

The world's largest closed loop

- for high-pressure calibration of natural gas meters



Unique high-pressure calibration system

The technology behind the high-pressure calibration system is unique in the world. It is built as a closed loop with low pressure loss, allowing calibration at maximum pressure and flow all year round, irrespective of the season. It is known as the world's largest closed loop.

The facility

The world's largest closed loop is part of the FORCE Technology gas flow calibration facility that consists of:

- 24" (600 mm) high-pressure closed loop
- 12" (300 mm) high-pressure closed loop
- 4" primary twin Piston prover system

The design of the closed loops ensures calibration at stable flow, pressure and temperature of all gas flow meters in the pressure range between atmospheric conditions and up to 65 bar g. The facility is working at primary level, and generating traceability by developing the European natural gas cubic meter (EuReGa).

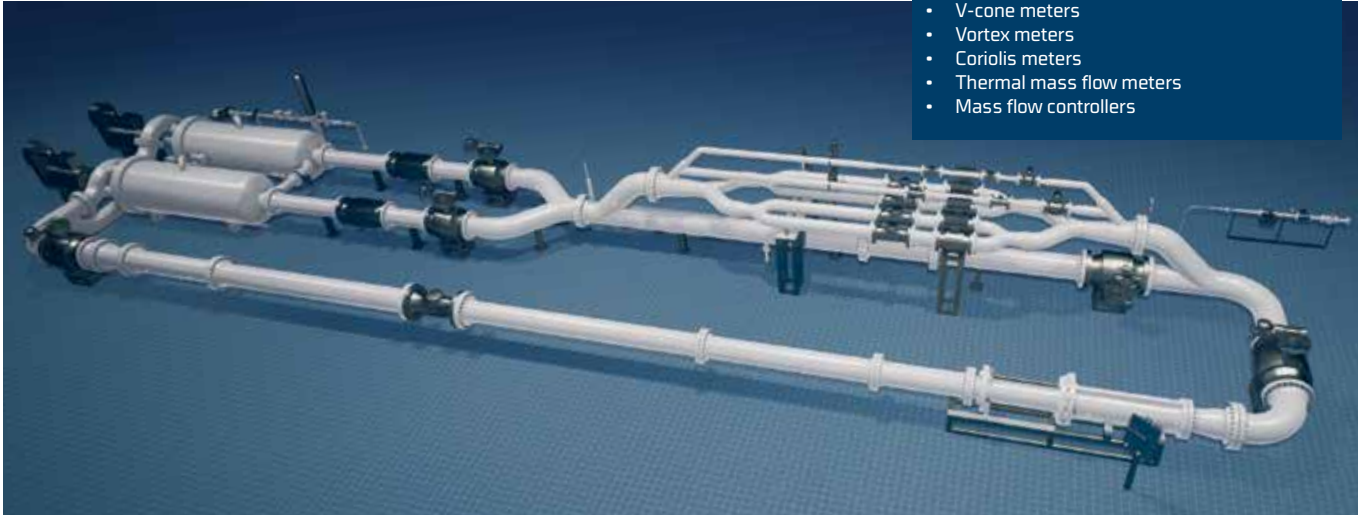
Specification	12" closed loop	24" closed loop
Calibration pressure	0 - 50 bar / 0 - 725 PSI	0 - 65 bar / 0 - 945 PSI
Flow	8 - 6.500 m ³ /h (8 - 10.000 m ³ /h) / 0.0678 - 5.51 Mmacfd (0.0678 - 8.48 Mmacfd)	10 - 32.000 m ³ /h (10 - 41.000 m ³ /h) / 0.0848 - 27,12 Mmacfd (0.0848 - 34.75 Mmacfd)
Power	310 KW	2,000 kW
Meter sizes	2" - 18" (50 mm - 450 mm)	4" - 30" (50") (100 mm - 1.250 mm)
Maximum N flow CMC	0.4 mill. Normal m ³ /h / 330 Mmscfd 0.22 - 0.18	2.5 mill. Normal m ³ /h / 2059 Mmscfd 0.21 - 0.14



Meter types

Types of meters calibrated at the closed loop

- Turbine meters
- Swirl meters
- Ultrasonic measuring instruments
- Ultrasound meters
- V-cone meters
- Vortex meters
- Coriolis meters
- Thermal mass flow meters
- Mass flow controllers



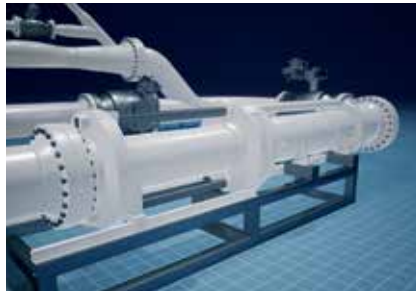
What makes the world's largest closed loop unique?

A combination of technical solutions make the closed loop unique in the world.



Blower and heat exchanger

This construction allows natural gas to circulate at a pressure that can vary from atmospheric conditions to 65 bar g.



Length compensator

The length compensator ensures that customer meter lines are calibrated under operation conditions equivalent to the conditions on-site.



Control monitors

Four monitors control the meter (MUT) during the calibration in order to register differences in the reading between monitors and working standards.



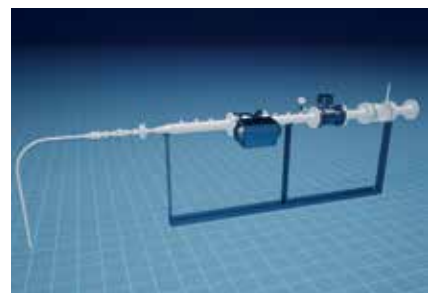
Working standards

The parallel working standards make it possible to adjust the calibration conditions to the customer meter.



Gas supply

The closed loop is connected to a natural gas transmission pipeline, which allows a fast supply of gas within one hour.



Gas discharge

After the calibration is performed, the natural gas is discharged to the grid, ensuring maximum environmental caution.



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