Certificates	CERTIFIED* EHEDG TYPE EL - CLASS I

Further options see page Seite 64 (Composition of Order Code)

* registered for recertification

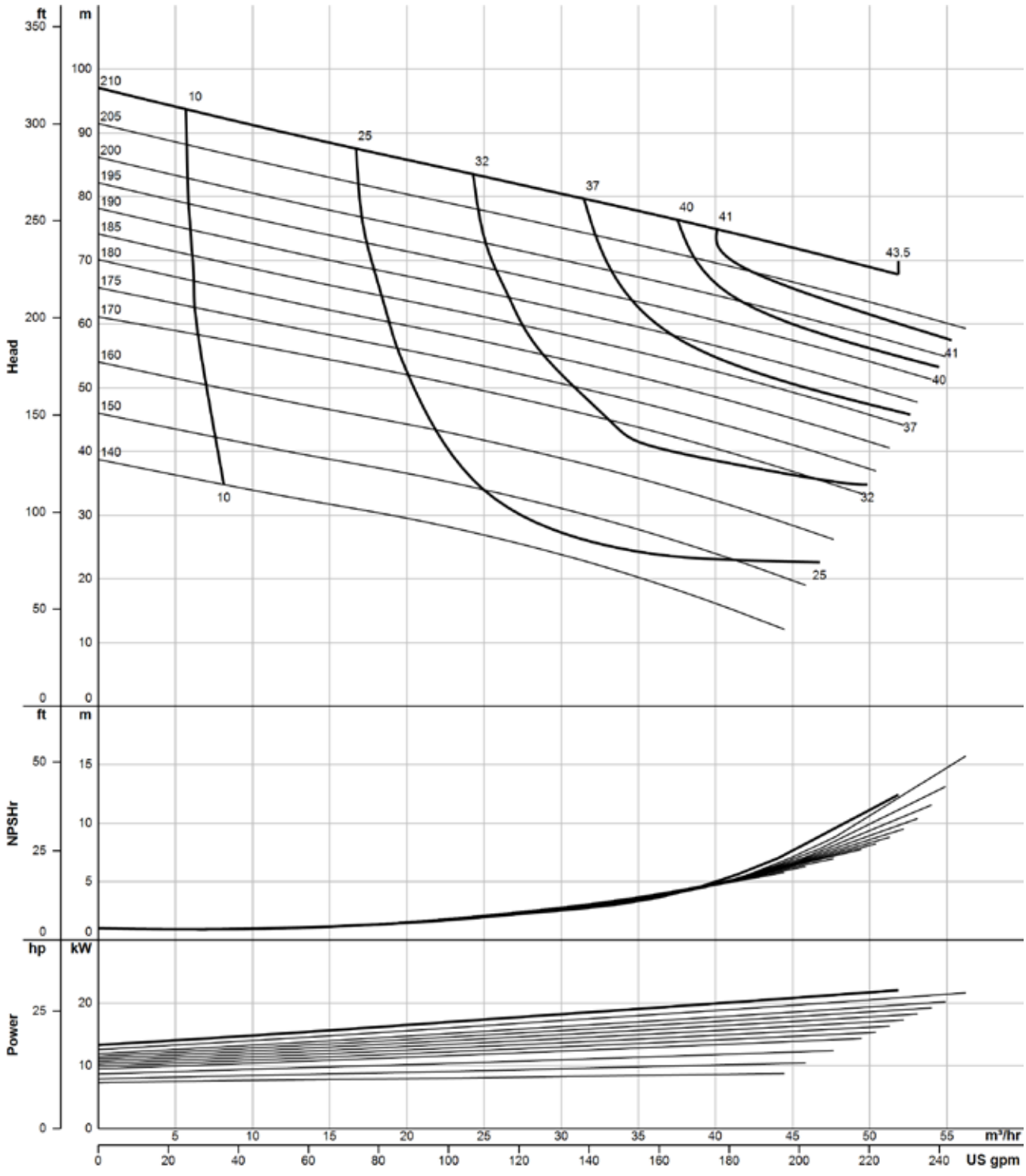


e1 = 103.1 mm
Ør = 309 mm
x = 10.4 mm
d = 200 mm

Dimensions																		
P2 [kW]	IEC-size	L [mm]	hH [mm]	LH [mm]	HH [mm]	dH [mm]	u [mm]	Øb [mm]	Øp [mm]	f3 [mm]	k3 [mm]	w1 [mm]	m1 [mm]	m2 [mm]	n2 [mm]	o [mm]	h1 [mm]	Weight [kg]
3.0	100L	559	217	471	340	278	149	50	250	133	360	63	140	335	160	85	187	68
4.0	112M	566	205	471	340	278	175	50	250	133	333	70	140	335	190	85	187	74
5.5	112M	566	205	471	340	278	175	50	250	133	333	70	140	335	190	85	187	81
7.5	112M	566	205	471	340	278	175	50	250	133	375	70	140	335	190	85	187	87
9.2	132M	667	225	561	380	332	195	50	300	153	410	89	178	410	216	85	207	115
11.0	132M	667	225	561	380	332	195	50	300	152	410	89	178	410	216	85	207	124
15.0	132M	667	225	561	380	332	195	50	300	152	435	89	178	410	216	85	207	125
18.5	160L	877	325	736	510	412	222	75	350	183	524	108	254	640	254	110	260	167
22.0	160L	877	325	736	510	412	222	75	350	183	554	108	254	640	254	110	260	204

