# UNDERSTANDING WHEN ACCESSIBILITY FOLLOWING A DESIGN FOR ALL APPROACH IS RELEVANT

The Table below provides examples of **context of use**, **environmental and human limitations** where **accessibility following a Design for All approach** is necessary. The list is not exhaustive.

Explanations to the columns:

**Column 1** can be used to identify the human or environmental limitations that are relevant to consider when developing the standard

**Columns 2, 3 and 4** provide examples of scenarios where a person using the product, good or service might experience a limitation (categorised under context of use, environment and impairment).

**Column 5** provides examples of design solutions or design considerations that might be considered during the design of the product, good or service.

**Column 6** provides examples of tools and techniques that can be used during the design and development of a product, good or service, to promote accessibility following a Design for All approach. This column can be referred to when writing requirements that describe any part of the design process of a product, good or service.

| 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|
| Human or environmental limitations to use of product, good or service | Constraining context of use | Constraining environment | Temporary or permanent impairment | Examples of design considerations that might help to address the limitation | How to apply accessibility following a Design for All approach to the Product/Service Design Process |

| 1 | 2 | 3 | 4 | 5 | 6 |
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| Using a product, good or service **without vision** | - Controls that are designed to be used by touch alone (e.g. video game controls, buttons on a steering wheel) | - At night time or in complete darkness | - People who are blind<br><br>- People who have forgotten their glasses<br><br>- People who must focus their vision elsewhere | Use of haptic information or feedback, sound or speech, and/or provide compatibility with assistive technologies such as screen readers. | DIRECT USER (OR USER EXPERT) INVOLVEMENT:<br><br>- Consult Design for All Expert<br><br>- Consult Accessibility Expert<br><br>- Consult users at all stages of the design process, ensuring that diverse user needs are represented |
| Using a product, good or service **with restricted vision** | - While wearing a helmet or goggles<br><br>- Using a small display<br><br>- When controls are in an awkward position (e.g. at the back of a television) | - In low lighting<br><br>- On a very sunny day (glare)<br><br>- In a smoky environment | - People who are visually impaired<br><br>- People who have forgotten their glasses<br><br>- People who mostly need to focus their vision elsewhere | Use of haptic feedback, sound or speech, and/or provide compatibility with assistive technologies such as screen readers. | |

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| Using a product, good or service **without hearing** or without audio | - In forced silence (library or meeting)<br><br>- When wearing earplugs or protective headgear | - In a very noisy environment (e.g. loud music, loud traffic, noisy machinery) | - People who are deaf<br><br>- People who are unable to use their hearing aid | Use of visual or haptic feedback and/or provide compatibility with assistive technologies for deaf people such as speech to text or speech to sign language. | - Consult relevant end user organisations (such as disability organisations, organisations that represent older people or consumer organisations)<br><br>- Test product, good or service in diverse environmental |
| Using a product, good or service **with restricted hearing** | - When ears are busy (e.g. listening to people talking while using a product, good or service)<br><br>- While wearing a helmet | - A room with poor acoustics<br><br>- In a noisy environment | - People who are hearing impaired<br><br>- People with tinnitus<br><br>- People who are unable to use their hearing aid | Use of visual or haptic feedback and/or provide for adjustable volume levels. | |

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| Using a product, good or service with **restricted manual dexterity** | - Wearing gloves<br><br>- Using controls while holding onto the product (e.g. buttons on a hand console, controls on a musical instrument, controls on a handlebar) | - In very cold weather or in an artificial cold environment<br><br>- If hands or fingers are slippery due to moisture or chemicals. | - People with limited or no manual dexterity (e.g. missing fingers, hands or arms, arthritis)<br><br>- People with loss of sensation in fingers<br><br>- People with injured fingers, hands or arms | Enable easy manipulation, allow for speech input and/or provide for compatibility with assistive products or technologies such as special keyboards, joysticks, eye tracking devices. | conditions and in real life contexts<br><br>- Involve users through, for example, interviews, focus groups, surveys, user testing, participatory design. |
| Using a product, good or service with **restricted mobility** | - In a tight space (e.g. accessing controls in the boot of a car)<br><br>- A very small or very tall person using a product, good or service at an awkward height<br><br>- While pregnant | - In very cold weather or in an artificial cold environment | - People with a physical impairment which limits their ability to move or control their body<br><br>(e.g. musculoskeletal disorders, paralysis, severe arthritis, broken limbs or any | All elements of the product, good or service should be easy to operate. Consider force, positioning and space.<br><br>Provide opportunity to operate with either left or right arm. Consider | - Observe users, for example using sampling techniques or user testing. |

