



Titano series



TITANO series

The pumps of the TITANO series are designed and manufactured according to API 674 and ASME standards, covering the range of medium power and have been studied with the purpose of:

- **guarantee a highly reliable service**
- **reduce downtime**
- **minimize the operating costs**

These characteristics make the Titano pumps series particularly suitable for process applications, where heavy operating conditions are satisfied by the conservatively sized crankmechanism and by widely proven hydraulic solutions, right for solving the problems connected with:

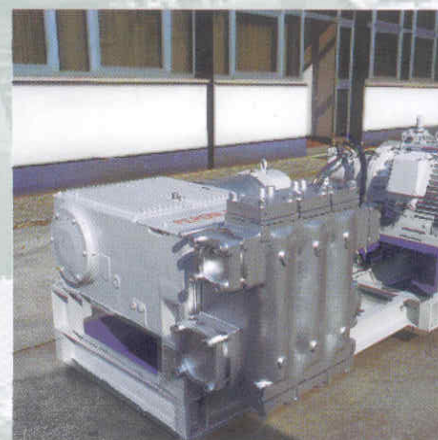
- **high pressures**
 - **high or low temperatures**
 - **products difficult to be handled** (toxic, corrosive, explosive and abrasive fluids, liquefied gases, slurries)
- conditions that are often present, even jointly, in many applications.

TITANO series consists of 4 pump sizes in triplex execution.

The largest pump of the series (model 31.40) is manufactured also in quintuplex (model 31.40/Q) and septuplex (model 31.40/S) execution, where the same components of the triplex model are used.

The pump series is used in a wide range of applications and in particular:

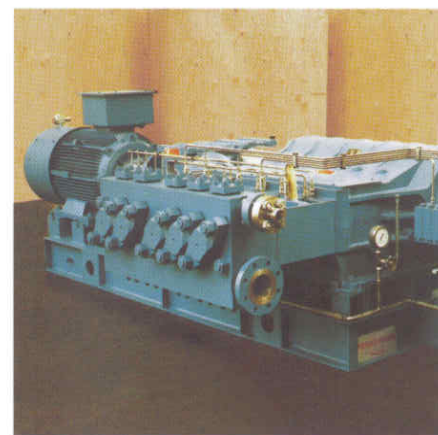
- **chemical and petrochemical industry** (urea, melamine, polyethylene, fatty acids, resins and detergents plants)
- **refineries** (hydrocracking and gasification processes, deep conversion of hydrocarbons residues)
- **oil and gas industry** (gas dehydration plants, gas gathering systems, produced water and CO₂ injection, crude oil pumping stations and pipeline pressure testing units)
- **steel industry** (descaling plants, forging presses, rolling mills support systems, coke by-products processes)
- **civil engineering** (grout injection for ground consolidation)



Titano 31.30 Triplex Pump for Filter Feeding



Titano 31.10 Triplex Pumps for Glycol



Titano 31.40/Q Quintuplex Pump for Carbamate

Crankmechanism

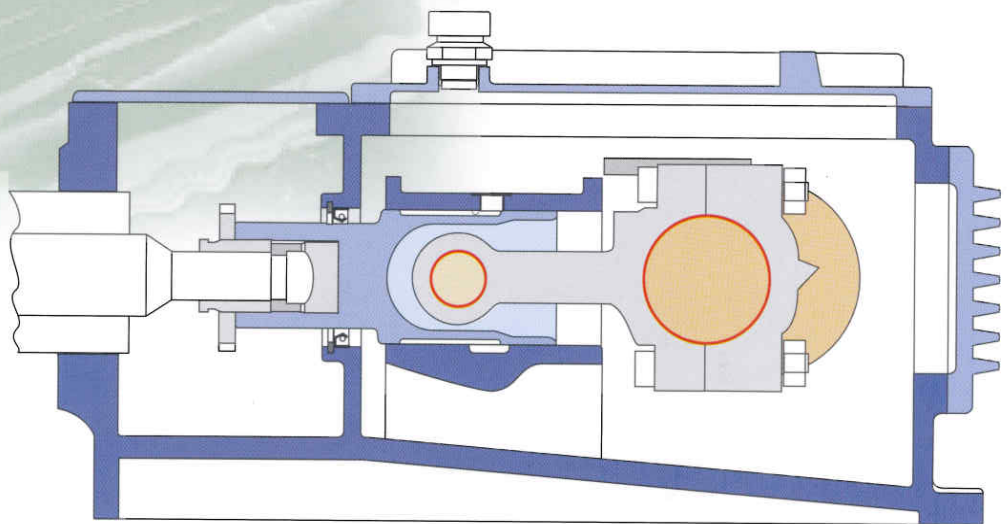
To meet the highest reliability requirements connected with process applications, the pumps of TITANO series are designed to assure:

