

## Rooms and equipment of the LNE's new mass laboratory

Tanguy MADEC<sup>1</sup>, André GOSSET<sup>1</sup>, Paul-André MEURY<sup>1</sup> and Jacques COURAUD<sup>1</sup>  
<sup>1</sup>Mass, Volume, Density and Viscosity Group, Division of Mechanical Metrology, LNE,  
France

### ABSTRACT

The LNE is the national metrology organization of France. Recently, using the opportunity of the transfer of its acoustic metrology group, it set up its new mass laboratory on the exceptional foundations of its old anechoic laboratory. Four metrological rooms, two locks and an air-conditioned room were installed in an area of about 160m<sup>2</sup>. In the main laboratory, are maintained environmental conditions such as a temperature of (20±0.1)°C, a mean air speed of 0.07m.s<sup>-1</sup> and a cleanness ISO 6 (# class 1000).

The rooms were built in order to insulate the mass comparators from interior and exterior sources of vibrations. A specific process was defined to assure the maintenance of the cleanness level when people and materials enter and leave.

These laboratories are intended for mass dissemination from the French national prototype in platinum/iridium to working mass standards ranging from 100g up to 50kg (calibrations beyond 50kg up to 5 tonnes are performed in another laboratory).

The mass chain of LNE counts no fewer than 500 units. For its calibration, 27 comparators or balances are used. Air density artefacts complete this equipment.

These new laboratories are also intended for studies of mass and density standards and their traceability to the mass unit. In particular, they were especially equipped with a new mass comparator appropriate for study of the evolution of the mass standards used in the watt balance experiment during vacuum-air transfer. The objectives are to find the best material to embody the mass unit in the future definition and also the best alloy for the standards used for dissemination.

Mass laboratory, dissemination of kilogram, traceability diagram, mass standard