



ZHEJIANG TIANDE PUMP CO., LTD

[www.tiandepump.com](http://www.tiandepump.com)

## Zhejiang Tiande Pump Co., Ltd

- ➔ **Tiande Pump, established in 1993, has been only concentrating on OH6 high-speed centrifugal pump's design and manufacture for 29 years.**
- ➔ **Tiande is qualified supplier of SINOPEC, CNPC, CNOOC, CNCC, ADNOC, SHELL, TOTAL, ACHILLES, EIL, EXXON MOBIL and many other large refining and EPC enterprises worldwide.**
- ➔ **Tiande obtained the second prize of China National Science and Technology Progress Award**
- ➔ **Tiande set up a R&D base for pumps products together with Zhejiang University and Zhejiang Sci-Tech University**
- ➔ **Tiande was awarded as the National High-tech Enterprise of China in 2005.**
- ➔ **Tiande has been ranked China No.1 Supplier for OH-6 High-speed Pump by SINOPEC in 2022.**



# ENTERPRISE HONNOR

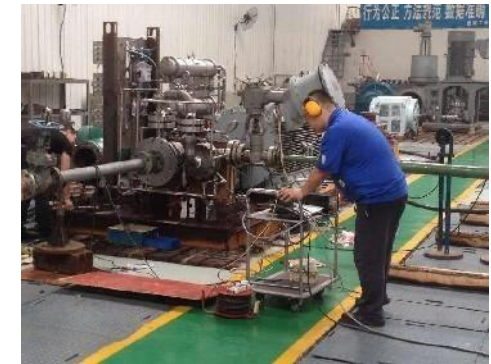
1. In 2000, Tiande won the second prize of China's State Science and Technology Advancement Award.

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2. From 1998 to 2022, Tiande had :
  - 3 projects supported by National Innovation Fund
  - 2 products titled State-level New Product
  - 3 second prizes of Zhejiang Science and Technology Advancement Award
  - 4 projects titled Major Science and Technology Project of Zhejiang Province
  - 1 product included in National Torch Plan Project

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3. In 2014, the 630KW (GSB-S-65/1682) high-speed centrifugal pump is certified to be the first series of product in Zhejiang Equipment Manufacturing Key Field. GSB-Q6 won the same prize in 2019 too.



**4. In 2016, GSB-Q6 high-speed pump 3D model was drafted into Wenzhou Museum as a long-term exhibit.**

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**5. In 2017, Tiande is approved to be one of the provincial High Sci-Tech R&D Centers.**

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**6. In 2020, Tiande won the first prize of Zhejiang Science and Technology Advancement cooperated with Zhejiang Sci-Tech University**



**1. Tiande owns a 11000m<sup>2</sup> manufacturing area and a 3500m<sup>2</sup> office area, the total assets is 111 million CNY.**



**2. We are planning to built a 480m<sup>2</sup> high/low voltage (up to 10kV) test center in 2023 which is designed by Zhejiang Institute of Mechanical & Electrical Engineering. The test center ´s max power is 1200kW, max flow is 300m<sup>3</sup>/h, and the actual measurement of head is 3500m.**



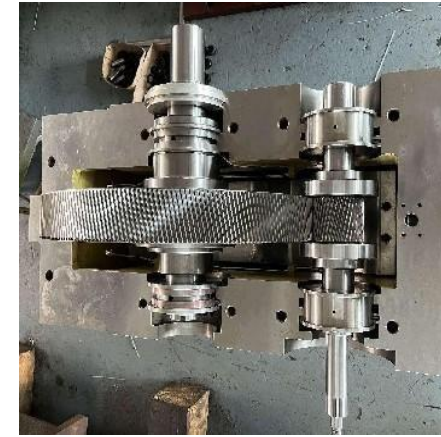
**3. Till now, Tiande owns a staff of 135, 76% of the staff have senior college degree or above including 4 senior engineers, 72% of the staff have been working in Tiande over 10 years.**



**4. Tiande has built long-term cooperation with Wenzhou Technician Institute and Quzhou Technician Institute for training skilled and professional technicians.**



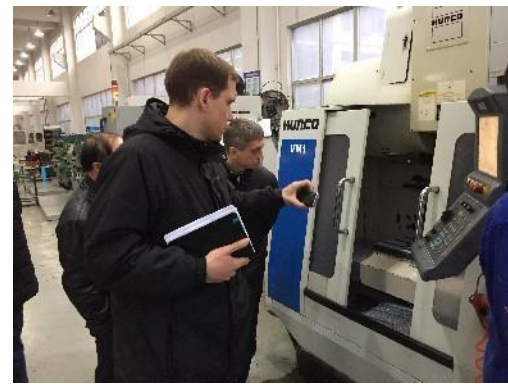
**5. Tiande purchased high quality CNCs and cooperates with the top sub-vendors in China to meet the strict requirements of OH-6 high-speed pump' s machining and fabricating accuracy.**



**6. Tiande' s production capacity is more than 1000 sets of high-speed pumps per year.**



Tiande has established a high-efficiency oversea business system. We have close-collaborated partners and representatives to serve our clients in India, Uzbekistan, Iran, UAE, Malaysia and many other countries.



In Russia, A.M.N LLC cooperates with Tiande as sales and service representative. AMN could provide complete after-sales service and technical support.



Tiande has own Southeast Asian Office in Singapore and participated OGA exhibition together with our Malaysian representative Bumi Wangsa TMS in September 13th, 2022. Visitors from Petronas, Shell (Singapore) and many other companies showed great interest in Tiande OH-6 High-speed pumps.



Since Tiande decided to enter the international market. More and more international coporations have treated Tiande as the first choice of OH-6 high-speed pump. The same choice that already made by Chinese corporations like SINOPEC.

## 入围通知书

浙江天德泵业有限公司:

在我公司组织的2022年度中国石化第三期高速泵框架公开招标所需的高速泵及其配件招标中(招标编号:WZ20220707-2301-8062-B1),经评标委员会评审,确定贵公司为入围投标人第1名。

入围货物:高速泵及其配件。请你公司依据入围通知书尽快与中国石化上海石油化工有限公司签订合同。

中国石化国际事业有限公司  
2022年07月25日



## Development History



From 1995 to 2009, Tiande developed 5 series of high-speed horizontal pump (GSB-F, Q1, Q2, Q3, Q4) which max power was 315kw and the head was up to 1200m.

From 2010 to 2015, Tiande developed 7 series of high-speed pump in addition, including vertical pump (GSB-L1, L2, L3) and horizontal pump (GSB-H, Q5, Q6, S). The max power reached 630kW and the head was up to 3100m.





**PERFORMANCE  
OVERVIEW**

Now Tiande has 11400 high-speed centrifugal pumps operating on 812 end-users' site. We have established partnership with more than 50 Engineering Design Companies both in China and abroad.



1、Tiande has 12 series of high-speed centrifugal pump:

Horizontal: GSB-S, GSB-Q1, GSB-Q2, GSB-Q3, GSB-Q4, GSB-Q5, GSB-Q6, GSB-F, GSB-H.

Vertical: GSB-L1, GSB-L2, GSB-L3;

2、**Power Range**: 3KW~1200KW

**Speed Range**: 4800rpm~24800rpm

**Flow Range**: 0.7m<sup>3</sup>/h (no reflux parameters) ~220m<sup>3</sup>/h

**Temperature Range**: Max design temperature: 350°C

Target design temperature: 450°C,

Minimum design temperature: -60°C.

Tiande developed cryogenic liquid oxygen pump which design temperature is under -200°C with Zhejiang Sci-Tech University.

**Head Range**: GSB-S, 2 stage of pump casing, up to 3100m(max working pressure is 26Mpa)

**Achievement**: GSB-S-65/1682, CNOOC Ningbo Daxie Petrochemical LTD , operating since May 2015

GSB-Q6, 1 stage impeller, up to 2380m;

**Achievement** : GSB-Q6-23/1780, Shandong Baoshun Chemical Technology LTD, operating since April 2018

Now, item number GSB-Q6-12/2153, 40/1610 and 45/1560 is used in the process.

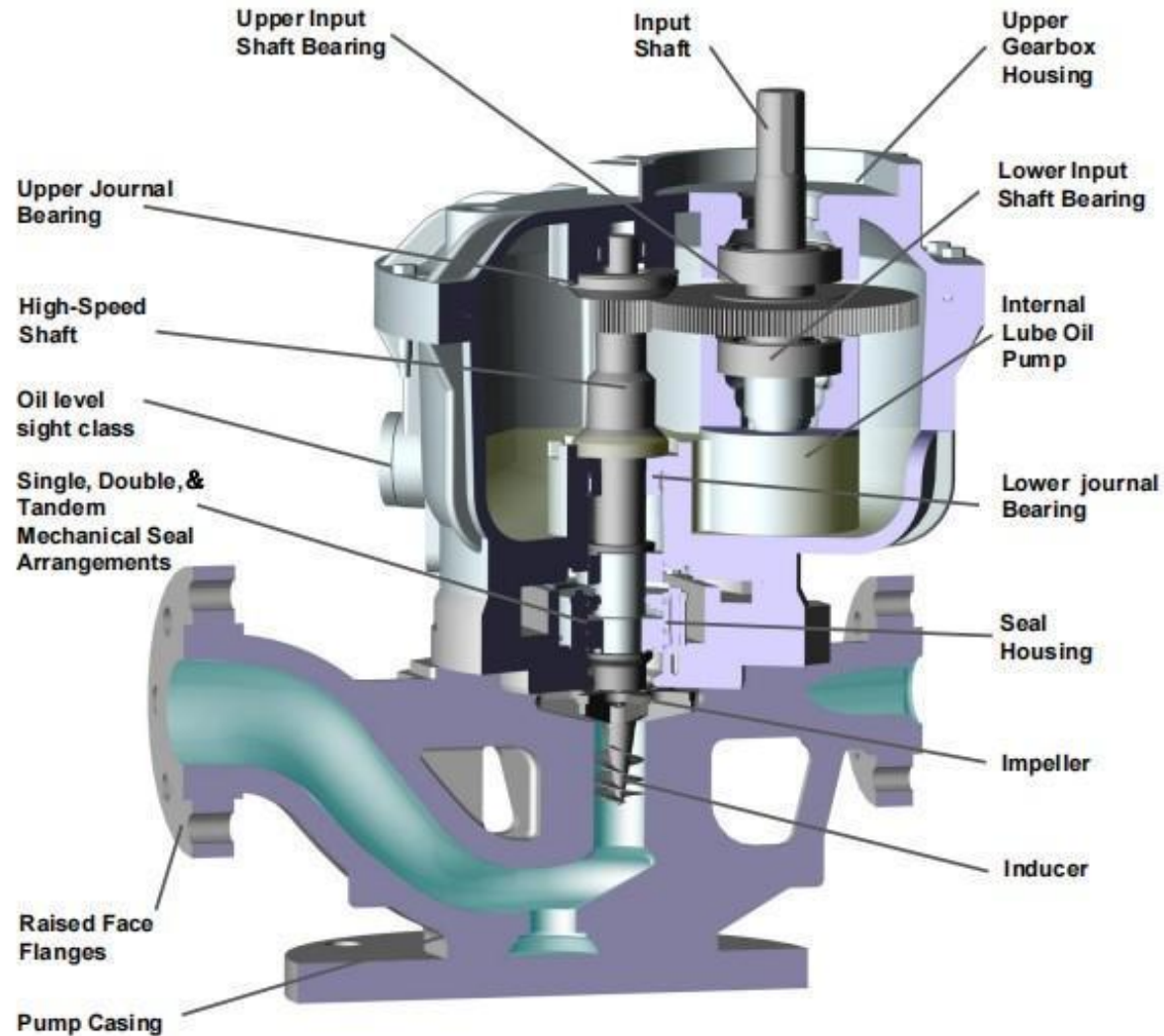
Equal to SUNDYNE LMV-322 (Metric & Inch Drawings)

- Single Stage Acceleration, Single Suction, Vertical
- Opened Type Straight-Blade Centrifugal Impeller
- Support: Journal Bearing & Thrust Bearing  
(Integral Type, Copper Alloy Bearing)
- Lubrication: Oil Pump &
- Auxiliary Gear Oil PUMP



## GSB-L1

### Cross Sectional



## GSB-L1 Design Feature

**Input Shaft Assembly:**  
Balancing standard service reduces vibration and noise while improving reliability and operating life. ISO 1940 Grade 2.5

**O-Rings Standard in Gearbox Split Line:**  
Eliminates leakage and reduces clean-up and contamination to atmosphere. Improves durability for shipping, storage, and assembly.

**Oil Mechanical Seal:**  
Eliminates leakage and reduces clean-up and contamination to atmosphere. Improves durability for shipping, storage, and assembly.

**Lube Oil Pump:**  
Improved design eliminates oil pressure fluctuations, prevents oil.

**Mechanical Seal:**  
Single, Double, & Tandem Mechanical Seal Arrangements can be optional.

**Pump Volute:**  
The hydraulic optimization design can effectively improve the hydraulic efficiency of the pump.

**Tapered Alignment Pins:**  
Maintains true position and integrity of the bearing bores. Alignment is maintained even after multiple rebuilds.

**Upper Radial Journal Bearing:**  
To ensure the smooth operation of the pump.

**Tapered Thrust Washer:**  
Handles higher thrust capacity and is dimensionally interchangeable.

**Output Shaft Assembly:**  
Balancing standard service reduces vibration and noise while improving reliability and operating life. ISO 1940 Grade 2.5. Designed for minimum bearing span to overhang ratio.

