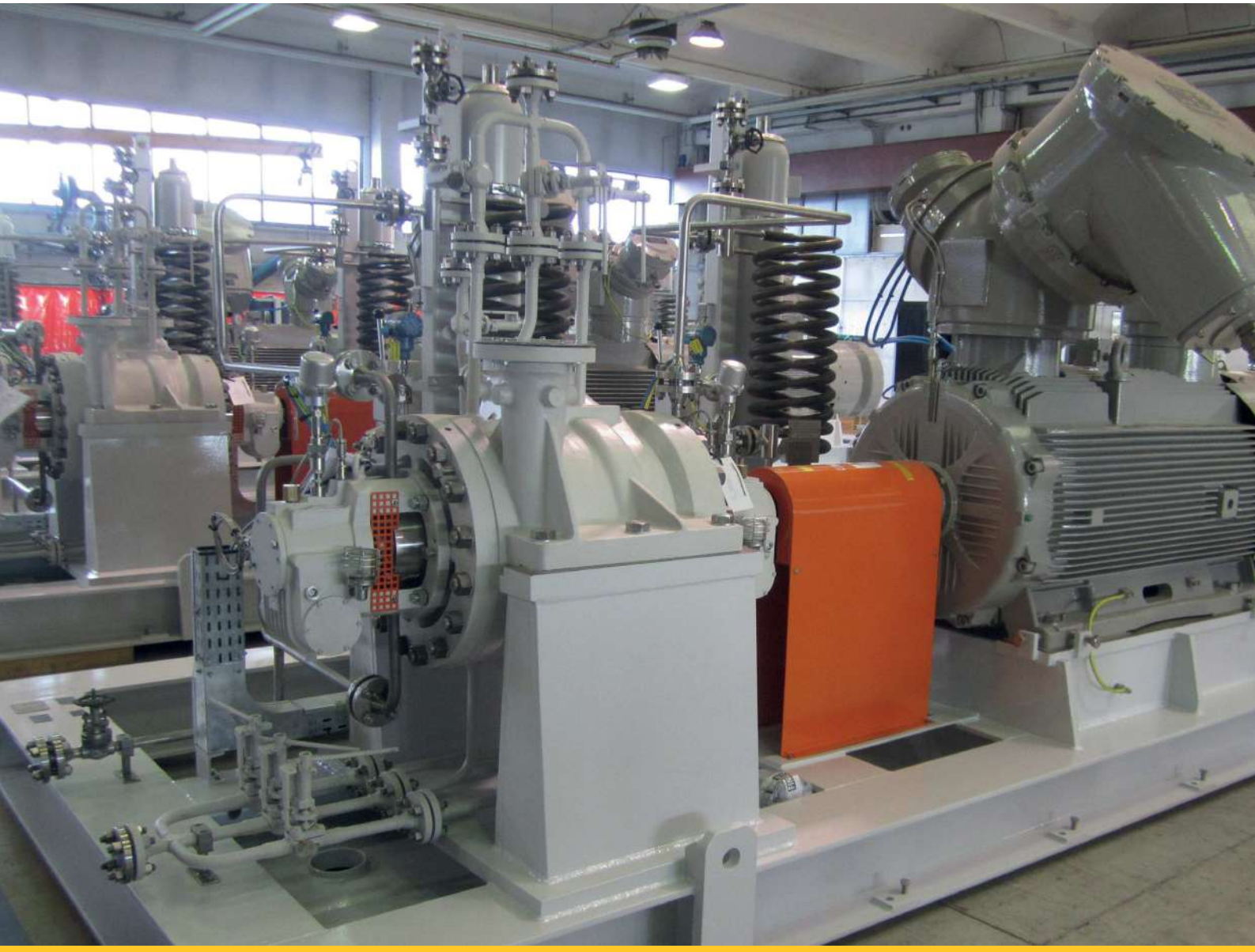
Gruppo Aturia

aturia Rotos Marelli ABC AUDOLI & BERTOLA ARIS CHIAPPA POMPE CEAPELLI Since 1904 Italy FINDER



