TECHNICAL SPECIFICATION

ISO/TS 21383

First edition 2021-03

Microbeam analysis — Scanning electron microscopy — Qualification of the scanning electron microscope for quantitative measurements



ISO/TS 21383:2021(E)



COPYRIGHT PROTECTED DOCUMENT

© ISO 2021

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office CP 401 • Ch. de Blandonnet 8 CH-1214 Vernier, Geneva Phone: +41 22 749 01 11 Email: copyright@iso.org Website: www.iso.org

Published in Switzerland

| Cont | tents | | Page |
|--------|--|--|------|
| Forew | ord | | v |
| Introd | luction | L | vi |
| 1 | Scope | | 1 |
| 2 | _ | ative references | |
| 3 | | s and definitions | |
| | | | |
| 4 | | ols and abbreviated terms | |
| 5 | Gener 5.1 | Condition setting | |
| | 5.2 | Contrast/brightness setting | |
| | 5.3 | Sample preparation | |
| 6 | Meası | urement of image sharpness | 7 |
| 7 | Measurement of drift and drift-related distortions (imaging repeatability) | | |
| | 7.1 | Measurement of image drifts within specified time intervals. | 9 |
| | | 7.1.1 One-minute drift measurement | |
| | | 7.1.2 Ten-minute drift measurement. | |
| | | 7.1.3 One-hour drift measurement7.1.4 Long-term larger than one-hour drift measurement | |
| | 7.2 | Evaluation of the drift and the drift-related distortions by using image overlay | |
| | 7.3 | Evaluation of the drift and the drift-related distortions by using cross-correlation | |
| | | function (CCF) | 13 |
| | | 7.3.1 Measurement of the drifts by using the CCF | 13 |
| | | 7.3.2 Measurement of the distortions by using the CCF | 15 |
| 8 | Measurement of electron-beam-induced contamination | | |
| | 8.1 Cleaning of the sample surface | | 16 |
| | 8.2 | Cleaning of the inner surfaces of the sample chamber | 16 |
| | 8.3 | Measurement method of the contamination | |
| | | 8.3.1 Measurement of the height of the contamination growth8.3.2 Measurement of relative carbon concentration of the contamination by | 1/ |
| | | the X-ray analysis | 18 |
| | | 8.3.3 Measurement of the surface contamination by the change of SEM signal | 10 |
| | | intensities | 18 |
| 9 | Meası | urement of the image magnification and linearity | 19 |
| | 9.1 | Measurement of the image magnification | 20 |
| | 9.2 | Measurement of the image linearity | 21 |
| 10 | Measi | urement of background noise | 22 |
| | 10.1 | Evaluation methods by using noise profiles and processed images | 22 |
| | 10.2 | Evaluation methods by calculating numerical image properties | 28 |
| 11 | Meası | urement of the primary electron beam current | 30 |
| | 11.1 | Ten-minute primary electron beam current measurement | |
| | 11.2 | Long-term primary electron beam current measurement | 30 |
| 12 | Repor | ting Form | 32 |
| Annex | A (info | ormative) Measurement of image sharpness | 34 |
| Annex | B (info | ormative) Measurement of image drift and distortions caused by unintended | |
| | | ons. | 36 |
| Annex | C (info | ormative) Measurement of electron beam-induced contamination | 47 |
| | | ormative) Measurement of the image magnification and linearity | |
| | | ormative) Measurement of the primary electron beam current | 56 |