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FARECOGAZ POSITION ON SUITABILITY FOR HYDROGEN APPLICATIONS - INSTALLED BASE

Subject:

Suitability of equipment and systems/installations for the use of H_2-NG mixtures in gas infrastructure, including commercial and industrial installations, burners, and gas appliances.

INDEX

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1. SCOPE

To encourage the development of the hydrogen market as part of efforts to decarbonize the European energy system. It provides practical guidance and operative instructions on assessing the suitability of FARECOGAZ products:

- Evaluating the current compatibility of equipment and systems;
- Identifying key regulatory gaps and required actions; and
- Addressing the evolving regulatory framework, which remains under development and is not yet fully established.

2. PREMISE

FARECOGAZ is the European Association representing manufacturers across the full gas metering chain, including equipment critical for the measurement, regulation, and safety of gas distribution systems. This encompasses gas pressure regulators, gas meters, safety devices, and associated infrastructure, ensuring reliable gas distribution and consumption measurement. Its members include companies involved in the production of:

- Gas pressure regulators;
- Safety devices for gas pressure systems;
- Gas meters for distribution and consumption measurement;
- Complementary equipment for pressure monitoring stations;
- Complete pressure control and metering stations for combustible gases; and
- Odorization systems for natural and renewable gases.

These systems are designed to operate at pressures up to 100 bar, making them suitable for use in both transmission and distribution networks across Europe. Given the rapidly evolving regulatory environment, FARECOGAZ offers operational guidance to evaluate the compatibility of existing systems with hydrogen mixtures, benefiting gas transporters, distributors, and consumers.

For several years, there has been a need to update standardization and assess the impact of hydrogen-natural gas (H_2-NG) mixtures in natural gas infrastructures. This is necessary to define requirements related to:

- **Internal and external leaks** (in pipes and equipment) when using H_2-NG mixtures, depending on the concentration and partial pressure of hydrogen in the gas;
- **Hydrogen embrittlement** (affecting the integrity of pressure components like welds, pipes, bends, valves, flanges, etc.);
- **Gas quality** (considering factors like flame stability, WOBBE index, energy measurement, and odorization efficiency);
- **Explosion protection and prevention** (impacting the classification of areas with potentially explosive atmospheres); and

Net emissions and impact on energy efficiency (including the potential reduction of greenhouse gases versus increased NOx emissions).

3. REFERENCE STANDARDS

The main design standards covering FARECOGAZ equipment and systems include:

- **EN 88-1** Pressure regulators for inlet pressures up to and including 50 kPa;
- **EN 88-2** Pressure regulators for inlet pressures above 50 kPa up to and including 500 kPa;
- **EN 126** Multifunctional controls for gas burning appliances;
- **EN 161** Automatic shut-off valves for gas burners and gas appliances;
- **EN 334** Gas pressure regulators for inlet pressure up to 10 MPa;
- **EN 1359** Gas meters — Diaphragm gas meters;
- **EN 12186** Gas infrastructures - Gas pressure regulating stations for transport and distribution - Functional requirements;
- **EN 12261** Gas meters — Turbine gas meters;
- **EN 12279** Gas transport and distribution - Installations for the regulation of gas pressure on distribution networks - Functional requirements;
- **EN 12480** Gas meters - Rotary displacement gas meters;
- **EN 14236** Ultrasonic domestic gas meters;
- **EN 14382** Gas safety shut-off devices for inlet pressure up to 10 MPa;
- **EN 16304** Automatic vent valves for gas burners and appliances;
- **EN 16678** Automatic shut-off valves for operating pressures up to 6,300 kPa;
- **EN 16898** Gas filters having a maximum working pressure up to and including 600 kPa;
- **EN 17526** Gas meter - Thermal-mass flow-meter based gas meter.

Standards specific to hydrogen applications:

- **CEN/TR 17797** Gas infrastructure - Consequences of hydrogen in the gas infrastructure and identification of related standardization needs in the scope of CEN/TC 234;
- **CEN/TR 17924** Safety and control devices for burners and appliances burning gaseous and/or liquid fuels - Guidance on hydrogen-specific aspects;
- **FprEN 17928** Gas infrastructure - Injection stations,
  - Part 1: General requirements;
  - Part 3: Specific requirements regarding the injection of hydrogen.

4. CHARACTERIZATION AND COMPATIBILITY WITH HYDROGEN/NATURAL GAS MIXTURES

To determine the suitability of FARECOGAZ equipment for use with H_2-NG mixtures or 100% hydrogen, manufacturers need to assess several aspects, including:

- Hydrogen embrittlement and chemical resistance of materials (both metallic and non-metallic);
- Internal and external leakage prevention (to manage areas with potentially explosive atmospheres and ensure safe downstream pressure)

For gas meters, additional attention must be paid to:

- Measurement accuracy; and
- Long-term durability of components like seals and diaphragms under hydrogen exposure.