	Connections								
DN 65/40 2½"/2" OD 60.3/48.3	11853-2 flange	VARIVENT® flange	1092-1 flange	DIN 32676 clamp	DIN 11851 thread	SMS thread	IDF thread	RJT thread	11853-1 thread
a1	187.0	186.5	203.5	189.5	201.5	185.5	183.0	187.8	197.5
h2	180.5	180.0	197.0	176.5	190.0	175.0	176.5	181.3	186.0

Motor dimensions depend on the motor manufacturer and execution. The shown motor dimensions indicate the size for the standard motor
Weight: net-weight without packaging

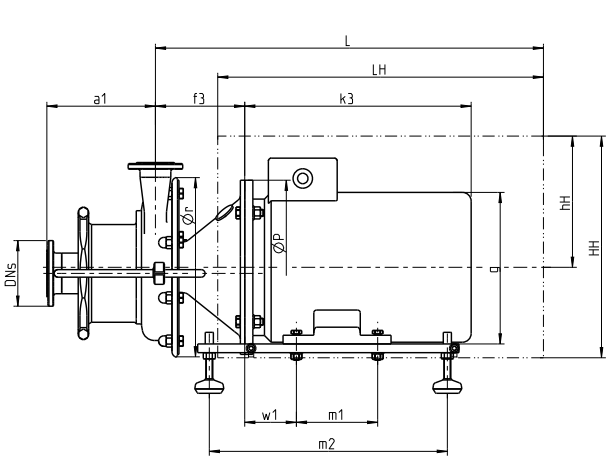


The flow charts are based on water, temperature 20 °C

Technical data of the standard version	
Materials	Pump housing deep-drawn: Stainless steel 316L (1.4404) Impeller: Precision casting 316L (1.4409)
Connections	Flange DIN 11853-2
Nominal width of connections	Suction side DN 80, pressure side DN 65–80
Mechanical seal	Single-acting, material C / SIC / EPDM
Static seals	EPDM (FDA, USP Class VI)
Motor	Standard motor: IEC-Motor, 3 phase 400 V, IM B35, IP 55, ISO-Class F, incl. thermistor, IE2
Documentation	Operating instructions, declaration of conformity
Flow rate	Max. 98 m³/h
Pump head	Max. 75 m
Housing pressure	Max. 16 bar
Certificates	CERTIFIED* EHEDG TYPE EL - CLASS I

Further options see page Seite 64 (Composition of Order Code)

