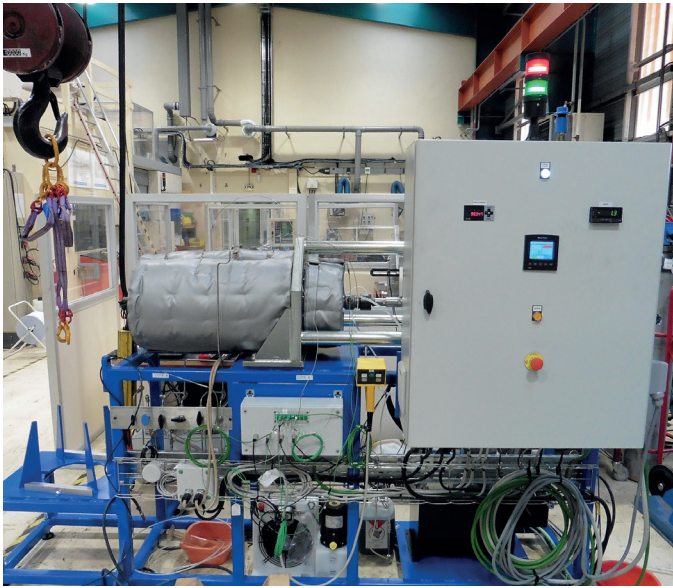


EDF

Sealing braids undergoing unprecedented tests

Do PTFE sealing braids retain their sealing performance once irradiated? Cycling tests carried out on an instrumented test bench specifically designed to meet EDF's requirements gave an affirmative answer to this question.



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OUR CUSTOMER

Corporate name
EDF

Turnover
71.3 billion euros in 2019

Workforce
Approximately 165,000 employees all over the world

Business activity
EDF is an integrated energy company operating in all types of electricity-related activities: generation, transmission, distribution, sales and marketing, as well as energy services.

Innovation sometimes hinges on tiny details. Details which, however, become extremely important when it comes to replacing the conventional graphite braids with equivalent Teflon (PTFE) ones to improve the reliability of operation of valves used in radiation exposure hazard areas by. Before such a deployment could be authorised, an EDF team conducted a validation test campaign which earned it the nuclear engineering innovation award.

A new requirement

Until today, PTFE braids have been used outside nuclear reactor containment vessels. When conditions allow, could all valves, irrespective of their

place of installation, take advantage of PTFE, a material which divides the friction level by 5 and thus allow easier valve operation? To answer this question, EDF needed to test the behaviour and sealing properties of Teflon braids (provided by two different suppliers) before and after irradiation. The energy company entrusted this difficult mission to Cetim, which designed a suitable cycling and sealing test bench that met unprecedented requirements. "After cycling tests under normal conditions of use, we wanted the seals to be kept under pressure during the gamma ionisation phase", says Laetitia Biringer, design engineer at EDF. Therefore, Cetim developed a modular test bench which makes it possible to remove the mechanical device representative of the valve head while keeping the seal in loaded condition. Then it became possible to transfer the device, without

any loss of tightening force, to the Belgian laboratory tasked with its irradiation. The performance and sealing properties of the braids (which did not exhibit any radioactive contamination) were then tested again at Cetim.

Validation of the Teflon solution

The operation was conducted several times with a gradual increase in the radiation dose. "The tests allowed us to confirm that the Teflon braids do not lose their performance or sealing properties after irradiation. From now on, they can be deployed everywhere in our nuclear plants when the conditions allow this", concludes Franck Milliard, design engineer at EDF.

Cetim's asset

Design and manufacturing of a test bench which meets the requirements of the industrial sector for the qualification of all types of seals and sealing braids. Possibility of collaboration with external partners. In this particular case, the partner was a laboratory that had gamma ionisation equipment.

