

# SLOVENSKI STANDARD

## SIST EN ISO 9241-303:2009

01-januar-2009

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Ergonomics of human-system interaction - Part 303: Requirements for electronic visual displays (ISO 9241-303:2008)

Ergonomie der Mensch-System-Interaktion - Teil 303: Anforderungen an elektronische optische Anzeigen (ISO 9241-303:2008)

Ergonomie de l'interaction homme-système - Partie 303: Exigences relatives aux écrans visuels électroniques (ISO 9241-303:2008)

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**Ta slovenski standard je istoveten z: EN ISO 9241-303:2008**

### **ICS:**

13.180	Ergonomija	Ergonomics
35.180	Terminalska in druga periferna oprema IT	IT Terminal and other peripheral equipment

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

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November 2008

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English Version

**Ergonomics of human-system interaction - Part 303:  
Requirements for electronic visual displays (ISO 9241-303:2008)**

Ergonomie de l'interaction homme-système - Partie 303:  
Exigences relatives aux écrans de visualisation  
électroniques (ISO 9241-303:2008)

Ergonomie der Mensch-System-Interaktion - Teil 303:  
Anforderungen an elektronische optische Anzeigen (ISO  
9241-303:2008)

This European Standard was approved by CEN on 12 April 2008.

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## Foreword

This document (EN ISO 9241-303:2008) has been prepared by Technical Committee ISO/TC 159 "Ergonomics" in collaboration with 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of an identical text or by endorsement, at the latest by May 2009, and conflicting national standards shall be withdrawn at the latest by May 2009.

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.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

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# INTERNATIONAL STANDARD

**ISO**  
**9241-303**

First edition  
2008-11-15

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## **Ergonomics of human-system interaction —**

### **Part 303: Requirements for electronic visual displays**

**iTeh STANDARD PREVIEW** *Ergonomie de l'interaction homme-système —*

**(standards.iteh.ai)** *Partie 303: Exigences relatives aux écrans de visualisation  
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## ISO 9241-303:2008(E)

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 9241-303 was prepared by Technical Committee ISO/TC 159, *Ergonomics*, Subcommittee SC 4, *Ergonomics of human-system interaction*.

This first edition of ISO 9241-303, together with ISO 9241-302 and ISO 9241-305, cancels and replaces ISO 9241-8:1998. Together with ISO 9241-302, ISO 9241-305 and ISO 9241-307, it cancels and replaces ISO 9241-7:1998 and ISO 13406-2:2001, and partially replaces ISO 9241-3:1992. The following has been technically revised:

- terms and definitions related to electronic visual displays have been transferred to, and collected in, ISO 9241-302;
- while the areas previously covered in ISO 9241 and by ISO 13406 remain essentially unchanged, test methods and requirements have been updated to account for advances in science and technology;
- all generic ergonomic requirements have been incorporated into ISO 9241-303;
- the application of those requirements to different display technologies, application areas and environmental conditions — including test methods and pass/fail criteria — is specified in ISO 9241-307.

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 4: Keyboard requirements*
- *Part 5: Workstation layout and postural requirements*
- *Part 6: Guidance on the work environment*
- *Part 9: Requirements for non-keyboard input devices*
- *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*
- *Part 17: Form filling 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 151: Guidance on World Wide Web user interfaces*
- *Part 171: Guidance on software accessibility*
- *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) [Technical Report]*
- *Part 309: Organic light-emitting diode (OLED) displays [Technical Report]*
- *Part 400: Principles and requirements for physical input devices*
- *Part 410: Design criteria for physical input devices*
- *Part 920: Guidance on tactile and haptic interactions*

For the other parts under preparation, see Annex A.

**ISO 9241-303:2008(E)****Introduction**

This part of ISO 9241 addresses a large range of technologies, tasks and environments.

ISO 9241 was originally developed as a seventeen-part International Standard on the ergonomics requirements for office work with visual display terminals. As part of the standards review process, a major restructuring of ISO 9241 was agreed to broaden its scope, to incorporate other relevant standards and to make it more usable. The general title of the revised ISO 9241, “Ergonomics of human-system interaction”, reflects these changes and aligns the standard with the overall title and scope of Technical Committee ISO/TC 159, Subcommittee SC 4. The revised multipart standard is structured as series of standards numbered in the “hundreds”: the 100 series deals with software interfaces, the 200 series with human-centred design, the 300 series with visual displays, the 400 series with physical input devices, and so on.

See Annex A for an overview of the entire ISO 9241 series.

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# Ergonomics of human-system interaction —

## Part 303:

## Requirements for electronic visual displays

### 1 Scope

This part of ISO 9241 establishes image-quality requirements, as well as providing guidelines, for electronic visual displays. These are given in the form of generic — independent of technology, task and environment — performance specifications and recommendations that will ensure effective and comfortable viewing conditions for users with normal or adjusted-to-normal eyesight.

This part of ISO 9241 does not address issues of accessibility for people with disabilities. However, it does take into account aspects of the eyesight of older people and could be of value to people dealing with issues of visual impairment in certain cases: the specification of essential characteristics for normal viewing can be used to gauge the severity of different visual abnormalities so that appropriate solutions can be identified.

NOTE In addition to the Bibliography, Annex F gives a selected bibliography of documents addressing the needs of people with disabilities, including people with poor, deteriorating or no eyesight.

### 2 Normative references

The following referenced documents are indispensable for the application 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 9241-302, *Ergonomics of human-system interaction — Part 302: Terminology for electronic visual displays*

ISO 9241-307, *Ergonomics of human-system interaction — Part 307: Analysis and compliance test methods for electronic visual displays*

### 3 Terms and definitions

For the purpose of this document, the terms and definitions given in ISO 9241-302 apply.