* registered for recertification

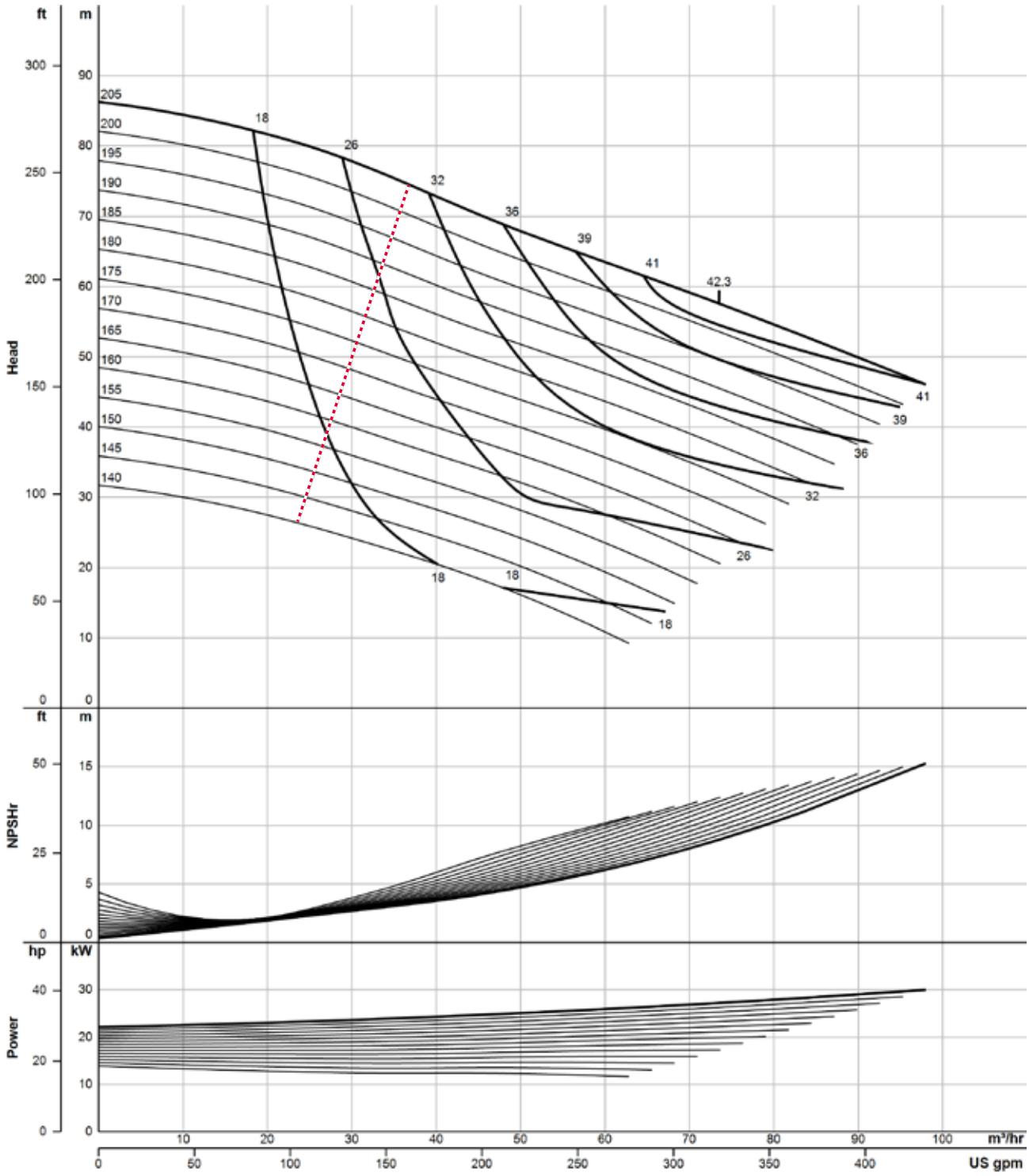


e1 = 114.1 mm
Ør = 432 mm
x = 12.5 mm
d = 222 mm

Dimensions																		
P2 [kW]	IEC-size	L [mm]	hH [mm]	LH [mm]	HH [mm]	dH [mm]	u [mm]	Øb [mm]	Øp [mm]	f3 [mm]	k3 [mm]	w1 [mm]	m1 [mm]	m2 [mm]	n2 [mm]	o [mm]	h1 [mm]	Weight [kg]
7.5	132S	667	225	561	380	332	195	50	300	150.0	365	89	140	410	216	86	208	117
9.2	132M	667	225	561	380	332	195	50	300	150.0	410	89	178	410	216	86	208	125
11.0	160M	877	325	736	510	412	222	75	350	183.5	498	108	210	640	254	110	270	138
15.0	160M	877	325	736	510	412	222	75	350	183.5	524	108	210	640	254	110	270	177
18.5	160L	877	325	736	510	412	222	75	350	183.5	524	108	210	640	254	110	270	187
22.0	160L	877	325	736	510	412	222	75	350	183.5	554	108	210	640	254	110	270	212
30.0	200L	975	352	821	580	472	292	100	400	187.5	648	133	305	810	318	115	315	255

	Connections								
DN 80/65 3"/2½" OD –	11853-2 flange	VARIVENT® flange	1092-1 flange	DIN 32676 clamp	DIN 11851 thread	SMS thread	IDF thread	RJT thread	11853-1 thread
a1	244.0	243.5	265.5	246.5	263.5	242.5	240.0	244.8	254.5
h2	298.0	297.5	314.5	300.5	312.5	296.5	294.0	298.8	308.5

Motor dimensions depend on the motor manufacturer and execution. The shown motor dimensions indicate the size for the standard motor
Weight: net-weight without packaging

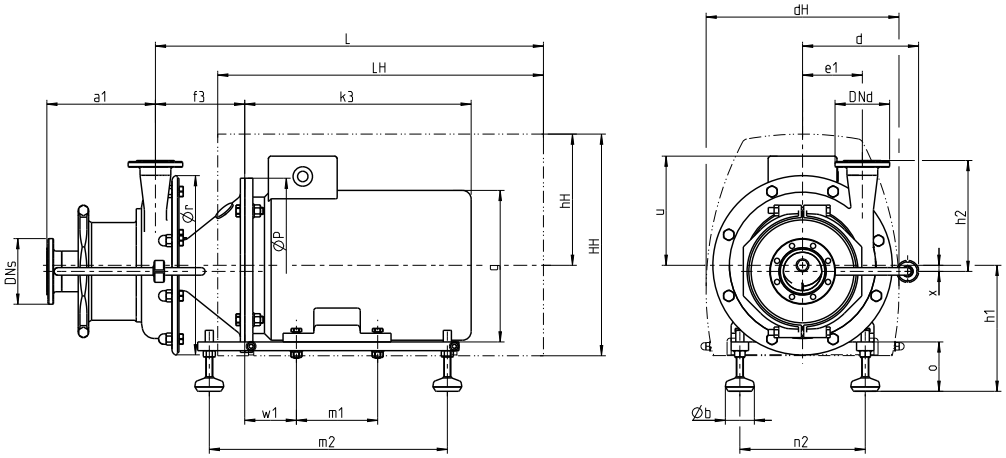


Lowest allowable duty points
The flow charts are based on water, temperature 20 °C

Technical data of the standard version	
Materials	Pump housing deep-drawn: Stainless steel 316L (1.4404) Impeller: Precision casting 316L (1.4409)
Connections	Flange DIN 11853-2
Nominal width of connections	Suction side DN 80, pressure side DN 65–80
Mechanical seal	Single-acting, material C / SIC / EPDM
Static seals	EPDM (FDA, USP Class VI)
Motor	Standard motor: IEC-Motor, 3 phase 400 V, IM B35, IP 55, ISO-Class F, incl. thermistor, IE2
Documentation	Operating instructions, declaration of conformity
Flow rate	Max. 115 m³/h
Pump head	Max. 138 m
Housing pressure	Max. 16 bar
Certificates	CERTIFIED* EHEDG TYPE EL - CLASS I

