

English Version

## Accessible systems for living independently - Requirements and recommendations

Systèmes accessibles permettant une vie autonome -  
Exigences et recommandations

Barrierefreie Systeme für ein selbstständiges Leben -  
Anforderungen und Empfehlungen

This European Standard was approved by CEN on 10 February 2025.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
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EUROPÄISCHES KOMITEE FÜR NORMUNG

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## European foreword

This document (EN 17999:2025) has been prepared by Technical Committee CEN/TC 293 “Assistive products and accessibility”, the secretariat of which is held by SIS.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 2025, and conflicting national standards shall be withdrawn at the latest by November 2025.

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

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## 1 Scope

This document specifies requirements, recommendations, and guidance on aspects of accessible systems for living independently (ASLI) in relation to technical solutions, service design, provision, and information. This includes adapting design and functionality of systems, to allow ease of use by any user, regardless of their abilities.

This document does not cover system-to-system communication.

This document is not applicable to household and similar electrical appliances covered by EN IEC 63008 [10].

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

EN 17161:2019, *Design for All — Accessibility following a Design for All approach in products, goods and services — Extending the range of users*

EN 301549:2021, *Accessibility requirements for ICT products and services*

ISO/IEC 20071-5, *Information technology — User interface component accessibility — Part 5: Accessible user interfaces for accessibility settings on information devices*

ISO 20282-1, *Ease of operation of everyday products — Part 1: Design requirements for context of use and user characteristics*

CEN ISO/TR 22411:2021, *Ergonomics data for use in the application of ISO/IEC Guide 71:2014 (ISO/TR 22411:2021)*

## 3 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

### 3.1

#### **accessibility**

extent to which products, systems, services, environments and facilities can be used by people from a population with the widest range of user needs, characteristics and capabilities to achieve identified goals in identified *contexts of use* (3.7)

Note 1 to entry: Context of use includes direct use or use supported by assistive technologies.

Note 2 to entry: The context in which the ASLI is used might affect its overall accessibility. This context could include other products and services with which the ASLI might interact.

[SOURCE: EN ISO 9241-112:2017, 3.15, modified – Added Note 2 to entry from EN 301549:2021, 3.1 definition “Accessibility” Note 1, modified.]

### 3.2

#### **system**

product, service, or any combination of them with which the user interacts

[SOURCE: ISO/IEC Guide 71:2014, 2.1, modified – Built environment is excluded in the definition as it is not included in ASLI.]

### 3.3

#### **accessible systems for living independently**

##### **ASLI**

product or service designed to meet multiple user needs in an interconnected way, in identified *contexts of use* (3.7), that facilitates the performance of activities for users

Note 1 to entry: ASLI also refers to design of accessible service environments. This includes accessing, interacting and using information about ASLI, as well as the ASLI itself.

Note 2 to entry: ASLI are not *assistive technology* (3.4) and not *assistive products* (3.5) but support interoperability with them.

Note 3 to entry: ASLI are accessible if they are detectable, accessible and usable for persons with disabilities in the usual way, without particular difficulties, and, as a rule, without help from others. An ASLI can be used with assistive technologies.

### 3.4

#### **assistive technology**

##### **AT**

equipment, product, system, hardware, software or service that is used to increase, maintain or improve capabilities of individuals

Note 1 to entry: Assistive technology is an umbrella term that is broader than assistive products.

Note 2 to entry: Assistive technology can include assistive services, and professional services needed for assessment, recommendation, and provision.

Note 3 to entry: Where information and communication technologies (ICT) do not support directly connected assistive technology, but which can be operated by a system connected over a network or other remote connection, such a separate system (with any included assistive technology) can also be considered assistive technology.

[SOURCE: EN 17161:2019, 3.2, modified – Note 3 to entry is added and copied from EN 301549:2021, 3.1 definition “Assistive Technologies” note 3.]

### 3.5

#### **assistive product**

##### **AP**

product which optimizes a person’s functioning and reduces disability

Note 1 to entry: Assistive products include devices, instruments, equipment, and software.

Note 2 to entry: Assistive products can be especially produced or generally available items.

[SOURCE: EN ISO 9999:2022, 3.3, modified – Original Note 1 to entry is omitted.]



