DRAFT International Standard

ISO/IEC DIS 25023

Systems and software engineering — Systems and software Quality Requirements and Evaluation (SQuaRE) — Measurement of product quality

Ingénierie des systèmes et du logiciel — Exigences de qualité et évaluation des systèmes et du logiciel (SQuaRE) — Mesurage de la qualité du produit logiciel et du système

ICS: 35.080

ISO/IEC JTC **1**/SC **7**

Secretariat: **BIS**

Voting begins on:
2026-03-16

Voting terminates on:
2026-06-08

This document is circulated as received from the committee secretariat.

THIS DOCUMENT IS A DRAFT CIRCULATED FOR COMMENTS AND APPROVAL. IT IS THEREFORE SUBJECT TO CHANGE AND MAY NOT BE REFERRED TO AS AN INTERNATIONAL STANDARD UNTIL PUBLISHED AS SUCH.

IN ADDITION TO THEIR EVALUATION AS BEING ACCEPTABLE FOR INDUSTRIAL, TECHNOLOGICAL, COMMERCIAL AND USER PURPOSES, DRAFT INTERNATIONAL STANDARDS MAY ON OCCASION HAVE TO BE CONSIDERED IN THE LIGHT OF THEIR POTENTIAL TO BECOME STANDARDS TO WHICH REFERENCE MAY BE MADE IN NATIONAL REGULATIONS.

RECIPIENTS OF THIS DRAFT ARE INVITED TO SUBMIT, WITH THEIR COMMENTS, NOTIFICATION OF ANY RELEVANT PATENT RIGHTS OF WHICH THEY ARE AWARE AND TO PROVIDE SUPPORTING DOCUMENTATION.

Reference number
ISO/IEC DIS 25023:2026(en)

© ISO/IEC 2026



COPYRIGHT PROTECTED DOCUMENT

© ISO/IEC 2026

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword ..... **v**
Introduction ..... **vi**
1 Scope **1**
2 Normative reference **1**
3 Terms and definitions **2**
4 Abbreviated terms **4**
5 Use of product quality measures **4**
5.1 Requirement of this document to be applied 4
5.2 Product quality measurement concepts 4
5.3 Approach to quality measurement 5
6 Format used for documenting the quality measures **7**
7 Product quality measures **8**
7.1 General 8
7.2 Functional suitability measures 8
7.2.1 General 8
7.2.2 Functional completeness measures 8
7.2.3 Functional correctness measures 9
7.2.4 Functional appropriateness measures 10
7.3 Performance efficiency measures 10
7.3.1 General 10
7.3.2 Time behaviour measures 11
7.3.3 Resource utilization measures 13
7.3.4 Capacity measures 15
7.4 Compatibility measures 16
7.4.1 General 16
7.4.2 Co-existence measures 17
7.4.3 Interoperability measures 17
7.5 Interaction capability measures 18
7.5.1 General 18
7.5.2 Appropriateness recognizability measures 18
7.5.3 Learnability measures 19
7.5.4 Operability measures 20
7.5.5 User error protection measures 21
7.5.6 User engagement measures 22
7.5.7 Inclusivity measures 23
7.5.8 User assistance measures 23
7.5.9 Self-descriptiveness measures 24
7.6 Reliability measures 24
7.6.1 General 24
7.6.2 Faultlessness measures 25
7.6.3 Availability measures 26
7.6.4 Fault tolerance measures 26
7.6.5 Recoverability measures 27
7.7 Security measures 28
7.7.1 General 28
7.7.2 Confidentiality measures 28
7.7.3 Integrity measures 29
7.7.4 Non-repudiation measures 30
7.7.5 Accountability measures 31
7.7.6 Authenticity measures 31
7.7.7 Resistance measures 32
7.8 Maintainability measures 33

© ISO/IEC 2026 – All rights reserved

7.8.1 General ... 33
7.8.2 Modularity measures ... 33
7.8.3 Reusability measures ... 33
7.8.4 Analysability measures ... 34
7.8.5 Modifiability measures ... 34
7.8.6 Testability measures ... 35
7.9 Flexibility measures ... 36
7.9.1 General ... 36
7.9.2 Adaptability measures ... 36
7.9.3 Scalability measures ... 37
7.9.4 Installability measures ... 38
7.9.5 Replaceability measures ... 38
7.10 Safety measures ... 39
7.10.1 General ... 39
7.10.2 Operational constraint measures ... 39
7.10.3 Risk identification measures ... 40
7.10.4 Fail safe measures ... 41
7.10.5 Hazard warning measures ... 41
7.10.6 Safe integration measures ... 41
Annex A (informative) **Considerations for the use of quality measures** ... **43**
Annex B (informative) **QMEs used to define product or system quality measures** ... **50**
Annex C (informative) **Detailed explanation of measurement types** ... **54**
Annex D (informative) **Application of Quality Measures at Different Stages** ... **60**
Bibliography ... **66**

© ISO/IEC 2026 – All rights reserved

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. 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 liaison with ISO and IEC, also take part in the work.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of documents should be noted. This document was drafted following the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives or www.iec.ch/members_experts/refdocs).

