

# GVSO

Vertical metal pump





# The GVSO

## For almost all chemical applications

28 basic sizes in a single-stage or multi-stage design allow maximum flexibility with duty points.

Customizable setting depth lengths can be extended through the use of one or more intermediate bearings. At the customer's request, the connecting flanges and the shape of the sole plate can be individually customized to fit the customer's container and piping dimensions.

### Design features

- Design: vertical, single- or multi-stage
- Casing design: double volute casing
- Pump installation: wet or dry installation
- Impeller: closed or open
- Bearing lubrication: grease lubrication
- Sleeve bearing lubrication:  
by the pumped medium or external lubrication
- Installation versions: sole plate for tank or steel structure
- Ambient temperature: -20 °C to +60 °C (-4 °F to +140 °F)



Picture: Installation of the GVSO in a solar power plant

## Technical data

	GVSO
Size DN	40 to 450
$Q_{max}$ m <sup>3</sup> /h (gpm)	4000 (17612)
$H_{max}$ m (ft)	180 (591)
Submersion depth <sub>max</sub> m (ft)	17,5 (57)
Temperature °C (°F)	-40 to +600 (-40 to +1112)
Standards	ISO 5199 (API 610 with deviations)
Flange motor design	Standard
Closed impeller	Standard
Heatable	Option
Foot bearing	Standard
Magnetic coupling	GVSOM
Seal	Stuffing box packing, Mechanical seal

## Options

- Temperature and vibration monitoring
- Equipment health monitoring with i-Alert®3
- Local recording of additional operating parameters
- Flange processing in line with international standards
- Suction tube and / or suction strainer design
- Thermosyphon system
- Quench Systems
- Gas supply system
- Pump accessories

## Typical applications

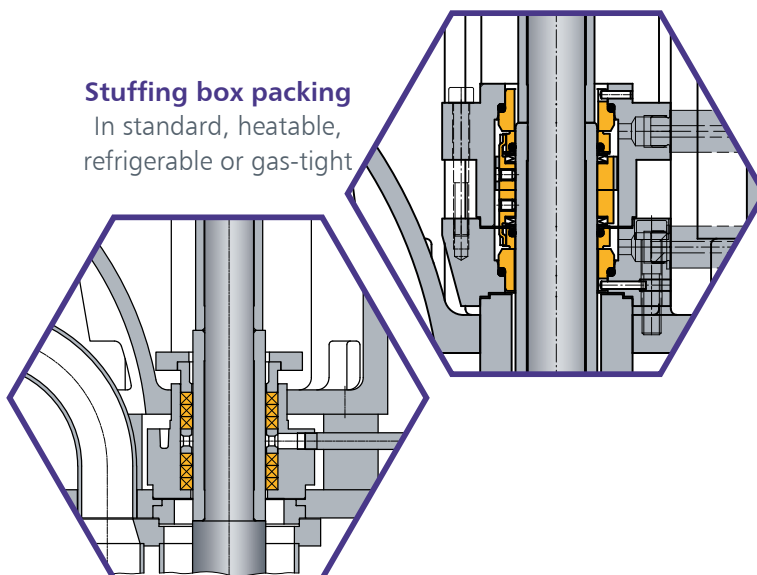
- Petrochemicals
- Organic chemistry
- Inorganic acids and alkalis
- Surface treatment
- Steel production and processing
- Cooling systems
- Heating systems
- Solar power plants

### Mechanical seal

Single-acting or double-acting  
with external lubrication on request

### Stuffing box packing

In standard, heatable,  
refrigerable or gas-tight



# Main features

1

## Robust bearing bracket with high-quality roller bearings

The increased distance to the mounting flange reduces possible heat transfer from the medium. Therefore, even with high temperature applications, a more reliable grease lubrication is possible. Maintenance and replacement of the roller bearings can be carried out with the pump still installed.

