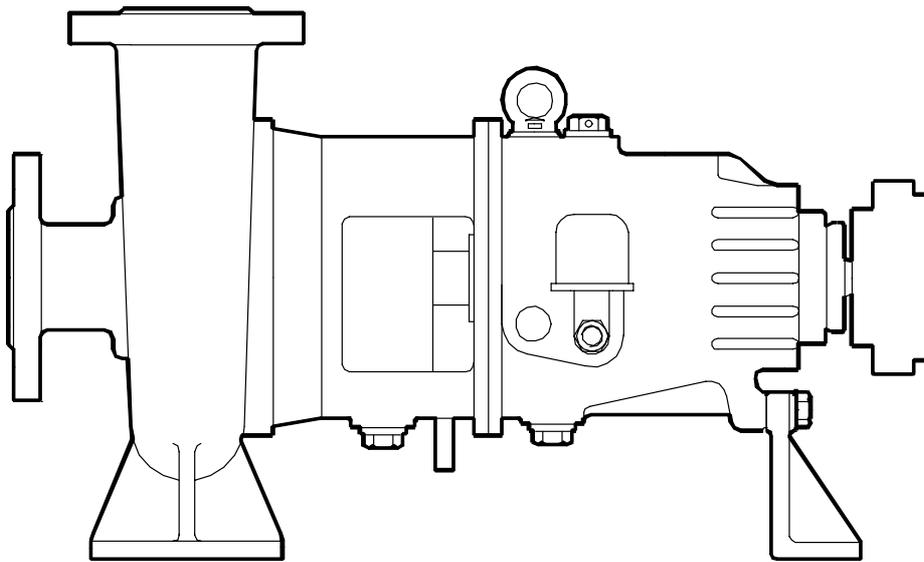




# HTFLO Series

## Petrochemical Process Pump

According to API610 7<sup>th</sup> Edition



**Capacity:** 2~3000m<sup>3</sup>/h (50Hz), 2.4~3600m<sup>3</sup>/h (60 Hz)

**Head:** ~300m (50 Hz), ~430m (60Hz)

**Pressure:** HTFLO, HTFLO-K: ~2.5MPa, HTFLO-G: ~5.0MPa

**Temperature:** -80~+350 °C

### Application:

For pumping liquids in refineries, petrochemical plants, power plants, general process, offshore industry, seawater, etc.



## 1 General

HTFLO pumps are designed according to the 7th revision of the standard of API 610.

Impellers of enclosed and semi-open types balance the axial thrust by the application of balance hole together with wearing rings. Impellers of open type balance the axial thrust by the application of back ribs on the back of impeller shroud.

In order to balance the radial force, pumps with discharge nozzle size greater than 80 mm are designed as the type of double volute. Thus the life of bearings and the stiffness at the shaft sleeve are ensured.

Depending on various operating conditions, cylindrical roller bearing plus angular contact ball bearing or cylindrical roller bearing plus taper roller bearings are available. The bearings' life can be extended greatly.



HTFLO series of pumps avoid the shortcomings of API610(6th) pumps by comprehensive considerations on the design of hydraulic parts, connections of casing and bearing housing, mechanical seal assembly, cooling methods and auxiliary piping system.

Casing and bearing housing are connected by adaptor that can be made of different material depending on the various operating conditions. Thus the seriously corrosion or fracture of bearing frame can be avoided when handling liquids with high pressure, strongly corrosive, flammable or explosible properties.

HTFLO pumps' hydraulic patterns are selected and improved basing on the existing excellent patterns. With enlarged impeller's eye area that results in lower suction velocity, pump's anti-cavitation ability is enhanced and efficiency is improved. Increased corrosion allowance of casing and impeller extend the pump's life.

Wearing plates are small parts such as wearing rings and shaft sleeve. Major parts such as shaft can be used continuously after the replacement of these wearing plates, thus the cost of maintenance is greatly decreased.

## 2 Rotation direction

Clockwise viewed from drive-end.

## 3 Three varieties of design are available as follows

HTFLO (basic design):

Foot support, enclosed impeller, design pressure 2.5 MPa, suitable for general process.

HTFLO-K (open impeller design):

Foot support, open or semi-open impeller, design pressure 2.5 MPa, suitable for various slurry or liquids with solid particles.