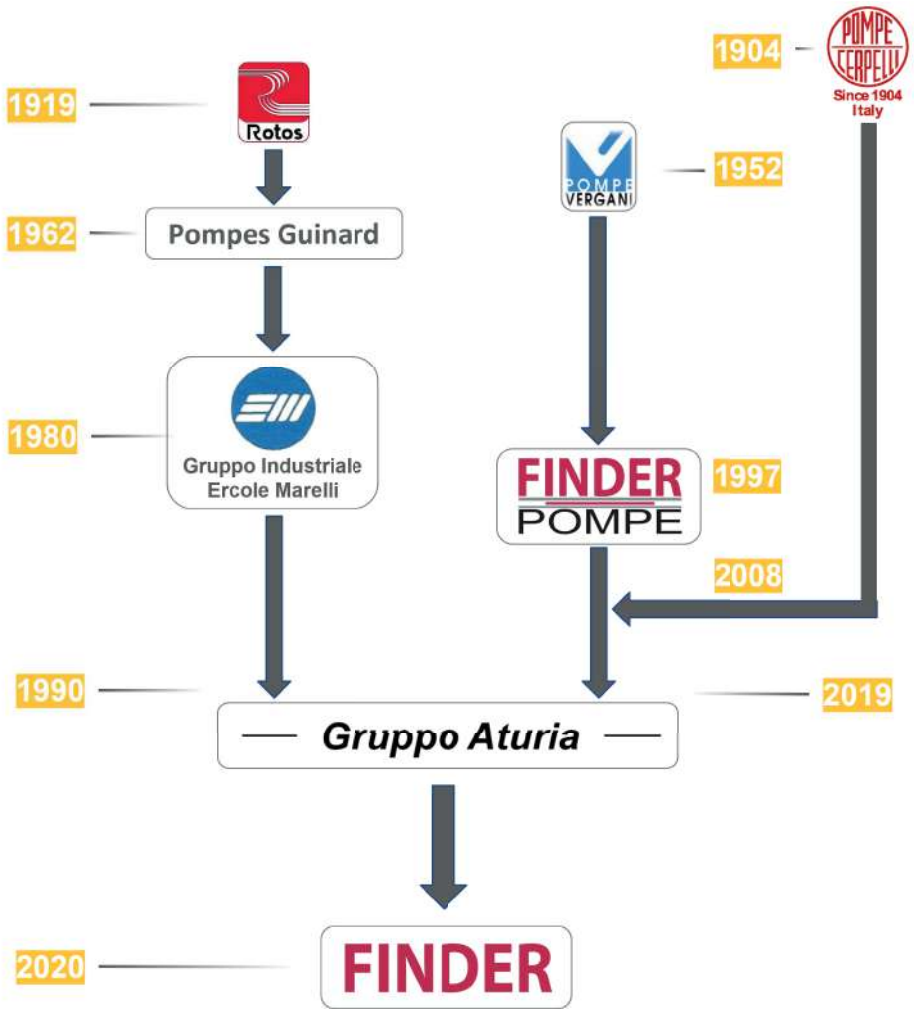
FINDER

Oil&Gas

FINDER - OIL&GAS Division

Our Heritage

FINDER - Oil & Gas division of Gruppo Aturia - merging experience of Rotos (formerly Pompes Guinard), Pompe Vergani (formerly Finder Pompe) and Pompe Cerpelli - is specialized in design, manufacturing and testing of Heavy Duty Pumps and process system.
With more than one hundred years, **FINDER** combines technical and manufacturing expertise in pump technology and provides knowledgeable solutions for all types industries, heavy-duty processes where advanced technical flow solutions and reliable product are required.





Merate (Lecco) Plant

With its Test Benches designed to verify API pumps performances, Merate plant became the main production hub for Heavy-Duty Process Pumps.

Assembly, Testing, Skid Finalization, Packaging and Shipping are carried out through an optimized layout and streamlined workflow.

Tailor Made Design

Design According International Standards

FINDER offers a wide range of pumping solution to meet most stringent standards and international codes.
Pumps can be provided in configurations fully compliant with:

- **API 610** (Centrifugal pumps for the petrochemical and natural gas industries)
- **API 685** (Seal-less centrifugal pumps for oil, heavy chemical and gas industry services)
- **API 676** (Twin-screw rotary positive displacement pumps)
- **ISO 5199** (Centrifugal pumps).

