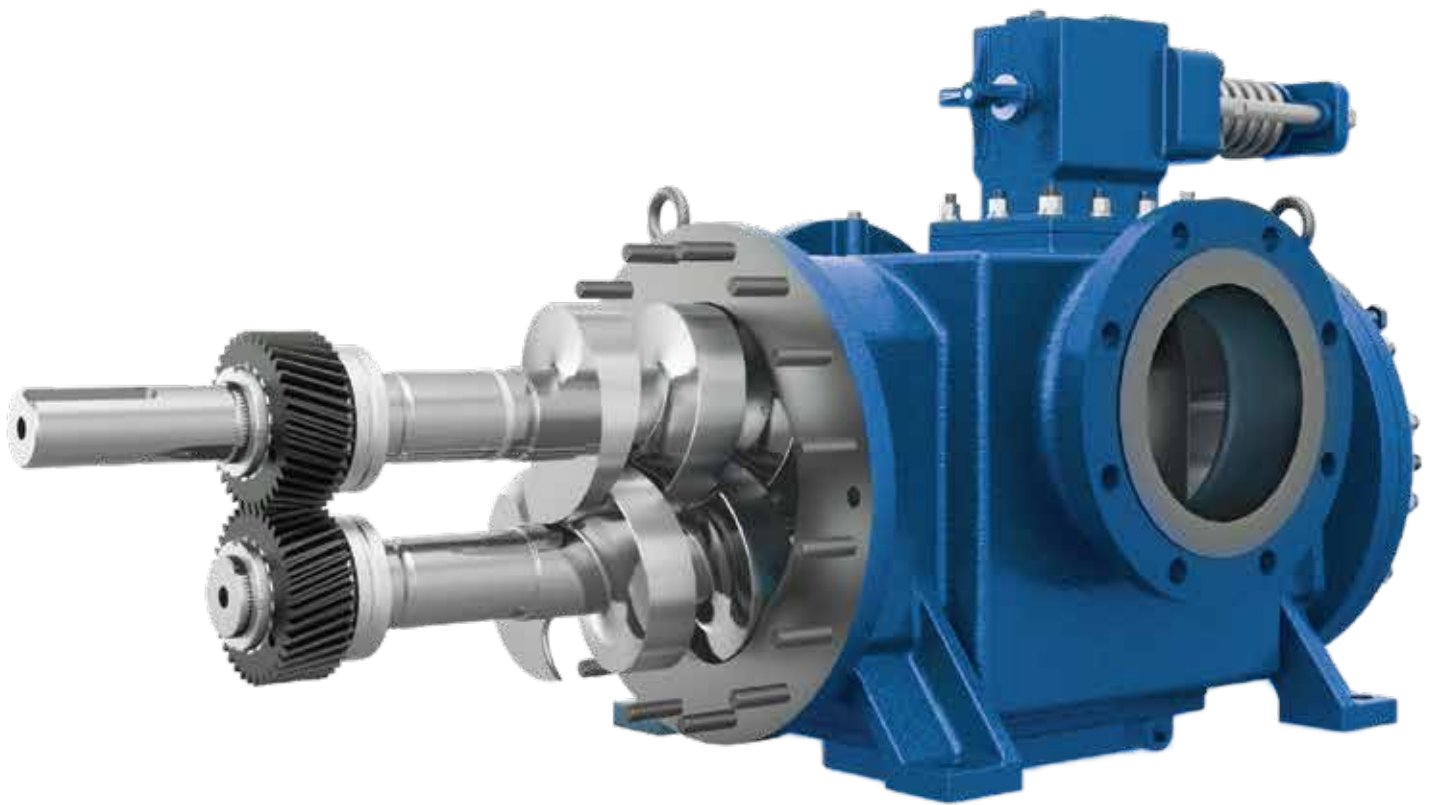


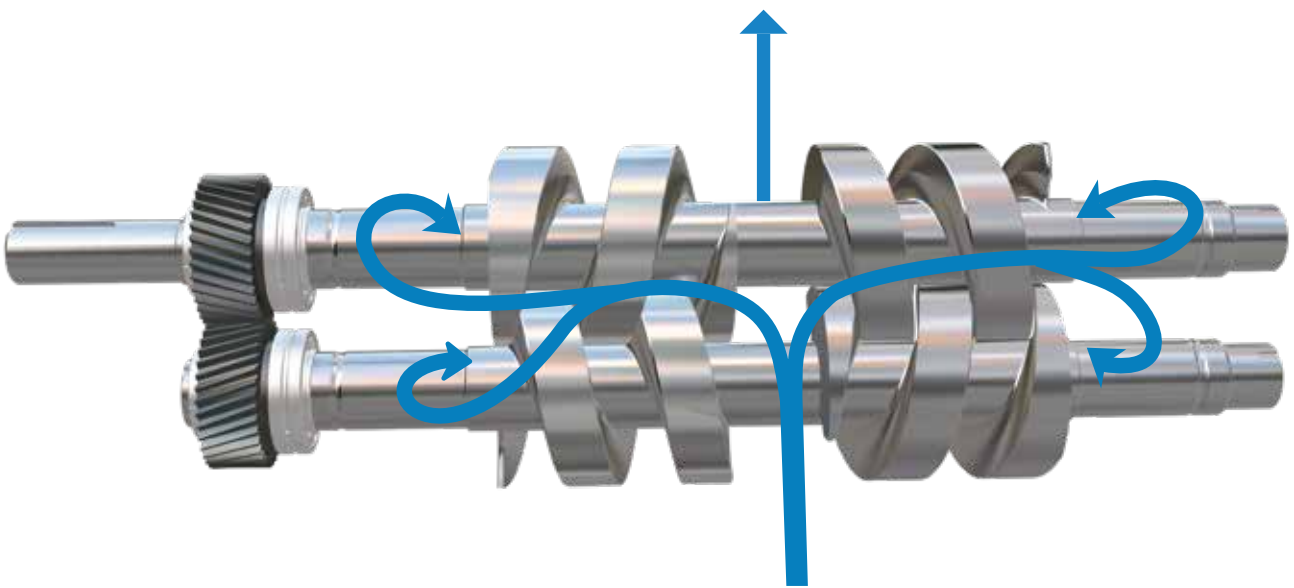
TWIN SCREW PUMPS



**TRULY
FIT & FORGET PUMPS**

Pumping Principle

Rotary twin screw pumps are designed to handle wide variety of lubricating, non-lubricating as well as aggressive liquids. These self-priming pumps perform efficiently even in critical applications irrespective of high temperatures & extreme site conditions.

