Flexim Non-Intrusive Ultrasonic Flow Meters for Hydrogen Applications

Leading Technology | Improved Accuracy
Superior Performance

FLEXIM

EMERSON™

Fit for the First Element

Hydrogen will be a key element in the process of decarbonization. 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, Emerson Flexim has pioneered the way to transfer the non-intrusive measurement technology to gases two decades ago. Since then, Flexim FLUXUS® G Ultrasonic Systems 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-intrusive 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.

Application Versatility

Hydrogen and hydrogen mixtures

Non-intrusive flow measurement

No leakage risk

No process interruption

Maintenance-free

No pressure loss

Extremely high turndown ratio

Approved accuracy

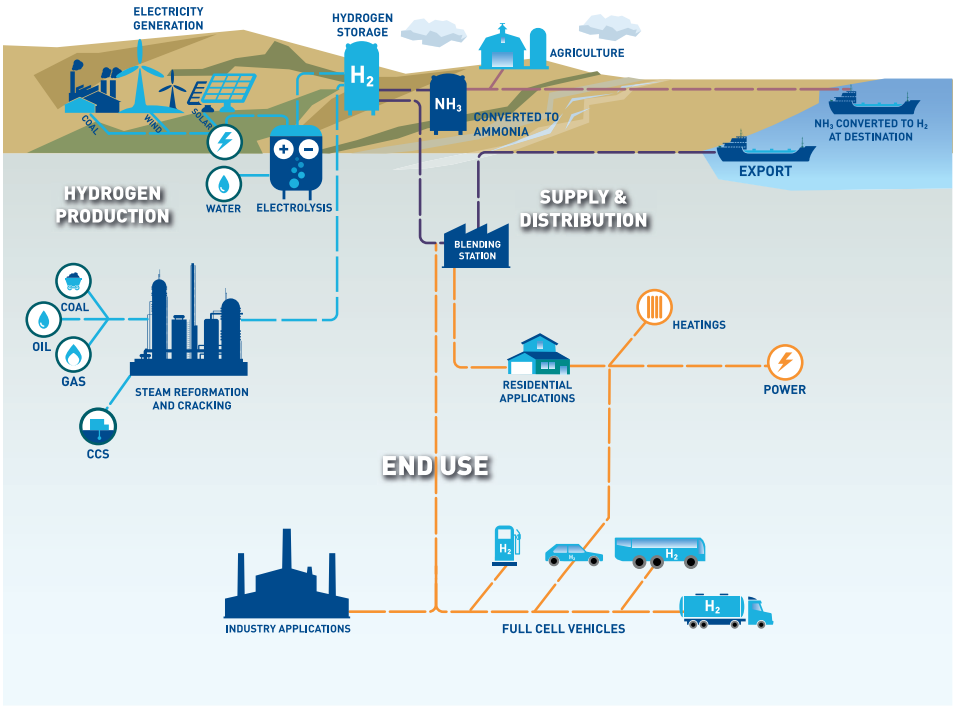
Highly cost-efficient

Permanent and portable measuring systems

Sophisticated analytical functionalities

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.

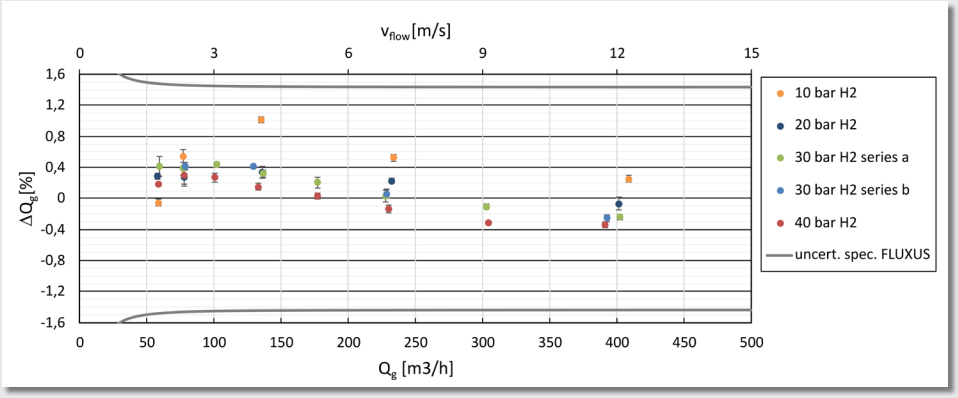


Approved accuracy

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% CO2 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%).



Results of the accuracy tests with pure H2 at the DNV HyLoop facility Groningen

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.Emerson.com.

ACCREDITED
CERTIFICATE #3791.01

For more information, visit
Emerson.com/Flexim

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