



SLOVENSKI STANDARD
SIST EN ISO 9241-305:2009
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Ergonomics of human-system interaction - Part 305: Optical laboratory test methods for electronic visual displays (ISO 9241-305:2008)

Ergonomie der Mensch-System-Interaktion - Teil 305: Optische Laborprüfverfahren für elektronische optische Anzeigen (ISO 9241-305:2008)

Ergonomie de l'interaction homme-systeme - Partie 305: Méthodes d'essai de laboratoire optique pour écrans visuels électroniques (ISO 9241-305:2008)

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

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**Ergonomics of human-system interaction - Part 305: Optical
laboratory test methods for electronic visual displays (ISO 9241-
305:2008)**

Ergonomie de l'interaction homme-système - Partie 305:
Méthodes d'essai de laboratoire optique pour écrans de
visualisation électroniques (ISO 9241-305:2008)

Ergonomie der Mensch-System-Interaktion - Teil 305:
Optische Laborprüfverfahren für elektronische optische
Anzeigen (ISO 9241-305:2008)

This European Standard was approved by CEN on 1 November 2008.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN Management Centre has the same status as the official versions.

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Foreword

This document (EN ISO 9241-305:2008) 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of an identical text or by endorsement, at the latest by May 2009, and conflicting national standards shall be withdrawn at the latest by May 2009.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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**Ergonomics of human-system
interaction —**

Part 305:
**Optical laboratory test methods
for electronic visual displays**

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Ergonomie de l'interaction homme-système —

(standards.iteh.ai)
*Partie 305: Méthodes d'essai de laboratoire optique pour écrans
de visualisation électroniques*

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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 9241-305 was prepared by Technical Committee ISO/TC 159, *Ergonomics*, Subcommittee SC 4, *Ergonomics of human-system interaction*.

This first edition of ISO 9241-305, together with ISO 9241-302, cancels and replaces ISO 13406-1:1999 and ISO 9241-8:1997. Together with ISO 9241-302, ISO 9241-303 and ISO 9241-307, it also 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;
- methods for the laboratory testing of those requirements are specified in ISO 9241-305.

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 9241-305:2008(E)**Introduction**

This part of ISO 9241 was prepared with the support of the flat panel display measurements (FPDM) task group of VESA (Video Electronics Standards Association, USA). Contributions from its FPDM standard ^[10] are identified in Annex C.

The methods specified in this part of ISO 9241 are provided to assist test laboratories (either suppliers' facilities or test institutes) in deciding whether a specific electronic display conforms to the other relevant parts of ISO 9241, insofar as such a decision can be made in a laboratory setting. This part of ISO 9241 does not specify how to select display adjustment parameters or software for making a test representative of intended actual use. That judgement has to be made by the test laboratory and described in the test report.

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, *Ergonomics*, Subcommittee SC 4, *Ergonomics of human-system interaction*. 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.

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See Annex A for an overview of the entire ISO 9241 series. (standards.iteh.ai)

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Ergonomics of human-system interaction —

Part 305:

Optical laboratory test methods for electronic visual displays

1 Scope

This part of ISO 9241 establishes optical test and expert observation methods for use in predicting the performance of a display vis-à-vis the ergonomics requirements given in ISO 9241-303.

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 9241-303, *Ergonomics of human-system interaction — Part 303: Requirements 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 purposes of this document, the terms and definitions given in ISO 9241-302 apply.

4 General

4.1 Measurements — Basic measurements and derived procedures

The collection of (optical) lab measurements necessary for the compliance evaluations given in this part of ISO 9241 are divided into *basic measurements* — identified by M and a measurement number — and *measurement procedures* — identified by P and a procedure number (and letter in the case of supplementary procedures) — briefly described below. Additional information, including decisions on developing the methods and their use for the definition of compliance procedures, can be found in Annex B.

4.1.1 Basic measurements (or evaluation) — Method M

Basic measurements should describe a fundamental method in as simple a form as possible. Most of the essential measurement parameters (such as screen location, viewing direction, test pattern) are not specified. The specified result is a physical quantity or some other directly measured property, and does not involve any processing of the collected data. These results are usually not directly used in a compliance procedure of the sort specified in ISO 9241-307. Rather, in a compound measurement procedure (see 4.1.2), a basic measurement will be used to achieve sets or collections of data.

