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Ergonomics of human-system interaction —

Part 307: Analysis and compliance test methods for electronic visual displays

Ergonomie de l'interaction homme-système —

Partie 307: Méthodes d'essais d'analyse et de conformité 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 9241-307 was prepared by Technical Committee ISO/TC 159, *Ergonomics*, Subcommittee SC 4, *Ergonomics of human-system interaction*.

This first edition of ISO 9241-307, together with ISO 9241-302, ISO 9241-303 and ISO 9241-305, cancels and replaces ISO 9241-7:1998 and ISO 13406-2:2001. Together with ISO 9241-302, ISO 9241-303 and ISO 9241-305, it partially replaces ISO 9241-3:1992. It constitutes a technical revision.

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.

Introduction

This part of ISO 9241 addresses different technologies for a wide range of visual display tasks and environments. Its modular structure will allow it to be readily amended, as ongoing technological development enables new forms of display interaction or new contexts become available.

Using ISO 9241-303 and ISO 9241-305, together with the compliance method specified in this part of ISO 9241, it is possible to obtain a good understanding of how to analyse an environment for which there does not exist a specific analysis and compliance method.

Ergonomics of human-system interaction —

Part 307:
Analysis and compliance test methods for electronic visual displays

1 Scope

This part of ISO 9241 establishes test methods for the analysis of a variety of visual display technologies, tasks and environments. It uses the measurement procedures of ISO 9241-305 and the generic requirements of ISO 9241-303 to define compliance routes suitable for the different technologies and intended context of use.

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 9241-300, *Ergonomics of human-system interaction — Part 300: Introduction to electronic visual display requirements*

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 9241-305, *Ergonomics of human-system interaction — Part 305: Optical laboratory test methods for electronic visual displays*

ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*

3 Terms and definitions

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

4 Guiding principles

Compliance procedures and assessment methods for human-system interaction systems require a structure that addresses the relevant aspects of the context of use in regard to the physical technology for the intended application.

This part of ISO 9241 links the ergonomic requirements given in ISO 9241-303 with the measurement methods specified in ISO 9241-304, ISO 9241-305 and ISO 9241-306.

For this purpose, the compliance routes specified in Clause 5 are separated into the following integral parts of compliance assessment:

— ISO 9241-303 requirements (attributes);

— Pass/Fail criteria based on those requirements and the intended context of use;

— measuring method references;

— assessment and reporting.

Annex C presents general information on the structure of compliance routes.

5 Compliance routes

5.1 CRT displays for indoor use — Display laboratory method

5.1.1 Intended context of use

The attributes of the user, environment, tasks and use of CRT (cathode ray tube) displays are summarized in Table 1. Attributes are derived from analysis of the intended context of use and are an essential prerequisite for the compliance assessment. Therefore, context elements different from those described in this method could influence the Pass/Fail criteria.

The supplier shall specify the intended context of use as well as the value or value range of an attribute. The values specified shall match the intended context of use. The intended context of use is part of the compliance report.

NOTE CRT displays are considered in this compliance route for typical visual display tasks for indoor use.

Table 1 — Intended context of use — CRT displays

Element	Attribute	Quantification
User	Vision	User with normal or corrected to normal vision of any age, 7 years or older (any literate user).
Environment	Design screen illuminance, E_S	At indoor locations (see References [5], [9], [19], [25]): — up to 200 lx, e.g. (mostly) general building areas; — up to 300 lx, e.g. (mostly) general machine work, rough assembly work, (general) museum; — vertical 250 lx + 250 lx × cos(α) in offices, where α is the screen tilt angle; — up to 500 lx, e.g. medium assembly and decorative work, simple inspection, counters, libraries, (mostly) educational areas, control rooms; — up to 750 lx, e.g. fine work, technical drawing; — up to 1 000 lx, e.g. precision work, quality control, inspection, medical examination and treatment; — up to 1 500 lx, e.g. high precision work; — > 1 500 lx, e.g. special workplaces in the medical area; — controlled and/or adjustable illuminance, e.g. projection rooms, film and video studios and radio stations, theatres, concert halls, X-ray departments. The supplier shall specify the maximum design screen illuminance as well as the intended environment. The screen tilt angle is considered to be 75°, if not otherwise specified by the supplier.
	Typical components of the illumination: large aperture source (15°) and small aperture source (1°) illumination	At indoor locations (see References [13], [19]): — $L_{REF,EXT}$ = 500 cd/m^2, $L_{REF,SML}$ = not applicable; — $L_{REF,EXT}$ = 300 cd/m^2, $L_{REF,SML}$ = not applicable; — $L_{REF,EXT}$ = 200 cd/m^2, $L_{REF,SML}$ = 2 000 cd/m^2 (suitable for general office use); — $L_{REF,EXT}$ = 125 cd/m^2, $L_{REF,SML}$ = 200 cd/m^2 (requires a specially controlled luminous environment); where $L_{REF,EXT}$ is the luminance of the large aperture source (15°); $L_{REF,SML}$ is the luminance of the small aperture source (1°). The supplier shall specify the luminance of the large and small aperture source of the illumination.
	Illuminant	For this compliance route, CIE illuminants A, D65, F11 and F12 are considered [1]. The supplier may specify the intended illuminant. NOTE 1 All these illuminants exist at every illuminance level of indoors use, often in combinations. It is assumed that by verifying that the visual display complies in each of the illuminants, the visual display will also comply with any combination of illuminants. NOTE 2 The compliance assessment need only be performed once, with a spectrally broad-band laboratory illumination. The compliance calculations are then made using spectral calculations and repeated for each of the specified illumination levels and illuminants.