- **low stress levels in all the components**, particularly crankshaft and frame;
- **crankshaft ends supported by roller bearings** for triplex pumps; quintuplex and septuplex pumps are respectively designed with three and four bearings;

- **connecting rod bearings of thin shell type**, made of steel with white metal coating, allowing for high specific loads;
- **alignment of the plunger with the hydraulic cylinder** guaranteed by a spherical joint, which prevents stress transmission to the stuffing box packings area;

- **a simple and safe hydrodynamic lubrication system** using the oil contained in the frame; oil is brought to the crankpin bushing by the shaft and fills an additional oil reservoir from which it flows to the crosshead and to its pin bushing by gravity.

The pumps of the TITANO series normally do not require auxiliary lubrication systems: this allows higher reliability with lower operating costs. However, to meet particular installation conditions (i.e. high environmental temperature or very low speed continuous service), the pumps of the TITANO series are pre-arranged for external oil cooling and forced lubrication systems.



Titano series: power end arrangement

Hydraulic head

The standard hydraulic head of TITANO pumps consists of a manifold provided with flanged connections and one independent valve body for each plunger.

This construction allows for **easy maintenance**, since:

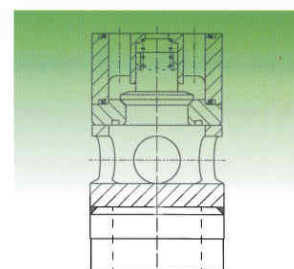
- **the disassembling of each valve body and cylinder is allowed without disconnecting the suction and discharge lines;**

- **the valve bodies (complete with valves and seats) and the hydraulic cylinders (complete with stuffing box packings and plungers) can be pre-assembled at the workshop minimizing on site works and downtime of the pump during replacement.**

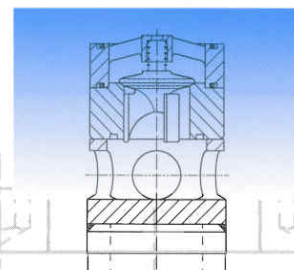
The solution with independent valve bodies is also particularly suitable in the applications where significant temperature fluctuations are expected, as the consequent thermal expansions are symmetrically distributed and absorbed by each single body. Special hydraulic end solutions have been designed to meet specific requirements, in particular to have

the possibility to heat the whole head or the cylinder area and to allow very high pressure up to 1500 bar. The plungers are made of austenitic stainless steel, hardened, chromium plated and ground, to obtain a smooth surface which assures long life to the stuffing box packing and easy surface reconditioning.

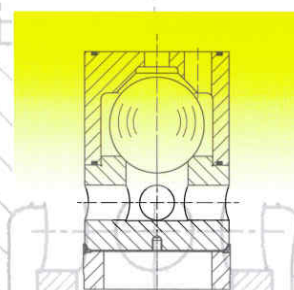
Ceramic or metal oxide coatings are available to meet the requirements connected with the handling of abrasive and corrosive fluids.



Up-guided valve



Wing valve



Ball valve



Up-guided valve assembly



Wing valve assembly

Valve assemblies

Various types of valves are used to meet the characteristics of the different fluids handled:

- **up-guided valves** for clean fluids, low viscosities and low NPSHA values;
- **wing valves** for fluids with limited content of solids and with medium viscosities;

- **ball valves** for fluids with a high percentage of suspended solid particles and/or high viscosity;
- **double ball valves** for the same above situation, but in addition with high pressure and need for low residual pulsations.

In the standard execution valves are made of quenched stainless steel and for particular applications they are in stainless steel with contact area stellite coated. The material of the valve seats is the same as the valves, but with higher surface hardness.

Contact surfaces of valves and valve seats is conical to assure the best sealing. Only in the ball valves solution, the valve seats have a sharp edge to avoid solid particles building up in the contact area. The largest sizes of TITANO pumps can also house axial type valve units in order to face the combined effect of heavy corrosion and fatigue stress typical of some specific applications.

