

norm

NEN-EN-ISO 9241-410

Ergonomics of human-system interaction
- Part 410: Design criteria for physical
input devices (ISO/DIS 9241-
410:2006,IDT)

Publicatie uitsluitend voor commentaar

mei 2006
ICS 13.180; 35.180

Commentaar voor 2006-08-20

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April 2006

ICS

English Version

**Ergonomics of human-system interaction - Part 410: Design
criteria for physical input devices (ISO/DIS 9241-410:2006)**

Ergonomie de l'interaction homme/système - Partie 410:
Critères de conception pour les dispositifs d'entrée
physiques (ISO/DIS 9241-410:2006)

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Foreword

This document (prEN ISO 9241-410:2006) 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 document is currently submitted to the parallel Enquiry.

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Ergonomics of human-system interaction — Part 410: Design criteria for physical input devices

Ergonomie de l'interaction homme/système —

Partie 410: Critères de conception pour les dispositifs d'entrée physiques

ICS 13.180; 35.180

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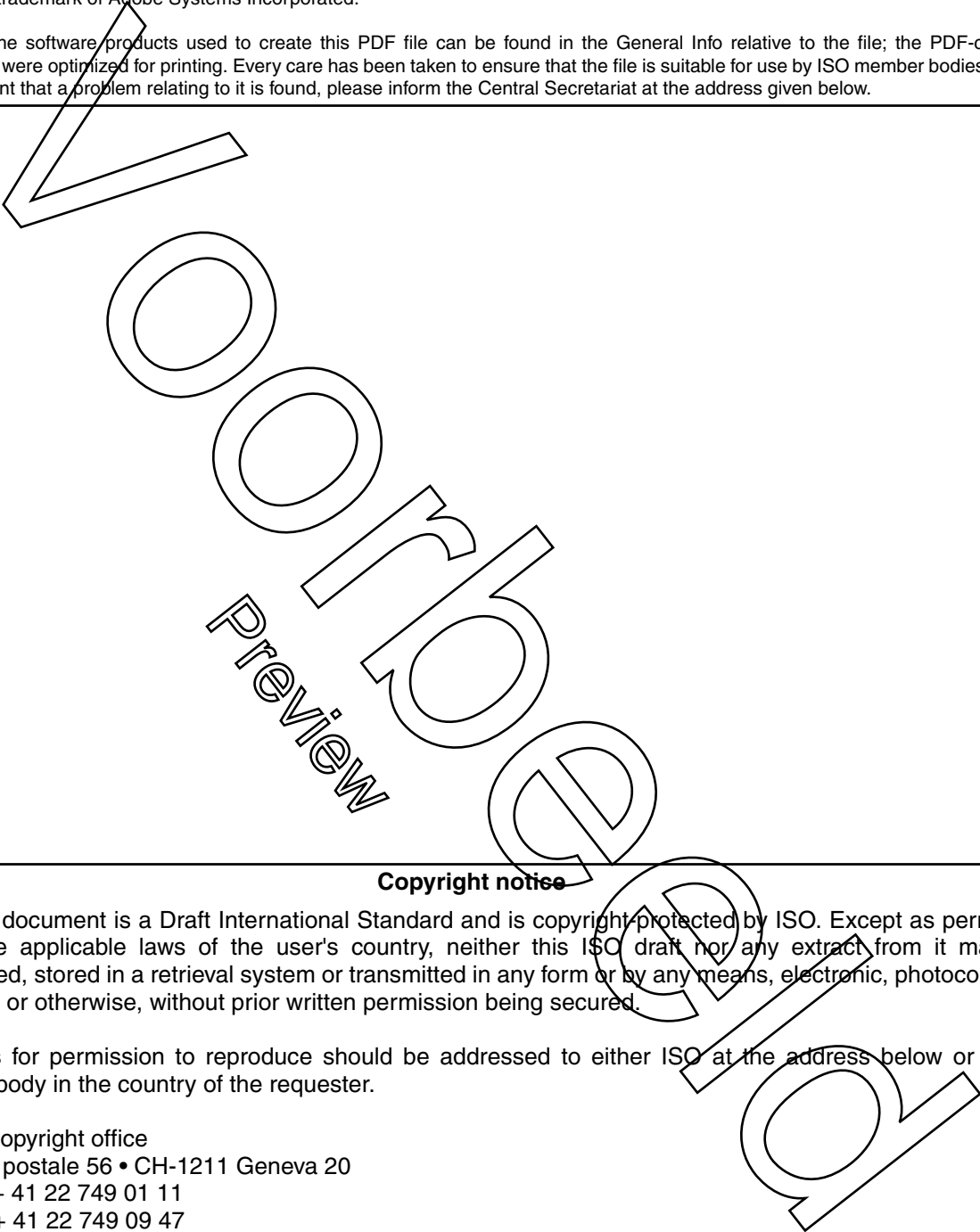
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Foreword

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 9241-410 was prepared by Technical Committee ISO/TC 159, *Ergonomics*, Subcommittee SC 4, and by Technical Committee CEN/TC 122, *Ergonomics* in collaboration.

