PD CEN/TS 17977:2023



BSI Standards Publication

Gas infrastructure — Quality of gas — Hydrogen used in rededicated gas systems

National foreword

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The UK participation in its preparation was entrusted to Technical Committee GSE/33, Gas supply.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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Published by BSI Standards Limited 2023

ISBN 978 0 539 21525 0

ICS 27.075; 75.180.01

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This Published Document was published under the authority of the Standards Policy and Strategy Committee on 30 November 2023.

Amendments/corrigenda issued since publication

Date	Text affected

TECHNICAL SPECIFICATION

SPÉCIFICATION TECHNIQUE

TECHNISCHE SPEZIFIKATION

CEN/TS 17977

November 2023

ICS 75.180.01; 27.075

English Version

Gas infrastructure - Quality of gas - Hydrogen used in rededicated gas systems

Infrastructures gazières - Qualité du gaz - Hydrogène utilisé dans des réseaux de gaz convertis

Gasinfrastruktur - Beschaffenheit von Gas - Wasserstoff zur Nutzung in umgestellten Gassystemen

This Technical Specification (CEN/TS) was approved by CEN on 28 August 2023 for provisional application.

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Ref. No. CEN/TS 17977:2023 E

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European foreword

This document (CEN/TS 17977:2023) has been prepared by Technical Committee CEN/TC 234 “Gas infrastructure”, the secretariat of which is held by DIN.

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Introduction

This document for hydrogen in rededicated gas systems takes into account the condition of existing piping with possible presence of liquid and solid deposits influencing the hydrogen quality.

Many parameters given in this document are deduced from EN 16726.

This document is the first edition and reflects the current situation, taking into account the existing grid, see Annex B. It is expected that over time the hydrogen delivered through such pipework will improve in quality. This will be taken into account in further development of the document.

This document is supposed to balance the requirements of gaseous hydrogen for the producer, the different grid operators and the end-users, respectively in order to set- up a reliable backbone of future energy supply which is (partly) based on using rededicated gas infrastructure. As a consequence, on-site pre-treatment cannot be excluded for applications and/or processes with specific stringent requirements.

The proposed parameters are verified by German project results (HyQual) which have been consulted in combination with end-users' specifications. In the project, different sources of hydrogen have been evaluated, including pyrolysis, steam reforming, electrolysis (Chlorine-Alkaline process and water electrolysis). Furthermore, the proposal takes biological hydrogen production process into account.

Also, the results of the Work Package 9 of the EC-CEN/GERG PNR project 'Removing the technical barriers to use of hydrogen in natural gas networks and for (natural) gas end users' have been taken into account.

This document supports the whole value chain (producers, system operators, other related services, end-users) to produce, transport, store, deliver and/or use hydrogen in a possibly rededicated (or adapted) natural gas infrastructure and connected applications in a safe way in the CEN member countries and where applicable, without the risk to harm or damage the infrastructure or connected user applications.

However, it is recognized that some end-users are sensitive to some gas quality parameters and impurities. In these cases, purification measures can be needed, for upgrading the hydrogen quality.

This document supports the implementation of the hydrogen strategy on European and national level and will accordingly facilitate the trade of hydrogen across entire Europe.

In the context of this document, the following aspects require close co-operation respectively co-ordination with other TCs (CEN-CLC/JTC 6, CEN/TC 268, ISO/TC 197, TCs for equipment and application):

— taking into account both natural gas systems and new built hydrogen systems;

— hydrogen qualities for fuel cell applications EN 17124:2022 (CEN/TC 268 WG 5, legally binding in some countries, e.g. DE).

1 Scope

This document defines the quality of gaseous hydrogen, i.e. its parameters and limiting values, to be transmitted, injected into and extracted from storages, distributed and utilized in fully and/or partially rededicated gas infrastructure and connected applications in a safe way.

This document gives evidence to the end-user which minimum exit hydrogen quality can be expected and ensured from natural gas infrastructure as minimum requirement and without further purification.

NOTE 1 The rededicated gas infrastructure can include new parts of this infrastructure constructed/added after the conversion of the natural gas grid.

NOTE 2 It is expected that over time the hydrogen delivered through such pipework will improve in quality, e.g. due to the increase in share of high purity hydrogen produced by electrolysis. This will be taken into account in further development of this document.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN ISO 13443, *Natural gas - Standard reference conditions (ISO 13443)*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp/

— IEC Electropedia: available at https://www.electropedia.org/

3.1
rededicated gas system
repurposed gas system
gas infrastructure originally used to convey or store gases of the first and second family which will be used from the time of rededication for other fluids as e. g. hydrogen. It can include new parts of infrastructure constructed/added after the conversion of the natural gas grid

Note 1 to entry: After a safety and reliability assessment the components of the infrastructure should be found suited for conveying hydrogen.

3.2
hydrogen
gaseous hydrogen with a certain purity as described in Clause 5

Note 1 to entry: The definition is focussing the purpose of this document.

3.3
exit point
point at which gas leaves the gas transmission or distribution system for end-use