2

## Application-related sealing options

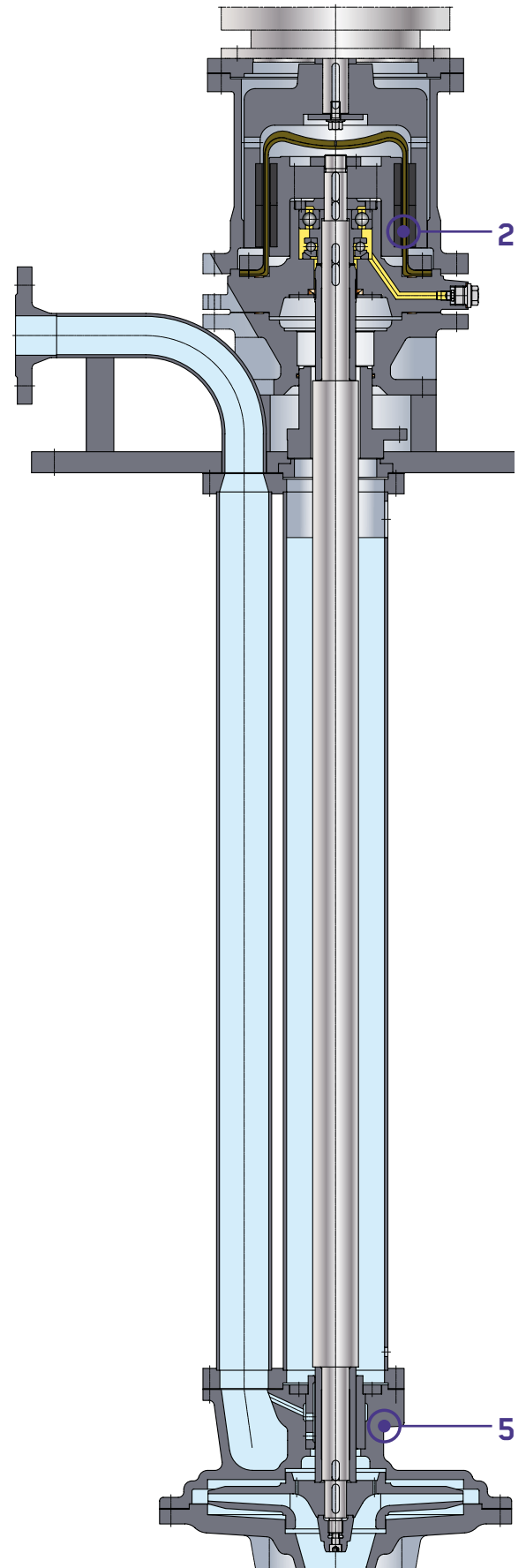
Non-wetted shaft seals on vertical pumps offer a high degree of safety against machine downtime and product emissions.

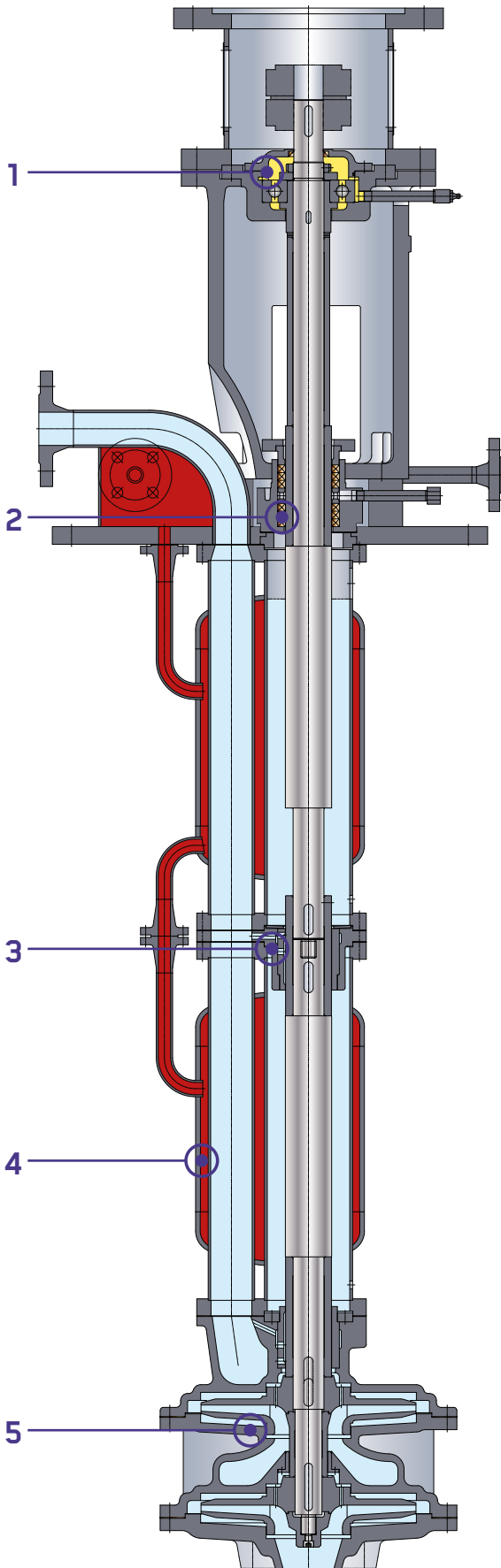
- Packing systems, open, locked, temperature controlled
- Mechanical seals, single or double acting, with liquid or gas supply systems
- Magnetic couplings, not in contact with product, free of eddy current and emissions

