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Information technology — Software packages — Quality requirements and testing

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) together form a system for worldwide standardization as a whole. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liason with ISO and IEC, also take part in the work.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for approval before their acceptance as International Standards. They are approved in accordance with procedures requiring at least 75 % approval by the national bodies voting.

International Standard ISO/IEC 12119 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*.

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Information technology – Software packages – Quality requirements and testing

1 Scope

This International Standard is applicable to software packages. Examples are text processors, spreadsheets, data base programs, graphics packages, programs for technical or scientific functions, and utility programs.

It establishes

- requirements for software packages (quality requirements);
- instructions on how to test a software package against these requirements (instructions for testing, in particular for third party testing).

It deals only with software packages as offered and delivered. It does not deal with their production process (including activities and intermediate products, e.g. specifications). The quality system of a supplier is outside the scope of this International Standard.

NOTE – Some software needs additional requirements, e.g. safety-critical software.

The intended users of this International Standard include

- a) suppliers when
 - 1) specifying requirements for a software package;
 - 2) designing a form to describe products;
 - 3) assessing their own products;
 - 4) issuing declarations of conformity [ISO/IEC Guide 22];
 - 5) applying for certificates or marks of conformity [ISO/IEC Guide 23];

b) certification bodies which may wish to establish a third-party certification scheme (international, regional or national) [ISO/IEC Guides 16, 28 and 44];

c) testing laboratories which will have to follow the instructions for testing when testing for a certificate or a mark of conformity [ISO/IEC Guide 25];

d) accreditation bodies for accrediting certification bodies and testing laboratories [ISO/IEC Guides 40 and 58];

e) auditors of testing laboratories when assessing their competence [ISO/IEC Guide 58];

f) buyers who may

1) compare their requirements with those described here;

2) compare the requirements for the intended work task with the information in product descriptions of existing products;

3) look for certified products;

4) check otherwise if the requirements are met;

g) users who may profit from better products.

2 Definitions

For the purposes of this International Standard, the following definitions apply. Definitions from other standards used in this International Standard are reproduced in annex A for convenient reference.

2.1 function: The implementation of an algorithm in the program with which the user or the program can perform part or all of a work task.

NOTES

1 A function does not need to be callable by the user (e.g. automatic backup or saving of data).

2 The notion of a function here is narrower than that used in ISO 2382-14:1978 (in the definitions of failure, fault, maintenance and reliability), but wider than those defined in ISO 2382-2 and ISO 2382-15.

2.2 requirements document: A document containing any combination of recommendations, requirements or regulations to be met by a software package.

NOTE – Examples are a technical or ergonomic standard, a requirements list (or model requirements specification) from a group (e.g. a market sector, technical or user association), a law or a decree.

2.3 product description: A document stating properties of a software package, with the main purpose of helping potential buyers in the evaluation of the suitability for themselves of the product before purchasing it.

NOTE – This term is more specific than the term “system description” in ISO/IEC 2382-20:1990. The purpose of the product description includes that of the “cover information” in ISO 9127. The product description is not a specification; it serves a different purpose.

2.4 user documentation: The complete set of documents, available in printed or non-printed form, that is provided for the application of the product and also is an integral part of the product.

2.5 package documentation: The product description and the user documentation.

2.6 test case: A documented instruction for the tester that specifies how a function or a combination of functions shall or should be tested. A test case includes detailed information on the following issues:

- the test objective;
- the functions to be tested;
- the testing environment and other conditions (configuration details and preparatory work);
- the test data;
- the procedure;
- the expected behaviour of the system.

2.7 maintenance: That part of system maintenance (see A.5.2) which is concerned with modifying a software package.

3 Quality requirements

Subclauses 3.1 to 3.3 contain

- the requirement that each software package has a product description and user documentation;
- requirements for the product description. In particular, there is a requirement that it shall contain specified information and that all its statements shall be testable and correct;
- requirements for the user documentation;
- requirements for the programs and for data, if any, included in the software package.

NOTES

1 The requirements on user documentation, programs and data contain many general requirements (independent from what may be promised in a product description), but they do not include all the properties that users may desire.

2 Certain properties, for example “understandability” and “ease of overview” of the user documentation and of the program messages, are admittedly required in the view of the user. However, due to the difficulty of testing for them with clear-cut and reproducible results these are formulated currently as recommendations only.

3 The requirements in 3.1 to 3.3 are arranged in the same order as the characteristics which appear in ISO/IEC 9126.

A software package conforms to this International Standard if it complies with all the requirements in 3.1 to 3.3. The recommendations (indicated by the use of the verbal form “should”) are optional.