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These basic measurements define the types of meters acceptable for use, meter parameters, and any default parameters ("fixed measurement conditions"), and list the parameters that are to be varied by the compound measurement procedure ("configurable measurement conditions"). These latter parameters are often defined by the compliance procedure (see ISO 9241-307).

4.1.2 Compound measurement procedures — Procedure P

Compound measurement procedures are methods that collect and evaluate physical quantities that were measured using a basic method (see 4.1.1). These procedures reference basic measurements, and may specify the specific requirements for the "configurable measurement conditions". They also include any special preparation procedures. The result of a procedure is a collection of basic quantities (e.g. area or angular distribution of luminance), or derived quantities (e.g. luminance contrast, colour difference). In many cases, the measurement procedures could have some of the configurable measurement conditions defined by the compliance procedure (see ISO 9241-307).

4.2 Structure

The measurement methods given in this part of ISO 9241 are structured as follows.

- a) **Objective:** this describes the purpose and quantities measured.
- b) **Applicability:** this describes the type of displays/applications in which the particular measurement is relevant.
- c) **Preparation and set-up:** this describes fixed and configurable measurement conditions, optional accessory equipment, and any special preliminary requirements.
- d) **Procedure:** this describes the measurement or references basic measurement method.
- e) **Analysis:** this describes any analysis of the measured data.
- f) **Reporting:** this describes the form of reporting, including the number of significant digits, where appropriate.
- g) **Comments:** this describes any special concerns or relevant information not contained elsewhere.

4.3 Matrix of measurement conditions methods and procedures

A matrix of measurement conditions, methods and procedures comparing various source documents (including earlier International Standards) can be found in Annex C.

NOTE Many of the procedures in this document have been incorporated, in whole or in part, from ISO 9241-3:1992. See Annex C and the Bibliography for further references.

5 Measurement conditions

5.1 Preparations and procedures

5.1.1 CRT (cathode ray tube) monitor standard preparation

Allow sufficient time for the display luminance to stabilise, with a minimum of 20 min.

5.1.1.1 Technology dependent parameters

Manual degauss in measurement position (for colour displays only). This refers to externally applied degauss (not manual activation of an internal system).

5.1.1.2 Cleaning

Ensure that the display is clean.

5.1.1.3 Alignment

The display screen should be aligned such that a plane tangential to the screen centre is parallel to the axes of the measurement system(s).

Tilt: the active display area shall be aligned such that a horizontal line through the screen centre is parallel to the horizontal axis of the measurement instrument and/or of the measurement instrument travel.

5.1.1.4 Brightness and contrast control settings

Adjust the brightness control until the raster is at cut-off.

Adjustment should be performed under the lighting conditions for the specific compliance route as specified in ISO 9241-307.

After adjusting the display brightness to its default, adjust the centre-screen luminance to 100 cd/m² at 20 % screen loading. If this is not achievable, report the centre-screen luminance.

The controls shall remain at these settings for all measurements.

5.1.1.5 Image size iTeh STANDARD PREVIEW

Use the factory setting or default, if available. Otherwise, adjust to a specified size.

5.1.1.6 Video drive levels SIST EN ISO 9241-305:2009

If the display uses an analogue interface, then the drive level(s) shall be specified for video signal lines.

Most applications drive the standard RGB interface with either 0,47 V or 0,7 V (corresponding to 2/3 video and full video respectively) and the use of one of these values is recommended. The value used should be specified.

5.1.2 LCD (liquid crystal display) monitor standard preparation

The flat panel display unit to be tested shall be physically prepared for testing.

5.1.2.1 Display warm-up

Allow sufficient time for the display luminance to stabilise, with a minimum of 20 min. When indicated by the manufacturer, the display shall be warmed up for the specified time (not to exceed 1 h).

5.1.2.2 Technology dependent parameters

Testing shall be conducted under normal user conditions for power supply. The bias settings (if any) of the display shall be set to those expected under typical use. Any reflection treatment or filter that is in place for the test specified in 6.5 shall be in place for every test.

One adjustment setting shall be used for each complete test sequence. If multiple settings are provided, this implies multiple complete test sequences.

5.1.2.3 Cleaning

Ensure that the display is clean.