## 4 Guiding principles

For a satisfying human–display interaction, a number of different requirements have to be met at the same time in an appropriate balance. For the purposes of this part of ISO 9241, these requirements have been grouped into the following eight major areas:

- viewing conditions;
- luminance;
- special physical environments;
- visual artefacts;
- legibility and readability;
- legibility of information coding;
- legibility of graphics;
- fidelity.

NOTE For the attractiveness of the image on the visual display, see Annex B.

## 5 Ergonomic requirements and recommendations

### 5.1 Viewing conditions

#### 5.1.1 General

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Many tasks require that the information presented on an electronic visual display be acted upon. Viewing the display such that this information can be taken up quickly, without error and with little effort, is thus highly important. A number of viewing conditions that are necessary, though not sufficient of themselves, can be specified for achieving fast, error-free and near-effortless viewing. These pertain to the design viewing distance and direction and to the needed gaze and head tilt angles of the viewer.

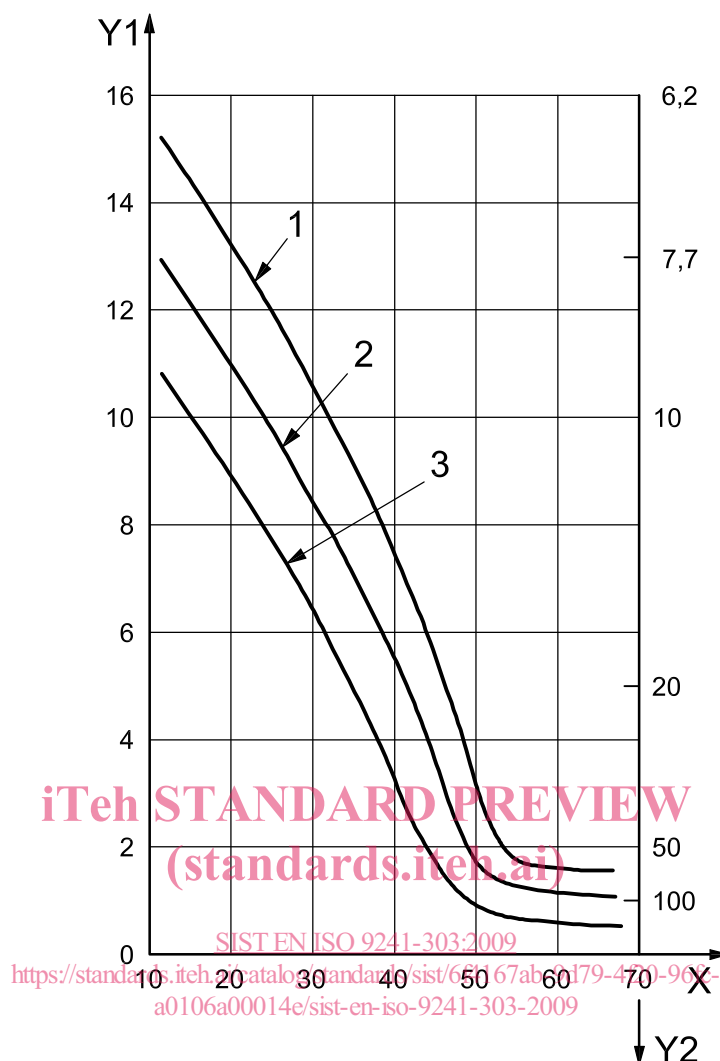
It is known that viewing distance and line-of-sight angle (gaze angle) need to be compatible with the user's vergence and accommodation capability and his or her capability to focus on short distances.

#### 5.1.2 Design viewing distance

The design viewing distance is dependent on the task and on the electronic visual display and shall not be less than 300 mm, being the typical minimum comfortable viewing distance, or *near point*, for normal (emmetropic) eyes of adults. There is a physiologically determined relationship between the near point and the age of the user, shown in Figure 1, and between the near point and the luminance level; however, there is a large variance in this relation.

Shorter viewing distances, of between 200 mm and 300 mm, can be observed in children and (very) young adults, enabling them to see details (e.g. parts of characters) smaller than those that they could see at greater distances, provided that aspects such as display luminance, contrast and the sharpness are high enough. However, most adults as well as older people position their displays at a larger viewing distance, typically 300 mm and more.

For larger visual displays, such as those used in office tasks, the preferred viewing distance is longer — typically 400 mm to 750 mm. At this distance, the accommodative strain to the eyes is less than at shorter viewing distances; moreover, there is larger freedom of movement at larger viewing distances. For presentation tasks or projection, the preferred viewing distance is still larger (typically 2 m to 10 m).



#### Key

- X age, in years
- Y1 accommodation span, dioptries
- Y2 near point of accommodation, centimetres
- 1 maximum
- 2 mean
- 3 minimum

**Figure 1 — Accommodation span and near point in relation to age of user**

#### 5.1.3 Design viewing direction

For normal use in which the user moves his or her head, a display shall be legible from any angle of inclination up to at least 40° from the normal to the surface of the display, measured in any plane.

Depending on the task, other limit values are possible. For example, for tasks requiring privacy, such as display use in crowded environments, the display should be only legible to a maximum angle of inclination between 15° and 20°.

**EXAMPLE** People in wheelchairs wishing to withdraw cash from an automatic teller machine in privacy are obliged to read the ATM display from a fairly low viewpoint. Their requirements can be met by a display that is only legible to a maximum angle of inclination between 15° and 20° in the horizontal plane, but downwards to a larger angle, of at least 40°, in the vertical plane.

**NOTE** Some display technologies exhibit anisotropic optical properties, which means that the luminance, contrast and colour vary with viewing direction.