# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

**Household and similar electrical appliances – Accessibility of control elements, doors, lids, drawers and handles**

**Appareils électrodomestiques et analogues – Accessibilité des éléments de commande, portes, abattants, tiroirs et poignées**

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INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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## CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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**HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES –
ACCESSIBILITY OF CONTROL ELEMENTS,
DOORS, LIDS, DRAWERS AND HANDLES**

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IEC 63008 has been prepared by IEC technical committee 59: Performance of household and similar electrical appliances.

The text of this International Standard is based on the following documents:

| FDIS | Report on voting |
|------|------------------|
| 59/720/FDIS | 59/723/RVD |

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

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- withdrawn,
- replaced by a revised edition, or
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# INTRODUCTION

Ever greater demands are now being placed on the accessibility of products, but, despite this, there has been no easily available data for assessing and evaluating household appliances from an accessibility perspective. An effective way to conduct product development is to work on the basis of adequate testing methods for assessing various properties, as accessibility recommendations can be formulated more clearly and be given greater emphasis during the development of household and similar appliances. It is important that accessibility properties be prioritized alongside functional, technical and production-related properties.

For this purpose, an inventory of sources with a product-accessibility focus has been drawn up, which has given useful basic information and data for setting recommendations for the design of household appliances. This International Standard on control elements, doors, lids, drawers and handles is a result of this work, and provides information in the form of accessibility facts and an understanding of the interaction of appliances and users with a wide range of abilities.

This document provides requirements, recommendations and measurements for specified product characteristics, i.e. related to control elements, doors, lids, drawers and handles of household and similar appliances. This contributes to their accessibility and underlying ergonomic principles. However, products may have other aspects that are not covered in this document, that might not be accessible. This information originates from scientific knowledge and the theory of ergonomics, physiology, product design and other relevant disciplines. This document applies ISO/IEC Guide 71:2014 and ISO/TR 22411:2008 to household and similar appliances. Data is drawn from ISO/TR 22411:2008 and, if not specified there, from other sources.

The purpose of designing and evaluating household and similar appliances with regard to accessibility is to maximize the number of people who can readily use the products. A more accessible product considers specific product characteristics. Such products are easier to use and beneficial for all users. This document explains the characteristics that meet the needs and abilities of an intended user in relation to control elements, doors, lids, drawers and handles.

# HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES –
# ACCESSIBILITY OF CONTROL ELEMENTS,
# DOORS, LIDS, DRAWERS AND HANDLES

## 1   Scope

This document contains accessibility requirements to enable more accessible use of certain elements found on household and similar electrical appliances by older persons and persons with disabilities. It provides guidance to achieve accessible design of only control elements (e.g. knobs, buttons), including control panels, display screens and doors, lids, drawers and handles. It does not enable the full assessment of the overall accessibility of a household appliance. This document covers supporting and auxiliary functions that a user performs regularly. Assembly, installation, configuration or repair of appliances are excluded.

This document provides test methods and data that support accessible design.

This document gives guidance to apply ISO/TR 22441:2008 and ISO/IEC Guide 71:2014 to the design of various interactive elements of household and similar electrical appliances. It does not deal with remote controls, or control via network or mobile applications. Touch control elements are covered in this document (see also Annex A), but new interaction controls, such as gestures and speech control, are not covered.

This document does not deal with safety issues.

NOTE   IEC 60335 (all parts) sets out requirements on safety issues, e.g. surface temperatures and sharp edges.

## 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.

IEC 60417, *Graphical symbols for use on equipment* (available at http://www.graphical-symbols.info/equipment)

IEC TS 62835:2015, *Electric toasters for household and similar use – Methods and measurements for improving accessibility*

IEC/IEEE 82079-1:2019, *Preparation of information for use (instructions for use) of products – Part 1: Principles and general requirements*

ISO 7000, *Graphical symbols for use on equipment* (available at http://www.graphical-symbols.info/equipment)

ISO 7010, *Graphical symbols – Safety colours and safety signs – Registered safety signs*

ISO 15008:2017, *Road vehicles – Ergonomic aspects of transport information and control systems – Specifications and test procedures for in-vehicle visual presentation*

ISO/TR 22411:2008, *Ergonomics data and guidelines for the application of ISO/IEC Guide 71 to products and services to address the needs of older persons and persons with disabilities*

ISO 80000-1:2009, *Quantities and units – Part 1: General*

ISO 8995-1:2002, *Lighting of work places – Part 1: Indoor*

## 3   Terms and definitions

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

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

* IEC Electropedia: available at http://www.electropedia.org/

* ISO Online browsing platform: available at http://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

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

[SOURCE: ISO 9241-112:2017, 3.15]

**3.2**
**accessible design**
design focused on diverse users to maximize the number of potential users who can readily use a system in diverse contexts

Note 1 to entry:   This aim can be achieved by (1) designing systems that are readily usable by most users without any modification, (2) making systems adaptable to different users (by providing adaptable user interfaces) and (3) having standardized interfaces to be compatible with assistive products and assistive technology.

