

# TMP news

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Termomeccanica Pompe and the LNG market.  
Supplying not only Design & Manufacturing but also Integrated Services Solutions

## New TM.P Branch opens in India

Termomeccanica Pompe (TMP) entered the Petrochemical and Oil & Gas markets in the early 1960s but recently renewed and enhanced its production program to supply a wide range of API 610 centrifugal pumps so as to cover the most demanding main process services, including oil pipelines, liquefied natural gas and on-shore & off-shore water injection. Since its beginning, the liquefied natural gas (LNG) trade has increased steadily at over 5%/year, as the worldwide gas market continues to grow to meet the consumption demands of both domestic and industrial users. In this scenario, Termomeccanica Pompe has been intensifying its commercial efforts towards products such as Sea Water Pumps (SWPs), with high added value for this type of plant and towards countries such as China, where the construction of LNG receiving terminals has been increasing significantly over the recent years. An LNG receiving terminal is the arrival point for LNG tankers in a gas utilization region. It is where a ship's liquefied natural gas cargo is unloaded and stored in its liquid state, then re-gasified and fed to the natural gas pipeline system as required by market demand.

LNG terminals have therefore four main functions:

- Receiving LNG tankers and unloading their cargo;
- Storing LNG in cryogenic tanks;
- Regasifying LNG to meet demand;
- Feeding gas into the national transmission network.

During the re-gasification phase, Open Rack Vaporisers (ORV) are commonly used to heat and vaporize the LNG using the seawater that is pumped from vertically suspended pumps installed in a sea water intake.



SWP per Zhuhai LNG Receiving Terminal before delivery

As such Sea Water Pumps (SWP) play a critical role in this kind of application, both in terms of reliability and energy consumption.

Therefore Termomeccanica Pompe's offer has not been limiting its offer to the supply of the complete package itself, which includes the pump and its relevant instrumentations, electric motor and air release valve, but has extended it to other services. Indeed, Termomeccanica Pompe has been cooperating with the End Users / EPC contractors for the design of the pump intake given that the settlement of the definitive geometry of a pump intake is generally on the critical path of an LNG project schedule and that, consequently, the SWPs are the equipments to be commissioned first. TMP's Research & Development Department actually verifies that the pump intake meets the criteria the Department has defined through its own experience and that it also complies with the recommendations established by the Hydraulic Institute Standards through two different steps:

- A Computational Fluid Dynamic Analysis, which allows to implement the modifications necessary to eliminate disturbances and vortices in the approach flow patterns, and within each pump sump; this study implies to consider all possible operating conditions;
- Physical tests on the intake model of reduced dimensions which allow to observe any type of vortex (free-surface, sub-surface) with the help of dye or artificial debris and to verify whether the HI acceptance criteria are satisfied; finally, swirl angles in the pump suction can be measured by proper swirl meter and compared with the maximum allowable value.

A case-specific pump design can thus be performed which optimizes its efficiency and the appropriate materials are also selected according to the specific characteristics and temperature of the sea water (duplex or superduplex are commonly used for this application).

In order to guarantee a high level of quality, an accurate Pump Inspection Test Plan, including several preliminary tests on each main components, is strictly followed. For instance, hydraulic tests on the pressure components and a balancing test on the impeller are performed at TMP's workshop.

In accordance with the API 610 standard, a performance test of each pump and relevant electric motor is finally carried out at the company's in-house test centre in order to verify the contractual parameters such as flow, head, power consumption, minimum submergence level, vibration, temperature and noise level. Besides design, manufacturing and testing activities, Termomeccanica Pompe also provides an integrated services system covering any need that may arise during the pumps' & plant's entire life cycle.

After-sales service starts with skilled TMP supervisors assisting Client's maintenance and operational staff during the on-site installation and commissioning activities by holding a dedicated maintenance training course for them. A 3 to 5-year Long Term Service Agreement (LTSA) is also always proposed to the End User as an added value for plant operators. In fact, this agreement includes services such as the supply of spare parts for minor and major overhaul activities as well as capital spare parts, maintenance & field engineering support for planned and unplanned on-site activities. A remote monitoring system that verifies the main pump parameters 24/7 is also available.