Further options see page Seite 64 (Composition of Order Code)

* registered for recertification

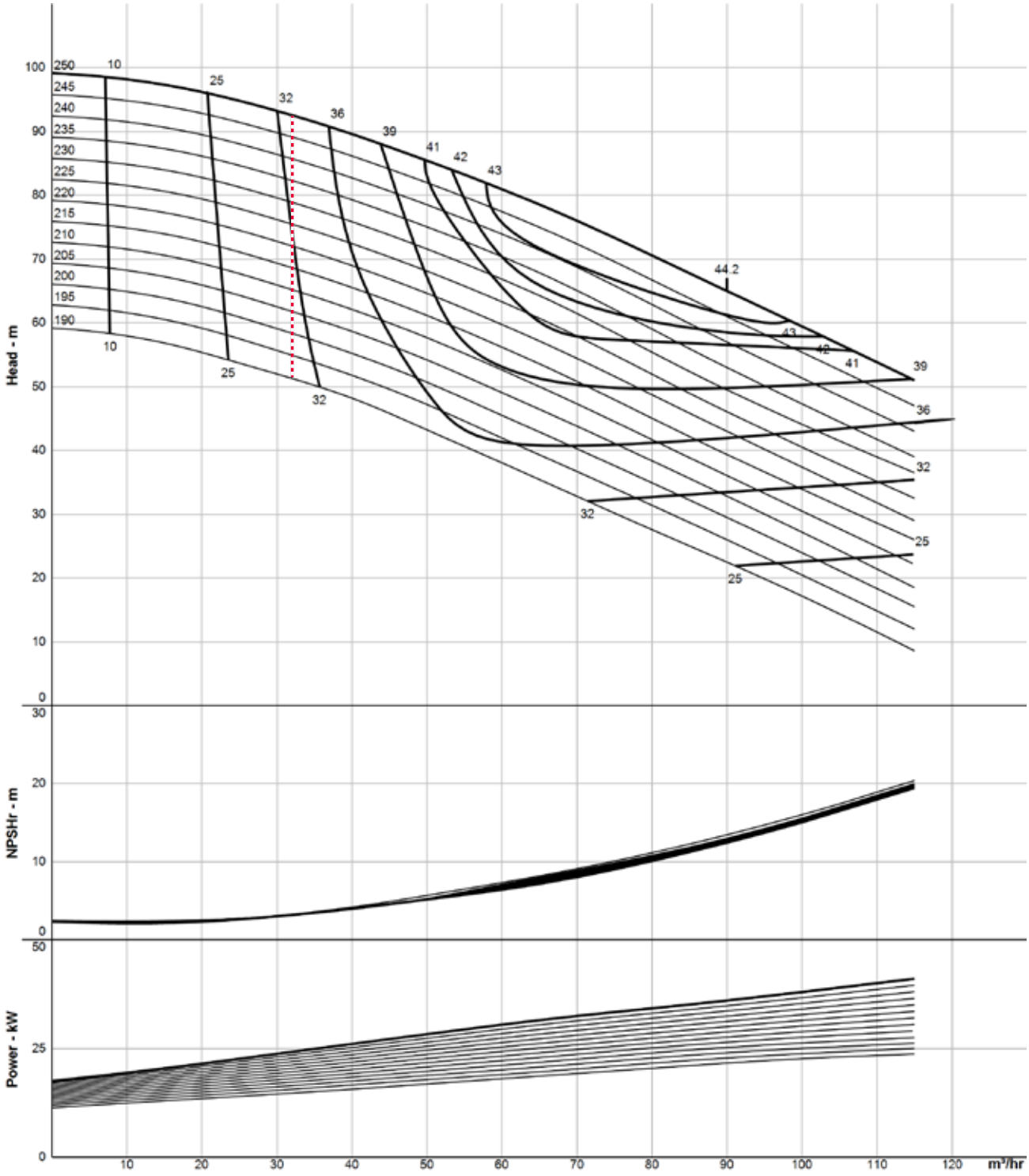


e1 = 114.1 mm
Ør = 432 mm
x = 12.5 mm
d = 222 mm

Dimensions																		
P2 [kW]	IEC-size	L [mm]	hH [mm]	LH [mm]	HH [mm]	dH [mm]	u [mm]	Øb [mm]	Øp [mm]	f3 [mm]	k3 [mm]	w1 [mm]	m1 [mm]	m2 [mm]	n2 [mm]	o [mm]	h1 [mm]	Weight [kg]
15.0	160M	877	325	736	510	412	222	75	350	191	524	108	210	640	254	110	270	155
18.5	160L	877	325	736	510	412	222	75	350	191	524	108	210	640	254	110	270	176
22.0	160L	877	325	736	510	412	222	75	350	191	554	108	210	640	254	110	270	212
30.0	200L	975	352	821	580	472	292	100	400	195	648	133	305	810	318	115	315	267
37.0	200L	975	352	821	580	472	292	100	400	195	648	133	305	810	318	115	315	292
45.0	200L	975	352	821	580	472	292	100	400	195	678	133	305	810	318	115	315	374