3

## Reliable sleeve bearings

Decades of experience in the use of sleeve bearing materials allow the optimal choice of sleeve bearing for almost every application. Materials and design of the intermediate bearings and foot bearings are adapted to the properties of the pumped medium. Even the delivery of low-viscosity, low-lubricating media is no problem when using external bearing lubrication. This minimizes bearing wear and optimizes the service life of the machine. The modular design of the pipe tours with the high-quality shaft bearing allows submersion depths of up to 18 m.





4

#### Heatable design

The heating jackets of the pipe tour and outlet elbow ensure constant heating and thus constant viscosity even with temperature-critical media. The common heating jacket for shaft and pressure pipe ensures uniform temperature distribution without cold spots. The flow and return of the heating medium (steam or thermal oil) are connected to a common connection.

5

#### Optimized vertical hydraulics

The volute casings, which are specially designed for vertical use with outlet in axial direction, ensure an extremely compact installation dimension and allow very small installation openings. By using multi-stage hydraulics, even large pumping heads can be achieved with low flow rates. All GVSO Vertical Hydraulic Units are equipped with double volutes, which minimizes the radial forces in favour of a low sleeve bearing load. The connection of the shaft and pressure pipe to an assembly stiffens the construction and prevents bearing and transport damage.

# Pump & installation dimensions

Size	SZ	BB	Pump dimensions					Shaft end		Flange dimensions		ID <sub>min</sub>
			e <sub>1</sub>	e <sub>2</sub>	f <sub>1</sub>	g	H	ød	h1	N1	N2	
40/160	I	1	140	30	275	23	385	25	75	50	40	310 <sup>6)</sup>
40/200	I	1	140	30	300	23	385	25	75	50	40	341
40/250	I	1	150	50	300	23	385	25	75	65	40	395
80/200	I	1	250	60	375	23	385	25	75	100	80	400
40/250	II-V	2	150	50	300	23	485	38	95	65	40	395
50/315	I-II	2	175	25	375	25	485	38	95	80	50	445
80/250	I	2	250	25	400	25	485	38	95	100	80	420 <sup>6)</sup>
80/315	I-II	2	250	25	400	25	485	38	95	100	80	500
100/250	I	2	325	58	475	25	485	38	95	125	100	505
100/315	I	2	325	58	475	25	485	38	95	125	100	580
125/315	I	2	250	58	450	25	485	38	95	150	125	600
150/250	I	2	275	58	500	25	485	38	95	200	150	540
50/315	III-V	3	175	25	375	35	580	48	135	80	50	445 <sup>6)</sup>
100/315	II-III	3	325	58	475	35	580	48	135	125	100	580
125/315	II	3	250	58	450	35	580	48	135	150	125	600
150/315	I-II	3	275	58	500	35	580	48	135	200	150	695
150/355	I	3	275	58	500	35	580	48	135	200	150	695
150/400	I	3	275	58	500	35	580	48	135	200	150	700
200/315	I	3	350	25	625	35	580	48	135	250	200	770
200/355	I	3	350	25	625	35	580	48	135	250	200	790
250/315	I	3	450	25	750	35	580	48	135	300	250	860
150/400	II	4	275	58	500	35	680	68	185	200	150	700
200/355	II	4	350	25	625	35	680	68	185	250	200	790
250/355	I	4	450	25	750	35	680	68	185	250	250	890
250/355	II	5	475	75	775	55	800	75	210	250	250	890
300/400	I	5	550	200	900	55	800	75	210	350	300	1340
400/500	I	5	700	250	1050	55	800	75	210	400	400	1600
450/500	I	6	Dimensions on request									

