SLOVENSKI STANDARD
SIST-TP CEN ISO/TR 22411:2011

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Ergonomski podatki in smernice za uporabo ISO/IEC Vodila 71 za proizvode in storitve, ki upoštevajo potrebe starejših in invalidnih oseb (ISO/TR 22411:2008)

Ergonomics data and guidelines for the application of ISO/IEC Guide 71 to products and services to address the needs of older persons and persons with disabilities (ISO/TR 22411:2008)

Ergonomische Daten und Leitlinien für die Anwendung des ISO/IEC Guide 71 für Produkte und Dienstleistungen zur Berücksichtigung der Belange älterer und behinderter Menschen (ISO/TR 22411:2008)

Données d'ergonomie et lignes directrices pour l'application du Guide ISO/CEI 71 aux produits et services afin de répondre aux besoins des personnes âgées et de celles ayant des incapacités (ISO/TR 22411:2008)

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Ergonomics data and guidelines for the application of ISO/IEC Guide 71 to products and services to address the needs of older persons and persons with disabilities (ISO/TR 22411:2008)

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This Technical Report was approved by CEN on 3 April 2011. It has been drawn up by the Technical Committee CEN/TC 122.

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

Management Centre: Avenue Marnix 17, B-1000 Brussels

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Foreword

The text of ISO/TR 22411:2008 has been prepared by Technical Committee ISO/TC 159 “Ergonomics” of the International Organization for Standardization (ISO) and has been taken over as CEN ISO/TR 22411:2011 by Technical Committee CEN/TC 122 “Ergonomics” the secretariat of which is held by DIN.

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The text of ISO/TR 22411:2008 has been approved by CEN as a CEN ISO/TR 22411:2011 without any modification.

TECHNICAL REPORT

ISO/TR 22411

First edition
2008-09-01

Ergonomics data and guidelines for the application of ISO/IEC Guide 71 to products and services to address the needs of older persons and persons with disabilities

Données d'ergonomie et lignes directrices pour l'application du Guide ISO/CEI 71 aux produits et services afin de répondre aux besoins des personnes âgées et de celles ayant des incapacités

Reference number
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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

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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.

In exceptional circumstances, when a technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example), it may decide by a simple majority vote of its participating members to publish a Technical Report. A Technical Report is entirely informative in nature and does not have to be reviewed until the data it provides are considered to be no longer valid or useful.

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ISO/TR 22411 was prepared by Technical Committee ISO/TC 159, *Ergonomics*.

Introduction

This Technical Report is intended to help standards developers understand the accessible design principles of ISO/IEC Guide 71 and implement them into individual standards by providing design considerations and ergonomic data related to human abilities. While this Technical Report was written primarily for standards developers, it is recognized that much of the information is technical in form and committees are advised to seek technical advice on the interpretation of such data where relevant expertise is not available within the committee. In addition to its application by standards developers, this Technical Report could also be useful to manufacturers, designers, service providers, educators and others.

ISO/IEC Guide 71 stresses the concept that taking care of the needs of older persons and persons with disabilities is important in developing relevant International Standards. The underlying idea is that products, services and environments encountered in all aspects of daily life and intended for the consumer market and the workplace should be designed to be accessible for all people including those with special requirements, such as older persons and persons with disabilities. This idea, called accessible design, has been spreading all over the world. Some regional and national standard bodies have adopted the ISO/IEC Guide 71 as their own standard or guidance.

ISO/IEC Guide 71 has successfully addressed the importance of being aware of the needs of older persons and persons with disabilities. For seven design fields it provides structured tables of factors and human abilities that need to be considered in designing products and services. Its tables are intended to also direct the attention of standards developers to these factors when they draft or revise standards. However, ISO/IEC Guide 71 does not exhaustively describe how to consider those factors or how to find solutions for them. What is required is to establish design methods for implementing the concept of accessible design into individual standards. The methods demand a wider range of knowledge on properties and ergonomic data of human abilities. Without such knowledge, better design for persons with special requirements will not be realized.

Social and economic effects are expected from accessible design. In the social dimension, a greater number of individuals — including older persons and persons with disabilities — will be able to be involved in social activities without any restriction in using products or enjoying services and environments. The economic effect is that products developed using accessible design can be purchased by a wider range of people, including older persons and those with disabilities, who are now a significant proportion of consumers with buying power.

