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Packaging — Accessible design — General requirements

Emballage — Conception accessible — Exigences générales

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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ISO 11156 was prepared by Technical Committee ISO/TC 122, *Packaging*.

Introduction

The accessible design of packages is a worldwide matter of concern because it allows everybody to use them safely, comfortably, and with satisfaction, irrespective of age, perceptual and cognitive ability, level of physical functioning, language and culture. This International Standard is designed to serve as a guideline for increasing accessibility in designing packages and packaged products.

Our aging population goes beyond specific countries to be a global trend. This aging leads to a relative increase in those with reduced ability and function using packages. As a result, around the globe packaged products are used by increasingly frail individuals. Building a social infrastructure to provide rights to the disabled, which is adopted by the United Nations, is a worldwide issue[1]. Further, this globalization results in the circulation of packages across borders, causing problems due to differences in language and culture.

This International Standard complies with ISO/IEC Guide 71[2], and ISO/TR 22411[3]. Following ISO/IEC Guide 71, this International Standard is designed to serve as a series of considerations to enhance accessibility of packaged products.

This International Standard does not supersede or replace any applicable safety or regulatory marking or labelling requirements.

Packaging — Accessible design — General requirements

1 Scope

This International Standard provides a framework for design and evaluation of packages so that more people, including persons from different cultural and linguistic backgrounds, older persons and persons whose sensory, physical, and cognitive functions have been weakened or have allergies, can appropriately identify, handle and use the contents. It considers varying aspects of the packaged product, including identification, purchase, use and disposal.

This International Standard does not apply to dimensions, materials, manufacturing methods, or evaluation methods of individual packages.

2 Normative references

The following referenced documents are indispensable for the application 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.

ISO 21067:2007, *Packaging — Vocabulary*

ISO/IEC 19762 (all parts), *Information technology — Automatic identification and data capture (AIDC) techniques — Harmonized vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 21067, ISO/IEC 19762 (all parts), and the following apply.

3.1
accessible design
design focussed on principles of extending standard design to people with some type of performance limitation to maximize the number of potential customers who can readily use a product, building or service

3.2
alternative format
different presentation that can make products and services accessible by the use of another mobility or sensory ability

3.3
packaging
⟨product⟩ any product to be used for the containment, protection, handling, delivery, storage, transport and presentation of goods, from raw materials to processed goods, from the producer to the user or consumer, including processor, assembler or other intermediary

[ISO 21067:2007, 2.1.1]

4 Main aspects for accessible design for packaging

4.1 Information and marking

4.1.1 Contents

The factors in 4.1.1.1 to 4.1.1.4 shall be considered in making the content information and markings accessible.

4.1.1.1 Characters and imagery

Characters shall be legible considering appropriate combinations of size, font, contrast and colour among other aspects for good visibility. Imagery such as pictograms shall be easily understood.

NOTE Important information written in large characters with good contrast increases accessibility for those with limited vision.

4.1.1.2 Braille and tactile cues

Tactile cues and information provided in Braille shall be perceptible and understandable to make the packaged product more accessible for all people including persons with visual disabilities.

EXAMPLE The use of Braille for pharmaceutical products (Directive 2004/27/EC)[4].

NOTE There are many non-Braille readers with visual disabilities.

For the tactile cues to be effective, the appropriate information should take into account the use of symbols and pictograms, as well as the form of language being used (i.e. size, proportion etc.). Social and cultural background should also be taken into account to make this International Standard acceptable and usable internationally and to benefit the elderly and disabled, as well as to apply for all types of packaging.

4.1.1.3 Providing information through alternative formats

When there is information printed on the package, alternative formats of communication shall be considered.

EXAMPLE Using ICT (Information and Communication Technology) based formats to provide information on ingredients and/or substances that can cause allergic reactions[5],[6].

4.1.1.4 Position to indicate information

The essential information for safe and effective use of a product shall be indicated in a conspicuous place that is not destroyed when the package or container is opened.

EXAMPLE Ingredients, instructions for use, and expiration dates and warnings, etc.

The essential information on each portion package should be indicated when a product is packed in separate portions.

4.1.2 Identification

4.1.2.1 By colour

Identification by colour is useful for distinguishing packages of the same shape. Selecting colours discernible by those who can have issues with colour perception shall be considered.

4.1.2.2 By Braille and other tactile cues

The use of Braille and other tactile cues, including raised characters, symbols, and notches, shall be considered, as these are effective for identifying different packages with the same shape.

NOTE A cut indicating the opening of a package or container helps locate the opening.

