



JAPANESE
INDUSTRIAL
STANDARD

Translated and Published by
Japanese Standards Association

JIS X 8341-2 : 2004

**Guidelines for older persons and
persons with disabilities—Information
and communications equipment,
software and services—Part 2:
Information processing equipment**

ICS 11.180.01 ; 35.180

Reference number : JIS X 8341-2 : 2004 (E)

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Foreword

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JIS X 8341 consists of the following 3 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: Information processing equipment

Part 3: Web content.

Date of Establishment: 2004-05-20

Date of Public Notice in Official Gazette: 2004-05-20

Investigated by: Japanese Industrial Standards Committee

Standards Board

Technical Committee on Information Technology

JIS X 8341-2 : 2004, First English edition published in 2005-02

Translated and published by: Japanese Standards Association
4-1-24, Akasaka, Minato-ku, Tokyo, 107-8440 JAPAN

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Printed in Japan

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Guidelines for older persons and persons with disabilities—Information and communications equipment, software and services—Part 2: Information processing equipment

Introduction With the progress of information society, all people increasingly come to use the information processing equipment. This Japanese Industrial Standard has been developed as the guidelines to ensure information accessibility required mainly by older persons, persons with disabilities and persons with temporary disabilities when they use the information processing equipment and its peripheral device. This Standard specifies, based on JIS Z 8071 *Guidelines for standards developers to address the needs of older persons and persons with disabilities*, guidelines of specifications to attain. The common guidelines are given in Part 1 and the information processing equipment and its peripheral device without regard to hardware and software in Part 2.

1 Scope This part of JIS X 8341 specifies the matters to consider when planning, developing and designing the information processing equipment and its peripheral device in order to ensure information accessibility when mainly older persons, persons with disabilities and persons with temporary disabilities (hereafter referred to as "older persons and persons with disabilities") use the information processing equipment and its peripheral device.

Remarks 1 Use of this Standard for designing This Standard shall be referred to when the individual information processing equipment and its peripheral device are planned, developed, and designed. If there are separately any standards for product groups of specific fields, those standards shall be referred to. If there are not any standards for product groups of specific fields, JIS X 8341-1 shall be referred to. When this Standard is applied to the individual equipment, according to their types and other conditions, only appropriate items shall be selected from this Standard and applied. When the items are selected, the reason for selection and the content of consideration (function and performance) shall be clearly demonstrated.

2 Use of this Standard for evaluation When the information accessibility of the individual information processing equipment and its peripheral device is evaluated, this Standard shall be referred to. If there are separately any standards for product groups of specific fields, those standards shall be referred to. If there are not any standards for product groups of specific fields, JIS X 8341-1 shall be referred to. When this Standard is applied to the individual equipment, according to their types and other conditions, only appropriate items shall be selected from this Standard and applied.

- 3 Combined products of new concept For the combined products of new concept that are now being developed, such as the livingwares with the information processing function and communication function and that are not defined as the conventional information processing equipment and its peripheral device, this Standard should be applied. However, when standards with regard to those specific product groups are established, those standards shall be referred to.

Information : The characteristics of persons with some sort of disabilities are diverse. When they use the information processing equipment and its peripheral device they encounter different barriers, depending on each individuals case : for example, for the case of older persons, depending on their career, culture and the body region and severity of disabilities caused by aging, and for the case of persons with disabilities, depending on the body region, severity, time of occurrence and subsequent circumstances of disabilities. Therefore, it is desirable to realize, as far as possible, such interfaces that are as diverse as possible and to enable each user to select the most suitable one from among them.

There are several methods to realize various interfaces that are equipped with diverse functions and performance. They are: inclusion into standard configuration, supply of options, connection to assistive devices and so on. Furthermore, the realization techniques are also diverse. They are: realization by hardware, realization by software, utilization of outside sources through network and so on. This Standard assumes to correspond mainly to standard configuration, but further it assumes to correspond to these diverse realization methods as well, and aims to realize the respective necessary functions in the appropriate form to each user according to the technical advance and cost situation.

Information : The supplementary matter on the definition of users is described in annex 1 (informative).

Information : The supplementary matter on accessibility and usability is described in annex 2 (informative).

