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**Guidelines for older persons and
persons with disabilities—
Information and communications
equipment, software and services—
Part 4: Telecommunications
equipment**

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Foreword

This Japanese Industrial Standard has been revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee as the result of proposal for revision of Japanese Industrial Standard submitted by Information Access Council (ICAC)/Japanese Standards Association (JSA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14.

Consequently **JIS X 8341-4:2012** is replaced with this Standard.

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JIS X 8341 series consists of the following 7 parts under the general title *Guidelines for older persons and persons with disabilities—Information and communications equipment, software and services*:

Part 1: Common Guidelines

Part 2: Personal computer hardware

Part 3: Web content

Part 4: Telecommunications equipment

Part 5: Office equipment

Part 6: Guidance on software accessibility

Part 7: Accessibility settings

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Guidelines for older persons and persons with disabilities—Information and communications equipment, software and services—

Part 4: Telecommunications equipment

Introduction

This Japanese Industrial Standard was established in 2005 and has gone through two revisions including this one. The last revision was made in 2012 in answer to establishment of **ITU-T F.790** (2007, 1st edition), and this revision has been initiated to bring the guidelines in this Standard up-to-date with advances in technologies as well as to ensure conformance to a new law that has been put into effect to address the needs of persons with disabilities.

No corresponding International Standard has been established at this point.

This Japanese Industrial Standard has been prepared based on **ITU-T F.790:2007** with some modifications of the technical contents.

One aspect of remarkable development in information and communications technologies like mobile communication and internet is that it has increased accessibility to telecommunications equipment and services. For instance, pay phones, which used to be the dominant means of communication away from home, were largely inconvenient for persons with disabilities: they were difficult to locate for visually impaired users, and challenging to use for wheelchair users with disabilities in lower limbs because of their difficulty in reaching for the phone or opening the door to the booth, and were hardly usable for persons with hearing and speech impairment who were not capable of any communication using voice, making communication away from home virtually impossible for these persons. Thanks to the spread of mobile phones and associated e-mail function (including text messages), however, these persons have been given accessibility to communication away from home and increased freedom in their activities.

While advancement in information and communication technology is beneficial in this way to older persons and persons with disabilities, the multifunctionality, complexity and reduced size of recent telecommunications devices can also present new barriers to these persons, creating the need to incorporate accessibility considerations in the planning, development, design, maintenance and operation of such devices. For example, the recent development of touch panels employed on smartphones or other devices has been recognized with the need to consider accessibility to visually impaired persons.

This Standard provides possible considerations that can be incorporated in the equipment design to ensure and increase accessibility of telecommunications equipment so that they can be easily used by older persons and persons with permanent or temporary disabilities to gain access to various telecommunications services. Among other telecommunications devices, this Standard focuses on those used at home or workplace, or carried with the users for use outside home.

This Standard can also be applied for composite devices incorporating a combination of existing functions, devices for public use or special use, and devices whose main use is not telecommunication but can be used under connection to network.

Although the main focus of this Standard is on telecommunications equipment and not on telecommunications services, accessibility to telecommunications in some cases can be only fully addressed by widening the range of considerations for other related equipment than the equipment directly handled by users or the entirety of communication service. Typical examples for such cases include telecommunications relay services and real-time text communications mainly provided for users with hearing and speech impairment. Based on this understanding, considerations for telecommunications services based on **ITU-T F.790** are provided in Annex A for reference.

1 Scope

This Standard provides guidelines for improving the accessibility of telecommunications equipment such that it will have wider accessibility for use in offices, at home, in mobile or public environments. It covers issues associated with the planning, development, design, maintenance and operation of telecommunications equipment for persons with a wide range of sensory, physical and cognitive abilities, including older persons and persons with permanent or temporary disabilities (hereafter referred to as older persons and persons with disabilities).

NOTE 1 This Standard also provides general guidelines for distributing, acquiring and evaluating telecommunications equipment for persons with a wide range of sensory, physical and cognitive abilities, including older persons and persons with disabilities.

NOTE 2 Products and product groups designed with new concepts that are outside the categories of conventional products, such as complex products, should also comply with this Standard. Where standards specific to such product groups are established, however, those standards should be applied.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this Standard. For the standard indicated below, only the edition of the indicated year shall be applied and any revisions (including amendments) made thereafter shall not be applied.

JIS X 8341-1:2010 *Guidelines for older persons and persons with disabilities—Information and communications equipment, software and services—Part 1: Common Guidelines*

3 Terms and definitions

For the purpose of this Standard, the terms and definitions given in **JIS X 8341-1:2010** and the following apply.