4.1.2.3 Specific shape of packages

The identification of a package with a specific shape by both touch and sight shall be considered.

4.1.2.4 For easily misidentified products

Concise identification is crucial for safe and effective use of the packaged products. Where there is a risk of misidentification, a package shall have conspicuous markings identifying its contents.

4.1.3 Openings

4.1.3.1 Opening position

The position of the opening shall have a shape and other characteristics that can be easily identified.

EXAMPLE 1 The opening position having a colour different from or contrasting with the surrounding area.

EXAMPLE 2 A cut-out to indicate the opening position.

4.1.3.2 Opening methods

The opening method or mechanism shall be clearly marked, either in writing or as a graphic illustration or combination thereof when it is not clearly evident.

4.2 Handling and manipulation

4.2.1 Portability

Packaged products should be easy to carry, taking into account appropriate size, shape, mass, frictional properties and stability (centre of gravity, balance and stiffness).

4.2.2 Ease of opening and re-closing

4.2.2.1 Ease of opening

Packages shall be designed so that they can be opened smoothly, irrespective of the size or power of the hands.

EXAMPLE Packages either with finger grips or slip stoppers or made of a material that can be easily cut straight.

4.2.2.2 Ease of re-closing

Re-closable packages shall be considered to have a structure firm enough to ensure re-closing to maintain package integrity.

EXAMPLE A re-closable package having a touch or auditory (e.g. click) mechanism to affirm that the package has been securely reclosed.

4.2.3 Taking out the contents

4.2.3.1 Ease of taking out the appropriate quantity

Packages should have a mechanism to measure out or take out an appropriate controlled quantity of the contents to prevent excess contents from leaving the package or container.

4.2.3.2 Ease of content removal

Packages shall be designed to prevent splashing or spilling in use and to provide users with access to all of the contents.

4.2.4 Storage and stability

4.2.4.1 Efficiency

Packages shall be designed for easy and efficient storage and be stable during storage.

4.2.4.2 Visibility

Packages shall be designed so that product names, expiration dates and essential information are easily recognizable during storage.

4.2.4.3 Quality assurance

Packages shall be designed so that the quality of the contents is maintained in both use and storage environments.

4.2.5 Separation and disposal

4.2.5.1 Ease of separating

Packages should be designed and marked with the appropriate material type to allow easy sorting by the consumer for disposal.

4.2.5.2 Ease of disposal

Packages shall be designed in such a way that users can perceive, understand and are capable of disposing of the empty package easily and safely, facilitating a variety of end-of-life scenarios.

EXAMPLES Paper boxes that can be easily folded, tubes that can be easily collapsed, or plastic bottles that can be easily crushed.

4.2.5.3 Safety

Packages shall be designed to ensure safety and prevent danger during and after sorting and disposal.

4.3 Evaluation of accessible design for packaging

4.3.1 Evaluation considerations

4.3.1.1 Stages of packaging

Evaluation of accessibility for packages shall be considered in light of all phases of packaging, including manufacturing, distribution, usage and disposal.

4.3.1.2 Context of use and human abilities

Evaluation of accessibility shall be considered in light of the context of use and human abilities (sensory, physical, cognitive and allergies).

NOTE For the purposes of this International Standard, the context of use includes the physical and social conditions under which the package is being used (e.g. a store, a home, etc.).

4.3.2 Evaluation methodology

Instrument-based evaluation and user-based evaluation should be carried out in parallel and should complement each other.

Instrument-based evaluation uses measuring instruments to obtain quantified data, such as force and torque levels in physical tests.

User-based evaluation relies on methods involving humans with or without the use of measuring instruments. It provides insight into the user's sensory, physical and cognitive aspects of accessibility.

5 Special considerations on packaging of harmful contents

5.1 Markings

5.1.1 Prevention of misuse

Packages of products that can pose a danger because of potential misuse or accidental ingestion of contents shall have danger markings in the most conspicuous places. Such danger markings should also be identifiable by alternative formats.

EXAMPLE 1 A package containing a chlorine cleaning agent indicating that mixing its content with an acid cleaning agent produces a dangerous chlorine gas, with a warning not to mix the two agents.

EXAMPLE 2 Tactile discrimination marking methods for packages are specified in ISO 11683[7].

5.1.2 Potentially harmful contents

Packages of products that can cause harm shall conspicuously identify the harmful substance(s). Such information on harmful substances should also be provided by alternative formats.

EXAMPLE 1 Marking of an alcoholic beverage.

EXAMPLE 2 Marking of substances containing an allergen.

EXAMPLE 3 Tactile discrimination marking methods for packages are specified in ISO 11683[7].

