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Packaging — Accessible design — General requirements

Emballage — Conception accessible — Exigences générales

ICS 11.180.99; 55.020

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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.

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. The present 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 will be 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].

Economic globalization results in the circulation of packages across borders, causing problems due to differences in language and culture.

The present standard complies with the ISO/IEC Guide 71, *Guidelines for standards developers to address the needs of older persons and persons with disabilities*, and ISO/TR 22411, *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.*[2] Following ISO/IEC Guide 71, *Guidelines for standards developers to address the needs of older persons and persons with disabilities,* this 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

The present 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 and use the contents. It considers varying aspects of the packaged product lifecycle from identification of the product and purchase and use of the product to the separation and disposal of the package.

The dimensions, materials, manufacturing methods, or evaluation methods of individual packages are beyond the scope of this standard. They will be specified in separate individual standards.

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, *Packaging – Vocabulary*

ISO/IEC Guide 71, *Guidelines for standards developers to address the needs of older persons and persons with disabilities*

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, 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 which may 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, 2.1.1]

4 Main aspects for accessible design for packaging

4.1 Information and marking

4.1.1 Contents

The following factors 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

Providing information in Braille or with tactile cues 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) [3]

NOTE 1 There are many non-Braille readers with visual disabilities.

NOTE 2 For the tactile cues to be effective, the appropriate information should take into account of the use of symbol/ pictogram, as well as the form of language to be used (i.e. size, proportion etc.). Social and cultural background should also be taken into account to make this standard acceptable and used 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 but not accessible, it is recommended that the information be delivered by way of alternative formats.

EXAMPLE Use ICT (Information and Communication Technology) based formats to provide information on ingredients and/or substances that might cause allergic reactions. [4]

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 will not be destroyed when the package or container is opened.

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

NOTE 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 may have some colour defects shall be considered.

4.1.2.2 By Braille and other tactile cues

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

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

4.1.2.3 Unique shape of packages

A package with a unique shape shall be considered as this can be identified both by touch and sight.

4.1.2.4 For easily misidentified products

Concise identification is crucial for safe and effective use of the packaged products. Where misidentification risks exist, packages shall have conspicuous markings identifying its contents.

4.1.3 Openings

4.1.3.1 Opening position

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

EXAMPLE 1 The opening position which has a different colour or contrast from the surrounding area

EXAMPLE 2 A cut-out to indicate the opening position

4.1.3.2 Opening methods

The opening method / mechanism shall be clearly marked either written or as a graphic illustration or combination thereof.

4.2 Handling and Manipulation

4.2.1 Portability

Packaged products should be easy to carry, taking into account appropriate size, shape, weight, frictional properties, and stability (center 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 with finger grips or slip stoppers or be made of a material that can be easily cut straight

4.2.2.2 Ease of re-closing

Re-closable packages shall have a structure firm enough to ensure reliable re-closing to prevent leaking.

EXAMPLE A re-closable package having a touch or auditory (e.g. click) mechanism to confirm that the opening has been resealed normally.

4.2.3 Taking out the contents

4.2.3.1 Ease of taking out the appropriate quantity

Packages should have a mechanism to weigh out or take out an appropriate controlled quantity of the contents to prevent too much of the 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; users have 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 recognized during storage.

4.2.4.3 Quality assurance

Packages shall be designed so that the quality of the contents will be 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 and allow easy separation, by the consumer, for disposal.

4.2.5.2 Ease of disposal

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

EXAMPLE 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 separation 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 view of all the 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 view of the context of use and human abilities (sensory, physical, cognitive and allergies).

NOTE For the purpose of this standard, the context of use includes the physical and social conditions under which the package is being used (e.g. a store, a home during the middle of the night etc.)

4.3.2 Evaluation methodology

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

Instrument-based measurement provides data obtained through the use of testing instruments without the involvement of the user, e.g. tensile testing, torque testing etc.

User-based evaluation provides data obtained from the interaction or involvement of users with or without using instruments. It can provide 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 may 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 will produce a dangerous chlorine gas, also warning not to mix the two agents

EXAMPLE 2 Tactile discrimination marking methods for packages are specified in ISO 11683, *Packaging--Tactile warnings of danger--Requirements* [5].

5.1.2 Potentially harmful contents

Packages of products that may 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 containing-an allergen

EXAMPLE 3 Tactile discrimination marking methods for packages are specified in ISO 11683, *Packaging--Tactile warnings of danger--Requirements* [5].