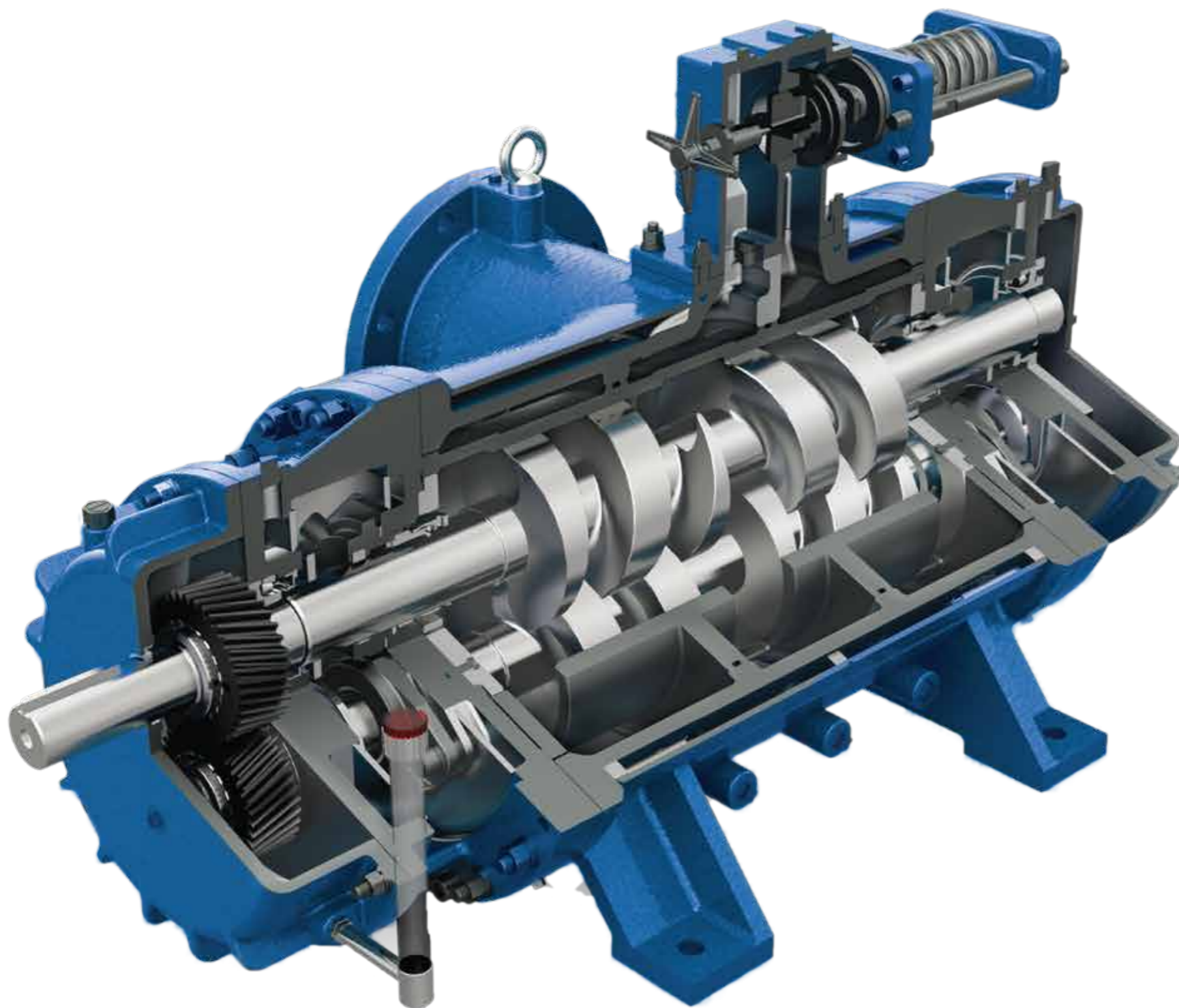


The pumping element comprises of two intermeshing screws rotating within a stationary housing. The pumping elements are supported by the bearings. Pair of timing gears maintain the clearance between the screws. Intermeshing rotating screws in the pump casing and liner form transfer chambers that transfer the fluid axially from the extreme ends to the centre of the casing.

Distinctive Features and Benefits

- **Long and trouble-free service life**
Due to absence of metal to metal contact between the pumping elements. Pump can even run dry for limited period of time.
- **No axial thrust**
Dual flow of liquid in opposite direction balances the axial thrust.
- **Higher volumetric efficiency**
Due to special double profile of screw flanks.
- **High cavitation free suction lift**
Due to low NPSH requirements.
- **Self-priming and capable of handling entrapped air/vapour/gas**
Due to positive displacement action and being inherently self priming.
- **Uniform metered flow**
Being a positive displacement pump, head developed is independent of speed & the capacity is approximately proportional to speed.
- **Capable of handling wide variety of fluids**
Clear lubricating/non-lubricating as well as aggressive liquids can be handled due to choice of different designs and material of construction.
- **Safe to operate**
Has in-built relief valve designed to bypass excessive pressure developed in the discharge.

Roto Advantages



- **Screw Profile**

Unique double profile of the screw flanks delivers a higher volumetric efficiency. The screw flanks are integral with the shaft. Various pitch sizes are available to optimize the flow rates and deliver higher efficiencies.

- **Robust Pump Housing**

Casing is designed for ensuring the smooth flow of liquids, thus minimizing NPSH requirement within the pump. Robust casing design takes care of flange loads.

- **Shaft Sealing**

These pumps can accommodate various types of shaft sealings like soft gland packing, single unbalanced, balanced, and double mechanical seals. Options are available for pumps fitted with mechanical seal conforming to API 682 standards and various flushing & quenching plans.

- **Timing Gear**

High alloy hardened steel & ground helical timing gears are oil lubricated and located on the drive side, away from the pumping liquid. These timing gears are capable of transmitting high torque with minimal torsion and also maintain the clearance between two screws resulting into longer service life.

