

Revision of Former JIS S 0021 and Establishment of New JIS S 0021 Packaging—Accessible design—General requirements

JIS S 0021:2000 “Guidelines for all people including elderly and people with disabilities—Packaging and receptacles” had stipulated various preferable points for increased identifiability and usability of product packages to be used by all people including the elderly and disabled. This JIS was entirely revised in line with the international ISO 11156 established in 2011, and published on May 20, 2014 as new JIS S 0021 “Packaging—Accessible design—General requirements.” This document summarizes the background and circumstances of the JIS revision, and some points discussed at the time of the deliberation as well as further problems to be solved in the future.

Introduction

1. Circumstances of JIS Revision

In line with the progress of an aging society in Japan, consideration of the disabled and mechanism for helping them are made in various aspects of the society. Under these circumstances, JIS S 0021 “Guidelines for all people including elderly and people with disabilities—Packaging and receptacles” was established in 2000, to provide for preferable measures to improve identifiability and usability of product packages to be used by all the people including the aged and disabled with deteriorated physical functions.

These guidelines proved highly influential, resulting in the promotion of the use of packages designed following these standards so widely in Japan, and it was believed to be necessary to make an international promotion of such standards. In preparation for that, discussion was held continuously between Japan, China and Korea from 2002 to 2005. As a result, a proposal was presented in 2007 jointly by Japan, China and Korea to the International Organization for Standardization (ISO) with the Japanese standards as a base. The proposal was favorably supported by other ISO member countries and they finally agreed to ISO 11156 Packaging—Accessible design—General requirements (hereinafter referred to as “International Standard”), established in July 2011.

In the International Standard diverse ideas of other countries were incorporated, making them widely different from the original JIS S 0021:2000 in the structure and provision details. So it was urgently required to revise this JIS as soon as possible. In response, the Japan Packaging Institute (JPI) established a committee

to create a revised JIS draft based on the International Standard. In order to discuss packaging in very extensive applications, a wide range of specialists participated in the deliberation—academic experts specializing in product packages, representatives from related corporations, elderly or disabled users, government officials and representatives from industry organizations. Subcommittee meetings were held with participation of packaging designers actually engaged in packaging. The deliberation concerning the revision of the JIS progressed.

2. Intention of JIS Revision

The former JIS S 0021:2000 had provided for various examples of convenient features of packages for the elderly and disabled, so that they could 1) easily identify receptacle contents from the package or container, 2) distinguish the product from similar ones, or 3) open the container easily, and so forth. Since the JIS establishment, a lot of ingenious packages were made based on these principles. The former JIS, however, had stipulated various package designing methods only, with some examples of packages and receptacles added. It was believed, therefore, that an entire framework of package design from a broader perspective should be made.

The preparation of the International Standard aimed for a proper organization of various features applicable to the elderly and disabled. As a result, basic ideas for upgrading the quality of package design were set forth so that everyone can use products safely and comfortably overcoming the difference in age, perception, cognitive capability, physical functions, language and culture. The resultant systematic guidelines related to everything occurring when using packages or receptacles, encompassing user acceptance, ease in handling and operation, as well as evaluation after usage. While the former JIS had referred simply to identifiability and usability for the elderly and disabled to use products, the International Standard showed the entire theoretical structure of accessible design so that products could be used by everyone safely and comfortably, and that all users could feel satisfied despite restrictive conditions of each of them, in an effort to make practical guidelines for those intending to upgrade packages and packaging design.

In Japan, where it was believed that giving full consideration to the elderly and disabled would become ultimately important viewpoints, the former JIS was revised in line with the newly established International Standard. Specifically, i) various aspects of accessible design, evaluation of them, and points requiring special consideration were presented, and ii) structure of accessible design of packaging and a number of actual packaging examples were shown in the Annexes. As a result,

the new JIS became totally different from the former version both in terms of standard structure and provision details. The title of the standard was also revised to “Packaging—Accessible design—General requirements” after the International Standard.

3. Major Points Revised

JIS Z 0108:2012 “Packaging—Vocabulary” defines accessible design as “design focused 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” Based on this idea, the revised JIS first presents various factors that should be considered when designing packaging, including ingenious ideas of using letters, Braille and tactile marks for indications and distinction information on the packaging.

