Ergonomics of human-system interaction - Part 392: Ergonomic recommendations for the reduction of visual fatigue from stereoscopic images (ISO 9241-392:2015)

EESTI STANDARDIKESKUS
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NATIONAL FOREWORD

See Eesti standard EVS-EN ISO 9241-392:2017 sisaldab Euroopa standardi EN ISO 9241-392:2017 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 9241-392:2017 consists of the English text of the European standard EN ISO 9241-392:2017.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 01.03.2017.	Date of Availability of the European standard is 01.03.2017.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

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Ergonomics of human-system interaction - Part 392: Ergonomic recommendations for the reduction of visual fatigue from stereoscopic images (ISO 9241-392:2015)

Ergonomie de l'interaction homme-système - Partie 392: Exigences ergonomiques pour diminuer la fatigue visuelle induite par des images stéréoscopiques (ISO 9241-392:2015)

Ergonomie der Mensch-System-Interaktion - Teil 392: Ergonomische Anforderungen zur Reduktion visueller Ermüdung durch stereoskopische Bilder (ISO 9241-392:2015)

This European Standard was approved by CEN on 8 February 2017.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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European foreword

The text of ISO 9241-392:2015 has been prepared by Technical Committee ISO/TC 159 “Ergonomics” of the International Organization for Standardization (ISO) and has been taken over as EN ISO 9241-392:2017 by Technical Committee CEN/TC 122 “Ergonomics” the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2017, and conflicting national standards shall be withdrawn at the latest by September 2017.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

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Endorsement notice

The text of ISO 9241-392:2015 has been approved by CEN as EN ISO 9241-392:2017 without any modification.

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

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 WTO principles in the Technical Barriers to Trade (TBT), see the following URL: Foreword — Supplementary Information.

The committee responsible for this document is ISO/TC 159, *Ergonomics*, Subcommittee SC 4, *Human-system interaction*.

ISO 9241 consists of the following parts, under the general title *Ergonomic requirements for office work with visual display terminals (VDTs)*:

— *Part 1: General introduction*

— *Part 2: Guidance on task requirements*

— *Part 5: Workstation layout and postural requirements*

— *Part 6: Guidance on the work environment*

— *Part 11: Guidance on usability*

— *Part 12: Presentation of information*

— *Part 13: User guidance*

— *Part 14: Menu dialogues*

— *Part 15: Command dialogues*

— *Part 16: Direct manipulation dialogues*

ISO 9241 also consists of the following parts, under the general title *Ergonomics of human-system interaction*:

— *Part 20: Accessibility guidelines for information/communication technology (ICT) equipment and services*

— *Part 110: Dialogue principles*

— *Part 129: Guidance on software individualization*

— *Part 143: Forms*

— *Part 151: Guidance on World Wide Web user interfaces*
— *Part 154: Interactive voice response (IVR) applications*
— *Part 171: Guidance on software accessibility*
— *Part 210: Human-centred design for interactive systems*
— *Part 300: Introduction to electronic visual display requirements*
— *Part 302: Terminology for electronic visual displays*
— *Part 303: Requirements for electronic visual displays*
— *Part 304: User performance test methods for electronic visual displays*
— *Part 305: Optical laboratory test methods for electronic visual displays*
— *Part 306: Field assessment methods for electronic visual displays*
— *Part 307: Analysis and compliance test methods for electronic visual displays*
— *Part 308: Surface-conduction electron-emitter displays (SED)*
— *Part 309: Organic light-emitting diode (OLED) displays*
— *Part 310: Visibility, aesthetics and ergonomics of pixel defects*
— *Part 331: Optical characteristics of autostereoscopic displays*
— *Part 400: Principles and requirements for physical input devices*
— *Part 410: Design criteria for physical input devices*
— *Part 420: Selection of physical input devices*
— *Part 910: Framework for tactile and haptic interaction*
— *Part 920: Guidance on tactile and haptic interactions*

For the other parts under preparation, see Annex A.

Introduction

When a person views a three-dimensional object, the lateral distance between the eyes provides each with a slightly different retinal image. The fusion of these retinal images by the brain provides a single percept with an associated sense of depth termed as stereopsis. Recent advances in the imaging technology have created a notable increase in our chances of viewing artificially-created stereoscopic images. The technology creates two different images, one of which is seen by one eye and the other by the other eye. Their fusion results in the sensation of stereopsis.

Stereoscopic images are appealing because of their heightened sense of reality compared with the traditional 2D images. Presentations of stereoscopic images also provide clear depth information and, for this reason, the broad use of stereoscopic images is anticipated in fields such as medicine and industry. However, there are scientific data indicating that without careful consideration of the properties of the human visual system, the stereoscopic presentation of images might induce undesirable effects.

This part of ISO 9241 describes the basic and minimal conditions for comfortable viewing of stereoscopic images. It is intended to promote an environment in which viewers can enjoy the benefits of stereoscopic images without adverse effects. In such an environment, new technologies for stereoscopic images can also be actively developed and applied in various fields. This part of ISO 9241 is not intended to restrict the freedom of expression or artistic creativity in the image culture.

This part of ISO 9241 is based on scientific findings related to the possible undesirable effects of viewing stereoscopic images and in the future, this part of ISO 9241 can be revised as new scientific data.

This part of ISO 9241 specifies human–system interaction standards. Readers who need guidance on other aspects of human–system interaction can therefore refer to other documents in ISO 9241 (see Annex A for an overview of the entire ISO 9241 series).

Ergonomics of human-system interaction —

Part 392:
Ergonomic recommendations for the reduction of visual fatigue from stereoscopic images

1 Scope

This part of ISO 9241 establishes recommendations for reducing the potential visual discomfort and visual fatigue experienced during viewing of stereoscopic images under defined viewing conditions. Visual fatigue and discomfort might be produced by the stereoscopic optical stimulus of disparate images that were presented binocularly.

This part of ISO 9241 is also applicable to the final products of stereoscopic presentations which depend on stereoscopic image content and stereoscopic displays when viewed under appropriate defined conditions. Therefore, the recommendations are intended for people responsible for the design, development, and supply of stereoscopic image content as well as stereoscopic displays.

NOTE 1 See Annex B for appropriate viewing conditions.

The recommendations in this part of ISO 9241 are applicable to stereoscopic displays such as those with glasses and two-view autostereoscopic displays, stereoscopic head-mounted displays, and stereoscopic projectors. Moreover, they are applicable to stereoscopic image content intended to be presented on the above-mentioned stereoscopic displays and stereoscopic presentations that are realized by the combinations of these images and displays.

NOTE 2 Annex C presents numerical criteria as an informative reference.

NOTE 3 Other guidance might need to be established by referring to this part of ISO 9241 when requirements and recommendations specific to each type of stereoscopic image content or stereoscopic display become necessary.

NOTE 4 ITU generally sets the standards for broadcasting.

NOTE 5 ISO 9241-303:2011, Annex E provides guidelines for virtual displays which are intended for stereoscopic head-mounted displays.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 9241-303, *Ergonomics of human-system interaction — Part 303: Requirements for electronic visual displays*

3 Terms and definitions

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

3.1
stereopsis
binocular, visual perception of depth or three-dimensional space

Note 1 to entry: See ISO 9241-302:2008, 3.3.40.