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Guidelines for standardization to address the needs of older persons and people with disabilities

Principes directeurs dans la normalisation pour répondre aux besoins des personnes plus âgées et celles ayant des incapacités

ICS 01.120; 11.180

Please see the administrative notes on page iii

In accordance with the ISO/IEC Directives, Part 1, 1995, clause P.4, this draft Guide is submitted to the ISO and IEC national bodies for approval. Ballot papers should be returned to the ISO Central Secretariat by the date shown above.

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**.

iii

Contents

Page

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft Guides adopted by the responsible Committee or Group are circulated to national bodies for voting. Publication as a Guide requires approval by at least 75 % of the national bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this Guide may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC Guide 71 was prepared by an ad hoc TAG based on the preliminary work undertaken by a COPOLCO (Committee on Consumer Policy) Working Group, at the request of the TMB Secretariat.

0 Introduction

0.1   It is important for the whole of society that all people have access to products, services and environments. The issue of accessibility has become more critical with the increasing percentage of older persons in the population worldwide. While not all older persons have disabilities, the prevalence of disability or limitations is highest amongst this demographic group.

0.2   The needs and abilities of people change as they advance from childhood to old age and the abilities of individuals in any particular age group vary substantially. It is important to recognize that functional and cognitive limitations vary from comparatively minor such as mild hearing loss or use of spectacles only to read, to severe loss such as blindness, deafness or the inability to move part or all of one's body. It should be noted that although some limitations may be minor in nature, in combination, as is the case in ageing, these can pose a significant problem.

0.3   Aside from the humanitarian reasons for making products, services and environments more accessible, there are a number of economic benefits to designing products and services that are accessible to a wider range of individuals, including individuals with limitations. The most obvious economic benefit is the increase in potential customers gained by making the product or services more accessible. The concept of universal design and accessible design also benefits individuals without limitations. Features that make products and services usable for people with disabilities can also make them convenient and easy to use for everyone else. This is particularly helpful when people have temporary difficulties, such as lost glasses, a broken leg or a journey with a pram/stroller or bulky luggage. Addressing the needs of older persons and people with disabilities at the early design stage will help enable producers to design and produce more products and services that more people can use at little or no extra cost.

0.4   Standardization greatly influences the design of products and services that are of interest to the consumer and therefore can play an important role in this field. However, this needs to be considered within the constraint that standards should normally not be design-restrictive. For many years, Standards Bodies at the national and international level have addressed the needs of people with disabilities in the development of specific standards in the area of assistive technology and barrier-free design. However, the needs of older persons and people with disabilities are not being adequately addressed when other relevant standards for everyday products and services are written or revised. Standards Bodies are starting to address ageing and disability issues and will, increasingly, develop and implement policies and programmes in their products and services to include the needs of older persons and people with disabilities.

0.5   Developments in the field of accessibility have resulted in the creation and use of a wide variety of terms and definitions. In addition, the terms used to describe and classify individuals and their health conditions differ throughout the world. For example, some people prefer to use the term "people with disabilities" and others prefer "disabled people". Overall, the terms have evolved to become more precise and descriptive, rather than negative or stigmatizing. However, as no universal practice exists, the terms used in this Guide reflect the language generally used by international agencies such as the United Nations and the World Health Organization.

0.6   This Guide is intended to be part of the overall framework that Standards Bodies can use in their efforts to support the need for more accessible products and services. The ISO/IEC Policy Statement — *Addressing the Needs of Older Persons and People with Disabilities in Standardization* also provides guidance to Standards Bodies and standards-writing committees. Primarily, this Guide is intended for those involved in the preparation and revision of International Standards. However, it also contains information which can be useful for manufacturers, designers, service providers, educators, etc.

0.7   A general guide cannot provide comprehensive information for specific product or service sectors and additional sector-related guides may need to be developed.

Guidelines for standardization to address the needs of older persons and people with disabilities

1 Scope

1.1 This Guide provides guidance to writers of International Standards on products, services and environments as to how to take into account the needs of older persons and people with disabilities. The purpose of this Guide is

a) to raise awareness about how human abilities impact on the usability of products, services and environments,

b) to outline the relationship between the requirements in standards and the accessibility and usability of products and services, and

c) to raise awareness about the benefits of adopting universal and accessible design principles.

1.2 In order to achieve the purposes listed above, this Guide

a) offers descriptions of body functions and examples of common limitations, plus general guidelines about how these can be addressed in the design, use, and provision of products and services,

b) provides a matrix to assist standards-writers in easily identifying the abilities that should be taken into account when developing standards that address the needs of older persons and people with disabilities, and to determine which aspects to consider in developing specific solutions or quantifiable requirements for their particular standard,

c) includes a flowchart for standards-writers to use in developing and using the overall Work Programme of a Technical Committee to ensure that they have fully considered the needs of older persons and people with disabilities, and

d) offers a list of sources that standards-writers can use to investigate more detailed and specific guidance materials.

To reflect the diversity of impacts that products and services can have on accessibility, this Guide may need to be supplemented by sectoral guides.

NOTE   Some people with very severe and complex disabilities may have requirements beyond the level described in this Guide.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this Guide. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this Guide are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO/IEC Guide 37:1995, *Instructions for use of products of consumer interest.*

ISO/IEC Guide 50:—[1]), *Safety aspects — Guidelines for child safety.*

ISO/IEC Guide 51:1999, *Safety aspects — Guidelines for their inclusion in standards.*

World Health Organization, *International Classification of Functioning and Disability*, ICIDH-2 Beta-2 Draft, July 1999.