All dimensions are shown in millimetres.

SZ = Number of stages (other multi-stage high pressure designs on request)

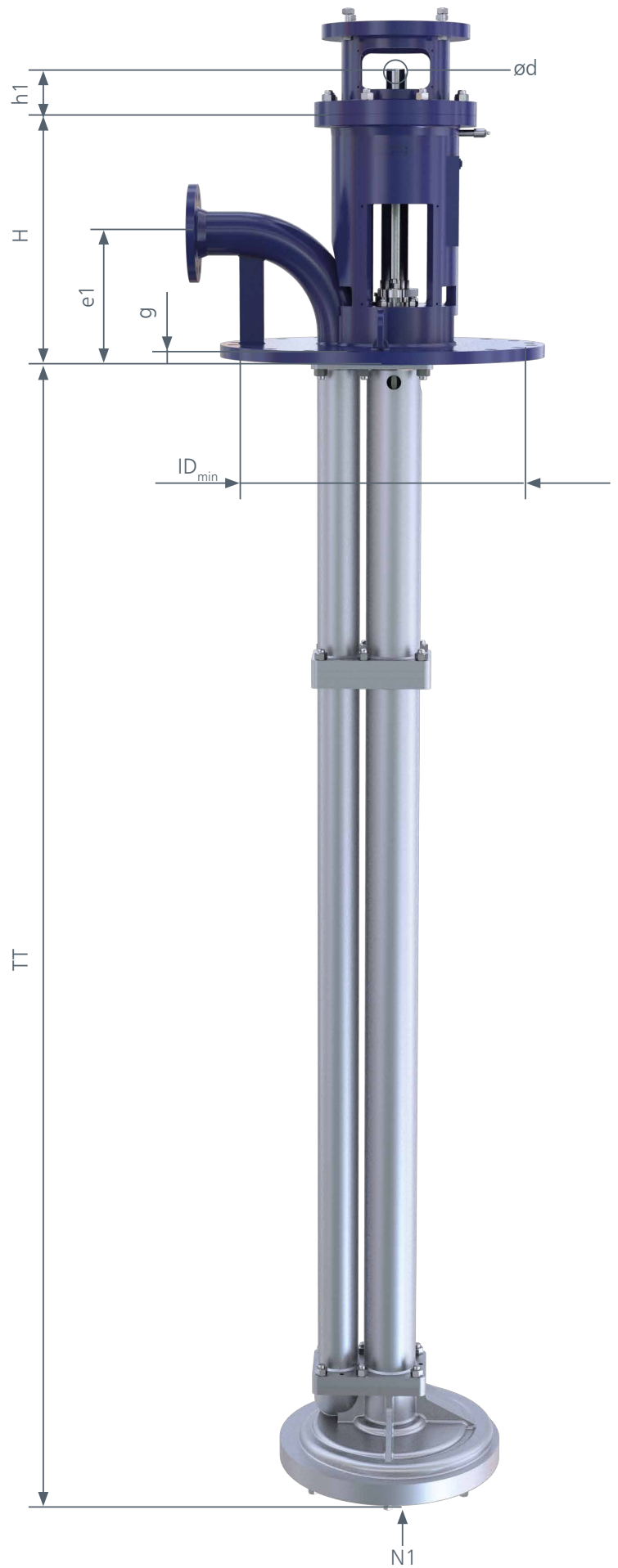
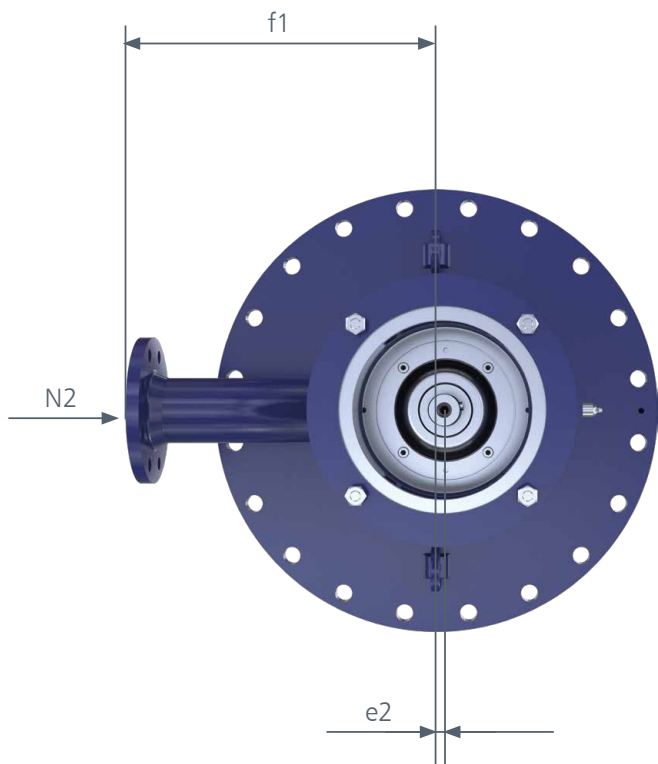
BB = Bearing bracket

