



POLITÉCNICA

# ICT Accessibility Standards

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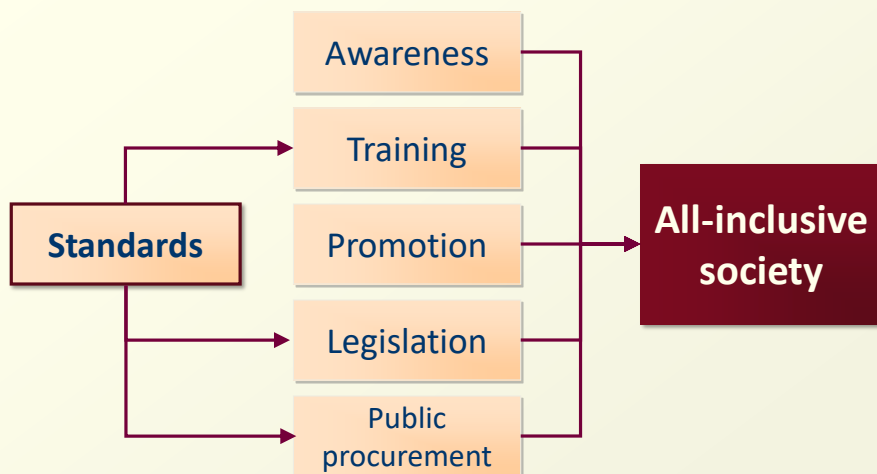


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# Standards Introduction













ICT Accessibility Standards

## Introduction



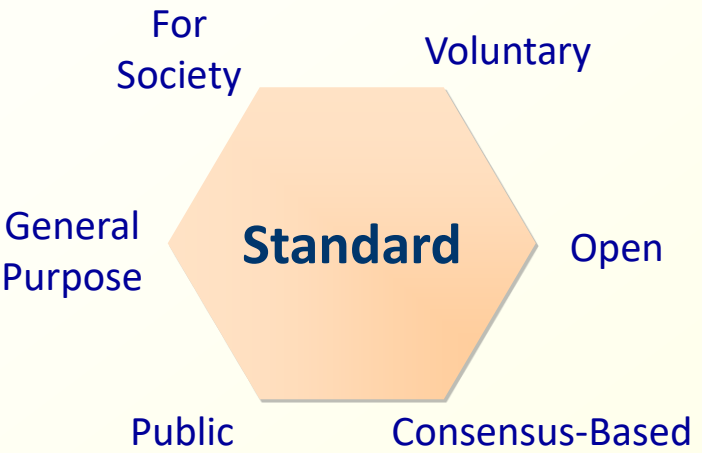
# Standard

- Document established by consensus and approved

Power Cord, Plug type					
Country	<a href="#">China USA Japan</a>	<a href="#">USA Japan</a>	<a href="#">Australia Argentina</a>	<a href="#">China Australia Argentina</a>	<a href="#">European Korea Switzerland</a>
Description	Type A 2 flat blades	Type B 2 flat blades with round ground pin	Type C oblique flat blades	Type D oblique flat blades - grounded	Type E 2 round pins
					
	<a href="#">European Korea</a>	<a href="#">European Korea</a>	<a href="#">British(U.K.) Singapore</a>	<a href="#">South Africa</a>	<a href="#">Italy Chile</a>
	Type F 2 round pins non-earthed	Type G 2 round pins with ground receptacle	Type I 3 flat blades UK BSI 1363/A type plug	Type K 3 round pins plug in triangle pattern	Type N Italy type plug
					
	<a href="#">Switzerland</a>	<a href="#">Denmark</a>			
	Type M Swiss type plug	Type O Denmark type plug			



