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## The Liquefied Natural Gas research and calibration facility

The Liquefied Natural Gas (LNG) research and calibration facility will be the worlds first site for calibration and testing of flow meters, analyzers, sampling systems and other equipment utilizing LNG as the test liquid at cryogenic conditions. It is currently being developed in the Rotterdam harbour in the Netherlands under coordination of VSL and in close cooperation with project partners and sponsors.

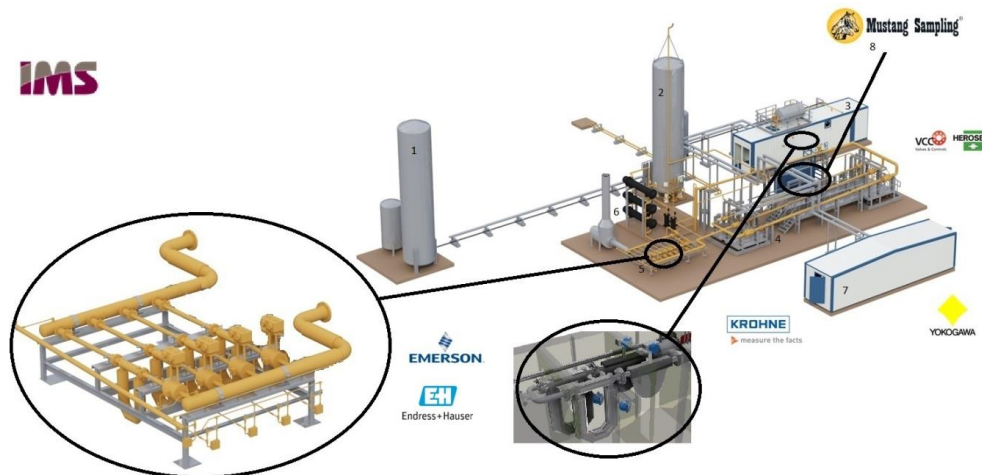


Figure 1. The LNG research and calibration facility. Distinguishing elements are: 1) Liquid Nitrogen (LIN) storage tank, 2) LNG storage tank, 3) Primary Standard (PSL) for flow utilizing the gravimetric method to calibrate the primary set of master meters, 4) Meter Under Test (MUT) Section, 5) Working standards, a set of work master meters, 6) heat exchangers, pump and N<sub>2</sub> warmer, 7) control room and 8) reference analyzers and Analyzer Under Test (AUT) Section.

### Specifications

The LNG research and calibration facility will have the following specifications:

- Closed loop with no release of methane.
- A maximum flow rate of 200 m<sup>3</sup>/h with the possibility to expand to at least 400 m<sup>3</sup>/h.
- Process pressure between 2 and 6 ×10<sup>5</sup> Pa.
- Process temperature between -132 and -175 °C.
- Traceable calibrations for flow and composition.

### Traceability

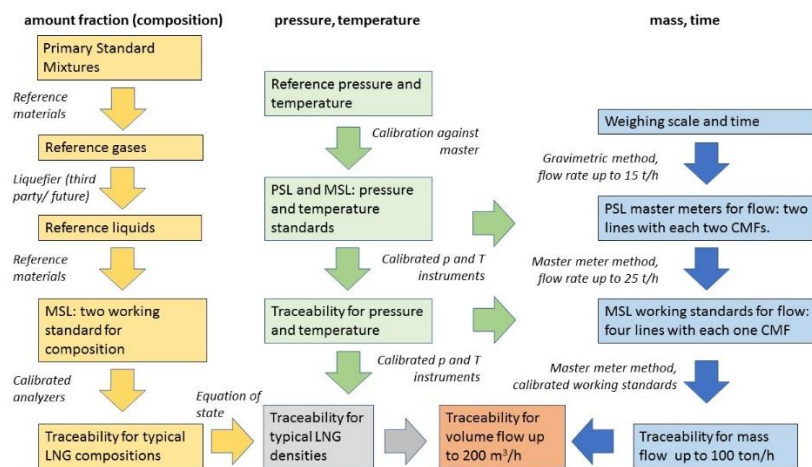


Figure 2. Traceability schemes for composition, liquid mass and volume flow rates. The flow working standards will be calibrated against the primary master meters (located in the PSL) via the master meter method (two lines in parallel to achieve 25 t/h). The two lines of the PSL contain two different types of flow meters, traceability will be based on the best performing device or a combination of the two via the gravimetric method of calibration.

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## Support

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- IMS (Russian Federation), design of the facility;
- Mustang Sampling (United States), analyzer to measure the composition of LNG;
- Emerson (Netherlands), 6 Coriolis mass flow meters;
- E+H (Switzerland), 2 Coriolis mass flow meters and pressure and temperature instruments;
- Krohne (Netherlands), 1 ultrasonic flow meter;
- Yokogawa (Netherlands), control system.

