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Systems and software engineering — Lifecycle profiles for Very Small Enterprises (VSEs) —

Part 3-3: Certification requirements for conformity assessments of VSE profiles using process assessment and maturity models

Ingénierie des systèmes et du logiciel — Profils de cycle de vie pour très petits organismes (TPO) —

Partie 3-3: Exigences de cetification pour la vérification de conformité en utilisant la vérification des processus et les niveaux de maturité

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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.

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 document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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

For an explanation on 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 the following URL: www.iso.org/iso/foreword.html.

The committee responsible for this document is ISO/IEC JTC 1, *Information technology*, Subcommittee SC 7, *Software and systems engineering*.

A list of all parts in the ISO/IEC 29110 series can be found on the ISO website.

Introduction

Very Small Entities (VSEs) around the world are creating valuable products and services. For the purpose of ISO/IEC 29110, a Very Small Entity (VSE) is an enterprise, an organization, a department or a project having up to 25 people. Since many VSEs develop and/or maintain system and software components used in systems, either as independent products or incorporated in larger systems, a recognition of VSEs as suppliers of high quality products is required.

According to the Organization for Economic Co-operation and Development (OECD) SME and Entrepreneurship Outlook report (2005), "Small and Medium Enterprises (SMEs) constitute the dominant form of business organization in all countries world-wide, accounting for over 95 % and up to 99 % of the business population depending on country". The challenge facing governments and economies is to provide a business environment that supports the competitiveness of this large heterogeneous business population and that promotes a vibrant entrepreneurial culture.

From studies and surveys conducted, it is clear that the majority of International Standards do not address the needs of VSEs. Implementation of and conformance with these standards is difficult, if not impossible. Consequently VSEs have no, or very limited, ways to be recognized as entities that produce quality systems/system elements including software in their domain. Therefore, VSEs are excluded from some economic activities.

It has been found that VSEs find it difficult to relate International Standards to their business needs and to justify the effort required to apply standards to their business practices. Most VSEs can neither afford the resources, in terms of number of employees, expertise, budget and time, nor do they see a net benefit in establishing over-complex systems or software life cycle processes. To address some of these difficulties, a set of guides has been developed based on a set of VSE characteristics. The guides are based on subsets of appropriate standards processes, activities, tasks, and outcomes, referred to as Profiles. The purpose of a profile is to define a subset of International Standards relevant to the VSEs' context; for example, processes, activities, tasks, and outcomes of ISO/IEC/IEEE 12207 for software; and processes, activities, tasks, and outcomes of ISO/IEC/IEEE 15288 for systems; and information products (documentation) of ISO/IEC/IEEE 15289 for software and systems.

VSEs can achieve recognition through implementing a profile and by being audited against ISO/IEC 29110 specifications.

The ISO/IEC 29110- series of International Standards and Technical Reports can be applied at any phase of system or software development within a life cycle. This series of International Standards and Technical Reports is intended to be used by VSEs that do not have experience or expertise in adapting/tailoring ISO/IEC/IEEE 12207 or ISO/IEC/IEEE 15288 standards to the needs of a specific project. VSEs that have expertise in adapting/tailoring ISO/IEC/IEEE 12207 or ISO/IEC/IEEE 15288 are encouraged to use those standards instead of ISO/IEC 29110.

ISO/IEC 29110 is intended to be used with any lifecycle such as waterfall, iterative, incremental, evolutionary or agile. Systems, in the context of ISO/IEC 29110, are typically composed of hardware and software components.

The ISO/IEC 29110- series, targeted by audience, has been developed to improve system or software and/or service quality, and process performance. See Table 1.

Table 1 — ISO/IEC 29110 target audience

ISO/IEC 29110	Title	Target audience
Part 1	Overview	VSEs and their customers, assessors, standards producers, tool vendors and methodology vendors.
Part 2	Framework for profile preparation	Profile producers, tool vendors and methodology vendors. Not intended for VSEs.
Part 3	Certification and assessment guidance	VSEs and their customers, assessors, accreditation bodies.
Part 4	Profile specifications	VSEs, customers, standards producers, tool vendors and methodology vendors.
Part 5	Management, engineering and service delivery guides	VSEs and their customers.
Part 6	Management and engineering guides not tied to a specific profile	VSEs and their customers.