3.1

telecommunications equipment

among other forms of equipment used in telecommunications, any equipment handled directly by users to utilize telecommunications services

3.2

telecommunications accessibility

usability of telecommunications equipment and services by the widest range of users with varying abilities, including older persons and persons with disabilities

3.3

telecommunications services

services provided to users through the use of telecommunications devices

3.4

touch targets

areas on a touch-panel screen on a device that are in the form of buttons and keyboards and are tapped for input operations

4 General principles

People who plan, develop and design telecommunications equipment (hereafter referred to as developers) shall comply with the following general principles in order to ensure and improve telecommunications accessibility.

- a) Older persons and persons with disabilities should be able to use telecommunications equipment on their own to the maximum extent possible.

NOTE 1 For approaches to be followed to ensure accessibility for older persons and persons with disabilities, see **5.2**.

NOTE 2 When compatibility with the intended users is evaluated, such evaluation is performed through activities related to development process (see **5.4**).

NOTE 3 In order to fully ensure accessibility, personal assistance may be required in some cases. However, solutions for ensuring accessibility should not be premised on the provision of personal assistance (e.g. by caregivers, family members).

- b) Telecommunications equipment should be operable to the maximum extent possible without imposing excessive burden upon cognitive capabilities such as intellectual and memory capabilities. The telecommunications equipment should also be operable to the maximum extent possible even when differences in culture or language exist, and/or in cases of use for the first time.
- c) Older persons and persons with disabilities, by using measures to ensure telecommunications accessibility, should be able to achieve the same or similar results that can be achieved by existing functions.
- d) In ensuring telecommunications accessibility, mental and physical safety of users should also be ensured.
- e) In ensuring telecommunications accessibility, information security of users should also be ensured.

5 Requirements for planning, development and design

5.1 Basic requirements for planning, development and design

The basic requirements for planning, development and design are as follows.

- a) Business administrators and development supervisors shall establish telecommunications accessibility policy when they plan, develop and design telecommunications equipment. They should also ensure that developers comply with the policy.
- b) In order to ensure and improve telecommunications accessibility, developers shall plan, develop and design telecommunications equipment in consideration of the requirements provided in this Standard.

NOTE When applying this Standard to individual equipment, requirements are selected from this Standard. In this case, reasons for selection and details of considerations are to be expressed.

- c) New designs of telecommunications equipment should be based on existing standards wherever possible and ensure compatibility with existing equipment.

5.2 Approach for ensuring accessibility

In order to ensure telecommunications accessibility, developers should take the following approaches.

- a) Design telecommunications equipment so that all users can use it without special preparations such as setting changes.

NOTE This approach is especially important when designing public terminals such as pay phones.

- b) Design telecommunication equipment so that its setting can be changed to suit the specific needs of individual users.

Example For multi-function telecommunications equipment, provide operation modes consisting only of frequently-used functions.

NOTE 1 With this approach, users with different abilities and needs can optimize the operational methods of telecommunications equipment for themselves.

NOTE 2 **JIS X 8341-7:2011** provides detailed guidelines for accessibility setting.

- c) Where **a)** and **b)** are infeasible or inappropriate, provide a set of telecommunications devices or several telecommunications devices which together cover the entire needs of all users to the maximum extent possible.

Example 1 Provide mobile phones equipped with text-to-speech function, mainly for users with visual impairment.

Example 2 Provide mobile phones limited to voice call functions, mainly for older persons who are not familiar with the operation of multi-function telecommunications equipment.

- d) Where needs of certain users cannot be addressed by **a)**, **b)** or **c)**, ensure connectivity with assistive technologies to establish foundation for those users to create measures to ensure accessibility for themselves (see **6.6** and **7.5**).

5.3 Basic policies

In order to secure and improve telecommunications accessibility, developers should understand the concept of human-centric design. Efforts for the human-centric design for telecommunications accessibility are characterized as follows.

- a) Actively involve intended users of the product such as older persons, persons with disabilities and caregivers in the development process to obtain a clear grasp of user requirements.

NOTE Requirements of individual users and their mental and physical functions vary greatly, and various use environments can have significant effect on how they use the product. Through facilitating active involvement of a wide range of users and their communication with developers, valuable information for securing and improving telecommunications accessibility can be obtained.

It is to be noted that participation methods of users differ based on measures used in development process.

- b) In order to achieve user-friendly interface for the intended users of the product being developed, classify functions into those that depend on users' operation and those that depend on telecommunications equipment and telecommunications services.

NOTE Absence of such division of functions will make the equipment or service difficult to use for older persons and persons with disabilities. It may also add to the production cost unnecessarily. Allocation of functions should be based on considerations for design, cost and reliability, as well as on accessibility considerations.

- c) Iterate design solutions and evaluations.

NOTE Determine product specifications considering users' requirement, and repeat design process to ensure and improve telecommunications accessibility using evaluation of users etc.

- d) Have experts with varying expertise participate in the development process.