Note 2 to entry:   Terms such as universal design, accessible design, design for all, barrier-free design, inclusive design and transgenerational design are often used interchangeably with the same meaning.

[SOURCE: ISO/IEC Guide 71:2014, 2.19]

**3.3**
**impairments**
problems in body function or structure related to a significant deviation or loss

Note 1 to entry:   Impairments can be temporary or permanent; progressive, regressive or static; intermittent or continuous.

Note 2 to entry:   See also ICF 2001 [9], WHO, A.4.

[SOURCE: ISO/IEC Guide 71:2014, 2.5, modified – Note 2 to entry added.]

**3.4**
**user**
person who accesses or interacts with the appliance

[SOURCE: ISO/IEC Guide 71:2014, 2.2, modified – In the definition, "individual" has been replaced by "person" and "a system" has been replaced by "the appliance".]

# 4   Classification of control elements, doors, lids, drawers and handles

## 4.1   Classification of control elements

### 4.1.1   Rotary control elements and knobs

These include different knobs of different types, including cylindrical knobs and bar-grip knobs, which can be seen in Figure 1. They may have discrete positions or continuous settings, or both.

They may have a push function for confirming a selection or hiding the element.



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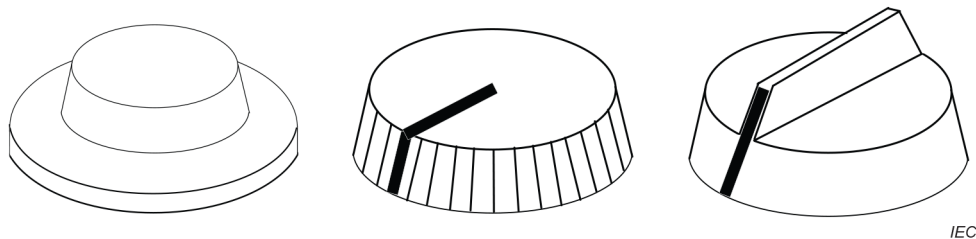
**Figure 1 – Cylindrical knobs and a bar-grip knob**

A selection wheel, which can be seen in Figure 2, is a special kind of rotary control element. It may have a push function for confirming a selection.

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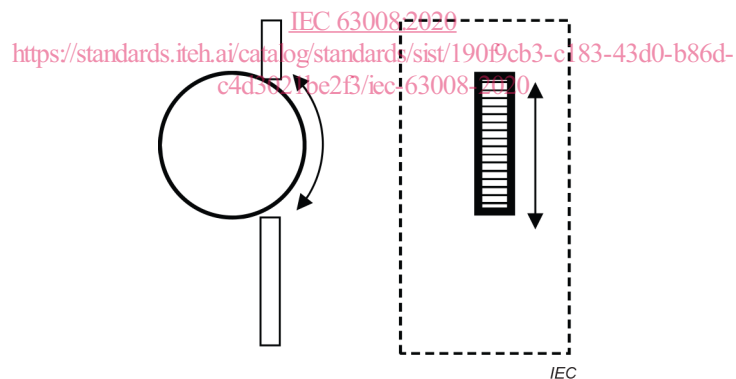
**Figure 2 – Selection wheel**

### 4.1.2   Slide controls

A slide control can be classified into the following categories:

- A small moveable part that slides within a groove to adjust a setting between defined start and end points, usually along one axis (see Figure 3). They may have discrete positions or continuous settings, or both.

  EXAMPLE 1   Steam setting on a steam iron.

- A pictorial indicator or control element depicted in a graphical track that, while being touched, can be dragged to adjust a setting between defined start and end points. The indicator/control element can be moved in either a linear direction along one axis, or in a circular direction. With this type of control, it is also often possible for the user to touch any point along the graphical track to move the indicator/control element directly to this position (setting).

EXAMPLE 2   Spin speed adjustment on touch screen on a washing machine.

- A lever is a special slide control.

