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Optics and photonics — Test methods for telescopic systems —

Part 7: Test methods for limit of resolution

Optique et photonique — Méthodes d'essai pour systèmes télescopiques —

Partie 7: Méthodes d'essai pour limite de résolution

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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).

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For an explanation on 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 the following URL: www.iso.org/iso/foreword.html.

The committee responsible for this document is ISO/TC 172, *Optics and photonics*, Subcommittee SC 4, *Telescopic systems.*

This second edition cancels and replaces the first edition (ISO 14490-7:2005), which has been technically revised with the following changes:

— addition of a new sentence in A.4 "Alternatively, a test pattern down to $2^{-1/3}$ = 0,79 is acceptable.";

— corrected Table A.2, last row: 302 replaced by 320.

A list of parts in the ISO 14490 series can be found on the ISO website.

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Introduction

There are various characteristics which are relevant for overall image quality of telescopic systems and observational telescopic instruments. Two important characteristics are the limit of resolution and the optical transfer function.

This document specifies the test method for the determination of the limit of resolution of telescopic systems and observational telescopic instruments. Optical transfer function measurement as applied to telescopic systems is specified in ISO 9336-3.

Besides the limit of resolution and the optical transfer function, further characteristics are relevant for an assessment of the image quality; the most important of them are the following:

— secondary spectrum (dispersive aberrations);

— distortion;

— vignetting;

— colour matching.

The secondary spectrum of the test specimen can produce colour fringes surrounding observed objects (especially at high contrast edges) which can look like coloured neon tube light.

The perceived image might have barrel or pincushion distortion. Pincushion distortion is considered to give a more natural impression of the observed object when swivelling the test specimen.

Vignetting can lead to a perceivable intensity degradation from the centre to the edge of the field of view.

Colour matching is the accuracy of the colour rendition of an object observed with the test specimen. Any colour deviation might be due to the lens material or to coatings.

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Optics and photonics — Test methods for telescopic systems —

Part 7: Test methods for limit of resolution

1 Scope

This document specifies the test methods for the determination of the limit of resolution of telescopic systems and observational telescopic instruments.

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 14490-1:2005, *Optics and optical instruments — Test methods for telescopic systems — Part 1: Test methods for basic characteristics*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 14132-1 apply.

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

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

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

4 Method of determination of the limit of resolution

4.1 General

The limit of resolution of a telescopic system is the minimum angular distance between centrelines of two adjacent bright (or dark) bars of the bar-type resolution test target whose direction can be detected when viewing through the test specimen.

4.2 Test equipment

The limit of resolution of telescopic systems shall be determined with the test arrangement shown in Figure 1.

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