

TMP news

Project Reference Person
Aldo Sammartano
Editor TM.P. S.p.A. Termomeccanica Pompe
Project Developed in-house
Authorisation from the Court of La Spezia N. 5/08 dtd. 02/12/2008

TM.P. S.p.A Termomeccanica Pompe
Tel. +39 0187 5521 • Fax 0187 552506
March 2014, issue 01

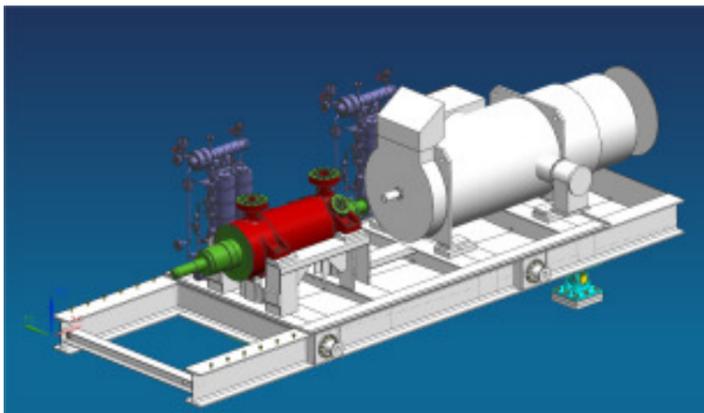
Via del Molo, 3 La Spezia Italy • pumps@termomeccanica.com • www.tmp.termomeccanica.com

Export Oil Pump Supply for the Greater Stella Offshore FPF1 platform

Within the development program of the Greater Stella oil & gas field, Ithaca Energy awarded Petrofac the refurbishment of the FPF1 platform which will be carried out at Remontowa Shipyard, Gdanz - Poland. The refurbished platform will be assigned to the offshore processing and export of hydrocarbons extracted from the Greater Stella field, located in the UK's Central North Sea continental shelf; the end user is a joint venture between Ithaca Energy, Dyas and Petrofac itself. Termomeccanica Pompe scope of works is the design and supply of the 14 centrifugal pumps to be installed on the PFP1 platform, comprising 2 export oils pumps with their booster pumps, 3 circulation pumps and 7 utility pumps. The installation of the pumps is scheduled for March 2014 and the start of operations with the pumping of oil for within the end of 2014.

Main oil export pumps & booster pumps

The export of oil is carried out by two BB5-type pumps (Termomeccanica MESB 150.11 model), each coupled with a 1,5 MW electric motor working under inverter. The use of the inverter is necessary so as to guarantee the pump working range under the various conditions expected during the development of the oil field, for a flow rate of 170 m³/h with the head ranging from 1350 m to 2073 m, obtained by increasing speed from 2720 rpm up to 3280 rpm. The use of the inverter has also proven necessary to increase the pumping pressure so as to remove the wax obstructions that may be generated during pumping stop at the typical North Sea temperatures, with the possibility to reach up to 2584 m at 3564 rpm with a flow rate reduced to 120 m³/h. The 2 export oil pumps are coupled with two OH2-type pumps (Termomeccanica 100AP50 model) working as booster. Both the main and booster pumps are provided with double pressurized mechanical seals with API PLAN 53/b. On top of the typical design issues that usually mark offshore projects, additional requirements from Petrofac Engineering, such as the installation on three-point baseplates and the blast load resistance design for both the main and booster pumps, have increased the contract design complexity. It is also important to remember that this project stems from the refurbishment of an existing platform, with



3-point base plate - top view

already defined spaces and a pre-existing hull, which will moreover operate in rough sea conditions. The combination of these additional project-specific factors entailed a further increase of the supply's design complexity. In fact, design not only had to be adapted to the particularly limited spaces available but it also had to take into account the tight constraints of vessel motion specification on structural elements and accessories; design further had to take into consideration interface loads higher than usual for this type of application. All the above requirements have entailed the necessity to dedicate considerable resources to engineering activities, substantially higher than for other comparable projects, whether

related to the "ad hoc" design of the baseplate and other skid structural elements or to the methodical use of FEM analysis for both design and verification of various components of the supply. The engineering of auxiliary and electrical components, such as inverters, electric motors and lube oil system was also subject to the limitations imposed by the afore-mentioned requirements. A HAZOP review was conducted at design completion in order to verify that all measures necessary to guarantee the safe operation of the plant had been taken into account during the design phase. The complete test of the pumping unit under all its operating conditions was carried out at Termomeccanica La Spezia's in-house test center facilities.

