BSI Standards Publication

Optics and photonics — Medical endoscopes and endotherapy devices

Part 5: Determination of optical resolution of rigid endoscopes with optics

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National foreword

This British Standard is the UK implementation of ISO 8600-5:2020. It supersedes BS ISO 8600-5:2005, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee CPW/172, Optics and Photonics.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Optics and photonics — Medical endoscopes and endotherapy devices —

Part 5: Determination of optical resolution of rigid endoscopes with optics

Optique et photonique — Endoscopes médicaux et dispositifs d'endothérapie —

Partie 5: Détermination de la résolution optique des endoscopes optiques rigides

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 172 *Optics and photonics,* Subcommittee SC 5, *Microscopes and endoscopes*.

This second edition cancels and replaces the first edition (ISO 8600-5:2005), which has been technically revised.

The main changes compared to the previous edition are as follows:

— document has been restructured;

— Clause 2 added;

— Clause 3 revised and updated;

— quality characteristics “Contrast Transfer Function” and “Modulation Transfer Function” as measurement methods are introduced;

— Measurement with limiting resolution moved to informative Annex A;

— informative Annex B added;

— informative Annex C added;

— normative Annex D added;

— informative Annex E added;

— informative Annex F added;

— informative Annex G added.

A list of all parts in the ISO 8600 series can be found on the ISO website.

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.

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Optics and photonics — Medical endoscopes and endotherapy devices —

Part 5: Determination of optical resolution of rigid endoscopes with optics

1 Scope

This document applies to rigid endoscopes designed for use in the practice of medicine. Endoscopes having a fibre-optic or opto-electronic imaging system are excluded. It specifies a test method for determining the optical resolution of endoscopes.

This document provides a measurement method for characterizing three aspects of the optical resolution of a rigid endoscope. Characteristic A is used to provide a simple measurement of the limiting resolution of the endoscope image. Characteristic B provides a measurement of low spatial frequency resolution and characterizes the sharpness, or contrast, of the endoscope image. Characteristic C provides a measurement of the spatial frequency response of the endoscope image.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 9334, *Optics and photonics — Optical transfer function — Definitions and mathematical relationships*

ISO 12233:2017, *Photography — Electronic still picture imaging — Resolution and spatial frequency responses*

ISO 15529:2010, *Optics and photonics — Optical transfer function — Principles of measurement of modulation transfer function (MTF) of sampled imaging systems*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
angular limiting resolution
smallest angle whose vertex is at the entrance pupil (can be approximated by the distal window surface if the target distance from the distal window is significantly larger than the distance between the distal window surface and the entrance pupil) of the endoscope at which a line pair (lp) at a given working distance d can just be resolved with normal visual acuity, with the unit of degrees/lp

Note 1 to entry: Angular limiting resolution is calculated using the formula