**3.6****plain language**

communication in which wording, structure and design are so clear that intended readers can easily

- find what they need,
- understand what they find, and
- use that information

[SOURCE: ISO 24495-1:2023, 3.1]

**3.7****context of use**

physical and social environments in which a system is used, including users, tasks, equipment and materials

[SOURCE: ISO/IEC Guide 71:2014, 2.7]

**3.8****interoperability**

ability of two or more systems or components to exchange information and to use the information that has been exchanged

[SOURCE: ISO/TS 27790:2009, 3.39]

**3.9****equal access**

principle to ensure that users can access and interact with a system using different methods and on equal terms

Note 1 to entry: The system can be used by all users with different modalities, according to their individual preference.

**3.10****user interaction****user-system interaction**

exchange of information between a *user* (3.11) and an interactive system via the user interface to complete the intended task

Note 1 to entry: User-system interaction represents a subset of human-system interaction that only focusses on intended users and not other humans who can be affected by the interactive system.

[SOURCE: EN ISO 9241-110:2020, 3.11]

**3.11****user of ASLI**

person who uses and interacts with an *accessible system for living independently* (ASLI) (3.3)

[SOURCE: EN 17161:2019, 3.12, modified – ASLI is added to the term.]

### 3.12

#### **carer**

#### **caregiver**

person who provides care for other persons

Note 1 to entry: A carer can be a healthcare professional or an *informal carer* (3.13).

[SOURCE: EN ISO 13131:2022, 3.2.1]

### 3.13

#### **informal carer**

individuals such as a family member, friend or other significant person who is giving assistance to a person who is dependent on assistance

Note 1 to entry: This term defines carers who are not professional or hired to provide care. Hence it does not include trained care providers affiliated with home care agencies or municipalities.

## 4 Symbols and abbreviations

For the purpose of this document, the following symbols and abbreviations apply.

ICT          Information and Communication Technologies

ASLI        Accessible Systems for Living Independently

## 5 Accessible Systems for Living Independently (ASLI)

### 5.1 Users of ASLI

Systems and technologies that should be made accessible for living independently, include but are not limited to:

- Emergency warning or security systems (alarms etc.);
- Robot technology;
- Smart home technology (remote control for light and curtains etc.);
- Interactive systems;
- Domestic appliances;

EXAMPLES: Multifunctional bathroom storage systems and shower rail.

- Technical solutions.

An ASLI strengthens a user's independence, gives them more control of their surroundings and increases their ability to engage in social activities. It is independent of age and abilities. The term includes i.e.: security technology, comfort related technology, technology for social interaction and for control of surroundings and care technology. Systems for living independently will benefit all.

Accessibility in this document refers to adapting the design and functionality of products and services, and the design and deployment of related information and services to enable living independently.

This will provide ease of use to any user, from a population with the widest range of user needs, characteristics and capabilities to achieve identified goals in identified contexts of use.

Accessibility provides all users with options for accessing, understanding and using ASLI. This enables users to take control over their individual situations and strengthen their independence and participation in activities both at home and in society in general.

Making systems accessible depends on two main areas of interdependent activity:

- a) Providing multiple means of information presentation and user interactions (see Subclause 8.2 in ISO/IEC Guide 71:2014 [17]).

NOTE ISO/IEC Guide 71:2014 [17] is adopted as CEN-CENELEC Guide 6 [16].

- b) Ensuring that the widest range of users and stakeholders are consulted at the earliest opportunity in the design and development of ASLI and related information, as well as deployment of such systems, see Clause 4 in EN 17161:2019.

## 5.2 Identification of users' characteristics and capabilities

Solutions that support accessibility shall be based on the understanding and adaption to relevant specific user abilities and characteristics in accordance with CEN ISO/TR 22411. See EN ISO 9241-20 [2] for more guidance.

NOTE 1 ISO/IEC Guide 71:2014 [17] (adopted as CEN-CENELEC Guide 6 [16]) can be used to help identify and document users' characteristics and abilities. These can then be used to identify the relevant 'Functional Performance Statements' of EN 301549:2021, Clause 4, see Annex A of this document.

NOTE 2 For more information about the relation between ergonomics and accessibility, see also EN ISO 9241-11 [1] and EN ISO 26800 [9].

## 5.3 Accessibility process requirements

ASLI shall ensure accessibility in accordance with EN 17161. Thus, it shall be demonstrated that:

- a) There is an internal organization-wide view of accessibility stated in policies and strategies, which address accessibility in the design, procurement, manufacture, supply or deployment of the products and services that make up ASLI;
- b) Diverse user characteristics, capabilities, preferences, accessibility needs and contexts of use have been fundamental in designing or providing systems, in such a way that the design, manufacture, supply or deployment of ASLI:
  - provide multiple means of user interaction;
  - provide information in accessible formats;
  - ensure the ASLI is based on recorded results from tests and evaluations of products and services by potential users and stakeholders.
- c) Design shall follow the applicable requirements specified in EN 301549 and ISO 20282-1.

