INTERNATIONAL STANDARD

**ISO/IEC 25041**

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# Systems and software engineering — Systems and software Quality Requirements and Evaluation (SQuaRE) — Evaluation guide for developers, acquirers and independent evaluators

*Ingénierie des systèmes et du logiciel — Exigences de qualité et évaluation des systèmes et du logiciel (SQuaRE) — Guide d'évaluation pour les développeurs, les acquéreurs et les évaluateurs indépendants*



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# 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. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

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

ISO/IEC 25041 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 7, *Software and systems engineering*.

This first edition of ISO/IEC 25041 cancels and replaces ISO/IEC 14598-3:2000, ISO/IEC 14598-4:1999 and ISO/IEC 14598-5:1998.

# Introduction

As the use of information technology grows, the number of critical systems also grows. Such systems include, for example, security critical, life critical, economically critical and safety critical systems. The quality of systems and software product of such critical systems is particularly important because software faults may lead to serious consequences.

Evaluation is the systematic determination of the extent to which an entity meets its specified criteria. The evaluation of product quality is vital to both the acquisition and development of software. The relative importance of the various characteristics of software quality depends on the intended usage or objectives of the system of which the software is a part; products need to be evaluated to decide whether relevant quality characteristics meet the requirements of the system.

This International Standard is part of the ISO/IEC 250nn SQuaRE series of standards. ISO/IEC 25040 contains general requirements and recommendations for product quality evaluation as well as associated general concepts. This International Standard provides specific issues related to the developers, acquirers and independent evaluators based on ISO/IEC 25040.

The general goal of creating the SQuaRE set of standards is to move to a logically organized, enriched and unified series covering two main processes: software quality requirements specification and software quality evaluation, supported by a software quality measurement process. The purpose of the SQuaRE set of standards is to assist those developing and acquiring products with the specification and evaluation of quality requirements. It establishes criteria for the specification of product quality requirements, their measurement, and evaluation. It includes a quality model for aligning customer definitions of quality with properties of the development process. In addition, the series provides recommended measures of product properties that can be used by developers, acquirers, and independent evaluators.

SQuaRE provides:

- terms and definitions;
- reference models;
- general guide;
- individual division guides, and
- standards for requirements specification, planning and management, measurement and evaluation purposes.

SQuaRE includes International Standards on quality modes and measures, as well as on quality requirements and evaluation.

SQuaRE replaces the current ISO/IEC 9126 series and the ISO/IEC 14598 series.

The SQuaRE series of standards consists of the following divisions under the general title *Systems and software Quality Requirements and Evaluation*:

- ISO/IEC 2500n - *Quality Management Division*,
- ISO/IEC 2501n - *Quality Model Division*,
- ISO/IEC 2502n - *Quality Measurement Division*,



 

- ISO/IEC 2503n - *Quality Requirements Division*, and
- ISO/IEC 2504n - *Quality Evaluation Division*.

This International Standard is intended to be used in conjunction with the other parts of the SQuaRE series of standards, and with the ISO/IEC 14598 series and ISO/IEC 9126 series until superseded by the ISO/IEC 250nn series of standards.

The descriptions in this International Standard are mainly based on the descriptions in ISO/IEC 14598-3, ISO/IEC 14598-4, and ISO/IEC 14598-5, which will be replaced by this International Standard.

Figure 1 illustrates the organization of the SQuaRE series representing families of standards, further called Divisions.

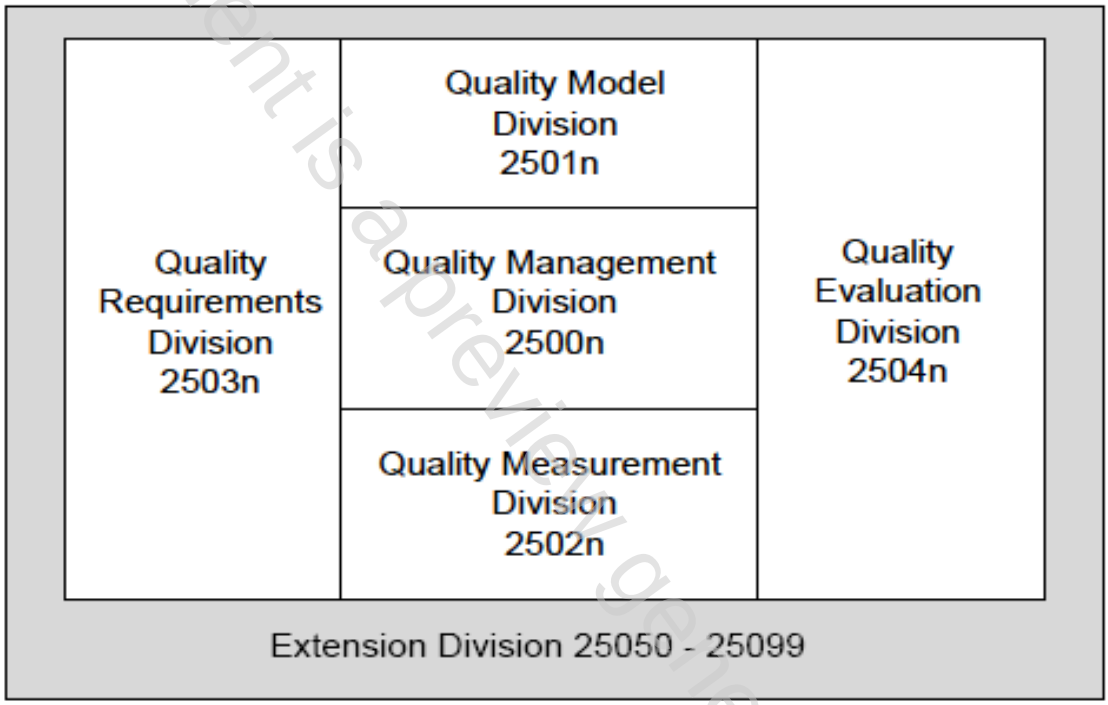


**Figure 1—Organization of SQuaRE series of International Standards**

The Divisions within the SQuaRE model are:

·**ISO/IEC 2500n - Quality Management Division**. The International Standards that form this division define all common models, terms and definitions referred to by all other standards from the SQuaRE series. Referring paths (guidance through SQuaRE documents) and high level practical suggestions in applying proper standards to specific application cases offer help to all types of users. The division also provides requirements and guidance for a supporting function which is responsible for the management of product requirements specification and evaluation.

·**ISO/IEC 2501n - Quality Model Division**. The International Standard that forms this division presents detailed quality models for software, quality in use and data. Practical guidance on the use of the quality model is also provided.

·**ISO/IEC 2502n - Quality Measurement Division**. The International Standards that form this division include a product quality measurement reference model, mathematical definitions of quality measures, and practical

guidance for their application. This division presents internal measures of software quality, external measures of software product quality and quality in use measures. Measurement primitives forming foundations for the latter measures are defined and presented.

·**ISO/IEC 2503n - Quality Requirements Division**. The International Standard that forms this division helps specifying quality requirements. These quality requirements can be used in the process of quality requirements elicitation for a product to be developed or as inputs for an evaluation process. The requirements definition process is mapped to technical processes defined in ISO/IEC 15288:2008.

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

ISO/IEC 25050 to ISO/IEC 25099 are reserved to be used for SQuaRE extension International Standards and/or Technical Reports.

This International Standard is part of the 2504n - Quality Evaluation Division that currently consists of the following International Standards:

·**ISO/IEC 25040 - Evaluation process**: contains general requirements for specification and evaluation of software quality and clarifies the general concepts. It provides a process description for evaluating quality of product and states the requirements for the application of this process. The evaluation process is the basis for product quality evaluation for different purposes and approaches. Therefore the process can be used for the evaluation of quality in use, the external measure of software product quality and the internal measure of software product quality, as well as for the evaluation of the quality of pre-developed software product or custom software product during its development process.

·**ISO/IEC 25041 - Evaluation guide for developers, acquirers and independent evaluators**: contains specific requirements and recommendations for developers, acquirers and independent evaluators.

·**ISO/IEC 25045 - Evaluation module for recoverability:** provides the specification to evaluate the subcharacteristics of recoverability defined under the characteristic of reliability of the quality model. It determines the external measures of software product quality of resiliency and autonomic recovery index when the information system composed of one or more software products' execution transactions is subjected to a series of disturbances. A disturbance could be an operational fault (e.g. an abrupt shutdown of an OS process that brings down a system) or an event (e.g. a significant increase of users to the system).

ISO/IEC 25040 is a revised version and replaces ISO/IEC 14598-1.

**ISO/IEC 25041 is a revised version and replaces ISO/IEC 14598-3, ISO/IEC 14598-4 and ISO/IEC 14598-5.**

The term "product" is used as a simplified term for "systems and software product" throughout this International Standard.

The term "evaluation process" is used as a simplified term for "product quality evaluation process" throughout this International Standard.

The term "evaluation report" is used as a simplified term for "product quality evaluation report" and the term "evaluation plan" is used as a simplified term for "product quality evaluation plan" throughout this International Standard.

# Systems and software engineering — Systems and software Quality Requirements and Evaluation (SQuaRE) — Evaluation guide for developers, acquirers and independent evaluators



## 1 Scope

This International Standard provides requirements, recommendations and guidelines for product quality evaluation specifically for developers, acquirers and independent evaluators. It is not restricted to any specific application area and can be used for quality evaluation of any type of products.

This International Standard provides a process description for evaluating product quality and states the specific requirements for the application of the evaluation process from the viewpoint of developers, acquirers and independent evaluators. The evaluation process can be used for different purposes and approaches. The process can be used for the evaluation of the quality of pre-developed software, commercial-off-the-shelf software or custom software and can be used during or after the development process.

This International Standard is intended for those who are responsible for product quality evaluation and is appropriate for developers, acquirers and independent evaluators of products.

This International Standard is not intended for evaluation of other aspects of products (functional requirements, process requirements, business requirements, etc.).

## 2 Conformance

Evaluation of product quality conforms to this International Standard if developers conform to requirements of Clauses 6 and 7, if acquirers conform to requirements of Clauses 6 and 8, and if independent evaluators conform to requirements of Clauses 6 and 9.

## 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/IEC 25000, *Software Engineering — Software product Quality Requirements and Evaluation (SQuaRE) — Guide to SQuaRE*

ISO/IEC 25001, *Software engineering — Software product Quality Requirements and Evaluation (SQuaRE) — Planning and management*

ISO/IEC 25030, *Software engineering — Software product Quality Requirements and Evaluation (SQuaRE) — Quality requirements*

ISO/IEC 25040, *Systems and software engineering — Systems and software Quality Requirements and Evaluation (SQuaRE) — Evaluation process*