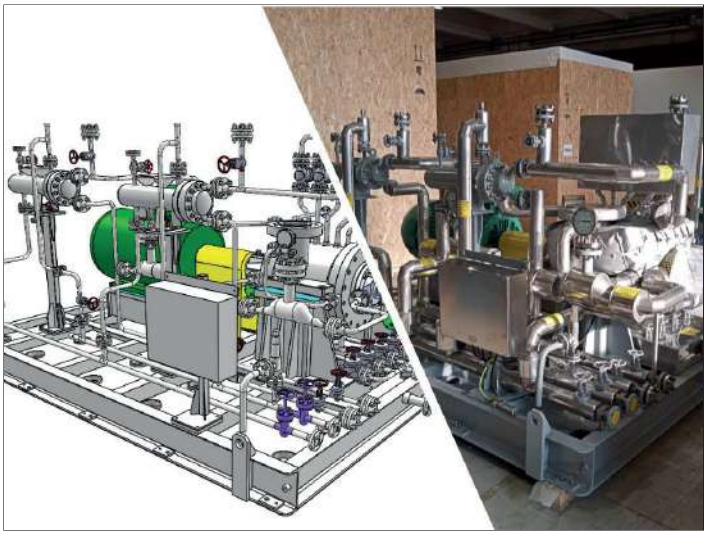
Harsh Environments and Complex Fluids

FINDER, Gruppo Aturia's Oil&Gas Division, is leader in the design, manufacturing and testing of Engineering To Order Pumping Skids for upstream, midstream, and downstream applications.

Chemical, Petrochemical and Oil&Gas Industries can easily rely on FINDER expertise in harsh environments (offshore, desert, cold environments, explosive atmospheres,...) for pumping complex fluids such as crude oil, crude petroleum, fuel/biodiesel, refined petroleum products, ethanol, solvents, hydrocarbons, sulfur, etc.









API 610 - VS1 / VS6



FG, PAG, TKV, HPVT, CKV and CKVN are vertically-suspended, single or multistage centrifugal pumps (VS1 or VS6 configuration), designed and built in full accordance with API 610 standards. The integrally cast diffuser type bowls assure optimum hydraulic efficiency and minimum radial thrust.

A generously sized, carefully designed line shaft assures rotor stability and low vibration level. An oil lubricated double row ball thrust bearing provides rotor axial positioning and support.

A rigid coupling with spacer allows the removal of the cartridge mechanical seal without interfering with motor positioning and alignment.

Line shaft bearings are lubricated by the pumped fluid and can be provided in different material combinations, depending on the fluid to be handled. PED and ASME design and certifications for can, column and discharge head are available as options.

C2KV and C2KV-N pumps are double suction twin volute vertical wet pit pumps. Because of their specific design, these pumps strongly reduce NPSHr value and the axial thrust value.





API 610 - VS4



NDV, HPV and V-PEP are API 610 compliant, vertically suspended, single-casing volute, line shaft driven VS4 type centrifugal sump pumps. Each HPV and V-PEP pump is engineered to customer specifications, application and requirements. Any pump length from 0,5 down to 10 m below the mounting plate can be achieved.

Standard features include a single-piece shaft, guided by sleeve type line bearings where needed, that is lubricated by the pumped fluid or from an external lubricating source (clean liquid or grease) in abrasive services. Thrust bearings are generously sized and are available in both a grease and oil lubricated version.

The mounting plate can be provided in either a square or round shape. A mounting flange having the same pressure rating of the corresponding tank interface is also available as an option.

All pumps can be manufactured in several materials combinations including Duplex SS and corrosion resistance Alloys.



API 610 - BB1

C2PO heavy-duty process pumps are horizontal, between bearings, with axially split casing, double suction, one stage impeller (BB1 configuration), in full compliance with API 610 std., latest edition (ISO 13709).

The C2PO design achieves very high efficiency with low NPSHr values. Robust casing, stiff shaft design and different bearing arrangements for specific applications make the C2PO an extremely reliable pump whit long service life and reduced maintenance costs.

With its specific design, inner parts are easily accessible without disconnecting the casing from the piping and the electric motor for labor savig in maintenance.

Pumps are available in any material listed in the API 610 tables. Other material combinations, such as erosion/corrosion resistant alloys, are also available upon request.