**Lower Radial Journal Bearing:**  
To ensure the smooth operation of the pump.

**Impeller:**  
With the impeller combination, can effectively improve the hydraulic efficiency of the pump, reducing pump vibration and noise.

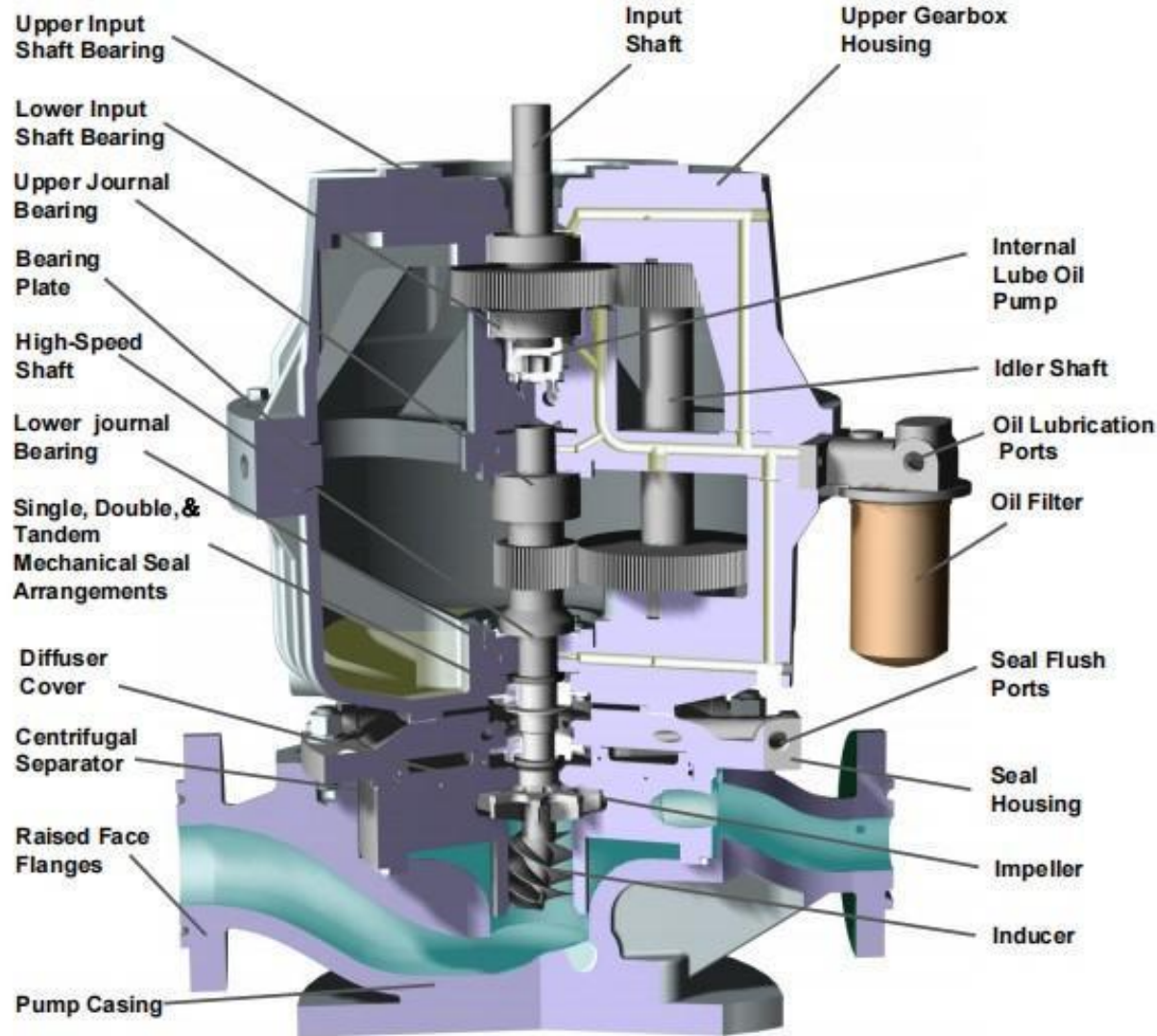
**Inducer:**  
Produced by machining centre, which can better improve the NPSHr

- Equal to SUNDYNE LMV-311/313 (Metric & Inch Drawings)
- 2 Stages Acceleration, Single Suction, Vertical
- Opened Type Straight-Blade Centrifugal Impeller
- Support: Journal Bearing & Thrust Bearing
- Lubrication: Oil Pump & Auxiliary Gear Oil PUMP



## GSB-L2

### Cross Sectional



## GSB-L2

### Design Feature

#### Input Shaft Assembly:

Balancing standard service reduces vibration and noise while improving reliability and operating life. ISO 1940 Grade 2.5.

#### Lube Oil Pump:

Improved design eliminates oil pressure fluctuations. prevents oil.

#### Radial Journal Bearing:

To ensure the smooth operation

#### Tapered Thrust Washer:

Handles higher thrust capacity and is dimensionally interchangeable.

#### Output Shaft Assembly:

Balancing standard service reduces vibration and noise while improving reliability and operating life. ISO 1940 Grade 2.5. Designed for minimum bearing span to overhang ratio.

#### Tapered Alignment Pins:

Maintains true position and integrity of the bearing bores. Alignment is maintained even after multiple rebuilds.

#### O-Rings Standard in Gearbox Split Line:

Eliminates leakage and reduces clean-up and contamination to atmosphere

#### Idle Shaft Assembly:

Balancing standard service reduces vibration and noise while improving reliability and operating life. ISO 1940 Grade 2.5.

#### Oil Mechanical Seal:

Eliminates leakage and reduces clean-up and contamination to atmosphere

#### Impeller:

With the impeller combination, can effectively improve the hydraulic efficiency of the pump, reducing pump vibration and noise.

#### Inducer:

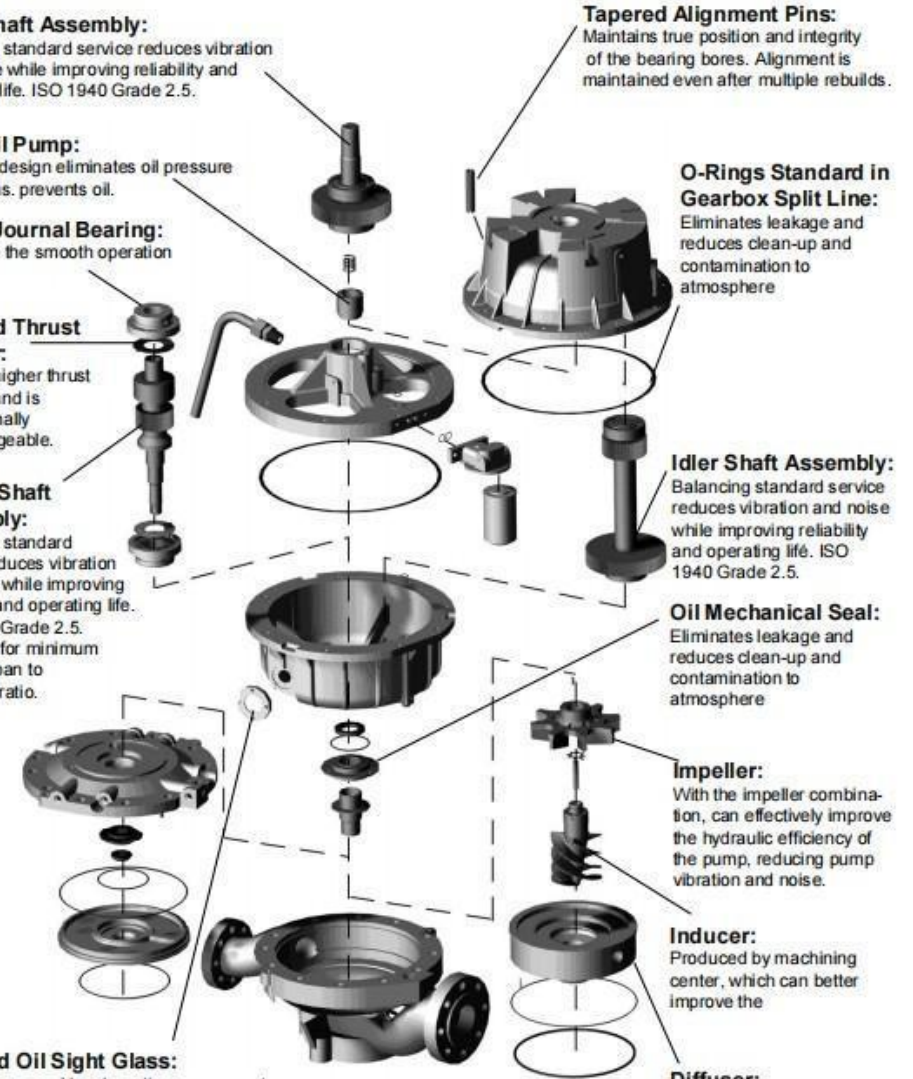
Produced by machining center, which can better improve the

#### Diffuser:

The hydraulic optimization design can effectively improve the hydraulic efficiency of the pump.

#### Extended Oil Sight Glass:

Greatly improves oil level reading accuracy at all temperatures and speeds. Helps to prevent overfilling.

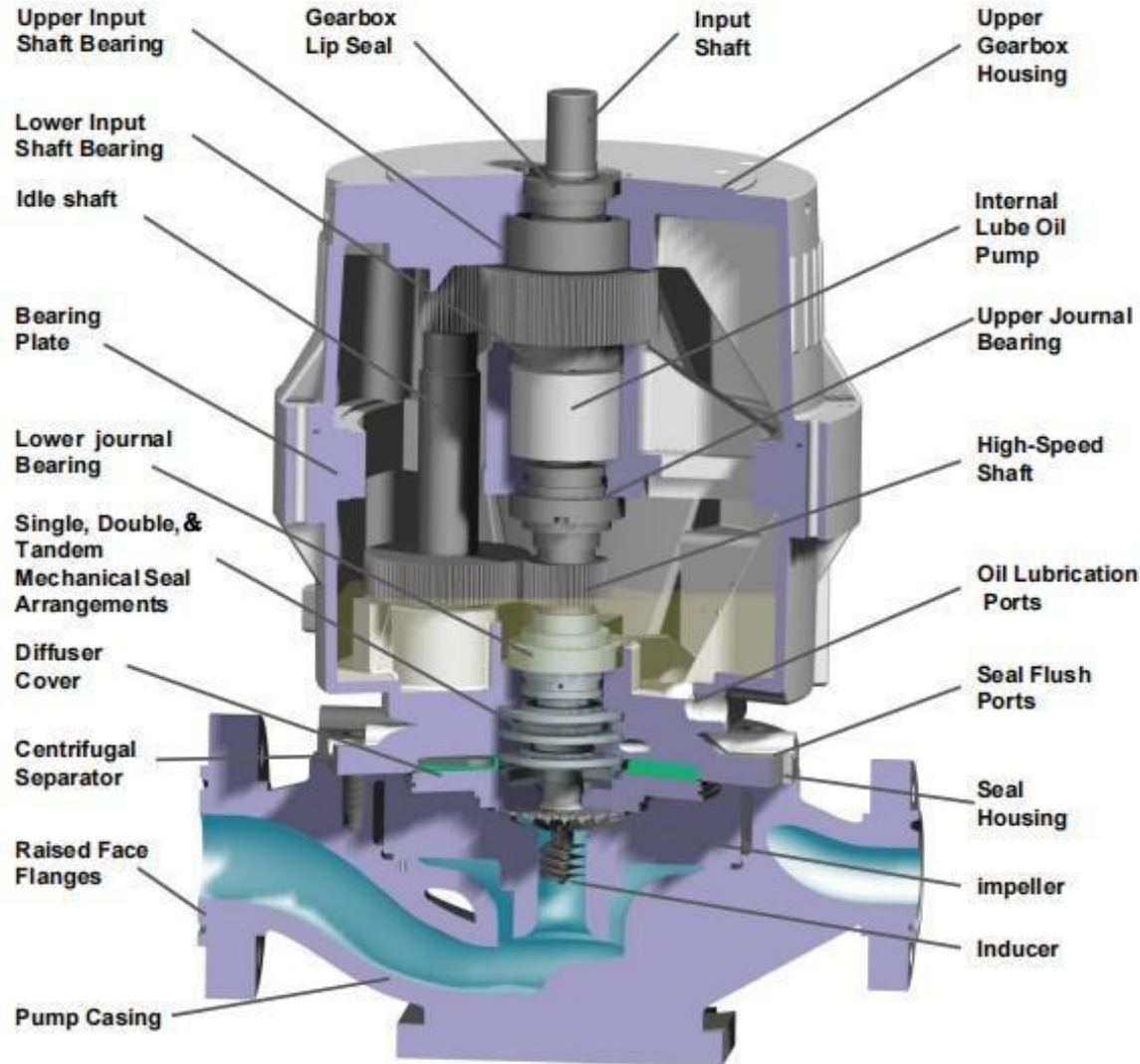


- Equal to SUNDYNE LMV-341/343/346 (Metric & Inch Drawings)
- 2 Stages Acceleration, Single Suction, Vertical
- Opened Type Straight-Blade Centrifugal Impeller
- Support: Journal Bearing & Thrust Bearing (Integral Type, Copper Alloy Bearing) , Helical Gear
- Lubrication: Oil Pump & Auxiliary Gear Oil PUMP



## GSB-L3

### Cross Sectional



## GSB-L3

### Design Feature

#### Input Shaft Assembly:

Balancing standard service reduces vibration and noise while improving reliability and operating life. ISO 1940 Grade 2.5.

