Coriolis Meters for Hydrogen Dispensing Measurement

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Flow Technologies at GE MS

Clamp-on Ultrasonic

- Install on existing pipes
- Low over cost of ownership
- Focused on liquid but also for gas

Wetted Ultrasonic

- Higher accuracy
- Difficult applications
- Very low operational costs
- Strong performance for liquid and gas

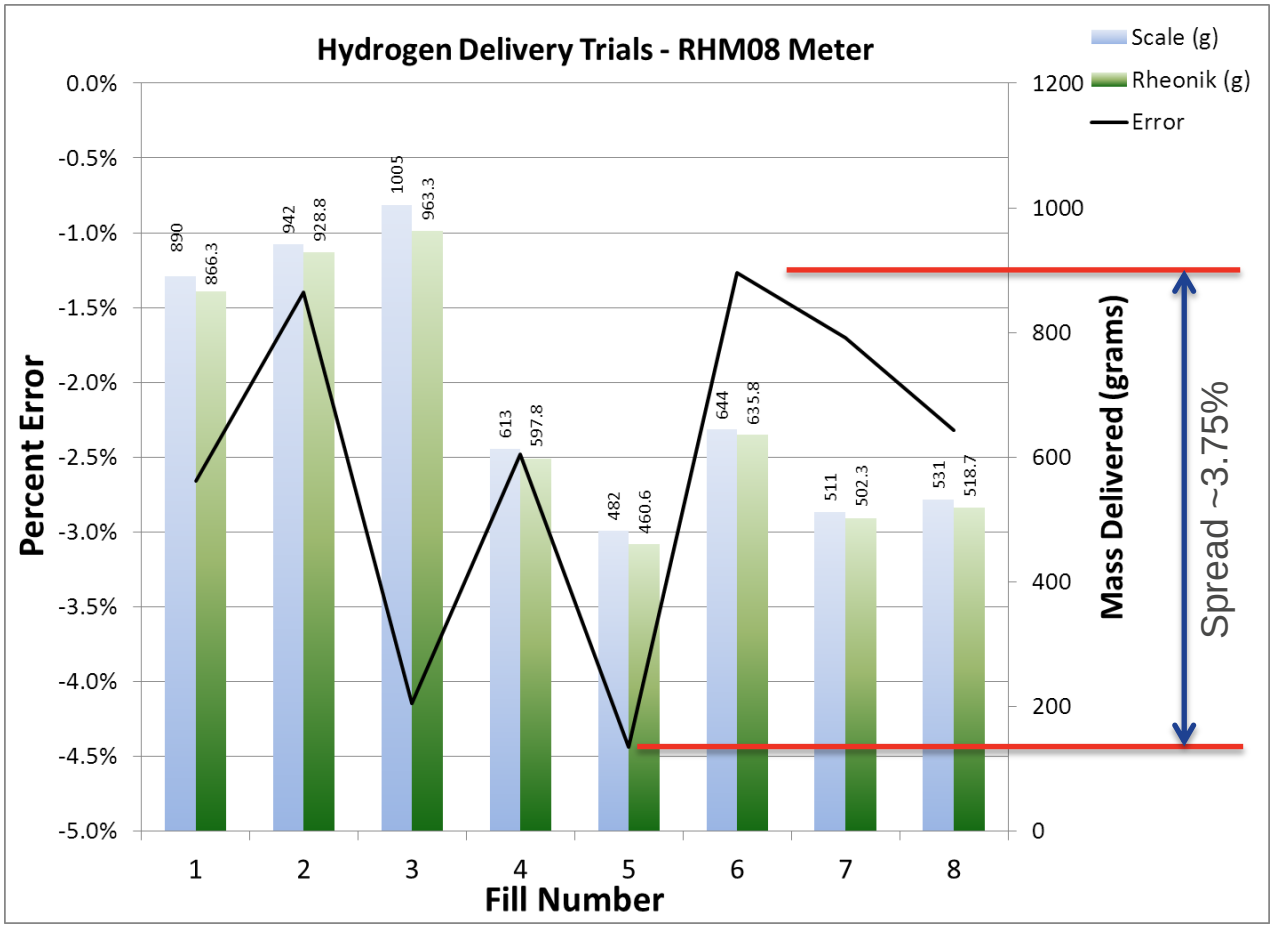
Coriolis

- Direct mass measurement
- High accuracy over wide range
- Liquid and Gas
- Pipes up to 12”

