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**Ease of operation of everyday
products —**

Part 4:
**Test method for the installation of
consumer products**

iTeh STANDARD PREVIEW —
Facilité d'emploi des produits quotidiens —

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*Partie 4: Méthode d'essai pour l'installation de produits de
consommation courante*

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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.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of document:

- an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;
- an ISO Technical Specification (ISO/TS) represents an agreement between the members of a technical committee and is accepted for publication if it is approved by 2/3 of the members of the committee casting a vote.

An ISO/PAS or ISO/TS is reviewed after three years in order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn. If the ISO/PAS or ISO/TS is confirmed, it is reviewed again after a further three years, at which time it must either be transformed into an International Standard or be withdrawn.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO/PAS 20282-4 was prepared by Technical Committee ISO/TC 159, *Ergonomics*, Subcommittee SC 1, *Ergonomic guiding principles*.

ISO 20282 consists of the following parts, under the general title *Ease of operation of everyday products*:

- *Part 1: Design requirements for context of use and user characteristics*
- *Part 2: Test method for walk-up-and-use products* [Technical Specification]
- *Part 3: Test method for consumer products* [Publicly Available Specification]
- *Part 4: Test method for the installation of consumer products* [Publicly Available Specification]

Introduction

Many people find everyday products such as telephone answering machines and videorecorders difficult to install. If the product is not easy to install, many users will find the product difficult, if not impossible, to use. This is clearly not desirable, either for the suppliers of such products or for the users. Information about the ease of installation of a product would therefore be of great value to both suppliers as part of their development process, and to potential purchasers making purchase decisions or comparing alternative products. This would provide an incentive for the production of products that are easier to install and use, and enable potential purchasers to pay specific attention to ease of installation when selecting a product to buy.

This part of ISO 20282 specifies a test method that can be used to provide an operational evaluation of the ease of installation of consumer products. The test method is a summative method that gives performance-based measures that can be used for assessment against predetermined criteria or as the basis for comparisons between different products. Thus the test method is an example of a “performance-related” usability method (see ISO/TR 16982) that can be used to measure ease of installation and establish whether quantitative usability requirements for ease of installation have been achieved.

Manufacturers can use the test method presented here to test whether requirements for ease of installation have been met, or to compare their products with previous versions, or with competitor products. They could communicate the test results to potential purchasers in product descriptions or advertising. Corporate purchasers can use the test method to determine whether products meet their needs, while testing organizations could use it as a basis for providing information to potential users and organizations representing users.

Usability (see ISO 9241-11) is the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction, in a specified context of use. Ease of installation provides a measure of the usability of an everyday product when used by the actual or intended users to achieve the goal of installing the product. It is assumed that users can achieve this goal when the product is installed correctly. The method is intended to be used with products where there is a clear criterion for successfully installing the product, and not where there is variable quality in the outcome. Ease of installation is primarily concerned with the installation process, rather than the quality of the features that are present within a product to support the product's installation.

When the installation process is relatively fast and of limited complexity, the most important measure of ease of installation is effectiveness. Effectiveness of installation is measured as the percentage of users who can successfully install the product. Efficiency of installation can be important if the time is extended. In addition, for some products to be identified as easy to install, it is important that users are satisfied with their experience of installation, for example, where the process is very complex.

ISO 13407 provides guidance on the human-centred design principles and design activities to be applied throughout development in order to produce usable products. It stresses that usability requirements should be specified prior to development, and that evaluation is an iterative process during development. The summative test method in this part of ISO 20282 can be used to evaluate pre-specified requirements. Other types of usability methods for formative evaluation are more appropriate when the main objective is to provide feedback in the course of design, although this summative method can also provide information on usability problems that need to be corrected. ISO 13407 also emphasizes the importance of identifying the context of use. ISO 20282-1 describes in more detail sources of variance in user characteristics that form part of the context of use that needs to be taken into account when designing for ease of installation. This information is also needed to identify the requirements for testing in this part of ISO 20282.

