Overview of DVGW-Standards and Research Papers relating to Hydrogen

Note: DVGW standards are now noted to be 'H2-ready' if applicable

DVGW #	Date	Type T=Technical Rule (Arbeitsblatt) G=Guideline (Merkblatt) R=Research (Forschung)	Title	Content / Comment
G221	2021-12	G	Guideline for the Application of the DVGW Codes of Practice to the Pipline Bound Supply of the General Public with Hydrogen-containing Fuel Gases and Hydrogen *Leitfaden zur Anwendung des DVGW-Regelwerks auf die leitungsgebundene Versorgung der Allgemeinheit mit wasserstoffhaltigen Gasen und Wasserstoff*	Umbrella standard that collates current best practice in regard to hydrogen transport (understood to cover the period during which corresponding detailed standards are being further developed). Particular focus is on repurposing existing natural gas infrastructure for hydrogen, including detailed methodologies, investigations, risk assessment, training/qualification requirements, etc. Other themes include: manufacturers compliance declarations for hydrogen application (H2-readiness), leak tightness, explosion protection, fire and gas systems, operating and maintenance issues, 'significant change' permit issues ('wesentliche Änderung' nach EnWG / GasHDrLtgV)
G466	2021-12	T	High Pressure Gas Steel Pipelines for a Design Pressure of more than 16 bar; Operation and Maintenance *Gashochdruckleitungen aus Stahlrohren für einen Auslegungsdruck von mehr als 16 bar; Betrieb und Instandhaltung*	Established standard for operation and maintenance of high pressure natural gas pipelines. Latest issue revised to include hydrogen pipelines
G463	2021-10	T	High Pressure Gas Steel Pipelines for a Design Pressure of more than 16 bar; Design and Construction *Gashochdruckleitungen aus Stahlrohren für einen Auslegungsdruck von mehr als 16 bar; Planung und Errichtung*	Established standard for design and installation of high pressure natural gas pipelines. Attachment C describes fracture mechanical evaluation 'Bruchmechanische Bewertung', that can be used for establishing H2-capability.
G201901	2021-06	R	Compendium Hydrogen in Gas Pipeline Networks *Kompendium Wasserstoff in Gasfernleitungsnetzen (H2-Kompendium FNB)*	Summary of various investigations and literature reviews into the H2-compatibility of the individual components of the gas network. For each component there is a fact sheet containing information on the tolerable amount of hydrogen admixture. This is an information publication and not a standard.

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				Concludes that steel with UTS >800 MPa (X100) is not suitable for H2, however, all other existing steels are generally suitable. A lifetime assessment is necessary (Bruchmechanische Bewertung), considering HAZ of welds, crack propagation likelihood. Differences between EN-steel (e.g. L485) and API-steel (X70) have an impact on H2-compatibility considering steel composition and strength. Identifies issues in regard to spiral wound pipes.
G655	2021-04	G	Guideline H2-Readiness Gas Utilisation *Leitfaden H2-Readiness Gasanwendung*	Enhances existing DVGW standards with consideration for hydrogen admixtures up to 20% and pure hydrogen. Stage 1 gives general guidelines on issues to be considered when assessing 'H2-readiness'. Results of ongoing research (Stage 2) will be incorporated in a future update (planned for xxxx). In line with 'Stage 1' status, there are many cross-references to ongoing studies, but few concrete recommendations.
G260	2021-09	T	Gas Quality *Gasbeschaffenheit*	Specifies the requirements for the quality of fuel gases for public gas supply. In principle, H2-admixture up to 20% is possible, provided Wobbe index and relative density limitations are met.
G409	2020-09	G	Conversion of High Pressure Gas Steel Pipelines for a Design Pressure of more than 16 bar for Transportation of Hydrogen *Umstellung von Gashochdruckleitungen aus Stahlrohren für einen Auslegungsdruck von mehr als 16 bar für den Transport von Wasserstoff*	Covers pipelines only (not valves, pig traps, PRMS). Following factors have 'to be considered': pipeline material, welds, previously transported fluids, operating modes (past/future, cycling), existing defects/anomalies. The standard describes documents to be collected as basis for evaluating H2-readiness of pipelines, and states that there should be an evaluation of pipeline condition according to DVGW 466-1, including inspection pigging or intensive CP measurement. Fracture-mechanics of pipes, fittings, welds need to be confirmed with consideration of target MOP and pressure cycling: reference is made to ASME B31.12. In case pigging results are not available 'conservative assumptions can be made in regard to pipeline condition'. This leaves a potential path to use TG PIMS evaluation as a basis for establishing condition of non-piggable pipelines. This standard leans heavily in the direction of ASME B31.12 requirements

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G201611	2019-05	R	Requirements, possibilities and limits of the separation of hydrogen from hydrogen / natural gas mixtures *Anforderungen, Möglichkeiten und Grenzen der Abtrennung von Wasserstoff aus Wasserstoff/Erdgasgemischen*	Final report on a research project relating to separation of H2 from H2-natural gas mixture using membrane technology
G201306	2017-10	R	Hydrogen Compatibility of Pore Storage *Wasserstoffverträglichkeit in Porenspeichern*	Final report on a research project relating to P2G and effect of H2-admixture on integrity of underground por storage (Project: Underground Sun Storage). No negative effect for H2-admixture up to 10% noted, apart from microbiological activity
G201205	2016-04	R	Hydrogen in Gas network *H2 im Gasverteilnetz. Untersuchungen zur Einspeisung von Wasserstoff in ein Erdgasnetz – Auswirkungen auf den Betrieb von Gasanwendungstechnologien*	Final report on a research project investigating up to 10% H2-admixture, supplanted from a technological point of view by new DVGW research/standards.
G 265-3	2014-05	G	Plants for the Injection of Hydrogen into Gas Supply Networks; Design, Manufacture, Construction, Testing, Commissioning and Operation *Anlagen für die Einspeisung von Wasserstoff in Gasversorgungsnetze; Planung, Fertigung, Errichtung, Prüfung, Inbetriebnahme und Betrieb*	Initially prepared to cover biogas plant, still valid, although supplanted from a technological point of view by newer DVGW standards