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**Ease of operation of everyday
products —**

**Part 3:
Test method for consumer products**

Facilité d'emploi des produits quotidiens —

Partie 3: Méthode d'essai pour produits de consommation courante

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Contents

Page

Foreword.....	iv
Introduction	v
1 Scope	1
2 Conformity	1
3 Normative references	1
4 Terms and definitions.....	1
5 Purpose of testing ease of operation	5
6 Test procedure	5
7 Test method.....	6
7.1 Identify product.....	6
7.2 Specify expected context of use	6
7.3 Check that the product is compatible with intended user characteristics	8
7.4 Design the test	8
7.5 Measures	10
8 Results	11
8.1 Main goals	11
8.2 Effectiveness of operation.....	11
8.3 Efficiency of operation	11
8.4 Satisfaction with operation	11
9 Report	11
Annex A (informative) Product goals	12
Annex B (informative) Background to the test method.....	14
Annex C (normative) Recruiting a representative sample of users.....	16
Annex D (normative) Confidence intervals.....	19
Annex E (normative) Satisfaction with operation scale	22
Annex F (normative) Format for test reports.....	23
Annex G (informative) Feedback on this part of ISO 20282.....	29
Bibliography	31

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 20282-3 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 ticket machines, washing machines and videorecorders 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 or for 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 install and 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 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 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 users and organizations representing users.

ISO/PAS 20282-3:2007

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, 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 consumer 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 or not 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 as a Publicly Available Specification so that information and experience of its use in practice can be gathered (see Annex G). Versions of the test method for walk-up-and-use products and for the installation of consumer products are given in ISO/TS 20282-2 and ISO/PAS 20282-4.

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Ease of operation of everyday products —

Part 3: Test method for consumer products

1 Scope

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

The purpose of the test is to provide a basis for predicting the ease of operation of a consumer product, including measures of its effectiveness and efficiency of operation, and the satisfaction of the intended user population in the intended context of its 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 and third parties such as consumer organizations.

2 Conformity

A test method reporting values for ease of operation 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 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, 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 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 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.

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

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[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.

[ISO 20282-1:2006, definition 3.9]

4.11

goal

intended outcome

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[ISO 9241-11:1998, definition 3.8]

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

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4.12

intended users

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

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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]

4.13

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(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.

4.15
satisfaction

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

[ISO 9241-11:1998, definition 3.4]

NOTE For the purposes 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]

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

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[ISO 9241-11:1998, definition 3.7]

4.20
user characteristics

attributes of a user that can 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

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]

4.22
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]

4.23**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 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 operation 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 videorecorder is very easy to program. A representative sample of 50 people who have purchased a videorecorder with the intention of programming it to record programmes are recruited. They are selected to be representative in age and education of owners of different brands of videorecorder (as these are expected to be the major factors that influence ease of operation). Each session is expected to take a total of 15 min to 20 min, and two videorecorders are set up with televisions for programming. Each person is asked to program the videorecorder to record a specified programme in a TV magazine. It is expected that most people will use the published code for the programme, but direct programming of the channel and time is also acceptable. The test result is given as the measured success rate together with a confidence interval. To be 95 % confident that 80 % of the user population can program the videorecorder, 45 of the 50 people tested will have to be successful.

NOTE 2 ISO/TS 20282-2 specifies a similar test method for walk-up-and-use products, and ISO/PAS 20282-4 specifies a similar method for the ease of installation of consumer products.

6 Test procedure

To measure 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) Establish a test procedure that includes a representative group of users using the products to achieve the main goals of use, see 7.4.7.
- h) Measure success rate and, optionally, task time and satisfaction (using a questionnaire), see 7.5.

- i) Calculate effectiveness of operation (percentage success rate) and, optionally, efficiency of operation (median task time) and satisfaction with operation (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 should be installed in its normal configuration.

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

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. 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.

Annex A contains a list of typical consumer products, 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 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.

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

EXAMPLE For a camera, acceptable exposure and focus of a picture.

7.2.2 Identify the tasks

The task activities that need to be carried out in order to use the product to achieve the main goal(s) shall be identified. This could be based on information provided by the manufacturer and/or a representative sample of potential users.

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 Camera: insert film [storage media], switch on, take aim, take picture, take steps to review picture.

EXAMPLE 2 Washing machine: insert clothes, insert detergent, select program, start machine, remove clothes after machine stops, switch off machine.

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