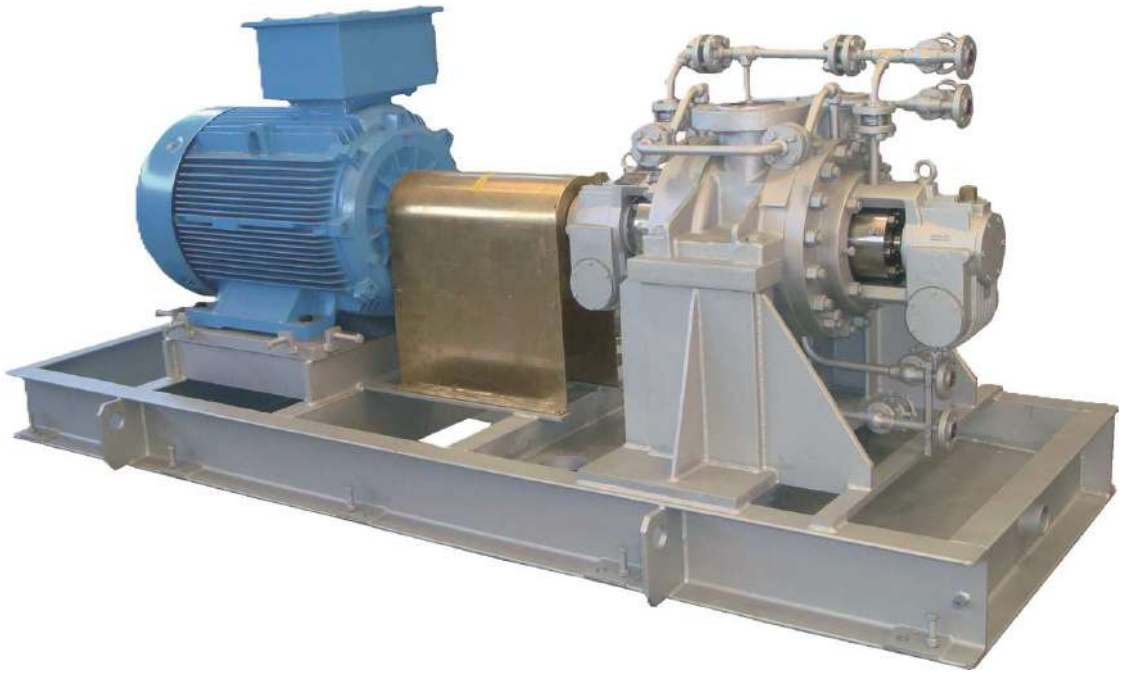
API 610 - BB2



Single and two stage between bearings process pumps, BB2 configuration, designed and manufactured according to API 610, latest edition. Their compact configuration and generously sized components make these pumps suitable for the most critical applications. To minimize shaft and bearing loads, the axial thrust is intrinsically balanced. The HPD series is a double suction design, while the HPE line can be configured in either a single or double suction version.

The pumps' advanced designs and precision manufacturing, including dynamic balancing of rotating parts, assure long term equipment reliability and smooth operation with low residual vibrations. For high temperature duties, specifically designed stainless steel integral coolers can easily be installed for bearing cooling and can be quickly removed for maintenance without dismounting the bearing housing. Alternatively, high efficiency, integrally cast air fans can be installed on the drive and non drive ends of the pump.

KSMKM, HDP and HPE pumps are available in any material listed in the API 610 tables. Other material combinations, such as special alloys for chemically aggressive services, are also available upon request.



API 610 - BB3

The HPM process pumps are multistage, axially split, volute type pumps with single or double suction first stage impeller that meet all requirements of the latest edition of API 610 standards.

