# Rodelta ETLS

The pump type ETLS (OH3) vertically inline mounted, flexible coupled, radial split case, single stage, single suction, heavy duty centrifugal process pumps. The design complies with the latest edition of the American Petroleum Institute standard 'Centrifugal Pumps For General Refinery Services', also known as API 610/ ISO13709. The inline configuration is a compact pumping solution that eliminates the need for an expensive baseplate saving valuable floor space. (This pump is also available in close coupled execution pump type ETL (OH5) for very compact applications).

## Features:

- According API 610 (OH3)
- Diffuser design reduces radial loads
- Reduces minimum flow requirements
- High efficiency at any duty
- Alignment free construction
- In line suction & discharge
- Space saving construction
- Stable head characteristics
- Meets API nozzle load requirements
- The connection dimensions of the pressure- and suction flange are made according to the British Standard BS4082.
- The impeller is a closed radial design, dynamically balanced and incorporates a wear ring on either side of the impeller. (The ETLS can also be supplied with a semi-open impeller for liquids which are sensitive to clogging.)
- Accommodates API 682 seal systems

## Specifications:

- Delivery size up to 200mm
- Capacity up to 600m3/hr (50Hz/3000 rpm)- 720m3/hr (60Hz/3600 rpm)
- Head up to 290m (50Hz/3000 rpm)- 420m (60Hz/3600 rpm)
- Suitable for liquid Temperature: Up to 425°C Depending on Pump size
- Sealing Arrangement: mechanical seals
- Flange rating: Cl. 150/300/600
- API material options available, NACE & ATEX approvals available on request

## Applications:

- Fluid handling in oil refineries and petrochemical industry
- High temperature and high pressure critical applications in chemical and allied industry
- Upstream, pressure booster
- Midstream, process transfer, bottom reflux, propane/butane/LPG handling, diesel oil/ gasoline/naphtha/lube oils etc., sodium carbonate/caustic sour water, MEA/DEA/TEA

- Fertilizer, carbamates/lean and semi lean solutions, NH3 feed, other removals
- Power plant, Hot water circulation, condensate transfer, fuel oil
- Onshore/Offshore installations
- FSPO platforms
- Hydrocarbon storage
- Liquid gas plants

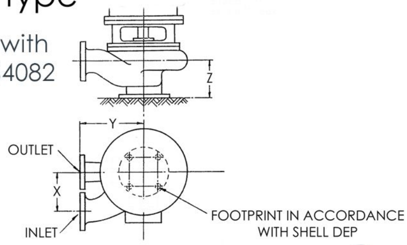
<u>Constructional features:</u>

- Suction and discharge flanges are available drilled to either ANSI or DIN-EN standards, flange rating comply with API 610 nozzle load requirements.
- The pump casing, cover and seal cover incorporate a fully confined gasket.
- Mechanical Seals conform to API 682 / ISO21049 and are fitted into the API compliant seal chamber, either single, double or engineered seals can be accommodated that meet the full process requirements. All seals are provided with the relevant API compliant flushing, cooling, heating, quench and buffer fluid systems and associated pipework. Use of standard electric motor design
- Grease lubricated bearings are used as standard, optional oil mist lubricated bearings can be used.

***There is also a version of the ETLS available where the motor is directly mounted onto the pump. Additionally, it is possible to equip the ETLS with a U-turn, bottom suction or even in a corner execution. If you are interested in these options, please ask about the possibilities.***