#### Lube Oil Pump:

Improved design eliminates oil pressure fluctuations, prevents oil.

#### Radial Journal Bearing:

To ensure the smooth operation of the pump.

#### Tapered Thrust Washer:

Handles higher thrust capacity and is dimensionally interchangeable.

#### Output Shaft Assembly:

Balancing standard service reduces vibration and noise while improving reliability and operating life. ISO 1940 Grade 2.5. Designed for minimum bearing span to overhang ratio.

#### Extended Oil Sight Glass:

Greatly improves oil level reading accuracy at all temperatures and speeds. Helps to prevent overfilling.

#### Oil Mechanical Seal:

Eliminates leakage and reduces clean-up and contamination to atmosphere. Improves durability for shipping, storage, and assembly.

#### Mechanical Seal:

Eliminates leakage and reduces clean-up and contamination to atmosphere. Improves durability for shipping, storage, and assembly. Single, Double, & Tandem Mechanical Seal Arrangements can be optional.

#### Tapered Alignment Pins:

Maintains true position and integrity of the bearing bores. Alignment is maintained even after multiple rebuilds.

#### Combination Labyrinth Seal:

The inner sleeve eliminates input shaft grooving and extends seal life to 3 years. The seal may be removed and reused many times.

#### O-Rings Standard in Gearbox Split Line:

Eliminates leakage and reduces clean-up and contamination to atmosphere. Improves durability for shipping, storage, and assembly.

#### Idle Shaft Assembly:

Balancing standard service reduces vibration and noise while improving reliability and operating life. ISO 1940 Grade 2.5.

#### Impeller:

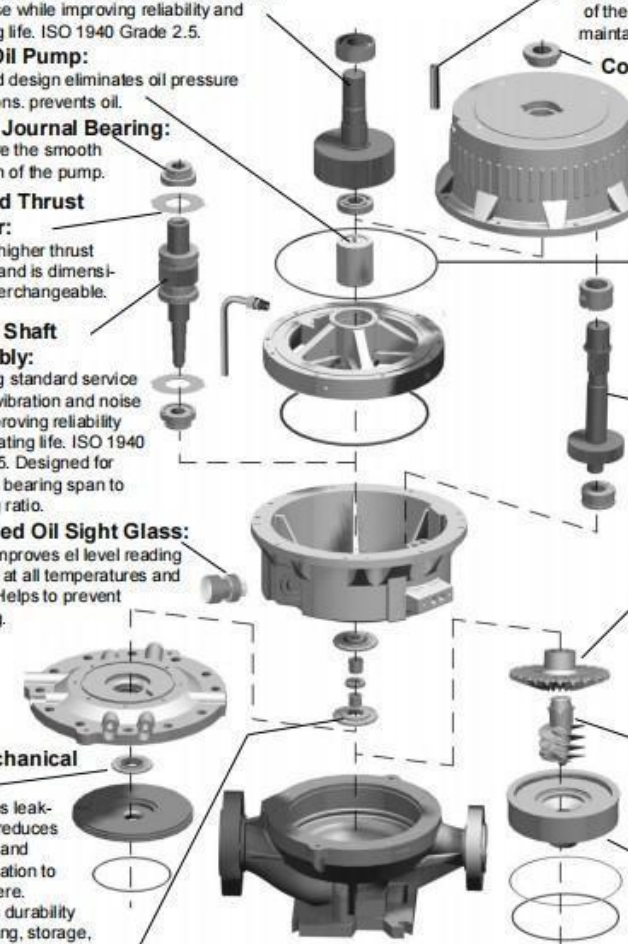
With the impeller combination, can effectively improve the hydraulic efficiency of the pump, reducing pump vibration and noise.

#### Inducer:

Produced by machining center, which can better improve the NPSHr of the pump.

#### Diffuser:

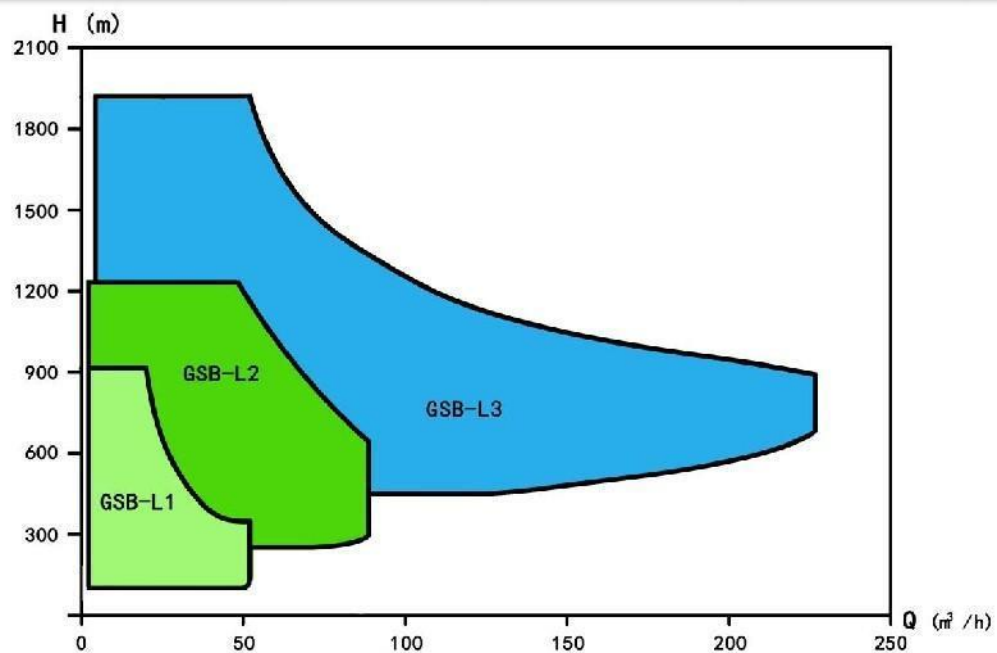
The hydraulic optimization design can effectively improve the hydraulic efficiency of the pump.



# GSB-L1, L2, L3 Parameters



Type	Flow m <sup>3</sup> /h	Head m	Speed RPM	TEMP °C	Power kW
GSB-L1	1~52	70~920	4800~14200	-60~350	5.5~37
GSB-L2	5~90	250~1220	7850~22700	-60~350	37~132
GSB-L3	10~220	500~1980	7850~24800	-60~350	132~315



# GSB-L1, L2, L3 Application



## ▲ CSPC Petrochemical LTD

454-P-01A/B  
HDPE Device Butene-1  
Charging Pump  
GSB-L1-3/55  
Power: 55kW

## ▲ Shanxi Yanchang Petroleum

(Group) CO., LTD  
P-102A/B  
Reaction Product Injection Pump  
GSB-L2-12/820  
Power: 110kW

## ▲ Roald, Iran Dry Chemical Fertilizer

Project  
3-P-3801A/B  
Ammonia recovery Charging Pump  
GSB-L3-15/1250  
220kW

# Sundyne Pump Reconstruct Example



## Reconstruct Sundyne LMV 346 Pump for SINOPEC Tianjin Branch

**Pump Parameter:** Fluid- Demineralized water Head- 1700 m Flow rate-19 m<sup>3</sup>/h  
Power- 266.9kW Suct. Press.- 200 kPa Disch. Press.- 16519 kPa

### Failure phenomenon:

The lower bearing of the high-speed shaft was damaged burned and locked immediately after the pump started.



### Cause analysis:

The axial force of the high-speed shaft is unbalanced and the downward axial force is too large.

# Sundyne Pump Reconstruct Example

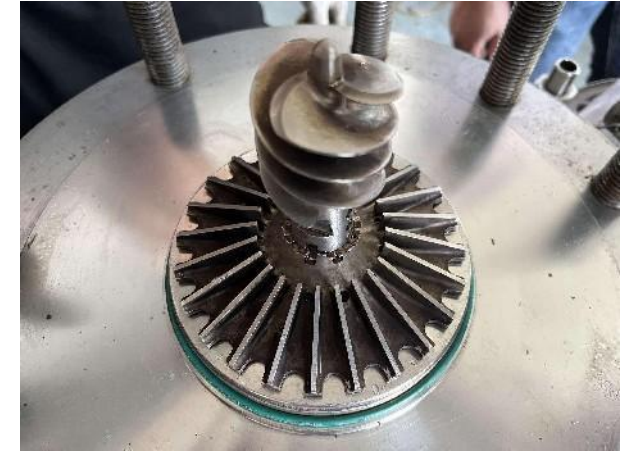


## Reconstructing action:

Drill a circle of holes on the impeller to balance the axial force

## Result:

The holes have no impact on the operation performance of the pump, only the efficiency is reduced by about 0.5%. The reconstructed pump is running stably at site now.



# Sundyne Pump Reconstruct Example

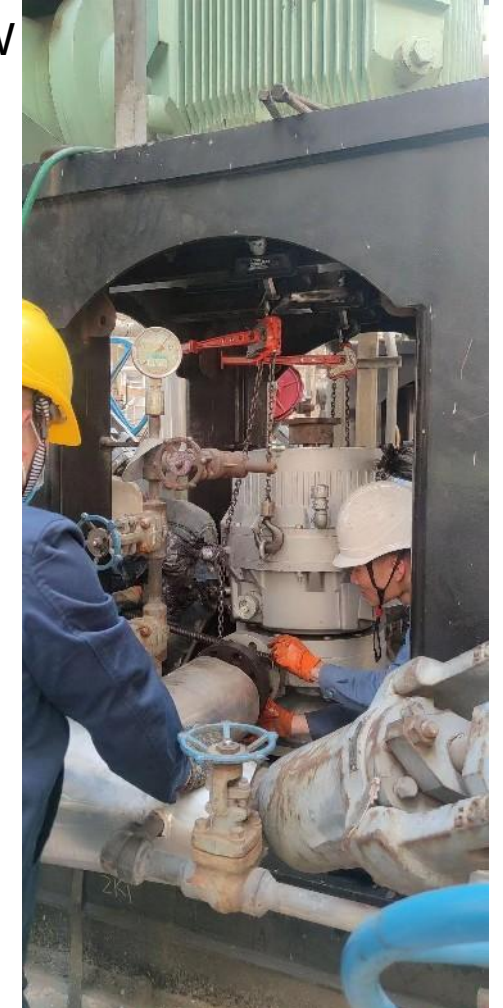


## Reconstruct Sundyne LMV 346 Pump for CNOOC (Taizhou) Petrochemical Co., Ltd

**Pump Parameter:** Fluid-Deaerated water Head-1370 m Flow rate-20 m<sup>3</sup>/h Power- 300 kW

### Cause of failure:

Impeller was damaged and crack appeared on its surface. Its high-speed shaft was worn, which results in obvious vibration.



# Sundyne Pump Reconstruct Example

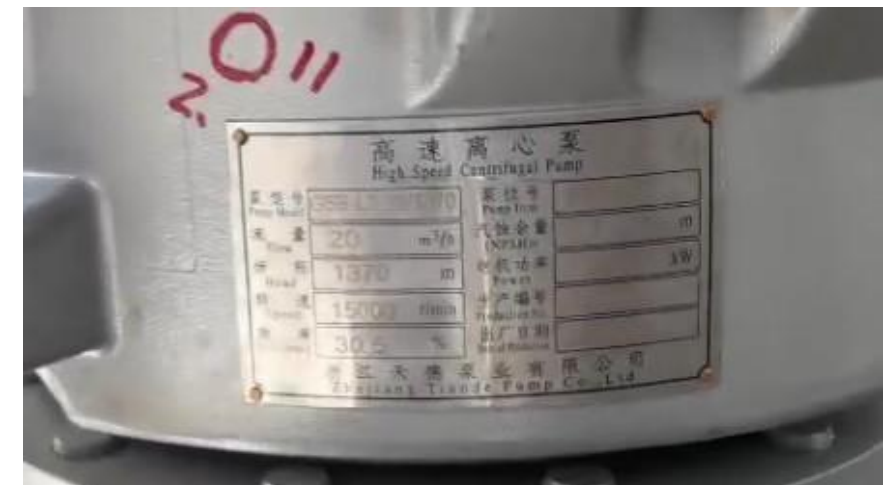


## Reconstructing action:

1. Design and manufacture a new bareshaft pump (including gearbox) to replace the original one in compliance with the pump data
2. A new gearbox has been assembled, it is composed of the qualified parts of the original Sundyne gearbox which are still available and the corresponding new parts manufactured by Tiande which replace the unavailable old parts.

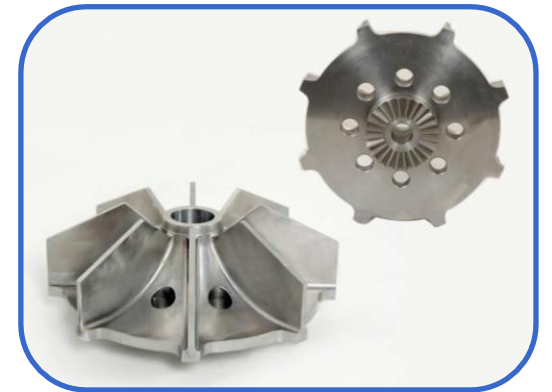
## Result:

The reconstructed pump is running stably at site now. The performance of the reconstructed pump remains the same with the original Sundyne pump.