Vortex

- Robust, multifunction alternative to DP
- Strong in small pipes less than 4”
- Very large pipes as insertion device

Current Status of Technology



Meter to 900 Bar available

High Turndown : 1000:1

Pulse and Digital outputs for totalization

Accuracy to 4.5% based upon water calibration of meter

Repeatability to 3.75%

Flows up to 10kg/min possible

Coriolis technology shows great promise as a fiscal metering solution for Hydrogen dispensing.

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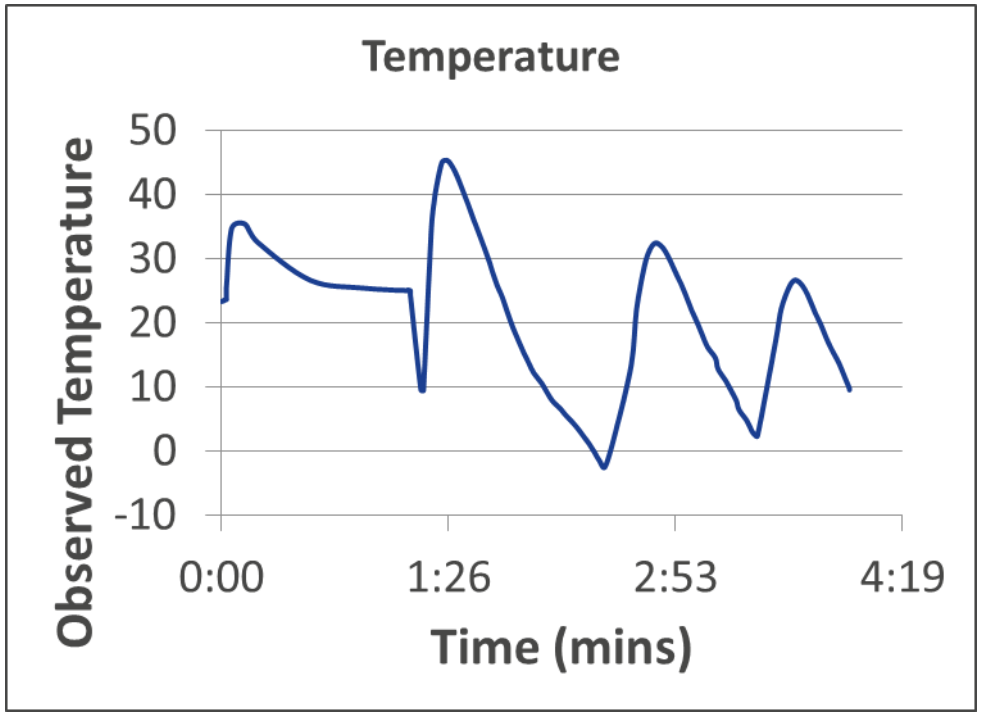
Ongoing Development

Reduction in repeatability spread

- Thought to be a temperature gradient issue. Investigating multiple temperature sensor solutions

Zero shift (water cal to HP gas)

- High pressure causes stiffness in the meter piping – developing a suitable correction function



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Market Needs and Challenges

Needs

- Performance Goals
  - Accuracy – 1% to 2%
  - Repeatability – 1%
- Suitability for Dispensing
  - Electronics for dispenser installation
  - Modbus connectivity etc.
  - Sealability for W&M

Challenges

- Lack of facilities to test HP Hydrogen flow
- Cost – volume will bring economy


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