2 Normative references The following standards contain provisions which, through reference in this Standard, constitute provisions of this Standard. If the indication of the year of publication is given to these referred standards, only the edition of the indicated year constitutes the provision of this Standard but the revision and amendment made thereafter do not apply. The normative references without the indication of the year of coming into effect apply only to the most recent edition (including amendments).

JIS S 0013 *Guidelines for the elderly and people with disabilities—Auditory signals on consumer products*

JIS X 8341-1:2004 *Guidelines for older persons and persons with disabilities – Information and communications equipment, software and services—Part 1: Common Guidelines*

JIS Z 8513 *Ergonomics—Office work with visual display terminals (VDTs)—Visual display requirements*

Remarks : ISO 9241-3:1992 *Ergonomic requirements for office work with visual display terminals – (VDTs) Part 3: Visual display requirements* is equivalent to the said standard.

JIS Z 8514 *Ergonomics – Office work with visual display terminals (VDTs) – Keyboard requirements*

Remarks : ISO 9241-4:1998 *Ergonomic requirements for office work with visual display terminals (VDTs)—Part 4: Keyboard requirements* is identical with the said standard.

JIS Z 8518 *Ergonomics – Office work with visual display terminals (VDTs) – Requirements for displayed colours*

Remarks : ISO 9241-8:1997 *Ergonomic requirements for office work with visual display terminals (VDTs)—Part 8: Requirements for displayed colours* is identical with the said standard.

JIS Z 8524 *Ergonomics—Office work with visual display terminals (VDTs)—Menu dialogues*

Remarks : ISO 9241-14:1997 *Ergonomic requirements for office work with visual display terminals (VDTs)—Part 14: Menu dialogues* is identical with the said standard.

JIS Z 8525 *Ergonomics – Office work with visual display terminals (VDTs) – Command dialogues*

Remarks : ISO 9241-15:1997 *Ergonomic requirements for office work with visual display terminals (VDTs)—Part 15: Command dialogues* is identical with the said standard.

ISO 9241-9:2000 *Ergonomic requirements for office work with visual display terminals (VDTs)—Part 9: Requirements for non-keyboard input devices*

ISO 13406-2:2001 *Ergonomic requirements for work with visual displays based on flat panels—Part 2: Ergonomic requirements for flat panel displays*

3 Definitions For the purposes of this Standard, the definitions specified in JIS X 8341-1 apply.

4 Basic principle The basic requirements for planners, developers and designers to ensure information accessibility of the information processing equipment and its peripheral device shall be as follows:

- a) From the phases of plan, development and design, consider so that equipment can be operated and used by older persons and persons with disabilities.

Remarks : In order to enable all users to access information, from the phases of plan, development and design, information accessibility shall be ensured. The service range and employment of operators shall not be limited.

- b) When the information accessibility to offer cannot be realized by a single function, one or more functions shall be combined to ensure information accessibility.

Remarks : The sensory, physical, and cognitive abilities of older persons and persons with disabilities deteriorate in a diverse way. Sometimes, a single solution is not sufficient and plural solutions or a combination of them are required, depending on the conditions and levels of the sensory, physical, and cognitive abilities to be addressed.

Furthermore, solution methods are not limited to hardware (including assistive devices) and software. A combination of them is allowed to offer functions which meet the requirements.

Furthermore, the basic and recommendation requirements in JIS X 8341-1:2004 shall be considered.

5 Basic requirements

5.1 Operation

5.1.1 Reduction of burden on sensory, physical and cognitive abilities Consider the visual, auditory and other sensory abilities; the physique, muscular strength and other physical abilities; and understanding, grasp and other cognitive abilities. Consider so that the operation does not impose any burden.

- Example 1** The persons with visual disabilities can have difficulty in reading small characters users or feel burden to follow large characters.
- Example 2** The users with auditory disabilities may feel burden to listen to the excessively low sound or the voice of unfavorable frequency bands, because they must be attentive not to fail to hear.
- Example 3** The persons with a hearing aid, etc. may feel discomfort when they hear excessively loud sound.
- Example 4** Some persons feel physical burden when operation needs a large force, repetition, intense motion, etc.
- Example 5** If the persons who can only operate one-handed are forced operation to use both hands, then, they may be forced to take an unnatural posture: instead of a single hand, they are forced to use their face or an elbow.

Example 6 If operation is of multiple layers or requires reading and hearing of much information to understand, it may impose a burden on the cognitive ability.