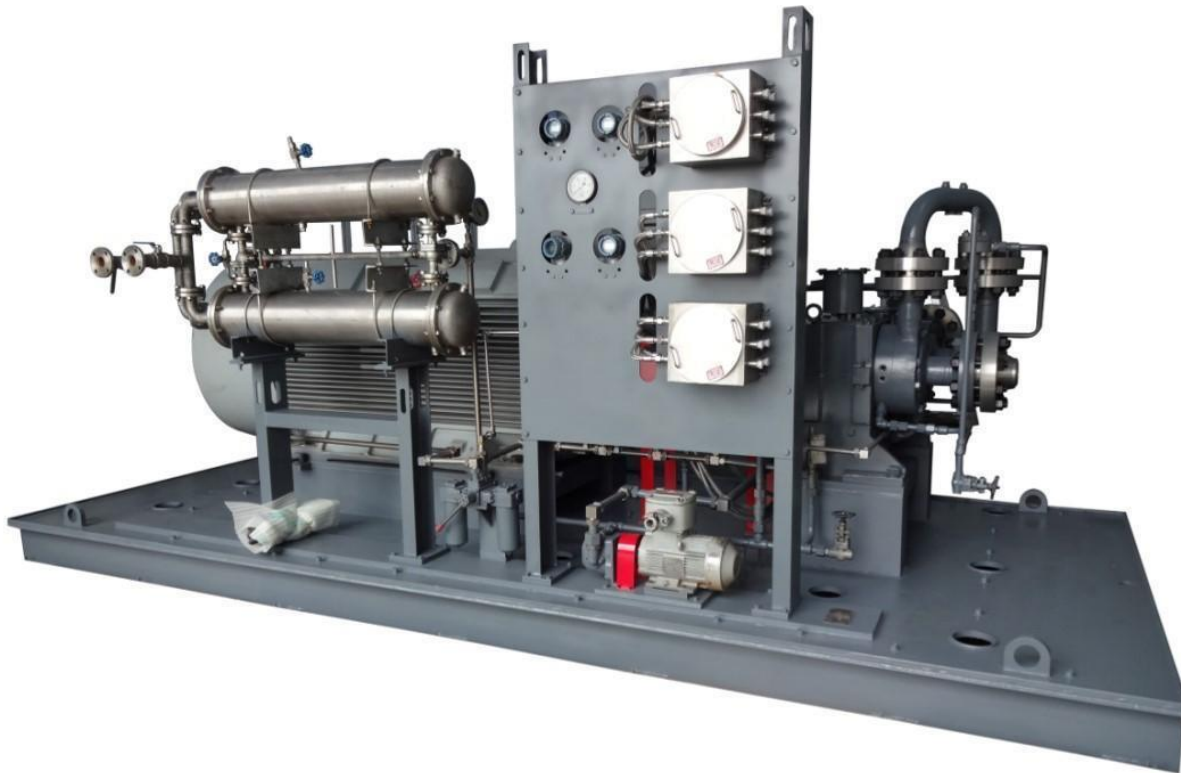


# Typical Example of Parts

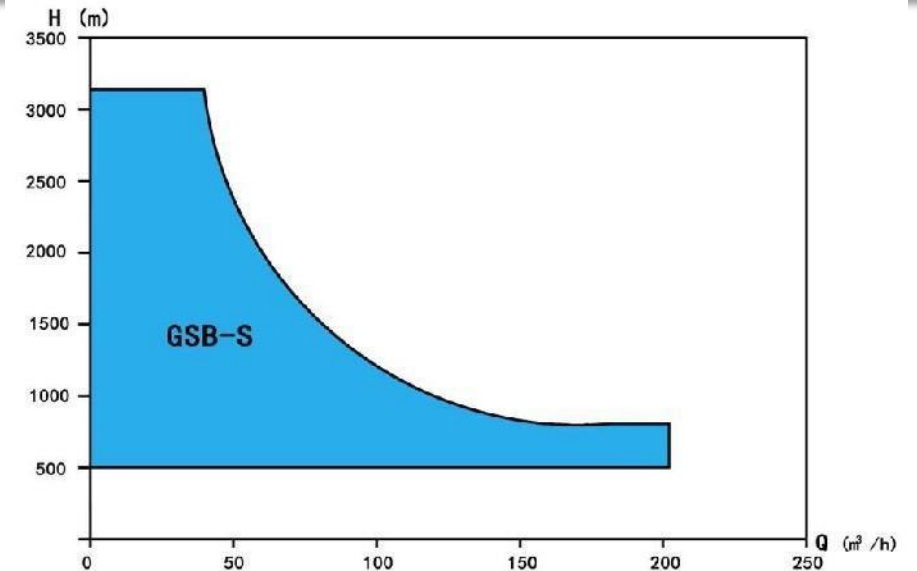
ZHEJIANG TIANDE PUMP Co., Ltd



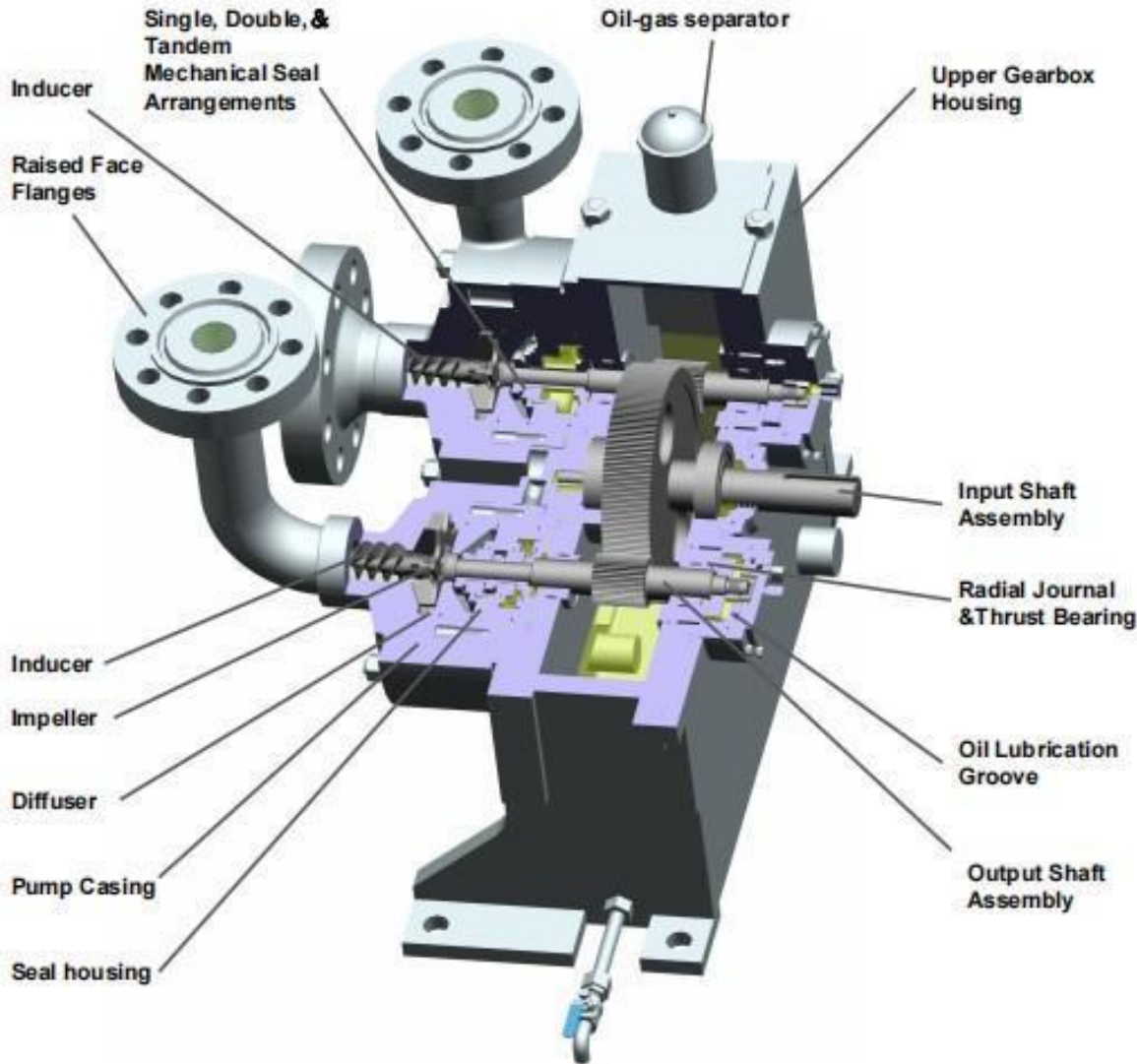
- Identical to SUNDYNE HMP-3000 (Inch Size)
- 2 Stages Pump Head, Serial & Parallel
- Horizontally split Accelerating Gearbox, Single Stage Acceleration, Single Input Shaft Drives 2 Parts
- Support: Journal Bearing & Thrust Bearing (Tilting Pad Bearing)
- Lubrication: External Main Oil Pump & Auxiliary Gear Oil PUMP



Type	Flow m <sup>3</sup> /h	Head m	Speed RPM	TEMP °C	Power kW
GSB-S	10~200	500~3100	5800~19200	-60 ~260	132~630



## GSB-S Cross Sectional



## GSB-S Design Features

**O-Rings Standard in Diffuser Split Line:**  
Eliminate liquid leakage and prevent contamination to environment.

**Impeller:**  
With the impeller combination, can effectively improve the hydraulic efficiency of the pump, reducing pump vibration and noise.

**Inducer:**  
Produced in advanced machining centre, which can better improve the NPSHr performance

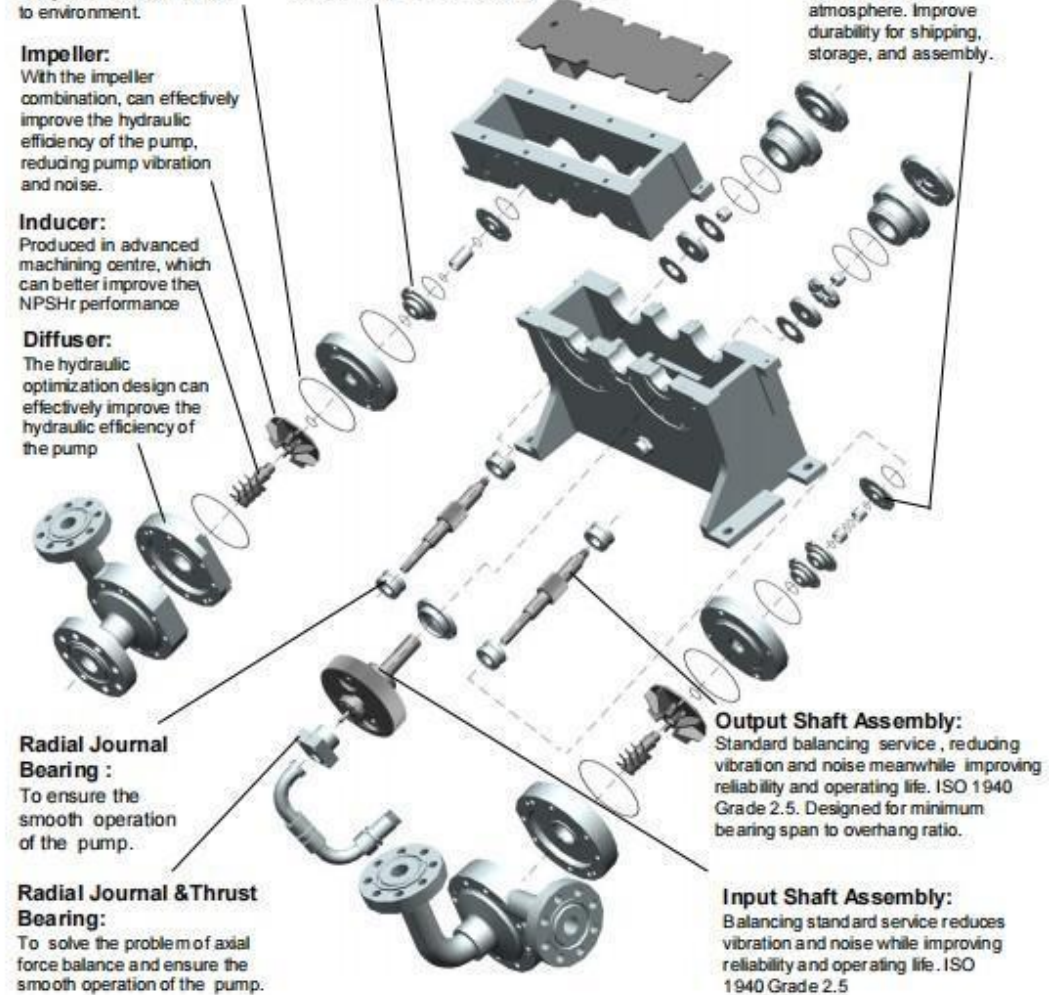
**Diffuser:**  
The hydraulic optimization design can effectively improve the hydraulic efficiency of the pump

**Radial Journal Bearing :**  
To ensure the smooth operation of the pump.

**Radial Journal & Thrust Bearing:**  
To solve the problem of axial force balance and ensure the smooth operation of the pump.

