ISO 29301:2017-12 (E)

Microbeam analysis - Analytical electron microscopy - Methods for calibrating image magnification by us ing reference materials with periodic structures

Contents

Page

Foreword iv

Introduction vi

1 Scope 1

2 Normative references 1

3 Terms and definitions 1

4 Image magnification 5
4.1 Definition of the image magnification 5
4.2 Expressing magnification 6

5 Reference materials 6
5.1 General 6
5.2 Requirements for CRM/RM 7
5.3 Storage and handling 7

6 Calibration procedures 7
6.1 General 7
6.2 Mounting CRM/RM 8
6.3 Setting TEM operating conditions for calibration 8
6.4 Capturing digitized image 9
6.5 Digitizing the image recorded on photographic film 10
6.5.1 General 10
6.5.2 How to decide the pixel-resolution for digitization 10
6.6 Measurement of the angle-corrected distance, Dt, from the digitized image 12
6.6.1 General 12
6.6.2 Measurement procedure 13
6.7 Digitization of reference scale for pixel size calibration 16
6.8 Calibration of image magnification 17
6.8.1 General 17
6.8.2 Calibration of scale unit (= pixel size), S 17
6.8.3 Calculating image magnification 19
6.9 Calibration of scale bar 20
6.9.1 General 20
6.9.2 Basic scale size corresponding to one pixel on the digitized image 20
6.9.3 Calibration of scale bar 20
6.10 Calibration procedure for length measurements using photographic film only 21

7 Accuracy of image magnification 22

8 Uncertainty of measurement result 22

9 Calibration report 24
9.1 General 24
9.2 of calibration report 24

Annex A (informative) Parameters that influence the resultant magnification of a TEM 26

Annex B (informative) Flowchart of image-magnification calibration procedure 27

Annex C (informative) How to decide the number of lines for averaging 28

Annex D (informative) Reference materials for magnification calibration 31

Annex E (informative) Example of test report for calibration of TEM magnification 35

Bibliography 44