5.1.2 Consistency of operation The consistency of operation shall be as follows:

- a) Consider so that users can use the particular physical function, consistently obtain and grasp information, and operate.

Example 1 Users who cannot use a pointing device can consistently input only by the keyboard operation.

Example 2 Users who can operate it only one-handed can consistently input only with one-hand.

- b) The consistency in a menu dialogue or a command dialogue shall be in accordance with JIS Z 8524 and JIS Z 8525.

Information : For the consistency in a menu dialogue or a command dialogue, the relevant provisions are extracted from JIS Z 8524 and JIS Z 8525 and are given in annex 3 (informative).

5.1.3 Prevention of operational errors Depending on the level of user's visual, auditory and other sensory abilities; physique, muscular strength and physical abilities; and understanding of sentences and other cognitive abilities, consider prevention of operational errors mistake made by a user.

Example 1 When there are various kinds of operation keys, in order to make them intelligible visually, change arrangement, colour scheme, contrast or shape of operation keys, print explanatory characters on each operation key. Such consideration shall be given when equipment is designed.

Example 2 If users with reduced muscular strength cannot continue to hold hands above the keyboard or tremor and involuntary movement of hands cause users to touch unintended keys, consider using a key guard and other assistive means when equipment is designed.

Example 3 When a user must make a response, use an intelligible text and large, legible characters. Use the voice in clear tone and in volume easy to hear. Such consideration shall be given when equipment is designed.

Example 4 It is desirable that a user can change character size, colour scheme, contrast, voice volume, speed, etc. by using the equipment or assistive devices. Such consideration shall be given when equipment is designed.

Example 5 For the persons with visual disabilities, marking tactile dots shall be attached to the key at the reference position of operation. A touch of the key shall produce auditory information such as the name and function of that key. Thus, the tactile sense and voice shall identify the right key. Such consideration shall be given when equipment is designed.

5.1.4 Cancellation of operational error Consider recovery from operational errors.

Example 1 An operation of multiple times is canceled one by one, and it can return to the previous status before each operation.

Example 2 When operational errors occur, and it takes a long time to return to the status before the operational errors, then, backup of file is acquired automatically and temporarily, so that recovery is possible.

5.1.5 Guide function for operation When offering the information on the operating instruction of hardware or software, consider so that a user can acquire it with plural means.

Example : When the operating instruction is offered in voice, it shall be displayed also in a text on a screen at the same time in consideration of persons who cannot hear voice or have difficulty in hearing voice.

5.1.6 Confirmation function In an operation, the following matter shall be able to be confirmed:

- Whether equipment is ready for use
- If there is any possibility that equipment cannot be used, presence or absence of that possibility
- Whether the intended input was done
- Result of operation

Example 1 When equipment is switched on and ready for use, equipment shall give, in addition to screen display, voice information.

Example 2 In order to inform of the possibility that the battery is dead for a portable information communication equipment, the consumption status of the battery shall be confirmed by voice, in addition to display.

Example 3 When a character is mistakenly input into the input field which accepts only a numeric value, it gives not only a beep but information which is recognized even by persons with auditory disabilities.

Example 4 When a warning message is displayed on a screen, it gives information which is understood even by persons with visual disabilities.

Information : The status that equipment is not ready means the following: the power supply is not switched on or another action is current and a new action cannot be accepted.

Remarks : The provisions for failure of equipment shall be in accordance with 5.1.8.

5.1.7 Start-up, shutdown and restart of system Consider so that the start-up and shutdown are capable of being operated by users themselves.

Information : The start-up and shutdown may not be capable of being operated physically by users themselves.

Example 1 Consider location, size, shape etc. of a power supply switch.

Example 2 A remote switch and other alternative means can be used.

5.1.8 Operation at time of failure Consider so that the forced shutdown and restart are capable of being operated by users themselves when failure occurs.

Information : If occurrence of failure is assumed by users, then, the forced shut-down and restart should be capable of being operated easily by users themselves. In that case, equipment should not be affected adversely, and it should be capable of returning to the status before occurrence of failure.

5.2 Vocabulary and notation

5.2.1 Use of general vocabulary and notation Technical terms, words of foreign origin and abbreviations shall not be used abundantly. Intelligible expression should be used.

Remarks 1 When technical terms, words of foreign origin and abbreviations are used, a glossary should be prepared, or other considerations should be given to help users understand operation.