NOTE 4 – Conformity of a product to the requirements in 3.1 to 3.3 may be difficult or impossible to prove. However, a test (including review of documents) according to clause 4 is deemed sufficient to provide the confidence required for a certificate of conformity according to ISO/IEC Guide 2. No formal proof is needed.

3.1 Product description

Each software package shall have a product description.

The product description defines the product. It is a part of the package documentation of the product. It provides information on the user documentation, the programs and, if any, the data.

The main purposes of the product description are

- to help the user or potential buyer in their evaluation of the suitability of the product for themselves. To this extent it is also sales information;
- to serve as a basis for testing (see clause 4).

The product description shall be available for people interested in the product.

3.1.1 General requirements on contents

The product description should be sufficiently understandable, complete and easy to overview for helping potential buyers in the evaluation of the suitability for themselves of the product before purchasing it.

It shall be free from internal inconsistencies. Each term should have the same meaning everywhere.

The statements of the product description shall be testable and correct.

NOTE – This requirement extends to the statements in external requirements documents invoked, if any (see 3.1.2 e).

The following subclauses 3.1.2 to 3.1.8 specify what the product description shall or should include. It may include additional statements on the product.

3.1.2 Identifications and indications

a) Identification of the product description

The product description shall possess a unique document identification. It may be named differently from “product description”, for example: “Functional Description”, “Product Information”, “Product Sheet”.

b) Identification of the product

The product description shall identify the product. The product identification shall have at least the product name and a version or date. If there are two or more variants mentioned in the product description, then each variant shall have at least the product name, a variant name and a version or date.

c) Supplier

The product description shall contain the name and address of at least one supplier.

NOTE – The name and address need not be printed; the rubber stamp of a dealer is sufficient.

d) Work task

The product description shall identify the intended work tasks that can be performed with the product.

e) Conformity to requirements documents

The product description may refer to requirements documents to which the product conforms, in which case the relevant editions shall be identified.

f) Required system

The required system (hardware, software and their configuration) for putting the product into use shall be specified, including manufacturer names and type identifiers of all parts, for example

- processing unit including co-processors;
- main memory size;
- types and sizes of peripheral storage;
- extension cards;
- input and output equipment;
- network environment;
- system software and other software.

Different required systems may be specified, e.g. for different work tasks, different boundary values or different efficiency requirements.

The statement “(or any other ..., if compatible)” may appear in a product description if previously a particular hardware or software product has been identified. The statement “or an updated version if compatible” may appear if previously a version of a product has been identified. The statement “from version X to at least version Y” may appear; “from version X” shall not appear.

NOTE – A statement “from version X” could later become false by the appearance of a version X+3 with which the software package would fail to operate.

g) Interfaces to other products

If the product description makes reference to interfaces to other products, the interfaces or products shall be identified.

h) Items to be delivered

Every physical component of the supplied product shall be identified, in particular all printed documents and all data media.

The form of the supplied programs shall be stated, e.g. source programs, object modules or load modules.

NOTE – Media formats (e.g. diskette formats) need not be indicated because the set of possible formats is determined by the required system (see 3.1.2 f).

i) Installation

It shall be stated whether or not the product installation can be carried out by the user.

j) Support

It shall be stated whether or not support for operating the product is offered.

k) Maintenance

It shall be stated whether or not maintenance is offered. If maintenance is offered, it shall be stated what is specifically included.

3.1.3 Statements on functionality

a) Overview of functions

The product description shall provide an overview of the user-callable functions of the product, the necessary data and the facilities offered.

It shall be clearly stated for each function mentioned (especially for an option or variant) whether it is a part

- of the product;
- of a product extension fully described in the product description;
- of a product extension referenced in the product description;
- of a supplement without guarantee.

NOTE – Not every user-callable function need be mentioned, and not every detail on how a function is called need be given.

b) Boundary values

If the usage of the product is limited by product specific boundary values, these shall be provided. Examples are

- minimum or maximum values;
- lengths of keys;
- maximum number of records in a file;
- maximum number of search criteria;
- minimum sample size.

In the case when it is not possible to provide fixed boundary values (when, for example, they depend upon the application type or upon the input data), then the limitations shall be stated. Permissible combinations of values may be provided and reference shall be made to more specific information in the user documentation.

c) Security

The product description should include information on means, if provided, for preventing unauthorized access, whether accidental or deliberate, to programs and data.

3.1.4 Statements on reliability

The product description shall include information on data saving procedures.

NOTE – It is sufficient to state, for example, that backup is possible by functions of the operating system.

Additional product properties should be described that ensure the functional capability of the product. Examples are

- checks whether input is plausible;
- protection against serious consequences of a user mistake;
- error recovery.