The table below reports the company's latest supplies of Sea Water Pumps in LNG receiving terminals.

PLANT	LOCATION	OWNER	MAIN CONTRACTOR	PUMP CHARACTERISTICS					CURRENT STATUS
				Q.ty	Flow (m <sup>3</sup> /h)	Head (m)	RPM	Power (KW)	
Yuedong LNG Receiving Terminal	China	CNOOC	CNOOC Yuedong LNG Co. Ltd	3	6.800	35	745	950	Delivery expected by March 2014.
Dunkerque LNG Receiving Terminal	France	EDF	TS LNG	5	8.976	36	595	1.250	Delivery expected by October 2013.
Qingdao LNG Receiving Terminal	China	SINOPEC	Sinopec Europa Handles GmbH	4	6.073	33	745	800	Delivery expected by April 2013.
Zhuhai LNG Receiving Terminal	China	CNOOC	Guangdong Zhuhai Golden Bay LNG Ltd	5	6.963	41	745	1.100	Delivered and ready to be installed. Commissioning is expected by August 2013.
Terminal Methanier de Fos Cavaou	France	GDF Suez	Société du Terminal Méthanier de Fos Cavaou	5	9.600	35	595	1.250	In operation since 2010.
Dapeng LNG Receiving Terminal	China	CNOOC	Guandong Dapeng LNG Co. Ltd	8	6.440	34	745	815	Nos. 6 in operation since 2007 (Phase 1) Nos. 2 in operation since 2009 (Phase 2)
Revithoussa LNG Terminal	Greece	DEPA	Sofregaz	3	2875	53	990	575	In operations since 2006 .
Inchon LNG Terminal	South Korea	KOGAS	KOGAS( Korea Gas Corp.)	4	1200	44	510	2000	Supplied in 1990. In operations since 2002.

In short, Termomeccanica Pompe has acquired key references in all main process and water injection services, becoming a player to reckon with in the Petrochemical and Oil&Gas international markets.

As 2012 moved into 2013, the new TM.P branch opened in India.

After a few months of bureaucratic procedures, TM.P finally obtained the authorisation of the Reserve Bank of India and the local Chamber of Commerce to operate with its own representational office in India.

The branch is based in the city of Pune, in the Indian state of Maharashtra. Pune lies approximately 200 km to the south-east of Mumbai, in a strategic position, both because it is geographically centrally located and because, in recent years, an important economic and industrial fabric has gone hand-in-hand with the major development experienced by this city.

Within the urban perimeter of the city, TM.P has its own representational office complete with meeting room and video conference system, to facilitate contact with the parent company and local partners, and a warehouse used to store and dispatch foundry models to local suppliers.

The opening of the Indian branch met with two primary objectives for TM.P:

- 1) to give a greater boost to the commercial action for the sale on the Indian market of compressors and centrifugal pumps in the Oil & Gas, Power and Water Transmission segments, all areas of great potential;
- 2) to facilitate and increase the possibility of locating qualified suppliers of materials in the country, to be contacted for projects where the primary driver is price and where contractual conditions with our customers allow it.

For this latter aspect, the branch is already operating as a technical and commercial interface organisation between local suppliers and TM.P, both during the offer stage and when orders are processed.

New supplier scouting and qualification initiatives have also been taken, aimed at diversifying and specialising suppliers according to their relevant experience and production capacity, with a view to improving performance in terms of quality, price and deliveries.



The work of the branch has also resulted in the recent stipulation of a new commercial collaboration agreement, which has led to the acquisition of a new order for the supply of 4 concrete volute (NV type) pumps for the thermoelectric plant of Painampuram in the state of Andhra Pradesh.