2 The notation and manual of equipment should be easily and correctly understood so that users can use equipment effectively.

5.3 Independence

5.3.1 Guarantee of independence of operation information and data The guarantee of independence of operation information and data shall be as follows:

a) OS shall not rewrite information on display and setting which users set for the purpose of information accessibility, without users' permission.

Information : If OS or an application changes information accessibility function and setting which OS presented, without informing users of such changes, users may make mistakes in subsequent operation. Operation may become impossible, and the related persons may be given inconvenience.

Example 1 Suppose that persons with auditory disabilities do not use voice output and have switched it off. If it is switched on automatically, this is not known to users, and the related persons may be given inconvenience.

Example 2 Suppose that persons with auditory disabilities have increased sound volume to hear better. If the volume is decreased automatically, the voice may not be noticed.

Example 3 Suppose that persons with colour sense disabilities have changed the colour scheme. If the setting is changed automatically, difference may not be distinguished, or a mistake in reading may occur.

Example 4 Suppose that users with visual disabilities are using a screen reader. If the voice is switched off automatically, users cannot know what has happened.

b) An application should not rewrite information on display and setting which users set through OS for the purpose of information accessibility, without users' permission.

Remarks : It is likely that intentional or accidental rewriting by other users cannot be prevented. Even when rewriting occurs, it is desirable to be able

to return easily to the original status.

5.3.2 Guarantee of independence between applications The guarantee of independence between applications shall be as follows:

- a) When an information accessibility function is effective in a certain application, it shall not be interrupted by other applications or it shall not be invalidated.

Information : It is likely that when an application has its own information accessibility function, this application changes or interrupts the colour scheme, sound volume, etc. which were already set to be suitable to users.

- b) When an application attempts to change the setting of information accessibility function, the application shall demand confirmation of change, and change after user's permission. After application is finished, it shall return the setting to the original setting.

Information : When application attempts to change by all means, it shall return the setting to the original setting on its completion, thereby, it does not affect other applications.

5.3.3 Requirements for change of design/development specifications Upgrade or update shall not damage the information accessibility functions that have already been offered.

Information : To learn new method is difficult for older persons, and the partial change of operating procedure induces confusion with the procedure before change, and often causes an operational error. Furthermore, when the range in which hands can move is limited due to the severe limb disability or the operation is performed by one switch and one button using functions other than hands, the change of operating procedure induces confusion with the procedure before change, and often causes an operational error.

Information : The multi-media function and other advanced functions that are newly offered may lower the level of information accessibility functions that have already been offered.

5.4 Connectivity

5.4.1 Interface specification and protocol For the interface specification and protocol, see the following:

- a) The hardware and software of alternative input and output equipment to be connected externally should disclose the external connection interface specification of the information communication equipment to which it is to be connected.

Remarks : In order to design and develop an alternative keyboard, an alternative pointing device, various switches, a braille printer, etc., it is indispensable to disclose the hardware specification and software specification of the external connection function. For this purpose, developers of information accessibility of information processing equipment and its peripheral devices should disclose the hardware specification of infor-

mation processing equipment itself and peripheral devices, etc. as well as the software specification including OS.

- b) The hardware and software of alternative input/output equipment connected externally should use the interface specification used widely among makers. However, if the interface specification of alternative input/output equipment connected externally is intended to be widely used among makers in future, this rule does not apply.

Information : If the interface specification of alternative input/output equipment connected externally such as an alternative keyboard, an alternative pointing device, various switches, a braille printer is now widely used among makers, that alternative input/output equipment can be connected to other main body system of identical purpose. Thus, a range of user's selection of equipment will widen.

Remarks : Rather than the wired connection, the wireless connection is preferable. However, it is necessary to consider the effect on human bodies, such as a pacemaker.

5.4.2 Location of entry ports of external optional equipment Those ports that are frequently engaged and disengaged should be easy to engage and disengage, considering the following matters:

Example 1 When the terminal requires frequent change of connection, consider so that its location and shape are such that insertion is easy, and mistake of input is prevented.

Example 2 In order to insert/remove the electronic media in the correct direction, consider the location of entry ports of electronic media and the inserting method.

Example 3 In order to ensure the correct and easy connection of connectors, consider location, colour scheme and contrast, and shape.