- **Spherical Roller Bearings**

Spherical roller bearings take care of both loads arising from hydraulic pressure. Bearings can also take care of the misalignment that arises due to unforeseen working conditions at the site.

- **Replaceable Liner**

Replaceable liner options is available for handling non-lubricating and contaminated fluids. This also helps to minimize the maintenance cost over a longer period.

- **Built in Safety Relief Valve**

The built in safety relief valve protects a pump in the system against excessive pressure built up in the discharge line.

Design Variants

Flow Rate - Up to 940 m³/hr (4140 GPM)

Viscosity - Up to 100,000 cSt

Pressure - Up to 16 bar (230 PSI)

Temperature - Up to 350 °C (662 °F)



Horizontal External Bearing Pump Long Shaft Design

Design Configurations

- Capable of Handling Lubricating Media.
- Foot Mounted as Standard.
- Centre Line Mounted.
- Steam Jacketing.
- Electrical / Steam Tracing.
- Bearing & Gear Box Cooling.



Horizontal External Bearing Pump Short Shaft Design

Design Configurations

- Capable of Handling Thin & Viscous Media.
- Foot Mounted as Standard.
- Sump Heating.
- Gear Box Cooling.
- Open Box Type Sealing Arrangement.



Horizontal Internal Bearing Pump

Design Configurations

- Capable of Handling Viscous & Lubricating Liquids.
- Bearing & Timing Gears are Lubricated by the Pumping Media itself.
- Heating Design is also available as an option.
- Sump Heating.