3   Terms and definitions

NOTE   This clause is designed to provide clarification of some of the terms used in the fields of accessibility and standardization. It does not provide descriptions of body functions and impairments. This information is provided in clause 4. (See also Introduction, 0.5.)

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

3.1
universal design
design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design

3.2
accessible design
design focussed on principles of extending standard design to people with some type of performance limitation to maximize the number of potential customers who can readily use a product or service

NOTE 1   Accessible design is a subset of universal design. Terms such as design for all, barrier-free design, inclusive design, transgenerational design (see 3.7) are used similarly but in different contexts.

NOTE 2   Design for all is more commonly used in Europe. It refers to designing mainstream products and services to be accessible by as broad a range of users as possible. It can be achieved through one of three ways:

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

b)   by making them adaptable to different users (adapting user interfaces); and

c)   by having standardized interfaces to be compatible with special products for people with disabilities.

NOTE 3   Barrier-free design is more commonly used in codes and standards documents, and often in reference to the removal of barriers in buildings, whether physical or sensory.

3.3
activity limitation
difficulty an individual may have in the performance of tasks or activities which may be associated with human ageing, temporary injury, or permanent disability

NOTE   Assistive devices do not eliminate an impairment but may remove limitations on activity in specific environments.

3.4
assistive technology
piece of equipment, product system, hardware, software or service that is used to increase, maintain or improve functional capabilities of individuals with disabilities

NOTE 1   This can be acquired commercially off the shelf, modified or customized.

NOTE 2   This term includes technical aids for people with disabilities.

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1)   To be published. (Revision of Guide 50:1987.)

3.5
ergonomics
branch of science that aims to learn about human abilities and limitations and then applies that knowledge to improve people's interaction with products, systems and environments

NOTE   Ergonomics is known as human factors in North America.

3.6
impairment
problem in body function or structure such as a significant deviation or loss

NOTE 1   Impairment can be temporary or permanent, slight or severe and can fluctuate over time (see clause 4).

NOTE 2   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 in ICIDH-2 of July 1999).

3.7
transgenerational design
creation of products, packages, graphics and environments that can accommodate physical and sensory impairments associated with human ageing and those that limit independence

NOTE   Transgenerational design concerns the creation of products, packages, graphics and environments that can accommodate physical and sensory impairments associated with human ageing and those that limit independence. Such designs are equally attractive to, and easily used by, younger as well as older people.

4   Abilities to consider

4.1   General

4.1.1   This clause and clause 5 provide the tools for identifying and addressing the needs of older persons and people with disabilities in standardization work. This clause includes information on the following:

⎯ a brief definition and description of the impairments associated with each ability heading in the matrix, Tables 1 to 4;

⎯ the practical implications of impairments;

⎯ the effects of ageing on functional abilities;

⎯ general guidance on the features of products and services that assist or hinder older persons and people with disabilities;

⎯ explanation of alternative formats that can make products and services accessible through the use of another physical or sensory ability;

⎯ examples of hazards from which older persons and people with disabilities are more at risk because of their functional limitations.

The matrix provides a table which should be used to determine the aspects to be considered by a Technical Committee in developing solutions or requirements for a particular International Standard.

4.1.2   It is recognised that standards committees will carry out **risk assessments** (as specified in Guide 50 and Guide 51). One aim of this Guide is to raise awareness of the additional risks for older persons and people with disabilities.

4.1.3   **Assistive technology** is available to meet the needs of people with disabilities, and is essential to people with severe and complex disabilities. It is important to ensure compatibility at the interface between assistive technology and mainstream products. Consideration needs to be given to everyday products and their potential to

allow the fitting of more technical aids commonly used by older persons and people with disabilities. Examples range from compatibility between baths and bath aids to the use of more specialized products such as the remote control equipment used by severely disabled people.

4.2 Sensory abilities

4.2.1 Vision

4.2.1.1   Seeing functions relate to sensing the presence of light and sensing the form, size, shape and colour of visual stimuli.

There is a wide range of problems which arise from an impairment in this field. The incidence and severity of visual impairment increase with age. Changes in the physical structure of the eye affect several aspects of visual functions, including:

— loss of visual acuity — nearby and at a distance,

— reduced field of vision,

— perception of colour,

— depth perception, and

— speed of adaptation to changing light levels and sensitivity to light.

Generally, older people need more light to read than they did at 20 years of age.

People with complete visual impairment depend mainly on tactile and acoustic input. Both must be clear — to feel or to hear — unambiguous and of good quality. The majority of people with seeing difficulties have some vision and therefore use visual stimuli. The main factors that make any visual stimuli easier to see, by people with any level of visual impairment, are its size, its colour contrast against its background and its location. An additional practical consideration is the complexity of any image or message — the simpler the image and the clearer its definition, the easier it is to see and read. The use of graphical symbols in addition to text should be considered. In buildings adjustability of lighting levels is desirable. Increasing light must not create glare. Reflecting surfaces should be avoided.

4.2.1.2 For people with low or limited vision, it is vital that any information is given in an **alternative format**. Functions must be accessible using at least one different format (e.g. voice, touch). The type and texture of **surface finishes** can be important in this respect (tactile marking, grip).

4.2.1.3   People who cannot see clearly are at an increased risk from, for example:

— sharp points and edges on products being handled, particularly if they rely on touching them to identify features,

— trip and fall hazards,

— hot surfaces that they might touch inadvertently,

— open fire and flames,

— corrosive substances unless they are labelled with a universally recognised tactile warning,

— in a building, any protrusion with which they might collide or fall over,

— non-identification of warnings which rely solely on colour.