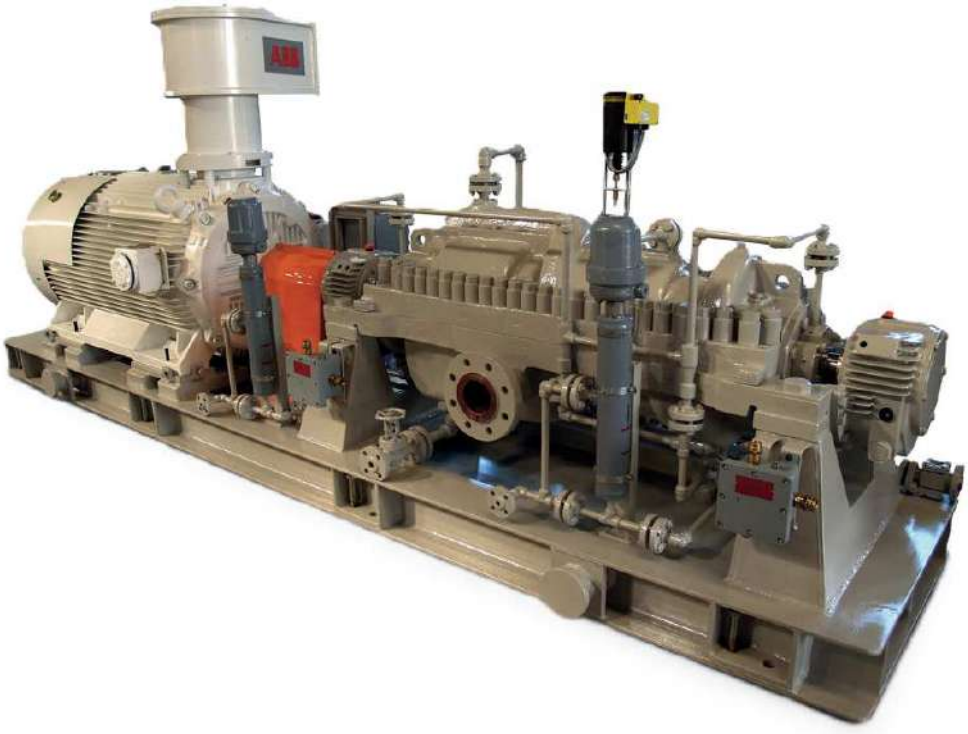
Casing is axially split; suction and discharge nozzles are integrally cast with the lower half casing. A crossover on integrally cast into the upper half casing to delivery pumped fluid from the first set of stages to the other stages.

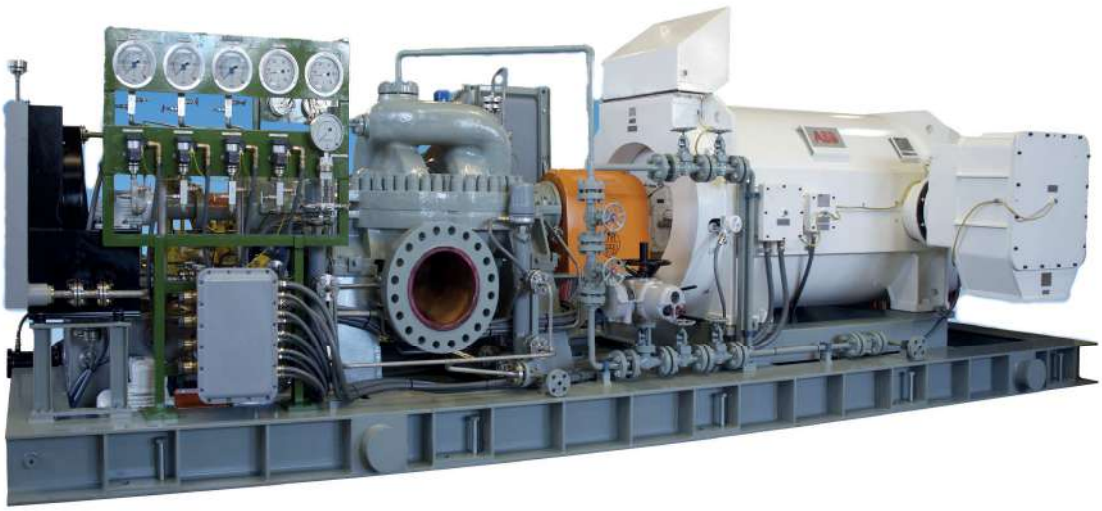
Axial thrust is eliminated by back-to-back configuration of the impellers within the rotor.

The double volute design minimizes the hydraulic radial forces, thus reducing shaft deflection.

Single impellers and the complete rotor are dynamically balanced to reduce vibrations.

Shaft dynamic characteristics were precisely engineered to reduce deflection under the most severe operating conditions. Anti-friction bearings are standard. Hydrodynamic bearings (journal bearing and tilting pad) are provided when requested by service or standard requirements.