HTFLO-G (Heavy duty design)

Centerline support, enclosed impeller, design pressure 5.0 MPa, suitable for high temperature and/or high pressure process



### 3 Auxiliary piping system

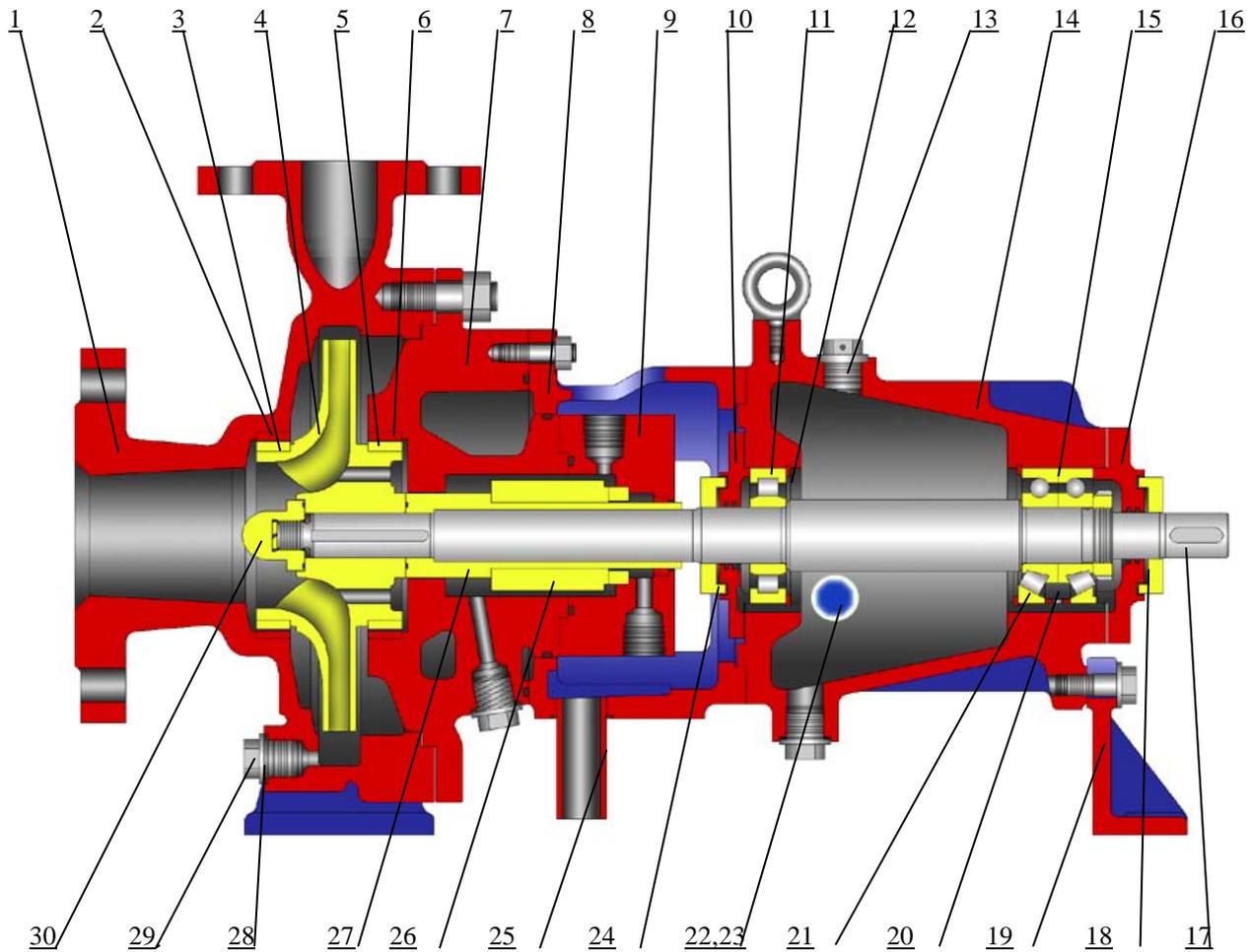
Various types of shaft sealing are available depending on the exact operating conditions. The temperature range under which pump can operate are widened by the application of air-cooled design by finned ribs or water-cooled design on bearing housing.

Both casing and casing cover can be equipped with heating jackets when pumped liquids are liable to crystallization or solidification.

Piping systems are meeting the requirements of API 610 (7<sup>th</sup>). Depending on various operating conditions, casing cover, bearing housing or casing support can be cooled. Seal cover can be quenched.