# Basic Principles



# Standardization Organizations

- **Official**

- International
- European
- National



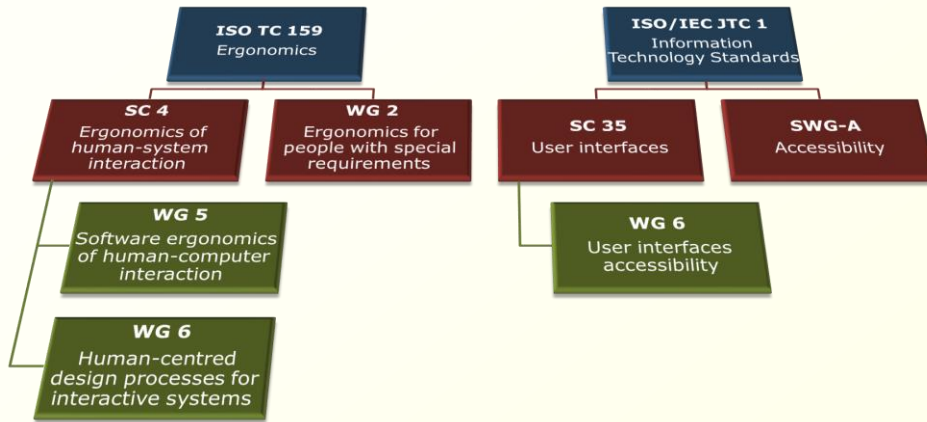
- **Unofficial**



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## Standards International

# ISO: Relevant Groups



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# ISO: Relevant Standards



- **ISO 9241-110:2006**
  - **Dialogue** principles
- **ISO 9241-20:2008**
  - Accessibility for **ICT equipment and services**
- **ISO 9241-151:2008**
  - Ergonomics of **World Wide Web user interfaces**
- **ISO 9241-171:2008**
  - **Software** accessibility
- **ISO/IEC 24751:2008**
  - Individualized adaptability and accessibility in **e-learning, education** and **training**
- **ISO 24786:2009**
  - Accessible user interface for **accessibility settings**
- **ISO/IEC 13066-1:2011**
  - Information technology - **Interoperability with assistive technology** (AT)
- **ISO/IEC 29136:2012**
  - Accessibility of personal **computer hardware**

ICT Accessibility Standards

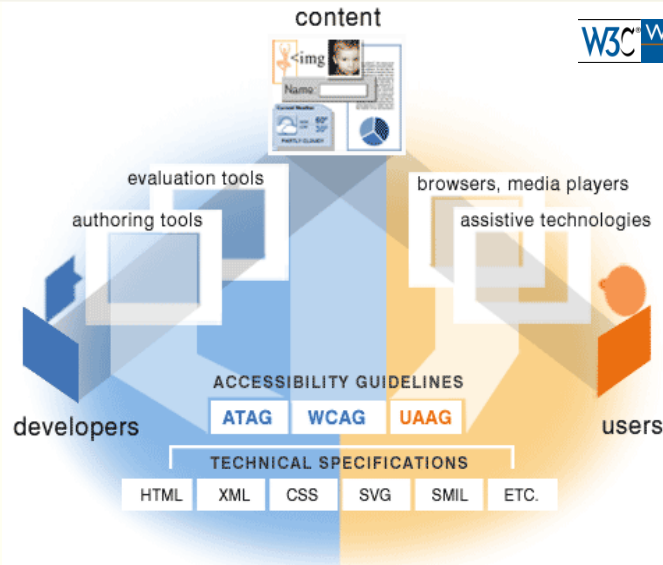


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# W3C - WAI



W3C Web Accessibility initiative



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# W3C-WAI



W3C Web Accessibility initiative

- **W3C** (World Wide Web Consortium)
  - **WAI** (Web Accessibility Initiative)
    - **WCAG** (Web Content Accessibility Guidelines)
      - Accessible web sites
      - WCAG 1.0: May 1999
      - WCAG 2.0: December 2008 (also as ISO/IEC 40500:2012)
      - **WCAG 2.1: June 2018**
    - **ATAG** (Authoring Tools Accessibility Guidelines)
      - Accessible software that creates accessible web sites
      - ATAG 1.0: February 2000
      - ATAG 2.0: September 2015
    - **UAAG** (User Agent Accessibility Guidelines)
      - Accessible web browsers and media players
      - UAAG 1.0: December 2002
      - UAAG 2.0: WG Note December 2015
    - **WCAG2ICT**
      - Applying WCAG to non-web ICT
      - WG Note September 2013

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# Europe



- Mandate M/376
  - December 2005
  - European Accessibility Requirements for Public Procurement of Products and Services in the ICT Domain
  - Aimed at



- Goals

Identify a harmonized set of functional European **accessibility requirements** for the procurement of ICT products and services

