Press Release

ROSEN CONDUCTS RESEARCH PROJECT FOR NATIONAL GAS ON THE INHIBITION OF HYDROGEN EMBRITTLEMENT

Lingen (Ems), Germany, May 2023 – The ROSEN Group, together with National Gas (formerly National Grid Gas Transmission), has started work on an intensive research project to find ways to mitigate the potential for embrittlement of pipeline steel in hydrogen service. This project will utilize ROSEN's newly developed materials testing laboratory dedicated to testing under hydrogen conditions.

The conversion of existing pipeline infrastructure to transport hydrogen or blended mediums rather than natural gas alone is a critical element of the energy transition. Therefore, fully understanding the effects of hydrogen on pipeline materials is vital in determining potential asset lifetimes, understanding potential issues, and determining safe operating conditions. Steel embrittlement is one such issue, and developing methods for mitigating this risk will be invaluable when it comes to safeguarding the use of existing assets while transitioning to a decarbonized future.

The goal of this research is to understand the impact of hydrogen on steel pipelines and how it may be mitigated. Several studies have shown that oxygen may reduce the embrittlement effects of hydrogen.

Slated for completion during 2023, the project promises to deliver:

- Fracture and fatigue property tests in air to give a baseline of pipeline material properties
- An understanding of what quantities of oxygen are required to mitigate hydrogen embrittlement effects
- The design and execution of a test program to quantify the effects of oxygen on different materials
- Gas composition for the tests in line with the hydrogen specifications of IGEM (Institution of Gas Engineers and Managers)

The dedicated ROSEN hydrogen test laboratory built by ROSEN in Lingen (Ems), Germany, is fully equipped to conduct all the necessary tests and supported by a dedicated team of materials and pipeline integrity experts on hand to analyze the results of those tests. It serves as a critical element in ROSEN's ambitious mission to de-risk the introduction of renewable fuels and help operators by assuring a safe and reliable future energy supply.

The ROSEN Group looks forward to working together with National Gas and its partners to further improve the understanding of hydrogen and its effects on materials. Together, we will enable National Gas to continue to play its leading role in the introduction of hydrogen into the UK National Transmission System.

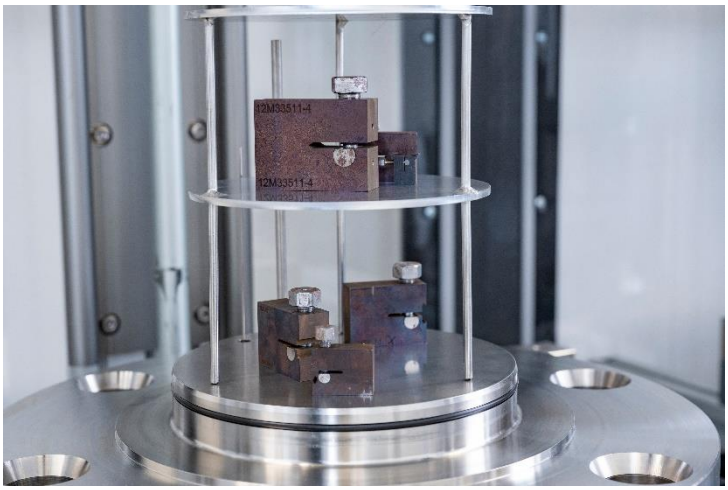
About the ROSEN Group

The ROSEN Group is a globally leading provider of cutting-edge solutions in all areas of the integrity process chain. Since its origins as a one-man business in 1981, ROSEN has rapidly grown and continues to do so. Today, the business is still privately owned and consists of a team of more than 4,000 employees operating in more than 120 countries.

ROSEN's products and services:

- Inspection of critical industrial assets to ensure reliable operations of the highest standards and effectiveness
- Customized engineering consultancy providing efficient asset integrity management
- Production and supply of customized novel products and systems
- Market-driven, topical, state-of-the-art research and development yielding "added-value" products and services

For more information about our approach to hydrogen pipelines and conversion visit https://hydrogen.rosen-group.com. For more information about the ROSEN Group, go to www.rosen-group.com.



Caption: ROSEN's hydrogen lab is equipped with five autoclaves for standard K_{IH} and exposure testing. They operate in a temperature range of -20 to +200 degrees Celsius and thus cover the most important operating range for pipelines. They are connected to an automatic gas mixing unit that allows flexible test gas mixing (hydrogen – H_2, methane – CH_4, carbon dioxide – CO_2, carbon monoxide – CO, and oxygen – O_2).

Press Contact:
ROSEN Group
Anja Dietze
Head of Company Marketing & Communications
E-mail press@rosen-group.com