
**Ease of operation of everyday
products —**

**Part 2:
Test method for walk-up-and-use
products**

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

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*Partie 2: Méthode d'essai pour les produits grand public d'accès et
d'utilisation immédiats*

ISO/TS 20282-2:2006

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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 normative 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order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn.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again after a further three years, at which time it must either be transformed into an International Standard or be withdrawn.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/TS 20282-2 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]

The following parts are under preparation:

- *Part 3: Test methods for consumer products* [Publicly Available Specification]
- *Part 4: Test methods for the installation of consumer products* [Publicly Available Specification]

Introduction

Many people find everyday products such as ticket machines, washing machines and video-recorders difficult to use, particularly when using them for the first time or infrequently. If the functions provided by a product to support the users' main goals are not easy to operate, many users will find the product difficult, if not impossible, to use. This is clearly not desirable, either for the suppliers of such products and their customers/organizations providing the services, or the users. Information about the ease of operation 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 use, and enable potential purchasers to pay specific attention to ease of operation 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 operation of walk-up-and-use products. This test method is a summative method that gives performance-based measures that can be used for assessment against pre-determined 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 operation and establish whether quantitative usability requirements for ease of operation have been achieved.

Manufacturers can use the test method presented here to test whether requirements for ease of operation 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 customers and organizations representing users.

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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 operation provides a measure of the usability of an everyday product when used by the actual or intended users to achieve their main goals when using the product. It is assumed that users can achieve their intended main goals when the product is operated correctly. The method is intended to be used with products where there is a clear criterion for successfully achieving goals (which is characteristic of most walk-up-and-use products), and not where there is variable quality in the outcome. Ease of operation is primarily concerned with the user interface and the interaction that it supports, rather than the quality of the features that are present within a product or their suitability for the product's intended use.

When the main goals of using a walk-up-and-use product involve task performance that is fast and of limited complexity, the most important measure of ease of operation is effectiveness. Effectiveness of operation is measured as the percentage of users who can successfully achieve the main goals of use of the product. Efficiency of operation may be important, for example, if a product is to be used by large numbers of users in rapid succession. In addition, for some products to be identified as easy to operate, it is important that users are satisfied with their experience of operation, for example, where users have discretion over whether to use the specified product and they can readily choose some alternative means of achieving their goals.

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 operation. 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 initially as a Technical Specification so that information and experience of its use in practice can be gathered (see Annex G). Versions of the test method for the installation and use of consumer products are to be given in ISO/PAS 20282-3 and ISO/PAS 20282-4.

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Ease of operation of everyday products —

Part 2: Test method for walk-up-and-use products

1 Scope

This part of ISO 20282 specifies a test method for measuring the ease of operation of “walk-up-and-use” products.

The purpose of the test is to provide a basis for predicting the ease of operation of a walk-up-and-use product, including measures of its effectiveness and efficiency of operation, and the satisfaction of the intended user population in its expected context of use.

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 or third parties (such as consumer organizations).

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2 Conformance

ISO/TS 20282-2:2006

A test method reporting values for ease of operation of a walk-up-and-use 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 produced, 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, while after release it 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 the physical and social environments in which a product is evaluated

4.4

context of use

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

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[ISO 9241-11:1998, definition 3.5]

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4.5

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

NOTE 1 Ease of operation is a specific aspect of usability (see 4.18) as defined in ISO 9241-11 that is in this case applied to the operation of everyday products. Ease of operation assumes that the functionality of the product other than the user interface operates correctly.

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]

4.6

effectiveness

accuracy and completeness with which users achieve specified goals

[ISO 9241-11:1998, definition 3.2]

NOTE 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.

4.7

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]

4.8

efficiency

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

[ISO 9241-11:1998, definition 3.3]

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

4.9

efficiency of operation

time taken to achieve the main goal(s)

NOTE This identifies a specific resource for efficiency as defined in 4.8.

[ISO 20282-1:2006, definition 3.8]

4.10

everyday product

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

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.

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[ISO 20282-1:2006, definition 3.9] <https://standards.iteh.ai/catalog/standards/sist/88068c99-23f1-4b5e-879e-63d2b971e8fb/iso-ts-20282-2-2006>

4.11

goal

intended outcome

[ISO 9241-11:1998, definition 3.8]

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

4.12

intended users

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

NOTE 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]

4.13

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.

4.14

main goal

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.

4.15

satisfaction

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

[ISO 9241-11:1998, definition 3.4]

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

4.16

satisfaction with operation

measures of attitude towards the operation of the product user interface

[ISO 20282-1:2006, definition 3.16]

4.17

task

activities required to achieve a goal

NOTE These activities can be physical and/or cognitive.

[ISO 9241-11:1998, definition 3.9]

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4.18

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]

4.19

user

person who interacts with the product

[ISO 9241-11:1998, definition 3.7]

4.20

user characteristics

attributes of a user that may influence usability

[ISO 20282-1:2006, definition 3.20]

4.21

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

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

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.

[ISO 20282-1:2006, definition 3.21]

4.22**user test group**

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

4.23**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 operation

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

NOTE 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 operation of a product to potential purchasers,
- a potential purchaser to check whether a product meets their requirements,
- a potential purchaser or test organization to compare alternative products.

This test may be carried out in a lab, or in conjunction with the potential purchaser, installing a prototype machine in a location where controlled trials can take place.