Analyse **conformity assessment schemes**

Provide an **electronic toolkit** to implement these requirements in the process of procurement of products and services



## M376: Phase 1 Results



### Accessibility Requirements

- [http://portal.etsi.org/stfs/STF\\_HomePages/STF333/STF333.asp](http://portal.etsi.org/stfs/STF_HomePages/STF333/STF333.asp)
- Characterize the public procurement of ICT products and services in Europe
- Provide a listing of existing functional accessibility requirements
- Identify gaps where there are no accessibility requirements
- Submit proposals for standardization work for the development of requirements and award criteria

### Conformity Assessment

- <http://www.econformance.eu/>
- Conformity assessment schemes and systems
- Model for analysing public procurement schemes, systems and situations
- Analysis of supplier skills and capacities

FINISHED: APRIL-2009



## M376: Phase 2



FINISHED: APR-2014  
UPDATED: APR 2015

### Objectives

- Provide a EU standard and mechanism giving public procurers access to an electronic toolkit, enabling them to make use of these harmonised procurement requirements

### Results

- A **European standard** specifying functional accessibility requirements for all ICT products and services within each of the technical areas, following the results of phase 1 of mandate 376 (**EN 301 549**)
- A Technical Report explaining the decisions taken during the development process of the EN
- Guidelines on accessibility award criteria
- Guidance and support material for public procurement
- A web-based, accessible toolkit



## M/554 (“M376 Phase 3”)



V2.1.2: AUG-2018!!  
V3: 2019

### Objectives

- Related to **DIRECTIVE (EU) 2016/2102** on the accessibility of the websites and mobile applications of public sector bodies
- To produce a **Harmonised** version of EN 301 549

### Results

- **Harmonised HEN 301 549 v2.1.2** (2018-08-28)
- It includes WCAG 2.1
- New structure for chapters 9/10/11
- Then v3.1.1. Deeper changes: closed functionality, RTT, hardware, how to use







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# Standards Spain

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## Activities

AENOR

- **Work groups:**

- **CTN 139:** Information and Communication Technologies for Healthcare
  - **SC 8:** Systems and Devices for the Elderly and the Disabled
    - **GT 1:** Standardisation of User Interfaces in Computer Applications for People with Disabilities
    - **GT 3:** Accessibility in Internet for People who are Elderly and People with Disabilities
- **CTN 153:** Assistive Products for People with Disabilities
  - **SC 5:** Communication aids
- **CTN 133:** Telecommunications
  - **GT 3:** Accessibility
- **CTN 170:** Needs and Adaptations for People with Disabilities



# Activities

AENOR

- **CTN 170** Universal accessibility
  - **UNE 170001-1:2007** Universal accessibility. MGLC criteria to facilitate accessibility to the environment
  - **UNE 170001-2:2007** Universal accessibility. Accessibility management system
  - **UNE-CEN/CLC Guide 6:2014** Guidelines for standards developers to address accessibility (ISO Guide 71, CEN/CENELEC Guide 6:2014)
- **CTN 153** Assistive Products
  - **UNE 153010:2012** Subtitling for deaf and hard-of-hearing people
  - **UNE 153020:2005** Audio description for visually impaired people
  - **UNE 153030:2008 IN** Accessibility in digital television
- **CTN 139 / SC8** Computer accessibility
  - **UNE 139801:2003** Hardware accessibility
  - **UNE 139802:2009** Software accessibility
  - **UNE 139803:2012** Web content accessibility
  - **UNE 139804:2007** Spanish Sign Language on computer networks

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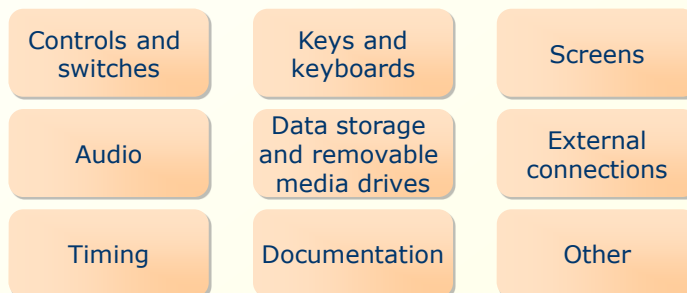
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## UNE 139801:2003