4.2.2 Hearing

4.2.2.1   Hearing functions relate to sensing the presence of sounds and discriminating the location, pitch, loudness and quality of sounds.

4.2.2.2   Hearing loss can range from a mild reduction in hearing to profound deafness. The majority of people with disabling hearing loss are older people. As people age, they tend to lose the ability to detect higher frequency sounds. Many hearing-impaired people use a hearing aid. With or without an aid, the level, frequency and clarity of any sound are important. The impact of hearing loss can be minimized if amplification and adjustment are built into audio equipment. Where possible sound signals should be supported by visual or other sensory stimuli. People who are deaf benefit from lighting that facilitates lip reading and sign language communication. In a building and in some communication equipment, for example telephones, induction loops can be installed which provide sound to suitably adjusted hearing aids. The reduction of resonance and of background noise are helpful.

4.2.2.3   People with hearing loss will need information and functions to be available in at least one **alternative format** (e.g. communication in writing).

People with a hearing loss are at an increased risk if spoken announcements and warnings are not loud or clear enough for them, or if frequencies are too high to detect. Audible warnings, such as fire alarms, should also activate, for example, visual stimuli, such as flashing lights which are well sited and clearly indicated.

4.2.3 Touch

4.2.3.1   Touch functions relate to sensing surfaces and their texture or quality. There will be reliance on other stimuli, particularly visual and auditory. The use of non-toxic materials will be important, and the use of distinct textures.

4.2.3.2   People with limitations as regards touch will need information and functions to be available in at least one **alternative format** (e.g. voice, vision). People with hypersensitive touch will be hurt by stimuli which might cause only discomfort to other people — for example, by sharp points and edges, and very hot/cold surfaces. These stimuli are also more likely to harm people with limited sensitivity, who might remain in contact with them for too long.

4.2.4 Taste/smell

These are separate conditions but have been grouped together in the matrix because of their similar practical implications. Taste functions relate to sensing qualities of bitterness, sweetness, sourness and saltiness. Smell relates to the sensory functions for sensing odours and smells. The ability to detect odours decreases as people get older.

The use of non-toxic and non-allergenic materials is particularly important to people with impaired tasting and smelling ability. Alternative indication of the nature of a product should be provided, rather than total reliance on its smell or taste, for example visual or audible indication. It is particularly important to warn of hazardous substances, such as gases, smoke and chemicals.

4.2.5 Balance

4.2.5.1   The ability to maintain balance and avoid falling is dependent on a sophisticated neural control system, which integrates information about the orientation and motion of the body from a wide range of sensory sources. It uses this information to generate the complex motor responses that keep the body's centre of mass over its base of support. Even when standing still, the upright human body is basically unstable, and any movements of parts of the body are further destabilising. Therefore, continuous control of balance is required during virtually all types of activities. Furthermore, slips, trips or other unexpected disturbances to balance can place extraordinary demands on the balance control system. The central nervous system must mobilise joint rotations and limb movements very rapidly. These reactions must be appropriate — in terms of timing, direction and magnitude to:

— the characteristics of the thing that has disturbed balance,

⎯ the current posture e.g. foot position, ongoing movement,

⎯ the constraints of the surrounding environment e.g. friction of the support surface, unobstructed space to step, availability of handholds to grasp.

4.2.5.2 The incidence of balance-impairments and falls increases with age. Age-related changes in sensory systems, neural processing and musculoskeletal mechanics all potentially impact on the processes by which balance is controlled. Older persons are more vulnerable since a fall more easily results in broken bones and lengthy recovery. Injuries such as hip fractures can be life-threatening, and even minor injuries can become complicated. The fear of falling is another serious consequence of falls.

4.2.5.3 People with poor balance are more likely to fall than others on, for example, stairs, escalators and slippery surfaces: sturdy, graspable and well-placed grips should be provided. There is also a greater risk of falling if handholds are located inappropriately, requiring over-reaching. Non-slip materials or surface treatments should be used on floors, to reduce risk of slipping. Even very small edges and protrusions can lead to trips. Hence, doorway and elevator thresholds should be as low as possible and clearly marked, and factors such as different size steps in a run should be avoided. Cushioned carpeting or footwear can impair balance control and increase risk of tripping. A thin layer of carpet, however, can avoid these problems. It also provides impact absorption that may reduce the risk of fracture injury if a fall occurs. Swinging or sliding doors can knock older persons off balance; appropriate safety mechanisms include dampers to control rate of door rotation and photocells to control automated elevator door-closing systems (rather than force-sensing systems). Gusts of wind around high-rise buildings can disturb the balance of older people. Appropriate safety measures can be implemented, such as the installation of handrails.

4.2.5.4 Age-related attentional deficits and visual impairment can reduce the ability to avoid hazards and to react to loss of balance. Therefore, both hazards (e.g. thresholds, edges of stair treads) and safety features (e.g. handrails) need to be accentuated and clearly visible. Distractions, such as mirrors or wall decorations on stairwells, should be avoided. Adequate lighting is needed to increase visibility of hazards, whereas room lighting, window coverings and floor surfaces should be designed to avoid glare.

4.3 Physical abilities

4.3.1 Dexterity

4.3.1.1 Dexterity relates to activities of hand and arm use, and activities of fine hand use, including coordinated actions of handling objects, picking up, manipulating and releasing them using one hand, fingers and thumbs.

