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## **Microbeam analysis — Analytical electron microscopy — Methods for calibrating image magnification by using reference materials with periodic structures**

*Analyse par microfaisceaux — Microscopie électronique analytique  
— Méthodes d'étalonnage du grandissement d'image au moyen de  
matériaux de référence de structures périodiques*



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## Foreword

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This document was prepared by Technical Committee ISO/TC 202, *Microbeam analysis*, Subcommittee SC 3, *Analytical electron microscopy*.

This third edition cancels and replaces the second edition (ISO 29301:2017), of which it constitutes a minor revision. The changes are as follows:

- the element name of Silver in [Table D.1](#) has been corrected to Silicon;
- normative references in [Clause 2](#) have been updated.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

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## Introduction

The transmission electron microscope (TEM) is widely used to investigate the micro/nano-structure of a range of important materials such as semiconductors, metals, nano-particles, polymers, ceramics, glass, food and biological materials. The technique used involves the transmission of electrons through an ultra-thin specimen, interacting with the specimen as they pass through. This interaction results in a magnified image which is focused onto an imaging device, such as a photographic film, an imaging plate, or an image sensor built into a digital camera. A TEM is capable of imaging at significantly higher resolutions than ordinary (light) microscopes. It can be used to examine fine details as small as a single atomic column in a given specimen. This document addresses the need for magnification calibration of the images. It describes the requirements for calibration of the image magnification in the transmission electron microscope using a certified reference material or a reference material with periodic structures.