AENOR

- Computer applications for people with disabilities. Computer accessibility requirements. Hardware
  - Computer + Peripheral Devices + Documentation
  - 59 requirements
- **Categories**

ISO/IEC 29136:2012



ICT Accessibility Standards



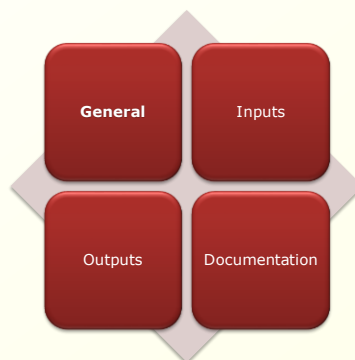
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## UNE 139802:2009

AENOR

- Computer applications for people with disabilities.  
Guidance on software accessibility
  - 147 requirements and recommendations

- **Categories**



ISO 9241-171:2008

ICT Accessibility Standards



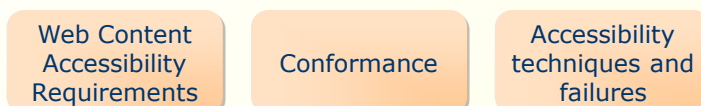
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## UNE 139803:2012

AENOR

- Computer applications for people with disabilities.  
Web content accessibility requirements
  - 7 requirements

- **Categories**



- Based on **WAI-WCAG 2.0**

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# UNE 139804:2007

AENOR

- Guidance on the use of the Spanish Sign Language on computer networks
  - 37 requirements
- **Categories**

General principles

Appearance of the signer

Staging and SSL capturing

SSL video characteristics

SSL integration in web pages

Alternatives to SSL

Computer-generated SSL

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## Standards UNE 139801:2003

ICT Accessibility Standards

# 139801: Hardware

AENOR

- Requirements to be met by computer **hardware components** and associated **documentation**, so that they can be used by **most people**, including people with disabilities and older people, and in any environment (home, school, work, etc.), either **without assistance** or using the appropriate **assistive technology**
- It applies to computer hardware components, divided into two main groups: the **computer** itself (central unit, screen, keyboard, mouse, data storage units, etc.) and **peripheral** devices (printer, scanner, etc.)
- 9 categories (59 requirements)
- Requirement structure:
  - Normative text
  - Priority
  - Scope
    - Computer
    - Peripheral device
  - Notes
  - Examples

ICT Accessibility Standards



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# 139801: examples

AENOR

- **Controls and switches**
  - **Controls and switches shall be placed in a position where they are easy to locate and activate**
    - Priority 1
    - Scope: Computer and Peripherals
    - NOTE: They should be positioned preferably on the front or top of the product. They should never be placed at the back or underneath
- **Controls and switches**
  - **Controls shall be concave, of sufficient size and have a non-slippery surface.**
    - Priority 1
    - Scope: Computer and Peripherals
    - NOTE: A control with these characteristics is easier to reach, aim at and press using certain assistive products.
    - NOTE: A suitable size is a surface area of at least 7mm x 7mm.
    - NOTE: This requirement will become priority 3 if the function performed by pressing the button can be activated by software.

ICT Accessibility Standards



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# 139801: examples

AENOR

- **Keys and keyboards**

- **The time between the initial key press acceptance and key repeat onset shall be able to be adjusted to at least 2 seconds.**
  - Priority 1
  - Scope: Computer and Peripherals
  - NOTE: This is important for users with hand dexterity problems who might hold a key down for too long when they press it.
  - NOTE: This adjustment can be provided by software.

- **Keys and keyboards**

- **Key labels shall be easily readable: they shall have a high contrast and a sans-serif font.**
  - Priority 2
  - Scope: Computer and Peripherals
  - NOTE: These types of characters are easier to distinguish for people with visual impairments.
  - EXAMPLE: Verdana or Tiresias are recommended fonts because they are highly readable.

ICT Accessibility Standards



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# 139801: examples

AENOR

- **Screens**

- **Screens with a position adjustment mechanism shall be able to be handled with one hand and shall not require movements that need tight grasping (maximum force 22.2 Newtons), twisting the wrist or precision gripping.**
  - Priority 2
  - Scope: Computer
  - NOTE: People with limited manual ability might not have enough manipulation and coordination capacity or strength to make these movements.