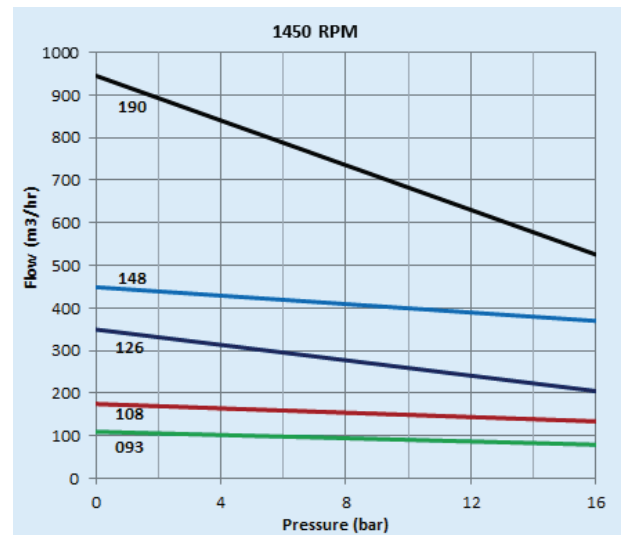
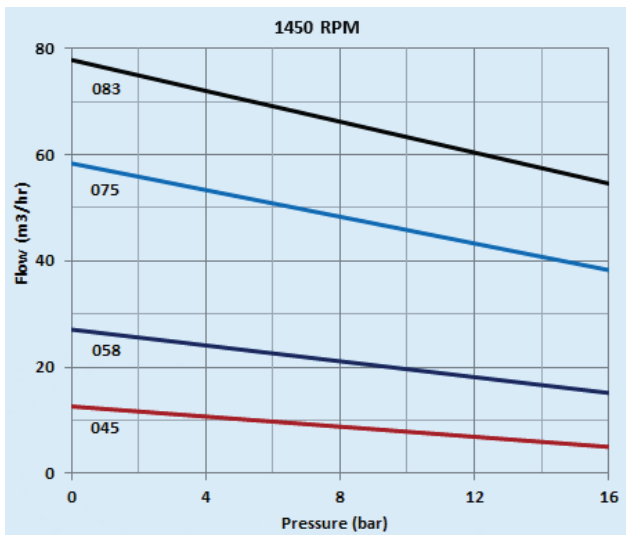
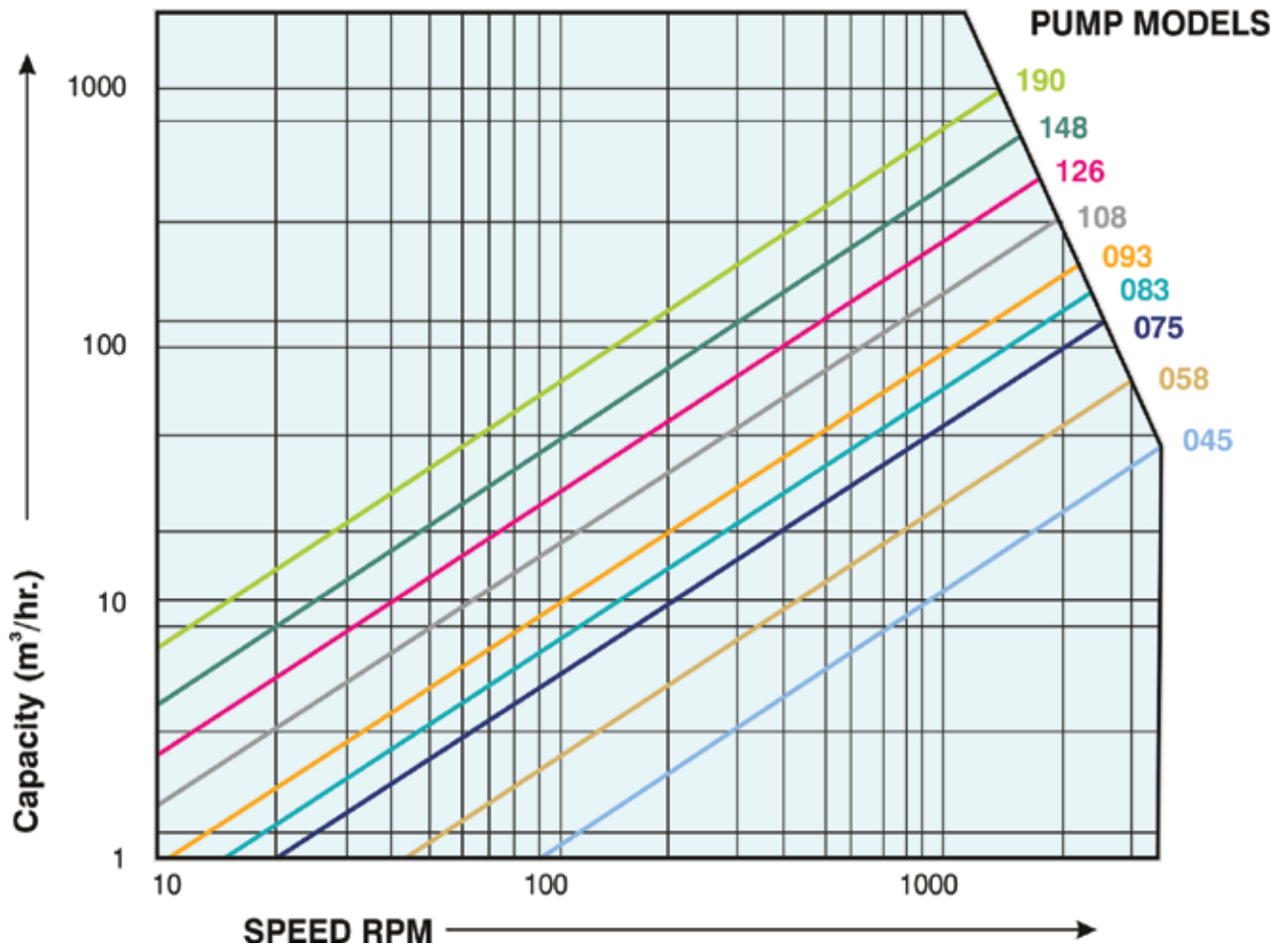


Vertical Pump

Design Configurations

- Used in Vertical Execution for Handling Viscous Oil & Lubricating Media.
- Available in Fabricated Steel.
- Steam Jacketing.
- Electrical Steam or Steam Tracing.
- Cooling Options for Gearbox & Bearing Housing are also available.
- Available in both Internal & External Bearing Options.

Theoretical Performance Curve



Material of Construction

Housing Components: Cast Iron, Cast Steel & Stainless Steel

Liner: Cast Iron & Stainless Steel

Screws: Alloy Steel, Nitrided Steel & Stainless Steel

Special Execution

In addition to the above material of construction, Roto Twin Screw Pumps can also be supplied with pump body in fabricated steel or stainless steel with renewable liners of suitable material.