This part of ISO 20282 has been published as a Publicly Available Specification so that information and experience of its use in practice may be gathered (see Annex G). Versions of the test method for ease of operation of walk-up-and-use products and for ease of operation of consumer products are given in ISO/TS 20282-2 and ISO/PAS 20282-3.

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Ease of operation of everyday products —

Part 4: Test method for the installation of consumer products

1 Scope

This part of ISO 20282 specifies a test method for measuring the ease of installation of consumer products.

The purpose of the test is to provide a basis for predicting the ease of installation of a consumer product, including measures of its effectiveness and efficiency of installation, and the satisfaction of the intended user population in the intended context of its use. The method could also be applied to maintenance tasks.

The intended users of this part of ISO 20282 are people with human factors expertise in the design and management of appropriate tests, including manufacturers, suppliers, purchasing organizations and third parties (such as consumer organizations).

2 Conformity

A test method reporting values for ease of installation of a consumer product conforms to this part of ISO 20282 if the method used conforms to the applicable requirements in Clauses 7, 8 and 9 and Annexes C, D and E. To provide evidence of conformance, a full report of the results shall be prepared using the format specified in Annex F.

3 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 20282-1:2006, *Ease of operation of everyday products — Part 1: Design requirements for context of use and user characteristics*

4 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

4.1

actual users

group(s) of people who directly interact with a product

NOTE Before a product is released this is the intended user group, and after release this is based on what is known about the actual user group.

[ISO 20282-1:2006, definition 3.1]

4.2

consumer product

product that is intended to be acquired and used by an individual for personal rather than professional use

[ISO 20282-1:2006, definition 3.2]

4.3

context of evaluation

users, tasks, equipment (hardware, software and materials), and physical and social environments in which a product is evaluated

[ISO/TS 20282-2:2006, definition 4.3]

4.4

context of use

users, tasks, equipment (hardware, software and materials), and physical and social environments in which a product is used

[ISO 9241-11:1998, definition 3.5]

4.5

ease of installation

ease of operation for the goal of first installing a product

4.6

ease of operation

usability of the user interface of an everyday product when used by the intended users to achieve the main goal(s) supported by the product

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NOTE 1 Ease of operation is a specific aspect of usability as defined in ISO 9241-11, which in this case is applied to the operation of everyday products. Ease of operation assumes that the functionality of the product other than the user interface operates correctly. <https://standards.iteh.ai/catalog/standards/sist/efcb85d5-6268-49aa-99b4-f94571a8b1c0/iso-pas-20282-4-2007>

NOTE 2 Ease of operation is measured as effectiveness of operation, optionally including efficiency of operation and satisfaction with operation.

[ISO 20282-1:2006, definition 3.4]

4.7

effectiveness

accuracy and completeness with which users achieve specified goals

[ISO 9241-11:1998, definition 3.2]

NOTE 1 For the purpose of this test method, effectiveness of operation is measured by the percentage of users who achieve the main goal(s) of use of a product accurately and completely. Measures of effectiveness of operation are based on the end result independently of whether the goal is achieved in the most efficient way.

NOTE 2 Effectiveness of installation is measured as the effectiveness of operation for the goal of first installing a product.

4.8

effectiveness of installation

effectiveness of operation for the goal of first installing a product

4.9

effectiveness of operation

percentage of users who achieve the main goal(s) of use of a product accurately and completely

NOTE Measures of effectiveness of operation are based on success in achieving the end result independently of whether the goal is achieved in the most efficient way.

[ISO 20282-1:2006, definition 3.6]

4.10

efficiency

resources expended in relation to the accuracy and completeness with which users achieve goals

[ISO 9241-11:1998, definition 3.3]

NOTE 1 For the purposes of this test method, efficiency of operation is measured as the time taken to achieve the main goal(s).

NOTE 2 Efficiency of installation is measured as the efficiency of operation for the goal of first installing a product.

4.11

efficiency of installation

efficiency of operation for the goal of first installing a product

4.12

efficiency of operation

time taken to achieve the main goal(s)

NOTE This identifies a specific resource for efficiency as defined in 4.10.

