VAMAS

Modulus Measurements
Technical Work Area 32

Call for Participation

Validation of the test method for the measurement of the tensile elastic modulus

Objectives

Existing tensile test method standards are generally unsuitable for measuring reliable elastic modulus values.

A new, more specific method needs to be developed, agreed and validated.

Background

The need for improved elastic modulus measurement was highlighted in the CIPM Working Group on Materials Metrology report that found extremely poor reproducibility in tensile elastic modulus proficiency testing.

This poor reproducibility was also encountered during the certification of the existing BCR-661 reference material. This material has been produced to serve as a tensile reference material, and based on an interlaboratory exercise it has been assigned several tensile testing related certified values (proof stresses, elongation at fracture, reduction in area at fracture, tensile strength). However, the obtained elastic modulus values were not sufficiently reliable to serve as a certified value (an indicative value with a relatively large uncertainty is provided instead).

Standardization Needs

Standards EN10002-1 and ASTM E8 focus predominantly on measuring the full stress-strain curve. ASTM E111 covers elastic modulus measurement in more detail, but there are still issues with aspects of strain measurement and data analysis, which need to be resolved.

Recommendations from an EU funded project (TENSTAND) included the development of a separate dedicated tensile test for elastic modulus, but further groundwork and lobbying of the relevant standards committees is required to gain support. A collaborative project to examine aspects of the procedures and test methodology will be a valuable development.

Work Programme

The work plan will examine methods for determining the elastic modulus from the tensile test, mainly through interlaboratory comparison exercises using ASTM E111 and in house testing procedures. To reduce and appropriately assess material variability, use will be made of samples of the existing BCR-661 reference material. Some comparison with dynamic modulus data will also be carried out.

Measurement Traceability

Through the MoU between BIPM and VAMAS, it is hoped an interaction will be developed with the Consultative Committees on length (CCL) and mass (CCM) to ensure best practice and traceability of the prime measurements made in elastic modulus tests.

Participation

Metrology and associated member institutes and leading experts will be canvassed and approached, including ISO/TC 164/SC 1 membership, where elastic modulus measurement is being proposed as a new work item.

All participants in the interlaboratory comparisons will be selected based on documented evidence of their expertise in the field of tensile testing.

Deliverables and Dissemination

- VAMAS technical report on the interlaboratory comparison exercise
- Draft text for submission to an international standards development organization

Funding

Participation is based on in-kind contributions from the partners.

Timescales

18 months following start-up.

Status

Project initiated January 2010.

For more information on participation:

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