Cooling Circulation pumps

For the cooling medium circulation service, the contract also included the supply of 3 vertical "in-line" API OH3-type pumps, with a flow rate of 1050 m³/h at a 52,5 m head and driven by a 230 KW electric motor. In this case too, the specific requirements of this project, particularly the need to reduce overall dimensions without affecting technical requirements, have led to a tailor-made solution with the supply of Termomeccanica DDBV-type pumps. This is actually a typical solution for Termomeccanica which consists of "in-line" vertical pumps that are however axially-split instead of radially-split as per the API 610 OH3 standard.



Export oil pipeline pump (BB5)

Utility pumps

The remaining utility services of the platform are covered by 5 more OH2-type pumps: two "off-gas compressor suction drain pumps", Termomeccanica 25AP32 model, and three "heating medium circulation pumps", Termomeccanica 80AP20 model.



FPF1 platform on Dry Dock Barge
remontowa Shipyard

Vertically suspended pumps

Termomeccanica supply finally included 2 vertically suspended pumps: one VS2-type pump, working as glycol transfer pump (Termomeccanica CPP50.1 model) and one VS4-type pump, working as drain sump pump (Termomeccanica 25CPPL16 model). Once again, the peculiarities of the project have prevailed over design standardization. The lack of space on the platform deck did not allow the development of design according to API610 standard as originally planned. In fact, the entire upper part of the pumps surmounting the baseplate had to be completely re-designed so as to reduce its height and allow installation as well as maintenance of the pumps in the small space available on the deck.

As it is usual for offshore projects, certification has represented an essential component of the scope of work of the supply. In addition to CE marking and ATEX certification, project specifications have required the involvement of the Lloyd's Register as Inspection & Verification body for marine classification and Bureau Veritas as third party inspector. Moreover, T.U.V. has been involved to carry out P.E.D. related activities.

In addition to the technical constraints described above, this project has also been subject to a major management challenge due to special customer requests. For example, as part of the de-risking project of the Greater Stella Area Development, both the client and the end user have requested Termomeccanica Pompe's involvement in a series of activities aimed at reducing the delivery lead-time by 1 to 2 months according to pump type. Termomeccanica succeeded in moving up of delivery as requested and it managed to do so by involving not only many departments across the company but also its main sub-suppliers as well as the client itself (Petrofac).

The design and supply of the 14 centrifugal pumps to be installed on the PFP1 platform of the Greater Stella oil & gas field has been characterized by uncommon design and management challenges that have not only tested Termomeccanica's experience and know how in the Oil & Gas Offshore sector, but also its flexibility to adapt and customize to the most diverse requests from both its client and end user. From this point of view, the positive feedbacks received by Petrofac and Ithaca Energy have confirmed the successful completion of the project by Termomeccanica.

TM.P. workshop New Machining Centre for API 610 Std Process Pump Main Items

As announced in the June 2013 edition in the article on the new API 610 std pump assembly department, in early 2014 Termomeccanica Pompe (TM.P.) procured its new centre for machining the main process pump components.

This essential investment became necessary as part of the Oil&Gas market development strategy that we have been pursuing for some years now, involving the overhaul and extension of the pump range built to the API 610 standard. In addition to the obvious need for parts to be machined to meet technical requirements, increased productivity was the main criterion in our search and ultimate selection of the machine tool to act as our new machining centre.



The machine tool chosen - a DS600/200C turning machining centre from Italian company Trevisan Macchine Utensili S.p.A. - actually gives productivity a significant boost as it allows us to:

- perform machining in-house instead of outsourcing as we had until now;
- produce a finished machined part on a single machine tool, with two placements at most, thus avoiding costly and time-consuming transfers between different machine tools (boring machines-lathes and vice versa);
- achieve improved efficiency linked to the actual speed of the machine (saving on machining hours);
- run certain machining stages unmanned as it works as a multi-pallet machining centre.

The Trevisan machine tool is a multi-pallet turning and milling machining centre whose operation - to venture into the technical jargon - relies mainly on mechanical and hydraulic kinematic mechanisms, driven respectively by brushless AC motors and hydraulic cylinders powered by a hydraulic power pack.



API 610 OH2 type pump

As mentioned, the machining centre in question is used mainly for machining certain process pump components. However, in determining which machine to purchase, we also factored in the option of extending its use to certain engineered pump components designed and built to order. Indeed, the machine's specifications mean it also lends itself to machining any components that require turning/boring work, such as certain boiler feed pump parts like suction casings, discharge casings, intermediate casings etc..

Of course, given its palletized nature, the machining centre only reaches peak efficiency when handling a substantial number of identical or similar workpieces.

