

H2 View introduces

WIKA's role in the hydrogen supply chain:
Distribution and storage perspective

Andrey Ruban, Global Segment Manager Industrial and Medical Gases at WIKA Alexander Wiegand SE & Co. KG, outlines WIKA's role in the hydrogen value chain and provides a distribution and storage perspective

The WIKA Group is a global market leader in pressure and temperature measurement. The family-run business, founded in 1946 and headquartered in Germany, today has a global presence and 11,200 employees. The broad portfolio of high-precision instruments, IIoT solutions and comprehensive services makes WIKA a strong and reliable partner for all the requirements of industrial measurement technology in the changing world.

Modern megatrends of decarbonisation, digitalisation and demographic change impose industries to many challenges. The first one – being the core – is leading to increasing global demand for Wika products in many segments, where hydrogen is perceived an indispensable part for energy transition.

Hydrogen applications have been established for decades, with demand primarily being driven by refineries, methanol and ammonia production and also in direct reduction in iron and steel production.

Conventional hydrogen production typically uses natural gas or coal as feedstock. It is expected, in the future, that hydrogen will have to play an important role in decarbonising the world's economy – if produced from renewable energy sources such as solar and wind energy.

Hydrogen processing, production, distribution and storage in above applications exposes the equipment used to extreme conditions, with temperatures as low as -253 °C, pressures of 700 bar and beyond and hydrogen migration-related impacts on metals and materials. Physical and chemical properties of hydrogen thus impose substantial demands on the

measurement technology.

WIKA has long been a partner to the hydrogen industry for instrumentation related solutions, with a proven track record, and is geared up to resolve any new challenges ahead.

Whether the hydrogen is produced by conventional methods or based on renewable energies, Wika provides solutions for the entire value chain of the hydrogen industry: electrolyzers, hydrogen refuelling stations, stationary and mobile fuel cells. Obviously compressed or liquified hydrogen distribution equipment is a necessary prerequisite for hydrogen molecules movement in the whole value chain.

Unless the production of the hydrogen is located at the point of usage it has to be stored and transported. Transportation is accomplished by either gas grids or – more commonly today – in various types and sizes of tanks. Pressure ranges for storage tanks range from 20 bar for liquefied cryogenic tanks up to 700 and 1,000 bar for compressed gas vessels. Also liquefied hydrogen is playing an increasingly important role due to its high energy density. Its temperature of -253 °C creates additional challenges though.

Wika can provide various solutions both for gaseous and liquified hydrogen storage. Typically pressure instruments – gauges or transmitters, as well as ball or check valves – are installed at valve manifolds, high pressure cylinder valves, gas control and supply panels, or as differential pressure gauges on cryogenic tanks to name a few.

For hydrogen mobility market Wika has in its portfolio OEM type of onboard transmitters MH-3-HY and special models with up to 900 bar working pressure. With its thermometer in cryogenic design, WIKA offers a special solution for measuring the temperature of liquified hydrogen (for instance, in vacuum insulated piping of cryogenic tanks).



TR10
Cryogenic design thermometer suitable for hydrogen service



732.15
Differential pressure gauges for cryogenic hydrogen storage tanks



MH-3-HY
OEM type of onboard hydrogen transmitter

Wika thermometers can be used also to measure temperature of the off-loaded and up-loaded hydrogen in transportation skids.

In hydrogen storage and distribution applications, hydrogen can impair the desired long-term stability of a sensor's measurement signal. If it adheres to the resistor and / or penetrates into sensitive structures of the electronic measuring instrument, this can result in signal offset and hence measurement errors.

One possible counter measure is to use separating layers to prevent hydrogen penetration. Gold is a suitable material for this kind of solution, which is why Wika has in its portfolio transmitters with gold plated sensors.

Hydrogen not only penetrates materials but also has a flammability range of 4% to 74% in air. WIKA can provide instrumentation with EX approval, intrinsically safe or with flameproof enclosure, when needed.

As long as OEM hydrogen components on vehicles

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such as pressure and temperature sensors are not defined in any new onboard hydrogen regulation, WIKA will follow the path described in EU2019/2144 and continue to carry out tests based on EC79/2009. This means that Wika customers can continue to rely on products that have been developed and qualified in accordance with sound engineering practice.

The broad portfolio of high-precision products, solutions and services makes the family-run business a strong and reliable partner. WIKA's unique experience and know-how make sensing technology smarter, add more value and prepare it for a sustainable future: This is “Smart in sensing”. **H+V**



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