ISO/TC 159, *Ergonomics*, has been involved in this challenging work, firstly with an ad hoc group and then with Working Group WG 2, *Ergonomics for persons with special requirements,* the result of which has been the development of this Technical Report, which also incorporates factors that do not appear in ISO/IEC Guide 71 where considered necessary. Nevertheless, these design considerations and human ability data are arranged in accordance with the structure of ISO/IEC Guide 71, for ease of reference.

This Technical Report widens the scope of users as far as possible and is not limited to the 5th to 95th percentiles of working populations[1]. It constitutes a starting point from which to offer technical information for accessible design. It is not exhaustive and does not fully reflect the present state of knowledge and data for accessible design: while some of the design considerations are well established, others are still under development.

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1) A percentile describes the percentage of people in a population group (e.g. 5 % or 95 %) for which the relation to a certain body size is greater or smaller than the value given in each case. For more details, see ISO 7250.

Ergonomics data and guidelines for the application of ISO/IEC Guide 71 to products and services to address the needs of older persons and persons with disabilities

1 Scope

This Technical Report presents ergonomics data and guidelines for applying ISO/IEC Guide 71 in addressing the needs of older persons and persons with disabilities in standards development.

It provides:

— ergonomics data and knowledge about human abilities — sensory, physical, cognitive abilities — and allergies;

— guidance on the accessible design of products, services and environments.

Each of its design considerations or recommendations is based on ergonomic principles that are necessary for making products, services and environments accessible to older persons and those with disabilities. It is applicable to products, services and environments encountered in all aspects of daily life, as well as in the consumer market and workplace (herein, the term “products and services” is used to cover all these areas). While it does not provide techniques for designing assistive devices, some of its provisions do, however, support interoperability with assistive technology. Conformity assessment of any international, regional or domestic standards is outside its scope.

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/IEC Guide 71:2001, *Guidelines for standards developers to address the needs of older persons and persons with disabilities*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
accessible design
design focused on principles of extending standard design to persons with some type of performance limitation to maximize the number of potential customers who can readily use a product, building or service, which may be achieved by

— designing products, services and environments that are readily usable by most users without any modification,

— making products or services adaptable to different users (adapting user interfaces), and

— having standardized interfaces to be compatible with special products for persons with disabilities.

NOTE 1 Terms such as design for all, barrier-free design, inclusive design and transgenerational design are used similarly but in different contexts.

NOTE 2 Accessible design is a subset of universal design, where products and environments are usable by all persons, to the greatest extent possible, without the need for adaptation or specialized design.

[ISO/IEC Guide 71:2001, 3.2]

3.2
assistive technology
assistive device
piece of equipment, product system, hardware, software or service that is used to increase, maintain or improve functional capabilities of individuals with disabilities

NOTE This can be acquired commercially off-the-shelf, modified or customized. The term includes technical aids for persons with disabilities. Assistive devices do not eliminate impairment but may lessen the difficulty an individual has in carrying out a task or activity in specific environments.

[ISO/IEC Guide 71:2001, 3.3]

3.3
user
person who interacts with the product, service or environment

NOTE Adapted from ISO 9241-11:1998.

[ISO/IEC Guide 71:2001, 3.6]

3.4
alternative format
different presentation which may make products and services accessible by the use of another mobility or sensory ability

[ISO/IEC Guide 71:2001, 3.8]

3.5
impairment
problem in body function or structure such as a significant deviation or loss which can be temporary due, for example, to injury, or permanent, slight or severe, and which can fluctuate over time, in particular, deterioration due to ageing

NOTE 1 Body function can be a physiological or psychological function of a body system; body structure refers to an anatomic part of the body such as organs, limbs and their components, as defined by the World Health Organization (WHO), see Reference [42].

NOTE 2 This definition differs from that in ISO 9999:2002 and, slightly, from the WHO definition, see Reference [43].

[ISO/IEC Guide 71:2001, 3.4]

3.6
accessibility
extent to which products, systems, services, environments or facilities can be used by people from a population with the widest range of capabilities to achieve a specified goal in a specified context of use

NOTE 1 Context of use includes direct use or use supported by assistive technology.

NOTE 2 Term and definition adopted by TC 159 and first published in 2007.

