FLEXIM

Flexible Industrial Measuring Technology
for the Energy Transition

HYDROGEN SOLUTIONS

Non-Invasive – Accurate – Field-Proven

- Hydrogen and hydrogen mixtures
- Non-invasive flow measurement
- No leakage risk
- No process interruption
- Maintenance-free
- No pressure loss
- Extremely high turndown ratio
- Approved accuracy
- Highly cost-efficient
- Permanent and portable measuring systems
- Sophisticated analytical functionalities

FLEXIM Sets Standards
when measuring matters

Fit for the First Element

Hydrogen will be a key element in the process of decarbonisation. The energy transition will require a multitude of new installations and the conversion of existing infrastructure. The crucial question today is: Will it also work with hydrogen?

As the technology leader in the field of clamp-on ultrasonic flow measurement, FLEXIM pioneered the way to transfer the non-invasive measurement technology to gases two decades ago. Since then, ultrasonic systems **FLUXUS® G** measure the flow of gases, amongst them hydrogen.

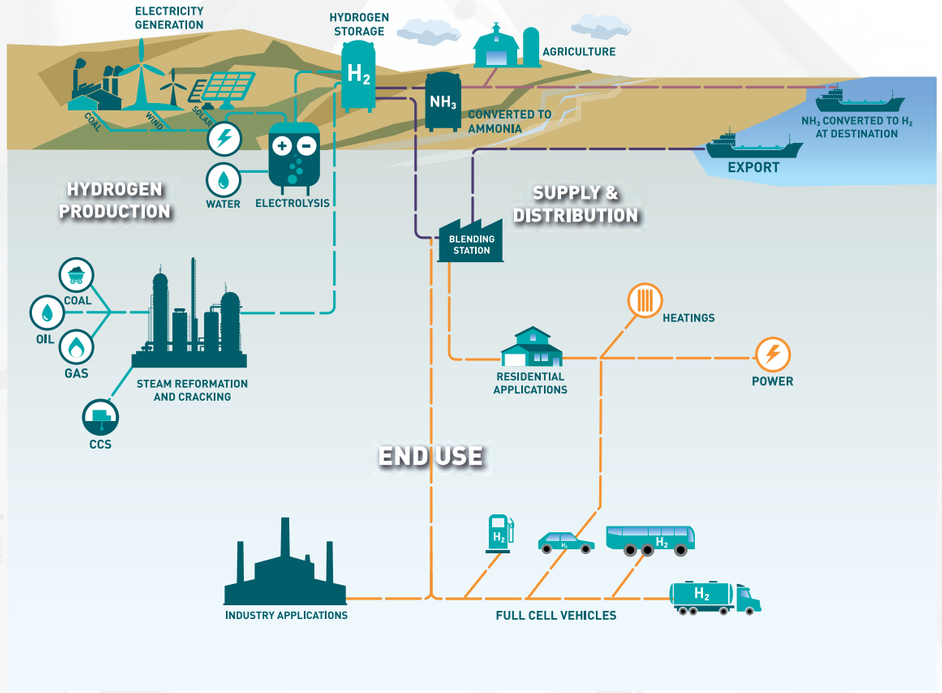
Ready for Change

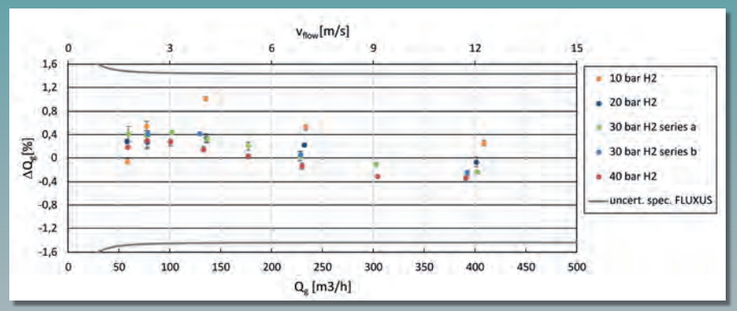
The physical properties of hydrogen differ highly from those of other gases, in particular natural gas. Plant operators are therefore faced with major challenges due to the necessary adaptations. FLEXIM's non-invasive measuring technology is not only flexible by principle, it also comes with further advantages which perfectly fit hydrogen applications:

- **FLUXUS®** flowmeters measure from the safe side – the outside of the pipe. The installation does not require any opening of the pipeline and is usually carried out during ongoing operation. The measuring device is not subject to wear and tear and it does not pose any leakage risk.
- The acoustic measuring method is characterised by its exceptional dynamics – independent of the flow direction (bidirectional). This makes it possible to record even the lowest flow velocities as well as the highest.
- Explosion protection is no issue. Both certified transmitters and transducers cover the relevant explosion group IIC (ATEX / IECEx).
- Sophisticated analytical functionalities allow for determination of hydrogen purity as well as the proportion of hydrogen in natural gas-hydrogen mixtures.

From Production to the Consumer

The application range of FLEXIM's **FLUXUS® G** gas flowmeters covers the entire value chain of the hydrogen economy, regardless of its way of production.





Results of the accuracy tests with pure H_2 at the DNV HyLoop facility Groningen

DNV

Approved accuracy

FLUXUS® stands its ground both in the field and in the lab. As the only manufacturer of clamp-on ultrasonic measuring technology, FLEXIM has been invited to participate in the Joint Industry Project (JIP) on "Suitability of natural gas flow meters for renewable gases" in 2021.

The test facility was the multiphase flow lab at DNV in Groningen, The Netherlands. On behalf of all major pipeline operators in the EU, the flow meters' capabilities to handle natural gas mixtures with up to 30% Hydrogen and up to 20% CO_2 were tested. FLEXIM proved to have excellent results: Over the entire test program, the **FLUXUS® G 721** performed within its specified measurement uncertainty (±1...2%) and repeatability (0.15%).

Similar convincing results were achieved in supplementary tests with technical quality hydrogen (98%) and pure hydrogen (100%).

Technical Data

		
Meter type	**G831 –** High performance flow meter for hazardous areas	**G721 –** High performance flow meter **G722 –** for challenging flow conditions
Inner pipe diameter	7...1600 mm	
Pipe temperature	-40...+240 °C	
Pressure range	1 bar ... unlimited	
Flow velocity	0.01...35 m/s	
Measurement uncertainty	±1...2 % MV ±0.005 m/s	
Repeatability	0.15 % MV ±0.005 m/s	
Inputs	Current, Temperature	Current, Temperature, Binary, Voltage
Outputs	Current, Binary, Frequency, HART, Foundation Fieldbus Ex-ia, Profibus PA Ex-ia	Current, Binary, Pulse, Frequency, HART, M-Bus, BACnet MSTP/IP, Modbus RTU/TCP, Profibus PA, Foundation Fieldbus
Explosion protection	Ex Zone 1, Class I Div. 1	Non-ex, Ex Zone 2, Class I Div. 2
Approvals	ATEX, IECEx, FM	
		
Meter type	**G706 –** High performance quad beam flow meter	**G608 –** High performance portable flow meter for hazardous areas
Inner pipe diameter	7...1600 mm	
Pipe temperature	-40...+240 °C	-40...+200 °C
Pressure range	1 bar ... unlimited	
Flow velocity	0.01...35 m/s	
Measurement uncertainty	±1...2 % MV ±0.005 m/s	
Repeatability	0.15 % MV ±0.005 m/s	
Inputs	Current, Temperature, Binary, Voltage	Temperature
Outputs	Current, Binary, Frequency, Pulse, Modbus RTU, Foundation Fieldbus	Current, Binary, Pulse, Modbus RTU
Explosion protection	Non-ex, Ex Zone 2, Class I Div. 2	Ex Zone 2, Class I Div. 2
Approvals	ATEX, IECEx, FM	

For more detailed information please download the Technical Specifications here: www.flexim.com.

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