As a result of limitations on this aspect, several problems may arise. Size, mass and force required to operate product controls are important aspects. Controls should not be too small or too large because some individuals with disabilities cannot bring their thumbs and fingers close together and others cannot separate them very far. People with involuntary movement will have problems with tasks that require precision, such as opening packaging and dealing with fastenings. Complex operations, such as push and turn, should be avoided; they require sustained pressure and twisting of the wrist which is painful or impossible for people with limited dexterity.

4.3.1.2 The **surface finish** of a product/material is important for people with limited dexterity. Materials and/or products which are easy to grip/ hold/ manipulate or non-slippery can help significantly.

4.3.1.3 People with limited dexterity may endanger themselves if they inadvertently activate controls. The likelihood of this is reduced if controls are spaced well apart. The inability to withdraw a hand quickly — from a flame for example — is an added danger: fire guards reduce the risk.

4.3.2 Manipulation

4.3.2.1 Manipulation relates to activities of carrying, moving and manipulating objects. It includes actions using legs, feet, arms and hands — reaching, lifting, putting down, pulling, pushing, kicking, grasping, releasing, turning, throwing and catching.

4.3.2.2 Manipulation can be impaired by an inability to use both hands (or feet) when carrying out an activity. It is also affected when joint movement, particularly of the hands or arms, is restricted. Speed of manipulation also declines in old age as a result of slower reaction time and slower movement.

4.3.2.3 Problems related to manipulation can be minimized if attention is paid to the mass of a product, to the location and spacing of control buttons, levers and keys. Large keys/buttons, especially if they have a concave rather than convex surface, assist people with limited manipulation to press the correct ones. Products should accommodate variations in hand and grip size and, if intended for use by one hand, should allow use by either hand. Speed of operation should be flexible to allow variations in individual response time. Individuals with impaired manipulation may inadvertently dislodge a device while in use and risk injury. Product design needs to minimize hazards and consequences of unintended actions.

Speed of operation should be flexible to allow variations in individual response time.

4.3.3 Movement

4.3.3.1 Movement relates to activities of maintaining and changing the body position and transferring oneself from one area to another, using legs, feet, arms and hands.

Movement can be impaired in different ways:

— limited ability to bear mass on the legs,

— reduced walking speed and step length and/or height,

— restricted range of movement in the joints of arms, legs and spine,

— difficulty carrying out a controlled and coordinated movement.

Many of these impairments are experienced in older age.

4.3.3.2 Some people with movement difficulties are assisted by equipment such as wheelchairs or walking aids; others may require personal help. In both cases extra space is needed around them to allow for approach and manoeuvring.

4.3.3.3 **Accessibility** in and around buildings can be improved by avoiding changes in level. Alternatively lifts and ramps should be provided and any stairs should be designed to accommodate older and disabled peoples' abilities and have handrails on both sides. Locations of features, e.g. controls, should be sited to be easily accessed by seated or standing users without bending — to be suitable for both, the positioning needs to be flexible/adjustable. Consider alternative controls such as (hands-free) automatic operation.

The timing of any procedure or operation should allow more time for people who move more slowly. Lifting and carrying items is sometimes a problem, which can be eased if articles are shaped to facilitate easy grasping, and are as light and compact as possible.

4.3.4 Strength

4.3.4.1 Strength relates to the force generated by the contraction of a muscle, or muscle group when carrying out an activity. Strength can be the force exerted with a specific part of the body in a specific action (e.g. pushing) or applied to a specific object (e.g. opening bottle tops). Activities include pulling, lifting, pressing, gripping, pinching and twisting. Strength also depends on stamina, the capacity to sustain force, and this is related to heart and lung function. Limited strength is common to nearly all disabling conditions and is a common reason for being unable to operate equipment.

4.3.4.2 Reduction in muscle power and stamina is common in older age resulting in impairment of strength. Impairment of grip strength can make it difficult or painful to operate an appliance against resistance or torque. Limitations of stamina will cause fatigue when use of a product requires prolonged activity. Control of passive

movement (i.e. when an external force such as gravity causes the motion) can be impaired resulting in difficulties, e.g. lowering a heavy object to the ground or sitting down on a chair.

4.3.4.3   Operating controls should allow comfortable grip, avoid twisting of the wrist, and offer minimal resistance. Textured surfaces, to increase friction, assist the application of force. Provision of alternative controls offering greater leverage or power-assistance should be considered. Consideration should be given to the size and mass of a product as it impacts on the effort to use it e.g. lifting/carrying/moving. Products should not need a long handling time and avoid unnecessary repetition of operation.

Assistive devices can allow some tasks to be performed with lesser amounts of power, force or endurance.

4.3.5 Voice

Voice relates to the sound produced by the vocal organs, usually as speech.

Speech impairments may influence speech in a general way or only certain aspects of it such as articulation, volume, fluency, speed, melody and rhythm.

Social interaction can be encouraged by use of alternative means of communication. This can include

⎯ use of sign language — this is not limited to face-to-face but can be via video-telephony,

⎯ amplification of speech to increase volume output,

⎯ use of keyboard to send text by telephone,

⎯ synthetic speech communicators can be interfaced with a telephone terminal.

It will be important for any equipment which usually employs speech, e.g. intercom, entry phone or social alarm system, to offer alternative means of operation.

Alternative input and output devices can reduce communication problems.

4.4   Cognition and allergies

4.4.1   Cognition/mental functions

Attention needs to be paid to cognition when assessing ability to comprehend.

4.4.2   Intellect

4.4.2.1   Intellect relates to general mental functions required to understand and constructively integrate the various mental functions including all cognitive functions and their development over the life span.

