Energy transition

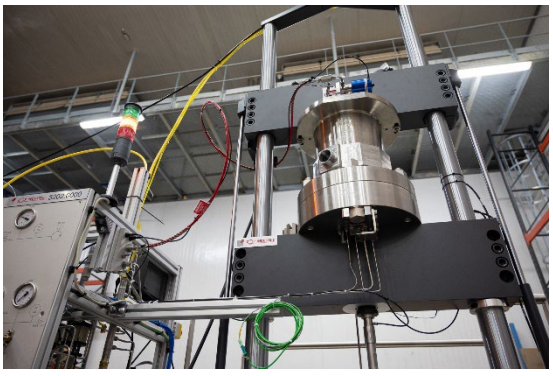
Hydrogen's impact on your infrastructure and equipment (FenHYx)

YOU ARE:

- **Operator of gas infrastructures** (transport, distribution, storage, LNG terminals) wishing to assess the impact of hydrogen (pure or with different mixing ratios) on your facilities.
- **Industrial customers** who consume gas and operate facilities where hydrogen is used on your assets.
- **Equipment manufacturers** whose products are installed on gas infrastructures and/or industrial sites, and who need to anticipate a growing proportion of hydrogen in the fluids they transport;
- **Research center** wishing to conduct tests on innovative equipment, in operating ranges replicating network conditions.

OUR CHALLENGES

Hydrogen produced from processes that do not emit carbon dioxide is a key lever in the energy transition. Gas infrastructures are essential to the development of hydrogen. They enable this energy carrier to be transported at lower cost, mixed with natural gas. Hydrogen can also be transported pure as part of a conversion of use on existing infrastructures.



Nevertheless, transporting hydrogen in exisiting gas pipelines today poses numerous problems in terms of integrity, tightness, corrosion and metering, as well as gas quality control and industrial safety.

To meet these challenges, NaTran R&I is developing FenHYx. This R&D platform aims to accelerate the adaptation of the European gas network and associated equipment to hydrogen. By removing the technical barriers to injecting hydrogen into gas networks, it will enable the hydrogen industry to develop and help solve the problem of interconnecting hydrogen producers and consumers in a safe, clean and efficient environment.

OUR RESOURCES

The expertise mobilized by NaTran R&I as part of the FenHYx project spans several themes, and is an active area for the development of new skills.

The following is a non-exhaustive list of the capabilities and skills we bring to bear on hydrogen-related issues:

Gas quality theme	• **Qualification of gas analyzers**, especially on 100% H2 gas matrix • Testing & qualification of detection equipments
Integrity theme	Assess the impact of hydrogen on the mechanical behavior and aging of materials • Tests are carried out on a **tensile testing machine** aafter accelerated aging of metal specimens in an **autoclave** in a hydrogen atmosphere (100 bar / 100% H2 or any other composition); • **Tests performed:** mechanical characterization: toughness, fatigue, tensile tests, crack propagation tests, on different specimen geometries.
Thematic Network equipment	Analyze the effects of hydrogen on valve operation, regulators, meters , and other network equipment • NaTran R&I has **static test benches** (100 bar / 100% H2 or any other composition), combining equipment ageing capacity, thermal conditioning chamber, manoeuvring arm and sealing bench in particular. • Calibration and operating tests are carried out for reference curves on one of **NaTran R&I's natural gas benches**. • **Tests can be carried out:** performance evolution as equipment ages in H2 atmosphere, tightness tests in the presence of H2, endurance and maneuverability tests on equipment aged in H2,
Corrosion theme	Assessing the impact of hydrogen on issues such as cathodic protection, the evolution of existing defects, and the problems of interaction with coatings or paints. • Tests are carried out in an **electrochemical autoclave** (100 bar / 100% H2 or any other composition); • **Tests:** electrochemical pressure tests, cathodic protection simulation, defect evolution, gas phase permeation, etc.
Industrial Safety theme	• Development of tools and methodologies associated with risk assessments (including methodology and tools for hazard studies, explosion simulation, etc.). • Advice & support in drafting technical arguments for the authorities

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THEY PUT THEIR TRUST IN US