NOTE Additional information can be found in Subclause 8.2 in ISO/IEC Guide 71:2014 [17] and CEN ISO/TR 22411.

It should be demonstrated that the ASLI includes functions supporting accessibility or that it is interoperable with assistive technology.

For technological systems to be accessible, consideration shall be made of interaction modes of ASLI. The following shall be ensured:



- d) mainstream products are adaptable to ASLI considerations or requirements;
- e) other technology components necessary for the use of ASLI are added;
- f) connected and integrated solutions for operation of the ASLI are available;
- g) communication and interoperability with the user's personal assistive devices is provided.

ASLI shall include accessible service environments for alleviating the access to and use of information about ASLI, in conjunction with the service provider.

The following shall be undertaken, as relevant:

- h) ensure that ASLI is secure for use when it has an interface with other systems;
- i) ensure that ASLI takes into account users' ownership of, and familiarity with existing smart information and communication devices. This can include adapting similar interaction modes in the ASLI;

EXAMPLE: Examples for smart technologies are smartphones, smart TVs, tablets, smart homes and Internet of Things. Examples of interaction modalities are voice recognition or gestures as input-to-system, or output as a virtual or augmented reality display.

- j) offer the possibility for human interaction with service providers if information is not available or accessible;
- k) ensure continuous training, support and evaluation of service and customer support providers. This includes use of means and modes to communicate in an accessible way with users and help them achieve necessary service-oriented tasks (for instance installation, updates, maintenance and financial concerns);
- l) ensure that service providers, who make site visits to users (for instance for installing hardware, checking installations, etc.), are trained in the different modes of operation;
- m) ensure evaluation mechanisms for both users' feedback and service provider performance;
- n) facilitate communication between service providers and second line service staff, or manufacturer, enabling the exchange of experiences to build a common accessibility awareness. Based on knowledge gained, the service provider should introduce new or improved services.

## **6 Multiple means of information presentation and user interaction**

### **6.1 Requirements for accessible human-ASLI interaction**

Accessible communication is the basis for successful human-ASLI interaction.

ASLI shall provide multiple means of accessible information. This means presenting information via more than one sensory modality (e.g. visual, auditory or haptic senses) or providing information in more than one form (e.g. an online video tutorial, digital or a printed manual or use of pictograms).

Electronic formats shall comply to the accessibility requirements in Clause 10 in EN 301549:2021.

EXAMPLE Alternate Formats can include:

— Braille: A tactile system that represents letters, numbers, punctuation and other symbols by dot combinations.

- Closed Captioning: Captioning translates the audio portion of a video presentation by way of subtitles, or captions, which usually appear on the bottom of the screen. Captioning can be closed or open. Closed captions can only be seen on a television screen that is equipped with a device called a closed caption decoder. Open captions are “burned on” a video and appear whenever the video is shown. Captioning makes television programs, films and other visual media with sound accessible to people who are deaf or hard of hearing.
- Described Video: With described video (also known as descriptive audio) all relevant action scenes and on-screen text (such as credits) in video, TV programming, Web-based multi-media or movies is described and read by a narrator.
- Digital Audio: Can be in MP3 format, with human voice, no navigational features or DAISY which stands for Digital Accessible Information System. The DAISY/NISO Standard is the Digital Talking Book (DTB) specification for accessible digital textbooks. This format includes ability to find and go to specific chapters and pages.
- ePub: ePub is an electronic book format that has become the industry standard, allowing eBooks that use this format to be read on a wide variety of e-Readers.
- E-Text: Electronic Text is a general term for any document that is read in digital form, but especially a document that is mainly text. The most common four file types of electronic formats used in the education setting are: Microsoft Word, Portable Document Format (PDF), PowerPoint, and Excel Spreadsheets.
- Large Print: Print enlargement on paper, minimum 18 point font size.

Common technical interfaces, for example smart home communication protocols, can facilitate connection to ASLI by providing an interface for a third-party provider of controls like large panel displays, switches or alternative mobile apps.

