International Standard

ISO 20793

Photography — Lenticular print for changing images — Measurements of image quality

Photographie — Impression lenticulaire pour images changeantes — Mesurages de la qualité des images

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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 document 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 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 42, *Photography*.

This first edition of ISO 20793 cancels and replaces the first edition of ISO/TS 20793:2019, which has been technically revised.

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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Introduction

Lenticular printing is a technology wherein lenticular lenses are used to produce printed images with an illusion of depth, i.e. three-dimensional (3D) effect, or the ability to change or move as the image is viewed from different angles. Lenticular prints for displaying changing images are built up with a lenticular lens sheet and a printed sheet that contains at least two images, interleaved with the same spatial frequency as the lenticular lens sheet.

In this context, lenticular lenses generally take the form of arrays of cylindrical lenses, each acting as a magnifying lens. Widespread applications of lenticular printing are signage, display posters, business cards, multilingual message boards, packages with changing images or 3D effects, and secure documents.

It has been reported that the market size of lenticular prints is over 100 million m^2 and that the market is growing. Furthermore, the potential image qualities of lenticular printing have dramatically improved, and further improvements are expected in the future. While production of lenticular sheets with a lens frequency of 100 lpi (lines per inch) is routine, products with a 200 lpi frequency are also currently available.

Although the potential image quality of lenticular prints is high as described above, the quality of images is not always good in the market due to various causes, e.g., due to the misalignment of the lenticular lens and lenticular printed images. This is a critical problem for lenticular printing.

To improve the image quality of lenticular prints, image quality measurements are essential. This document provides standard measurement methods and the specifications for the image quality of lenticular prints.

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Photography — Lenticular print for changing images — Measurements of image quality

1 Scope

This document specifies the measurement methods and specification of image quality of lenticular prints that are used for changing images. This document does not cover lenticular prints that are used for 3D images.

NOTE Lenticular prints for 3D images can be measured with the same types of procedures. However, it needs more information, such as the dependence of the measurement distance, to evaluate the 3D performance.

This document specifically describes measurement methods for crosstalk, viewing angle range, angular misalignment from the designed viewing angle and the uniformity of the image within the printing area of the lenticular print images. These are critical for the image quality of lenticular prints for changing images.

This document is applicable to lenticular prints produced by printing technologies that include impact and non-impact printing. Examples of the former are off-set, gravure and flexography, while the examples of the latter are silver halide, inkjet, dye diffusion thermal transfer and electrophotography. The multiple laser images (MLI) and changeable laser images (CLI) process of using a laser to write through a lenticular screen at different angles to create two monochrome images is also used.

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 5-3, *Photography and graphic technology — Density measurements — Part 3: Spectral conditions*

ISO 5-4, *Photography and graphic technology — Density measurements — Part 4: Geometric conditions for reflection density*

3 Terms and definitions

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

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

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

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

3.1 Terms

3.1.1
lenticular lens
array of magnifying semi-cylindrical lenses, designed to produce a desired perception, such as 3D, motion or morphing, to the underlying interlaced image

EXAMPLE This technique is widely used in lenticular printing, wherein the lenticular lens is used to provide an illusion of depth, change or motion to an underlying interlaced image when viewed from different angles.

[SOURCE: ISO/TS 20328:2016, 3.1, modified — Note 1 to entry has been removed.]

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