



Quantitative Microstructural Analysis

Technical Work Area 37

Project 1

Determination of reproducibility and repeatability of grain size measurement by Electron Back Scattered Diffraction (EBSD)

Objectives

Electron Backscatter Diffraction (EBSD) is increasingly used to measure grain sizes in engineering materials, but there is little or no comparative data on the reproducibility and repeatability of this method for establishing uncertainties associated with the method.

An interlaboratory comparison will be carried out to measure the grain size in a representative range of metals used for advanced engineering applications to enable inclusion in International Standards of statements on the uncertainty of measurement for this technique.

Background

EBSD is capable of measuring grain size at and below the spatial resolution of current methods such as optical microscopy. It also has advantages for providing additional information on the complex and refined structures that are increasingly required for advanced engineering applications. EBSD is used for research and increasingly for quality control, but to

fully exploit its potential, accurate knowledge is required of the issues affecting the reproducibility or repeatability of measurement to enable comparison not only of different EBSD data sets but also comparison with measurements by other methods.

Standardization Needs

ISO TC202/WG7 is writing a new standard ISO13067 "Microbeam analysis-Electron Backscatter Diffraction-Measurement of Grain Size and Distribution" and this has now reached the stage of a Draft International Standard. However there is little or no comparative data to enable a statement of the uncertainty of measurement.

Work Programme

An initial pilot study involving several laboratories will be carried out using a simple equiaxed structure with a mean grain size equal or greater than 30 microns, which is also amenable to optical characterisation.

If the pilot study is successful work will be extended to more complex structures. Options about choice of

Call for Participation



material, type of structure and whether polishing technique is part of the intercomparison will be discussed with partners. Also there needs to be discussion of whether a single sample is circulated or several samples measured at a single laboratory prior to circulation. Possible structures for this later stage include bimodal, perhaps in a rolled, textured material and a dual phase material.

Deliverables and Dissemination

The results of this work will be published in a peer reviewed journal and a VAMAS report, with a summary of the findings included in the standard ISO13067.

Funding

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

Status

Work is planned to start in April 2010, with a six month pilot study followed by more detailed interlaboratory comparison over a further 12 months.

For more information on participation, please contact:

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