SLOVENSKI PREDSTANDARD

oSIST prEN ISO 9241-400:2005

september 2005

Ergonomija medsebojnega vpliva človek-sistem - Fizične vhodne naprave - 400. del: Načela, predstavitev in splošne zahteve za načrtovanje (ISO/DIS 9241-400:2005)

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

ICS 13.180; 35.180

Referenčna številka
oSIST prEN ISO 9241-400:2005(en)

EUROPEAN STANDARD

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ICS

English version

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

Ergonomie de l'interaction homme/système - Dispositifs d'entrée physiques - Partie 400: Principes directeurs, introduction et exigences générales de conception (ISO/DIS 9241-400:2005)

Ergonomie der Mensch-System-Interaktion - Physikalische Eingabegeräte - Teil 400: Ergonomische Grundlagen: Einleitung und Anforderungen (ISO/DIS 9241-400:2005)

This draft European Standard is submitted to CEN members for parallel enquiry. It has been drawn up by the Technical Committee CEN/TC 122.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Ref. No. prEN ISO 9241-400:2005: E

Foreword

This document (prEN ISO 9241-400:2005) 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.

Endorsement notice

The text of ISO 9241-400:2005 has been approved by CEN as prEN ISO 9241-400:2005 without any modifications.

DRAFT INTERNATIONAL STANDARD ISO/DIS 9241-400

ISO/TC **159**/SC **4** Secretariat: **BSI**

Voting begins on: **2005-06-09**

Voting terminates on: **2005-11-09**

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Ergonomics of human–system interaction — Physical input devices —

Part 400: Guiding principles, introduction and general design requirements

Ergonomie de l'interaction homme/système — Dispositifs d'entrée physiques —

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ISO/CEN PARALLEL ENQUIRY

The CEN Secretary-General has advised the ISO Secretary-General that this ISO/DIS covers a subject of interest to European standardization. **In accordance with the ISO-lead mode of collaboration as defined in the Vienna Agreement, consultation on this ISO/DIS has the same effect for CEN members as would a CEN enquiry on a draft European Standard.** Should this draft be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month FDIS vote in ISO and formal vote in CEN.

In accordance with the provisions of Council Resolution 15/1993 this document is circulated in the English language only.

Conformément aux dispositions de la Résolution du Conseil 15/1993, ce document est distribué en version anglaise seulement.

To expedite distribution, this document is circulated as received from the committee secretariat. ISO Central Secretariat work of editing and text composition will be undertaken at publication stage.

Pour accélérer la distribution, le présent document est distribué tel qu'il est parvenu du secrétariat du comité. Le travail de rédaction et de composition de texte sera effectué au Secrétariat central de l'ISO au stade de publication.

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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 9241-400 was prepared by Technical Committee ISO/TC 159, *Ergonomics*, Subcommittee SC 4, and by Technical Committee CEN/TC 122, *Ergonomics* in collaboration.

ISO 9241-4:1998, *Ergonomic requirements for office work with visual display terminals (VDTs) – Part 4: Keyboard requirements*, and ISO 9241-9:2000*, Ergonomic requirements for office work with visual display terminals (VDTs) – Part 9: Requirements for non-keyboard input devices*, will be consolidated and divided into the standards of the ISO 9241-400 series.

The framework of the standards of the series ISO 9241-400 *Ergonomics of human system interaction — Physical input devices* consists of following parts:

— *Part 400: Ergonomic principles: introduction and requirements*

— *Part 410: Design criteria for products*

— *Part 411: Laboratory assessment methods*[1)]

— *Part 420: Ergonomic selection procedures*

— *Part 421: Workplace assessment methods*[2)]

This structure was selected to address the needs of different user groups of the standard involved in the design and use of physical input devices in separate documents.

ISO 9241 consists of the following parts:

— *Ergonomic requirements for office work with visual display terminals (VDTs) — Part 1: General introduction*

— *Ergonomic requirements for office work with visual display terminals (VDTs) — Part 2: Guidance on task requirements*

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1) To be planned in consideration of ISO 9241-410.

2) To be planned in consideration of ISO 9241-420.

— *Ergonomic requirements for office work with visual display terminals (VDTs) — Part 3: Visual display requirements*

— *Ergonomic requirements for office work with visual display terminals (VDTs) — Part 4: Keyboard requirements*

— *Ergonomic requirements for office work with visual display terminals (VDTs) — Part 5: Workstation layout and postural requirements*

— *Ergonomic requirements for office work with visual display terminals (VDTs) — Part 6: Guidance on the work environment*

— *Ergonomic requirements for office work with visual display terminals (VDTs) — Part 7: Requirements for display with reflections*

— *Ergonomic requirements for office work with visual display terminals (VDTs) — Part 8: Requirements for displayed colours*

— *Ergonomic requirements for office work with visual display terminals (VDTs) — Part 9: Requirements for non-keyboard input devices*

— *Ergonomic requirements for office work with visual display terminals (VDTs) — Part 11: guidance on usability*

— *Ergonomic requirements for office work with visual display terminals (VDTs) — Part 12: Representation of information*

— *Ergonomic requirements for office work with visual display terminals (VDTs) — Part 13: User guidance*

— *Ergonomic requirements for office work with visual display terminals (VDTs) — Part 14: Menu dialogues*

— *Ergonomic requirements for office work with visual display terminals (VDTs) — Part 15: Command dialogues*

— *Ergonomic requirements for office work with visual display terminals (VDTs) — Part 16: Direct-manipulation dialogues*

— *Ergonomic requirements for office work with visual display terminals (VDTs) — Part 17: Form-filling dialogues*

— *Ergonomics of human system interaction — Part 110: Dialogue principles*[3)]

— *Ergonomics of human-system interaction — Ergonomic requirements and measurement techniques for electronic visual displays — Part 300: Introduction*[4)]

— *Ergonomics of human-system interaction — Ergonomic requirements and measurement techniques for electronic visual displays — Part 302: Terminology*[4)]

— *Ergonomics of human-system interaction — Ergonomic requirements and measurement techniques for electronic visual displays — Part 303: Ergonomic requirements*[4)]

— *Ergonomics of human-system interaction — Ergonomic requirements and measurement techniques for electronic visual displays — Part 304: User performance test methods*[4)]

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3) This international Standard is currently at DIS stage.