For slightly abrasive applications, the screws are of Nitrided steel and Liners of Ni-resist steel. These pumps are also available in exotic alloys such as Duplex and Super Duplex.

Skid mounted pumping systems with complete piping and instrumentation arrangement is also available as an option.

Sealing Options

Soft Gland Packings

- Aramid Packing -Impregnated with PTFE High Temperature Resisting Lubricants
- Lubricated PTFE Yarn Packing
- Graphited Impregnated Glass Yarn Packing Lubricated with Mineral Oil Lantern Ring is Optional

Mechanical Seal

- Single Coil Elastomer Bellow Seals
- Single Coil Unbalanced Unidirectional/ Bidirectional
- Lug Driven
- Balanced Seals
- Double Seals
- Metal Bellow Seals
- API 682 Compliant Cartridge Seals
- Non API Cartridge Seals
- Various API Flushing & Quenching Plans

Accessories

Relief Valve

Prevents the pump and the system from over pressurization. Roto Pumps are supplied either with internal or line mounted relief valve. Various material options and sizes of these relief valves are available.

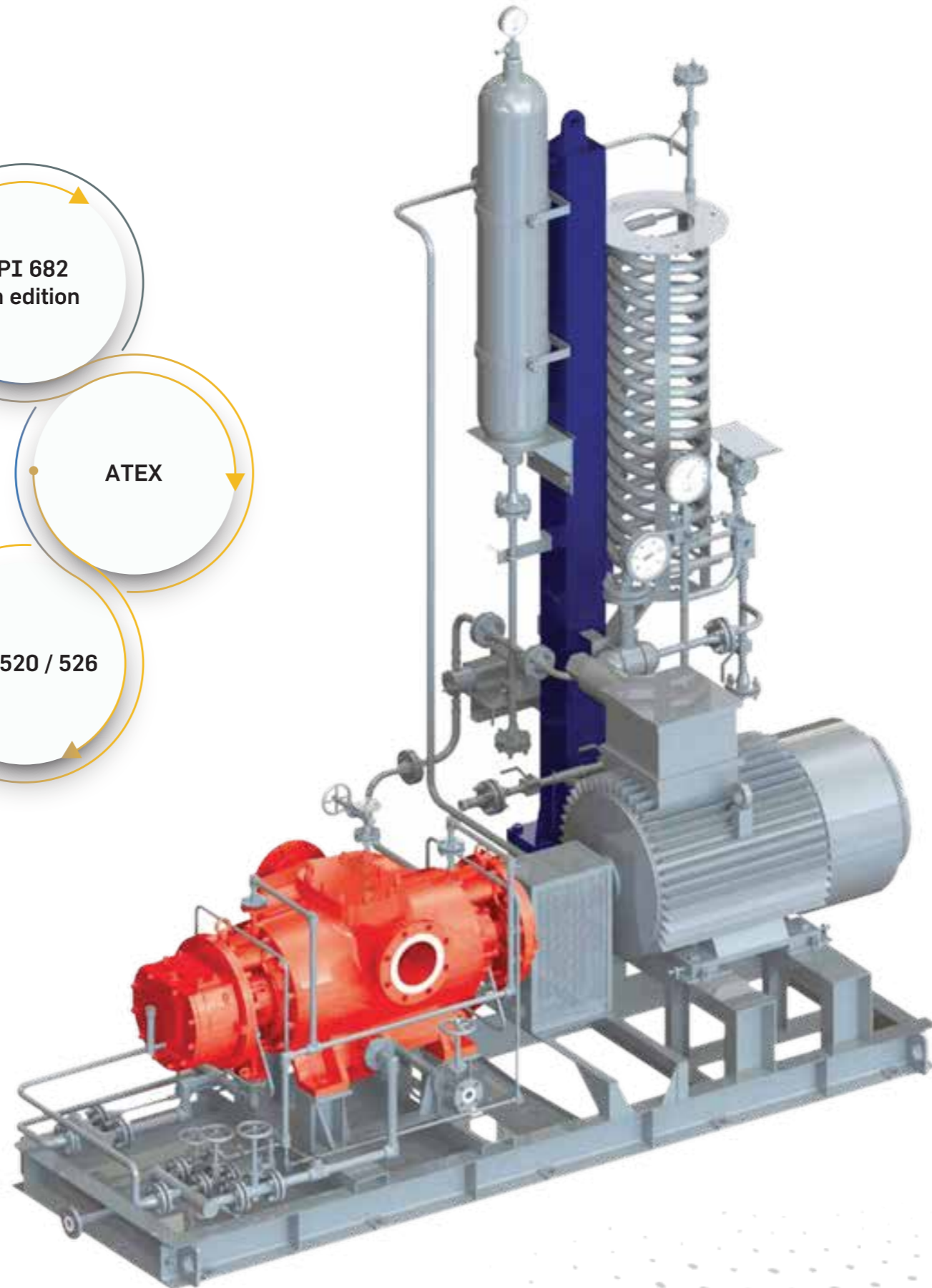
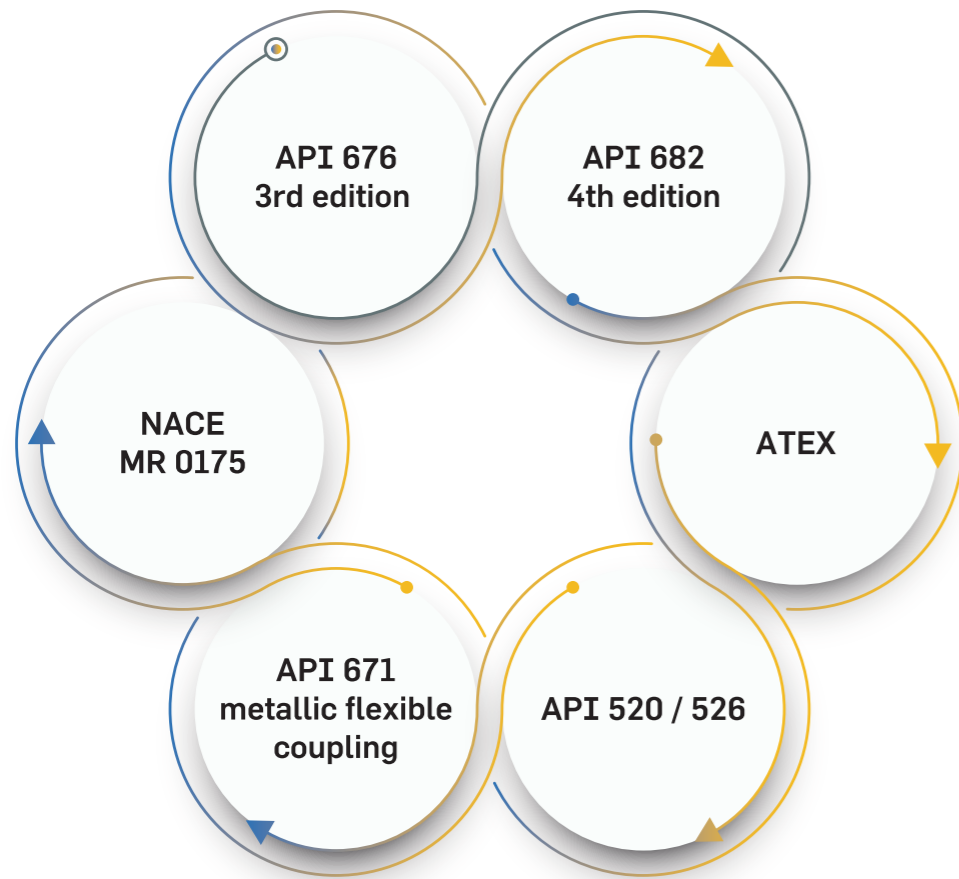
Strainer

Protect Pumps from unwanted dust, foreign material & lumps of products. Roto Pumps offer a range of simplex or duplex type basket strainers in various material options.

Gauges

These devices are important for the system monitoring. Roto offers all type of gauges viz - Pressure, Vacuum, and Differential gauges required for monitoring the pump performance.