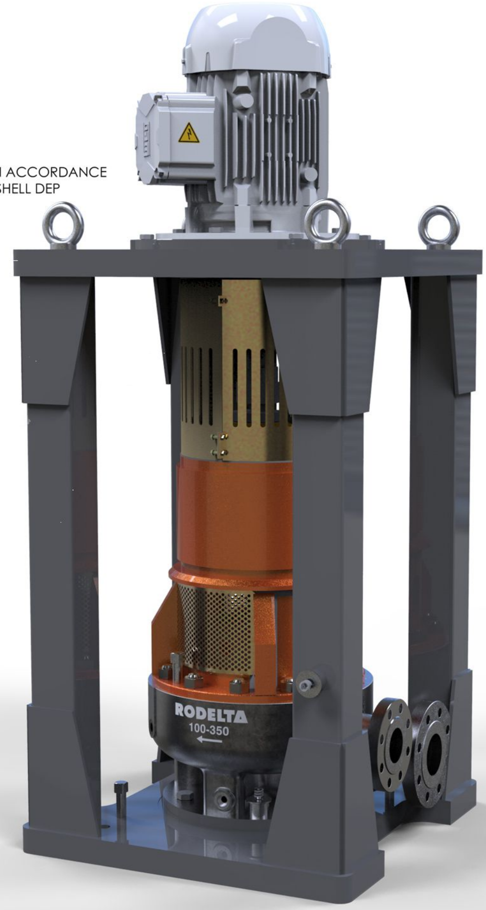
ETLS-U type

In accordance with
British Standard BS4082





ETLS with motor directly on the pump




ETLS U-turn execution

## Why using diffuser technology in ETLS pumps?

The working principle of centrifugal pumps is based on adding energy to the working medium using a rotating impeller. This process, in addition to increasing the static pressure, also increases the velocity of the fluid. The added energy in the form of velocity (or dynamic pressure) can be partially converted into static pressure by properly slowing down the fluid. This is often done by using a volute which is a spiral-formed casing around the impeller, collecting and guiding the fluid towards the discharge pipe while gradually decreasing its velocity.

A volute pump casing combines two functions: providing the hydraulic flow path and the pressure casing for the fluid. In diffuser pumps, these functions are split into two separate parts. A casing (or collector) is used for creating the pressure boundary, while the velocity-pressure conversion is done by employing a diffuser, which is a ring with multiple diverging channels, placed around the impeller. This provides more guidance for the decelerating flow which can be beneficial from several points of view. Especially for pumps made for operation at relatively low flow rates, diffuser pumps outperform volute pumps efficiency wise. In addition to the higher maximum efficiency, the efficiency does not collapse as fast when operating in part load conditions ( See *figure 4* )

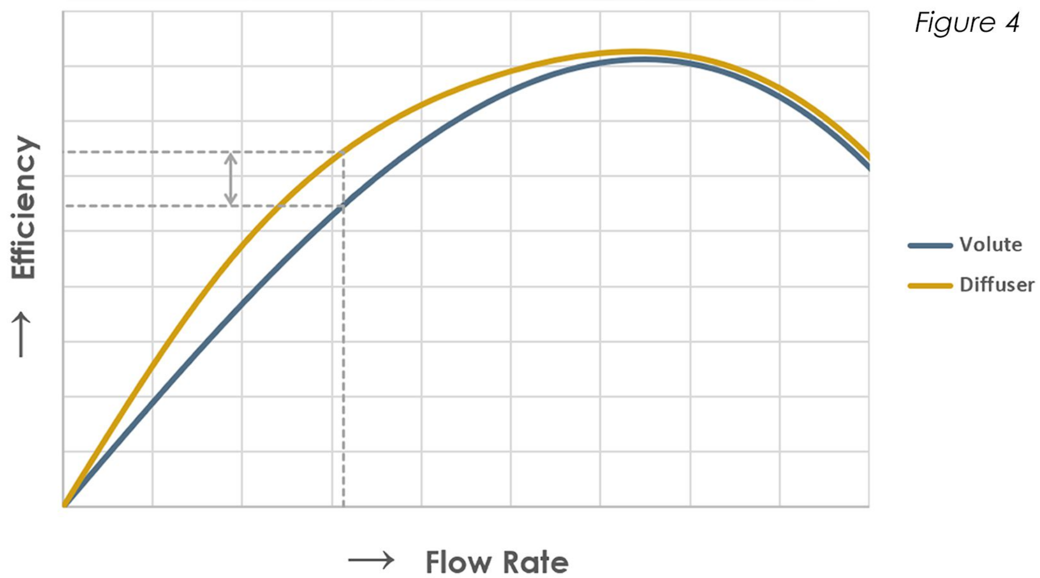
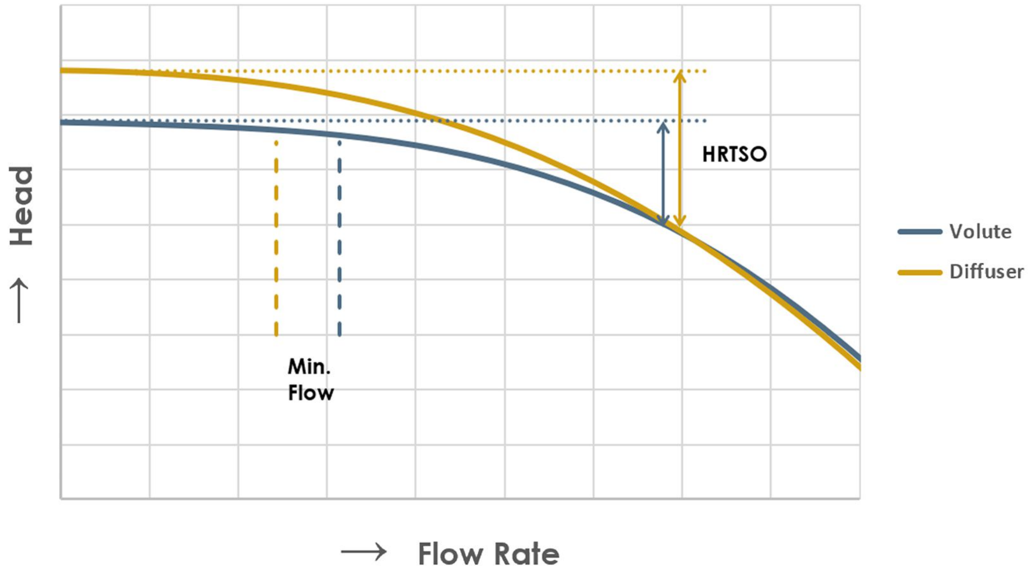



