

for the transportation and storage of hydrogen

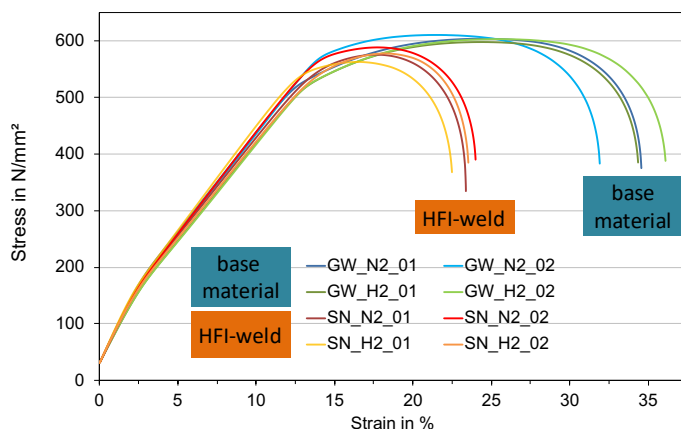
Product description

“Mannesmann H2ready“ steel pipes from Mannesmann Line Pipe offer maximum flexibility and safety for the transport and storage of gaseous hydrogen and of hydrogen admixed to natural gas.



Our pipes feature an optimum service life. Previous tests and existing standards already show that the use of line pipe grades up to API 5L X52 (L360) is non-critical, even if there are restrictions on the alloy content (EIGA Guideline, DVGW tests, EU project NaturalHy). The behavior of higher-strength materials of grade X70 (L485) was tested on exposure to pure compressed hydrogen and hydrogen/natural gas mixtures in slow strain rate tensile tests at 80 bar. Neither the base material, nor the HFI weld or standard girth weld showed signs of increased susceptibility to hydrogen in the structurally relevant area.

We have involved the Group’s own research institute, Salzgitter Mannesmann Forschung, in the testing and realization of the highest quality standards.



Stress-strain behavior in slow strain rate tensile test of X70 in 100 % hydrogen (H₂) compared to an inert nitrogen atmosphere (N₂) on base material specimens (GW) and HFI weld specimens (SN).

Application

Besides worldwide increasing energy demand, it is particularly political efforts to reduce greenhouse gas emissions that are generating growing demand for alternative energy sources. This is accompanied by a decline in base-load generation capacity,



which is being accelerated in Germany by the forced phase-out of nuclear power.

Given an energy mix with a strong regenerative focus, the technical compensation of fluctuating electricity production and demand-based long-distance conveyance to the centers of consumption will be of critical importance. Innovations in energy storage and transportation are thus decisive for a successful energy turn-around.

In the power-to-gas sector, hydrogen in particular is proving to be a useful storage and transport medium. New fields of application can be found, for example, in the conversion of electricity, the heat market, automotive industry (fuel cell technology), steel industry, glass industry, chemical industry and food industry.

Especially in Germany, increasing the use of hydrogen makes good sense for several reasons.

- The country has over 100 years’ experience of the commercial handling of hydrogen
- It ranks among the group of global leaders in the development of H₂ and fuel cell technologies
- Its chemical industry is searching for hydrogen from increasingly carbon-extensive sources
- There are salt caverns for large-volume H₂ storage in northern Germany (unlike in California or Japan)
- Energy-intensive premium steel production and further processing

However, the increased use of hydrogen calls for corresponding infrastructure for the medium's transportation and storage. This creates enormous demand for new gas pipelines suitable for hydrogen conveyance. In the simulation of a hydrogen network

Product properties

Steel as a material is noted for its extremely high toughness, durability and high resistance to external influences. Our supply



infrastructure with mass-storage facilities, a possible future scenario has been determined: For the complete conversion of mobility to hydrogen as an energy source by the year 2052, with 33.9 million fuel-cell vehicles, 9,450 H₂ filling stations would be required nationwide. Since hydrogen technology is also being seriously promoted in countries with extremely high traffic density, such as the USA, Japan, China and India, there is no question that new pipelines are needed.

range with a broad spectrum of steel pipe dimensions from DN 100 to DN 600 is fully amenable to a wide range of applications and special uses. Thanks to an optimized combination of materials and grades, our "Mannesmann H2ready" pipes are not only clean and safe, but also economical.

High-frequency induction-welded "Mannesmann H2ready" line pipe from Mannesmann Line Pipe, with chemical, mechanical and geometric properties specially adapted to the transport of hydrogen, is ideally suited to the imminent expansion of pipeline capacity. Proven welding technology and the use of modern steel grades resistant to the corrosive effect of hydrogen make our line pipe a cost-effective and environment-friendly solution.

Mannesmann Line Pipe GmbH is a member of the „The Fuel Cells and Hydrogen, E-Mobility“ EnergyAgency.NRW



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