[ISO 20282-1:2006, definition 3.8]

4.13

everyday product

consumer product or walk-up-and-use product designed for use by members of the general public

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NOTE 1 Some products are designed for use by the general public as well as for professional use, but this definition only applies to non-professional use of the product.

NOTE 2 “Everyday” does not imply that the product must be used every day by the user, rather that it is found in everyday life.

[ISO 20282-1:2006, definition 3.9]

4.14

goal

intended outcome

[ISO 9241-11:1998, definition 3.8]

NOTE A goal is stated independently of the functionality used to achieve it.

4.15

intended users

group(s) of people for whom a product is designed

NOTE 1 Adapted from ISO 9241-9:2000, definition 3.4.6.

NOTE 2 In many cases the actual user population is different from that originally intended by the manufacturer. The intended user group is based on realistic estimations of who the actual users of the product will be.

[ISO 20282-1:2006, definition 3.12]

4.16
interaction

bi-directional information exchange between users and equipment

[IEC/TR 61997:2001, definition 3.4]

NOTE 1 Equipment includes both hardware and software.

NOTE 2 Information exchange may include physical actions, resulting in sensory feedback.

4.17
main goal(s)

most frequent or important outcome(s) that all or a large majority of users want to achieve when using a product

[ISO 20282-1:2006, definition 3.14]

NOTE Examples of main goals are given in Annex A.

4.18
satisfaction

freedom from discomfort, and positive attitudes towards the use of the product

[ISO 9241-11:1998, definition 3.4]

NOTE 1 For the purposes of this test method, satisfaction with operation is measured by the attitude towards the operation of the product.

NOTE 2 The satisfaction with installation is measured by the satisfaction with operation for the goal of first installing a product.

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4.19
satisfaction with installation

satisfaction with operation for the goal of first installing a product

4.20
satisfaction with operation

measures of attitude towards the operation of the product user interface

[ISO 20282-1:2006, definition 3.16]

4.21
task

activities required to achieve a goal

NOTE These activities can be physical and/or cognitive.

[ISO 9241-11:1998, definition 3.9]

4.22
usability

extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use

[ISO 9241-11:1998, definition 3.1]

4.23**user**

person who interacts with the product

[ISO 9241-11:1998, definition 3.7]

4.24**user characteristics**

attributes of a user that can influence usability

[ISO 20282-1:2006, definition 3.20]

4.25**user interface**

elements of a product used to control it and receive information about its status, and the interaction that enables the user to use it for its intended purpose

EXAMPLE The user interface of a shower tap is the water control lever, where the movement of the lever controls the temperature of the water and the position of the lever communicates the temperature to the user.

NOTE A list of operating instructions permanently displayed on the product is part of the user interface.

[ISO 20282-1:2006, definition 3.21]

4.26**user test group**

group of persons selected to participate in a test of usability, sampled according to specific requirements

[ISO/TS 20282-2:2006, definition 4.22]

4.27**walk-up-and-use product**

everyday product that provides a service to the general public

NOTE This includes products intended for use by the general public in commercial premises such as in a shop or hotel.

[ISO 20282-1:2006, definition 3.22]

5 Purpose of testing ease of installation

The purpose of the test method is to evaluate whether ease of installation objectives have been met, or to compare products with previous versions or competitor products.

NOTE 1 This method is complementary to test methods for formative evaluation that use a smaller number of participants (see Annex B).

The test method may be used by

- a manufacturer to test whether usability requirements have been met and/or to provide evidence of the ease of installation of a product for marketing purposes, or
- a potential corporate purchaser or test organization to compare alternative products.

EXAMPLE A manufacturer wants to demonstrate that a multi-function home printer and copier is very easy to install. A sample of 50 people who own a printer/copier at home and who are representative in age, education and ownership of different brands (as these are expected to be the major factors that influence ease of installation) are recruited. Testing takes place on one day. Each session is expected to take a total of 10 min to 30 min, and five kits are available. The printer/copier is returned to its default settings on completion of each test and repackaged as it would be received by the

consumer. Users are taken from a pool in a waiting room. Each person is asked to install the printer/copier and print and copy a test page. The test result is given as the measured success rate together with a confidence interval, and the median task time together with a confidence interval. To be 95 % confident that 80 % of the user population can successfully install the printer/copier, 45 of the 50 people tested will have to be successful.