*Figure 4*

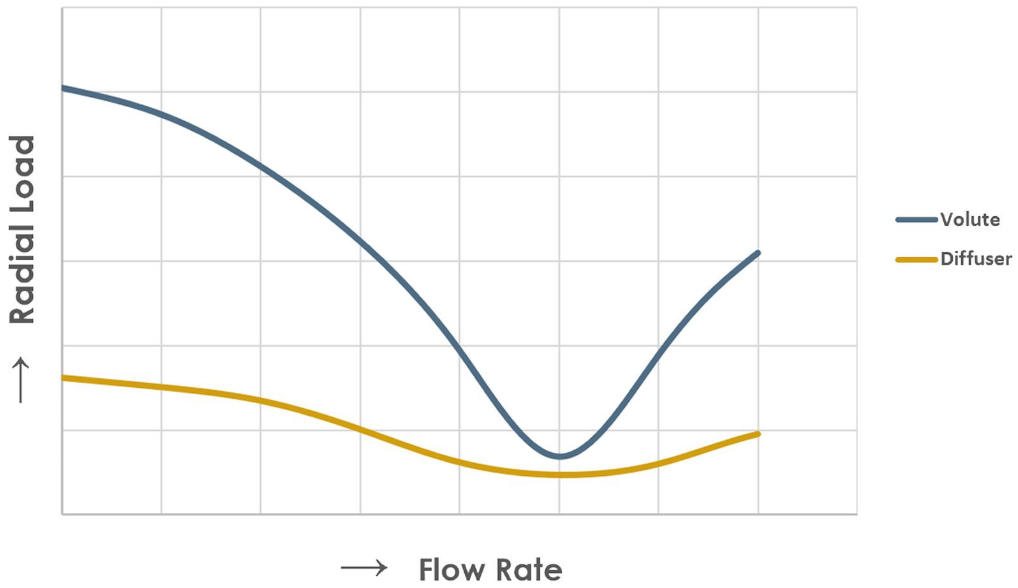
Furthermore, diffuser pumps mostly have higher head rise to shut-off (HRTSO) and greater steepness and stability of the head curve, which is especially required for pumps operating in the API market and for parallel operation (see *figure 5*).