- **Screens**

- **Screens should be designed to avoid flickering with a frequency of 2 to 50 Hertz.**
  - Priority 3
  - Scope: Computer and Peripherals
  - NOTE: Flickering frequencies of 2-50 Hz can trigger epilepsy attacks.

ICT Accessibility Standards



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# 139801: examples

AENOR

- **Audio**

- **All important audio signals shall be provided in a visual form or be made available to the software.**
  - Priority 1
  - Scope: Computer and Peripherals
  - EXAMPLE: If a printer which runs out of paper emits a sound, it must be accompanied by a luminous signal or it should inform the computer so that the controller installed in the operating system can inform the user.
  - EXAMPLE: The alarm sound generated by a computer that is not connected to the keyboard when it is turned on must be accompanied by a message on the screen indicating the problem.

- **Audio**

- **If the product generates audio output through earphones or other similar devices placed near the ear, it shall not interfere with hearing aids.**
  - Priority 2
  - Scope: Peripherals
  - EXAMPLE: Examples of this type of device are the virtual reality integrated helmets or the driving seat simulators, since they usually include their own loudspeakers which are normally placed near the ear.

ICT Accessibility Standards



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# 139801: examples

AENOR

- **Data storage devices and removable media drives**

- **Removable media drives shall be able to unload/eject through software control.**
  - Priority 2
  - Scope: Computer and Peripherals
  - EXAMPLE: A CD or DVD should be able to be ejected via a command from the operating system.

- **Data storage devices and removable media drives**

- **Removable media drives shall use a sliding tray to insert and to eject media.**
  - Priority 2
  - Scope: Computer and Peripherals
  - NOTE: This way, people with limited manual ability can easily insert the media using the tray.

ICT Accessibility Standards



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# 139801: examples

AENOR

- **External connections**

- **The cables and their corresponding connections shall be tactilely and visually distinguishable.**
  - Priority 2
  - Scope: Computer and Peripherals
  - EXAMPLE: They could be distinguished by having a specific colour or drawing and also have certain texture that identifies them.

- **Timing**

- **When a response is required from the user within a set time, a warning shall be provided before that time expires. This warning shall be perceived both in visual and audible forms.**
  - Priority 2
  - Scope: Peripherals
  - EXAMPLE: The controls of some printers have a particular behaviour during start up, and if these controls are pressed at that moment they will produce a printing test or a calibration of injectors, etc. The printer would have to warn the user when this is over.



# 139801: examples

AENOR

- **Documentation**

- **The technical and client support services should accommodate the communication requirements of users with disabilities.**
  - Priority 3
  - Scope: Computer and Peripherals
  - EXAMPLE: Users who are deaf must be able to contact technical and client support services, and this may require that these services are available through some intermediation centre under a special agreement.

- **Other**

- **All components of the system shall have a stable and non-slip base, except for those components that need to be moved in order to perform certain basic functions.**
  - Priority 1
  - Scope: Computer and Peripherals
  - NOTE: All devices must remain fixed in a place while they are working. This includes the printer, trackball, keyboard, etc., that must have a stable and non-slip base. However, this is not applicable to those peripheral devices that need to be moved, such as a mouse or portable scanner.





# 139801: examples

AENOR

- **Other**

- **If the product has a cover or a flap in order to protect certain controls, the cover shall have a hook so that it can easily be opened.**
  - Priority 2
  - Scope: Computer and Peripherals
  - NOTE: This way, a user with mobility problems will be able to open or to close it without difficulty, it should also be quite light and easy to handle.
  - EXAMPLE: Some types of computer enclosure have a cover that protects the restart and switch-on controls so they are not activated by accident.