The revised JIS goes on to address ease in handling packages, carrying around, opening, closing after use, picking up contents, classifying as waste and disposing of packages. The reference to waste classification and disposal at the end is new in the JIS standards, not covered in any previous JIS standards. The new JIS further addresses safety features, including indication of hazardous substances and measures to prevent erroneous use of such substances, again for the first time in the JIS standards history.

Useful examples of actual packages are shown in the latter part of the standard so that many people can fully recognize the idea of accessible design and put these ideas into actual package design. Those involved in the standards revision work spent a lot of time obtaining related information and presenting ideas in a concrete form.

(1) Scope of Application

As mentioned before, the revised JIS S 0021:2014 “Packaging—Accessible design—General requirements” was made by reviewing the former JIS based on the International Standard, which was proposed by Japan. This JIS presents useful guidelines for designing and evaluating packages so that everyone can properly distinguish package contents and handle and use the product overcoming differences in age, perception and cognitive capacity, physical functions, language and culture, while presenting viewpoints for consideration covering the entire lifecycle of a packaged product from product recognition, purchase, and use to waste classification and disposal. Thus this JIS shows the entire picture of accessibility of packages in each stage of lifecycle and framework for evaluation. The revised JIS is basically a faithful reproduction of the intended ideas of the international ISO11156

with additions of actual examples in line with the purport of the International Standard.

(2) Consideration in Preparation of Standard

The following points were carefully considered in preparing the new JIS standard.

Definition of terms

Careful consideration was made concerning terms used in the standard because it involves matters in wide areas related to packaging. Use of package terms was based on the above JIS Z 0108:2012, while that of automatic recognition was based on JIS X 0500:2009 (group of standards) “Automatic identification and data capture (AIDC) techniques—Harmonized vocabulary.”

Handling of annexes

Annexes A and B present background information concerning various points in the body text. Both are closely interrelated and thus there is no material difference between the International Standard and the JIS. On the other hand, Annex C serves as easy-to-understand guidelines for those beginning to create accessible design. So Annex C was based on actual examples given in the International Standard but modification was made to a certain degree. We hope, however, that package designers will find these modified examples to be truly useful and that they fully utilize them in a practical situation.

(3) Points that required special consideration during deliberation

Some of the major subjects that required special consideration during the deliberation for the JIS amendment are as follows:

● Title of the standard

While the former JIS had rather limited characteristics, simply providing for those points that should be considered during package and product designing, the revised JIS was expanded in terms of scope of application and subjects in line with the International Standard. So the new JIS is quite different from the previous one in structure and content, and is considered to be an entirely new standard though the intention and purpose of the former JIS are remained unchanged. So discussion was made as to whether it was appropriate to continue using the previous name of the standard. As a result of deliberation between those concerned, it was determined that it was helpful to all the JIS users to make the

name of the new JIS Packaging—Accessible design—General requirements” in line with the International Standard.

- **Relationship between Accessible design and JIS S 0021**

As presented in JIS Z 0108:2012 “Packaging—Vocabulary,” accessible design is widely known and it is expected that the intent will be accepted even further in the future together with the concept of universal design. The revised JIS S 0021 includes a systematic presentation of various aspects of accessible design in packaging, refers to the relationship between human behavior and packaging, and makes plain explanation of these points, so even those who are involved in packaging for the first time may be able to easily understand the ideas concerned.

- **Use of appropriate terms**

The International Standard that corresponds to the revised JIS is written in English. In order to convey correct intention and ensure correct understanding of the standard, Japanese translation must be precise and the careful attention is required with regard to packaging-related words and terms commonly used in Japan as well as technical terms. In actual process of Japanese standard writing, translation was first presented by experts in package design, package material development or packaging evaluation who are familiar with actual situation of package usage, and then further discussion continued together with experts in addition to those responsible for the translation.

In order to make the documents easily understood by anyone, borrowed English words were not used even if those in packaging business commonly use them in Japan, but precise Japanese equivalents were used. Another effort was to not use especially technical expressions but to write statements easy for general public to understand.

- **Selection of packaging examples in Annex C**

The package examples shown in the International Standard were selected at the time of preparing the original draft of that standard. These examples were in the annex of the document just for informative purposes, intended to be of help for understanding the standards. The examples are shown focusing on each package aspect, ranging from distinction of contents of packages or receptacles having the same or similar shape, to indication of danger or harmfulness. For the Japanese standard revision, however, discussion was held as to whether it was appropriate or not to continue to show those examples. A lot of efforts were made to verify the

appropriateness and determine deletions and additions.