	Connections								
DN 80/65 3"/2½" OD –	11853-2 flange	VARIVENT® flange	1092-1 flange	DIN 32676 clamp	DIN 11851 thread	SMS thread	IDF thread	RJT thread	11853-1 thread
a1	243.0	242.5	264.5	245.5	262.5	241.5	239.0	243.8	259.5
h2	288.0	287.5	304.5	290.5	302.5	286.5	284.0	288.8	298.5

Motor dimensions depend on the motor manufacturer and execution. The shown motor dimensions indicate the size for the standard motor
Weight: net-weight without packaging



Lowest allowable duty points
The flow charts are based on water, temperature 20 °C

Pump code

With 3-A Sanitary Standard

Position	Composition of order code					
1	**Pump type**					
	TPS 2030 	TPS 3050 	TPS 8050 	TPS 8080 		
2	**No. of stages**					
	1	1-stage				
3	**Version**					
	A/B/C	Non 3-A			D	3-A
4	**Design**					
	K  Plug-in shaft					
5	**Mounting**					
	H  On 3-A Stainless Steel Adjustable Feet	M  On Motor Foot	B  On Adjustable Feet	2  On 2-Wheel Trolley		
6	**Stainless steel shroud**					
	S	With stainless steel shroud			W	Without stainless steel shroud
7	**Impeller**					
	C  Semi-open					
8	**Impeller diameter (mm)**					
9	**Connection type**					
		COA	DIN 32676 Tri-clamp			
		TN	VARIVENT® flange		TK	VARIVENT® flange complete
		AAB	ANSI-B 16.5 flange		ASK	DIN 11864-2 flange complete
		ASN	DIN 11864-2 / DIN 11853-2 flange		FD	DIN EN 1092-1 flange
		NFK	DIN 11864-2 flange			
		SMG	SMS thread		GK	DIN 11851 thread complete
		GO	DIN 11851 thread		RJK	RJT thread complete
		GSK	DIN 11864-1 thread		AVK	DIN 11864-1 thread complete
		RJT	RJT thread			
		IG	IDF thread			
		SMK	SMS thread complete			
10	**Connection norm**					
	D	DIN		O	OD	I ISO
11	**Diameter suction side**					
	DIN			**OD**		**ISO**
	1	65–80		2	2½" (2.5)–3" (3)	3 48.3 (48)–114.3 (144)

12	**Diameter pressure side**					
	DIN		**OD**		**ISO**	
	1	40–80	2	1½" (1.5)–3" (3)	3	48.3 (48)–114.3 (144)
13	**Surface roughness**					
	1	$R_a \leq 3.2$ µm	3	$R_a \leq 0.8$ µm		
14	**Material product-wetted parts**					
	2	1.4404 (316L)				
15	**Ferrite content**					
	W	Without restriction				
16	**Execution of mechanical seal**					
	E  Single		Q  Quench		P Face to face (Double)	
17	**Mechanical seal, execution of spring**					
	E  Encapsulated spring					
18	**Mechanical seal material (static)**					
	a	Carbon				
	i	SiC shrunk				
19	**Mechanical seal material (rotating)**					
	a	Carbon				
	e	Stainless steel				
	i	SiC shrunk				
20	**Elastomer**					
	V	Viton / FKM				
	E	EPDM				
	B	Buna				
21	**Options**					
	C	Drainage connection (Tri-clamp)	V	Drainage Vesta	W	Without drain
	D	Drainage VTP	S	Special		
22	**Further options**					
	Drain					
	0.75	¾"				
	W	Without drain				

* The pump needs to be mounted according to 3-A Sanitary Standard.

Example of pump order code:

Position	1		2		3		4	5	6		7	8		9	
Code	TPS 3050	/	1	/	A	/	K	H	W	/	C	180	/	GO	/

10	11		12		13	14	15		16	17	18	19	20		21		22
D	65	×	50	/	1	2	W	/	E	E	a	e	E	/	W	/	W

Motor code

Position	Composition of order code							
1	**Motor standard**							
	IEC		NEMA		IEC NEMA			
2	**No. of poles**							
	2	2-pole						
3	**Frequency**							
	50	50 Hz						
	60	60 Hz						
4	**Motor power**							
	2.2 kW to 45 kW							
5	**Voltage**							
	400/690	400VD/690VY						
	230/400	230VD/400VY						
	220/380	220VD/380VY						
	208–230/460	208–230/460						
6	**Motor design**							
	B5	B5	B34	B34	B35	B35		
	B3	B3	CM	C-Face with foot	CO	C-Face without foot		
7	**Size**							
	80M to 200L							
8	**Efficiency class**							
	1	IE 1						
	2	IE 2						
	3	IE 3						
	4	IE 4						
	5	IE 5						
	P	NEMA premium efficiency						
	S	NEMA super premium efficiency						
9	**Protection class**							
	55	IP55	56	IP 56	65	IP65	66	IP66
10	**Motor supplier (alternative motor suppliers on request)**							
	S	Standard						
11	**Options**							
	G	General purpose						
	W	Washdown						
	A	Stainless steel washdown						
	S	Special						
	X	No specification						
12	**Terminal box**							
	L	Left	R	Right	O	Top	U	Bottom
13	**External fan**							
	M	With external fan			W	Without external fan		
14	**Thermistor**							
	M	With thermistor			W	Without thermistor		
15	**Frequency converter**							
	F	With integrated frequency converter			W	Without integrated frequency converter		
16	**ATEX**							
	M	With ATEX			W	Without ATEX		

