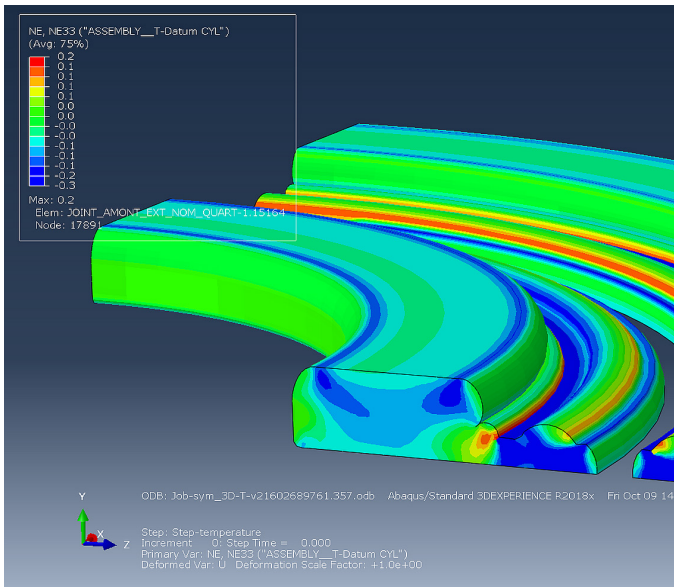


IRSN

# Tests and simulation on an **XXL** gasket

Combining tests and numerical modelling tools has enabled IRSN to characterise the sealing performance of polymer seals used in powerplants.



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## OUR CUSTOMER

**Corporate name**  
IRSN

**Workforce**  
1,816 employees in 2020

**Business activity**  
French public expert in the research and investigation of nuclear and radiological risks.

In a nuclear powerplant, the building in which the reactor operates is designed to prevent any risk of leakage of radioactive elements into the external environment. However, there are walkways for the personnel to access the building and take equipment inside. They are sealed with silicone gaskets qualified for nuclear applications. As part of safety requirements, their performance must be checked over a ten-year period. Some tests are performed under normal conditions of use. Others are carried out under conditions that may occur during an accidental situation (high temperature, pressure rise, irradiation, etc.). These tests are implemented

by IRSN with a small-scale model of the sealing system on a gasket that has a real cross-sectional diameter and which has previously undergone accelerated aging. The next step is to extrapolate the results to those that could be obtained with a gasket that may have an actual developed length of more than twenty meters.

## Working in partnership

This approach requires both the proficient use of numerical modelling tools and thorough expertise regarding the behaviour of materials. It also requires the ability to deftly interpret the results of the tests and those obtained by calculation. “Cetim has such skills and expertise. They are perfectly matched with those of our experts and test engineers. The joint work of multidisciplinary teams is

key to the success of such a project”, explained Georges Nahas, research engineer at IRSN. Therefore, using the test results and advanced simulation tools that take into account representative defects, this collective work has made it possible to validate the behaviour of the full-size gasket under normal and accidental conditions of use. “Accordingly, we have developed a tool which, depending on the influential parameters, helps to determine the limits of sealing performance. As such, we can identify under which configurations leaks are likely to occur and therefore prevent them”, added Georges Nahas.

## Cetim's asset

Extensive expertise in the field of sealing which allows us to support manufacturers of all sectors, including the nuclear energy sector, in the process of validating their sealing systems. Ability to numerically model non-linear behaviours taking into account the environment, the influential parameters and representative defects.