5.2 Design of containers to avoid danger and damage

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

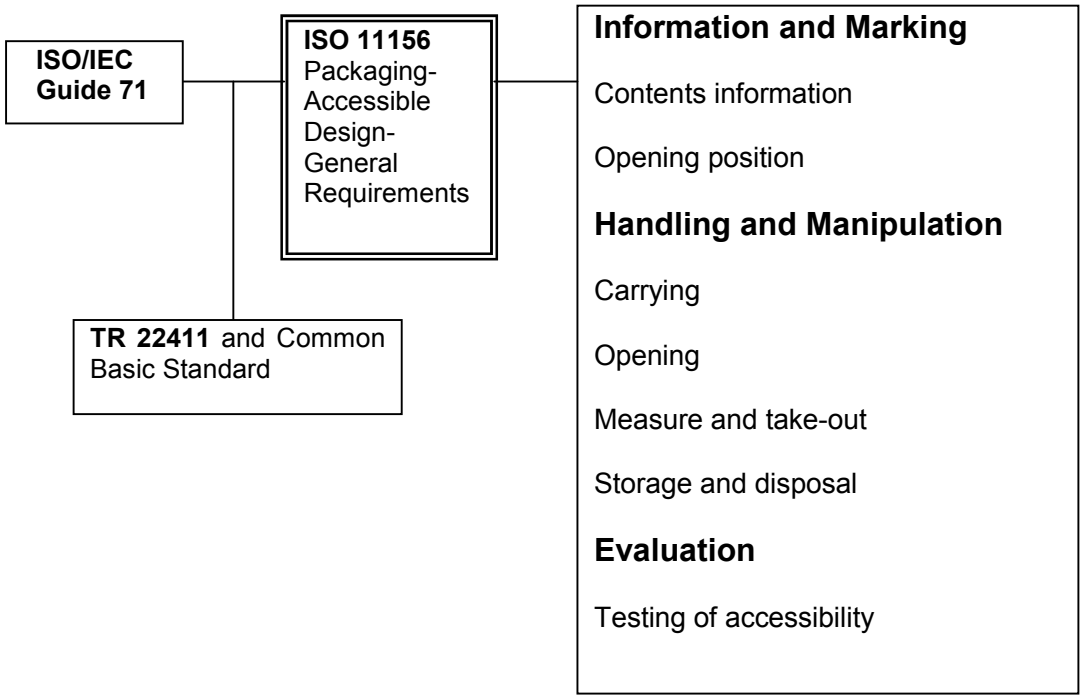
EXAMPLE A container of a product designed so that the direction of use is intuitive to a variety of users.

Annex A
(Informative)

A structure for accessible design standards in packaging

A.1 General

The ISO 11156 complies with the ISO/IEC Guide 71, *Guidelines for standards developers to address the needs of older persons and persons with disabilities*, and ISO/TR 22411, *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.* Following ISO/IEC Guide 71, ISO 11156 is designed to serve as a series of considerations shown below to enhance accessibility of packaged products.



Annex B
(informative)

A framework of considerations for testing accessibility

B.1 General approach

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 users must accomplish with packaging (e.g. identification, opening, removal of contents, storage, separation and disposal).

A common model of information processing (Rousseau *et al.*, 1998; Rogers *et al*., 2000) has been adapted to explain the steps that consumers must negotiate when using a packaged product.[6] This model comprises the following stages:

1) Exposure: a user must be exposed to a feature or information required to appropriately accomplish the task at hand

2) 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).

3) Encode: the external information is transformed into an internal representation.

4) Comprehend: the user must understand the meaning of the encoded information.

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

Success or failure in navigating each of the aforementioned stages is influenced by four factors (adapted from Norris *et al.*, 1999) [7]:

1) The user: their perceptual, cognitive, physical and psychological characteristics.

2) The package: the graphic and structural characteristics of the packaged product.

3) The task: the nature of the activity and the user's goals (e.g. this needs to be moved, stored, used, disposed of, etc.).

4) The context of use: the 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).

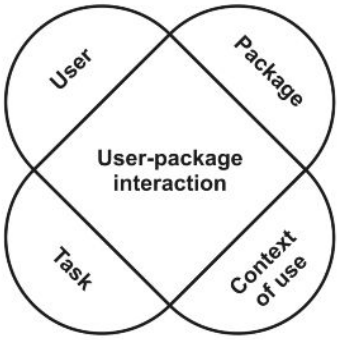


Figure B.1 — Four factors to influence success or failure

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 will ultimately influence successes or failures in use. Evaluations should carefully consider the factors so that they deliver results that are reproducible, repeatable and realistic.