5.2 Design of containers to avoid danger and damage

Package structure shall be designed to prevent danger and damage to minimize operational error.

EXAMPLE A container of a product designed so that the direction of use is evident to a variety of users.

Annex A
(informative)

Structure for accessible design standards in packaging

This International Standard complies with ISO/IEC Guide 71[2] and ISO/TR 22411[3]. Following ISO/IEC Guide 71, this International Standard is designed to serve as a series of considerations shown below to enhance accessibility of packaged products.

The specific design consideration for packaging will be elaborated in a concise set of supplemental standards, addressing the physical characteristics of the package (shape, structure and its relation to accessibility of the product) as well as the informational characteristics of the package (information and the way this enhances accessibility of the product).

Figure A.1 is a flow chart that shows the interaction of ISO/IEC Guide 71, ISO/TR 22411[3], and this International Standard. Future standards on information and marking, handling and manipulation and evaluation will be appended to this flow chart.

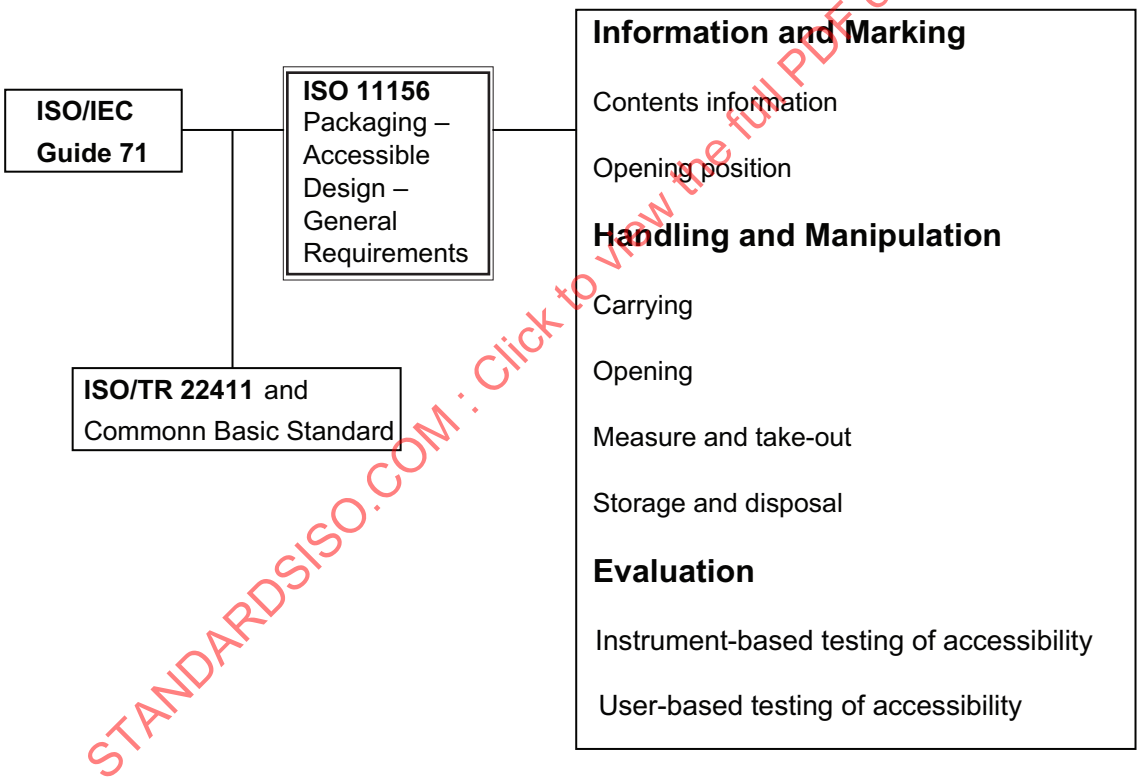


Figure A.1 — Flow chart for accessible design standards

Annex B
(informative)

Framework of considerations for testing accessibility — General approach

B.1 In order to provide the richest information for those designing packaging and the best solutions for people of all abilities, it is crucial that those evaluating packages understand the complex nuances of the interface between users and packages. Considerations include the multifaceted aspects of user ability and varied contexts of use for the varied tasks that it is necessary for the users to accomplish with packaging (e.g. identification, opening, removal of contents, storage, separation and disposal).

