# TECHNICAL REPORT



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

Teh STISO/CEL71 aux produits et services afin de répondre aux besoins des personnes âgées et de celles ayant des incapacités (standards.iten.al)

ISO/TR 22411:2008 https://standards.iteh.ai/catalog/standards/sist/ec53d06a-a2c7-4832-8c4a-1e1cc6b65241/iso-tr-22411-2008



Reference number ISO/TR 22411:2008(E)

#### PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

# iTeh STANDARD PREVIEW (standards.iteh.ai)

<u>ISO/TR 22411:2008</u> https://standards.iteh.ai/catalog/standards/sist/ec53d06a-a2c7-4832-8c4a-1e1cc6b65241/iso-tr-22411-2008



# COPYRIGHT PROTECTED DOCUMENT

#### © ISO 2008

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

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 Published in Switzerland

# Contents

Forewo	ord	v		
Introductionvi				
1	Scope	1		
2	Normative references	1		
3	Terms and definitions	1		
4	General considerations	3		
4.1	Need for technical guidance in implementing ISO/IEC Guide 71 in individual standards	3		
4.2	Approaches for achieving accessibility	3		
4.5		4		
5	Using this Technical Report	4		
6	Developing standards — Issues to consider during the standards developing process	4		
6.1 6.2	General	4		
0.Z 6 3	Composition of the drafting committee	4		
6.4	Content of the standard CT A ND A DD DD FV/IFVV	5		
6.5	Review process	6		
6.6	Publication of the standard to mole it oh, oi)	6		
7	Resolution of contradictory requirements	6		
0	Eactors to consider with design SurdRui22411:2008	7		
0 8 1	General https://standards.iteh.ai/catalog/standards/sist/ec53d06a-a2c7-4832-8c4a-	7		
8.2	Alternative format 1e1cc6b65241/iso-tr-22411-2008	/		
8.3	I ocation and layout of information and controls and positioning of handles	17		
84	I infining levels and glare	20		
8.5	Colour and contrast	22		
8.6	Size and style of font and symbols in information, warnings and labelling of controls	24		
8.7	Clear language in written or spoken information	27		
8.8	Graphical symbols and illustration	31		
8.9	Loudness and pitch of non-spoken communication	33		
8.10	Slow pace of information presentation	33		
8.11	Distinctive form of product, control or packaging	35		
8.12	Ease of handling	36		
8.13	Expiration date marking	50		
8.14	Contents labelling and warning of allergens	51		
8.15	Surface temperature	52		
8.16		52		
0.17	Logical process	50 64		
0.10	Surface IIIISII	62		
8 20	Acoustics	63		
8 21	Fail-safe	64		
8.22	Ventilation	65		
8.23	Fire safety of materials	65		
0	France data on human abilities and the concentration of impairment	C F		
9 0 1	Ergonomic data on numan admittes and the consequences of impairment	05 65		
9.1 Q.2	Sansary abilities	60		
9.2	Physical abilities	96		
94	Cognitive abilities	25		
<b>.</b>				

# ISO/TR 22411:2008(E)

9.5	Allergies		131
Annex	A (informative)	Principles of accessible design	134
Annex	<b>B</b> (informative)	Data on spectral sensitivity of the eye as a function of age and application	136
Annex	C (informative) groups	Visual acuity data as a function of viewing distance for different age	140
Annex	<b>D</b> (informative)	Span of fundamental colours	144
Annex	E (informative)	Cases of allergy	148
Bibliog	raphy		154

# iTeh STANDARD PREVIEW (standards.iteh.ai)

<u>ISO/TR 22411:2008</u> https://standards.iteh.ai/catalog/standards/sist/ec53d06a-a2c7-4832-8c4a-1e1cc6b65241/iso-tr-22411-2008

# 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.

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

https://standards.iteh.ai/catalog/standards/sist/ec53d06a-a2c7-4832-8c4a-1e1cc6b65241/iso-tr-22411-2008

# 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.

#### 1e1cc6b65241/iso-tr-22411-2008

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<sup>1</sup>). 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.

<sup>1)</sup> 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 idesigning 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.cc6b65241/iso-tr-22411-2008

# 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. STANDARD PREVIEW

[ISO/IEC Guide 71:2001, 3.6]

# ISO/TR 22411:2008

(standards.iteh.ai)

#### 3.4

alternative format https://standards.iteh.ai/catalog/standards/sist/ec53d06a-a2c7-4832-8c4adifferent presentation which may make products6and4services2accessible 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.