4 General considerations

4.1 Need for technical guidance in implementing ISO/IEC Guide 71 in individual standards

ISO/IEC Guide 71 provides standards developers with guidance on taking into account the needs of older persons and persons with disabilities when developing new standards or revising existing ones. It defines seven design fields and human abilities and summarizes ergonomic factors to be considered in the form of tables. These are followed by possible solutions with some practical examples.

However, ISO/IEC Guide 71 neither fully describes methods for realizing its principles nor shows ways to consider the factors in developing standards, and the examples and possible solutions explained therein are not exhaustive. Standards developers need to interpret the principles of ISO/IEC Guide 71 and find their own technical solutions, applicable to individual standards. To achieve this, ergonomic data on human abilities as a function of age and impairment (grouped by their nature) are necessary. This technical information is currently distributed across multiple standards and documents. Therefore, it would be preferable and helpful for users of ISO/IEC Guide 71 to have common technical guidance that they could consult during their drafting work from time to time. This technical guidance, provided by this Technical Report, is intended to bridge ISO/IEC Guide 71 and other, individual standards, as shown in Figure 1. Furthermore, standards for different products or services can become inconsistent or contradictory if they lack common data sources on accessible design.

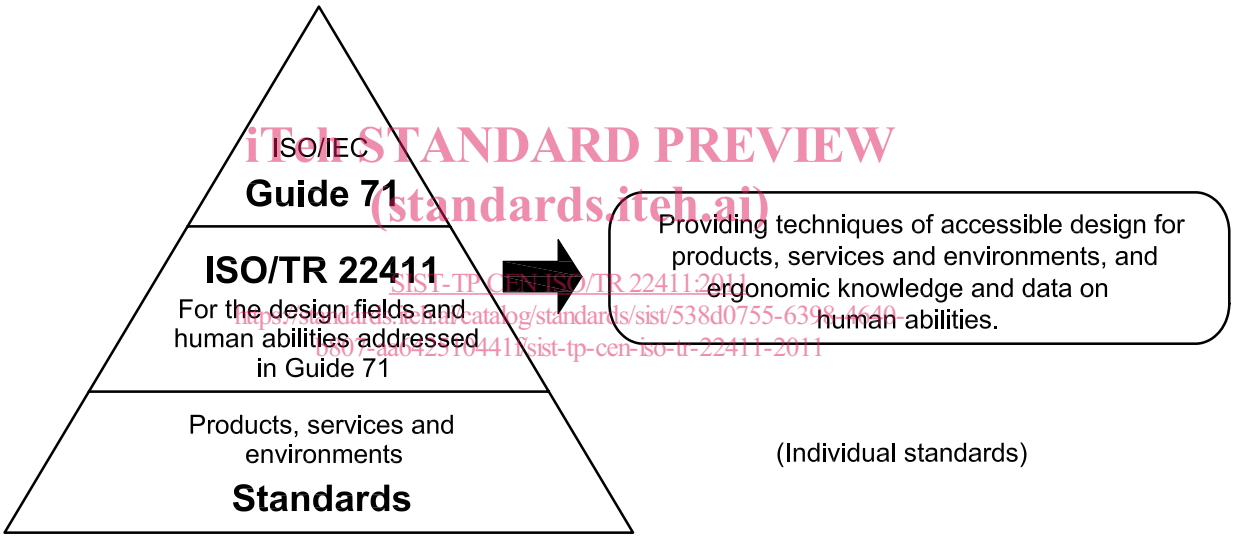

Figure 1 — ISO/TR 22411 in relation to ISO/IEC Guide 71 and individual standards

4.2 Approaches for achieving accessibility

This Technical Report describes two different approaches.

The first is concerned with compensation for impaired abilities with alternative modalities. An example of this is providing visual information for visually impaired persons by means of other sensory modalities such as hearing and/or tactile sense(s). This approach is called the *alternative format* in ISO/IEC Guide 71. Although this method is primarily intended to compensate for serious impairments, it is also helpful for persons when one of their modalities is occupied by another busy task, such as using auditory information for a person who is involved in tasks with visual displays.

The second approach is to design products and services taking into account the extent of impairments, including those related to ageing. Impairments occur in every aspect of sensory, physical, and cognitive abilities. Many can be compensated for by ergonomic design methods provided the impairment is not serious. Giving auditory information at a higher sound level for persons with hearing impairment is an example of this approach, which relies on sets of data derived from knowledge on human abilities.