

# Course Gas Flow Metrology

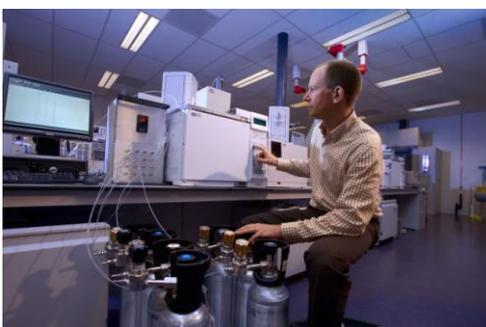


This **five-day course** focuses on the backgrounds of gas flow and energy measurement and the pitfalls that can be encountered in these measurements.

It was developed for people who are active in gas quantity and energy measurements and for people who are responsible for calibration or the initial verification of gas meters, like metering managers and metering engineers, design engineers, station operators, service staff, inspectors and employees responsible for and performing calibration activities.

## Contents of the course

- Module 0: Backgrounds of metrology (0,5 day)
  - The structure of metrology
  - Measurement uncertainty
- Module 1: Legal metrology requirements (0,5 day)
  - Structure of legal metrology
  - Legal requirements for gas meters and volume conversion devices
  - Risks of measurement based decisions
- Module 2: Fluid dynamics and instrumentation (1 day)
  - Introduction to fluid dynamics
  - Instrumentation for low-pressure gas flows
  - Instrumentation for high-pressure gas flows
- Module 3: Energy measurement (gas composition) (1 day)
  - Energy measurement
  - Gas chromatography
  - Performance assessment and evaluation
  - Software and algorithms
- Module 4: Gas properties (0,75 day)
  - Thermodynamic properties of natural gas
  - Gas Custody Transfer
- Module 5: Calibration of meters (1,25 day)
  - Euroloop, the new facility for calibration of flow meters
  - LNG measurements and standards
  - Calibration models, uncertainty of calibration
  - Building-up traceability, calibration facilities
  - Hands-on training Calibration of flow meters in VSL laboratories



The participants should have basic knowledge of pc-based spreadsheets like Excel.



#### **VSL B.V.**

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Capabilities  
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#### **Duration**

5 consecutive days, 9h00-16h30

#### **Language**

The course material is in English. The course will also be given in English, unless only Dutch speaking participants will attend.

Lunches, refreshments and course material are included.

#### **Location**

The course takes place at:

VSL

Thijsseweg 11

2629 JA DELFT, The Netherlands

#### **Certificate**

All participants will receive a certificate of attendance at the end of the course.

#### **Information**

For further information please contact

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