Under the guidance of the branch, important negotiations are also underway for boiler feed water pumps intended for Indian nuclear plants and pumps for large water transmission plants.

The branch also works closely with Termomeccanica Compressori for the promotion and marketing of lubricated air screw compressors (air-ends) intended for the main local packaging companies that play a key role on the air compression market.

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## Termomeccanica Service Sud Environmental Impact & Energy Saving

In 2007, as part of its development strategy involving the establishment of service companies positioned in strategic areas with significant company machinery installed base, Termomeccanica Pompe established **TM.P. Termomeccanica Service Sud Srl** (TMPSS), located in the industrial area of Massafra (Taranto). The corporate aim of the company is to supply customers from Southern Italy with an excellent global service on rotating machines, that is not limited to maintenance alone, but rather extended to include the replacement and/or improvement of machinery, with energy saving programmes supported by the technological background of the parent company.

Moreover, the company, which develops over an industrial area measuring 4500 m<sup>2</sup>, of which 2500 m<sup>2</sup> covered, has been equipped with a cutting-edge mechanical workshop able to produce high-precision mechanical parts.

A significant example of this company vocation looking to energy saving and the safeguarding of the environment has been applied with the use of an innovative product represented by the HSS (Hydraulic Self Sustained System) type pump patented by TM.P; such pump exploits the principle of the hydraulic support of the rotor by means of the fluid pumped, with no need for grease- or oil-lubricated bearings. The special design of the wear rings also enables axial centring of the rotor with extremely limited play, reducing volumetric loss.



HSS pump during testing at TMP test Center

HSS technology is currently used at the pumping stations of Milan, Genoa, La Spezia, Cagliari, and, in the project involving the aqueduct of Apulia, the drinking water supply infrastructure of the region of Apulia. In this latter plant and, more specifically, in the pumping stations of Parco del Marchese, Secli, Mercadante and Locone, a transformation is underway, exchanging the original split case machines with 1 or 2 impellers and rotor supported by rolling bearings on both sides for HSS type floating rotor machines.

The replacement of traditional machines with HSS type machines ensures a significant increase in the machine yields, thanks to the reduction of friction and hydraulic losses, with a consequent reduction of the power of the electric motor; the energy savings achieved therefore result in lower power consumption and help reduce the CO<sub>2</sub> emissions released into the environment.

At present, the company is also busy rehabilitating the entire rotating machines fleet of the Taranto ILVA and is playing a key role in the overhauling and upgrading programme of the Navy Fleet at the Taranto Navy Arsenal and other Italian Arsenals.

These initiatives provide important evidence of just how the company has managed to gain standing on the global service market, providing customers with an innovative, highly-technological product, with results that are entirely up to the best expectations.

## Termomeccanica Pompe opens its Doors to Students

The Termomeccanica Group and in particular Termomeccanica Pompe (TM.P) has been **collaborating with both Training Entities and Institutes of the Province** for several year now, with a view to enabling young students to "get to know" the company's business context.

In this regard and on request, the students visit our offices, are accompanied throughout our structures and production departments and are therefore able to actually see what they learn in school being applied. At the same time, traineeships and apprenticeships of varying duration are initiated, ranging from a minimum of a fortnight to a maximum of three months.



TM.P has also subscribed to the programme "Alternanza - Scuola Lavoro", the school project establishing the alternation of periods of study with periods of "work" in companies.

The project targets students in their final years of technical and professional secondary school institutes. They are given the possibility of working alongside our operators, watching our staff for two weeks as they are involved in the various different stages of the production process, from workings through to assembly and tests. These activities are not only a golden opportunity for the young adults concerned, but also for our company: we come into contact with the new generations, which enables us to "evaluate" the young students with a view to their potential future inclusion in the company.

**Careful attention is also paid to relations with the universities**, in different ways. The range goes from thesis projects for both standard three-year degrees and masters' courses, to meetings between the university and the company.