B.2 A common model of information processing (Rousseau, *et al.*, 1998[8]; Rogers, *et al.*, 2000[9]) has been adapted to explain the steps that it is necessary for the consumers to negotiate when using a packaged product[9]. This model is comprised of the following stages.

a) Exposure: It is necessary that a user be exposed to a feature or information required to appropriately accomplish the task at hand.

b) Notice: The user's attention is directed to a package feature so that information is brought in through the five perceptual systems (vision, hearing, touch, smell, and taste).

c) Encode: The external information is transformed into an internal representation.

d) Comprehend: It is necessary that the user understand the meaning of the encoded information.

e) Comply: The user acts in an appropriate fashion and the design enables success.

B.3 Success or failure in navigating each of the aforementioned stages is influenced by the following four factors (adapted from Norris *et al.*, 1999[10]):

a) user: their perceptual, cognitive, physical and psychological characteristics;

b) package: graphic and structural characteristics of the packaged product;

c) task: nature of the activity and the user's goals (e.g. moving, storing, using, disposing of, etc.);

d) context of use: physical and social conditions under which the package is being used (e.g. a store, a home during the middle of the night, etc.).

As mentioned, success or failure of the steps is determined by the combined effect of these four factors (see Figure B.1).

As such, evaluations of package accessibility should consider that failures can occur on a perceptual, cognitive, or physical level, and that a variety of factors ultimately influence successes or failures in use. Evaluations should carefully consider the factors so that the results are reproducible, repeatable and realistic.

Designers and evaluators, ideally, understand that test conditions are likely to strongly influence the results and carefully consider the users, tasks and context of use of the evaluative conditions. For instance, a test that asks a panel of healthy panellists to open a package under laboratory conditions with no time limits is likely to yield a result different from testing that is conducted under more valid conditions (a busy home environment) under a time limit with a consumer that has just broken an arm.

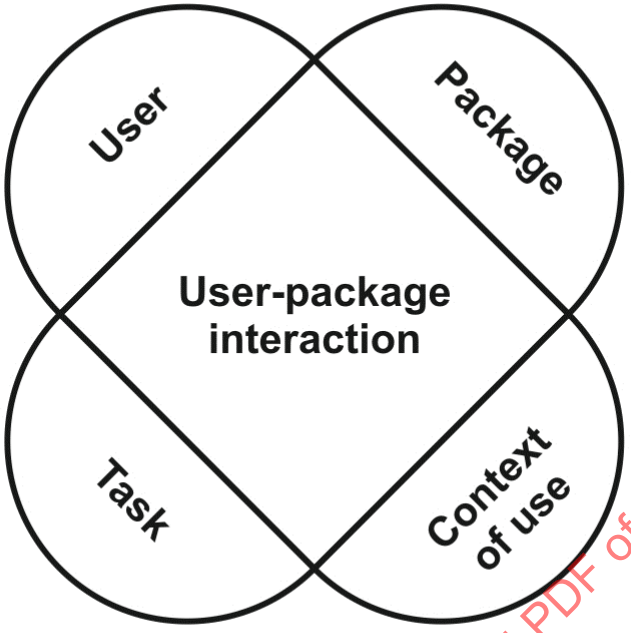


Figure B.1 — Four factors to influence success or failure

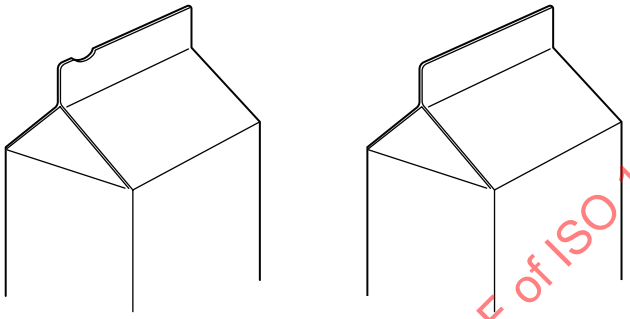
Market segmentation is a strategy that attempts to deliver products with maximum impact to homogenous groups, the members of which share requirements and preferences from the population. Although market segmentation has been a force in marketing since the 1950s, and company testing commonly targets a specific market geographically, demographically, psychographically, by product attribute and by buyer behaviour, it is considered that market segmentation is not the correct strategy for testing accessibility. Accessibility testing should be designed so that it embraces users with broad ranging abilities that are challenged in a variety of contexts of use during the design and evaluation process, as opposed to focusing narrowly. Insights garnered during the course of such an evaluation process can aid in creating products and packages that are not only easier for consumers with difficulties (consumers with disabilities, pregnant women, children or people with casts, for instance) in challenging contexts, but they are also easier for the general populace under normal conditions of use.