ISO and IEC draw attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO and IEC take no position concerning the evidence, validity, or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO and IEC had not received notice of (a) patent(s) that may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents and https://patents.iec.ch. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html. In the IEC, see www.iec.ch/understanding-standards.

This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 7, *Software and systems engineering.*

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html and www.iec.ch/national-committees.

© ISO/IEC 2026 – All rights reserved

Introduction

This document is a part of the SQuaRE family of International Standards. It provides a set of quality measures for the characteristics of ICT products, including software products, that can be used for specifying requirements, measuring and evaluating the product quality, in conjunction with other SQuaRE family of International Standards, especially ISO/IEC 25010, ISO/IEC 25030, ISO/IEC 25040 and ISO/IEC 25041. The term "Product" is used for ICT Products which can include software, data, hardware and communication facilities, and other ICT products throughout this document.

The second edition of ISO/IEC 25010 replaces ISO/IEC 25010:2011, which has been technically revised, quality model overview and usage are moved to ISO/IEC 25002 and the quality-use-in model is moved to ISO/IEC 25019.

The major changes in the quality model defined in the second edition of ISO/IEC 25010 are as follows:

a) The target of the product quality model has been extended to include various types of ICT products and information systems.

b) Safety has been added as a quality characteristic with subcharacteristics, i.e. operational constraint risk identification, fail safe, hazard warning, and safe integration.

c) Usability and portability have been replaced with interaction capability and flexibility respectively.

d) Inclusivity and self-descriptiveness, resistance, and scalability have been added as subcharacteristics of interaction capability, security, and flexibility respectively.

e) User interface aesthetics and maturity have been replaced with user engagement and faultlessness respectively.

f) Accessibility has been split into inclusivity and user assistance.

NOTE Accessibility and "inclusivity and user assistance" are different meanings. Correctly, accessibility is not one of product quality sub-characteristics same as usability. However, inclusivity and user assistance have been defined because it is necessary to prepare terms related to diversity in sub-characteristics of interaction capability

g) Several characteristics and subcharacteristics have been given more accurate names and definitions.

The set of quality measures in this document were selected based on their practical value. They are not intended to be exhaustive and users of this document are encouraged to refine them if necessary.

This document is a part of the ISO/IEC 2502n series that currently consists of the following International Standards:

— ISO/IEC 25020 — **Quality measurement framework**: provides a reference model and guide for measuring the quality characteristics defined in ISO/IEC 2501n quality model division.

— ISO/IEC 25021 — **Quality measure elements**: provides a format for specifying quality measure elements and some examples of quality measure elements (QMEs) that can be used to construct software quality measures.

— ISO/IEC 25022 — **Measurement of quality-in-use**: provides measures including associated measurement functions for the quality characteristics in the quality-in-use model.

— ISO/IEC 25023 — **Measurement of product quality**: provides measures including associated measurement functions for the quality characteristics in the product quality model.

— ISO/IEC 25024 — **Measurement of data quality**: provides measures including associated measurement functions for the quality characteristics in the data quality model.

— ISO/IEC TS 25025 — **Measurement of IT service quality**: provides measures including associated measurement functions for the quality characteristics in the IT service quality model.

© ISO/IEC 2026 – All rights reserved

Figure 1 depicts the relationship between this document and the other International Standards in the ISO/IEC 2502n division. Developers, evaluators, quality managers, acquirers, suppliers, maintainers, and users of target system/software products can select measures from these International Standards for the measurement of quality characteristics of interest. This could be for defining requirements, evaluating system/software products, performing quality management activities, or for other purposes.