API 610 - BB5

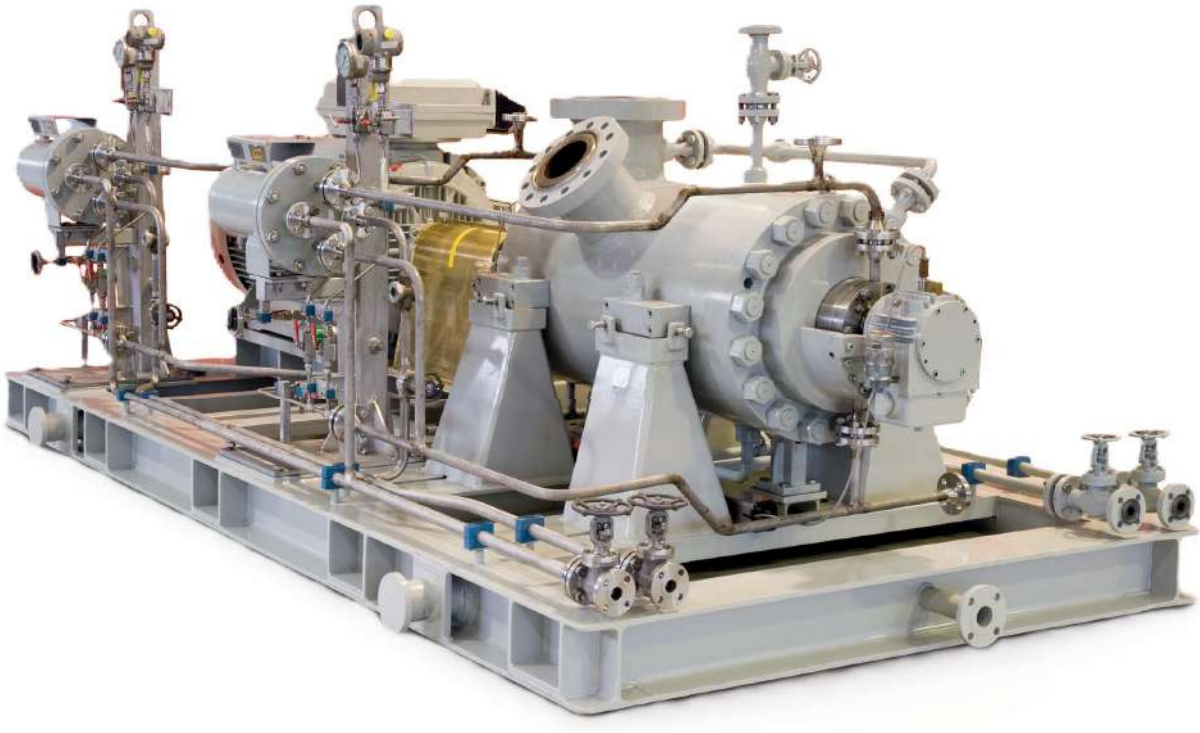


The HPMB line barrel pumps is multi-stage and suitable for heavy-duty applications such as oil and gas, refining and petrochemical, power plant boiler feedwater, water injection and reverse osmosis. The HPMB pump was designed and manufactured according to API 610, latest edition.

The pump casing is radially split and the centerline is supported to eliminate the effects of the thermal expansions in case of high temperature applications. HPMB pumps feature vaned diffusers and small capacity HPMB pumps (<80 m^3/h) are equipped with double volute diffusers.

The opposed impeller and diffuser configuration allows it to minimize axial and radial thrusts. Full cartridge design allows quick and easy dismantling.

It is available with 4 to 13 stages with the ability to be “de-staged” to increase or decrease the number of stages and meet future requirements. For low NPSHr, the first impeller is larger than those of subsequent stages or is double suction.