If the ASLI has open functionality, it shall support interoperability with assistive technologies according to Clause 11 in EN 301549:2021. If the ASLI has closed functionality (meaning that no use of assistive technology is possible) it shall comply to Clause 5 and applicable subclauses on closed functionality in Clause 11 in EN 301549:2021.

The ASLI shall be configurable to the user's needs and preferences. For activating accessibility modes, it shall comply with ISO/IEC 20071-5.

ASLI should consider the accessibility requirements provided in EN IEC 63008 [10]. Detailed guidance on the accessibility of touch and gesture operation can also be found in Annex B in EN IEC 63008:2020 [10].

ASLI can support human-to-human communication by integrating two or multiple point audio or video communication (see EN 301549:2021 Clauses 6 and 7) or other social media.

ASLI should consider the use of relay services for human-to-human communication (see EN 301549:2021 Clause 13).

Equal access to interaction shall be ensured by multiple modalities of communication.

Having multiple modalities of interaction available in an ASLI contributes to a robust system. It also allows accessibility for users who require specific interaction modes. Multiple modalities will also provide backup in case some modes of communication fail.



## 6.2 Human-ASLI interaction

ASLI shall provide more than one means of interaction modality to ensure equal access.

User to ASLI communication and interaction includes facilities for user input e.g. keyboard, pointing devices and touchscreen technology. A touch panel may also be operated by a stylus, remotely by voice commands, or with an accessible alternative application on a smart mobile device. Assistive technologies like eye-gaze control, screen readers, and screen magnifiers are also considered as input devices.

The following requirements and recommendation apply:

- a) Multiple alternative input possibilities shall be ensured;
- b) The use of assistive technology for interaction shall be enabled. For example: buttons and switches or the possibility for voice control;
- c) Systems offering speech recognition technology, should support the user's chosen vernacular.

## 6.3 ASLI to user interaction

### 6.3.1 Introduction

ASLI to user interaction encompasses the accessibility of various types of user interface outputs.

Assistive technologies like screen readers, and screen magnifiers are also considered as output devices.

The following requirements and recommendation apply:

- a) Interaction technology shall have means to provide informative feedback (visual, auditory and haptic) on user actions;
- b) Interaction technology shall have multiformat information presented in verbal and non-verbal outputs;
- c) Systems offering text-to-speech functionality, should support the user's chosen vernacular.

### 6.3.2 Visual information

Printed or on-screen information shall conform to EN 301549:2021 Clauses 9, 10, and 11. See Subclause 7.2.2.3 in ISO/IEC Guide 71:2014 [17] and Subclause 6.2 in CEN ISO/TR 22411:2021 for further guidance. This covers font type, font size, spacing, layout, colour contrast or luminance contrast etc.

### 6.3.3 Audio information

Audio messages and spoken text shall comply with the requirements given in EN 301549:2021 Subclause 5.1.3.

Sound parameters should be adjustable by users.

NOTE Sound parameters cover volume, tone (loudness, bass, and treble), speed and pitch and balance (of stereo channels).

The user shall be able to start, stop, pause, resume, cancel or repeat the audio stream. The function of combined stereo joins the audio stream of both channels which supports persons with hearing capabilities on one ear only. Noise cancellation can be used to suppress noise from the surrounding.

Sound processors can provide clear speech output by automatically reducing background noise. So called equalizers can be used to adjust the volume in 5 to 20 subfrequency bands of the audio stream to meet the needs of persons with reduced hearing capabilities. The talking speed of text-to-speech systems or



the playingspeed of the audio players should be adjustable in a range of –30 % to +50 % without any effect on the tone.

Modulated frequency sound should be provided for auditory signals, e.g. confirmation beep, error, warning etc.

The signal to noise ratio of audio output from ASLI should be high enough for users to perceive the information in the intended context of use. Systems can automatically provide signal to noise ratio adaption.

#### 6.3.4 Haptics

Tactile dots, bars and arrows should be used to locate, identify and distinguish operable components like buttons, lids and doors of ASLI. Braille labels should be provided for operable components. If there is enough space, raised letters should be provided for those not familiar with Braille. A refreshable Braille display may be connected to ASLI by a screen reader.

Pictograms and complex tactile symbols should not be used as part of ASLI.

Considerations for input components:

- a) Buttons shall be in sizes and shapes to be easily noticeable;
- b) Buttons should have haptic feedback;
- c) Touch buttons shall be easy to sense and touch and be identifiable without accidental activation or changing the status (see Annex A in EN IEC 63008:2020 [10]);
- d) If one cannot feel the state of the input control, there should be acoustic and visual feedback for each user input action or change in state.