4.4.2.2   Impairments or restrictions lead to perception problems, which include difficulty taking in, attending to, and discriminating sensory information. Difficulties in problem solving include recognising the problem, identifying, choosing and implementing solutions, and evaluating the outcome.

As people get older they have more difficulty concentrating and in continuing to pay attention to a task. Changes in the sleep-wake rhythm mean older people can be less alert and sleepy during the day. Dementia and Alzheimer's disease, which are age-related, lead to progressive intellectual decline, confusion and disorientation.

4.4.2.3   People with cognitive impairment take longer to learn things. They have difficulty using products and devices with complex operating procedures and instructions, and in relating written instructions to what they are doing. Operating elements should follow simple, straightforward and logical sequences. Repeated actions within a task are helpful because the repetition makes learning easier. Individuals with cognitive impairments can use most well-designed controls and displays but take longer to learn to use them and need error protection.

People should not be overloaded with different types and presentations of information. Printed instructions should use short sentences of simple, straightforward and non-technical language and include simple illustrations. Too complex instructions or operations will often deter older people and people with limited intellect from using a product or device.

People are at greater risk of injury from products if they cannot understand instruction: products need to be failsafe. They can also be in dangerous situations, for example, if they cannot quickly understand warning instructions.

4.4.3 Memory

Memory relates to specific mental functions of registering and storing information and retrieving it as needed.

Failing memory affects people's ability to recall and learn things. Short-term or long-term memory can be affected. Short-term memory is more important for product use. Operating appliances, such as washing machines, should not require lengthy and complex actions. People can forget what they should be doing before they complete the task. Simple, short and logical sequences should be required. The repetition of actions within a task helps people to remember what to do. People can be helped considerably by using familiar and consistent controls and symbols in familiar locations. Pauses between actions in a required task are also helpful.

The use of these strategies is particularly important in danger warnings. The design and manufacture of products should also take into account people who forget to turn things off, such as stoves and taps.

4.4.4 Language/literacy

These are the specific mental functions of recognising and using signs, symbols and other components of a language.

Language impairment may cause difficulty in comprehension and/or expression of written and/or spoken language. Translations should be carried out by mother-tongue speakers or profesional translators.

Language/literacy problems vary considerably. However, by providing all information and functions in at least one alternative format, for instance vision or touch, more people, including some with language/literacy problems, may be helped. As a rule, these individuals benefit from use of simple displays, simple use of language, use of patterns, straightforward, obvious sequences and cued sequences. Special attention needs to be given to the fact that these individuals might not understand warning messages.

4.4.5 Allergies

NOTE   Allergy might not in the strictest sense be considered a disability; if the person avoids contact with the substance to which they are hyper-sensitive, their body is not impaired. However, allergies do impose limitations on an individual's activities otherwise. In some circumstances the consequences are serious and may be life-threatening. In view of the implications for products, particularly labelling and warnings, information is provided on this topic.

4.4.5.1 Allergen types

An allergy is an immunological reaction to a substance. Types of allergens that cause allergic reactions include pollens, dust particles, mould spores, food, latex rubber, insect venom or certain medicines.

Many products and devices unnecessarily contain substances which cause allergies. Examples of everyday objects include doorknobs and window frames which contain nickel. Apart from the avoidance of allergenic substances, proper and clear content labelling of all products is of key importance to individuals who suffer allergies.

Allergic reactions can range from mild and annoying to sudden and life-threatening. An example of sudden reaction is swollen throat and acute difficulties in breathing for people allergic to a certain foodstuff.

4.4.5.2   Contact allergies

Contact allergies are caused by allergens that enter the body through the skin. They are particularly contained in powders, lotions, perfumes, household chemicals, some metals or latex, and may be found in many household, building and electrical appliances for end-consumer use. Contact allergy is prevalent among about 15 % of the population and is often life-long.

In general, people with contact allergies require clear content labelling of products and packaging. Specific labels for "allergy-tested" products and packaging as well as clear instructions for safe use/operation are helpful. Materials which are less likely to cause allergies should be used wherever possible (for example, avoiding nickel).

4.4.5.3   Food allergies

A food allergy is a reaction or intolerance to one or more foodstuffs. Six foods cause most food allergies: milk, wheat, soy, egg, peanuts and fish. Food colours, preservatives and additives are also a major cause of allergy. Clear content labelling of food products and packaging is therefore of utmost importance for individuals who suffer from such allergies. Attention should be drawn to any change in composition of existing products.

4.4.5.4   Respiratory allergies

4.4.5.4.1   Allergies to airborne allergens cover those that are inhaled, such as dust, pollen, mites, moulds and animal dander. The most typical respiratory allergy is asthma, which is chronic inflammatory imbalance in the immune system. For the purposes of this Guide, this clause includes chemical sensitivities, i.e. reactions to chemicals in the human environment. These allergy-like reactions may result from exposure to a wide variety of synthetic and natural substances, such as those found in paints, carpeting, building materials, plastics, perfumes, cigarette smoke and plants.

4.4.5.4.2   Key requirements for individuals with respiratory allergies are ventilation systems which filter out pollen and other allergenic substances by default. Information and labelling of products and packaging are other important requirements. Cleaning appliances and methods need to take into account the needs of people with allergies.

5   Matrix

The matrix given in Tables 1 to 4 provides a tool linking aspects and characteristics of a product, service or environment, to human abilities. It is intended to help standards-writers to identify factors that will affect the use of a product, service or environment by people with different levels of ability. It provides an overview of these factors, and more details in a form that may be worked through by standards-writers.