NOTE To properly address diverse needs of users with varying mental and physical functions, participation will be required, not just of developers, but also of specialists from various fields, such as ergonomics experts, accessibility experts, user interface designers, system engineers, programmers, support representatives, and sales department personnel, so that a wide range of expertise is available to help achieve accessible and user-friendly design.

5.4 Activities related to development process

Developers shall include the policy to ensure telecommunications accessibility in their development process plan. The activities related to four development processes specified in 5.4.1 to 5.4.4 should be repeated until the goal is achieved. See 5.3 of JIS X 8341-1:2010.

5.4.1 Understanding and specifying the context of use

For the purpose of understanding and specifying the context of use by the intended users of the product being developed, the following activities shall be conducted.

- Comprehend the characteristics of mental and physical functions of the intended users of the product being developed.
- Comprehend the knowledge, experiences and demands of the intended users of the product being developed regarding the use of telecommunications equipment.
- Comprehend the environment in which the intended users of the product being developed will use telecommunications equipment.

NOTE Older persons and persons with disabilities are more prone to influences and restrictions by environment in their use of telecommunications equipment.

5.4.2 Comprehension of user requirements

In order to comprehend the requirements of the intended users of the product being developed, following activities shall be conducted.

- Identify requirements of the intended users of the product being developed.
- Determine priorities of intended user requirements of the product being developed.
- Comprehend the relationship between requirements provided by relevant laws etc. and the requirements of users.

NOTE Select one or more necessary requirements from Clause 4, Clause 5, and Annex B to Annex E.

5.4.3 Production of design solutions

In order to produce design solutions, following activities shall be performed.

- Use existing knowledge including specific considerations, and examples and notes for providing solutions as given in this Standard, ergonomics, and cognitive engineering.
- Develop prototypes of solutions using simulations, models, mockup etc.

5.4.4 Evaluation of designs against requirements

To evaluate designs against requirements, following activities shall be performed.

- Involve intended users in evaluation of prototypes.
- Return to each activity based on the evaluation results as necessary, and iterate the development process until the requirements of the intended users are met.

6 Common requirements for operation and usage

6.1 Operation

6.1.1 Operation of functions

All the necessary procedures for functions of the telecommunications equipment shall be operable without any difficulties from beginning to end wherever possible.

6.1.2 Simplicity of operation procedures

Basic functions of telecommunications equipment should be designed to be operable by procedures that are as simple and straightforward as possible with considerations of cognitive process and behavioral characteristics of the intended users in mind.

Example 1 In operations requiring memorizing the whole operational procedure or the current content on the screen to proceed to the subsequent steps, it is possible to display the previous operational steps or bring back the previous content on the screen.

Example 2 Input can be done only with one hand.

Example 3 Information can be obtained only with voice guidance.

Example 4 The equipment can be operated only through interactive menu.

Example 5 The format of information presentation is consistent across all pages.

Example 6 A simplified menu consisting only of frequently used functions is provided.

NOTE 1 Similarity of operations among similar types of equipment will allow users to guess the necessary operations from experiences of use of similar equipment, without the need to learn/memorize a new set of operations.

NOTE 2 Users with memory decline due to ageing etc. may have difficulty in remembering operational procedures or contents on the screen correctly.

NOTE 3 Ensuring consistency in operational procedures etc. for the equipment can reduce the extent of complication and inefficiency that can be caused by the use of assistive technology.

NOTE 4 Recommendations for menu structures, menu presentation etc. regarding menu dialogue design are provided in **JIS Z 8524:1999**.

6.1.3 Confirmation via multiple senses

Confirmation of the following by the users shall be possible via multiple senses.

- Whether the equipment is in a usable condition
- Whether the communication line is in a usable condition
- Results of operations
- Whether the input operation was intended
- The fact that the equipment will be unusable soon, or if possible, the reason for that

Confirmation of other conditions than above should be possible via multiple senses.

- Example 1 A usable condition can be confirmed with auditory signals, in addition to visual indications on the screen.
- Example 2 Communicable state can be confirmed with visual indications, in addition to auditory signals.
- Example 3 Changes of mode can be confirmed with auditory signals in addition to visual indications on the screen.
- Example 4 Inadvertent cases such as input of characters in the area that accepts only numbers are notified by vibration or blink of the screen, in addition to auditory signals.
- Example 5 Caution messages are provided by voice guidance, in addition to indications on the screen.
- NOTE 1 Information presented via visual means only will not be communicable to users with visual impairment or in any use environment where the screen cannot be seen.
- NOTE 2 Informational guidance given only via auditory means is inaccessible to users with hearing impairment or users in an environment with ambient noises or an environment where making a sound is not appropriate.
- NOTE 3 Providing multiple confirmation functions is effective for users with reduced cognitive abilities such as memory, as well as in diverse use environments.
- NOTE 4 Other possible ways of making confirmation accessible is to substitute visual information with auditory information and to compensate for sensory decline by e.g. providing auditory information in larger volume.

