INTERNATIONAL ISO

Second edition
2020-01

Optics and photonics — Optical transfer function — Application —

Part 3: Telescopes

Optique et instruments d'optique — Fonction de transfert optique — Application —

Partie 3: Télescopes

Reference number
ISO 9336-3:2020(E)

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Published in Switzerland

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Foreword

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This document was prepared by Technical Committee ISO/TC 172, *Optics and photonics*, Subcommittee SC 4, *Telescopic systems*.

This second edition cancels and replaces the first edition (ISO 9336-3:1994), which has been technically revised.

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

— update of the document based on the latest technical developments;

— Annex A regarding tests on components and sub-assemblies using azimuth scanning systems removed, due to lack of practical relevance;

— two new Annexes added regarding test methods using detector arrays and deriving an objective image quality criterion from the MTF.

A list of all parts in the ISO 9336 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.

Introduction

Methods of assessing the imaging quality of telescopic systems can be found in ISO 14490-7. The methods described in this document are basically subjective, relying as they do on the judgement of the observer and the quality of his vision. The technique of measuring the “limit of resolution” is relatively easy and quick to perform and provides a single figure of merit for each orientation of the test pattern. However, being a subjective measurement, it can be open to significant variations in its results. Measuring the optical transfer function (OTF), or more usually just its modulus, the modulation transfer function (MTF), provides a completely objective means of evaluating imaging quality that can be compared directly with the theoretical assessment done by the optical system designer.

Integration of the system MTF over a certain domain of spatial frequencies and normalised to the diffraction limited MTF will provide a single figure of merit that is a reasonable representation of the system performance without relying on any subjective assessment. When the spatial frequency domain is selected in accordance with the properties of the detector system the method can be applied to telescopic systems operating with any detector type, thus not limiting the method to visual observation. This is of importance as in state-of-the-art telescopes the same optical path can be used for visual observation as well as for wavelengths outside the visual range (using appropriate detector systems).

As a special case, an “objective limit of resolution”, providing a single figure of merit, can be derived from a measurement of MTF by using the latter in combination with a “contrast sensitivity” curve for the eye and a measurement of MTF may also be used as the basis for several other image quality criteria (see Annex B).