If a new profile is needed, ISO/IEC 29110-4 and ISO/IEC/TR 29110-5 can be developed with minimal impact to existing documents.

ISO/IEC/TR 29110-1 defines the terms common to the Set of ISO/IEC 29110 Documents. It introduces processes, life cycle and standardization concepts, the taxonomy (catalogue) of ISO/IEC 29110 profiles, and the ISO/IEC 29110- series. It also introduces the characteristics and needs of a VSE, and clarifies the rationale for specific profiles, documents, standards and guides.

ISO/IEC 29110-2-1 introduces the concepts for systems and software engineering profiles for VSEs. It establishes the logic behind the definition and application of profiles. For standardized profiles, it specifies the elements common to all profiles (structure, requirements, conformance, assessment). For domain-specific profiles (profiles that are not standardized and developed outside of the ISO process), it provides general guidance adapted from the definition of standardized profiles.

ISO/IEC 29110-3 defines certification schemes, assessment guidelines and compliance requirements for process capability assessment, conformity assessments, and self-assessments for process improvements. ISO/IEC 29110-3 also contains information that can be useful to developers of certification and assessment methods and developers of certification and assessment tools. ISO/IEC 29110-3 is addressed to people who have direct involvement with the assessment process, e.g. the auditor, certification and accreditation bodies and the sponsor of the audit, who need guidance on ensuring that the requirements for performing an audit have been met.

ISO/IEC 29110-4-m provides the specification for all profiles in one profile group that are based on subsets of appropriate standards elements.

ISO/IEC/TR 29110-5-m-n provides a management and engineering guide for each profile in one profile group.

ISO/IEC/TR 29110-6-x provides management and engineering guides not tied to a specific profile.

This part of ISO/IEC 29110 presents conformity assessment requirements using process assessments and maturity models. This part of ISO/IEC 29110 is addressed to people who have direct involvement with the assessment process, e.g. assessor, certification and accreditation bodies and sponsor of an assessment.

Figure 1 describes the ISO/IEC 29110 International Standards (IS) and Technical Reports (TR) and positions the parts within the framework of reference. Overview, assessment guide, management and engineering guide are available from ISO as freely available Technical Reports (TR). The Framework document, profile specifications and certification schemes are published as International Standards (IS).