Example of motor dimension order code:

Position	1		2		3		4	5		6	7		8	
Code	IEC	/	2	/	50	/	5.5 kW	400/690	/	B35	112M	/	3	/

9		10		11		12		13		14		15		16
55	/	S	/	X	/	O	/	W	/	W	/	W	/	W

INQUIRY SHEET · CENTRIFUGAL PUMPS 1/2

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GEA Hygienic Pumps

Contact Data

Company:

Contact Person: E-mail:

Phone: Country:

Preferred Range

☐ VARIPUMP ☐ SMARTPUMP ☐ No requirement

Liquid Data

*Liquid: Solids: ☐ No ☐ Yes:

*Liquid temperature [°C/°F]: Kind of solids:

*Density [kg/dm³]: Size of solids [mm]:

*Viscosity [mPas]: Abrasive: ☐ No ☐ Yes

Concentration [%]:

Operating Conditions

*Duty point 1 *Flow [m³/h/gpm]: *Head [m lc]:

Duty point 2 Flow [m³/h/gpm]: Head [m lc]:

☐ End-suction pump: ☐ Self-priming pump:

Inlet pressure (NPSHa) [m]: Suction head [m]:

Vacuum at inlet: ☐ No ☐ Yes: Gas content: ☐ No ☐ < 5 % ☐ > 5 %

Vacuum, abs. [mbar]:

System pressure [bar]:

Cleaning / Sterilization

CIP: ☐ No ☐ Yes: SIP: ☐ No ☐ Yes:

CIP Temperature [°C/°F]: SIP Temperature [°C/°F]:

CIP Flow [m³/h/gpm]: SIP Duration [min]:

CIP Head [m Fls]:

Pump execution

***Connection Type**

☐ Tri Clamp (DIN 32676) ☐ ANSI Flange ☐ DIN 11851

☐ DIN 11853-2/11864-2 ☐ Other:

Connection Size DN_I/DN_O:

Other:

Drainable: ☐ No ☐ Yes

Execution and Design

☐ Pump in Bloc version with motor

☐ Pump in long coupled version with base plate and standard motor

☐ With stainless steel motor shroud

☐ 3-A stainless steel adjustable feet

☐ Combi foot

☐ On Trolley

☐ Cast iron foot

☐ Stainless steel foot

☐ Motor foot

☐ Horizontal

☐ Vertical

☐ Vertical with stainless steel stand

INQUIRY SHEET · CENTRIFUGAL PUMPS 2/2

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GEA Hygienic Pumps

Surface Roughness

- ☐ Not specified
- ☐ $R_a \leq 3.2$ µm
- ☐ $R_a \leq 0.8$ µm
- ☐ $R_a \leq 0.4$ µm

Ferrite Content

- ☐ Not specified
- ☐ Fe < 1%

Shaft Seal

- ☐ Single mechanical seal
- ☐ Flushed mechanical seal

Material Shaft Seal

- ☐ Carbon/Stainless Steel
- ☐ SiC/SiC
- ☐ Carbon/SiC
- ☐ other: _____

Elastomer

- ☐ EPDM
- ☐ FKM (Viton)
- ☐ other: _____

Motor Data

Power supply:

- ☐ 3~ 400V/50 Hz
- ☐ 3~ 200V/50 Hz
- ☐ other: _____
- ☐ 3~ 460V/60 Hz
- ☐ 3~ 200V/60 Hz
- ☐ 3~ 380V/60 Hz

Motor speed [1/min]: _____

PTC-Thermistors: ☐ No ☐ Yes

2 wire-Thermistors: ☐ No ☐ Yes

Variable speed drive ☐ No ☐ Yes:

- ☐ External frequency converter (not on motor)
- ☐ Integrated frequency converter (on motor)

Explosion protection ☐ No ☐ Yes

ATEX ☐ No ☐ Yes:

Ex-Zone: _____

Temperature class: _____

Ambient temperature [°C/°F]: _____

EXP Motor ☐ No ☐ Yes:

Temperature class: _____

Ambient Temperature [°C/°F]: _____

Class: _____

Division: _____

Group: _____

Certificates/Documentation

- ☐ 3-A Sanitary Standard certification
- ☐ Inspection certificate 3.1 acc. to DIN EN 10204
- ☐ Test report 2.2 acc. to DIN EN 10204
- ☐ EHEDG certification
- ☐ Further certificates and documentation: _____
- ☐ FDA declaration of conformity
- ☐ Surface roughness test report
- ☐ Delta ferrite test report