# 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.

Some design methods extend over both approaches.

# 4.3 Human abilities data

In addition to design considerations, this Technical Report supplies human ability data relevant to the accessible design of products and services. The data were adopted from scientific journals or publicly available sources such as international or domestic standards and academic books. When ergonomic data were not available, recommended, *de facto*, values have been described.

# 5 Using this Technical Report

This Technical Report follows the same structure as that of ISO/IEC Guide 71, for easy reference.

Clause 6 describes additional issues to consider when standards developers draft or revise a standard.

Clause 7 briefly mentions the present status of knowledge pertaining to the factors adopted in this Technical Report. It also addresses the need to cope with competing requirements in standards which can arise in drafting or revising a standard.

Clause 8 provides design considerations for each factor described in ISO/IEC Guide 71. Each subclause begins with a citation from ISO/IEC Guide 71 (in a box) relevant to the subclause. Then design considerations about the factors follow, where available. The subclauses are linked to the rows in the tables of ISO/IEC Guide 71, Clause 7. When no information is given, none was available at the time of writing: further research is necessary.

Clause 9 provides basic knowledge of and reference data for human abilities. Some are directly related to the design considerations in Clause 8 to supplement them with human ability data, where available. The subclauses are linked to the columns in the tables of ISO/IEC Guide 71, Clause 7.

#### ISO/TR 22411:2008

Annex A introduces some hguiding dprinciples and accessibles designed to 2 supplement the descriptions in ISO/IEC Guide 71. Annexes B to D describe visual ability data which supplement the relevant descriptions in Clause 9. Annex E shows a case report on cases of allergy.

# 6 Developing standards — Issues to consider during the standards developing process

# 6.1 General

ISO/IEC Guide 71:2001, Clause 6, describes a helpful process for ensuring that the needs of older persons and persons with disabilities are included when standards developers draft a new standard or revise an existing standard. Users of this Technical Report are advised to refer to ISO/IEC Guide 71 for an overview. Additional guidance is provided below.

# 6.2 Definition of the standardization project

While the standards project is being defined and the purpose clarified, it is important to identify the end-users of the product or service being standardized. Various standards, such as ISO 20282-1:2006 (for everyday products), provide methods for identifying important user characteristics.

During this process, the following fundamental design recommendations apply. See Annex A.

- Accessible products and services should find acceptance with as many persons as possible.
- Accessible design should not have adverse effects on the functionality of the product or service or on the usability for any user.

- Accessible design should not impact the privacy of the users.
  - EXAMPLE 1 The voice output of cash dispensers is not audible to a third party.
- Products and services should not discriminate against, stigmatize or disadvantage users in any other way.

EXAMPLE 2 A separate entrance for wheelchair users that takes the occupant to a back corridor rather than into the main foyer.

EXAMPLE 3 Voice output or key tones that can be switched off so as not to disadvantage users who are sensitive to noise.

- Products and services should pose no safety risk to their users and should comply with the relevant International Standards under the technical safety laws of the respective countries.
- Products and services should be designed for the intended environment and context of use.

# 6.3 Composition of the drafting committee

The members of the committee drafting the standard should be aware of ageing and disability issues. Data on issues affecting older persons and persons with disabilities should be collected. This Technical Report can serve as a starting point for that information. However, experts in the subject should be consulted or placed on the committee so that appropriate use of the data can be made within the context of the specific standard being developed. The following considerations concerning the committee composition are also relevant.

- Experts in ergonomics or human factors can help to interpret data on human physical, sensory, perceptual and cognitive abilities. They have the skills necessary to apply the data for the intended user groups that will be affected by the standard. CS. Iten.al
- Older persons and persons with disabilities should be included for their first-hand experience. https://standards.iteh.ai/catalog/standards/sist/ec53d06a-a2c7-4832-8c4a-
- Accessibility experts can provide a more general knowledge on accessibility requirements.

# 6.4 Content of the standard

To keep the needs of older persons and persons with disabilities in mind during the writing of the standard, it is beneficial to consult, for example, the principles of universal design (see Annex A)<sup>[44]</sup>.

It is presupposed that a product or service complies with the relevant International Standards under the technical safety laws of the respective countries. However, persons with certain impairments have requirements that differ from, and may run counter to, safety regulations. For example, someone with one hand could wish to disengage a control which requires two-handed operation, for safety reasons, or to de-activate the child-safety mode.