**Mechanical Seal:**  
Single, Double, & Tandem Mechanical Seal Arrangements can be optional.

**Oil Mechanical Seal:**  
Eliminate leakage and reduce clean-up and contamination to atmosphere. Improve durability for shipping, storage, and assembly.



# GSB-S Application



▲ **SUNDYNE  
Standby  
High-Speed Pump**

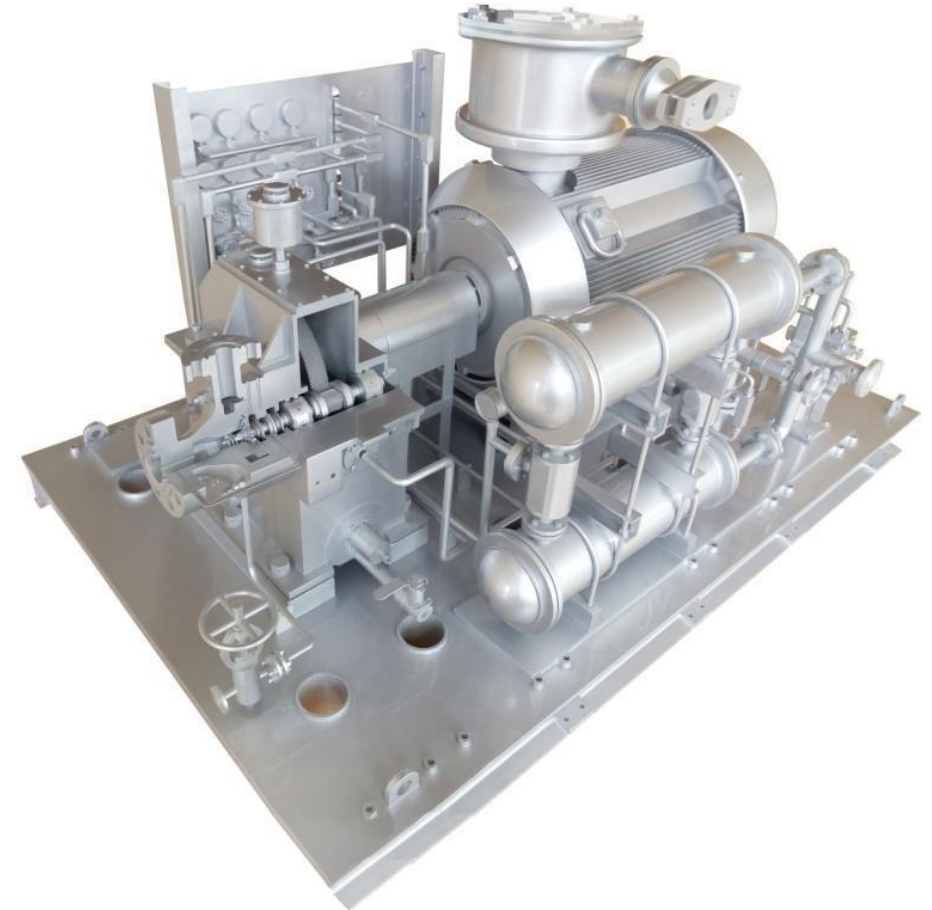
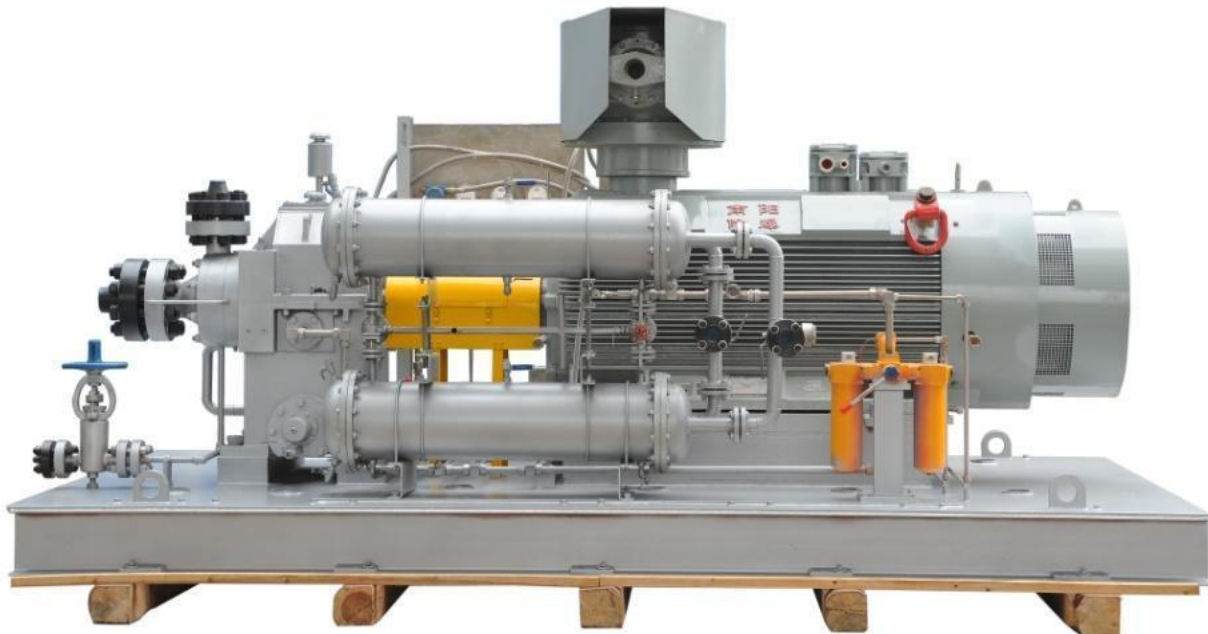


▲ **CNOOC Ningbo Daxie Petrochemical LTD  
HCGO Cracking to Produce Olefin Project  
Feedstock Hydrogenation Device  
(2.1 million of tons each year )  
0202-P-103B Injection Pump  
GSB-S-65/1682    Power: 630kW**



Since trial-produce in may, 2015  
Tiande high-speed pump has  
been operating steadily as the  
main pump.

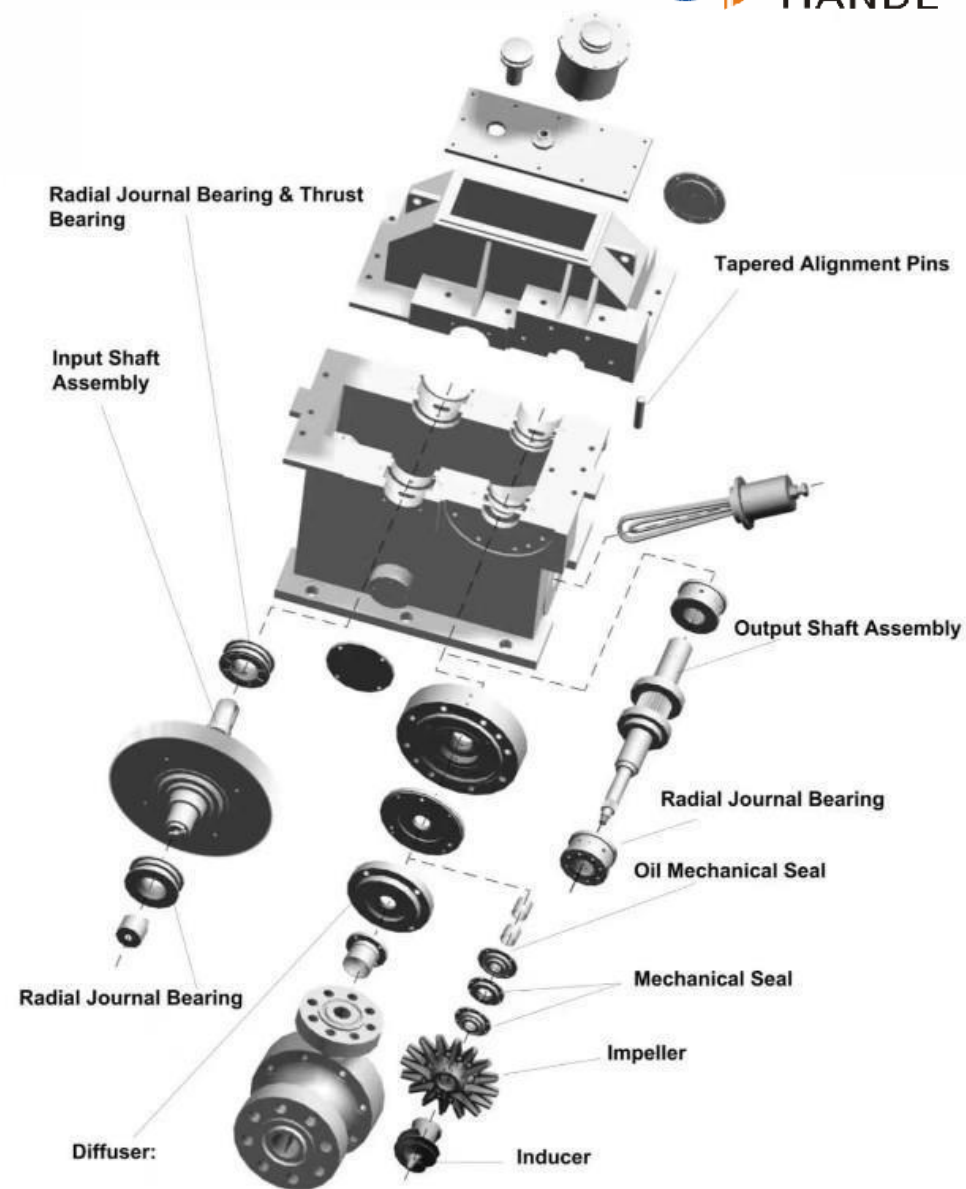
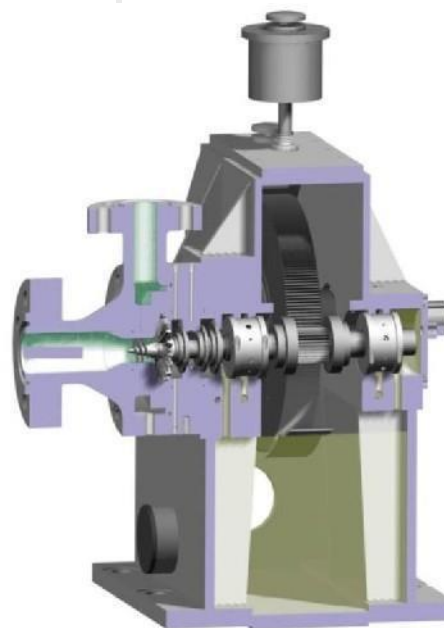
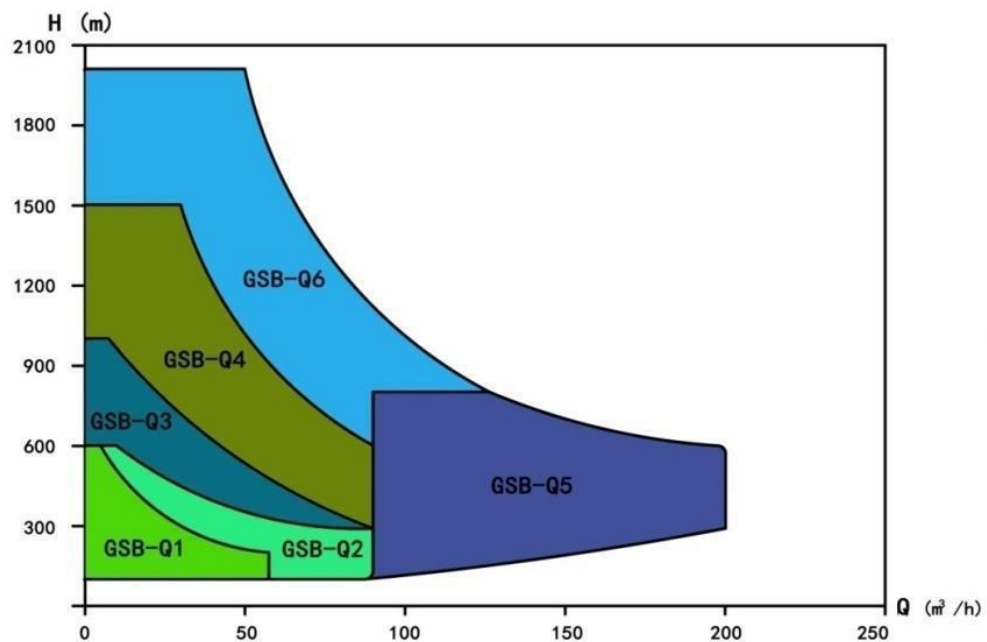
- **Horizontally split Accelerating Gearbox , Single Stage Helical Gear Accelerating**
- **Support: Journal Bearing & Thrust Bearing ( Tilting Pad Bearing )**
- **Opened Type Straight-Blade Centrifugal Impeller**
- **Lubrication: External Double-Geared Oil Pump**



# GSB-Q6 Parameters



Type	Flow m <sup>3</sup> /h	Head m	Speed RPM	TEMP °C	Power kW
GSB-Q6	12~220	800~2380	15200~23300	-60~300	≤1200