Further Information

** Fields marked with an asterisk are mandatory for a pump selection*

V1.0-2018

2.1		Works certificate according to DIN EN 10204: Declaration of the compliance with the order. This certificate is issued by the manufacturer.
2.2		Test report according to DIN EN 10204: Declaration of the compliance with the order under specification of the results of non-specific tests. This certificate is issued by the manufacturer.
3.1		Inspection certificate 3.1 according to DIN EN 10204: Declaration of the compliance with the order under specification of the results of specific tests. This certificate is issued by an authority which is independent of manufacturing and is validated by the manufacturers authorized inspection representative.
3-A		3-A Sanitary Standards, Inc. (3-A SSI) is an independent, non-profit corporation dedicated to advancing hygienic equipment design for the food, beverage, and pharmaceutical industries.
AS-i		Actuator Sensor interface. BUS system for the lowest field level.
ASME-BPE		Standard of the ASME's – bioprocessing equipment association
ATEX		Atmosphères Explosibles. ATEX comprises the directives of the European Union in the area of explosion protection. For one thing, this is the ATEX equipment directive 94/9/EC, for another, the ATEX workplace directive 1999/92/EC.
cCSAus		Test of a product by CSA according to applicable safety standards in Canada and the USA.
CE		Conformité Européenne. By affixing the CE mark, the manufacturer confirms that the product complies with the European directives applicable to the specific product.
CSA		Canadian Standards Association. A non-governmental Canadian organization which issues standards as well as checking and certifying the safety of products. It is now globally active.
cULus		Test of a product by UL according to applicable safety standards in Canada and the USA.
DIN EN ISO 9001:2015		This norm is the basis for a multitude of varied organizations in different industries worldwide for quality assurance and quality management. It is the most widespread standards of ISO (International Organisation for Standardization).
EAC		Euroasion conformity. The symbol is used similar to the European CE mark. The manufacturer or supplier confirms that the machine has passed all necessary compliance procedures in one of the Member States of the customs union.
EG 1935/2004		Materials in contact with the product used in pumps from GEA Hilge are in accordance with EC regulation 1935/2004. This defines a general framework for materials and objects intended to come into contact with foodstuffs.
EHEDG		European Hygienic Engineering & Design Group. European supervisory authority for foodstuffs and pharmaceuticals. This authority issues approvals and certificates for products and materials that are used in the foodstuffs and pharmaceuticals industries.
FDA		Food and Drug Administration. US supervisory authority for foodstuffs and pharmaceuticals. This authority issues approvals and certificates for products and materials that are used in the foodstuffs and pharmaceuticals industries.
UL		Underwriters Laboratories. An organization founded in the USA for checking and certifying products and their safety.
USP Class VI		The United States Pharmacopeial Convention (USP) is a scientific nonprofit organization that sets standards to help protecting public health. Class VI administer tests and impacts of material and their substances on animal and human tissues.

Abbreviation	Explanation
°C	Degrees Celsius, unit of measurement for temperature
°F	Degrees Fahrenheit, unit of measurement for temperature
3D	Three-dimensional
A	Ampere, unit of measurement of current intensity or Output, term used in automation
AC	Alternating Current
ADI free	All elastomer compounds are free of animal-derived ingredients
AISI	American Iron and Steel Institute, association of the American steel industry
ANSI	American National Standards Institute, American body for standardizing industrial processes
approx.	approximately
AS-i	Actuator Sensor interface, standard for fieldbus communication
ASME	American Society of Mechanical Engineers, professional association of mechanical engineers in the USA
ASME-BPE	Standard of the ASME's – bioprocessing equipment association
ATEX	Atmosphères Explosibles, synonymous with the directives of the European Union for potentially explosive areas
bar	Unit of measurement for pressure. All pressure values [bar/psi] refer to positive pressure [bar_g/psi_g], unless specifically stated otherwise.
bar_g	Unit of measurement for pressure relative to atmospheric pressure
CAN	Controller Area Network; asynchronous serial bus system
CE	Conformité Européenne, administrative symbol for the free movement of industrial products
CIP	Cleaning In Place, designates a process for cleaning technical process systems.
CRN	Canadian Registration Number, is issued by a Canadian Jurisdiction and covers pressure vessels, fittings, or pressure piping. It is a necessary authorization allowing these components to be in operation in Canada.
CSA	Canadian Standards Association, a non-governmental Canadian Standardization organization
Cv	The Cv value corresponds to the water flow rate through a valve (in US gal / min) at a pressure differential of 1 PSI and a water temperature of 5 °C to 30 °C. kv = 14,28 Cv (USA).
Cvs	The Cv values of a valve at nominal stroke (100 % opening) is designated the Cvs value.
dB	Decibel, one tenth of a bel, named after Alexander Graham Bell and used for identifying levels and dimensions
DC	Direct Current
DIN	Deutsches Institut für Normung e. V. Standardization organization in the Federal Republic of Germany, DIN = synonym for standards issued by the organization