Designers and evaluators will, ideally, understand that test conditions are likely to strongly influence the result 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 will likely yield a different result than testing that is conducted under more ecologically valid conditions (a busy home environment) under a time limit with a consumer that has just broken their arm.

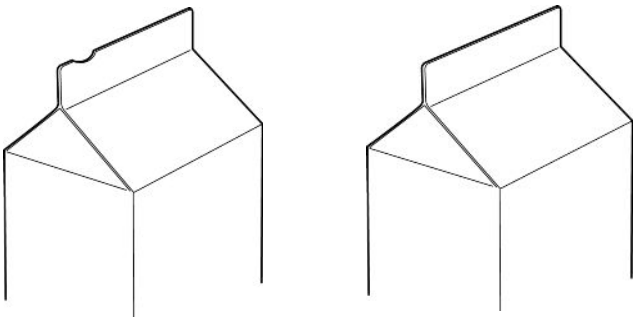
Market segmentation is a strategy that distinguishes homogenous groups who share needs and preferences from the population at large in an attempt to deliver products with maximum impact. Although market segmentation has been a force in marketing since the 1950's, and company testing commonly targets a specific market geographically, demographically, psychographically, by product attribute and by buyer behavior, we submit 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 varied contexts of use during the design and evaluation process, as opposed to focusing narrowly. Insights garnered during the course of such an evaluation process will create 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 could be the result of consumers not noticing the opening instructions. It could also be the result of failing to notice the opening feature. Perhaps the consumer noticed instructions, but could not decipher them because of insufficient contrast or text size. However, it might be that the consumers was able to decipher the instructions but failed to understand the mechanism for opening even after they had seen them. Beyond that, it could be that they were physically unable to perform the task. The design solution for each failure will likely be different so it is important to understand where in the five steps the design is failing. [8]

Annex C
(informative)

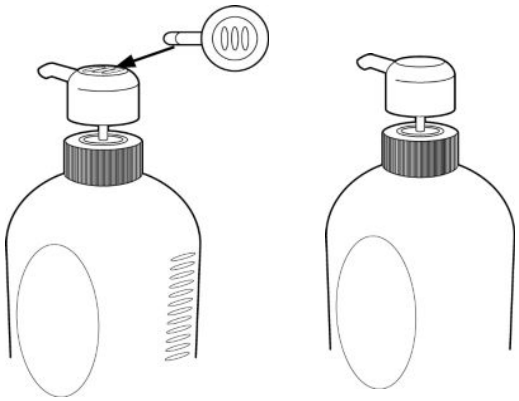
Examples of accessible packaging design

C.1 Examples of content identification



NOTE With or without a notch will help 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 will 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 a 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

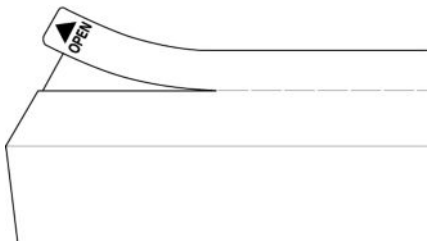


Figure C.5 – Clear identification for opening position

C.3 Example of ease of handling

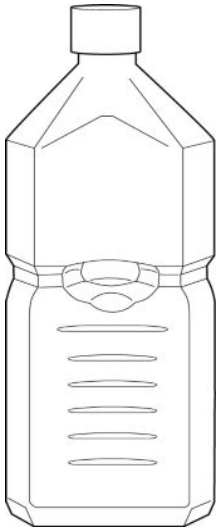
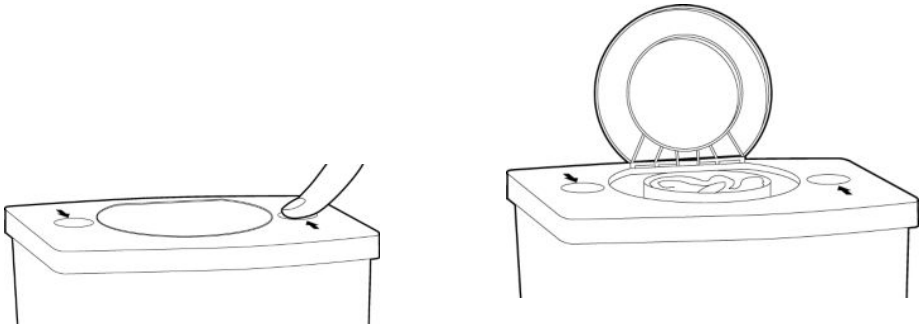


Figure C.6 – Pinched waist plastic bottle with dent(s)

C.4 Example of ease of opening



NOTE Pushing the top once makes the lid open.