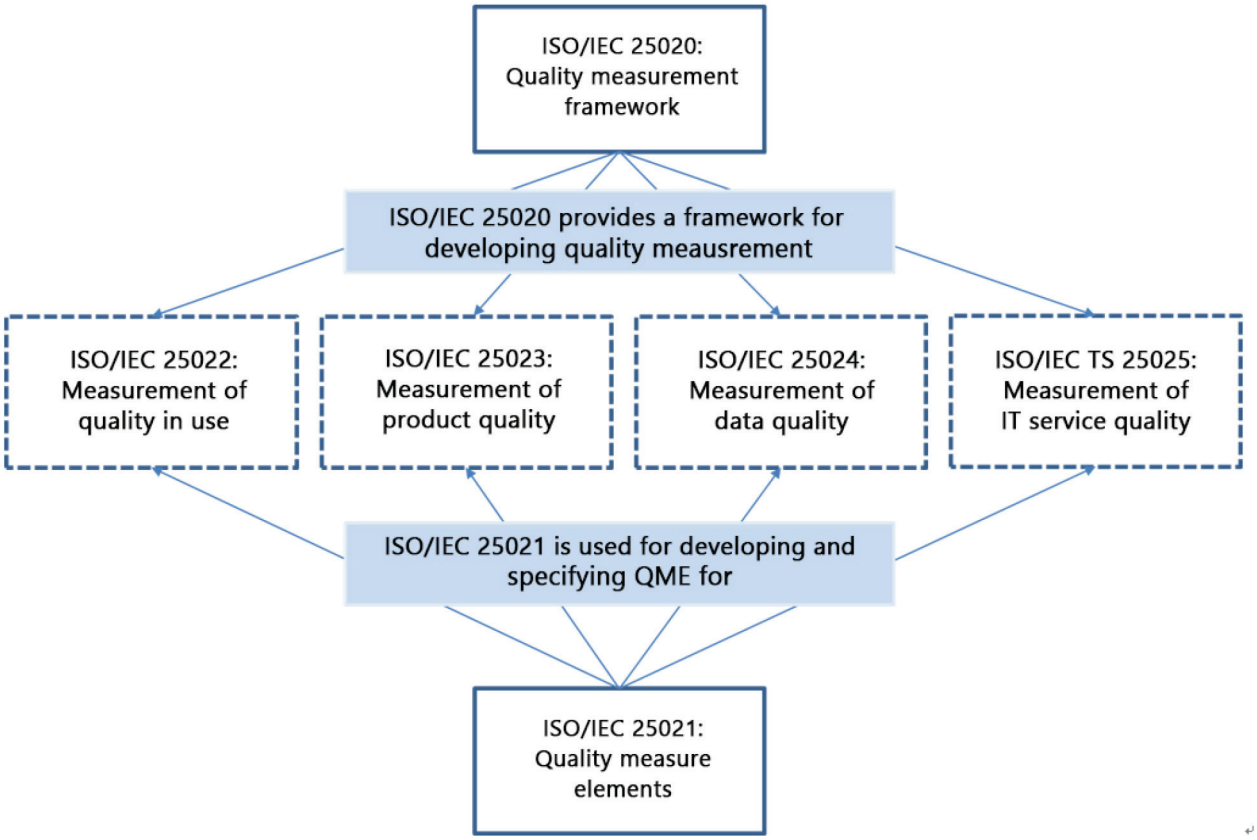


Figure 1 — Structure of the Quality Measurement Division

The divisions within the SQuaRE family are:

— **ISO/IEC 2500n- Quality Management Division.** The International Standards that form this division define all common models, terms, and definitions further referred to by all other International Standards from the SQuaRE family. This division also provides requirements and guidance for a supporting function that is responsible for the management of the requirements, specification, and evaluation of software product quality. Practical guidance on the use of the quality models is also provided.

— **ISO/IEC 2501n- Quality Model Division.** The International Standards that form this division present detailed quality models for computer systems and software products, data, IT services, and quality-in-use. Practical guidance on the use of the quality models is provided by ISO/IEC 25002 in the Quality Management Division.

— **ISO/IEC 2502n- Quality Measurement Division.** The International Standards that form this division include quality measurement framework, mathematical definitions of quality measures, and practical guidance for their application. Examples are given of quality measures for the internal and external properties of product, data, IT services, and quality-in-use. Quality Measure Elements (QME) forming foundations for quality measures for the internal and external properties of product are defined and presented.

— **ISO/IEC 2503n- Quality Requirements Division.** The International Standards that form this division help specify quality requirements, based on quality models and quality measures. These quality requirements can be used in the process of quality requirements elicitation for information systems and IT services to be developed or as input for an evaluation process.