It is also prerequisite that the surroundings (such as the lighting conditions, climate and noise level) promote the accessibility of the product or at least in no way restrict it.

However, there can be situations where, despite following the guidelines and recommendations of this Technical Report and other standards, the product or service is not equally usable by all persons to the greatest extent possible. In those cases, the following measures can be taken to prevent the exclusion of users.

- a) Provide instructions and recommendations specific to users with special requirements to help them adapt the product to their needs.
- b) Ensure compatibility with assistive technology.

EXAMPLE 1 Mobile telephones can be fitted with an interface (i.e. according to the ETSI standards) which enables connection to voice output or a Braille display.

c) Offer supplementary aids.

EXAMPLE 2 Supplementary modules or templates.

- d) If accessibility of the product or service is affected by its installation or configuration, provide information to the user or service provider to help him or her optimize the product or service use during this first assembly.
- e) In certain cases, train users with special requirements to facilitate the use of the product or service.

EXAMPLE 3 Accessible design can promote activities of specialists for adapting aids to the product, for preparing special instructions and for training users.

- f) Provide appropriate information on product properties that allows users to determine whether the product
  - 1) is appropriate for their abilities to the full extent,
  - 2) can be re-equipped and adapted so that they are able to benefit from the expected use, or
  - 3) cannot be used by them.

# 6.5 Review process

During the standardization process, existing ergonomic data and design guidelines can help to guide the product or service standard definition. When possible, this information should be further validated with members of the intended user groups. This step is especially important when considering the needs of older persons and persons with disabilities. This validation includes verifying the physical, sensory and cognitive requirements, including the understanding of how to use the product or service. Various standards, such as ISO 13407:1999, provide processes for human-centred design and evaluation activities.

#### SO/TR 22411:2008

EXAMPLE A new standard is being drafted to define graphical symbols for medicine prescription bottles. Existing data helped identify the possible colours and sizes for the symbols. As a check on the requirements identified for the graphical symbols, they are tested with a representative sample of the target user group (50 % of which is over the age of 65) to determine whether the symbols can be visually identified and whether they are correctly understood.

Just as it is important to review the standard definition of the product or service, it is also worthwhile reviewing the actual standard document itself from the standpoint of (or with) older persons and persons with disabilities.

# 6.6 Publication of the standard

The standard should be available in alternative formats that meet the needs of older persons and persons with disabilities. See 8.2.

EXAMPLE A standard is made available in large print, Braille or in an accessible electronic format, which allows users to adapt the documents to their needs.

# 7 Resolution of contradictory requirements

The accessibility of a product is perceived very differently by individuals depending on their experience, training and/or type or degree of impairment. In order to resolve conflicts between competing requirements that can arise from different types of impairment, these should be weighed against each other using the following criteria.

# a) Number of potential users

The decision about what is readily achievable and what would be acceptable to the user should be oriented towards the alternative which would address as many additional potential users as possible.

# b) Application areas for the product

When designing products and services for the public sector, it is particularly important to take into consideration as many requirements and recommendations as possible since, in contrast to the private sector, the user is usually not in a position to choose from several alternatives the product or service that would be most appropriate for his or her personal abilities. Until fully accessible products and services are available, accessibility can be secured by the installation of several supplementary units (such as machines for wheelchair users and blind persons). These can be conventional products or services or products or services designed for persons with a specific impairment (if necessary with adaptation).

# c) Economic appropriateness

Accessibility should not result in an inappropriately high cost of the product or service. Therefore, the considerations and recommendations of this Technical Report can already be taken into account or followed during the early design stages of new products and services. Economic appropriateness may also be achieved by making only intended product or service functions or only certain products in a product line or services in a service line accessible.

Accessible products need to avoid the inappropriate implementation of recommendations that benefit a few to the disadvantage of many.

EXAMPLE 1 If the loudness of speech or a signal intended to assist a hearing-impaired user is set too high, it may disturb or be audible to others in the vicinity who do not need to hear.

Where a product or service appears to breach accessibility guidelines, compromise solutions are required.

EXAMPLE 2 If there is a demand for miniaturized products, the recommendations in this Technical Report could still be implemented to a reasonable extent when designing the product

EXAMPLE 3 Where it is not possible to make all products in a product line fully accessible, accessible versions for certain impairments could be provided as part of the product range.

https://standards.iteh.ai/catalog/standards/sist/ec53d06a-a2c7-4832-8c4a-

1e1cc6b65241/iso-tr-22411-2008

# 8 Factors to consider with design guidelines

# 8.1 General

This section is structured to present the relevant guidance from ISO/IEC Guide 71 first (in a box), followed by design considerations about the factors presented in Guide 71. The considerations are presented in the same structure as those of Guide 71. For some factors useful information is not currently available, therefore no extra considerations will be given in these cases.