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

C.5 Example of ease of measuring and taking out

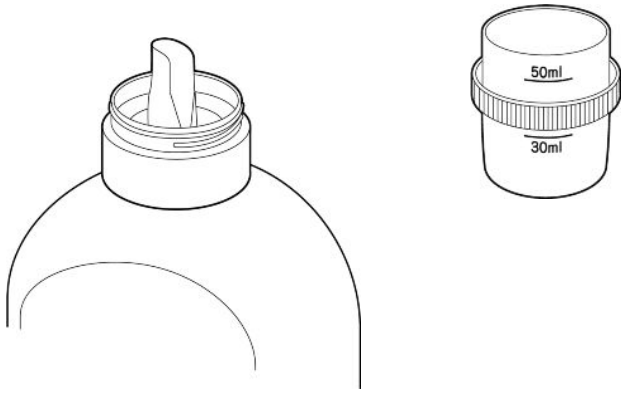


Figure C.8 – Cap with a measuring spout

C.6 Example of ease of separation and disposal

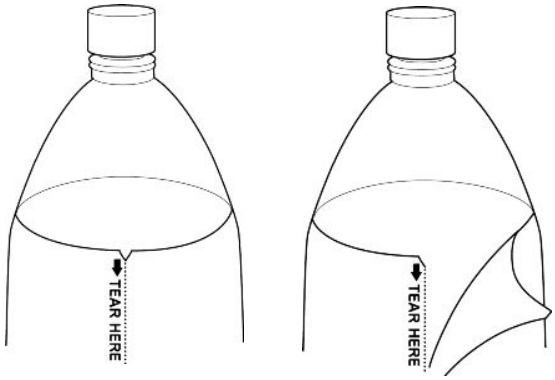
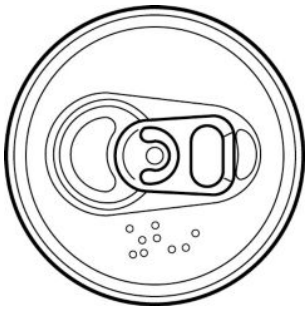


Figure C.9 – Easy-to-peel label

C.7 Examples of Danger and harm marking



NOTE Japanese braille indicates that this is an alcoholic drink.

Figure C.10 – Tactile cue or symbol

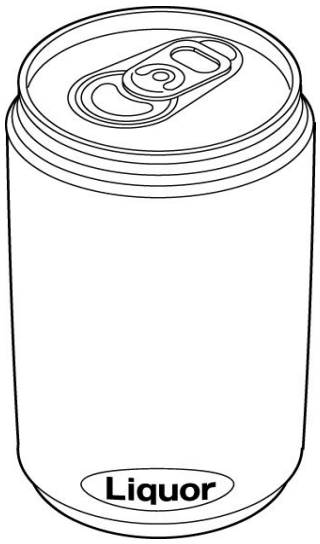


Figure C.11 – Clear indication of the content (Liquor)

NOTE ”DO NOT MIX” message will inform consumer of danger caused by chlorine-based detergent with acidic detergent.

Figure C.12 – Clear indication of danger

Bibliography

[1] Declaration on the Rights of Disabled Persons

[2] ISO/TR 22411*, 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*

[3] Directive 2004/27/EC of the European parliament and of the council of 31 March 2004 amending Directive 2001/83/EC on the Community code relating to medicinal products for human use

[4] ISO 17366, *Supply chain applications of RFID – Product packaging* and ISO 17367, *Supply chain applications of RFID – Product tagging*

[5] ISO 11683, *Packaging - Tactile warnings of danger - Requirements*

[6] Rogers WA, Lamson N, and Rousseau GK (2000). "Warning research: An integrative perspective." Human Factors 42(1): 102-139.

[7] Norris BJ, and Wilson JR (1999). "Ergonomics and safety in consumer product design" in "Human factors in product design: current practice and future trends". W.S. Green and P.W. Jordan. London, United Kingdom, Taylor & Francis: 73-84.

[8] Norris BJ, and Wilson JR (1997). "Designing safety into products: making ergonomics evaluation a part of the design process". London, United Kingdom, Department of Trade and Industry.