© ISO/IEC 2026 – All rights reserved

— **ISO/IEC 2504n- Quality Evaluation Division.** The International Standards that form this division provide requirements, recommendations, and guidelines for software product evaluation, whether performed by evaluators, acquirers, or developers. The guideline for documenting a measure as an Evaluation Module is also provided.

— **ISO/IEC 25050– 25099 SQuaRE Extension Division.** These International Standards currently include requirements for the quality of ready-to-use software products (RUSP), instructions for testing, and requirements for quality of Commercial Off-The-Shelf software and Common Industry Formats for usability reports and quality models and measures for new technologies such as cloud services and artificial intelligence.

© ISO/IEC 2026 – All rights reserved

Systems and software engineering — Systems and software Quality Requirements and Evaluation (SQuaRE) — Measurement of product quality

1 Scope

This document defines quality measures for quantitatively evaluating product quality in terms of characteristics and subcharacteristics defined in ISO/IEC 25010 and is intended to be used together with ISO/IEC 25010. It can be used in conjunction with the ISO/IEC 2503n and the ISO/IEC 2504n standards or to more generally meet user needs concerning ICT products and software products quality.

This document contains a basic set of quality measures for each characteristic and subcharacteristics. It includes, as informative annexes, considerations for the use of quality measures (Annex A), QMEs used to define product or system quality measures (Annex B), and a detailed explanation of measurement types (Annex C).

This document does not provide the specific ranges of values of the measures to rated levels or grades of compliance because these values are determined based on the nature of the system, product, or a part of the product, and depending on factors such as the category of the software, integrity level, and users' needs. Some attributes could have a desirable range of values, which does not depend on specific user needs but depends on generic factors;

The proposed quality measures are primarily intended to be used for quality assurance and improvement of products during or post the development life cycle process.

The main users of this document are people carrying out quality requirement specification and evaluation activities as part of the following:

— development: including requirements analysis, design specification, coding, and testing through acceptance during the life cycle process;

— quality management: systematic examination of the software product or computer system, for example, when evaluating system or software product quality as part of quality assurance, quality control, and quality certification;

— supply: a contract with the acquirer for the supply of a system, software product, or software service under the terms of a contract, for example, when validating quality at qualification test;

— acquisition: including product selection and acceptance testing, when acquiring or procuring a system, software product, or software service from a supplier;

— maintenance: improvement of the software product or system based on quality measurement.

2 Normative reference

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 25000, *Systems and software engineering — Systems and software Quality Requirements and Evaluation (SQuaRE) — Guide to SQuaRE*

ISO/IEC 25002, *Systems and software engineering — Systems and software Quality Requirements and Evaluation (SQuaRE) — Quality model overview and usage*

© ISO/IEC 2026 – All rights reserved

ISO/IEC 25010, *Systems and software engineering — Systems and software Quality Requirements and Evaluation (SQuaRE) — Product quality model*

ISO/IEC 25020, *Systems and software engineering — Systems and software Quality Requirements and Evaluation (SQuaRE) — Quality measurement framework*

3 Terms and definitions

For this document, the terms and definitions given in ISO/IEC 25000 and the following

apply. ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

Note 1 to entry The essential definitions from ISO/IEC 25000 and the other ISO standards are reproduced here.

3.1
ICT Product
product that uses Information and Communication Technologies, and can be a part of an information system

[SOURCE: ISO/IEC 25030:2019]

Note 1 to entry: ICT products can constitute other ICT products (sub-products) and sometimes a component of an ICT product can also be considered an ICT product by itself. Examples of ICT products include computer hardware, software products, software components, and data.

Note 2 to entry: ICT product refers to the combination of one or more technology components (e.g., cloud, internet, data, multimedia, communication, hardware, firmware, software, and middleware) that enables modern computing and allows people and organizations to interact and operate in the digital world.

Note 3 to entry: ICT products do not include people, machines, infrastructure, and other facilities which are independent of communication and data. ICT Product includes hardware with embedded computers, such as sensors and communicators, but not the users.

Note 4 to entry: While many artifacts like data sheets, user manuals, installation manuals, operations guides, and configuration guides contribute to the quality of an ICT Product and the information system that constitutes it, they are not ICT products by themselves.

3.2
measure
variable to which a value is assigned as the result of measurement

Note 1 to entry: The plural form “measures” is used to refer collectively to base measures, derived measures, and indicators

[SOURCE: ISO/IEC/IEEE 15939:2017, 3.15]

3.3
measure
make a measurement

[SOURCE: ISO/IEC 25000:2014, 4.19]

3.4
measurement
set of operations having the objective of determining the value of a measure

Note 1 to entry: Measurement can include assigning a qualitative category such as the language of a source program (ADA, C, COBOL, etc.).