Abbreviation	Explanation
DIP	Dual Inline Package, design of a switch
DN	Diameter Nominal, DIN nominal width
Device Net	Network system used in the automation industry to interconnect control devices for data exchange
E	Input, term used in automation
EAC	Certification of technical conformity from the customs union of Russia/Belarus/Kazakhstan
Pressure Equipment Directive 97/23/EC	Directive of the European Parliament and the Council Directive for layout and conformity evaluation for pressure equipment and assemblies with a maximum pressure (PS) of more than 0.5 bars.
EG No. 1935/2004	Regulation of the European Parliament which lays down common rules for materials which come, or may come, into contact with food, either directly or indirectly.
EHEDG	European Hygienic Engineering and Design Group. Consortium of equipment manufacturers, food industries, research institutes as well as public health authorities
EN	European standard, rules of the European Committee for Standardization
EPDM	Ethylene propylene diene rubber, acronym acc. to DIN/ISO 1629
Ex	Synonym for ATEX
FDA	Food and Drug Administration, official foodstuffs monitoring in the United States
FEM calculation	Finite Element Method; calculation process for simulating solids
FKM	Fluorinated rubber, acronym acc. to DIN/ISO 1629
GOST	Gosudarstvennyy Standart, Certification of conformity for components according to standards and regulations of the Russian Federation
H	Henry, unit of measurement for inductance
HNBR	Hydrated acrylonitrile butadiene rubber, acronym acc. to DIN/ISO 1629
Hz	Hertz, unit of frequency named after Heinrich Hertz
I	Formula symbol for electrical current
IEC	International Electrotechnical Commission, international standardization organization for electrical and electronic engineering
IP	Ingress Protection/International Protection, index of protection class acc. to IEC 60529
IPS	Iron Pipe Size, American pipe dimension
ISA	International Society of Automation, international US organization of the automation industry
ISO	International Organization for Standardization, international organization that produced international standards, ISO = synonym for standards from the organization
kg	Kilogram, unit of measurement for weight
Kv	The Kv value corresponds to the water flow rate through a valve (in m^3/h) at a pressure differential of 0.98 bar and a water temperature of 5 °C to 30 °C.

Abbreviation	Explanation
Kvs	The Kv values of a valve at nominal stroke (100 % opening) is designated the Kvs value
L	Conductive
LED	Light-Emitting Diode
mm	Millimeter, unit of measurement for length
M	Metric, system of units based on the meter or Mega, one million times a unit
m^3/h	Cubic meters per hour, unit of measurement for volumetric flow
max.	Maximum
NAMUR	Standardization working association for measuring and control technology in the chemical industry, synonym for the interface type of the organization, especially for potentially explosive atmospheres
NC	Normally Closed; valve or solenoid valve control which is closed in idle status
NO	Normally Open; valve or solenoid valve control which is open in idle status
NOT-element	Logic element, NOT gate
NPN	Signal transmission against reference potential, current-consuming
NPT	National Pipe Thread, US thread standard for self-sealing pipe fittings
OD	Outside Diameter, pipe dimension
ODVA	Open DeviceNet Vendor Association, global association for network standards
PA 12/L	Polyamide
Pg	Armored thread
PN	Nominal pressure for pipeline systems according to EN 1333, rated pressure in bar at room temperature (20 °C)
PNP	Signal transmission against reference potential, current-supplying
PPO	Polyphenylene oxide, thermoplastic material
PS	Maximum permitted operating pressure at which the components can operate safely at maximum allowable temperature (TS)
psi	Unit of measurement for pressure, pound-force per square inch, 1 psi = 6894.75 Pa. All pressure values [bar/psi] refer to positive pressure [bar_g/psi_g], unless specifically stated otherwise.
psi_g	Unit of measurement for pressure relative to atmospheric pressure
PV	Solenoid valve
R_a in µm	Average roughness value, describes the roughness of a technical surface
International Protection-Code IP67, IP66, IP69K	Classifies and rates the degree of protection provided against intrusion dust, accidental contact, and water

Abbreviation	Explanation
SES	GEA Tuchenhagen control head for Ex areas, control top system of GEA Tuchenhagen
SET-UP	Self-learning installation, the SET-UP procedure carries out all necessary settings for generating messages during commissioning and maintenance.
SIP	Sterilization in Place, refers to a process for cleaning technical process systems
SMS	Svensk Mjölk Standard, Scandinavian pipe dimension
SW	Indicates the size of a tool spanner, "Schlüsselweite"
TA-Luft VDI 2440	If a product is certified according to TA Luft it meets the requirements for proof of high grade performance according to TA Luft of 1.0x 10-4 mbar x l / (s x m) at service conditions under the VDI guideline 2440. The product will hence be tested for tightness.
TS	Maximum permitted operating temperature
UL	Underwriters Laboratories, a certification organization established in the USA
USP Class VI	The United States Pharmacopeial Convention (USP) is a scientific nonprofit organization that sets standards to help protecting public health. Class VI administer tests and impacts of material and their substances on animal and human tissues.
UV	Ultraviolet, ultraviolet radiation is a wavelength of light
V	Volt, unit of measurement for voltage
VMQ	High-polymer vinyl methyl polysiloxane, silicone rubber, MVQ = synonym
W	Watt, unit of measurement for power
Y	Control air connection for the working cylinder, designation from pneumatic systems
µ	Micro, one millionth of a unit
Ω	Ohm, the unit of electrical resistance named after Georg Simon Ohm

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We live our values.

Excellence • Passion • Integrity • Responsibility • GEA-versity

"Engineering for a better world" is the driving and energizing principle connecting GEA's workforce. As one of the largest systems suppliers, GEA makes an important contribution to a sustainable future with its solutions and services, particularly in the food, beverage and pharmaceutical sectors. Across the globe, GEA's plants, processes and components contribute significantly to the reduction of CO_2 emissions, plastic use as well as food waste in production.

GEA is listed on the German MDAX and the STOXX® Europe 600 Index and also included in the DAX 50 ESG and MSCI Global Sustainability indexes.

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