### 4 Cross sectional drawing

#### Basic design

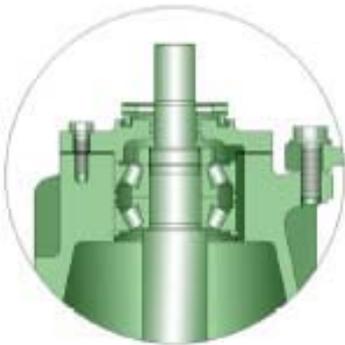


- |                               |                               |                                 |                         |                    |
|-------------------------------|-------------------------------|---------------------------------|-------------------------|--------------------|
| 1 Casing                      | 7 Casing cover                | 13 Vent plug                    | 19 Foot                 | 25 Draining pipe   |
| 2 Casing wearing ring         | 8 Adaptor                     | 14 Bearing housing              | 20 Bearing spacer ring  | 26 Mechanical seal |
| 3 Front Impeller wearing ring | 9 Gland cover                 | 15 Angular contact ball bearing | 21 Taper roller bearing | 27 Shaft sleeve    |
| 4 Impeller                    | 10 Front Bearing cover        | 16 Back bearing cover           | 22 Constant level oiler | 28 Plug            |
| 5 Back Impeller wearing ring  | 11 Cylindrical roller bearing | 17 Shaft                        | 23 Oil sight glass      | 29 Sealing gasket  |
| 6 Casing cover wearing ring   | 12 Snap ring                  | 18 Back deflector               | 24 Front deflector      | 30 Impeller nut    |

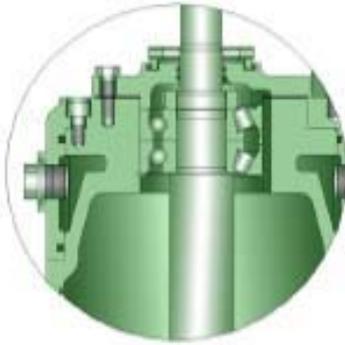


**Design variety**

3. Taper roller bearings are optional



4. Bearing housing water-cooling design



5. Bearing box design of HTFLO-K



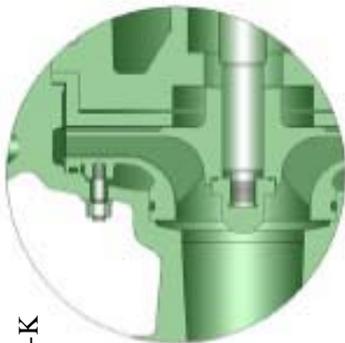
6. Foot support of HTFLO, HTFLO-K



7. Semi-open impeller Design



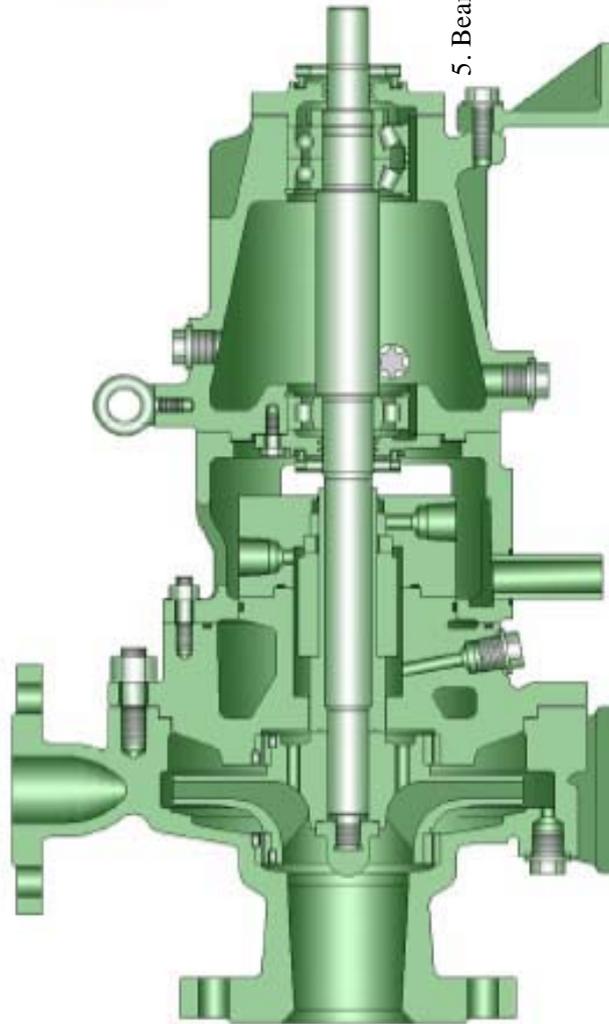
2. Open impeller of HTFLO-K



1. Centerline support of HTFLO-G



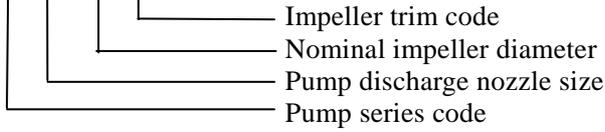
8. Inducer design





## 5 Designation

HTFLO 40-160 B



HTFLO (Basic design)  
 HTFLO-K (Open impeller design)  
 HTFLO-G (Heavy duty design)

