# INTERNATIONAL STANDARD

# ISO 22489

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# Microbeam analysis — Electron probe microanalysis — Quantitative point analysis for bulk specimens using wavelength-dispersive X-ray spectroscopy

*Analyse par microfaisceaux — Analyse par microsonde de Castaing — Analyse quantitative ponctuelle d'échantillons massifs par spectrométrie X à dispersion de longueur d'onde*

Reference number
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# Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 22489 was prepared by Technical Committee ISO/TC 202, *Microbeam analysis*, Subcommittee SC 2, *Electron probe microanalysis*.

# Introduction

Electron microanalysis is widely used for the quantitative analysis of elemental composition in materials. It is a typical instrumental analysis and the electron probe microanalyser has been greatly improved to be user-friendly. Obtaining accurate results with this powerful tool requires that it be properly used. In order to obtain reliable data, however, optimum procedures must be followed. These procedures, such as preparation of specimens, measurement of intensities of characteristic X-rays and calculation of concentrations from X-ray intensities, are given, for use as standard procedures, in this International Standard.

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## 1 Scope

This International Standard specifies requirements for the quantification of elements in a micrometre-sized volume of a specimen identified through analysis of the X-rays generated by an electron beam using a wavelength-dispersive spectrometer (WDS) fitted either to an electron probe microanalyser or to a scanning electron microscope (SEM).

It describes:

- the principle of the quantitative analysis;
- the general coverage of this technique in terms of elements, mass fractions and reference specimens;
- the general requirements for the instrument;
- the fundamental procedures involved, such as specimen preparation, selection of experimental conditions, the measurements, the analysis of these and the report.

This International Standard is intended for the quantitative analysis of a flat and homogeneous bulk specimen using a normal incidence beam. It does not specify detailed requirements for either the instruments or the data reduction software. Operators should obtain information such as installation conditions, detailed procedures for operation and specification of the instrument from the makers of any products used.

## 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 14594, *Microbeam analysis — Electron probe microanalysis — Guidelines for the determination of experimental parameters for wavelength dispersive spectroscopy*

ISO 14595, *Microbeam analysis — Electron probe microanalysis — Guidelines for the specification of certified reference materials (CRMs)*

ISO/IEC 17025:2005, *General requirements for the competence of testing and calibration laboratories*

ISO 17470, *Microbeam analysis — Electron probe microanalysis — Guidelines for qualitative point analysis by wavelength dispersive X-ray spectrometry*

ISO 22309:2006, *Microbeam analysis — Quantitative analysis using energy-dispersive spectrometry (EDS)*