NOTE 1 See design considerations in Subclause 7.2.4.3 in ISO/IEC Guide 71:2014 [17], Subclause 6.4 in CEN ISO/TR 22411:2021 and Subclause 4.1 in EN IEC 63008:2020 [10].

NOTE 2 Information about tactile guide maps, tactile dots and bars and tactile symbols and characters can be found in ISO 19028 [12], EN ISO 24503 [8] and ISO 24508 [14], respectively.

NOTE 3 Information on tactile/haptic formats can be found in EN ISO 9241-971 [5].

#### 6.3.5 Plain language

Plain language strives to ensure the reader finds and understands information as quickly, easily, and completely as possible. Written information provided in the context of ASLI should follow the plain language governing principles and guidelines in ISO 24495-1 [15].

Plain language:

- provides a useful structure including headings to help navigating the text;
- provides clear and concise sentences;
- explains abbreviations and acronyms used (first appearance only);
- uses short, simple words;
- uses short sentences and paragraphs;
- omits unnecessary words;

- uses the same term consistently for a specific thought or object;
- avoids legal, foreign and technical jargon;
- covers only one topic in each paragraph;
- uses examples;
- uses speakable text, avoids using “\*”, “/”, “&”, “”;;
- avoids complex wording or complex grammar;
- uses lists, where appropriate;
- uses tables to make complex material easier to understand, where appropriate.

#### **6.4 Accessibility requirements for user information**

User information, instructions and manuals shall be provided in accessible formats and in alternate formats upon request for an ASLI, see 6.1.

User instructions and manuals for ASLI shall:

- a) use plain language, see 6.3.5;
- b) use illustrative graphical symbols that improve comprehension. Illustrative elements do not usually need alternative text;
- c) give relevant information in logical sequence;
- d) provide easy methods to get further clarification;
- e) provide a quick reference guide with images, illustrations or photographs including a step-by-step approach for the user;
- f) provide images, illustrations and photographs accompanied with explanatory text.

For the visual design of information see 6.3.2.

Digital documents shall be available for converting into accessible presentation of information. That includes printing, use of braille, auditory formats, in order to satisfy individual preferences.

NOTE EN IEC/IEEE 82079-1:2020[11] provides principles and general requirements on instructions for use of products by consumers.

#### **6.5 Accessibility requirements for user support**

- a) User support should be available in multiple modalities of communication (e.g. Telecommunication, chat lines, email and others).
- b) Training and support shall be available.
- c) Training of the service staff shall be provided for optimal communication with diverse users and to help them achieve necessary service-oriented tasks.
- d) Users shall have the possibility to choose bilateral communication as an alternative to just receiving information.

## **Annex A**

### **(informative)**

### **Functional Performance Statements**

The statements below are intended to describe the functional performance of information and communication technologies (ICT) enabling people to locate, identify, and operate ICT functions, and to access the information provided, regardless of physical, cognitive or sensory abilities.

Functional performance statements are explained in EN 301549 and include:

- Usage without vision,
- Usage with limited vision,
- Usage without perception of colour,
- Usage without hearing,
- Usage with limited hearing,
- Usage with no or limited vocal capability,
- Usage with limited manipulation or strength,
- Usage with limited reach,
- Minimize photosensitive seizure triggers,
- Usage with limited cognition, language or learning,
- Privacy.



## Annex B (informative)

### Understanding the wide range of users

Table B.1 provides guidance to whether accessibility should be considered or implemented through presenting the wide range of users and their potential and user needs.

NOTE Table B.1 is adapted from ISO accessibility toolkit document “Understanding the needs of the widest range of users” [18].