Additionally, varied users and contexts aid in understanding the mode of failure so that a more effective strategy for corrective action on poor designs can be taken. Consider, for instance, a package with a novel opening feature that cannot be opened by a large number of consumers. The failure can be the result of consumers not noticing the opening instructions. It can also be the result of failing to notice the opening feature. Perhaps the consumer noticed instructions, but was not able to decipher them because of insufficient contrast or text size. However, it can also be that the consumers were able to decipher the instructions but even after they had seen them, failed to understand the mechanism for opening. Beyond that, it can be that they were physically unable to perform the task. The design solution for each failure is likely be different, so it is important to understand where in the five steps the design is failing[11].

Annex C
(informative)

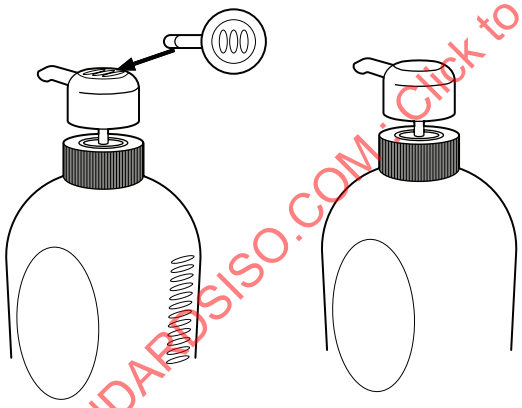
Examples of accessible packaging design

C.1 Examples of content identification



NOTE The presence or absence of a notch helps consumers differentiate milk from juice (or some other products) packed in packages of the same/similar shape and stored close to each other.

Figure C.1 — Addition of a notch on the top



NOTE Tactile cues applied on the top and the side help consumers differentiate shampoo from conditioner (or some other products) packed in packages of the same/similar shape and stored close to each other.

Figure C.2 — Addition of tactile cues on the bottle

NOTE Those who cannot read Braille can identify the content.

Figure C.3 — Raised characters

C.2 Examples of clear indication of opening position

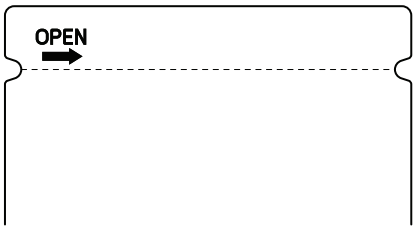


Figure C.4 — U-shaped notch to indicate opening position

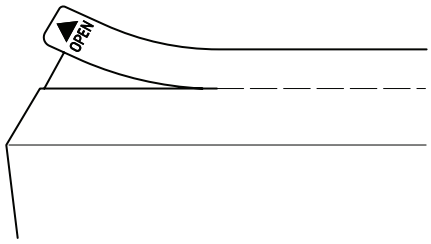


Figure C.5 — Clear identification for opening position

C.3 Example of ease of handling

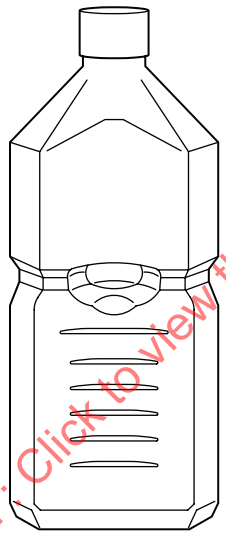
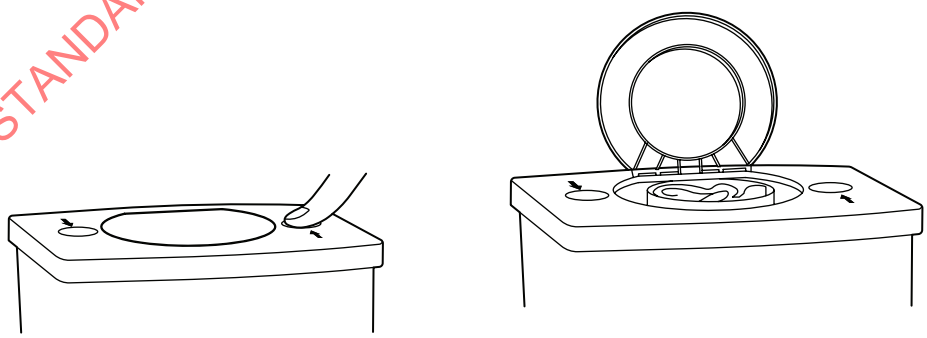


Figure C.6 — Pinched waist plastic bottle with dent(s)

C.4 Example of ease of opening



NOTE Pushing the top once makes the lid open.

Figure C.7 — Easy-to-open plastic container