e2 = Centre offset of sole plate/hydraulics

N1 = Suction flange (undrilled)

N2 = Pressure flange

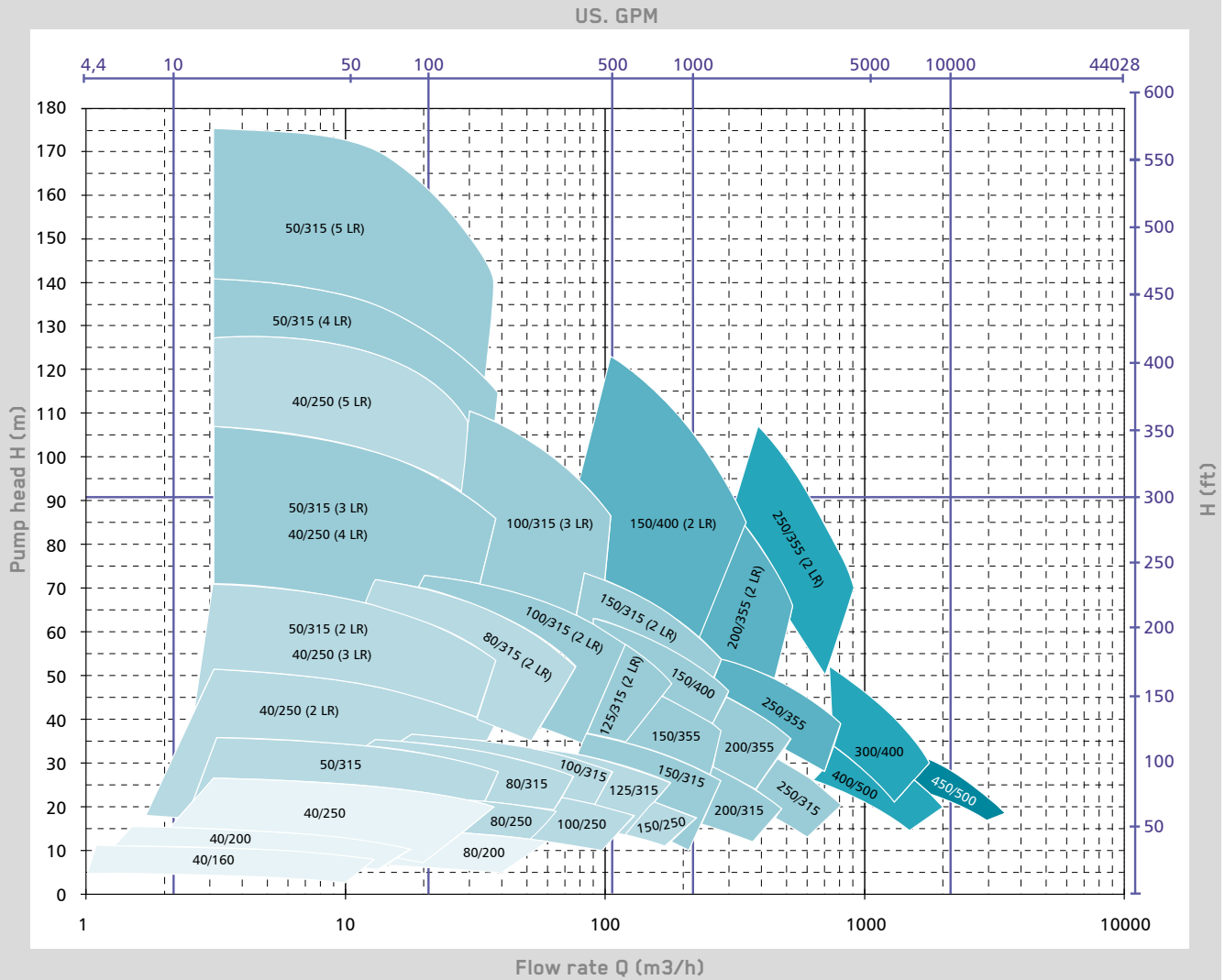
ID<sub>min</sub> = Different with heatable version