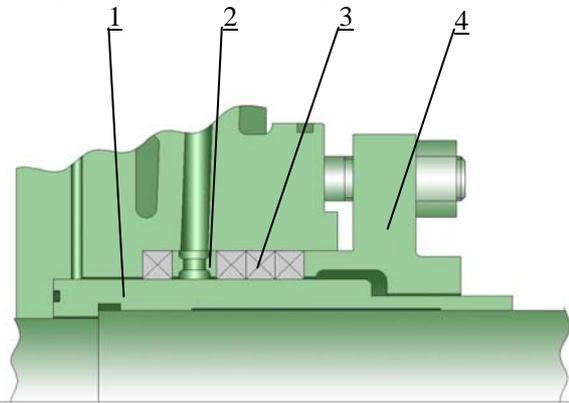
## 6 Operating parameters

Nozzle:	DN	25~400 mm
Capacity:	Q	2~3000 m <sup>3</sup> /h (50Hz), 2.4~3600 m <sup>3</sup> /h (60 Hz)
Head:	H	~300 m (50 Hz), ~430 m (60Hz)
Pressure:	P	~ 5.0 MPa
Temperature:	T	-80~+450 °C

## 7 Shaft sealing system

### Gland packing

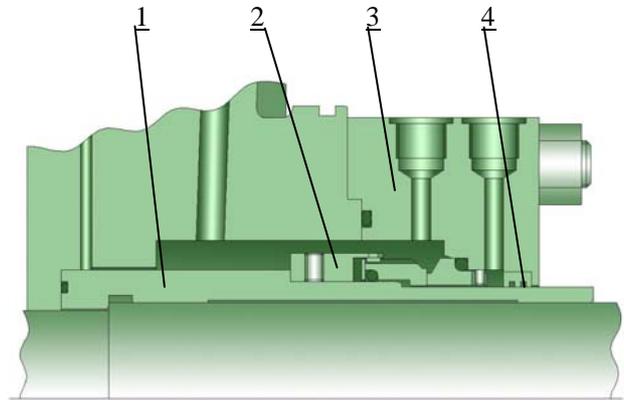
Gland packing is more economical than other types of sealing. Some leakages are allowable. So the sealed liquid should be clean, non-hazardous and preferred to have property of self-lubricating.



1 Shaft sleeve 2 Lantern ring 3 Gland 4 Gland cover

### Single mechanical seal

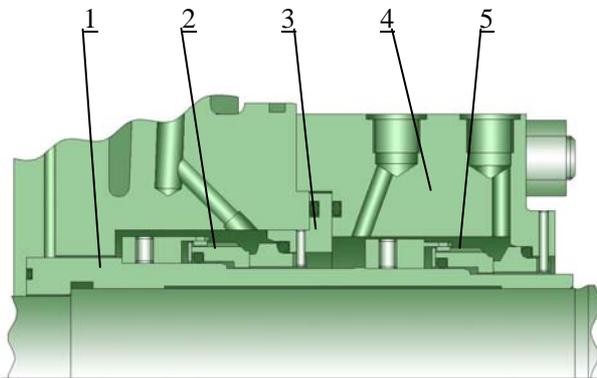
With simple construction, single mechanical seal can suit most operating conditions. But the sealed liquid must be clean or the seal is flushed by clean liquid from external source.



1 Shaft sleeve 2 Mechanical seal 3 Seal cover 4 Throttle bushing

### Tandem mechanical seal

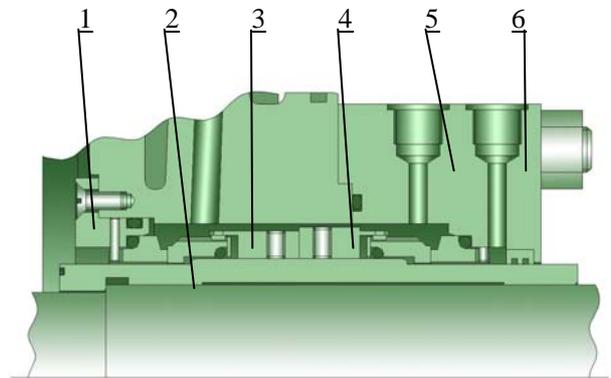
When pressure of pumped liquid is beyond the allowable range of single mechanical seal can stand, tandem seal should be applied. Furthermore, possible seal failure can be detected by monitoring the pressure of seal chamber. Normally pressure alarm are applied.



1 Shaft sleeve 2 Mechanical seal 3 Stationary ring seat  
4 Seal cover 5 Mechanical seal

### Double mechanical seal

When pumped liquid are not clean or not allowed to leak into atmosphere, double mechanical seal type should be applied. If double mechanical seal applied, barrier liquid's pressure should be greater than sealed liquid.



1 Stationary ring seat 2 Shaft sleeve 3 Mechanical seal  
4 Mechanical seal 5 Seal cover 6 Throttle bushing



## 10 Performance coverage (50Hz)

