

Microscope quality control: UK RMS Focused Interest Group

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Update 2020

- Drafted a methodology manual to satisfy the Confocal ISO 21073
- Engaged with other groups in EU and US
- Detailed methodology for large raft of QC procedures ongoing

Microscope quality control: Methods

INTERNATIONAL STANDARD

ISO 21073

First edition
2019-12

Microscopes — Confocal microscopes — Optical data of fluorescence confocal microscopes for biological imaging

*Microscopes — Microscopes confocaux — Données optiques des
microscopes confocaux à fluorescence pour l'imagerie biologique*

arXiv.org > q-bio > arXiv:2011.08713

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[Submitted on 17 Nov 2020 (v1), last revised 19 Nov 2020 (this version, v2)]

Interpretation of Confocal ISO 21073: 2019 confocal microscopes: Optical data of fluorescence confocal microscopes for biological imaging– Recommended Methodology for Quality Control

Glyn Nelson, Laurent Gelman, Orestis Faklaris, Roland Nitschke, Alex Laude

The performance of a confocal imaging system may be no better than a general-purpose widefield system if it is not properly maintained or quality controlled. The publication of ISO 21073, 'Confocal microscopes– Optical data of fluorescence confocal microscopes for biological imaging', set a standard for the minimal Quality Control (QC) that should be performed for Confocal Microscopes. Here we describe methodology for performing the QC requirements to satisfy ISO 21073, as well as suggesting other QC methods that should be performed to obtain a minimum level of information about the microscope system.

Comments: When drawing up this document, it became apparent that further work was required to determine best methodology and further minimal QC tests, as well as extend to other common imaging modalities. As a consequence, QUAREP-LIMI (this [https URL](https://arxiv.org/abs/2011.08713)) was established to produce a more definitive and expansive QC Methodology manual for light microscopy to supersede this document

Subjects: Other Quantitative Biology (q-bio.OT)

Cite as: arXiv:2011.08713 [q-bio.OT]

(or arXiv:2011.08713v2 [q-bio.OT] for this version)

Draft paper uploaded to arXiv

Microscope quality control: ISO manual

- 4 metrics to measure for Confocal ISO:
 - Lateral and Axial Resolution
 - Uniformity of Field
 - Chromatic Aberration and Co-registration
 - Stability of Illumination Power
- Our manual also proposed the following as routine QC tests:
 - Laser Power at objective
 - Laser power at source
 - Detector Linearity
 - Detector Sensitivity
 - Z Drive Accuracy
 - Stage Repositioning Accuracy

Microscope quality control: Wider Engagement

- We followed up from previous discussions we had at ELMI with Alison North (Rockefeller), Roland Nitschke, (Freiburg), Orestis Faklaris (MfM) and Laurent Gelman (Lausanne) and the ISO methods manual. This became the base for an online meeting hosted by Roland in April:
 - Established an international consortium for determining best practice and methodology for QC across a larger range of metrics.
 - Current RMS QC-FIG work is ongoing through this group.
 - Everyone in the UK community is invited to join this.