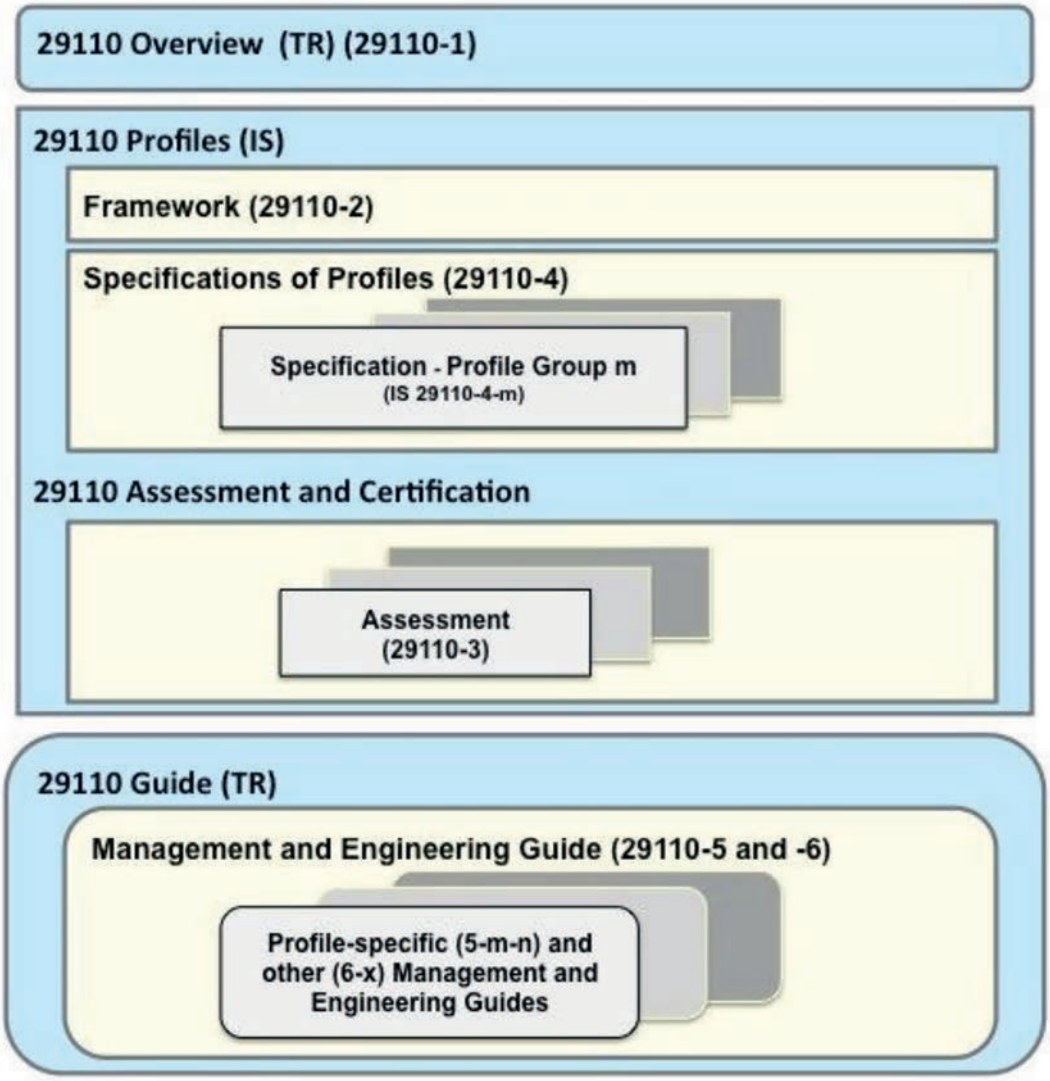

Figure 1 — ISO/IEC 29110 Series

Systems and software engineering — Lifecycle profiles for Very Small Enterprises (VSEs) —

Part 3-3: Certification requirements for conformity assessments of VSE profiles using process assessment and maturity models

1 Scope

This document contains the requirements for certification bodies performing conformity assessments, of the requirements contained in VSE profile specifications (e.g. ISO/IEC 29110-4-1 for VSE software basic profile), using process assessments and maturity models. This document is based on published ISO/IEC standards and guides for

a) certification bodies (see ISO/IEC 17065)

b) the process assessment and organizational process maturity performed according to the requirements of the ISO/IEC 33001 to ISO/IEC 33099 family of process assessment standards, and

c) based on ISO/IEC 29169 to support an environment which encourages worldwide recognition of VSE profiles conformity assessment results.

The overall framework for conformity assessment follows the approach defined in ISO/IEC 17065:2012.

This document has been developed following practical use and in consultation with key stakeholders, national accreditation bodies, and ISO's policy committee for conformity assessment (CASCO).

This document is addressed to people and certification bodies who have a direct relationship with the assessment process based on the VSE profiles.

It is intended that ISO/IEC/TR 29110-1, ISO/IEC 29110-2-1 and ISO/IEC 29110-4-1 (containing VSE profile specifications) be read first when investigating the possibility of conducting VSE profile certification.

NOTE Any clause with requirements directly copied from other standards has those copied requirements marked up in a box. Other requirements which are also copied but for which information is added are not marked up in a box but their source is clearly referenced in the text.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 17065:2012, *Conformity assessment — Requirements for bodies certifying products, processes and services*

ISO/IEC/TR 29110-3-1, *Systems and software engineering — Lifecycle profiles for Very Small Entities (VSEs) — Part 3-1: Assessment guide*

ISO/IEC 29110-4-1, *Software engineering — Lifecycle profiles for Very Small Entities (VSEs) — Part 4-1: Software engineering - Profile specifications: Generic profile group*

ISO/IEC 29169, *Information technology — Process assessment — Application of conformity assessment methodology to the assessment to process quality characteristics and organizational maturity*

ISO/IEC 33002:2015, *Information technology — Process assessment — Requirements for performing process assessment*

ISO/IEC 33003, *Information technology — Process assessment — Requirements for process measurement frameworks*

ISO/IEC 33004, *Information technology — Process assessment — Requirements for process reference, process assessment and maturity models*

ISO/IEC 33020, *Information technology — Process assessment — Process measurement framework for assessment of process capability*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC/TR 29110-1, ISO/IEC 17000 and ISO/IEC 17065 and the following apply.