API 685
Seal-Less



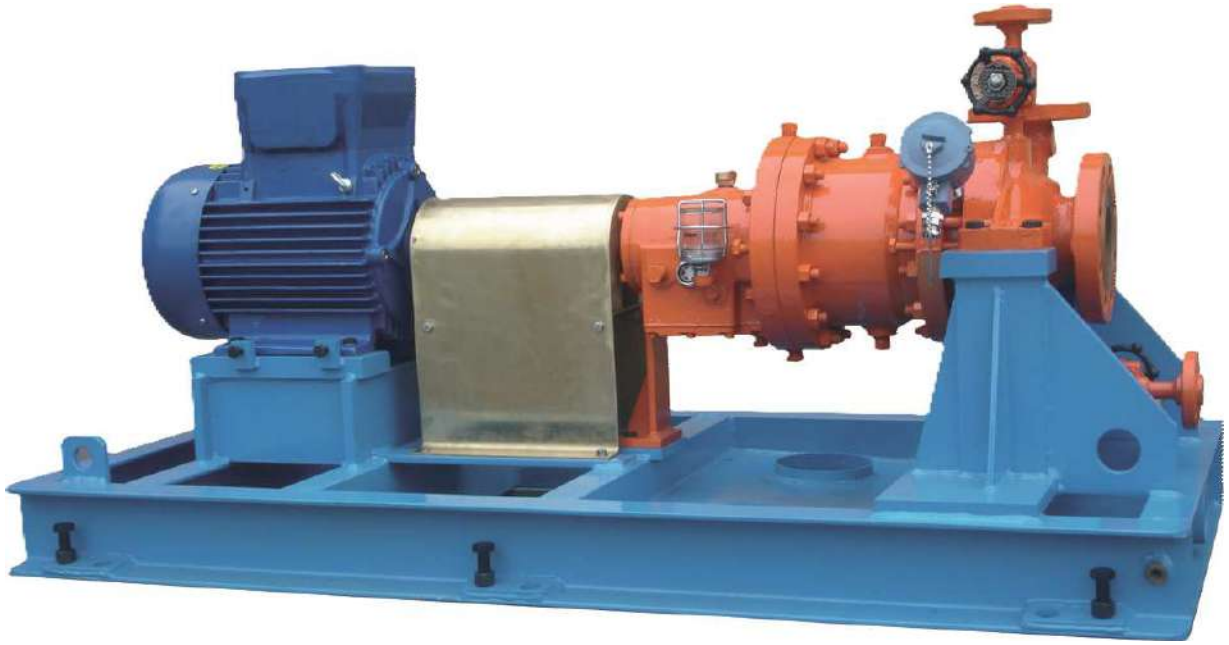
Finder can supply seal-less pumps in OH1, OH2 and VS4 configurations.

SMKM-M, HPPMD and PEPMD pumps (OH2) and NDMV, HPVMD (VS4) pumps are designed and manufactured in full accordance with the API 685 (seal-less centrifugal pumps for petroleum, heavy duty chemical and gas industry, latest edition) standards.

Hydraulics are directly derived from the API 610 series (HPP, PEP, and HPV) while magnetic couplings, containment devices and inner bearings have been designed to comply with the most stringent requirements of the guiding norms.

The magnetic couplings are generously sized for the applied torques and manufactured with Samarium-Cobalt elements. The primary containment shell can be manufactured in Hastelloy C or Titanium alloy for high-pressure applications. The standard containment casing is designed to withstand the pump casing MAWP. The HPPMD series is also equipped with a compensation device to withstand axial and radial thermal expansion for smoother and more reliable operation at higher temperatures and thermal transiet conditions.

HCMD pumps (OH1) are derived from HC series and are in compliance with ISO 2858 norms.



API 610 - OH2



The SMKM and HPP series meets API 610 standards, latest edition (ISO 13709). The pumps casings are radially split, single or double volute. Stuffing boxes are designed to accomodate single or dual mechanical seals, according to the API 682 standard. Special designs, such as jacketed casings, reinforced bearings, etc., are available to meet specific process requirements.

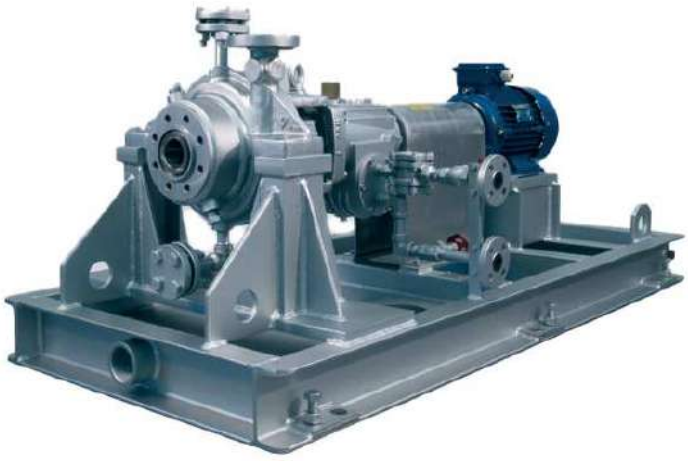
All material combinations listed in the API 610 material tables, plus erosion/corrosion resistant alloys, are available.



