

# Technical Information – Guideline

## DVGW G 464 (M) March 2023

**Fracture-Mechanical Assessment Concept for Steel Pipelines with  
a Design Pressure of more than 16 bar for the Transport of Hydrogen**

Bruchmechanisches Bewertungskonzept für Gasleitungen aus Stahl  
mit einem Auslegungsdruck von mehr als 16 bar für den Transport  
von Wasserstoff

H<sub>2</sub> Ready

GAS

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# Fracture-Mechanical Assessment Concept for Steel Pipelines with a Design Pressure of more than 16 bar for the Transport of Hydrogen

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## **Preface**

This Code of Practice has been developed by the project group “fracture mechanical assessment concept” within the Technical Committee “Gas Transportation Pipelines”.

In principle, high pressure gas pipelines are designed for predominantly static loads since barely any significant interior pressure changes occur and even in case of possible sharp-edged defects occurring under these conditions, the crack growth is negligible. Compared with natural gas, operating a pipeline with hydrogen has a larger potential for crack growth which then requires carrying out a fracture mechanical assessment. Consequently, steel pipes, fittings, and weld seams used during the construction of or conversion to an operation with 100% hydrogen shall be demonstrated to be hydrogen-ready for the expected duration of operation. Regarding potential crack growth, Technical Rules DVGW G 409, DVGW G 463 and DVGW G 466-1 refer to American Standard ASME B31.12, however ASME B31.12, does not define a generally applicable concept for fracture mechanical assessments of hydrogen compatibility.

This Code of Practice aims to define such a generally applicable concept, based on assumed defect sizes and operating pressure fluctuations including safety factors (e.g., against number of load cycles and/or critical defect sizes), to enable fracture mechanical assessment of hydrogen readiness for the construction or conversion of high pressure gas pipelines

## **Earlier Versions**

This Code of Practice is a new publication.