EXAMPLE 3   Bread carriage lever on a toaster.
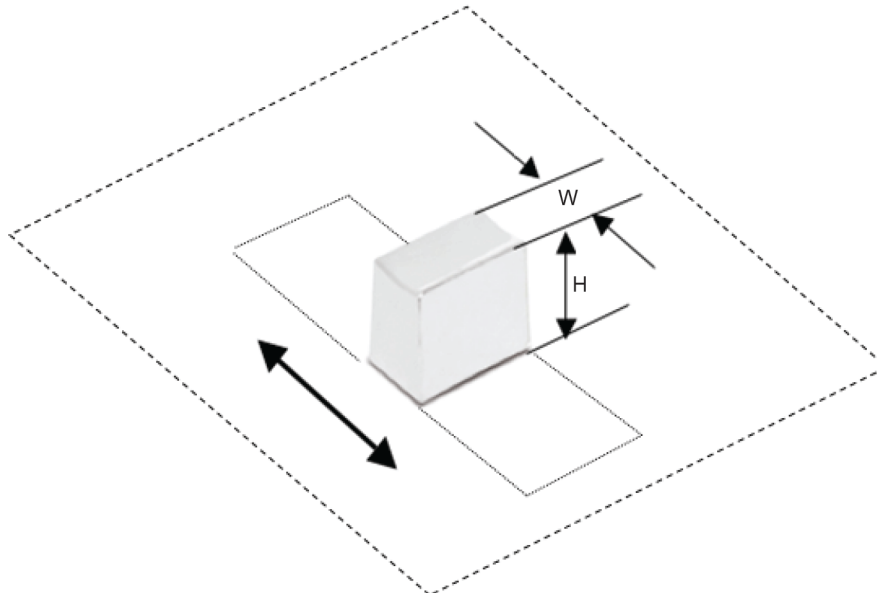
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**Key**

W   is the width of slide control.

H   is the height of slide control.

NOTE   The double arrow on the left-hand side shows the direction of operation.

**Figure 3 – Slide control**

### 4.1.3   Buttons and switches

It is the action needed to operate a button together with its interface (e.g. size and shape) that affects its accessibility, regardless of whether the button is activated mechanically and/or electrically. Buttons and switches can be classified into the following categories according to the action needed:

- Latching push buttons: push buttons that latch into place, maintaining their physical state until pressed again, when they will latch back to where they started.

- Returning push buttons: push buttons that move in the direction of the press, then move back to their original state as the pressure is released. They may have more than one state, for example two states turn the appliance on/off, or multiple selections for setting temperatures.

- Countersunk buttons: like returning push buttons, but completely located within indentations in the product when operated.

- Light touch buttons, for example micro switches: switches covered by a rubber mat or plastic foil, often grouped on a panel with minimal or no protrusion. They require very low operation force and the movement for operation is very low (less than 1 mm).

- Touch control elements: buttons that require no pressing action and can be actuated by part of the hand or finger either brushing against it or lightly tapping the surface. Depending on technology and software, their sensitivity, size and reaction speed are different. Most touch control elements have minimal or no protrusion. Often they are grouped on panels.

- Rocker switches: a type of switch that rocks back and forth when one end becomes raised when the other one is pressed.

- Toggle switches: a type of switch with a short stem that moves back and forth. They may have more than two discrete positions.

### 4.1.4 Control panels

A control panel is part of the appliance used to control all or some of its functions. It may comprise control elements (e.g. knobs, buttons or slide controls), display screens, indicator lights, labels and/or markings.

## 4.2 Classification of doors, lids and drawers

### 4.2.1 Doors and lids

Doors allow access from the front, sides or back of an appliance, whereas lids allow access from the top. Lids include covers that may be screwed into place.

Doors and lids are classified into two categories according to their associated functions:

- the main function is related to the intended use;

    EXAMPLE 1   Doors of refrigerators, ovens, washing machines, dryers, dishwashers, microwave ovens.

    EXAMPLE 2   Lids of kettles, food mixers, coffee machines, dishwasher detergent dispensers, top loader washing machines, chest freezers.

- the supporting and auxiliary function is related to functions of maintenance or cleaning.

    EXAMPLE 3   Door for cleaning the washing machine filter.

    EXAMPLE 4   Cover for the light in an oven or a refrigerator.

### 4.2.2 Drawers

Drawers are able to be slid in and out of an appliance and are used to contain or support items. Drawers in this context include shelves, racks and trays.

EXAMPLE 1   Warming drawers.

EXAMPLE 2   Pull-out oven shelf.

EXAMPLE 3   Drawer for detergent of a washing machine or drawer for water of a steam oven.

EXAMPLE 4   Dishwasher racks.