Figure 5




Diffuser pumps are not just advantageous from an efficiency standpoint. The multi-channel diffuser geometries show more axial symmetry than the asymmetric volute shapes. As this axial symmetry is also present in the pressure distribution of the flow field, most of the radial loads are cancelled out (see *figure 6* )

Figure 6

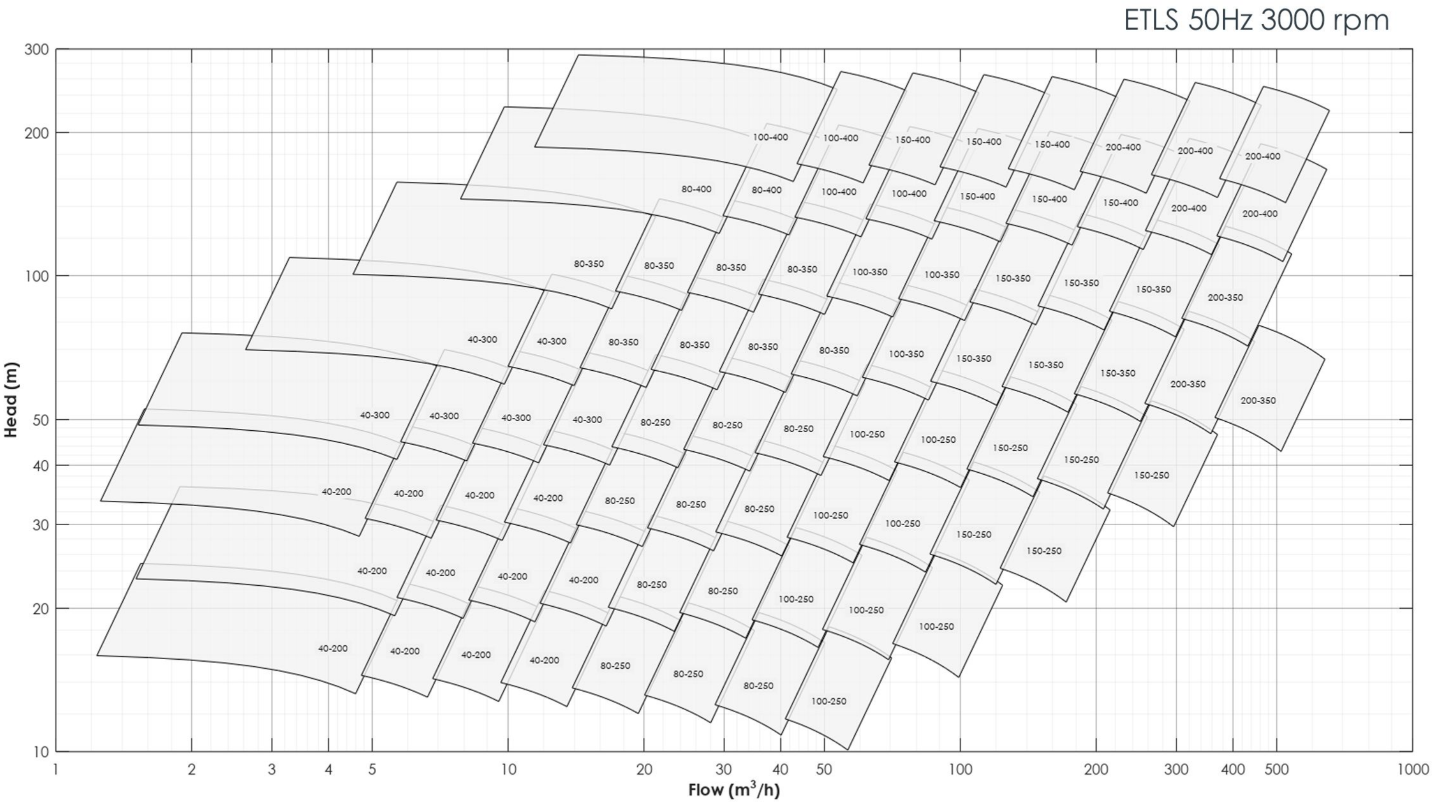



Also, due to a series of diffuser vanes as opposed to a single volute tongue, pulsations from the passing impeller blades and other unsteady flow phenomena are greatly reduced. Lower unsteady behavior means lower vibration and noise levels, which is especially noticeable at off-design operating conditions. The reduced loading and vibrations in turn lead to longer mean time between maintenance, mean time between failure and lower minimum continuous safe flow rates. Although diffuser pumps are generally more expensive than their volute counterparts, the higher investment can be easily returned by the longer life-cycle of the pump, lower spare part cost and the significant reduction in down-time of the entire process.