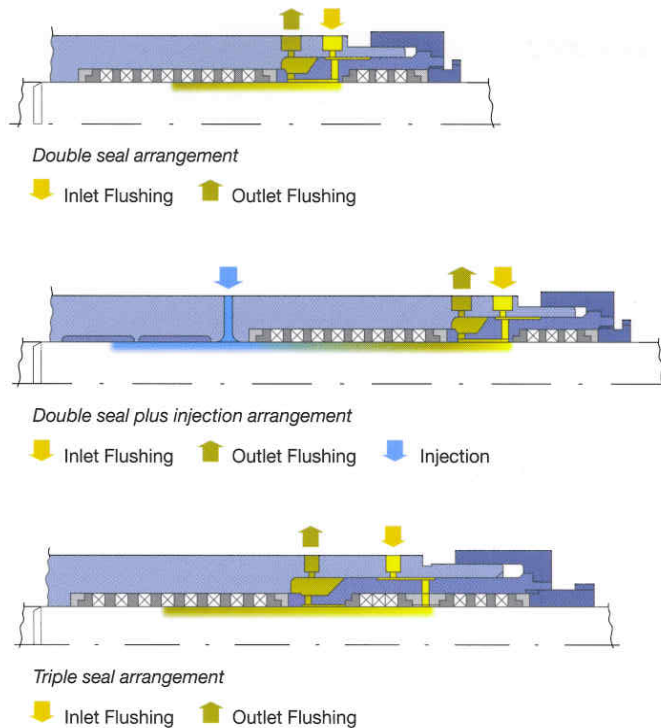
Sealing systems

According to the characteristics of the pumped fluid various sealing systems are available in order to satisfy different operating conditions found in the process applications. The most frequently used solutions are:

- **double seal for clean and not dangerous fluids;** flushing is provided for cooling and/or lubrication of the stuffing box packings and recovery of the leakages from the main packing;
- **double seal plus injection for fluids containing suspended solids or having the tendency to crystallize;** this solution (in addition to the functions indicated in the previous case) through the injection of a product suitable and compatible with the process in front of the sealings, guarantees the contact of the sealings with a clean fluid; in this way the life of the

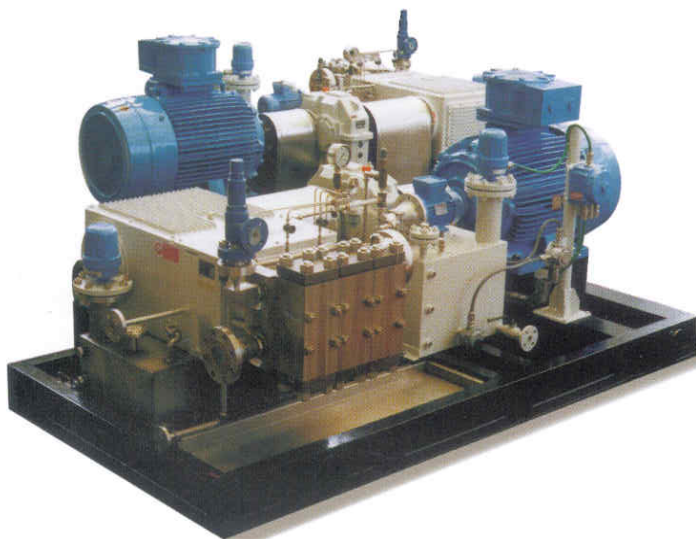
plunger-sealing-hydraulic cylinder system will be considerably longer;

- **triple sealing, allowing to build up an hydraulic barrier system (besides the flushing and the leakages recovery) preventing any leakage of the product out of the pump;** this is the solution adopted for pumping condensate hydrocarbons, liquefied gases and toxic or explosive products.

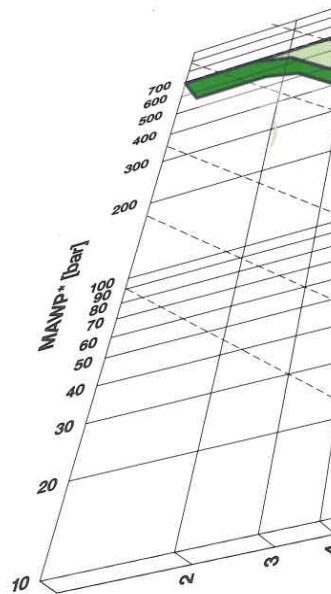


In the above solutions the stuffing box packings are made with

preformed braid rings, in specific materials depending on the pumped fluid, but in any



Titano 31.20 Triplex Pump for Etylene Vinyl Acetate



case spaced out with support rings having the function to maintain the braid rings shape under pressure load and assure optimum heat transfer.

