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Ergonomi vid människa-systeminteraktion – Del 303: Krav på elektroniska bildskärmar (ISO 9241-303:2008)

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

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Europastandarden EN ISO 9241-303:2008 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN ISO 9241-303:2008.

Denna standard ersätter SS-EN 29241-3, utgåva 1; SS-EN ISO 9241-7, utgåva 1; SS-EN ISO 9241-8, utgåva 1; SS-EN ISO 13406-2, utgåva 1.

The European Standard EN ISO 9241-303:2008 has the status of a Swedish Standard. This document contains the official English version of EN ISO 9241-303:2008.

This standard supersedes the Swedish Standard SS-EN 29241-3, edition 1; SS-EN ISO 9241-7, edition 1; SS-EN ISO 9241-8, edition 1; SS-EN ISO 13406-2, edition 1.

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EUROPEAN STANDARD

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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)

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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of an identical text or by endorsement, at the latest by May 2009, and conflicting national standards shall be withdrawn at the latest by May 2009.

This document supersedes EN 29241-3:1993, EN ISO 13406-2:2001, EN ISO 9241-7:1998, EN ISO 9241-8:1997.

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Endorsement notice

The text of ISO 9241-303:2008 has been approved by CEN as a EN ISO 9241-303:2008 without any modification.

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.

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 attractivity of the image on the visual display, see Annex B.

5 Ergonomic requirements and recommendations

5.1 Viewing conditions

5.1.1 General

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.

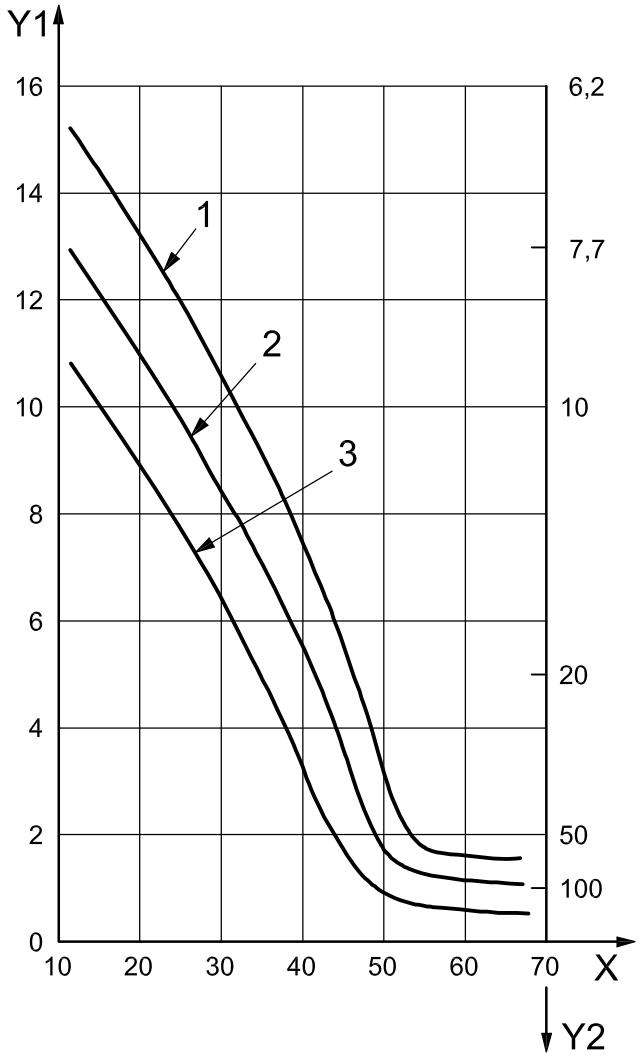
It is known that viewing distance and line-of-sight angle (gaze angle) need to be compatible with the user's vergence and accommodation capability and his or her capability to focus on short distances.

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, dioptres
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.