4) This international Standard is under preparation by ISO/TC 159/SC 4/WG 2 "Visual display requirements".

— *Ergonomics of human-system interaction — Ergonomic requirements and measurement techniques for electronic visual displays — Part 305: Optical laboratory test methods*[5)]

— *Ergonomics of human-system interaction — Ergonomic requirements and measurement techniques for electronic visual displays — Part 306: Field assessment methods*[5)]

— *Ergonomics of human-system interaction — Ergonomic requirements and measurement techniques for electronic visual displays — Part 307: Analysis and compliance test methods*[5)]

— *Ergonomics of human system interaction — Physical input devices — Part 400: Ergonomic principles: introduction and requirements*[6)]

— *Ergonomics of human system interaction — Physical input devices — Part 410: Design criteria for products*[6)]

— *Ergonomics of human system interaction — Physical input devices — Part 411: Laboratory assessment methods*[7)]

— *Ergonomics of human system interaction — Physical input devices — Part 420: Ergonomic selection procedures*[6)]

— *Ergonomics of human system interaction — Physical input devices — Part 421: Workplace assessment methods*[8)]

5) This international Standard is under preparation by ISO/TC 159/SC 4/WG 2 "Visual display requirements".

6) This international Standard is under preparation by ISO/TC 159/SC 4/WG 3 "Controls, workplace and environmental requirements".

7) To be planned in consideration of ISO 9241-410.

8) To be planned in consideration of ISO 9241-420.

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.

Input devices may be utilised for the sole purpose they have been designed for, e.g. a keyboard for entering character codes. Under circumstances they may be used also for some other purposes. However, in this case, generally their efficiency and/or effectiveness is restricted to a certain degree (e.g. keyboard for pointing). An input device can also be used in combination with others if needed to enhance the capabilities of users. Utilising a keyboard and a mouse for drawing straight lines is an example for the latter.

Whether or not an input device or a combination of input devices is acceptable from an ergonomic point of view is to be determined following the rationale of the usability concept. This concept postulates that an entity has no inherent usability, but one in a specified context of use, for specified goals and specified users. A product may be designed for an intended user population and for a restricted context of use, e.g. for children in moderately tempered indoor spaces. Specifying goals for using a device needs additional considerations, however.

Goals users of input devices need to achieve may be defined as high-level tasks such as “word processing” or “multimedia”. A definition in this level, however, may be too abstract to design, test or select a device on the basis of usability. For this reason, this standard specifies “task primitives” such as “pointing”, “dragging” or “code input”.

Design and selection equipment requires a fit to be achieved between a range of task requirements and the needs of users. The concept of fit as defined in ISO 9241-5 concerns the extent to which equipment (visual display units, input devices, etc.) can accommodate individual users’ needs. Good fit is needed for the intended user population including users with special needs, e.g. handicapped persons, if the use of a certain device is not limited to a specified user population and task. Since a variety of input devices exists that may enable a user to achieve the same usability for the same task by creating input through different bodily abilities (e.g. hand, foot, speech or eye control) the required fit can be achieved by utilizing any device that offers the required level of usability. Depending on the character of the special needs, a combination of different devices may be necessary, e.g. a foot and an eye controlled input device instead of a mouse for a user who cannot use the hands for whatever reason.

This standard specifies generic ergonomic principles valid for the design and use of input devices. It also specifies properties relevant for the usability of input devices and typologies in consideration of different aspects (e.g. degrees of freedom, property sensed etc.). Guidance on the application of these principles on product design is given in ISO 9241-410[9)] . The ergonomic guidance for the design of products is given without including aspects related to a particular context (e.g. using keyboards at CAD-workstations). Selecting the intended context of use is part of the design process and not subject to this standard.

ISO 9241-411[10)] specifies methods for determining conformance through observation, performance, and by measuring the physical attributes of the various devices.

NOTE This standard will be supported by following methods (ISO 9241-411):

— Usability test for text and data input using stationary keyboards (currently in ISO 9241-4)

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9) This international Standard is under preparation by ISO/TC 159/SC 4/WG 3 "Controls, workplace and environmental requirements".

10) To be planned in consideration of ISO 9241-410.

— Generic usability test for keyboards for non-touch typing tasks

— Input device selection, usability testing and analysis (currently in ISO 9241-9)

— Testing of efficiency and effectiveness of physical input devices (based on the methods as specified in ISO 9241-9)

— Assessment of comfort (currently in ISO 9241-4 and ISO 9241-9)

— Additional evaluation methods

Guidance on the application of these principles on selecting appropriate products for a given context of use is described in ISO 9241-420[9)] in form of ergonomic selection and combination criteria for using single or multiple input devices at the same workstation.

This standard includes no test and evaluation methods for the use by manufacturers and test houses as well as workplace test methods for user organizations, since such methods may be subject to frequent change. These will be formulated separately for each target group as separate document for the respective document.