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## Standards UNE 139802:2009

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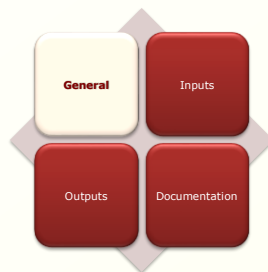
## ISO 9241-171:2008



- *Ergonomics of human-system interaction — Part 171: Guidance on software accessibility*
- Provides **guidance and specifications for the design of accessible software**
  - Covers issues associated with designing accessible software for people with the widest range of physical, sensory and cognitive abilities
  - Is applicable to the accessibility of any interactive system
  - Does not cover the behaviour of, or requirements for, assistive technologies, but it does address the use of assistive technologies
  - Is intended for use by those responsible for the specification, design, development, evaluation and procurement of software platforms and software applications
- Contains 147 requirements and recommendations
- It is also a European... and UNE standard



## Sections 139802:2009



1. Names and labels (8)

2. User preference settings (7)

3. Special considerations for accessibility adjustments (6)

4. Control and operation (12)

5. Compatibility with assistive technology (13)

6. Closed systems (4)



## General: examples

AENOR

- **8.1.1 Provide a name for each user-interface element**
  - Software **shall** associate an identifying name with every user-interface element except where the name would be redundant.
- **8.1.4 Make names available to assistive technology**
  - Each name of a user-interface element and its association **shall** be made available by the software system to assistive technology in a documented and stable fashion.
- **8.2.1 Enable individualization of user-preference settings**
  - When the software enables the user to set personal preferences, these settings **should** be easily adjustable.

## General: examples

AENOR

- **8.2.7 Enable user control of timed responses**
  - Unless limits placed on the timing of user responses are essential to maintaining the integrity of the task or activity or are based on real life time constraints (e.g. an auction), software **shall** allow users to adjust each software-specified user response time parameter in one or more of the following ways:
    - the user is allowed to deactivate the time-out;
    - the user is allowed to adjust the time-out over a wide range which is at least ten times the length of the default setting;
    - the user is warned before time expires, allowed to extend the time-out with a simple action and given at least 20 s. to respond.

## General: examples

AENOR

- **8.3.1 Make controls for accessibility features discoverable and operable**
  - Software **shall** enable any “On”/“Off” controls and adjustments for accessibility features to be discoverable, and operable, by those who need that feature.
- **8.3.6 Enable persistent display**
  - When users can activate a menu, control, or other user-interface element to display additional information or controls, software **should** allow that information or control to persist while the user engages in other tasks, until the user chooses to dismiss it, if it is appropriate to the task.
- **8.4.3 Provide “Undo” and/or “Confirm” functionality**
  - Software **should** provide a mechanism that enables users to undo at least the most recent user action and/or cancel the action during a confirmation step.

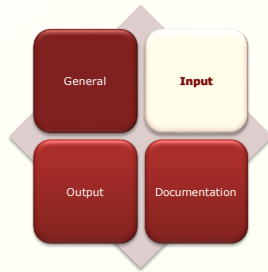


## General: examples

AENOR

- **8.4.11 Provide understandable user notifications**
  - Alerts, warnings and other user notifications provided by software **should** be short, simple and written in a clear language.
- **8.5.2 Enable communication between software and Assistive Technologies**
  - Platform software **shall** provide a set of services that enable assistive technologies to interact with other software sufficient to enable the requirements or recommendations of 8.5.5, 8.5.6, 8.5.7, 8.5.8, 8.5.9 and 8.5.10 to be complied with or followed.
- **8.6.4 Pass through of system functions**
  - Software that is on, or intended for, installation on closed systems **shall** pass through or implement the platform’s accessibility features.





1. Alternative input options (5)

2. Keyboard focus (3)

3. Keyboard input (19)

4. Pointing devices (14)

## Input: examples

- **9.1.1 Provide keyboard input from all standard input mechanisms**
  - Platform software **should** provide a method for generating keyboard input from each standard input mechanism provided by the platform.
- **9.2.1 Provide keyboard focus and text cursors**
  - Software **shall** provide a keyboard focus cursor that visually indicates which user-interface element has the keyboard focus at a given moment, as well as a text cursor to indicate the focus location within a text element.
- **9.3.2 Enable full use via keyboard**
  - Unless the task requires time-dependent analogue input, software **shall** provide users with the option of carrying out all tasks using only a non-time dependent keyboard (or keyboard-equivalent) input.

## Input: examples

AENOR

- **9.3.3 Enable sequential entry of multiple (chorded) keystrokes**
  - Software **shall** enable users to lock or latch modifier keys (e.g. shift, "Ctrl", "Command", "Alt"/"Option", depending on the operating system) so that multiple key combinations and key-plus-mouse button combinations can be entered sequentially rather than by simultaneously pressing multiple keys.
- **9.3.10 Provide accelerator keys**
  - Software **should** provide accelerator keys for frequently used features.