The matrix comprises four tables, each covering a different group of human abilities:

⎯   Table 1: sensory abilities,

⎯   Table 2: physical abilities,

⎯   Table 3: cognitive abilities,

⎯   Table 4: allergies.

The individual abilities (e.g. vision, dexterity, strength) are identified by headings across the first row of each table; they are detailed in clause 4. The left-hand column is repeated in each of the tables. It identifies the various aspects in International Standards regarding products, services and environments. Individual cells highlight factors that should be considered by standards-writers to encourage the development of products, services and environments that will be more accessible to older persons and people with disabilities.

To use the Matrix, it is suggested that standards-writers first work down the first column of Table 1, identifying and marking those aspects relevant to their draft International Standard. The same relevant aspects can be marked on each of the remaining tables. The committee should then work across the abilities for each relevant aspect to identify the factors which should be considered.

NOTE   Generally, the matrix does not provide detailed solutions but summarizes, in tabular form for easy reference, the concerns found in the previous clauses of the Guide.

Table 1 — Matrix for sensory abilities

Aspects to consider	Abilities				
	Vision (4.2.1)	**Hearing** (4.2.2)	**Touch** (4.2.3)	**Taste/smell** (4.2.4)	**Balance** (4.2.5)
Information: — Labelling — Instructions — Marking — Warnings	— Size and style of font — Colour and contrast — Glare — Location — Surface finish — Layout structure — Alternative format — Lighting	— Simple, clear — Adjustable volume and frequency — Alternative format — Location on product	— Distinct form — Lighting — Warning on high or low temperature — Alternative format*r* — Location	— Date-marking (e.g. foods) — Alternative format*r*	— N/A
Packaging: — Opening — Use — Closing — Disposal	— Orientation — Intuitive, especially opening/closing — Alternative format — Colour and contrast — Glare	— N/A	— Texture, ease of handling — Intuitive — Alternative format — Logical structure — Surface finish	— Use of non-toxic, non-allergenic materials	— Size — Shape — Mass — Transportability
Materials	— Colour and contrast — Glare — Ease of handling	— Acoustics	— Temperature — Use of non-toxic, non-allergenic materials — Surface finish — Durability	— Use of non-toxic, non-allergenic materials	— Non-slip surfaces
Installation	— Illumination — Marking of position — Fail-safe — Intuitive	— See section on information	— N/A	— N/A	— Mass — Size

Aspects to consider	Abilities				
	Vision (4.2.1)	**Hearing** (4.2.2)	**Touch** (4.2.3)	**Taste/smell** (4.2.4)	**Balance** (4.2.5)
User interface: — Controls — Feedback	— Intuitive — Layout — Angle of view — Location — Avoidance of interference — Minimizing simultaneous stimuli — Providing information on surroundings — Size — Colour and contrast — Spacing — Identification — Feedback on status — Alternative format — Luminance	— Volume and frequency — Clarity of sound — Alternative format — Short, simple, clear, slow spoken format — Background noise — Duration and repetition — Resonance	— Ease of use — Alternative format — Temperature — Use of vibrations — Minimizing need for dexterity — Shape — Spacing — Surface finish — Location or position	— N/A	— Mass — Dimensions — Stable handling — Ease of handling
Maintenance, storage and disposal	— Alternative format — Orientation — Stability — Product distinction — Lighting	— Alternative format	— Ease of handling	— N/A	— Size — Mass
Built environments (buildings)	— Lighting — Colour and contrast — Marking of hazardous points — Alternative format for public information — Allow guide-dog — If needed, provide personal guide	— Background noise — Alternative format — Allow hearing dog — Adequate lighting for lip-reading or sign language interpretation	— Temperature sensitivity — Alternative format	— Alternative format	— Consistent stair/step size — Remove or reduce hazards such as entry thresholds — Clear marking of hazards and safety measures — Glare; reduce distrations — Positioning and use of handrails — Seating locations — Orientation by guide lanes — Use of communication devices — Non-slip surfaces

Table 2 — Matrix for physical abilities

Aspects to consider	Abilities				
	Dexterity (4.3.1)	**Movement** (4.3.3)	**Manipulation** (4.3.2)	**Strength** (4.3.4)	**Voice** (4.3.5)
Information: — Labelling — Instructions — Marking — Warnings	— Ease of handling — Size — Rigidity — Alternative format — Duration	— Route information — Location — Special needs services — Help-points — Duration	— Location — Duration	— Location — Duration	— N/A
Packaging: — Opening — Use — Closing — Disposal	— Simple operation — Force — Size — Surface finish — Ease of handling — Single-handed use	— Ease of handling — Size — Shape — Mass — Single-handed use	— Size — Shape — Mass — Single-handed use	— Force — Surface finish	— N/A
Materials	— Surface finish	— Mass — Surface finish	— Surface finish	— Mass — Surface finish	— N/A
Installation	— Ease of installation — Surface finish — Manipulation — Mass — Shape — Size	— Ease of installation — Mass — Shape — Size	— Ease of installation — Mass — Size	— Easy of installation — Force — Mass — Size — Shape	— N/A
User interface: — Controls — Displays	— Manipulation — Ease of use — Force — Size — Surface finish — Location — Spacing — Speed — Response time — Alternative format	— Ease of use — Mass — Shape — Size — Alternative format — Location	— Mass — Size — Force — Location	— Mass — Force — Size — Shape — Alternative format — Location	— Alternative format
Maintenance, storage and disposal	— Manipulation — Size — Shape — Surface finish	— Size — Ease of transportation — Mass	— Transportability — Mass — Size — Ease of disassembly	— Force — Mass — Size	
Built environment	— Ease of manipulation	— Accessibility by building design, barrier-free	— Ease of reach	— Force — Height, width and depth	— Alternative format

