European Association of Manufacturers for Gas Pressure Control,
Gas Metering and Related Systems/Installations
Mevissenstrasse 1, 50668 Cologne, Germany

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FARECOGAZ Position on:

"Suitability for Hydrogen Applications – Installed Base" - Rev01

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.

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1. Scope

To encourage the development of the hydrogen market and support the decarbonization of the European energy system, this document provides operational guidance to assess the suitability of FARECOGAZ products through the following phases:

- analysis of the current suitability of equipment and systems;
- identification of the main regulatory gaps;
- definition of the actions needed

to complete the assessment within the current legislative and normative framework, which is still evolving and not yet consolidated.

2. Premise

FARECOGAZ is the European Association representing Manufacturers of the following categories of products:

- gas pressure regulators;
- safety devices for gas pressure management;
- complementary equipment for pressure control stations;
- complete pressure-control and gas metering stations;
- odorization systems for combustible gases;

intended for operation at pressures up to 100 bar.

In a legislative and normative context that is still under development, FARECOGAZ provides operational guidance to assess the suitability of its equipment and systems/installations, supporting gas Transmission and Distribution Operators, as well as End Users connected to the transmission and/or distribution network.

It has long been necessary to update standards and evaluate the implications of using H_2–NG mixtures in natural gas infrastructures, particularly with regard to:

- **internal and external leaks** (piping and equipment) depending on hydrogen concentration and partial pressure;
- **hydrogen embrittlement of materials** (integrity of pressure parts: welds, pipes, bends, reducers, tees, valves, insulating joints, flanges, etc.);
- **fuel gas quality** (flame stability and speed, Wobbe Index, energy measurement, odorization efficiency);
- **explosion protection and prevention** (impact on hazardous area classification);
- **net emissions and energy efficiency** (e.g., possible NO_x increase despite reduced GHG emissions).

3. Reference Standards

Main standards for FARECOGAZ equipment:

- **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;
- **EN 17928-1:** Gas infrastructure - Injection stations
  - Part 1: General requirements
  - Part 3: Specific requirements regarding the injection of hydrogen
- **CEN/TS 18173** Hydrogen applications — Material compatibility evaluation and qualification

***Note**: Application of national regulations remains the responsibility of operators; this document refers only to European/International standards.*

4. Suitability for Hydrogen/Natural Gas Mixtures

Suitability for use with H_2–NG mixtures and/or with 100% hydrogen must be evaluated in terms of:

a) **Design/Construction** (risks related to pressure and explosive atmospheres):

- Materials integrity (hydrogen embrittlement) and chemical compatibility of metallic and non-metallic materials;
- External and internal leak prevention, especially in relation to hazardous area classification and pressure behavior.

b) **Operational Use** (ageing and cyclic stress risks):

- performance under service conditions;
- surveillance and maintenance over the equipment lifecycle.

Key parameters to assess:

- hydrogen percentage and partial pressure (*see **Note***);
- metallic and non-metallic materials used;
- design and operating conditions (temperature, pressure, flow);
- current condition of the equipment and of the systems of existing installations.

***Note**: Common mixture concentrations cited in regulations:*

- *10% (CEN/TR 17797, CEN/TS 18173),*
- *20% (CEN/TR 17797)*
- *25% (EN ISO 80079-36 and EN ISO 60079-0)*

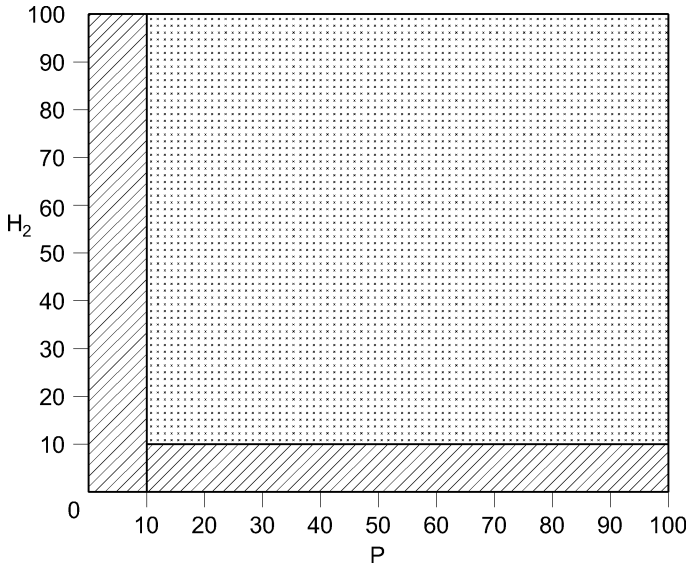
Suitability shall be assessed case-by-case by the Manufacturer.