Another advantage arises from the fact that the diffuser is a separate part from the pump (pressure) casing. A lot of design flexibility is introduced because a single casing can fit a wide range of diffuser geometries. As the diffuser channels are machined, they do not suffer from the limitations of a casting process, which is the case for volute casings. This also provides the opportunity to make custom diffusers for every order, which can be done very rapidly. Doing this for a volute would be an almost impossible task, as designing a volute is more complex and casting patterns would have to be made and stored for every single volute. This means that volute pumps will mostly be a compromise: due to the limited number of volute pumps in a range, the customer duty point will deviate from the best efficiency point of the pump. This problem can be circumvented using diffusers. By trimming the impeller diameter and creating a custom diffuser geometry, the required pump performance can be achieved where the best efficiency point is located exactly where the customer needs it. This even provides possibilities for retrofitting existing diffuser pumps with a new impeller and/or diffuser, in order to completely change the duty point of the pump, increasing the life cycle of the pump even further.

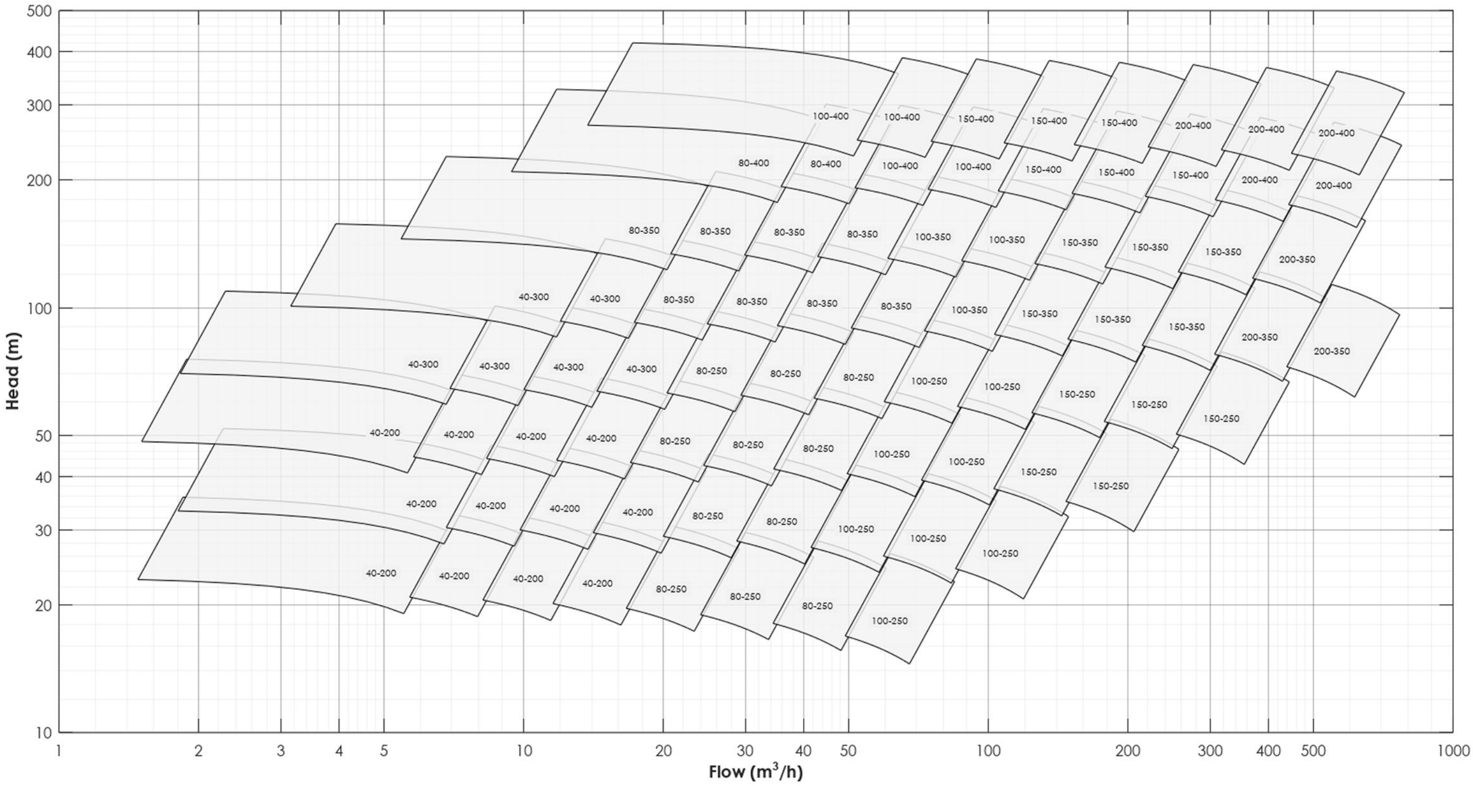
*Machined diffuser*

## ETLS  performance curves

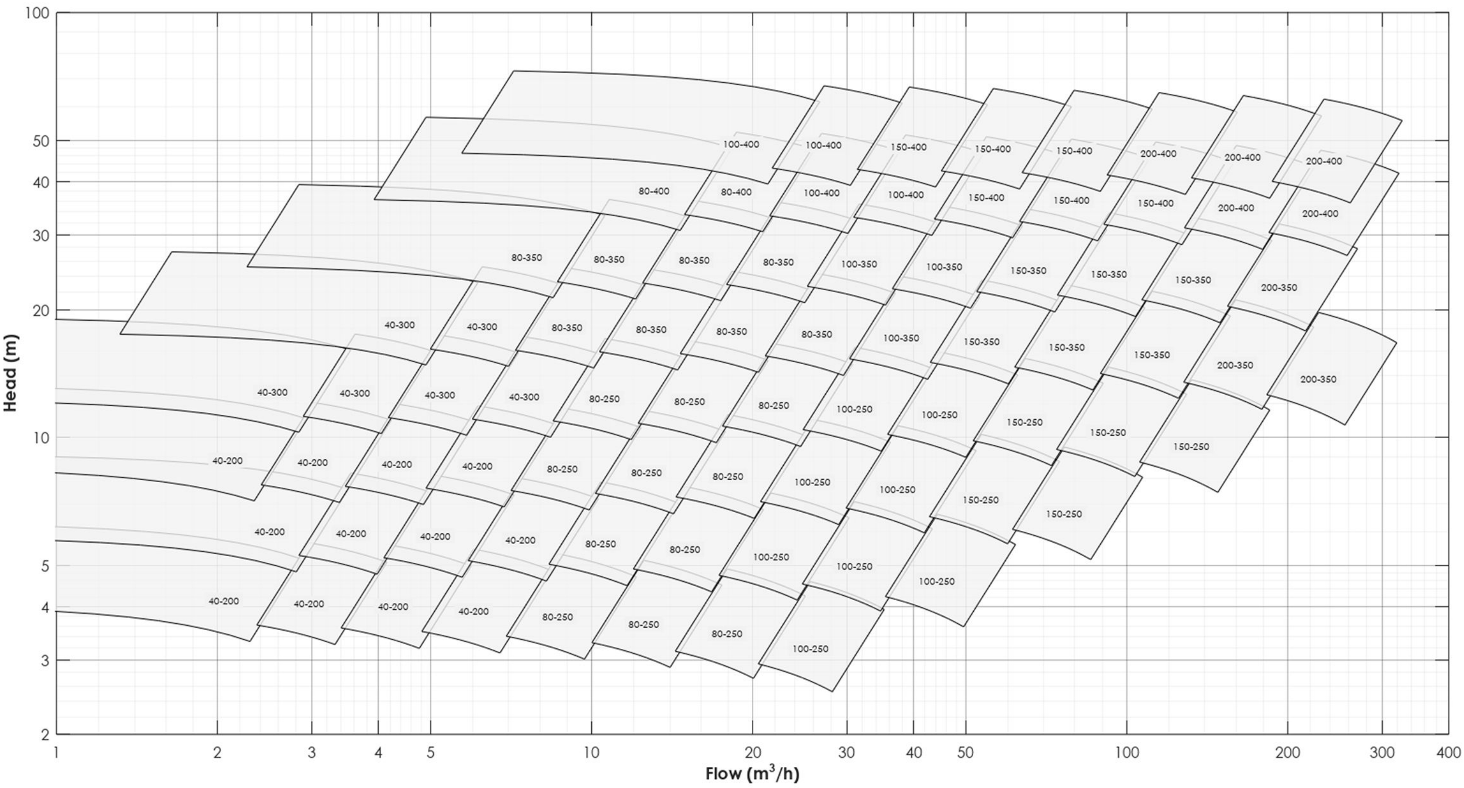


# ETLS performance curves

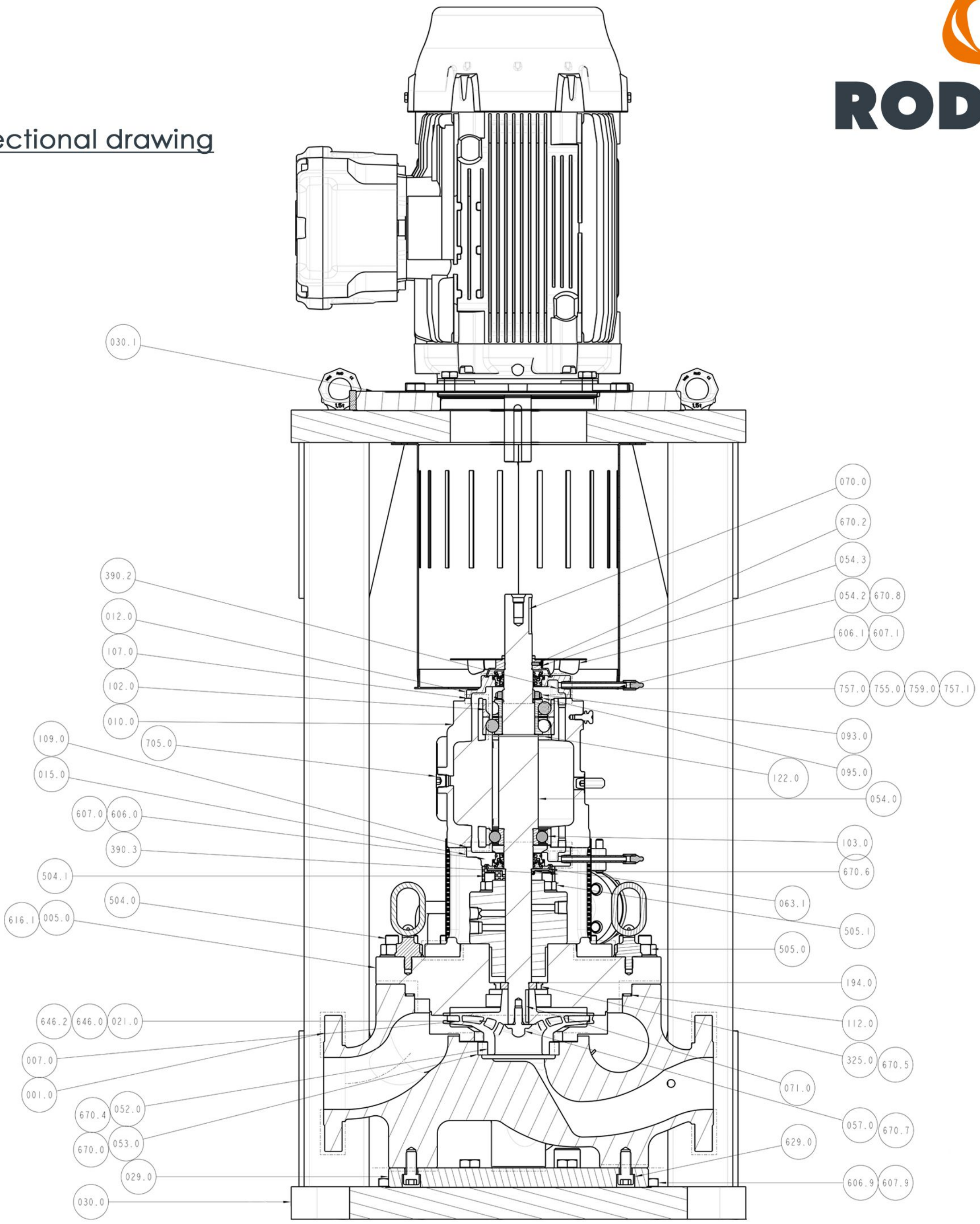
## ETLS 60Hz 3600 rpm



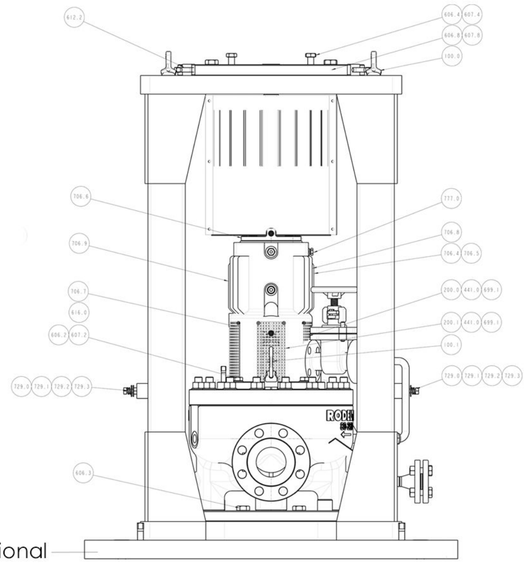