# 8.2 Alternative format

# 8.2.1 General considerations

An alternative format (defined in 3.8) describes a different presentation or representation intended to make products and services accessible through a different modality or sensory ability. By providing all input and all output, i.e. information and functions, in at least one alternative format, for instance visual and tactile, more people, including some with language/literacy problems, may be helped. In terms of function for people with dexterity and strength impairment, alternative packaging solutions may need to be envisaged.

[ISO/IEC Guide 71:2001, 8.2.1]

Providing several alternative formats increases the probability of making a product or service accessible to the greatest number of people. There are two basic approaches (see also ISO 9241-20 and ISO 9241-171).

# a) Presenting information via different senses

In this approach, the same information is provided through more than one sense, such as providing visual and auditory information for the same content.

EXAMPLE 1 Floor designation in an elevator is displayed in both visual and tactile format so that blind persons can identify the floor number by touch. See Figure 2 a).

# b) Presenting information via different aspects of the same sense

In this approach, additional cues are provided, such as showing two different visual implementations of the same content.

EXAMPLE 2 Lines in a graph are displayed in different colours and different patterns so that colour deficient persons can identify the lines by the patterns. Persons without colour deficiency can also identify the lines under low illuminance conditions. See Figure 2 b).



# a) Raised sign for floor designation in elevator and s b) Colour and line pattern in graph

# Figure 2 — Examples of alternative format

https://standards.iteh.ai/catalog/standards/sist/ec53d06a-a2c7-4832-8c4a-1e1cc6b65241/iso-tr-22411-2008

# 8.2.2 Alternatives to visual information

The type and texture of surface finishes can be important in providing tactile feedback which can reinforce instructions and warnings for those with visual impairment. Where the principal form of instruction on a product or in a building is written, alternatives would be voice (instructions "spoken" by a product or service), sound (feedback from clicks, bells and buzzers) or touch (tactile marking or grip).

Wherever feasible, visual information which is presented on electronic products should be available from the product in audio or other sensory stimuli for those with a visual impairment including those who cannot read Braille, as well for those who have difficulty with reading or are unable to read. Printed visual information should be available in alternative formats (electronic audio, large raised letters or Braille, etc.) which are readable by individuals without vision and in large print for those with low vision.

[ISO/IEC Guide 71:2001, 8.2.2]

# 8.2.2.1 Tactile markings

Tactile markings can be used as an alternative to visual information not only for persons with visual impairments but also for persons whose eyes are occupied with other tasks. In principle, tactile markings can be used anywhere visual information is needed. However, some persons with touch impairments (e.g. older persons or persons with diabetes) have difficulty sensing tactile information. Surface temperature is unsuitable for conveying precise information. See 9.2.3.4.

Tactile markings are useful for indicating locations, recognizing surface structure, perceiving shape of goods, and presenting information contained in characters, signs or plans.

The following accessibility considerations are relevant to the use of tactile markings <sup>[46]</sup>.

The shape of the markings is designed to clearly correspond to the function assigned to it.

EXAMPLE 1 Door handles, rocker switches, emergency stop switches.

— The surface is designed so that the function can be recognized.

EXAMPLE 2 Walking areas, handle zones.

— A pyramid shaped cross section is preferred for raised letters and lines. See Figure 3.



# Figure 3 - Raised letter with pyramid shaped cross section

- (standards.iteh.ai) Smoothing sharp edges increases accessibility.
- Dots with a convex shape (in contrast to cylindrical or peak form) and a sufficient amount of raised height above the surface increase accessibility/standards/sist/ec53d06a-a2c7-4832-8c4aelectob65241/iso-tr-22411-2008
- The dimensions like height and size are designed suitably to the spatial and temporal resolution of tactile sense. See 9.2.3.2 and 9.2.3.3.
- If there is sufficient space, Braille and raised characters can be provided additionally.
- Non-abbreviated Braille is preferred due to the international use and support of elderly blind users.

A large variety exists in the recommendations for spacial dimensions of tactile markings and Braille depending on, for example, material used, body dimensions (fingertips, feet, etc.) and environmental conditions. Table 1 summarizes them.