The suitability of equipment depends on:

- The percentage of hydrogen in the natural gas mixture;
- The partial pressure of hydrogen in the gas mixture;

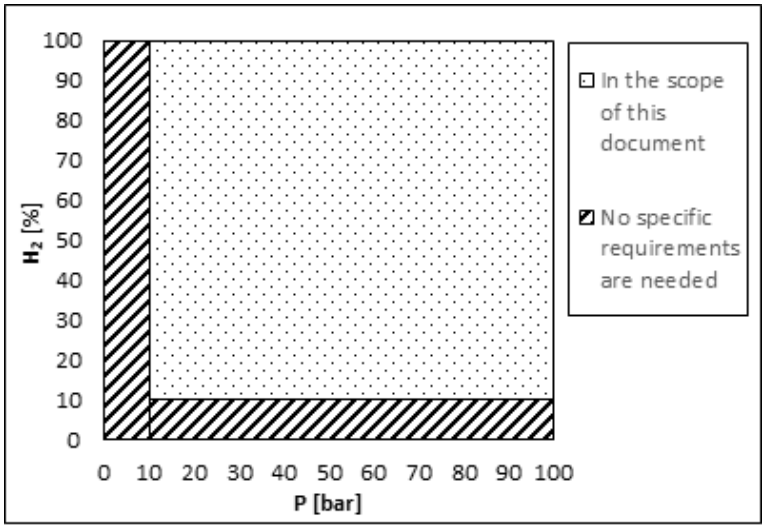
- The materials used in the equipment and systems; and
- The current condition of existing installations.

Manufacturers must assess suitability on a **case-by-case basis**.

NOTE: According to UNI CEN/TR 17797:2022 and UNI CEN/TR 17924:2023, no specific material requirements are necessary for:

- Homogeneous H_2-NG mixtures with up to 10% hydrogen by volume, at operating pressures up to 100 bar (10 MPa); or
- Operating pressures up to 10 bar (1 MPa), with hydrogen percentages of up to 100%.

The attached graph illustrates these situations:



5. ACTIONS NEEDED

To assess the suitability of equipment for hydrogen applications, different actions are needed depending on:

- The date of the product's first availability on the market;
- The type of equipment and mixture (H_2/NG); and
- The relative pressure of hydrogen in the mixture.

5.1. NEW AND PRICE LIST EQUIPMENT

Such equipment remains the property of Manufacturers until it is made available on the market.

In the absence of a consolidated regulatory framework, the suitability of this type of equipment can be assessed by the Manufacturer under specific operating conditions (such as % H_2, relative pressure, temperature) based on:

- Project documents;
- Laboratory tests;
- Official studies and consolidated guidelines; and
- Current state of the art and knowledge shared within FARECOGAZ.

The results of these assessments will be made available to Users at no additional cost.

5.2. EQUIPMENT ALREADY INSTALLED IN THE FIELD

Such equipment is owned by Users.

Even after a regulatory framework is established, the suitability of this equipment can be assessed through consultancy requested and paid for by the User.

FARECOGAZ Manufacturers are available to support this process, which should include:

- Collecting design and maintenance data;
- Evaluating the current condition of the equipment;
- Repairing or replacing any worn or non-compliant components;
- Conducting final testing and verification;
- Updating documentation and nameplates; and
- Issuing a declaration of suitability/compatibility.

NOTE: Users must provide information on the age and operating conditions of the equipment with H_2/NG mixtures.

5.3. EQUIPMENT “HYDROGEN READY”

Such equipment remains the property of Manufacturers until it is made available on the market.

The commercialization timeline for "hydrogen-ready" products depends on the development of a regulatory framework.

In the meantime, manufacturers may issue self-declarations or third-party certifications of suitability, under well-defined conditions (e.g., hydrogen concentration, partial pressure).

5.4. SYSTEMS AND INSTALLATIONS

Systems and installations may include piping or components not manufactured by FARECOGAZ members.

In such cases, manufacturers of those components must assess their suitability and provide declarations to confirm the overall system's compatibility.

FARECOGAZ Manufacturers cannot be held responsible for missing declarations from third parties.

6. FINAL CONSIDERATIONS

FARECOGAZ experts actively participate in regulatory discussions to ensure the continued development of standards that validate the suitability of equipment and systems for hydrogen use.

The guidelines in this document reflect the best available knowledge at the time of publication, drawing on technical literature and standards.

This document may be periodically updated to reflect technological advances, particularly when:

- New regulations are issued; or
- New, reliable data from field or laboratory experiences become available.

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