## ETLS 50Hz 1500 rpm



## Cross sectional drawing




SECTION A-A




| Pos nr | Part description | Pos nr | Part description |
|---|---|---|---|
| 001.0 | Casing | 070.0 | Coupling key |
| 005.0 | Cover | 010.0 | Bearing bracket |
| 007.0 | Impeller | 012.0/015.0 | Bearing bracket covers |
| 0.53.0 | Wear ring casing | 107.0/109.0 | Gasket bearing bracket covers |
| 051.0 | Wear ring cover | | |
| 052.0 | Wear ring impeller | 390.0 | Labyrinth ring |
| 194.0 | Throat bush | 391.0 | Inpro seal |
| 325.0 | Stub sleeve | 924.0 | Cooling coil |
| 021.0 | Diffuser | 063.0 | Seal cover ring |
| 054.0 | Pump shaft | 054.3 | Fan bush |
| 057.0 | Impeller nut | 054.2 | Fan |
| 112.0 | Gasket casing-cover | 200.0/200.1 | Seal guards |
| 504.0 | Stud casing | 102.0 | Thrust bearing |
| 505.0 | Nut casing | 103.0 | Radial bearing |
| 572.0 | Stud seal | 093.0 | Lock washer |
| 505.0 | Nut seal | 095.0 | Thrust bearing lock nut |
| 071.0 | Impeller key | | |

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|---|---|---|
| **Design standard** | BS 4082-1, ISO 13709 | |
| **Features** | Vertical In-line Overhung OH3,Long coupled (API 610) | |
| **Capacity @ BEP** | Upto 600 $m^3$/hr 50Hz3000 Rpm | 720 m/hr 60Hz 3600 Rpm |
| **Head** | Upto 290m (50Hz 3000 Rpm) | 420m (60Hz 3600 Rpm) |
| **Temperature range** | -40 to 425 °C | |
| **Discharge pressure** | Default. 300#' | |
| **Nozzle Orientation (suc/dis)** | In line position | |
| **Standard Motor Sync. Speed** | 1000/1500/3000 rpm | 1200/1800/3600 rpm |
| **Suction Pressure** | Upto 20 Bar | |
| **Max. Operating Speed** | 3600 rpm | |
| **Flange ratings(#RF)** | Cl. 150/300 | |