EXAMPLE 1 Estimating effectiveness of operation in the field — An underground railway operator is installing ticket machines at a station at an international airport, and would like to be confident that 80 % of visitors who speak the languages supported by the machine can purchase an appropriate one way ticket. A prototype machine is installed at the airport. Based on the distribution of relevant user characteristics within the intended user population, a user test group of 100 people with representative characteristics is identified. Travellers are approached individually and, if they match the sample requirements, are invited to try using the machine. This process is continued until the sampling requirements have been satisfied. The test result is given as the measured success rate together with a confidence interval. To be 95 % confident that 80 % of the population can purchase a ticket, 87 of the 100 people tested will have to be successful (see Annex D).

EXAMPLE 2 Comparison of efficiency of operation in the lab or test location — A subway operator is installing new ticket barriers that will mainly be used by commuters, and speed of movement through the barrier is important for avoiding queues. The operator wishes to check that the users can operate the new barrier at least as quickly as the one it is replacing. Both types of barrier are installed in a test location and a representative sample of 50 users is recruited. They are asked to form queues to pass through the barriers. When the task time for passing through each barrier has reached a level that is consistent for that barrier, the times are compared. The test result is given as the success rate and median task time together with a confidence interval. The times for using the two barriers are compared using an appropriate statistical test, to find out whether there is a significant difference.

EXAMPLE 3 Comparison of effectiveness and efficiency of operation in the lab and the field — The manufacturer of a self-service terminal used by customers to make purchases from a catalogue in a store, wants to demonstrate (for marketing purposes) that their terminal is easier to use than competitive terminals and will provide a higher throughput of customers with fewer errors. They expect the new terminal to be much faster to use. A prototype is installed in a store. Success rates and task times are measured for the same specified purchases made by 15 typical first time users and 15 typical regular purchasers, using each type of terminal. The task times for successful purchases using the two terminals are compared using an analysis of variance, to find out whether there is a significant difference. To provide a larger sample of success rates, data is collected from the store computers on the success rate in ordinary use by

200 users of each of the two types of terminal. The two success rates are compared to find whether there is a significant difference.

NOTE Similar test methods may also be suitable for testing other types of products. See, for example, ISO/PAS 20282-3¹⁾ and ISO/PAS 20282-4¹⁾ for versions of the test method for the ease of operation and ease of installation of consumer products.

6 Test procedure

In measuring ease of operation, 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 using the products to achieve the main goals of use, see 7.4.
- h) Measure success rate and, optionally, task time and satisfaction (using a questionnaire), see 7.4.2.
- i) Calculate effectiveness of operation (percentage success rate) and, optionally, efficiency of operation (median task time) and satisfaction with operation (mean questionnaire scores), see 7.5 and Clause 8.
- j) Prepare a full report and/or a short summary, see Clause 9.

7 Test method

7.1 Identify the product

Identify the specific product and version to be tested and, if appropriate, the organization responsible for provision of the service supported by the product.

7.2 Specify expected context of use

7.2.1 Identify main goals of use of the product

The main goal(s) of use of the product shall be identified based on information provided by the manufacturer or the organization responsible for the installation of the product for public use. This shall include the most frequent and/or important user goals that the product is intended to support. It is assumed that it is possible for a user to achieve these goals when the product is operated correctly. The goals shall be expressed in terms of the intended outcome of the task activity expressed independently of the means by which it is achieved.

1) Under preparation.

Annex A contains a list of typical walk-up-and-use products, together with the main goals of use of each product. These are accompanied by examples of the task activity that are typically associated with using the product to achieve the main goal. If the walk-up-and-use product being tested is listed in Annex A, a test shall be carried out including the main goal listed for that product. If other main goals are identified for the product being tested the results should be reported separately, see 8.1.

NOTE For many everyday products there will be one self-evident main goal, such as using a telephone to make a phone call, or using a vending machine to purchase an item.

The criteria for complete and accurate goal achievement shall be specified.

EXAMPLE Obtaining the cheapest return ticket from London to Manchester, valid for the desired dates and times of travel.

7.2.2 Identify the tasks

The task activities that need to be carried out in order to use the walk-up-and-use product to achieve the main goal(s) should be identified. This could be based on information provided by the manufacturer and/or the organization responsible for the operation of the product or the provision of the service it supports. The organization responsible for the operation of the product or the provision of the service may be able to provide a breakdown of the frequency and characteristics of the transactions expected to be performed using the product.

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

EXAMPLE 1 Cash dispenser (ATM): insert debit card, enter PIN, key in amount, retrieve card, take money.

EXAMPLE 2 Railway ticket machine: select one adult one way to destination, insert payment, take ticket.

EXAMPLE 3 Public telephone: activate the phone (lift the speaker), provide payment, activate a number (dial).

7.2.3 Specify intended or actual user groups

The actual users of the product, if in use and known, otherwise the intended user groups of the product, shall be identified, based on information provided by the manufacturer and/or the organization responsible for the installation or operation of the product for public use. The range of each user characteristic listed in ISO 20282-1:2006, Clause 7, expected to have a significant effect on ease of operation, shall be specified.

EXAMPLE The user population of a cash dispenser (ATM) at a particular location are expected to be 80 % English-speaking, 10 % French-speaking and 10 % speakers of other languages. It is assumed that all the users will have prior experience of using ATMs to carry out financial transactions.

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

- Which user characteristics could affect the ease of operation 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?