# GSB-Q6 Application



**Shandong Baoshun  
Chemical Technology LTD**

P2102A/B Injection Pump

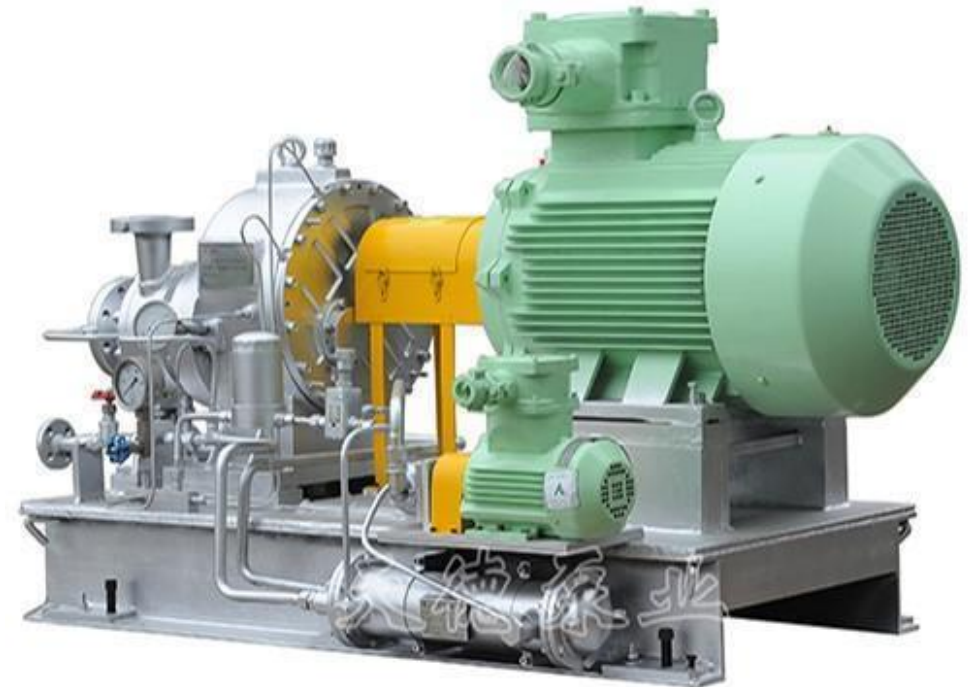
GSB-Q6-23/1780

Power: 355kW

- **Single Suction, Single Stage Acceleration, Overhung Horizontal, Closed Type Impeller**
- **Integral Type Accelerating Gearbox, Involute Helical Gear Accelerating**



**GSB-Q1**

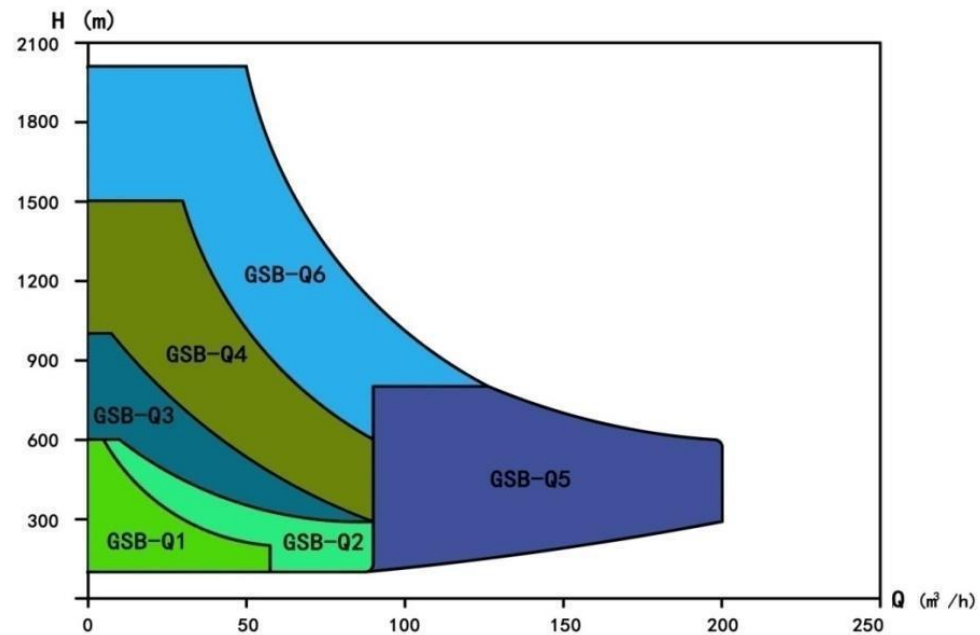
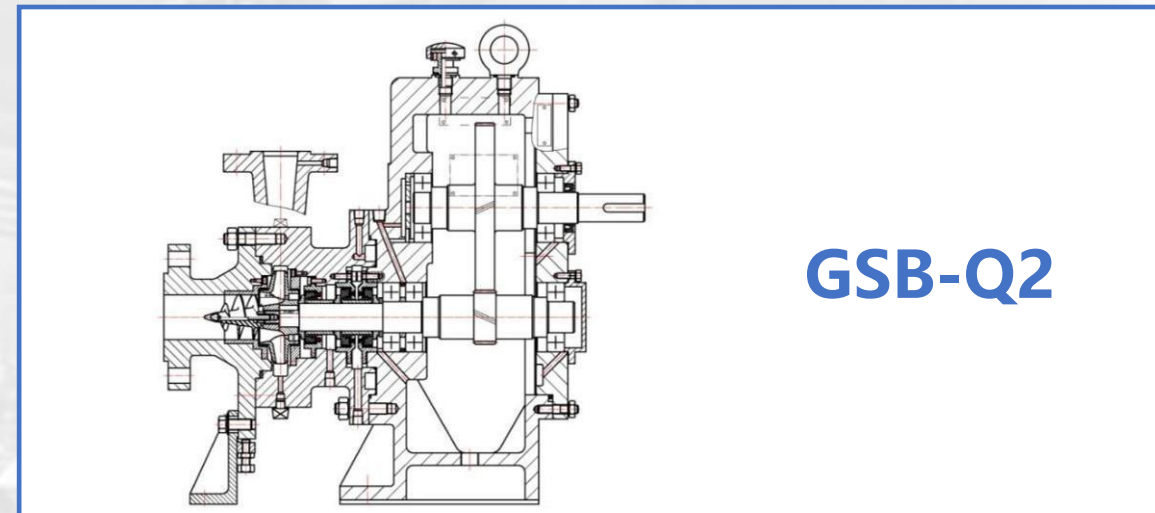
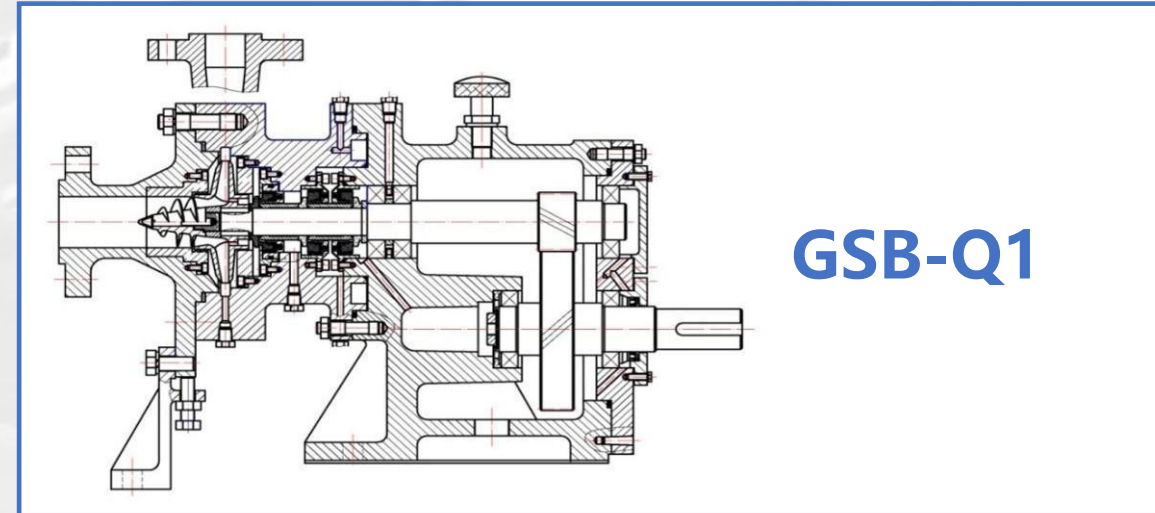


**GSB-Q2**

# GSB-Q1, Q2 Parameter

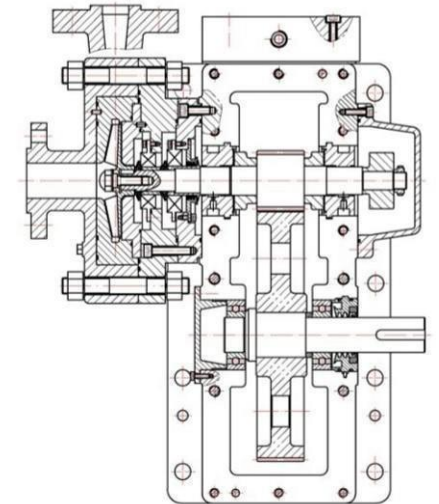
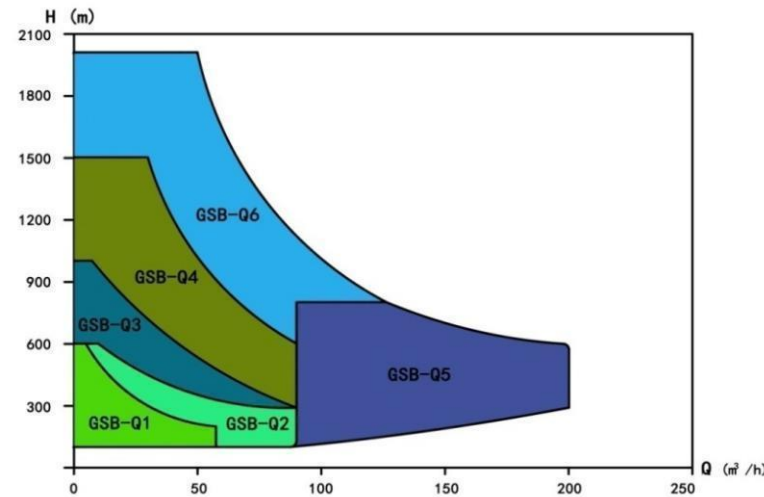


Type	Flow m <sup>3</sup> /h	Head m	Speed RPM	TEMP °C	Power kW
GSB-Q1	2~60	80~600	7300~9500	-60 ~260	≤45
GSB-Q2	2~90	80~600	7300~9500	-60 ~260	≤132

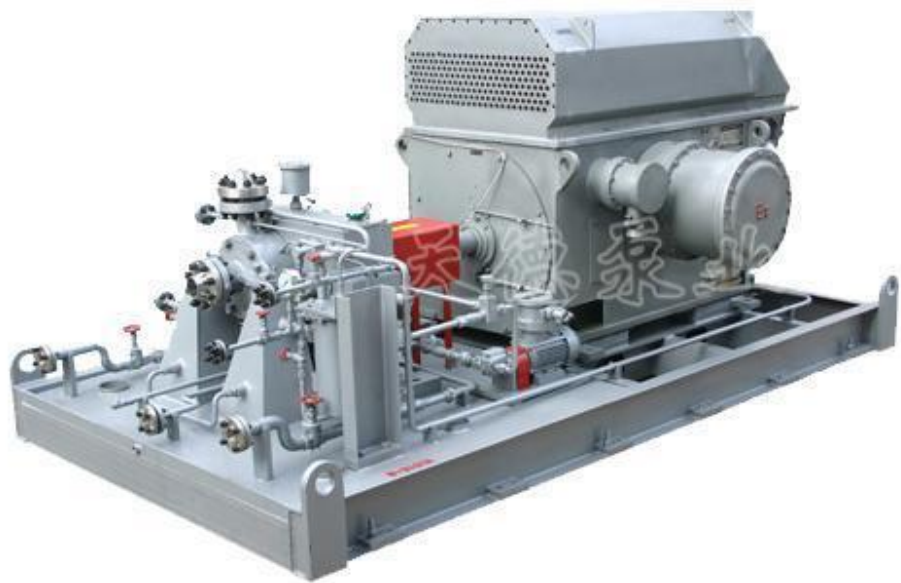


- Split Accelerating Gearbox , Single Stage Straight Tooth Acceleration
- Opened Type Impeller
- Support: Journal Bearing & Thrust Bearing ( Tilting Pad Bearing )
- Lubrication: External Double-Geared Oil Pump

Type	Flow m <sup>3</sup> /h	Head m	Speed RPM	TEMP °C	Power kW
GSB-Q3	3~90	300~1000	9500~15000	-60 ~ 150	≤160



- Split Accelerating Gearbox , Single Stage Straight Tooth Acceleration
- Opened Type Impeller
- Support: Journal Bearing & Thrust Bearing ( Tilting Pad Bearing )
- Lubrication: External Double-Geared Oil Pump