EXAMPLE 5   Toaster crumb removal tray.

### 4.2.3 Handgrips and finger grips

Handgrips or finger grips are a part of a door, lid or drawer for grasping and applying force (e.g. to open the door).

EXAMPLE 1   Handgrip on a refrigerator or an oven door.

EXAMPLE 2   Finger grip on detergent compartment in a washing machine drawer.

## 4.3 Classification of handles

a)  Handle for moving an appliance that can support normal operation for intended use or for transport purposes.

    NOTE   Grips to operate doors are described in 4.2.3 and the requirements are stated in 7.3.4.2.

    EXAMPLE 1   For intended use: handle on a kettle, coffee pot, vacuum cleaner. Crank handle (e.g. for curling of a cord).

    EXAMPLE 2   For transport purposes: on a fryer, bread maker.

b)  Handle that functions as a control element.

EXAMPLE 3   On/Off control on iron handle.

c) Combination of a) and b).

EXAMPLE 4   Iron, blender.

# 5   Accessibility considerations

## 5.1   Users' characteristics

### 5.1.1   General

Abilities and characteristics of people change during their life and vary substantially among individuals within the same age group.

Impairments can be temporary or permanent and generally increase with age. Sensory, physical and cognitive limitations vary from comparatively minor (such as mild seeing impairment) to significant limitations (such as deafness).

Although some impairments are minor in nature, combinations of impairments can impose significant limitations, as is often the case when people get older.

NOTE 1   For ergonomic data, see ISO/TR 22411:2008, Clause 9.

NOTE 2   For principles of accessible design, see ISO/TR 22411:2008, Annex A.

### 5.1.2   Impairments

Details about human abilities and the consequences of impairment are described in ISO/IEC Guide 71:2014, Clause 7.

In an assessment of accessibility, the following impairments shall be considered:

- **Partial sight**

  Seeing images indistinctly, reduced field of vision, inability to distinguish colours

- **Blindness**

  No useful vision and dependent on tactile and auditory input

- **Deafness**

  Inability to hear sound and dependent on visual and tactile input

- **Hearing impairment**

  Reduced ability to sense the presence of sounds and to discriminate and comprehend sound

- **Touch impairment**

  Reduced ability to sense surfaces and their texture or quality

- **Dexterity impairment**

  Restricted use of hand and arm for handling objects

- **Manipulation impairment**

  Restricted use of hands, arms, feet or legs to reach, carry, move and manipulate objects

- **Movement impairment**

  Restricted range of movement of arms, legs and spine for changing the body position and moving from one area to another

- **Strength impairment**

  Lack of force that can be exerted for example when pulling, lifting, pressing, gripping, pinching and twisting

- **Intellect/memory impairment**

  Lack of knowing, understanding, reasoning and concentration

- **Language impairment**

  Difficulty in comprehending or expressing written or spoken language

## 5.2 Procedure

The accessibility assessment requires consideration of both objective and subjective aspects of using an appliance:

- objective aspects can be assessed by engineers and other professionals;

- subjective aspects should be assessed by at least one of the following methods:

  - assessors trained to consider the needs of a wide group of users, for example an ergonomist or people with ergonomics training such as a designer, occupational therapist, etc.;

  - a user trial that comprises users with a wide range of abilities.

NOTE   Details can be found in IEC TR 61592 [2][1].

# 6   General conditions for the measurements

## 6.1   Ambient conditions

Ambient conditions concerning temperature and lighting are defined as follows:

- ambient temperature shall be in accordance with respective product-related standards of IEC/TC 59;

- ambient lighting shall be 500 lx (in accordance with ISO 8995-1:2002).

All data shall be reported.

## 6.2   Installation and positioning of the appliance

- The electricity supply shall be in accordance with respective product-related standards of IEC/TC 59.

- The appliance shall be positioned in accordance with the respective product-related standards of IEC/TC 59 and with the manufacturer's instructions. If variable positioning is possible, the installation shall follow the ergonomic principles.

- All surfaces for installation and positioning of the appliance should be horizontal.

- The appliance is operated for all tests in the delivery status with unchanged default settings. If the appliance offers mode(s) that assist accessibility, such as audio signals for operating touch controls or brightness of displays, they are activated and set to enable this mode(s) in an optimum manner.

- The appliance shall be at ambient temperature at the beginning of each test.

- Where appliances that are operated continuously affect measurements, for example force required to open the freezer door, these appliances shall be evaluated in running state after approximately 12 h of operation.

All data shall be reported.

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[1]   Numbers in square brackets refer to the bibliography.