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| | - While holding a child<br><br>- Awkwardly positioned controls (e.g. buttons at the back of a monitor; a power socket behind furniture)<br><br>- While driving a car or cycling a bicycle<br><br>- While pulling luggage | | other illness or injury that limits strength, stamina or movement)<br><br>- Wheelchair users who use products and access services in a seated position<br><br>- People who use a walking aid | the range of body sizes, heights, and postures.<br><br>Consider adjustable features or series of parallel designs that cover the whole spectrum of anthropometric variance. Consider compatibility with assistive products/ technology. | INDIRECT USER-CENTRED DESIGN TECHNIQUES:<br><br>- Impairment simulators<br><br>- Personas<br><br>- Scenarios<br><br>- Stakeholder mapping techniques |

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| Using a product, good or service with **restricted balance** | - While driving or cycling<br><br>- While travelling in a moving vehicle<br><br>- While operating heavy machinery<br><br>- While pregnant<br><br>- While carrying a child<br><br>- While holding something heavy or awkwardly shaped | - In windy weather<br><br>- In wet or cold weather where surfaces are slippery | - People with impaired balance (e.g. conditions that affect the middle ear, musculoskeletal disorders)<br><br>- People experiencing vertigo | Elements and parts of buildings such as windows, doors, bathroom-elements, lifts/elevators, lobbies, intercom systems, etc., should be accessible and easy to handle. This concerns the application of force, positioning, logical structure and having enough space to move around when using assistive products. Surfaces should be slip-resistant. | Secondary Sources of User Research:<br><br>- Consult Design for All, Universal Design, Inclusive Design or Accessibility guidelines and standards<br><br>- Consult anthropometric databases |

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| Using a product, good or service **under high cognitive stress** | - When busy, under time pressure, distracted or stressed<br><br>- When panicked (e.g. using a fire extinguisher in a fire)<br><br>- When under pressure in an unfamiliar place (e.g. an airport)<br><br>- When feeling unwell | - In extreme weather conditions (e.g. stormy weather) | - People with cognitive difficulties (perception, memory, attention, learning, orientation, visual and verbal thinking) | Use of clear and concise formulations. No excess information. Limit number of choices. Supplement textual information with images and icons. 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. Ensure that actions are easily reversible. | - Consult user research reports |

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| Using a product, good or service when **unable to read or understand** | - Text in a foreign language<br><br>- Moving text that is difficult to read<br><br>- Labels or instructions for use are damaged | - In poor lighting<br><br>- In darkness | - People with a reading disability<br><br>- People with a learning disability<br><br>- People who are visually impaired<br><br>- People who have forgotten their glasses | Possibility of selecting language, using audio output such as speech (synthetic or recorded), and illustrative icons drawings, pictures or videos. | |

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| Using a product, good or service when **unable to write or provide text input** | - Limited input methods (e.g. a mobile device)<br><br>- Wearing gloves<br><br>- In restrictive clothing (e.g. chemical suit)<br><br>- In a moving vehicle | - In cold weather | - People with a writing disability<br><br>- People with dyslexia<br><br>- People who have limited manual dexterity | Let user select between predefined alternatives, use speech recognition, provide for compatibility with access technologies such as special keyboards, joysticks or eye tracking devices. | |
| Using a product, good or service **without the use of voice** | - 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<br><br>- People who are deaf or hard of hearing | An alternative to speech input should be provided. | |

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| Using a product, good or service **without the use of taste or smell** | - In environments with strong odours or smoke | | - People with reduced ability to distinguish odours or flavours<br><br>- 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, good or service **while having specific preferences and requirements regarding wellbeing, the environment or health** | | | - People with impairments related to their immunological system (such as contact, food or respiratory allergies or hypersensitivities) | Provide customisation or personalisation. List ingredients; avoid the inclusion of allergens or sensitising substances. | |

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This table was informed by multiple sources, including:

- CEN (2002). CEN-CENELEC Guide 6: "Guidelines for standards developers to address the needs of older persons and persons with disabilities" Edition 1, January 2002

- EN 301 549: 2015 "Accessibility requirements suitable for public procurement of ICT products and services in Europe"

- Fuglerud, K. S. (2009). Universal design in ICT services. In Vavik, T. (ed.) Inclusive buildings, products & services: Challenges in universal design, Trondheim, Norway: Tapir academic press. pp. 244–267.

- ISO/IEC TR 29138-1: 2009 "Information technology – Accessibility considerations for people with disabilities – Part 1: User needs summary"

- Vanderheiden, G. (2000). Fundamental principles and priority setting for universal usability. Proceedings on the 2000 conference on universal Usability, Arlington, Virginia, United States: ACM Press.