Table 3 — Matrix for abilities of cognition

Aspects to consider	Abilities	
	Intellect/memory (4.4.2, 4.4.3)	Language/literacy (4.4.4)
Information: — Labelling — Instructions — Marking — Warnings	— Logical, conspicuous — Graphical symbols and illustrations — Reduction of information elements — Specify context — Simple and precise language — Slow pace — Minimize simultaneous stimuli — Colour and contrast — Facilitate repetition	— Simple, clear — Logical — Graphical symbols and Illustrations — Use of a few, logically sequenced elements — Alternative format — Location — Training — Repetition, redundant format — Symplify and separate multi-language formats
Packaging: — Opening — Use — Closing — Disposal	— Use of simple technique — Use of familiar actions/solutions	— Graphical symbols and illustrations
Materials	— Familiar — Automatic shut-off — Failsafe, fault-free	— N/A
Installation	— Simple, easy and logical — Use of graphics — Timing of operations	— Graphical symbols and illustrations
User interface: — Controls — Feedback — Displays	— Simple. logical — Speed — Repetition — Use of graphics/pictograms — Training — Flexible and adjustable — Degree of precision required (fault-tolerant, forgiving design) — Familiar — Length of sequences demanding continuous control/attention — Minimizing simultaneous actions — Grouping — Colours — Conformance to procedures used for similar controls in the person's environment — Location — Logical context and background — Alternative format	— Training — Alternative format — Simple and logical — Use of familiar functions — Flexible and individually adaptable — Use of symbols

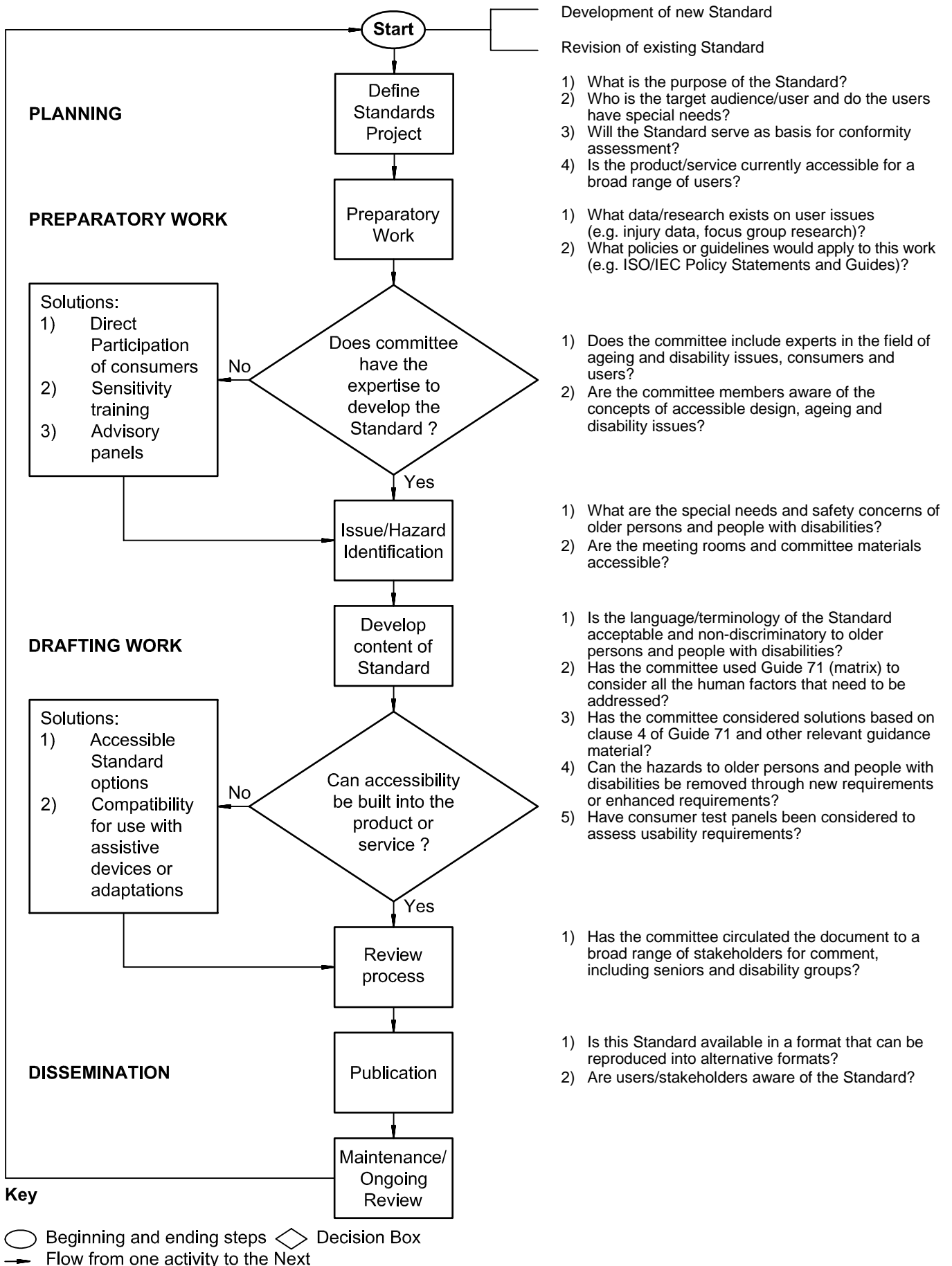| Aspects to consider	Abilities	
	Intellect/memory (4.4.2, 4.4.3)	**Language/literacy** (4.4.4)
Maintenance, storage and disposal	— Simple logical procedures — Easy technique — Minimal multi-tasking	— Logical
Built environment	— Provision of simple and clear information (reference to the information section)	— Provision of simple and clear information

