

Development of a microflow primary standart

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Abstract

The Volume Laboratory (LVO) of the Portuguese Quality Institute (IPQ), in partnership with the Department of Mechanical and Industrial Engineering (DEMI) of the Faculty of Sciences and Technology of Universidade Nova of Lisbon (FCT / UNL) developed a gravimetric standard for measuring fluid flow between 10 ml / min and 100 nl/min, allowing traceability and calibration of equipments at the Central Laboratory of Metrology of IPQ.

The development of this standard was based on three main elements: a flow generator (Syringe pump), a collector device (mass comparator) and a system for measuring and data acquisition (in "LabView").

After conception, modeling and assembly the standard of micro fluids in LVO, a applicational "LabView" module was developed to automate the acquisition, validation, statistical treatment of data and the determination in "run time" of errors and the correspondent uncertainties, as well as to safeguard the data for future analysis. The flow measuring system was subsequently tested and validated to several different flow rates: 10 ml/min, 3 ml/min, 1 mL/min, 330 µl/min 100 µl/min and 33 µL/min, verifying uncertainties in the range of 0.1% to 0.5%.

Keywords: Micro flow, Calibration, Measurement, Uncertainty, Fluid