PEP and D-PEP
Low Flow / High Head

The PEP pump range has been specifically designed to meet low flow, high head and low NPSHr API 610 requirements without requiring increased speed solutions.

Hydraulic working principles are the same described in the literature for “Partial Emission” or “Barske type” pumps i.e. open impeller with full radial vanes and 90° exit angle, concentric volute, the energy being transferred to the liquid in a forced vortex regime and converted into pressure in a diverging diffuser. The peculiarity of PEP range is that the required output velocity is obtained by increased impeller diameter instead of increased rotating speed. Low rotating speed grants low NPSHr values all over the operating range: in all PEP pumps, NPSHr remains less than 1m @ 3000 rpm without the use of inducers which are often restricting the pump operating region.



The result is a robust, maintenance friendly pump for extreme service conditions: from less than 1 to 25 m^3/h, up to 300 m head, with casing pressures 50 Bar and over, at temperatures up to 400 °C and with any type of hazardous and flammable fluids.

Open impeller design and generous clearances allow moderate solid contents in the process fluid and surface coating if required.

API 610 - OH3



LHVN and L-PEP process pumps are single-stage, vertical in-line over-hung type (OH3 configuration) and fully comply with API 610 std. (ISO 13709), latest edition.

The pump casings are radially split with an in-line nozzle arrangement. Larger sizes are designed with twin volutes to minimize radial loads.

The shaft has a stiff design to assure the first lateral critical speed remains well above the operating speed of the pump.

The axial thrust to the motor is supported by oil lubricated ball bearings. The bearing housing and motor baseframe are mounted on the casing that is directly bolded on a foundation plate. Its vertical configuration provides a smaller footprint in limited space environments.

LHVN pumps can be used for a capacity range up to 3000 m^3/h with total dynamic head of 140 m.l.c.. The L-PEP pumps cover the low flow, high head range from 1 to 35 m^3/h at 300 m head.

Pumps are available in any material listed in the API 610 tables.



API 676
Twin Screw



RR and RRH pumps are P.D. twin-screw pumps, designed and manufactured according to API 676 standards. They represent the result of over one century's experience in the design of this technology.

The two rotors are machined from a single-block piece, and the intermeshing screws provide a synchronous operation thus balancing the axial hydraulic trhusts.

The screw bearing housing can either be internal or external in a wide variety of configutations according to customer requirements.

Screw motion is trasferred by a coupled timing gear located inside one of the bearing housing. This configuration prevents metal-to-metal contact and resultant wear between the pump screws and provides a synchronous yet rotation of the screws.

Mechanical seal seats are designed for compliance with API 682 standards.

As specified in API 676, the pump casing overpressure safety valve is supplied separately. However, it can be integrated and fitted onto the pump casing on request.

These pumps are used whenever a steady flow is required and are suitable for pumping both low and high viscosity fluids such as bitumen, mineral oils, hydrocarbons, fuel oils, etc.

Additionally, they are capable of pumping dirty fluids, even with some solid particles, as well as aggressive fluids such as acids and alkaline solutions provided the pump and its components are built with the appropriate materials.



By applying special constructive solutions, the RR and RRH twin-screw pumps are also suitable to convey fluids that include a moderate quantity of dissolved gases. They function well at low suction pressure conditions and with low NPSHr curves.

They can be supplied both in vertical and horizontal configurations for onshore and offshore applications.

Engineered Chemical ISO Pumps



ND-HC pumps are designed and manufactured according to ISO standards for a wide range of process applications in the chemical industry as well as other heavy-duty uses in all industrial sectors.

ND-HC pumps, in back-pull-out execution, can be manufactured in any materials combination. It contains a number of constructive features such as a seal gland for single, double and cartridge type mechanical seal; heating/cooling chambers on the pump casing and/or stuffing box; and flanges rated according to DIN and ANSI.

ND-HC pumps are also available with a semi-open impeller (SO version) or an open impeller (VX vortex design), which is suitable for fluids with suspended solids. ND-HC and VX pumps are also available in vertical configurations: NDV-HCV and VXV with a shaft length of up to 10 m.

Vertical pumps can be supplied with a lip-seal, packing ring or mechanical seal.



In the Test Rooms













Gessate (Milano)



20.000 sqm

Merate (Lecco)



7.000 sqm

Taglio di Po (Rovigo)



5.000 sqm

Gruppo Aturia S.p.A.

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