This first edition of ISO 9241-410 cancels and replaces, together with ISO 9241-400, ISO 9241-411¹⁾, ISO 9241-420¹⁾ and ISO 9241-421¹⁾, the ISO 9241-4:1998 and ISO 9241-9:2000, of which have been technically revised as follows:

- a) former definitions have been moved to ISO 9241-400 and are valid for ISO 9241-410;
- b) all principles have been moved to ISO 9241-400 and unified to meet the scope of the new series;
- c) the principles are applied in ISO 9241-410 to generate provisions for the design of products;
- d) the procedure for application of the standard was added because of the structure of the new series and the nature of the new standard (usability based instead of property based);
- e) for each device, a separate normative annex was formulated for ease of use;
- f) an informative annex was added at the end of this standard to address issues related to accessibility.

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 3: Visual display requirements
- Part 4: Keyboard requirements
- Part 5: Workstation layout and postural requirements
- Part 6: Guidance on the work environment

1) Under preparation.

- Part 7: Requirements for display with reflections
- Part 8: Requirements for displayed colours
- 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 equipment and services
- Part 110: Dialogue principles
- Part 300: Introduction to requirements and measurement techniques for electronic visual displays
- 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 400: Principles for physical input devices, Introduction and requirements
- Part 410: Design criteria for products for physical input devices

The following parts, under the general title Ergonomics of human-system interaction, are under preparation:

- Part 151: Guidance on World Wide Web software user interfaces
- Part 171: Guidance on software accessibility
- Part 411: Laboratory test and evaluation methods for the design of physical input devices
- Part 420: Selection procedures for physical input devices
- Part 421: Workplace test and evaluation methods for physical input devices

Introduction

Input devices are means for users for entering data into interactive systems. Generally speaking, an input device is a sensor that can detect changes in user behaviour (e.g. gestures, moving fingers etc.) and transform it into signals to be interpreted by the interactive system. An „input device“ is regarded as the combination of hardware with the software designed to use it (e.g. a driver).

This standard defines design criteria for products on the basis of relevant properties of physical input devices as outlined in ISO/DIS 9241-400:2005. Assessment methods for laboratory use will be treated in a separate part (ISO 9241-411²⁾) to accelerate future development of test and evaluation methods. Assessment methods for user organizations will be given in ISO 9241-420²⁾.

Most of the principles used in this standard have been defined or outlined in former standards for keyboards and other input devices (ISO 9241-4 and ISO 9241-9). Where necessary the definitions have been reformulated to become applicable to all input devices.

ISO 9241 was originally developed as a seventeen part 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 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 SC4. The revised multipart standard is structured as a series of standards numbered in 'hundreds' for example 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.

2) Under preparation.

Ergonomics of human-system interaction — Part 410: Design criteria for physical input devices

1 Scope

This part of ISO 9241 applies to physical input devices for interactive systems. It provides guidance based on ergonomic factors for the following devices: keyboards, mice, pucks, joysticks, trackballs, trackpads, tablets and overlays, touch sensitive screens, styli, and light pens, voice controlled devices, gesture controlled devices.

This part of ISO 9241 gives guidance on the design of these devices so that the capabilities and limitations of users are considered. The guidance includes generic design criteria for physical input devices as well as specific design criteria for each type of device. Requirements for the design of products are given either as a result of context-free considerations (e.g. "The contrast of key legends shall be greater than ...") or need to be determined in consideration of the specified design criteria for the intended use.

Design criteria for the intended use are generally subdivided in task oriented categories if applicable, e.g. the resolution of a pointing device is given in relation to four levels of Index of Difficulty (I_D) for the Fitts Test. The required category for the resolution can be determined on the basis of the task characteristics, user population and context of use for the intended application. This standard does not specify the appropriate categories for devices since according to the concept of usability a product has no inherent usability. Selecting the category to which a certain property of a device belongs to is subject to the design of a product.

The target users of this part of the standard are manufacturers of physical input devices including product designers and test organizations. The guidance given here is to be used to determine design characteristics of the device for the intended context of use (i.e., user population, task, software or environment etc.).

The data generated by them for the description of the properties of their products can be used for selecting the adequate device for an actual context of use on the basis of the task primitives relevant for the task of the specific user population and for achieving the required level of efficiency and effectiveness for a given system.

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 7000, *Graphical symbols for use on equipment – Index and synopsis*

ISO 9241-5:1998, *Ergonomic requirements for office work with visual display terminals (VDTs) – Part 5: Workstation layout and postural requirements*

ISO/DIS 9241-110:2004, *Ergonomics of human system interaction – Part 110: Dialogue principles*

ISO/DIS 9241-400:2005, *Ergonomics of human-system interaction – Physical input devices – Part 400: Guiding principles, introduction and general design requirements*

ISO/IEC 9995 (all parts), *Information technology – Keyboard layouts for text and office systems*

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