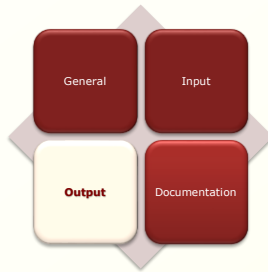


## Input: examples

AENOR

- **9.3.14 Separate keyboard navigation and activation**
  - Software **shall** allow users to move the keyboard focus without triggering any effects other than the presentation of information (e.g. scrolling or pop-ups that do not change the focus or selection). An explicit keystroke or similar user action shall be provided to trigger any other user-initiated effect.
- **9.4.3 Provide easily-selectable pointing-device targets**
  - Target size **should** be optimized to maintain adequate target selectability, grouping and separation from adjacent user-interface elements.
- **9.4.13 Provide a means of finding the pointer**
  - Platform software **shall** provide a mechanism to enable users to locate the pointer, unless it is always high contrast with background, always visible, and always solid and larger than text.





1. General output (3)

2. Visual output (4)

3. Text/fonts (3)

4. Colour (5)

5. Window appearance and behaviour (10)

6. Audio output (9)

7. Text equivalents of audio (4)

8. Media (4)

9. Tactile output (3)

## Output: examples

- **10.1.2 Enable user control of time-sensitive presentation of information**
  - Whenever moving, blinking, scrolling or auto-updating information is presented, software **shall** enable the user to pause or stop the presentation, except for simple progress indicators.
- **10.4.1 Do not convey information by colour output alone**
  - Software **shall** not use colour alone to convey information or indicate an action.
- **10.5.4 Enable “always-on-top” windows**
  - Platform software that manages windows **shall** enable windows to be set to always remain on top of other windows.

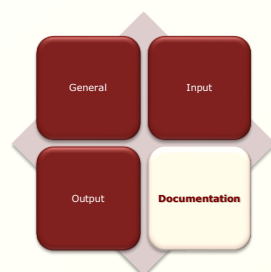
## Output: examples

AENOR

- **10.6.2 Enable control of audio volume**
  - Software **shall** enable users to control the volume of audio output.
- **10.7.1 Display any captions provided**
  - Software presenting audio information **shall** provide the facility to display associated captions.
- **10.8.1 Enable users to stop, start and pause**
  - Software **shall** enable users to stop, start and pause the presentation
- **10.9.1 Do not convey information by tactile output alone**
  - Software **should** not use tactile output alone to convey information or indicate an action.

## Sections 139802:2009

AENOR



1. Documentation and "Help" (5)

2. Support services (2)



## Documentation: examples

AENOR

- **11.1.2 Provide user documentation in accessible electronic form**
  - All user documentation and “Help” **shall** be delivered in an electronic form that meets applicable documentation accessibility standards. This documentation shall be provided with the product, or upon request on a timely basis and without extra cost.
- **11.1.5 Provide documentation and “Help” on accessibility features**
  - “Help” or documentation for software **shall** provide general information on the availability of accessibility features and information about the purpose of, and how to use, each feature.
- **11.2.1 Provide accessible support services**
  - Technical support and client support services for software **shall** accommodate the communication needs of end-users with disabilities.

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**Standards**  
**UNE 139804:2007**

ICT Accessibility Standards

## 139804: SSL on networks

AENOR

- Basic requirements for adding Spanish Sign Language to computer networks to assure that the user is able to understand the contents
- Covers areas such as staging, SSL playback techniques, how to let users know which websites have SSL contents...
- Covers real image-based SSL (like downloadable files or streaming) or computer-generated SSL
- 7 categories (37 requirements)
- Requirement structure:
  - Normative text
  - Scope
    - Real image on a downloadable file
    - Real image streaming from a server
    - Data files for SSL generation
  - Notes
  - Examples

## 139804: examples

AENOR

- **General Principles**
  - The linguistic criteria defined by the SSL language user community that are in everyday use or stated and established by means of relevant linguistic research results **shall** be applied.
    - Scope: All
    - NOTE: Law 27/2007 recognizes the Spanish sign languages and regulates the means for supporting oral communication with and among deaf, hearing-impaired and deaf-blind people. This law set up the Centre for Spanish Sign Language Linguistic Standardisation for the purpose of investigating, promoting, disseminating and ensuring proper use of this language.
- **General Principles**
  - Signing **should** conform to the characteristics of the target users.
    - Scope: All
    - NOTE: If the target audience is children, the signer should use a vocabulary and difficulty level that is suitable for their age group, go slower and be more expressive.
    - NOTE: If the target audience is located in a specific region, signs common in that area can be used to supplement SSL in order to make the message more easily understandable.