Information : Users with reduced muscular strength, paralysis, tremor and involuntary movement of hands, reduced muscular strength due to aging may find it difficult to change the electronic media and connect peripheral devices. Furthermore, users with reduced vision due to visual disabilities or aging may find it difficult to identify their location or direction of attachment and detachment.

5.5 Physical safety

5.5.1 Confirmation of safety Consider so that the operation of equipment which has an adverse effect on safety and health of a user due to the unprepared motion of a user does not occur. Depending on the case, consider so that a product and a system may be safely suspended, or a warning shall be given to prevent a user from getting confused and perplexed.

Example 1 When persons with visual disabilities are operating using the sound information with the headphone, the sudden addition of sound with unexpected power shall not cause auditory disabilities.

Example 2 When buzzer sound or voice information output is produced, a part of screen shall blink. When error message or other information is displayed on the screen, sound or voice shall be produced to inform the situation.

Example 3 In order to cope with users with both visual and auditory disabilities, equipment shall need the function to present information by vibration or other tactile sense.

Example 4 When it is predicted that a user performs a dangerous work accidentally, the predicted danger shall be made known to a user with more than one means.

Information : When persons with visual disabilities require operation by touch, if caution/warning for operation is presented beforehand by the means which users can recognize, users can avoid danger at the time of operation.

Information : These functions also help users with intellectual disabilities.

5.5.2 Prevention of photosensible epilepsy, etc. When blinking a picture, light, etc., consider the blinking condition so that photosensible epilepsy, etc. is not induced.

Information : The blinking light may induce photosensitive seizure (photosensible epilepsy). The peak is time frequency of 20 Hz. Alternative blinking of red and blue is most likely to induce the epilepsy. Since it is related with a user's safety, the maximum consideration is required.

5.5.3 Consideration on allergy Consider so that the use of material which may cause allergy is avoided.

5.6 Requirements for security

5.6.1 Information leak Equipment shall offer accessible operation methods which ensure information security when the information processing equipment and its peripheral devices dealing with information which shall not be leaked are used.

Information : If voice output or image enlargement is performed without considering information security, then, there is a possibility that the third party steals password, personal information and other important information.

5.6.2 Alternative means for user's identification means When biometrics is used to identify users or to authorize use of equipment, selection of an alternative identification means shall be possible, and such means shall not rely on user's physical characteristics.

Information : When authentication is performed by fingerprint, iris, face, etc., an alternative method shall be prepared; for example, input of password, etc. by a numeric pad.

Example : It is necessary to consider that there are users who cannot use fingerprint authentication due to disabilities of hands caused by an accident, etc.

5.7 Requirements for personal information

5.7.1 Prevention of information leak due to alternative means Even when an alternative means is used, consider so that information on privacy may not be known by the third party.

Example 1 In the case of voice output, consider so that the produced voice may be displayed and the stop of voice output can be selected.

Information : In the case of users with auditory disabilities, they may not notice that the voice output is carried out.

Example 2 When the information processing equipment and its peripheral devices, etc., are used for the input of personal information, consider so that neither screen display nor input operation may be peeped at.

Example 3 When an earphone and a headphone are attached, the output from the loudspeaker of main body shall be stopped.

5.7.2 Appropriate warning to users When a problem may arise in the protection of information on privacy, it is desirable to inform a user with adequate means before input operation.

Information : Warning shall be presented before input operation. Equipment shall present selection means as to which alternative means are needed by users. Appropriate warning shall be presented to any problems to basic input means and problems when alternative means are not selected.

Information : Users must correctly recognize the privacy problems that arise at the input operation of the information processing equipment and its peripheral devices. This is important for protection of privacy. Some users are beginners and others are frequent users; though it might be unnecessary for frequent users, for beginners, appropriate warning is very effective.

5.8 Requirements for content protection means

5.8.1 Right of use Even when data are protected, for example, by reason of copyright etc., data shall be available by some means or other to users who have the right to use the data.

Information : Users with visual disabilities sometimes want to read the text displayed on the screen in braille output and the voice output. For that purpose, text data are necessary.

Information : The present copyright law allows to convert the open publications into electronic braille files for braille output and disclose them. (2000 Revised Copyright Law, Article 37: Open publications are allowed to be reproduced in braille. Open publications are allowed to be recorded on the recording media or publicly communicated, by processing braille with a computer.)

Information : The Agency of Cultural Affairs recommends that when copyright owners permit free use of their copyright, they attach the mark,