

Technical Information – Guideline

DVGW G 407 (M) August 2022

Conversion of Gas Pipelines made of Steel Pipes for the Distribution of Hydrogen-containing High-Methane Gases and Hydrogen up to 16 bar Operating Pressure

Umstellung von Gasleitungen aus Stahlrohren bis 16 bar Betriebsdruck für die Verteilung von wasserstoffhaltigen methanreichen Gasen und Wasserstoff

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Preface

This guideline was created by the project group “conversion of gas pipelines” within the Technical Committee “Gas Distribution”.

The energy transition and the ambitious climate goals that the Federal Republic of Germany has set for itself require alternatives to the currently used fossil fuels as well as efficient energy storage technology.

Power-to-gas technology that creates hydrogen by hydrogen electrolysis and electricity application has promising potential for climate protection. In larger quantities, this fuel gas can be used as energy storage and, across sectors, for supplying heating in buildings. In this context, methane-rich gases and hydrogen can be employed.

The already existing gas infrastructure has large potential for the distribution of hydrogen, from the injection point over the distribution network up to the interface with network customers, without requiring more expansive technical changes. Extensive pilot projects with network operators have successfully demonstrated that the existing networks are suitable for the distribution of hydrogen. Both hydrogen-containing, methane-rich gases (2nd gas family) and hydrogen (5th gas family) as specified by DVGW G 260 can be used for the conversion of the network.

The basic prerequisite for the usage of hydrogen-containing, methane-rich gases and hydrogen in the existing gas infrastructure is the technical suitability of the system. This suitability shall be demonstrated prior to conversion.

This requires an examination of the possible changes that the properties of hydrogen might entail, separately from the conversion process. Especially the behaviour of pipeline materials, joints, and valves requires precise testing / precise evaluation to create a basis for the conversion of a gas pipeline to hydrogen-containing, methane-rich gases or hydrogen.

For this reason, “guide rails” have been created in the context of this guideline for orientation during a systematic process for evaluating and converting existing gas distribution networks to operate with hydrogen-containing, methane-rich gases and hydrogen. A specific focus lies on the description of technical aspects and the procedure to determine the suitability of the gas pipeline in terms of materials mechanics.

This Guideline contains the conversion of pipelines pursuant to DVGW Code of Practice G 472 for gas distribution and G 459-1 for service lines.

The requirements of this guideline are, insofar helpful and necessary, aligned with the requirements of DVGW Guideline G 408 “Conversion of Gas Pipelines made of Plastic Pipes for the Distribution of Hydrogen-containing High-Methane Gases and Hydrogen up to 16 bar Operating Pressure”.

Earlier Versions

This guideline is a new publication.