Delivering High Performance & Results



- **Seal System** - API Seal support system option.
- **Shaft Seal** - Single or double mechanical seal as per API 682, with various flushing & quenching plans.
- **Electric Motor** - As per IEC/NEMA standards for hazardous duties.
- **Connections**- ANSI / ASME B16.5 flange connections.
- **Baseplate** - Welded steel construction with drain connection & lifting arrangement.
- **API 676 3rd Edition Rotary Positive Displacement Pumps.**
- **API 682 4th Edition Mechanical Seals.**
- **ATEX Directive 94/9/ec.**
- **API 520 / 526 Pressure Relief Valves.**
- **API 671 Metallic Flexible Coupling.**
- **Material As Per Nace MR 0175.**

Handling Vacuum Residue in Refinery



The highly viscous fractionated atmospheric residue is transported from the atmospheric distillation tower (ADU) to the Vacuum Distillation tower (VDU). Due to very low pressure; heavy materials are vaporized at temperatures under cracking conditions.

High amount of light and middle fractions of gas oils, fuel oils and a residue (Vacuum Bottoms) are removed from the fluid, resulting in increase in viscosity of vacuum residue feedstock. A Twin Screw Pump is used at this location.

Roto Twin Screw Pumps can handle the highly viscous residual fluid even at the elevated process temperatures and are capable of dealing with low NPSH conditions due to the high vapour pressure of the process stream.

Handling Bitumen in Storage Terminals



Bitumen or asphalt has a wide range of uses both in refining, construction of road and roof. Bitumen is primarily obtained as a vacuum residue in the vacuum distillation of petroleum.

Crude that are high in sulphur mainly consists of high molecular weight hydrocarbon and contains small quantities of sulphur, oxygen and nitrogen. The medium is highly viscous and reaches a fluid consistency only under high temperatures.

Roto Twin Screw Pumps have the capacity to operate within a wide range pressures, temperatures and product viscosities. These pumps are used in the loading and unloading of bitumen.

Industrial Applications



Heavy Crude Oil - Oman
Flow - 55 m³/hr, Pressure - 16 bar

Oil & Gas - Up Stream

- Heavy Crude Oil • Stabilized Crude
- Hydrocarbon Condensate • Chemical Injection
- Slop & Drain Oil • Well Water With Natural Gas
- Oily Water • Produced Water



Vacuum Residue at Refinery - Ecuador
Flow - 48 m³/hr, Pressure - 11 bar

Oil & Gas - Down Stream

- Vacuum Residue • Vis Breaker Feed • Catalytic Reform Unit Feed
- Delayed Coker Unit Feed • Catalyst Slurry
- Bitumen & Asphalt • Black Oil & White Oil
- Industrial Fuel Oil • Lubricating Oil
- Slop Oil • Wax • Crude Oil • Diesel
- Kerosene • Naptha • Gasoline



Heavy Crude Oil - Oman
Flow - 55 m³/hr, Pressure - 16 bar

Storage & Distribution

- Tank Stripping • Railway Wagon Loading & Unloading
- Road Tanker Loading & Unloading • Export Pumps
- Ship Loading & Unloading



Polystrol Oil at Chemical Plant - India
Flow - 30 m³/hr, Pressure - 4.5 bar

Chemical & Processing

- Fine Chemicals • Polymers • Paint • Inks
- Varnish • Biofuel • Petrochemicals • Speciality Chemicals • Cosmetic Raw Material • Glue
- Synthetic Resins • Solvents • Ethanol • Methanol
- Viscose • Caustic Slurry • Reject Viscose
- Modal Fibre • Normal Fibre • Diesel Oil



Offshore Marine Gas Oil - Singapore
Flow - 150 m³/hr, Pressure - 10 bar

Marine & Shipbuilding

- AVCAT • Bilge • Lube Oil • Engine Oil
- Light and Heavy Fuel Oil • Ballast Sea Water • Lubricants • Hydraulic Oil • Marine Diesel Oil • Crude Oil • Asphalt • Chemicals
- Offshore Recovered Oil • Thermal Oil • Vegetable Oil • Waste Oil • Slop Oil
- Tar • Produced Water



Tar at Steel Plant - South Korea
Flow - 110 m³/hr, Pressure - 3.6 bar

Power & Steel

- Fuel • Lube Oil • High Speed Diesel Oil
- Light Diesel Oil • Heavy Fuel Oil • LSHS
- HPS • Dirty Oil • Recovery Oil • Drain Oil