Submersion depth (TT):  
 Maximum submersion depth 17,5 m (57 ft)  
 Staging 0,1 m (0,33 ft)

# Capacity ranges

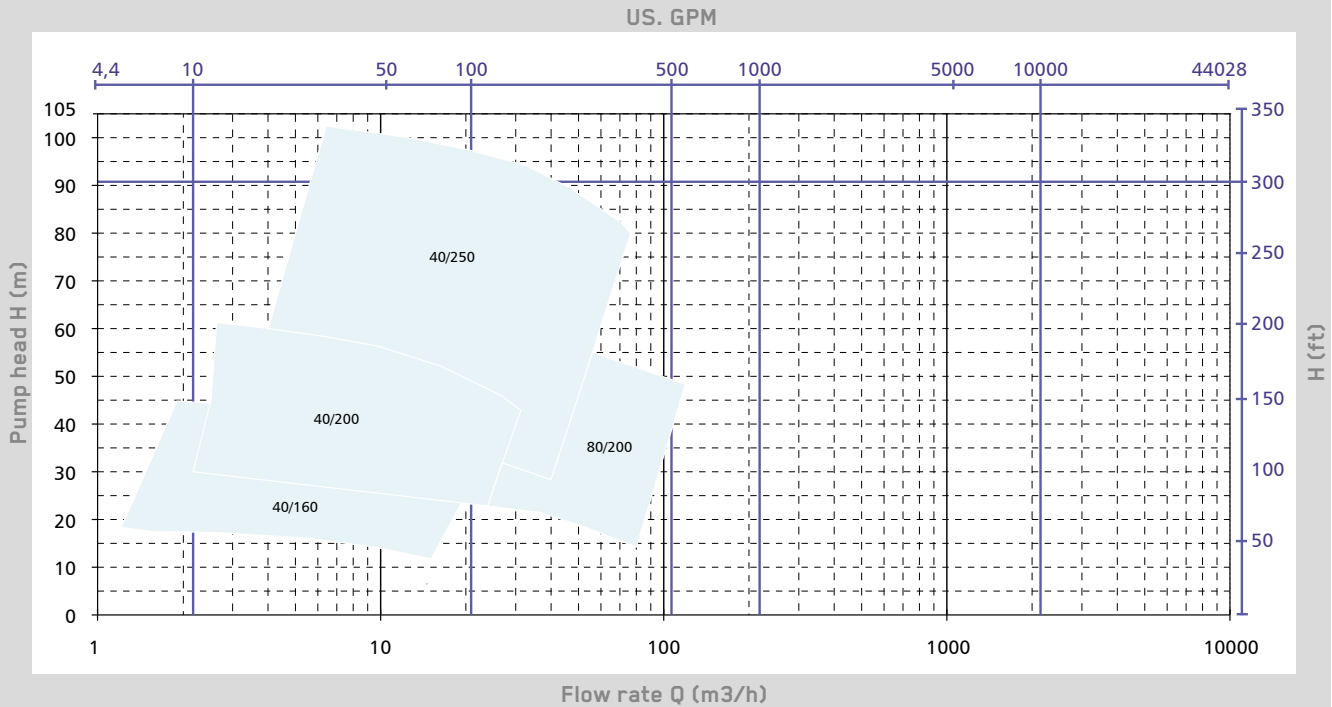
GVSO : 50 Hz n = 1450 /min



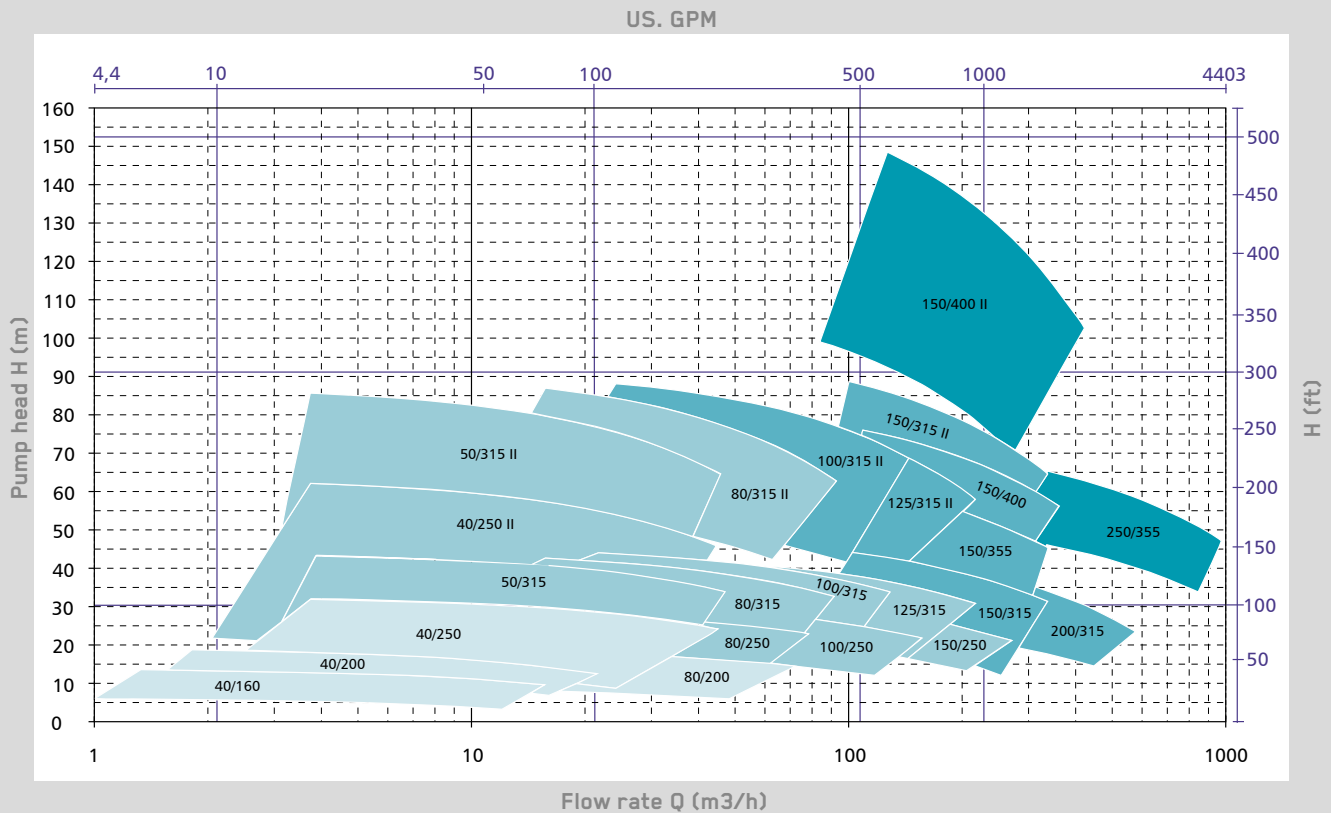
Bearing bracket 1 2 3 4 5 6



GVSO : 50 Hz n = 2900 /min



GVSO : 60 Hz n = 1750 /min



# Metal materials

The range of metallic materials encompasses a wide variety of different types of material which are distinguished mainly by their alloy composition, their structure and their manufacturing process. This wide variety of material options allows us to select the most appropriate material for each individual application.

## 1.0619

High temperature ferritic cast steel, can be used up to 450 °C. For use with low or non-corrosive media, such as molten sulphur.

## 1.7357

High temperature ferritic cast steel, can be used up to 450 °C. The most frequent application is the pumping of molten salts.

## 1.4136S

Corrosion and erosion resistant high alloy ferritic cast steel. Typical applications are highly concentrated sulphuric acid up to 180 °C, oleum, fertilizer production, crude phosphoric acid containing solids.

## RHSX

Special high-alloyed material with excellent resistance to erosion-corrosion for pumps operating in the dryer-, intermediate- and end-absorber stage of sulphuric acid plants up to temperatures of 150 °C.