## 139804: examples

AENOR

- Appearance of the signer
  - The signer **shall** wear clothing with a uniform color and texture.
    - Scope: All
    - NOTE: Fabrics that have a pattern, design or relief texture can distract or cause unwelcome optical effects.
- Appearance of the signer
  - The signer **shall** not wear jewelry or other accessories.
    - Scope: All
    - NOTE: Objects such as rings, watches, bracelets, necklaces, brooches, scarves or any other type of accessory can be attention-grabbing and distracting, and produce glare and reflections.



## 139804: examples

AENOR

- Staging and SSL capturing
  - The framing **shall** be a medium shot or medium-long shot.
    - Scope: All
    - NOTE: A medium shot shows the human figure from the waist up.
    - NOTE: A medium-long shot shows the human figure from the calf up.
    - NOTE: Some SSL signs involve the area below the waistline or above the head. The medium-long shot should be used to record signing in the area below the waistline.
- Staging and SSL capturing
  - Lighting **shall** assure that hand movements in front of the signer's body do not cast shadows on his or her face.
    - Scope: All
    - NOTE: Shadows on the face can obscure facial expression, which is extremely important for SSL comprehension.



## 139804: examples

AENOR

- **SSL video characteristics**
  - The video **shall** have a minimum rate of 25 frames per second.
    - Scope: All
    - NOTE: This applies to the whole process: capture, digitization, compression and broadcasting.
- **SSL video characteristics**
  - If using video streaming, features offered by the server for automatically degrading the video frame rate or giving priority to audio when the connection quality is degraded **shall** be disabled.
    - Scope: Streaming
    - NOTE: In degraded connection quality situations, it is preferable to use other strategies for viewing the video without loss of quality, even if there are playback interruptions.
    - NOTE: If connection likely to be bad, it is preferable to offer downloads of video files instead of streaming.

## 139804: examples

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- **Addition of SSL contents to web pages**
  - The following icon representing sign language **should** be used.
    - Scope: All
- **Addition of SSL contents to web pages**
  - When there is delay prior to visualization of an embedded SSL video, the user **shall** be informed of the progress of this process.
    - Scope: Real-image downloadable file, streaming
    - EXAMPLE: A progress bar is displayed to report the progress of a SSL download process.
    - EXAMPLE: The fill rate of the buffer that must be full before the video starts to play is displayed at the start of SSL video streaming playback.
    - NOTE: This functionality is part of the default behaviour of most media players.



## 139804: examples

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- Adding SSL alternatives
  - Voice and subtitles **should** be added to SSL content.
    - Scope: All
    - NOTE: This gives more people access to the content. It is also a SSL learning aid.
    - NOTE: This guideline is especially important when the content is only provided in SSL.
    - NOTE: W3C's SMIL (Synchronized Multimedia Integration Language) can be used to add subtitles.
    - NOTE: If the SSL content has no sound, it is advisable to delete the audio track in order to save bandwidth. This is especially important in the case of video streaming because it leaves more bandwidth for video.
- Adding SSL alternatives
  - If subtitles are added they **should** conform to all applicable UNE 153010 requirements for digital presentation.
    - Scope: All

## 139804: examples

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- Usage of computer-generated SSL
  - When using computer-generated SSL, it **shall** be tested on deaf SSL users to ensure its suitability.
    - Scope: SSL generation
    - NOTE: There are currently R & D projects and some cutting-edge products and services that have this capability. However, no known system of this kind has yet achieved a good level of suitability for use.
    - NOTE: In any case, contents are not automatically translated to computer-generated SSL, which requires human involvement.
    - NOTE: Most of the requirements and recommendations stipulated in this standard are also applicable to computer-generated SSL. Note that references to "the signer" apply to the animated character (avatar) that does the SSL in computer-generated SSL.



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# ICT Accessibility Standards

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