Sealing Solutions for Hydrogen Applications

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In recent years, the importance of hydrogen in various industry and mobility applications has been increasing steadily. This is mainly due to the fact, that hydrogen is one of the most promising alternative energy sources. Especially green hydrogen, which is generated by electrolysis using only water and renewable energy, will be an important building block in the exit from nuclear and fossil-fuel energy.

There are many possible applications for hydrogen in industry and mobility. It can be used directly as a high-energy fuel (caloric value: 33.3 kWh/kg; raw oil: ~11.6 kWh/kg), for the generation of electricity in fuel cells, or it can be processed further to other fuels, chemicals or alternative forms of storage.

However, this increasing interest in hydrogen also creates a number of new challenges in many different areas, one of them being the sealing industry. Hydrogen is extremely challenging to seal, as is the smallest of all molecules and has a very low density, high mobility and high tendency for diffusion. Therefore, the generation, transport, storage and processing of hydrogen requires high performance sealing solutions, which are provided by Frenzelit. Frenzelit gasket materials e.g. the novapress® 850 and the novapress® 880 with new Frenzelit inner eyelet technology fulfill the challenging requirements of hydrogen applications with excellent leakage performance under various conditions and chemical resistance to hydrogen.

So far, all common specifications and norms for sealing materials are based on tests with nitrogen or helium as a test medium. Due to the lack of reliable data, it is difficult to find reasonable and universally applicable requirements for gaskets in hydrogen applications. As a first step towards solving this problem, different procedures that use hydrogen as a test medium have been developed at Frenzelit GmbH. The first results of these tests will be presented at the ACHEMA 2022.