## 1.4306S

A specially developed material for the pumping of ammonium nitrate melt, hot nitric acid at medium concentrations and also the vaporization of waste nitric acid.

## 1.4408 / 1.4581

Austenitic chromium nickel molybdenum steels with good general corrosion resistance. These materials are

suitable for pumping almost all organic liquids, 50 % caustic soda up to 90 °C, KTL paint, pure phosphoric acid, dry chlorine, liquid sulphur, PTA and many other media.

## 1.4517

Duplex (Semi-austenitic), molybdenum and copper alloyed material with a high resistance to pitting and stress corrosion. This material is one of the super duplex steels. It can be used with crude phosphoric acid, containing solids at up to 100 °C, hot sea water, many solutions containing chloride, FGD suspensions and sulphuric acid at all concentrations at low temperatures.

## R 3020

Fully austenitic special stainless steel with a high of chrome and nickel content. High resistance to pitting, stress corrosion and intercrystalline corrosion. Suitable for 70 % caustic soda up to 200 °C, sulphuric acid at all concentrations at low and medium temperatures, sulphuric acid pickling solutions, in certain areas of the manufacture of phosphoric acid, for pumping solutions with a high chloride content and in spin baths.

## 1.4529S

A fully austenitic cast material highly resistant to acidic media containing solids and rich in chlorides. Used in absorber and quench fluids of the FGD, acidic and chloride containing gypsum slurries, phosphoric acid production, in vaporization and crystallization processes and for hot sea water.



# Typical application processes

## Molten salt

- Heat resistant materials up to 600 °C media temperature
- Special roller bearing design for safe operation with grease lubrication
- Numerically developed vertical construction for submersion depths up to 18m at 550 °C.

## Sulphur

- Proven heating jacket system for reliable temperature constancy during conveying
- Material combinations optimised in terms of media quality
- Special version for Ex-zone in the vessel



## Sulphuric acid

- A large range of materials allows a wide application at different temperatures and concentrations.
- Special designs for HoKo acids
- Wide range of slide bearings

## Fertilizer production

- Flexible use in different process stages of fertilizer production
- High-quality materials for concentrated acids and alkalis
- Safe special constructions for ammonium nitrate solutions and melts
- Special vertical hydraulics for small installation dimensions even at high heads.



— An ITT Brand

ITT RHEINHÜTTE Pumpen GmbH  
Rheingaustraße 96-98  
D-65203 Wiesbaden  
T +49 611 604-0  
[info@rheinhuette.com](mailto:info@rheinhuette.com)  
[www.rheinhuette.de](http://www.rheinhuette.de)