NOTE 2 ISO/TS 20282-2 specifies a similar test method for ease of operation of walk-up-and-use products, and ISO/PAS 20282-3 specifies a similar method for the ease of operation of consumer products.

6 Test procedure

To measure ease of installation, the following steps shall be followed.

- a) Identify the product to be tested, see 7.1.
- b) Identify the expected context of use (users, tasks and environment), see 7.2.
- c) Check that the product is compatible with intended user characteristics, see 7.3.
- d) Decide whether to test one or more groups, see 7.4.1.
- e) Identify which measures are required, whether there are required values for the measures, or whether two results are being compared, see 7.4.2.
- f) Select a group of users that represents the intended user group of the product, see 7.4.4.
- g) Design a test procedure that includes a representative group of users to install the products, see 7.4.7.
- h) Measure success rate and, optionally, task time and satisfaction (using a questionnaire), see 7.5.
- i) Calculate effectiveness of installation (percentage success rate) and, optionally, efficiency of installation (median task time) and satisfaction with installation (mean questionnaire scores), see Clause 8.
- j) Prepare a full report and/or a short summary, see Clause 9.

7 Test method

7.1 Identify product

Identify the specific product and version to be tested.

The product shall be provided as it would typically be received by the user.

Consumer products may be tested with separate instructions, if these would typically be available.

EXAMPLE A mobile phone is provided in a box with associated documentation, or an oven is provided professionally installed in a physical housing connected to gas or electricity, but without configuration of the clock or other controls.

7.2 Specify expected context of use

7.2.1 Identify criteria for successful installation

The condition(s) that constitute successful installation shall be identified from information supplied by the manufacturer.

The main goal is to install the most common configuration.

The criteria for complete and effective installation shall be specified.

7.2.2 Identify installation procedure

The intended installation procedure shall be identified, typically from information supplied by the manufacturer. Examples are given in Annex A.

This information is needed to plan the test and analyse the results, but is not included in the task instructions (see 7.4.7).

7.2.3 Specify intended or actual user groups

The actual or intended user group expected to install the product shall be identified — for example, based on information provided by the manufacturer.

NOTE If installation requires special skills (e.g. in the use of tools), it is possible that the user group for installation might not be the same as the user group for use.

Some products are aimed at specific segments of the population (e.g. related to income or age group), or could be in a family of related consumer products for different market sectors. The range of each user characteristic listed in ISO 20282-1:2006, Clause 7, expected to have a significant effect on ease of installation, shall be specified.

EXAMPLE The user population of a mobile phone is expected to be 80 % English speaking, 10 % French speaking and 10 % other languages. It is assumed that all the users will have prior experience of using mobile phones to make phone calls.

For those user groups to be included in the testing, the following information is needed.

- Which user characteristics could affect the ease of installation of the product?
- What range of characteristics exists in the intended or actual user group?
- What is the expected distribution of each relevant user characteristic?

a) Physical characteristics

Identify whether installation of the product requires particular physical characteristics (such as body dimensions, strength and biomechanical abilities, visual abilities, auditory abilities, or handedness). Either prior tests of users near the expected limits or the use of existing sources of data on the range of human characteristics may be used to establish the range of people who can use the product.

EXAMPLE Existing data could be used to determine the size of text required for legibility by particular segments of the population.

The range of potential users may also be established by testing users near the expected limits.

b) Psychological and social characteristics

It is important to establish what cognitive characteristics or capabilities (such as knowledge and experience, cultural differences, literacy and language) are likely to have a major effect on ease of installation. This may be done by expert assessment, collection of actual usage data, or empirical studies to evaluate the effect of different user characteristics.

c) Special needs

Identify to what extent the product is intended to support people (such as older users) whose physical or psychological characteristics (body dimensions, strength, biomechanical abilities, visual abilities, auditory abilities, handedness, knowledge, experience, culture, literacy or language) are towards the end of the range. Where possible, use existing data.