Examples given in a standard must be useful and effective, providing clue for solution of possible problems related to an aspect of the intended package. Also, examples of general characteristics should be used, rather than examples of very special situation. Recommended examples must be free from any restriction in patent, utility model, etc. to be used. Also, recommended examples must either actually be used currently, likely begin to be used or more widely afterwards. Package examples adopted in the Japanese standard were selected in consideration of these points.

Package examples shown in Annex C of JIS S 0021 are classified into eight categories: i) examples for content distinction of packages or receptacles having the same or similar shape, ii) examples of clear indication of how to open, iii) package examples easy to carry, iv) package examples easy to open or reseal, v) package examples easy to weigh/measure or picking up contents, vi) package examples for easy waste classification or disposal, vii) package examples for avoidance of content misuse, and viii) package examples to indicate danger or harmfulness.

To introduce part of discussion concerning package indication for content distinction, there were three types of indications of liquid content in paper receptacle—milk, juice, and others, before the JIS revision discussion. An idea was presented to limit such indications to two types, milk and others, because there were quite a limited number of juice indications actually used compared to milk and others, both used in a great number. Concerning this idea, however, some experts presented their view that it was necessary to keep the juice indication as a guideline to show the container content of juice. As a result, the three types of indications remain in the new JIS, unchanged from the previous one.

Again with regard to indication for content distinction, it was already recommended to put a distinction mark to shampoo bottles in order to distinguish between shampoo and rinse, both of which are likely to be used in the bath at the same time. Now the use of body soap has been increasing lately, so we asked related industry organizations for cooperation to look for tactile indications for distinction between shampoo, rinse and body soap. As a result of their investigation, including test user surveys based on trial products, agreement was reached on adding a special line mark to body soap bottles. Examples of this instance are added newly to the JIS.

● Illustrations of package examples in Annex C

For easy-to-understand presentation of package examples in Annex C, visual

appeal, or, in other words, using illustrations is definitely necessary just like in the former JIS. Unlike industrial design drawings, these illustrations should have purposes of clarification for users. Illustrations used must properly show the intended function, and misleading illustrations should be avoided. The intended product use and implications must be clearly shown in the illustration. If it was difficult to convey the intention sufficiently with illustrations, other useful auxiliary elements were used, such as arrows, directional marks, and deformed sketch presentation. Illustrations were prepared based on a full understanding of product designers' intention and ingenuity exercised for packages that are available on the market. Finished illustrations were evaluated and selected by multiple examiners, rather than only one person. Also, illustrations in an abstract expression were prepared, where possible, in consideration of utility rights and trade mark rights to actual specific designs. In examples for erroneous use avoidance, the indication to not mix multiple products was made with words, like "*Mazeruna Kiken* (Danger—Do Not Mix) in a box against a white background in accordance with the advice given by the Consumer Affairs Agency of the Japanese government.

Annex A

Structure for accessible design standards in packaging

This International Standard complies with the ISO/IEC Guide 71 and ISO/TR 22411. 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, and this International Standard. Future standards on information and marking, handling and manipulation and evaluation will be appended to this flow chart.