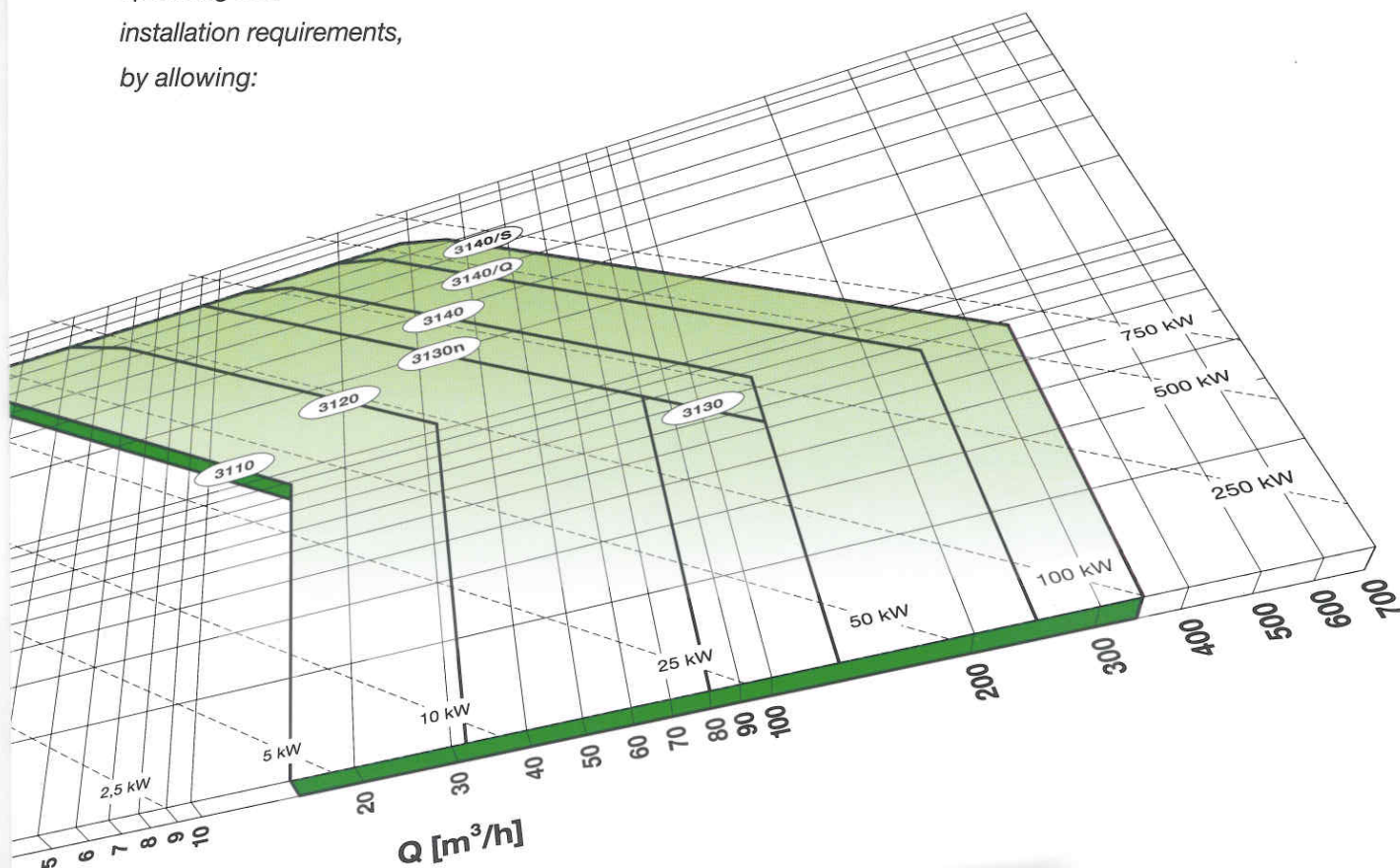
Drives

The driving systems of the pumping units with pumps of the TITANO series can be designed in order to satisfy different operating and installation requirements, by allowing:

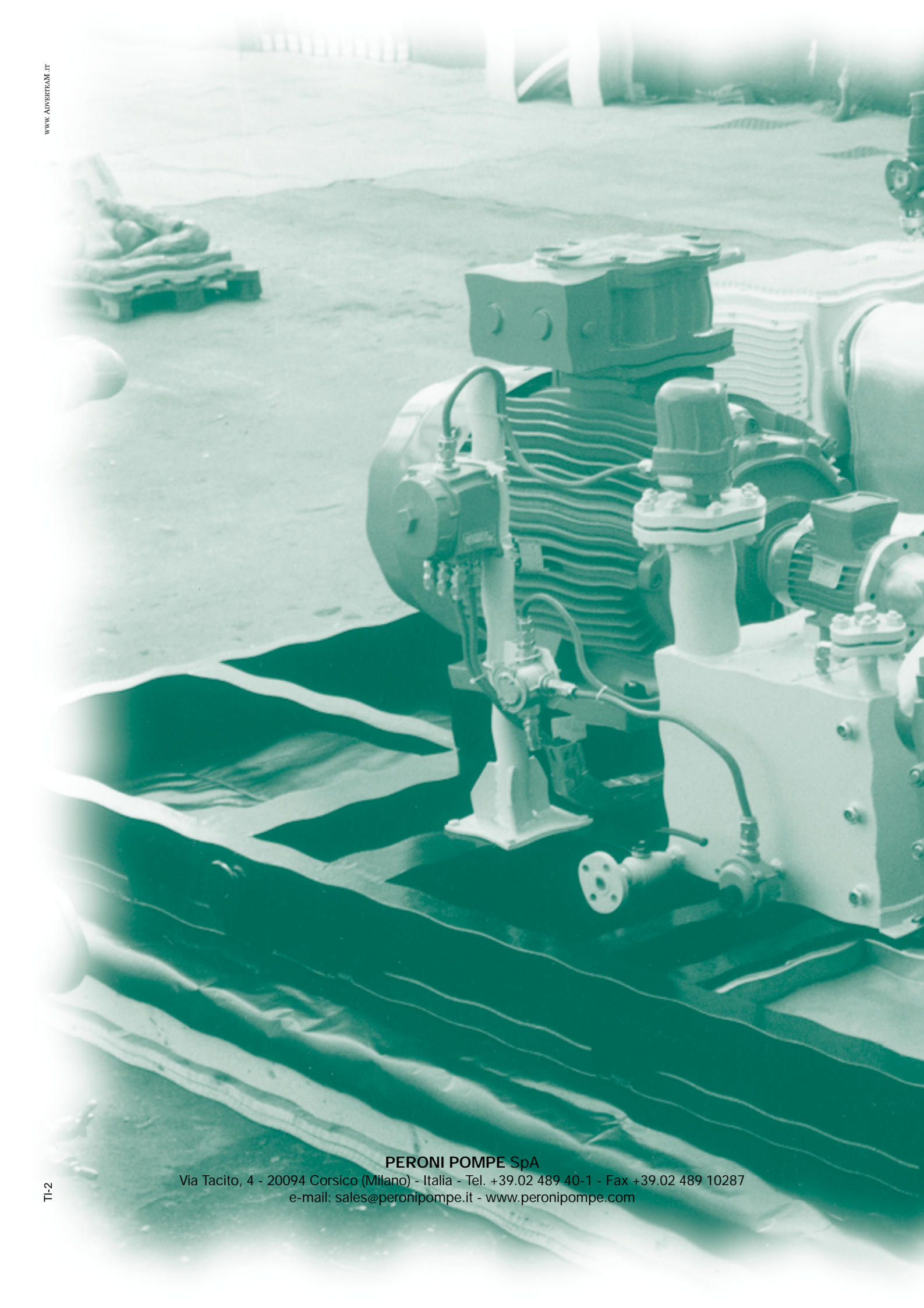
- RPM reduction by parallel axes, orthogonal or coaxial gear boxes or by means of belts and pulleys systems;
- RPM variation by means of frequency converters or variators, both mechanical or hydraulic;
- electric, diesel or hydraulic motors drive.

Performances

The diagram shows the performances of pumps of the TITANO series for a preliminary selection of the most suitable model for the specific application.



* Maximum Allowable Working Pressure



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