[SOURCE: ISO/IEC 25000:2014, 4.20]

© ISO/IEC 2026 – All rights reserved

3.5
measurement function
algorithm or calculation performed to combine two or more quality measure elements

[SOURCE: ISO/IEC 25021:2012, 4.7, modified]

3.6
product
artifact that is produced, is quantifiable and is deliverable to the user as either an end item in itself or a component item

[SOURCE: ISO/IEC 25030:2019]

Note 1 to entry: In this document, product refers to an ICT product that is part of an information system. ICT product components include subsystems, software, firmware, hardware, data, communication infrastructure, and other elements that are part of the ICT Product

3.7
property to quantify
property of a target entity that is related to a quality measure element and which can be quantified by a measurement method

Note 1 to entry: A software artifact is an example of a target entity.

[SOURCE: ISO/IEC 25021:2012, 4.11, modified

3.8
quality measure
measure that is defined as a measurement function of two or more values of quality measure elements

[SOURCE: ISO/IEC 25010:2023]

Note 1 to entry: Quality measures can be considered as derived properties of an ICT product or information system.

Note 2 to entry: Inherent (structural) quality measures quantify structural properties of the ICT product or information system, while behavioural quality measures quantify properties that can be identified and measured on the ICT product or information system as a whole and its behaviour in a context of use.

3.9
quality measure element (QME)
measure defined in terms of a property and the measurement method for quantifying it, including optionally the transformation by a mathematical function

[SOURCE: ISO/IEC 25021: 2012 4.14]

3.10
quality model
defined set of characteristics and relationships between them, which provides a framework for specifying quality requirements and evaluating the quality

[SOURCE: ISO/IEC 25000:2014, 4.27]

3.11
quality property
property of a target entity that is related to a quality measure element, and which can be quantified by a measurement method

[SOURCE: ISO/IEC 25020:2019, 3.11, modified]

Note 1 to entry: Quality properties can be used either in the measurement of quality or just for providing qualitative feedback.

© ISO/IEC 2026 – All rights reserved

3.12
quality characteristic
category of quality attributes that bears on the quality of the ICT product or information system

Note 1 to entry: Quality characteristics can be further divided into quality subcharacteristics. While characteristics typically represent one aspect of quality that is of interest to stakeholders, quality subcharacteristics can help subdivide quality characteristics into individual aspects that help map them to quality properties.

[SOURCE: ISO/IEC 25000:2014, 4.34, formerly software quality characteristic, adapted to apply to a larger scope of products and systems, Note 1 to entry added]

3.13
product quality
capability of an ICT product or its components to satisfy stated and implied quality needs when used under specific conditions

[SOURCE: ISO/IEC 25010:2023]

Note 1 to entry: This definition differs from the ISO 9000:2015 quality definition mainly because the software quality definition refers to the satisfaction of stated and implied needs, while the ISO 9000 quality definition refers to the satisfaction of requirements.

Note 2 to entry: Typically, users do not consider systems that only satisfy requirements as high-quality systems. Quality is related to satisfying and even surpassing expectations with associated constraints and conditions.

4 Abbreviated terms

The following abbreviated term is used in this document.

QM quality measure

QME quality measure element

5 Use of product quality measures

5.1 Requirement of this document to be applied

Any quality requirement specification or quality evaluation that conforms to this document shall:

a) select the quality characteristics and/or subcharacteristics to be specified or evaluated as defined in ISO/IEC 25010;

b) for each selected characteristic or subcharacteristic, all the Generic (G) quality measures defined in Clause 8 are recommended as a baseline set, but may be adapted or excluded with appropriate justification;

c) optionally select any Specific (S) quality measures in Clause 8 that are relevant;

d) if any quality measure is modified, provide the rationale for the changes;

e) define any additional QMs(quality measures) and QMEs(quality measure elements) as per ISO/IEC 25020 and ISO/IEC 25021 that are not included in this document.

5.2 Product quality measurement concepts

The quality of a product is the degree to which it satisfies the stated and implied needs of its various stakeholders. By meeting these needs, the product provides value to them. These stated and implied needs are represented in the SQuaRE family of standards by quality models that categorize product quality into characteristics, which in some cases are further subdivided into subcharacteristics, as described in ISO/IEC 25002. The measurable quality-related properties of a product are called properties to quantify

© ISO/IEC 2026 – All rights reserved