First and foremost, the "Job Meeting", organised in collaboration with Italian universities, including that of Pisa. This is the event that enables the company to meet young university graduates of various faculties and to collect applications that may be used to start inclusions in the company.

TM.P has also been collaborating with some Italian universities for several years on research and doctorate projects. At present, there are in fact two technical research doctorate courses running in the Termomeccanica Group, each lasting three years and seeking to further investigate some important issues for our business.

## Termomeccanica Group takes part a new Oil&Gas exhibition OMC 2013



After participating last year to IRPC Milan and ADIPEC, the Termomeccanica Group could not miss the Offshore Mediterranean Conference & Exhibition (OMC) held in Ravenna from March 20<sup>th</sup> to 22<sup>nd</sup>.

Since its launch twenty years ago, OMC has supported the Oil&Gas business, above all the Italian Energy industry, offering to professionals an ideal arena for discussion on the industry subjects such as R&D, technological achievements and future challenges.

The Offshore sector includes all the activities relative to oil drilling and extraction taking place near a marine environment. In this regard, the Termomeccanica Group particularly called the attention of the OMC participants thanks to the wide range of solutions proposed, deriving from the synergy between its participating companies:

- Termomeccanica Pompe with its vertical pumps for chemical products and water injection;
- Termomeccanica Pompe Service Sud with its so-called "strategic" pumps for the pumping of petrochemical products;
- Termomeccanica Servizi Integrati which deals with complementary activities (compressors, valves and cryogenic pumps, gas and vapor turbines);
- Termomeccanica Compressori with its SCA 14GAS compressor, designed and built according to API619 standards for applications such as refineries, process plants with explosive atmospheres, offshore platforms, extraction wells and mines with residual gases;
- Termomeccanica Industrial Process with its experience on air & gas treatment deriving from industrial processes, solvent distillation, combustion of organic liquids or liquids contaminated by solvents and from chemical plants with continuous or batch processes.

It is only with such an integration and synergy among companies who belong to the same group that it becomes possible to offer a customer service which goes further than the one offered by traditional service companies. In our case, we call it Global Service aimed at technological improvement, at increasing the performance of processes by precious percentage points and at extending plant life, all of which always taking in consideration the aspects related to environmental impact and energy saving.

## Flash News

### A 4 million Euro Order in Saudi Power Generation for TMP

Last January, Termomeccanica Pompe acquired a new 4 million Euro contract for a supply to the "PP12" plant which is to be up & running within 2014 in Saudi Arabia in the Riyadh area.

The order is related to the conversion of a power generation structure from an open cycle type, with gas turbine only, into a combined-cycle power station and therefore with 2 steam turbines of 342 MW and 8 HRSG (supplied by Alstom Power France).

The total power of the plant will reach 2175 MW. The end user is SEC, Saudi Electricity Company, while the EPC Contractor to carry out the installation, TM.P.'s direct customer, is Arabian BEMCO Contracting in JV with GS E&C from Korea. Between December 2013 and January 2014, TM.P. shall therefore supply BEMCO with 10 boiler feed water pumps and 10 condensate extraction pumps complete with electrical motors.



Boiler Feed water pump with motor

### New web application for TMC's customers the "TMC Data Book"

As a part of a digitalization process, Termomeccanica Compressori has developed an application which helps its Customers to easily select the right compressor for their application(s) from the complete TMC screw compressors range.

Such application has been made available from the company's website and also directly from [www.tmcdatabook.com](http://www.tmcdatabook.com)

This innovative web-app, fully compatible with all the most-widely used operating systems, is already available in Italian and English versions. A Chinese version is also in progress so as to cover all of TMC's markets.

The main advantage of this new cutting edge communication tool is to provide TMC's existing & potential customers a fast and effective device available to them whenever and wherever needed.

### Our mission

To contribute to the success of our customers through our experience and know-how. We pursue this goal giving the utmost consideration to the hard work and commitment of both employees and suppliers, respecting the Environment and complying with the expectations of our Shareholders.