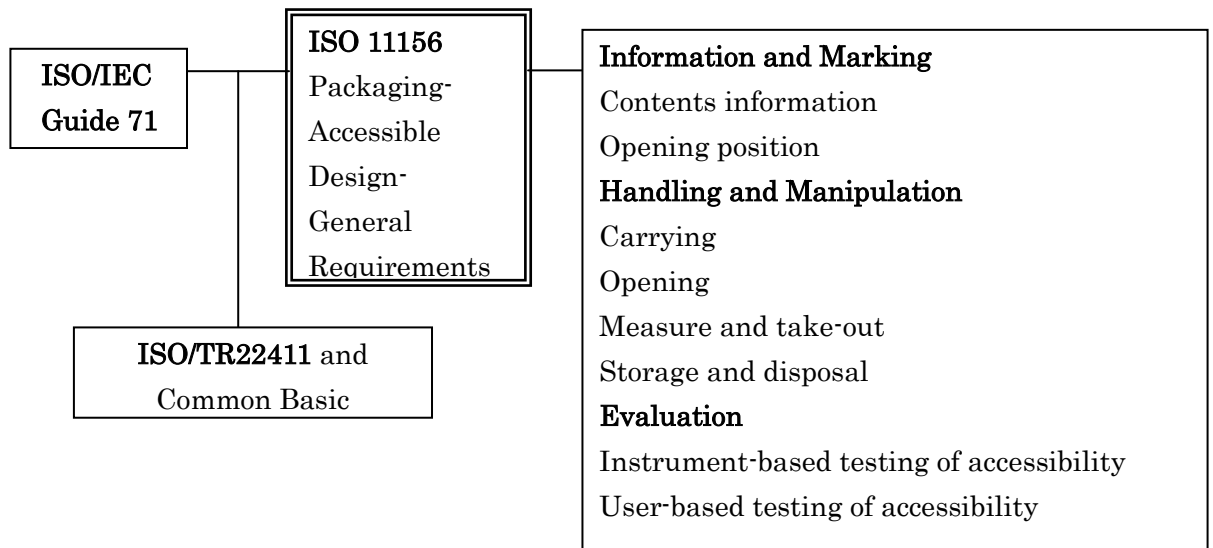


Figure A.1 Flow chart for accessible design standards

Annex B

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; Rogers *et al.*, 2000) has been adapted to explain the steps that it is necessary for the consumer to negotiate when using a packaged product. 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 must 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):

- 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).

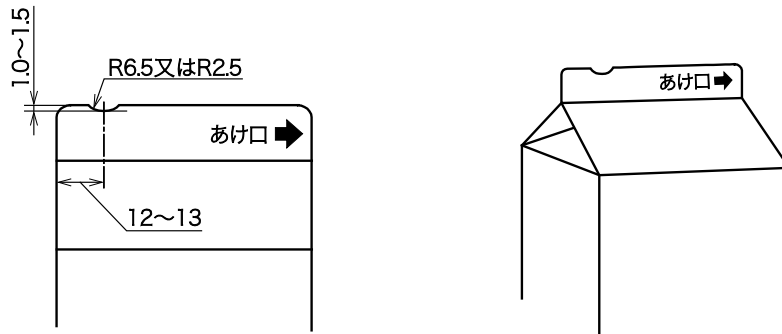
As such, evaluations of package accessibility should consider that failures can occur on a perceptual, cognitive, or physical level, and that a variety of factors ultimately influence successes or failures in use. Evaluations should carefully consider the factors so that the results are reproducible,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

Designers and evaluators, ideally, understand that test conditions are likely to strongly influence the 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 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.

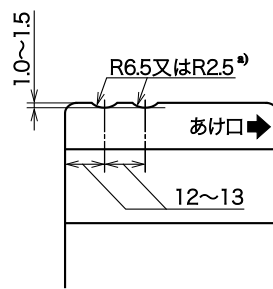
Annex C Examples of accessible packaging design

For distinction between milk and juice

Unit mm



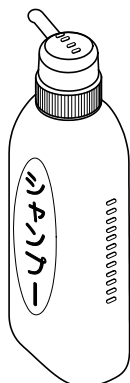
a) Milk carton



b) Juice carton

Note ^{a)} Radius should be the same in these two locations.

For distinction between shampoo and body soap



Add a tactile mark to the receptacle
(for shampoo)



Add a tactile mark to the receptacle
(for soap to clean body, except the face and hair)

(4) Future Consideration

The corresponding International Standard proposes useful and easy-to-handle packaging that can equally be used by all of the general consumers, the elderly and those with reduced perceptual, physical or cognitive function in consideration of every possible factor wherever accessible design of packaging is necessary for them. When the International Standard is revised as the above idea further expands in the future, it will also be necessary to revise the applicable JIS.

Now that the international standard of general requirements is in place, it is probable that the group of standards “Guidelines for all people including elderly and people with disabilities—Packaging and receptacles” have to be revisited for thorough review, specifically, JIS S 0022 Test methods for opening; JIS S 0022-3 Tactile indication for identification; JIS 0022-4 Evaluation method by user; and JIS S 0025 Tactile warnings of danger—Requirements.

Reported by Japan Packaging Institute