**GSB-Q4**

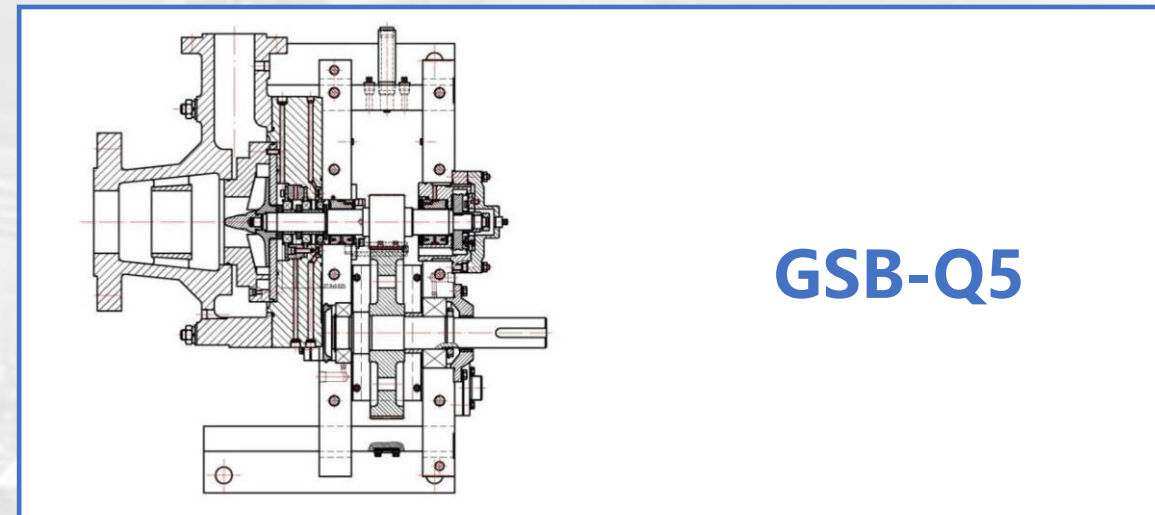
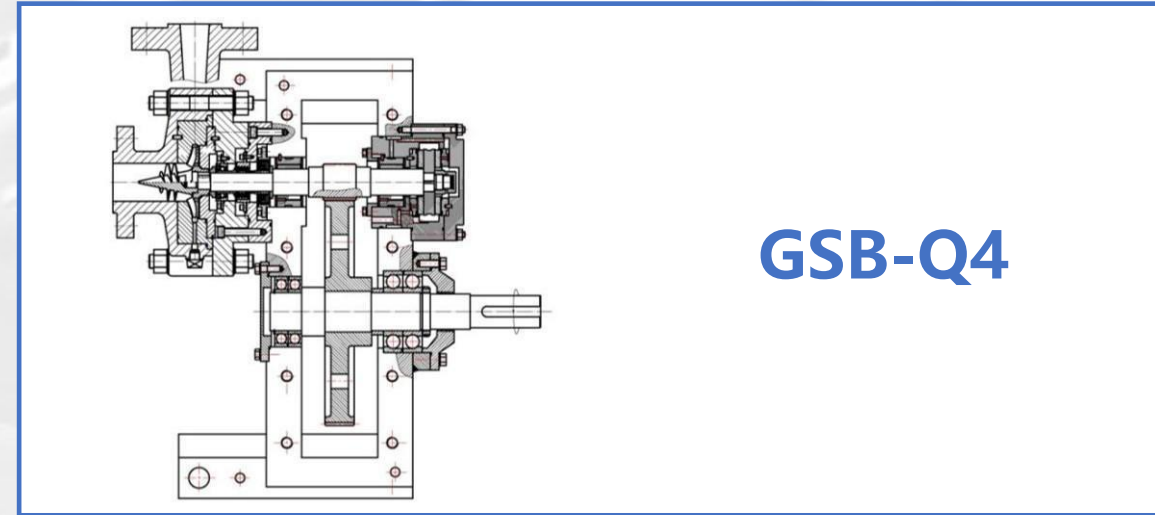
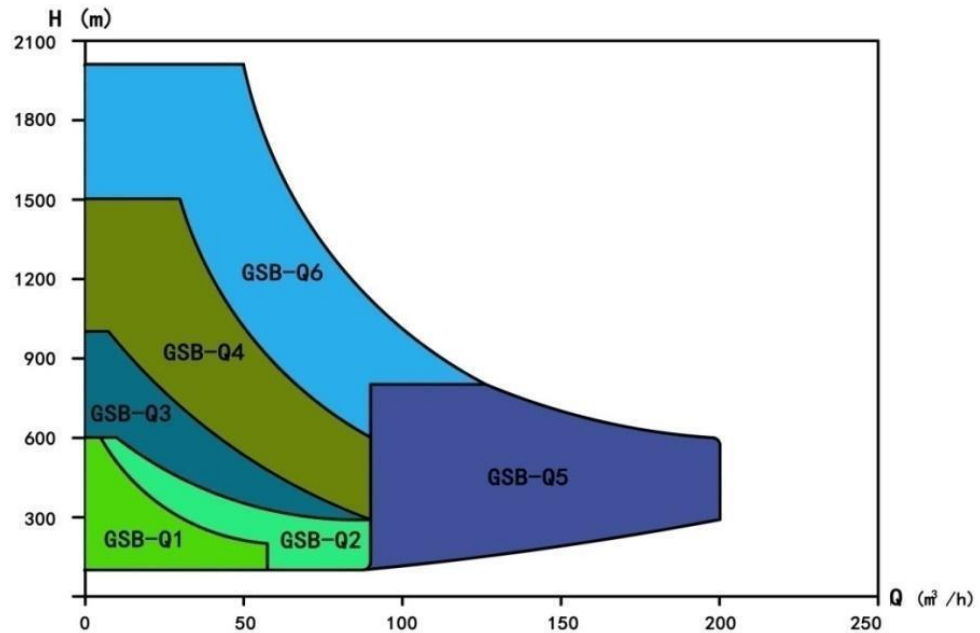


**GSB-Q5**

# GSB-Q4, Q5 Parameters



Type	Flow m <sup>3</sup> /h	Head m	Speed RPM	TEMP °C	Power kW
GSB-Q4	6~90	500~1500	15800~ 19600	-60~260	≤315
GSB-Q5	90~220	300~900	9600~ 11000	-60~260	≤630



# GSB-Q1 ~Q6 Series Overview



**GSB-Q1**



**GSB-Q2**



**GSB-Q3**



**GSB-Q4**



**GSB-Q5**



**GSB-Q6**

# GSB-Q1~Q5 Application



▲ **CNPC Daqing Petrochemical Company**  
**GP-3004A/S**  
**Desuperheating Injection Pump**  
**GSB-Q1-4/530**  
**Power: 37KW**

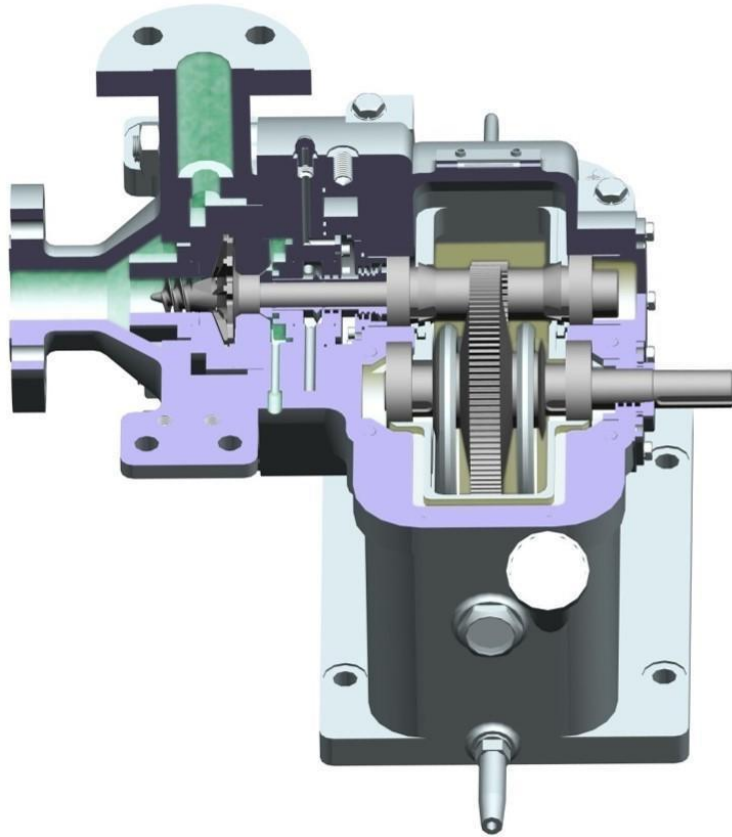


▲ **CNOOC Huayue Chemical Company**  
**P3001A/B**  
**Hydrogenation Charging Pump**  
**GSB-Q4-25/1100**  
**Power: 185KW**



▲ **Fujian United Petrochemical Co., Ltd**  
**2000-P40412AR/BR**  
**Propylene Product Pump**  
**GSB-Q5-171/580**  
**Power: 255KW**

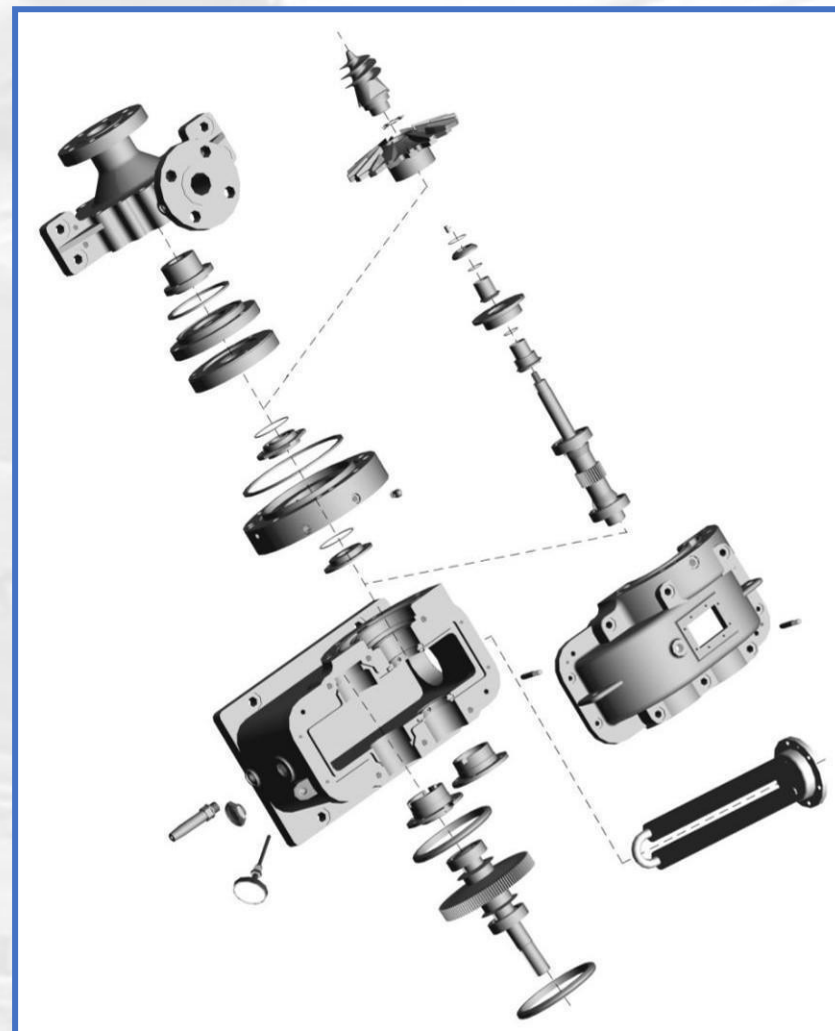
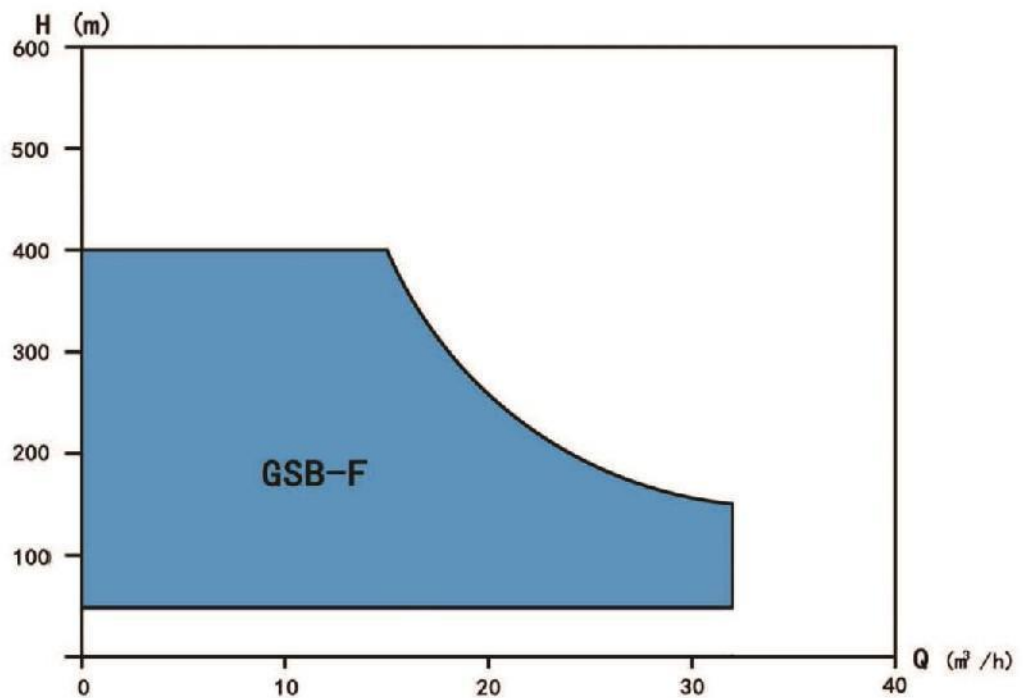
- Single Stage Acceleration, Single Suction, Rear Entry , High Standard , High Interchangeability .
- Lubrication system uses patented technology:  
Centrifugal jet (oil separating) and other structural combination



