

METAS

Short report for CCAUV

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Metas, Laboratory of Acoustics and Vibration

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Organisation

The Federal Office of Metrology (METAS) - is the National Metrology Institute of Switzerland. As such it realises and makes available internationally agreed units and standards at the required accuracy. It supervises the use of measuring instruments in the fields of commerce, traffic, public safety, health and environmental protection. It monitors the compliance to legal requirements by cantons and authorised bodies, as well as instructs and advises verification experts and verification agencies. Its services are available to researchers, industry and commerce.

METAS employs some 130 persons. The laboratory of acoustics and vibration is part of the division "Electricity, Chemistry, Traffic and Acoustics" and has a permanent staff of 2 persons.

Acoustics and Vibration Laboratory

The METAS acoustics laboratory has been active for many years with the following duties:

- Realisation of the primary standard for sound pressure
- Calibrations and verifications of microphones, sound level measuring instruments and acoustic calibrators
- Pattern evaluations and approvals of sound level meters
- Calibration and monitoring of measuring equipment in the field of audiometry
- Conformity testing of hearing aids
- Pattern evaluation of acoustic warning devices
- Calibration of vibration sensing instrumentation

The last item in this list had been added in the context of a new regulation which aims at protecting people from harming or annoying vibrations in their homes. As a starting point for vibration calibration activities in the lab a commercial system was purchased in 2005 and put into service subsequently. We are currently providing a number of calibration services in the field of vibration covering to a certain extent the needs of Swiss industry and engineering services. The above mentioned regulation is still not been enforced for the time being. Practical schemes to finance related rehabilitation work are studied.

Calibration and verification

Within the scope of our measurement capabilities the laboratory of acoustics is providing a wide variety of services to a multitude of customers. An important part of the workload stems from **verifications of sound level meters and sound calibrators**. The number of instruments officially used on the Swiss market has steadily increased to 630 in 2007. Most of the verification work, however, is done by two verification laboratories under our supervision. We did some 120 verifications in 2007.

There are no regulations in the field of audiometry in Switzerland. However, based on a contract between the organization of ORL-physicians, the social security and METAS we are

also providing **references for audiometry** and supervising three verification laboratories inspecting annually close to 800 audiometers.

In order to be eligible for reimbursement in Switzerland the **conformity of hearing aids** with the declared specifications needs to be tested by an independent laboratory. METAS was performing these evaluations for certain instruments specifically manufactured for our market (while accepting formally approvals for the majority of instruments tested abroad). The distribution of hearing aids in our country is subject to a dramatic change in the near future, with the insurances buying directly (rather than refunding). Hearing aid measurements will therefore most probably be stopped at METAS.

Naturally, our laboratory is also **calibrating acoustic instrumentation** for industrial customers (ca. 100 devices a year).

In the field of calibration of **vibration measuring equipment** METAS has started providing calibrations of accelerometers and vibration calibrators. A larger demand for services is expected to occur primarily in the low frequency range for devices used by civil engineers for measuring structural vibrations and to assess structure borne sound.

Research activities

In relation with our above mentioned activities several investigations or applied research projects have been carried out (or started).

- **Calibration of heavy transducers**

Calibrating devices used by engineers in practice may be quite a different task from the calibration of reference transducers. Such sensors may be optimized for different factors (such as suitability for harsh environments) and turn out rather clumsy and heavy. The issues related to their calibration were analyzed in detail and measurement set-ups were adapted and optimized for this purpose. A Euramet project has been proposed to compare calibration systems at different NMIs.

- **Primary calibration set-up**

In expectation of a rising demand in vibration calibration services our instrumentation has been extended by additional components which could be integrated in our previously purchased modular system. A great deal of validation work has been executed and a bilateral comparison (to underpin our improved CMCs) prepared and officially announced.

- **Calibration of Artificial Mastoids**

Within the framework of our above mentioned audiometry activities we are routinely calibrating artificial mastoids using a particular type of impedance head for which no replacement is commercially available. We initiated a Euramet research project aiming at investigating to which extent alternative products may be used in this context.

International cooperation

Metas has participated in numerous working groups of the IEC (TC 29: WG 4, WG 5, WG 10, WG 17, WG 21) as well as ISO (TC 43) and is member of Euramet.