Table 4 — Matrix for allergies

Aspects to consider	Abilities		
	Contact allergies [a] (4.4.5.1)	**Food allergies** (4.4.5.2)	**Respiratory allergies** (4.4.5.3)
Information: — Labelling — Instructions — Marking — Warnings	— Contents labelling and warnings of allergens — "Allergy-tested" labels indicating *positive* result of testing — Instructions for safe use	— Full labelling of contents — Labelling to facilitate choice may make the consumer choice easier	— Contents labelling and warnings of allergens
Packaging: — Opening — Use — Closing — Disposal	— Non-allergenic packaging	— Non-contaminating packaging	— Gas-emitting packaging to be avoided — Cleaning of a product to be easy and not involve allergenic substances
Materials	— Non-allergenic materials (If not possible, warning of the hazard)	— N/A	— No allergenic or irritant substances
Installation	— Non-allergenic materials	— N/A	— Installation to minimize possible air pollution
User interface: — Product — Services — Environment	— Avoid allergenic or corrosive materials or fluids — No dangerous materials (If not possible, warning of the hazard)	— N/A	— N/A
Controls	— Non-allergenic materials	— N/A	— N/A
Feedback — Displays	— Low radiant display (for people sensitive to electro-magnetic radiation)	— N/A	— N/A
Maintenance and storage	— Non-allergenic handles	— N/A	— N/A
Disposal	— Systems avoiding dispersal of allergenic substances	— N/A	— N/A
Hazard (including risk)	— N/A	— Inadequately labelled foodstuff	— N/A
Built environment	— Non-allergenic materials — Declaration of contents of materials	— Declaration of contents	— Ventilation system designed not to cause respiratory allergies or irritation — Smoke-free buildings — No pets allowed in public buildings

[a]   Contact allergy includes allergies and hypersensitiveness.

NOTE   While allergies do not fall into the strict scope of human abilites and impairments, there is growing recognition that the issues of allergies should be addressed in the design of products, services and environments. This matrix is provided to assist users in addressing the issue of allergies in standards work.

6   Preparation of International Standards

In the drafting of International Standards, Technical Committees are encouraged to address the needs of older persons and people with disabilities (see ISO/IEC Policy Statement, Addressing the Needs of Older Persons and People with Disabilities in Standardization Work). This flowchart is designed to provide standards-writers with a systematic approach to addressing ageing and disability issues in the writing and revision of International Standards. It will also assist Technical Committees to evaluate how they are addressing these needs in their Work Programmes.

PLANNING

Development of new Standard

Revision of existing Standard

Start

Define Standards Project

1) What is the purpose of the Standard?
2) Who is the target audience/user and do the users have special needs?
3) Will the Standard serve as basis for conformity assessment?
4) Is the product/service currently accessible for a broad range of users?

PREPARATORY WORK

Preparatory Work

1) What data/research exists on user issues (e.g. injury data, focus group research)?
2) What policies or guidelines would apply to this work (e.g. ISO/IEC Policy Statements and Guides)?

Solutions:
1) Direct Participation of consumers
2) Sensitivity training
3) Advisory panels

Does committee have the expertise to develop the Standard ?   No

1) Does the committee include experts in the field of ageing and disability issues, consumers and users?
2) Are the committee members aware of the concepts of accessible design, ageing and disability issues?

Yes

Issue/Hazard Identification

1) What are the special needs and safety concerns of older persons and people with disabilities?
2) Are the meeting rooms and committee materials accessible?

DRAFTING WORK

Develop content of Standard

1) Is the language/terminology of the Standard acceptable and non-discriminatory to older persons and people with disabilities?
2) Has the committee used Guide 71 (matrix) to consider all the human factors that need to be addressed?
3) Has the committee considered solutions based on clause 4 of Guide 71 and other relevant guidance material?
4) Can the hazards to older persons and people with disabilities be removed through new requirements or enhanced requirements?
5) Have consumer test panels been considered to assess usability requirements?

Solutions:
1) Accessible Standard options
2) Compatibility for use with assistive devices or adaptations

Can accessibility be built into the product or service ?   No

Yes

Review process

1) Has the committee circulated the document to a broad range of stakeholders for comment, including seniors and disability groups?

DISSEMINATION

Publication

1) Is this Standard available in a format that can be reproduced into alternative formats?
2) Are users/stakeholders aware of the Standard?

Maintenance/ Ongoing Review

Key

⬯ Beginning and ending steps   ◇ Decision Box

→ Flow from one activity to the Next

Bibliography

NOTE   The use of the World Wide Web (www), in addition to bibliographical material below, is to be encouraged.

[1]   ISO 7176-5:1986, *Wheelchairs — Part 5: Determination of overall dimensions, mass and turning space*.

[2]   ISO 9999:1998, *Technical aids for disabled persons — Classification*.

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Draft ISO/IEC Guide 71 — *Guidelines for standardization to address the needs of older persons and people with disabilities*

Projet de Guide ISO/CEI 71 — *Principes directeurs dans la normalisation pour répondre aux besoins des personnes plus âgées et celles ayant des incapacités*

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