With the addition of the Trevisan machining centre, we have almost brought to fruition our 2011-2013 plan to establish TM.P. as the first choice for process pumps, guaranteeing an annual production capacity of at least 600 units.

As an additional measure aimed at making the API pump department's facilities even more comprehensive, in late 2013 we created a dedicated area for final skid assembly and, more specifically, for completing the pipework to connect auxiliary equipment.

Partnership between Termomeccanica Compressori and NEC Srl for a significant contract in the Balkans

NEC S.r.l, established in 1997 in Livorno, is an Italian engineering company which supplies turnkey plants for the Oil & Gas and Petrochemical markets, both at national and international levels.

This is why, last August, NEC won an important contract in Serbia for the supply of a compression unit of a total value of around 6 million euros.

The tender was awarded by Gazprom Neft's subsidiary NIS (Naftna Industrija Srbije) thanks to the experience NEC has accrued in designing Oil & Gas refineries. The project is indeed related to the modernization of NIS' refining capacity in Serbia and more specifically involves a new light hydrocracking and motor fuel hydro-treatment facility.

For the above-mentioned contract, NEC has decided to avail itself of the support and partnership of Termomeccanica Compressori who offers complete compression packaged solutions.

In fact, with more than a hundred years of experience, TM.C represents today a key player of the international compression market, offering a wide range of services from reciprocating to centrifugal technology and to the latest innovative screw solutions for the Oil & Gas market, designed mainly for flare gas, off gas, wellhead gas, biogas and other fluids that are either highly complex to treat or to compress. TM.C has supported NEC throughout the completion of the entire system with its own design, technology and experience in the complete compression field.

It is important to note that NEC and TM.C have focused their efforts on developing a customized product designed to NIS' specifications since day one of the partnership.



NIS Pancevo Refinery (Serbia)

The assembled modular unit, designed for CO₂ compression, is provided with instrumentation and valves, including pressure safety valves for safe and proper operation; the heart of the unit is represented by an efficient, innovative reciprocating compressor connected with a gas motor, which covers a power range of 1,600 kW.

The unit is also certified according to API 618 standards, and, thanks to its conservative rotational speed, it is able to ensure safer, smoother and more reliable operation.

A successful outcome has been achieved thanks to NEC's experience in engineering and to TMC's great knowledge in designing and manufacturing compression and pumping machines for refineries, so much so that the two companies are looking forward to further partnerships in the future.



TMC gas compressor skid

Intensification of the Internationalization of Termomeccanica Pompe Group



The growth of TMP Group is closely linked to its internationalization process which is related not only to sales but also to operations i.e. procurement, production and local service companies. Even if TMP's internationalization started long ago (exports already represent around 80% of revenue), time has come to speed up its course. In fact, the current crisis has accelerated the globalization process and changed the nature of the game: price has become the market driver and it will remain so for quite a long time. As a consequence, our companies must adapt to this new reality, whether by innovating on products and processes or by delocalizing operations where they cost less, preferably in areas that also offer a local market. Furthermore, in Europe, neither the economic upturn nor the restart of investments in the sectors regarding TMP's activities will take place in the near future and this drives the company to turn to foreign markets for new opportunities even more and, in other words, to become "global". The "Controlled Company Day" which took place last December at the La Spezia headquarters is one of the tangible signs of the acceleration of our international process. Indeed, such event has brought together the network of branches and controlled company which constitutes today the TMP group, i.e.:

- TMC SpA Termomeccanica Compressori (La Spezia - Italy)
- Adicomp Srl (Venezia - Italy)
- TMP Termomeccanica Service Sud Srl (Taranto - Italy)
- TMSI Srl Termomeccanica Servizi Integrati (Brindisi - Italy)
- SC TMP Termomeccanica Romania Srl (Bucarest - Romania)
- TM.MSK LLC (Mosca - Russia)
- Termomeccanica Pompe Middle East FZE (Dubai - UAE)
- Termomeccanica Saudia Co. Ltd (Riyadh - Al Jubail - Saudi Arabia)
- TMP SpA Termomeccanica Pompe - India Branch (Pune)
- TMC. SS Shanghai (China)

The day was the occasion to intensify the relationships not only between head office and each "satellite" company but also amongst the "satellite" companies themselves, giving each of them the opportunity to present their core business and to identify and start new intra-company synergies related to commercial promotion (of products and services) and/or procurement.

The editors of this issue are:

G. Bongiorno - S. Carret - G. Del Dotto - M. Giacomelli - A. Giorgi - C. Nardini - A. Riccobaldi

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.