6.1.4 Addressing time restrictions

Where the telecommunications equipment requires users to enter information within a limited time span, the time limit should be adjustable wherever possible. If this is not possible, the existence of the time limit should be informed in advance.

- Example 1 There is no time limit for information presentation and input confirmation.
- NOTE When exceeding the time limit has caused the screen to automatically change, it is possible that the user does not notice this and therefore cannot continue the operation.
- Example 2 Users can confirm the telephone number they entered before making a call.
- NOTE For persons with disabilities due to ageing or other reasons such as reduced cognitive functions, reduced vision, reduced muscle strength, paralysis, hand-shaking, involuntary movements, input of response may take longer than usual.

6.1.5 Prevention of incorrect operations

Telecommunications equipment shall be designed with considerations for preventing users from incorrect operations.

- Example 1 The arrangement, colouration, contrast and shape of operation buttons are such that function of each button is readily identifiable. Character or symbol printed on each operation button is easily recognizable.
- Example 2 When requiring a response from the user, simple and understandable expressions, characters of readable size, and voice guidance with clear tone and easy-to-hear volume and speed, are used.
- Example 3 In order to enable users with visual impairment to recognize correct keys with tactile sense or auditory sense, the key of the basic position is marked with a tactile symbol, or the name or function of the key is read out with speech.
- Example 4 Consumables such as printing paper, ink ribbons can be supplied or replaced only in correct direction. Peripheral equipment can be connected only in correct direction.
- Example 5 For operations that cannot be cancelled, such as data transmission or deletion, users are asked to confirm the operation before executing it.

6.1.6 Cancellation of incorrect operations

Users shall be able to cancel incorrect operations and return to the previous setting or operation as far as possible.

- Example 1 In multiple-step operations, users are able to revert to the previous steps one by one, or return to the initial status.
- Example 2 When users made an erroneous selection on a hierarchic menu, they are able to return to the previous menu.

NOTE This consideration does not apply to cancellations that cannot be performed by telecommunications equipment alone, such as cancellation of already transmitted data or to restoration of large volume of data that cannot be stored within the telecommunications equipment due to its limited storage capacity.

6.1.7 Return to initial status

Users shall be able to easily return to the initial status even during the procedure.

- Example Users are able to return to the top menu during operation of any given menu where they do not know how to proceed.

6.1.8 Error reset

Telecommunications equipment shall be designed so that they can be restored to operable status by users in cases of errors as far as possible.

- Example 1 Operable status can be restored by turning off the power and then turning it on again.
- Example 2 Default status can be restored by pressing a reset button.

6.1.9 Output adjustment

Level and nature of outputs such as sound, vibration and screen flashing shall be adjustable by users. In addition, the level and nature of the outputs should be displayed on the equipment.

NOTE 1 For persons with reduced sense of touch, weak vibration may not be tactile.

NOTE 2 For persons with narrow field of view, screen flashing may be difficult to notice depending on the size of flashing area or timing of flashing.

NOTE 3 Persons with hearing impairment may not notice when the telecommunications equipment is set to a large sound level that may be disturbing to surrounding people.

6.1.10 Error messages

Error messages and actions to be taken to resolve the errors should be clear and without room for ambiguity.

6.2 Installation, connection and configuration

Common requirements for installation, connection and configuration are as follows.

- a) Design of packages should allow users to easily open and unpack the packages without aid and without damaging the contents.

Example 1 Marking is given on the package to identify top and bottom of the package.

Example 2 Procedure for opening the package is illustrated on the package.

Example 3 Packages have sufficient openings and are easy to reach into.

Example 4 Packing materials and fixing tapes are readily identifiable and easy to remove.

- b) Setup procedures for telecommunications equipment should be simple enough for users to perform without aid.

- c) Telecommunications equipment should be of simple structure, and plugging of connectors and wiring of cables should be simple enough for users to perform without aid.

Example Terminals that may be plugged/unplugged by users are designed with colour, contrast or shape that guides the users into plugging/unplugging them in the correct direction.

- d) Telecommunications equipment shall be designed to resist movement or tumbling during operation.

Example Metal fittings, screw holes etc. for rigidly fixing the telecommunications equipment are provided.

- e) The position and the procedure for installation of auxiliary equipment, e.g. a tray, and batteries shall be simple and straightforward.

- f) Storing of information such as time, names, and phone numbers in the telecommunications equipment should be simple enough for users to perform themselves.

NOTE Information to be stored may include phone numbers, speed dial settings, time settings and user name.

- g) Replacement of consumables should be easy enough for users to perform themselves.