**Table B.1 — Understanding the wide range of users**

<b>Factor</b>	<b>Constraining situation</b>	<b>Constraining environment</b>	<b>Temporary or permanent impairment</b>	<b>Examples of design considerations that might help to address the issue</b>
Using a product or service <b>without vision</b>	<ul style="list-style-type: none"> <li>– Controls that are designed to be used by touch alone (e.g. video game controls, buttons on a steering wheel)</li> </ul>	<ul style="list-style-type: none"> <li>– At night time or in complete darkness</li> </ul>	<ul style="list-style-type: none"> <li>– People who are blind</li> <li>– People who have forgotten their glasses</li> <li>– People who must focus their vision elsewhere</li> </ul>	Use of haptic feedback, sound or speech, and/or provide interoperability with assistive technologies such as screen readers.
Using a product or service <b>with restricted vision</b>	<ul style="list-style-type: none"> <li>– While wearing a helmet or goggles</li> <li>– Using a small display</li> <li>– When controls are in an awkward position (e.g. at the back of a television)</li> </ul>	<ul style="list-style-type: none"> <li>– In low lighting</li> <li>– On a very sunny day (glare)</li> <li>– In a smoky environment</li> </ul>	<ul style="list-style-type: none"> <li>– Partially sighted people</li> <li>– People who have forgotten their glasses</li> <li>– People who mostly need to focus their vision elsewhere</li> </ul>	Use of haptic feedback, sound or speech, and/or provide interoperability with assistive technologies such as screen readers.
Using a product service <b>without hearing or without audio</b>	<ul style="list-style-type: none"> <li>– In forced silence (such as a library or in a meeting)</li> <li>– When wearing earplugs or protective headgear</li> </ul>	<ul style="list-style-type: none"> <li>– In a very noisy environment (e.g. loud music, loud traffic, noisy machinery)</li> </ul>	<ul style="list-style-type: none"> <li>– People who are deaf</li> <li>– People who are unable to use their hearing aid</li> </ul>	Use of visual or haptic feedback and/or provide interoperability for assistive technologies for deaf people such as speech to text or speech to sign language.
Using a product or service <b>with restricted hearing</b>	<ul style="list-style-type: none"> <li>– When ears are busy (e.g. listening to people talking while using a product or service)</li> </ul>	<ul style="list-style-type: none"> <li>– A room with poor acoustics</li> <li>– In a noisy environment</li> </ul>	<ul style="list-style-type: none"> <li>– People who are hearing impaired</li> <li>– People with tinnitus</li> </ul>	Use of visual or haptic feedback and/or provide for adjustable volume levels.

Factor	Constraining situation	Constraining environment	Temporary or permanent impairment	Examples of design considerations that might help to address the issue
	<ul style="list-style-type: none"> <li>While wearing a helmet</li> </ul>		<ul style="list-style-type: none"> <li>People who are unable to use their hearing aid</li> </ul>	
Using a product or service <b>with restricted manual dexterity</b>	<ul style="list-style-type: none"> <li>Wearing gloves</li> <li>Using controls while holding onto the product (e.g. buttons on a hand console, controls on a musical instrument, controls on a handlebar)</li> </ul>	<ul style="list-style-type: none"> <li>In very cold weather or in an artificial cold environment</li> <li>If hands or fingers are slippery due to moisture or chemicals.</li> </ul>	<ul style="list-style-type: none"> <li>People with limited or no manual dexterity (e.g. missing fingers, hands or arms, arthritis)</li> <li>People with loss of sensation in fingers</li> <li>People with injured fingers, hands or arms</li> </ul>	Enable easy manipulation, allow for speech input and/or provide for interoperability with assistive technologies such as special keyboards, joysticks, eye tracking devices.
Using a product or service <b>with restricted mobility</b>	<ul style="list-style-type: none"> <li>In a tight space (e.g. accessing controls in the boot of a car)</li> <li>A very small or very tall person using a product or service at an awkward height</li> <li>While pregnant</li> <li>While holding a child</li> <li>Awkwardly positioned controls (e.g. buttons at the back of a monitor; a power socket behind furniture)</li> <li>While driving a car or cycling a bicycle</li> <li>While pulling luggage</li> </ul>	<ul style="list-style-type: none"> <li>In very cold weather or in an artificial cold environment</li> </ul>	<ul style="list-style-type: none"> <li>People with a physical impairment which limits their ability to move or control their body (e.g. musculoskeletal disorders, paralysis, severe arthritis, broken limbs or any other illness or injury that limits strength, stamina or movement)</li> <li>Wheelchair users using a product or service in a seated position</li> <li>People using a walking aid</li> </ul>	<p>All elements of the product or service should be easy to operate. Consider force, positioning and space.</p> <p>Provide opportunity to operate with either left or right arm. Consider the range of body sizes, heights, and postures.</p> <p>Consider adjustable features or series of parallel designs that cover the whole spectrum of anthropometric variance.</p> <p>Consider interoperability with assistive products and technologies.</p>
Using a product or service <b>with restricted balance</b>	<ul style="list-style-type: none"> <li>While driving or cycling</li> <li>While travelling in a moving vehicle</li> <li>While operating heavy machinery</li> <li>While pregnant</li> </ul>	<ul style="list-style-type: none"> <li>In windy weather</li> <li>In wet or cold weather where surfaces are slippery</li> </ul>	<ul style="list-style-type: none"> <li>People with impaired balance (e.g. conditions that affect the middle ear, musculoskeletal disorders)</li> </ul>	Elements and parts of buildings such as windows, doors, bathroom-elements, lifts/elevators, lobbies, intercom systems, etc., should be accessible and easy to handle.

