

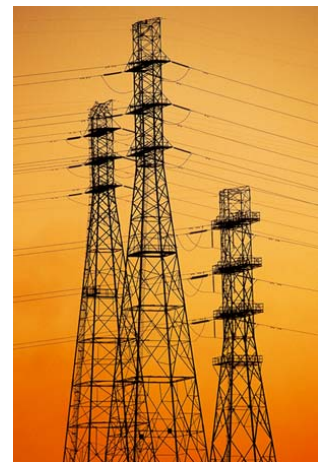


Enel relies on Fluiten quality and installs mechanical seals on pumps at the “Andrea Palladium” power station in Fusina

Fluiten, an entirely Italian company that has worked in the rotary shaft seal sector for over 40 years, was awarded an unprecedented contract by Enel to carry out retrofit work at a thermal power station in the province of Venice. The company replaced the original pump packing seals with its own mechanical seals and optimized plant output..

The “Andrea Palladium” thermal power station in Fusina (VE) is one of the most important in Italy. It is found in the Marghera industrial area and consists of four coal-fired production units with an overall power of 1,136 MW and a production capacity of 6 billion kWh. Enel decided to replace the packing seals (radial plait gaskets) on the four boiler feed pumps, which have been operating for several years at this plant, with more technologically advanced mechanical seals. To select the most reliable supplier for this delicate operation, Enel issued a call for tenders in December 2005. All the most highly regarded companies made offers, including the pump manufacturer itself.

Fluiten answered Enel's call and, thanks to the quality of its seals, the expertise of its technicians, the excellent quality-price ratio, and perfect compliance of the design presented with Enel's requirements, it was awarded the contract in spring 2006.



Pumps, at the “Andrea Palladium” thermal power station

Fluiten carried out the retrofit work, i.e. the upgrading operation on the pumps, at the “Andrea Palladium” thermal power station between 2006 and 2008. It replaced the packing seals originally fitted to the system with its own mechanical ones in order to ensure power station reliability over time and optimize the original set-up. The packing seals were replaced with Fluiten cartridge mechanical seals, which were pre-assembled to make them easier to fit and simplify maintenance and any future replacement.

Before going ahead with the installation at the Enel Fusina plant, Fluiten had already tested the “stationary cartridge” solution in other projects with positive results. These are seals where the springs do not rotate with the shaft and the seal components are supplied ready assembled with a flange and shaft sleeve to make them easier to fit to the machine.

Enel and the Fluiten service team followed all stages of the operation constantly and in strict correspondence, from inspections to the technical assessment. The operations were broken down into several stages, such as adaptation and inspection of dimensions. After 6-8 months, once the final design drawn up by the Fluiten engineering department was approved by the Enel management, the mechanical seals themselves were manufactured.



The equipment was delivered as a single consignment, whereas installation was carried out in two stages. It was decided to perform the work at two different times in order to minimize the occurrence of problems, avoid complete plant shutdown and guarantee Enel a year of perfect mechanical seal operation.

The equipment included 8 seals for the 4 feed pumps, 8 seals for the 4 booster pumps and a set of spare parts: each pump has two supports and each one is fitted with 2 mechanical seals. In the first stage, 4 seals were fitted to 2 feed and booster pumps; in the second, the other 4 seals were fitted to the remaining 2 feed and booster pumps.

The boiler feed pump is one of the critical components of a power production plant because it is the part which draws the water from the Degasifier and sends it to the boiler, in this case, at a pressure of over 160 bars. The booster pump, found after the Degasifier and directly connected to the electric engine of the feed pump, gives to the feed pump the necessary head (intake) to avoid cavitation.

The mechanical seal prevents water leakage between the rotary shaft and pump body, which - besides being a danger for people - leads to loss of performance of the machine, and consequently the whole plant. The working conditions are therefore extremely heavy duty, especially for the boiler feed pump seals with a shaft diameter of 100 mm, which have to withstand a water temperature of 170°C and peripheral shaft speed of 25 m/s at 4,800 rpm. Booster (auxiliary) pump seals are, on the other hand, subject to less heavyduty conditions: the pump shaft has a diameter of 50 mm and the seals have to withstand pressures of 8 bars at 1,450 rpm.



Fluiten engineering department

In order to install cartridge seals, the dimensions of the stuffing boxes were taken, and a few of them were sent to the Fluiten workshop in Pero, near Milan, for adaptation. The company then carried out a series of operations, including machining and alterations to its own products, under the direction of its service and engineering department, an extremely flexible team independent of the production process, created to provide an overall customer assistance service.



Fluiten service team

The mechanical seals were fitted in two stages between October 2006 and February 2007. During each stage, work was carried out on one feed pump/booster pump assembly on each 160 MW thermal generating unit. Since each thermal generating unit has two feed pump-booster pump assemblies (one acting as backup for the other), it was possible to avoid complete shutdown, thus keeping the outage of the unit affected to a bare minimum. Run-of-the-mill problems were also avoided thanks to the Fluiten service team which followed the installation both during assembly and start-up.

One year after the first replacement, the Fluiten mechanical seals were inspected and found to operate excellently. Consequently Enel decided to go ahead with the second replacement, which led to mechanically sealing the entire plant and extending the qualità and optimization of Fluiten products to the rest of the machines.

Enel gave the all-clear for the second installation in January/February 2008; the work on the feed and booster pump flanges was completed at the beginning of April; fitting was concluded at the end of May.



Commenting on the successful outcome of the project, Fluiten's sales manager Rino Campaniello stated: "Working in cooperation with Enel was one of our most interesting projects and another successful case in the history of Fluiten: we have solved many important problems in several years, not just in the energy field, but also in the pharmaceutical, chemical and petrochemical sectors. Fluiten has proved in this way - as it has done on many other occasions in the past - that it is able to design high quality mechanical seals which are the best solution for the customer".



Rino Campaniello
Fluiten's sales manager

What is a thermal power station?

A thermal power station is a plant in which a fuel is burnt inside a boiler to produce energy (heat) that transforms process water into steam. The superheated steam acts on the blades of a turbine connected to an alternator which generates medium voltage electricity. The voltage is raised by step-up transformers which connect the power station to the high voltage grid. After the steam has transferred its energy to the turbine, it is expelled by the turbine itself and collects inside the condenser. Here it is re-transformed into water by cooling water from the outside and drawn back into the boiler by the feed pump to repeat the cycle again.

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