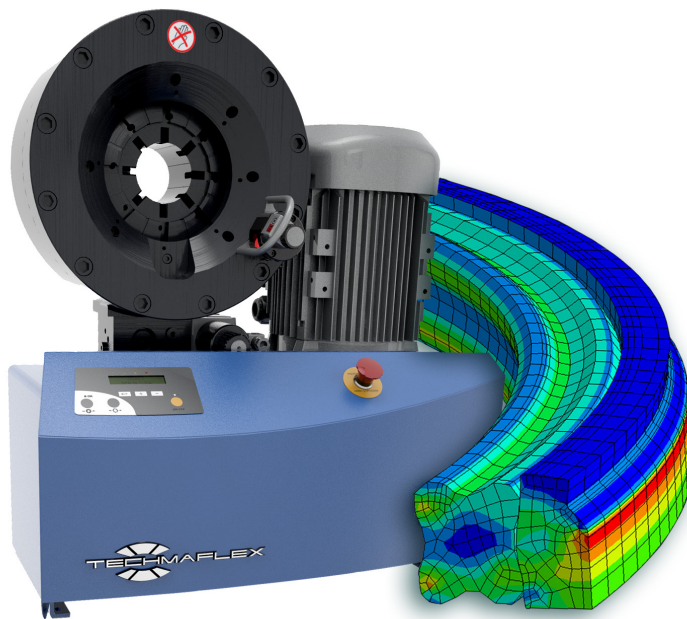


Techmaflex

# Modelling sealing to improve dynamic seals

To understand the root causes of a sudden degradation of leak tightness, Techmaflex decided to have its seals thoroughly analysed through modelling and simulation. The result? A change of materials and suppliers!



friction zone between the seal and part with which it is moving in relative translation. Cetim's study revealed that the loss of leak tightness was due to elongation of the polyurethane seal caused by excessive tightening generated by the nitrile seal and also due to ageing and the shrinkage of the nitrile seal.

Loïc Boussard concludes: "The study demonstrated that it was necessary to question the seals. This led us to select another supplier with whom we took into account of the criteria related to the elasticity of the seal material without, however, modifying the geometry of the existing grooves".

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## OUR CLIENT

**Corporate name**  
Techmaflex (Manuli  
Rubber Industry group)

**Activity**  
Manufacturing  
of hydraulic hose  
crimping machines

**Turnover**  
10 million euros, 90%  
in exports in Europe, Asia  
and America

**Workforce**  
40

**T**echmaflex produces between 300 and 400 hose crimping machines per month in approximately fifty different models. "One of our machines intended for Australia exhibited a leak tightness problem although this model had been on the market for more than eight years without any problems," says Loïc Boussard, Head of the Design Office. "It started to ooze oil after five to six months of use."

The quality of the seal was the only possible cause, as no modification have been made in this machine throughout its life. This seal is composed of

a Nitrile Butadiene Rubber (NBR) O-ring seal which, like a spring, rests on a polyurethane seal held tight against the bushing of the moving shaft. Loïc Boussard continues: "I asked Cetim to analyse the seal and recommend a solution that could use standard machining processes as far as possible, or even to propose a modification, as applicable."

Cetim characterised the materials of the two seals in order to model the dynamic seal, then simulated the behaviour of the very thin oil film (0.1 µm) under high pressure (350 bar).

This oil film lubricates the

## Cetim's asset

Cetim engineers are recognised experts in sealing. They have suitable tools at their disposal to simulate dynamic seals behaviour. These tools are based on modelling of elasto-hydrodynamic lubrication phenomena and make it possible to assess various parameters such as sealing capacity, friction and risk of failure and wear.