Factor	Constraining situation	Constraining environment	Temporary or permanent impairment	Examples of design considerations that might help to address the issue
	<ul style="list-style-type: none"> <li>– While carrying a child</li> <li>– While holding something heavy or awkwardly shaped</li> </ul>		<ul style="list-style-type: none"> <li>– People experiencing vertigo</li> </ul>	<p>This concerns the application of force, positioning, logical structure and having enough space to move around when using assistive devices.</p> <p>Surfaces should be slip-resistant.</p>
Using a product or service <b>under high cognitive stress</b>	<ul style="list-style-type: none"> <li>– When busy, under time pressure, distracted or stressed</li> <li>– When panicked (e.g. using a fire extinguisher in a fire)</li> <li>– When under pressure in an unfamiliar place (e.g. an airport)</li> <li>– When feeling unwell</li> </ul>	<ul style="list-style-type: none"> <li>– In extreme weather conditions (e.g. stormy weather)</li> </ul>	<ul style="list-style-type: none"> <li>– People with cognitive difficulties (perception, memory, attention, learning, orientation, visual and verbal thinking)</li> </ul>	<p>Use of clear and concise formulations. No excess information. Limit number of choices. Supplement textual information with images and icons.</p> <p>Consider grouping of features that are similar. Allow for variation in completion time. Require attention to only one place at a time. Robust error handling.</p> <p>Ensure that actions are easily reversible.</p>
Using a product or service <b>when unable to read or understand</b>	<ul style="list-style-type: none"> <li>– Text in a foreign language</li> <li>– Moving or blinking text that is difficult to read</li> <li>– Damaged labels or instructions for use</li> </ul>	<ul style="list-style-type: none"> <li>– In poor lighting</li> <li>– In darkness</li> </ul>	<ul style="list-style-type: none"> <li>– People with a reading disability</li> <li>– People with a learning disability</li> <li>– People who are visually impaired</li> <li>– People who have forgotten their glasses</li> </ul>	<p>Possibility of selecting language, using audio output such as speech (synthetic or recorded).</p> <p>Illustrative icons drawings, pictures or videos.</p>
Using a product or service <b>when unable to write or provide text input</b>	<ul style="list-style-type: none"> <li>– Limited input methods (e.g. a mobile device)</li> <li>– Wearing gloves</li> <li>– In restrictive clothing (e.g. chemical suit)</li> </ul>	<ul style="list-style-type: none"> <li>– In cold weather</li> </ul>	<ul style="list-style-type: none"> <li>– People with a writing disability</li> <li>– People with dyslexia</li> <li>– People who have limited manual dexterity</li> </ul>	<p>Let user select between predefined alternatives, use speech recognition, provide for interoperability with access technologies such as</p>



Factor	Constraining situation	Constraining environment	Temporary or permanent impairment	Examples of design considerations that might help to address the issue
	– In a moving vehicle			special keyboards, joysticks or eye tracking devices.
Using a product or service <b>without the use of voice</b>	– In forced silence (library or meeting)	– In a noisy environment where voice will not be heard or understood	– People with a speech or communication impairment – People who are deaf or hard of hearing	An alternative to speech input should be provided.
Using a product or service <b>without the use of taste or smell or with severely diminished taste or smell</b>	– In environments with strong odours or smoke	– At high altitude (such as in an airplane)	– People with reduced ability to distinguish odours or flavours – People with a cold or flu	List ingredients, use by and expiration dates and use visual and auditory signals to alert people to the presence of smoke or dangerous chemicals.
Using a product or service <b>while having specific preferences and requirements regarding wellbeing, the environment or health</b>			– People with impairments related to their immunological system (such as contact, food or respiratory allergies or hypersensitivities)	Provide customization or personalization. List ingredients; avoid the inclusion of allergens or sensitizing substances.

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