

# Testing of Passive Fire Protection (PFP)

**Understanding your PFP's fire resistance capability**

A fire accident in a facility could potentially cause devastating losses. The life of the employees, the damage to the property and even disastrous environmental harm are not something to be taken for granted. Not to mention the dollars that have to be spent.

Understanding what needs to be done to protect yourself from potential fire accidents is therefore essential.

## What We Can Do For You

### Explosion Before Fire Scenario (Blast Testing)

This test simulates an explosion that occurs before a jet fire event. An explosion can cause damage to your PFP therefore can reduce its durability against an ensuing fire.

We perform our blast testing using a 50 m<sup>3</sup> explosion vessel. The facility uses ignited flammable gas, chosen to be propane to achieve the required test overpressure. The test follows the draft standard ISO/DIS 23692-1.

### Standard Jet-fire Scenario



The objective of this test is to assess the fire resistance of PFP products to

be used on pipes, valves, structural elements, etc.

This test simulates a jet fire caused by a leak in a pipe that contains flammable fuel at a high pressure.

During the test, we will expose the test sample to continuous jet fires as specified in the standard ISO 22899-1. The gas temperature during the test can reach 1200 °C and the radiation level can reach 250 kW/m<sup>2</sup>.

### High Heat Flux Jet Fire Scenario

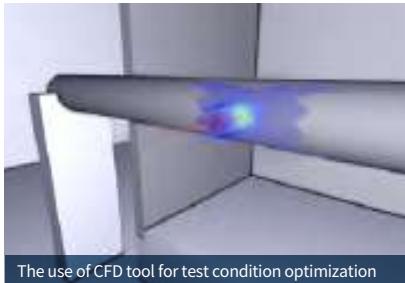


PFP is being exposed to the high heat flux jet fire

In this test, the sample will be exposed to continuous jet fire with heat fluxes reaching the level of 350 kW/m<sup>2</sup> and gas temperature exceeding 1300 °C.

High heat flux jet fire tests have been shown to be more realistic as evolves from the results of large-scale fire tests therefore necessary.

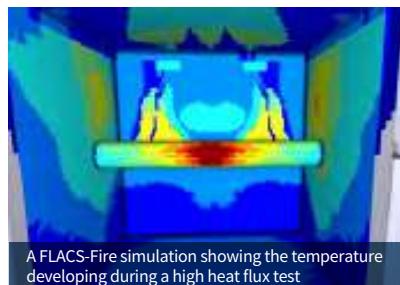
## Test Condition Optimization with CFD (Computational Fluid Dynamics) Calculation



The use of CFD tool for test condition optimization

FLACS-Fire is an extension of the existing FLACS capabilities to include the required physics for accurate simulation of fires. FLACS-Fire module adds jet and pool fire modelling capability to the industry standard 3D CFD (Computational Fluid Dynamics) explosion and dispersion modelling software FLACS.

FLACS-Fire can be used to perform CFD calculations to determine suitable test conditions before performing a real jet fire test for a specific project.



A FLACS-Fire simulation showing the temperature developing during a high heat flux test

This method allows for choosing optimal test conditions without having to perform a series of initial tests. Therefore, making it more cost-effective for our customers.

We have performed many experiments throughout the years to verify that the result of FLACS-Fire are valid which makes FLACS-Fire the right tool to find the test conditions that the customers desire.

## One of the Few Large-Scale Jet Fire Facilities in the World

Our jet fire facility had undergone trialling and validation in order to deliver a world-class jet fire testing capability.



Gexcon jet fire test facility in Steinsland, Norway

One of our aims is to avoid influence of weather conditions to achieve stable and repeatable test results.

This facility is extremely flexible for R&D testing and product development as well as standard tests dedicated for equipment certification.

### About Gexcon

Gexcon is a world-leading company in the field of safety and risk management and advanced dispersion, explosion and fire modelling. Our experience arises from detailed knowledge of explosion phenomena built up throughout years of conducting extensive research projects, carrying out safety assessments, performing accident investigations, and performing physical testing at the company's facilities.

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