# GSB-F Series Parameters



Type	Flow m <sup>3</sup> /h	Head m	Speed RPM	TEMP °C	Power kW
GSB-F	0.7~32	50~400	7081~11406	-60 ~150	3 ~45



# GSB-F Series Application



▲ CNOOC Dongfang Petrochemical LTD  
Slug Reduction & Charging Pump  
GSB-F-1.2/325  
Power: 22kW



▲ CNPC Wuhan Petrochemical LTD  
Water Treatment Pump  
GSB-F-19/180  
Power : 22kW

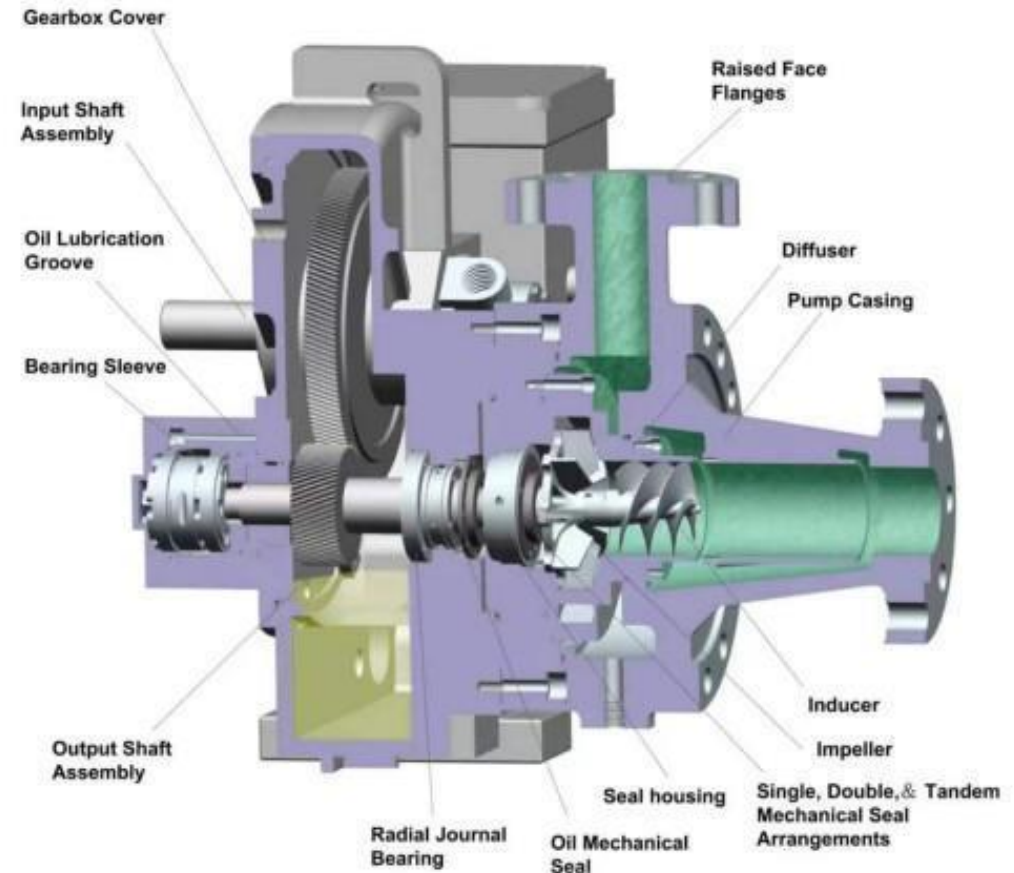
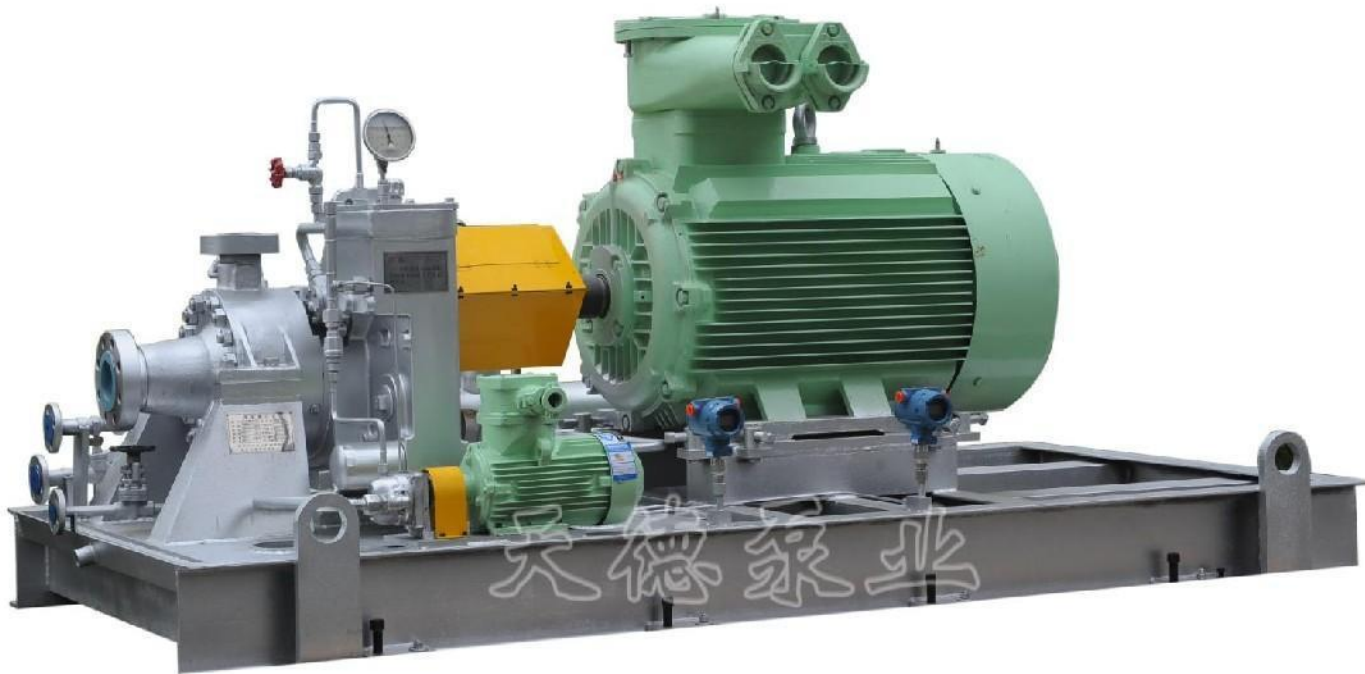


▲ CNOOC Ningbo Daxie Petrochemical LTD  
Ammonia-poor Liquid Pump  
GSB-F-10/360  
Power : 30kW



▲ Shanxi Yanchang Petroleum (Group) CO., LTD  
Desulfurization Ammonia-poor Liquid Pump  
GSB-F-5/323  
Power : 22kW

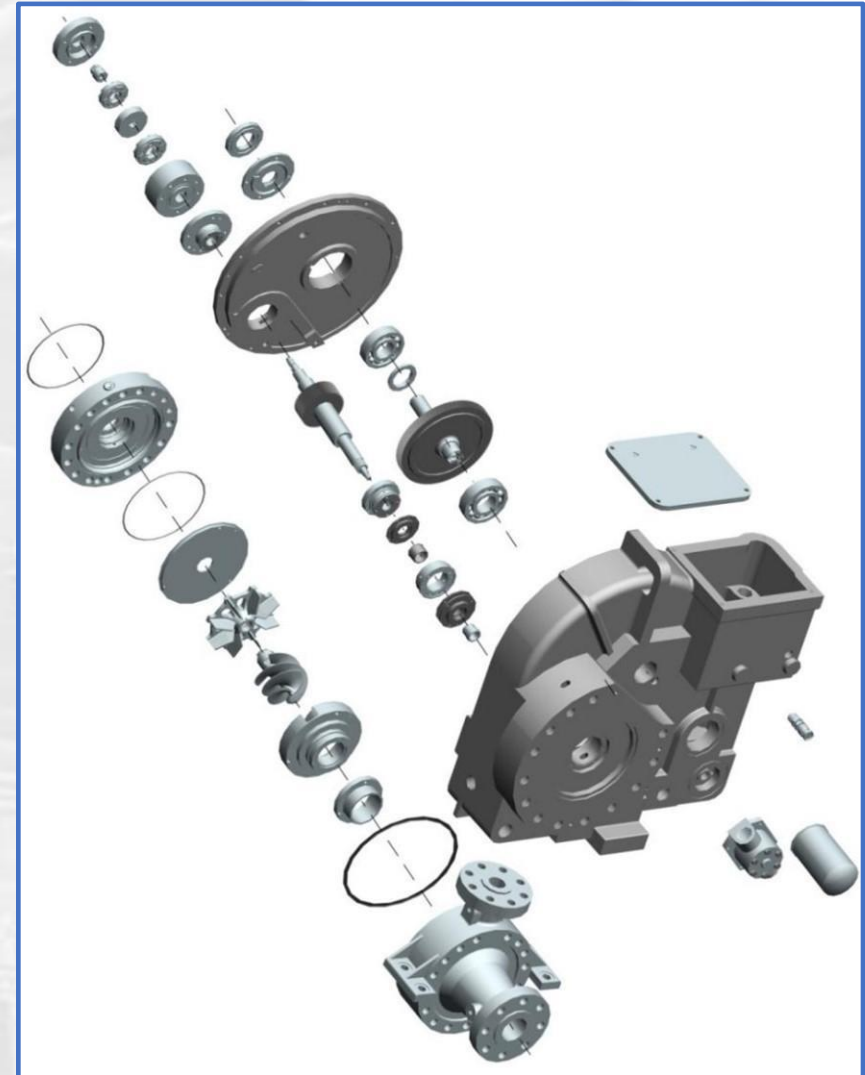
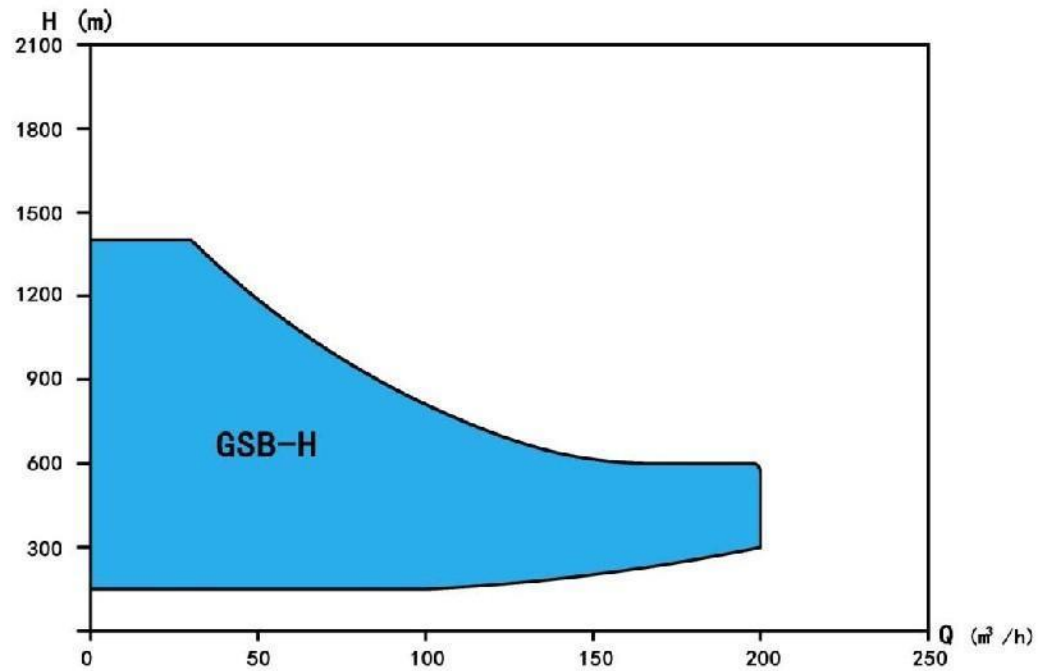
- Upper & Lower Oil Tank
- Single Stage Acceleration, Single Suction, Horizontal
- Support: Journal Bearing & Thrust Bearing ( Tilting Pad Bearing )
- Lubrication: External Main Oil Pump & Auxiliary Gear OIL PUMP



# GSB-H Series: Horizontal High-Speed Centrifugal Pump



Type	Flow m <sup>3</sup> /h	Head m	Speed RPM	TEMP °C	Power kW
GSB-H	5 ~200	180 ~1400	6800~17521	-60~200	75~355



# GSB-H Application



▲ SINOPEC Maoming  
Petrochemical Company  
Gas Fractionation Device  
400 thousand tons each year  
P-101A/B  
Depropanizer Charging Pump  
GSB-H-110/300  
Power: 110KW

▲ SINOPEC Lanzhou  
Petrochemical Company  
Diesel Hydrogenation Device  
3 million tons each year  
P-102A/B  
GSB-H-30/788  
Power: 160KW

▲ CNOOC Huizhou Refinery Company  
Ethylene Chemical Engineering Device  
1 million tons each year  
OCU Device  
250 thousand tons each year  
2104-P-201A/B  
Selective Hydrogenation Charging Pump  
GSB-H-117/355 Power: 132KW



# Thank You for Watching

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