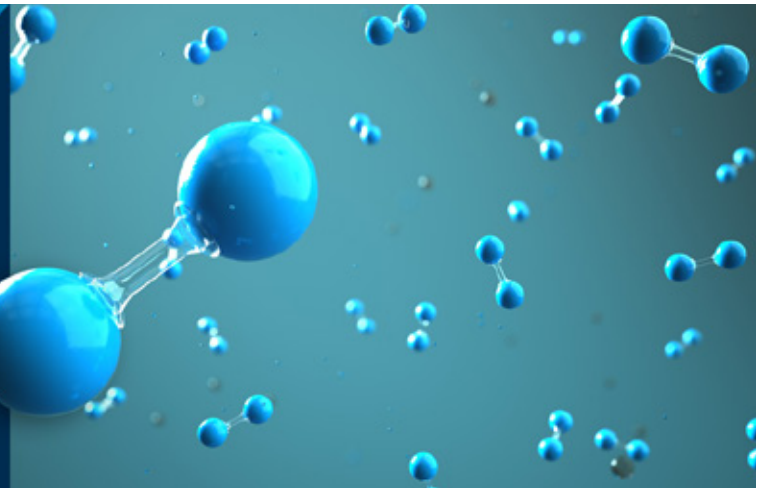
mokveld

H_2

Hydrogen Ready



Mokveld supplied the first valves for hydrogen applications over 30 years ago. At present our axial control valves, on-off valves and check valves are operating in various H_2 applications. This includes pure H_2 and mixes, like syngas.

Facts

A sustainable solution

Mokveld axial flow valves are lower in weight and in many cases smaller valves can be used than with other valve types. This results in low energy consumption to produce Mokveld valves and therefore lower GHG Scope 3 emissions for our clients.

The one piece body casting of our axial valves prevents a leak path to atmosphere versus many other 2 or 3 split body-designs. In addition the casting process requires less energy than a forging process.

Wide range of experience

Experience in hydrogen service varies from 100% hydrogen to different mixtures, this concerns often syngas applications. The products applied are axial control valves, axial on-off valves and axial check valves. All valves operate to full satisfaction of our clients.

Material selection

Hydrogen may cause material degradation, such as embrittlement, but also may degrade surface treatments. Therefore the correct material selection is highly important. For small sizes austenitic stainless steel is often selected. However for large sizes (e.g. above 4 inch) stainless steel becomes expensive and alternate materials become interesting. For the pressure containing parts Carbon Steel can often be applied. For the internals different solutions are available at Mokveld.

At present no specific standards are available for valves, Mokveld is part of a CEN workgroup starting to prepare a standard. The ASTM B31.12 discusses piping for hydrogen and on one hand specifically indicates that the standard is not applicable for valves, however on the other hand specifically indicates several materials.

Conformity with NACE MR0175 and / or ISO 15156 is required for the materials in hydrogen applications, however this is not the only requirement since these standards are considering H_2S rather than H_2. Mokveld can suggest the optimum solution for your application.

Tightness

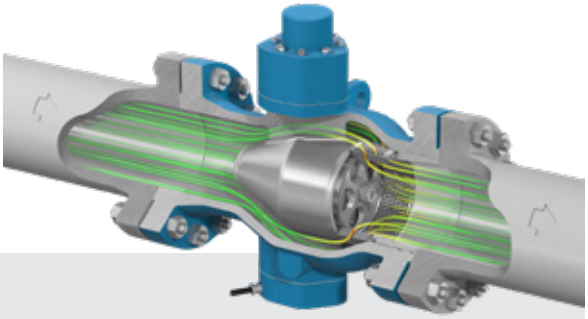
Hydrogen appears as H_2. When compared to helium, helium itself is slightly bigger than H, however when compared to H_2 sizes become comparable. As such Helium may be a proper detection gas to measure leakage. An alternate might be a mixture of hydrogen and nitrogen. However when testing with hydrogen (or mixtures) special attention shall be paid to safety and the explosive limit of the hydrogen. In addition it shall be noted that the testing methods to detect helium or hydrogen are different, helium is usually detected by a mass spectrometer where hydrogen is measured by a detection probe (sniffer).

The requirements for leakage to atmosphere may differ for instance based on where the valves are installed. In case of outside installation, for instance in a gas metering station, leakage to atmosphere might be less critical than when the valves are installed in an enclosed space.

Mokveld axial control and on-off valve have a one piece body design and a reliable dynamic sealing of itself. Tests and acceptance criteria are however agreed upon per specific application, this also to reduce overall cost.

Mokveld axial flow check valves do not have seals to atmosphere at all.

Explosion proof certification
Both the mechanical and the electrical explosion proof certification (e.g. ATEX, FM) shall be verified to be compliant with H_2 service. At the same time the zone classification on the plant might change due to the different Lower Explosive Limit (LEL) of hydrogen versus for instance methane. Mokveld products are fully compliant for hydrogen service.



Product Summary

Application
Hydrogen
Hydrogen mixtures

Products
Mokveld's Zero emission control valve model ZEV-R
Mokveld's axial check valve model TKZ-Y
Mokveld's axial control valve model RZD-R
Mokveld's axial on / off valve model RZD-X

Scope
Sizes: 2" - 72"
Ratings: ASME 150 - 2500 or API 3000 - 10 000
Higher pressure ratings upon request

Mokveld engineering assistance

Both for new applications on hydrogen and for applications where natural gas service is converted to hydrogen service the Mokveld engineering assistance will be happy to assist you.
As a member of the Working Group (WG19) of the CEN (TC 69), the European Committee for Standardization, Mokveld is actively participating in developing standards for valves and hydrogen.

In general existing valves can be converted to be suitable for hydrogen service. The majority of the valves Mokveld delivered are in full conformance with NACE MR0175 and / or ISO 15156. Based on the information for the application and the valve's serial number we can suggest the optimum solution for you.

For more information visit mokveld.com/hydrogen

Mokveld valves are H_2 ready

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