

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



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2020 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 000 terminological entries in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

67 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Recherche de publications IEC -

webstore.iec.ch/advsearchform

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études,...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et une fois par mois par email.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: sales@iec.ch.

Electropedia - www.electropedia.org

Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 000 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 16 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

Glossaire IEC - std.iec.ch/glossary

67 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

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

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 97.030

ISBN 978-2-8322-8036-2

Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.

CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references	7
3 Terms and definitions	8
4 Classification of control elements, doors, lids, drawers and handles	9
4.1 Classification of control elements.....	9
4.1.1 Rotary control elements and knobs.....	9
4.1.2 Slide controls.....	9
4.1.3 Buttons and switches.....	10
4.1.4 Control panels	11
4.2 Classification of doors, lids and drawers	11
4.2.1 Doors and lids	11
4.2.2 Drawers.....	11
4.2.3 Handgrips and finger grips.....	11
4.3 Classification of handles	11
5 Accessibility considerations	12
5.1 Users' characteristics.....	12
5.1.1 General	12
5.1.2 Impairments.....	12
5.2 Procedure	13
6 General conditions for the measurements.....	13
6.1 Ambient conditions.....	13
6.2 Installation and positioning of the appliance.....	13
6.3 Measurements	14
6.3.1 General	14
6.3.2 Linear dimensions	14
6.3.3 Angle.....	14
6.3.4 Force.....	14
6.3.5 Torque.....	14
6.3.6 Rounding.....	14
7 Test procedure	14
7.1 Method	14
7.2 Control elements and control panels	14
7.2.1 General	14
7.2.2 Perceive	14
7.2.3 Recognize	15
7.2.4 Reach.....	15
7.2.5 Operate	15
7.2.6 Monitor	17
7.3 Doors, lids and drawers	17
7.3.1 Perceive	17
7.3.2 Recognize	18
7.3.3 Reach.....	18
7.3.4 Operate	18
7.3.5 Monitor	21

7.4	Handles	21
7.4.1	Perceive	21
7.4.2	Recognize	21
7.4.3	Reach	21
7.4.4	Operate	21
7.4.5	Monitor	23
7.5	Presentation of information on the appliance	23
7.5.1	General	23
7.5.2	Visual symbols	23
7.5.3	Characters	23
7.5.4	Colour contrast	24
7.5.5	Tactile markings	24
7.5.6	Audible signals	24
7.5.7	Indicator lights	24
7.5.8	Display screens	25
Annex A (informative) Requirements of touch-control elements for visually impaired users		26
Bibliography		27
Figure 1 – Cylindrical knobs and a bar-grip knob		9
Figure 2 – Selection wheel		9
Figure 3 – Slide control		10
Figure 4 – Hand grip		20
Figure 5 – Knuckle clearance when holding a handgrip		20
Figure 6 – Handle with finger shapings to be avoided		22
Figure 7 – Handles for supporting – examples		22
Table 1 – Dimensions and activation force/torque of control elements		16

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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".]