Based on CEN/TR 17797:2022 and CEN/TR 17924:2025:

a) **No specific material requirements are necessary for:**

- homogeneous H_2–NG mixtures up to 10% H_2 by volume at pressures up to 100 bar (10 MPa);
- up to 100% H_2 at operating pressures up to 10 bar (1 MPa).

b) **No significant impacts are expected on the performance** for pressure-control equipment, filtration systems or pre-heating systems under the above service conditions.



Key

H2	hydrogen content, expressed in percentage by volume (vol %)
P	operating pressure, expressed in bar (bar)
⬚	specific requirements are needed
▨	no specific requirements are needed

Figure 1 - Operating conditions

5. Actions Needed for Design & Construction

Assessing the suitability of equipment and systems/installations for operation with H_2–NG mixtures and 100% hydrogen requires the implementation of specific operational actions, which depend on:

- market availability date;
- type of equipment/system and H_2 concentration;
- hydrogen partial pressure.

5.1 New and Pricelist Equipment

For equipment not yet sold (still owned by Manufacturers), suitability may be assessed under specific conditions by the Manufacturer based on:

- internal Manufacturer's design documentation;
- laboratory test results;
- validated technical literature and standards;
- shared industry knowledge within FARECOGAZ.

Results are shared with Users at no additional cost.

5.2 Equipment Already Installed in the Field

Owned by Users.

Even after the regulatory framework is consolidated, the suitability of this category can be assessed through a consultancy service commissioned and funded by the User. The activities shall include at least:

- collection of detailed information on design specifications and maintenance procedures and materials;
- assessment of current equipment condition;
- repair/replacement of worn/damaged parts and/or parts not compliant with the original design or not suitable for H_2–NG applications;
- final verification and testing;
- update of documentation / nameplate;
- issuance of a declaration of suitability;

***Note**: The User must provide information on the age of the installed equipment and the expected operating conditions with H_2–NG mixtures.*

The consultancy outcome includes:

- analysis of retrofit/replacement scenarios (and/or as-is suitability of the installed equipment);
- planning for implementation timeline of the equipment within scope.

5.3 "Hydrogen-Ready" Equipment

Still owned by the Manufacturer until it is made available on the market.

Commercialization timelines for "hydrogen-ready" products depend on the availability of a defined and consolidated regulatory framework.

Pending a consolidated framework, Manufacturers may attest suitability through:

- self-declarations, or
- third-party certifications (where applicable).

These attestations must in any case specify H_2 concentrations and partial pressures applicable to natural gas.

5.4 Systems and Installations

The approach for systems and installations is analogous to that described above for equipment designed and manufactured by FARECOGAZ members; this includes Pressure Control Devices (PCDs) where used as an alternative plant solution to pressure-control stations according to the relevant standards.

Since assembled systems/installations may include piping and/or equipment not designed/manufactured by FARECOGAZ members (buy-out), the suitability assessment can only be completed with the support of the manufacturers of the purchased parts.

Those manufacturers shall verify the suitability of their equipment and provide a declaration of the assessment outcome, so that the overall system/installation can be confirmed as suitable.

In the total or partial absence of such evidence, confirmation of the suitability of the overall system/installation may be limited, conditional or not fully supported.

6. Actions Needed for the Operational Aspects

The impact on performance and on surveillance activities/procedures of equipment and installations when using H_2–NG mixtures or 100% H_2 is not yet quantitatively defined by official standards; such assessment shall be based on the relevant operating parameters and the available technical guidance.

Qualitative guidance is available in CEN/TR 17797:2022:

- 7.4 H_2 suitability — Gas transmission pipelines with MOP > 16 bar;
- 7.5 H_2 suitability — Gas pressure control;

- 7.6 H_2 suitability — Gas metering;
- 7.7 H_2 suitability — Gas pipelines with MOP ≤ 16 bar;
- 7.8 H_2 suitability — Service lines.

7. Final Considerations

FARECOGAZ experts actively participate in major European and national standardization working groups to finalize the update of requirements for validating the suitability of relevant equipment and systems/installations.

The criteria and operational guidance, presented in Sections 5 and 6 of this document, represent the best knowledge and judgment at the time of publication, based on:

- available technical literature;
- operational experience;
- current regulatory conditions.

This document may be periodically reviewed and updated, as necessary, to reflect technological changes, particularly when:

- official standards covering the topics addressed become available; or
- reliable data from new field experience or laboratory testing are published.

Attestations and assessments shall in any case be interpreted within the limits of the technical and normative state of the art applicable at the time of issue.