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

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

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

3.1
basic process set
set of processes that ensure the achievement of the basic maturity level

Note 1 to entry: The set of processes are drawn from specified process assessment models.

Note 2 to entry: A basic process set will include a minimum set of processes, together with additional and optional processes determined by the organizational context for the assessment.

3.2
certification body
third-party conformity assessment body operating certification schemes

Note 1 to entry: A certification body can be non-governmental or governmental (with or without regulatory authority).

Note 2 to entry: For this document, the certification body will be also named the assessment body of Type A independence (i.e. third party), as defined in ISO/IEC 33002 for process assessments.

[SOURCE: ISO/IEC 17065:2012, 3.12, modified – Note 2 has been added.]

3.3
certification scheme
certification system related to specified products, to which the same specified requirements, specific rules and procedures apply

Note 1 to entry: Adapted from ISO/IEC 17000:2004, 2.8.

Note 2 to entry: A “certification system” is a “conformity assessment system”, which is defined in ISO/IEC 17000:2004, 2.7.

[SOURCE: ISO/IEC 17065:2012, 3.9, modified – Notes 3 and 4 have been deleted.]

3.4
conformity assessment
demonstration that specified requirements relating to a product, process, system, person or body are fulfilled

[SOURCE: ISO/IEC 17000:2004, 2.1]

3.5
conformity assessment body
body that performs conformity assessment services

[SOURCE: ISO/IEC 17000:2004, 2.5]

Note 1 to entry: Where the term conformity assessment is used, the definition in ISO/IEC 17000 applies. Wherever the term assessment is used without the word conformity (e.g. assessment, process assessment, conformant process assessment, assessment body), the relevant ISO/IEC 33001 definitions apply.

Note 2 to entry: Conformity assessment body is synonymous with assessment body or the body performing assessment in ISO/IEC 33002.

Note 3 to entry: In this document it will only refer to third-party conformity assessment body operating conformity assessment services.

3.6
conformity assessment scheme
conformity assessment system as related to specified objects of conformity assessment to which the same particular specified requirements, rules and procedures apply

[SOURCE: ISO/IEC 17000:2004, 2.8]

3.7
extended process set
set of processes specific to a maturity level higher than the basic maturity level that ensures the achievement of the relevant process profile

Note 1 to entry: The set of processes are drawn from specified process assessment models.

Note 2 to entry: An extended process set will include a minimum set of processes, together with additional and optional processes determined by the organizational context for the assessment.

3.8
maturity model
model, derived from one or more specified process assessment model(s), that identifies the process sets associated with the levels in a specified scale of organizational process maturity

[SOURCE: ISO/IEC 33001:2015, 3.3.7]

Note 1 to entry: The maturity model for the VSE profiles is defined in ISO/IEC/TR 29110-3-1:2015, Annex A.

3.9
organizational (process) maturity
extent to which an organizational unit consistently implements processes within a defined scope that contributes to the achievement of its business needs (current or projected)

Note 1 to entry: The defined scope is that of the specified maturity model.

Note 2 to entry: In this document, and as defined in ISO/IEC/TR 29110-3-1, organizational (process) maturity corresponds to fulfilment of VSE profiles.

[SOURCE: ISO/IEC 33001:2015, 3.4.2, modified – Note 2 has been added.]

4 General requirements

The requirements of ISO/IEC 17065:2012, Clause 4, apply.

ISO/IEC 29169 applies to this document.

5 Structural requirements

The requirements of ISO/IEC 17065:2012, Clause 5, apply.

6 Resource requirements

6.1 Introduction

The requirements of ISO/IEC 17065:2012, Clause 6, apply.

6.2 Independence

In addition, an important clarification when using the results of an Organizational Maturity Level Assessment is the level of independence of the assessment body and the assessment team performing the assessment.

ISO/IEC 33002:2015, Annex A sets out a typology to categorize the types of independence of different assessment bodies and the make-up of the assessment team performing an assessment (Types A, B, C and D). The relationship between ISO/IEC 17065 certification bodies and the ISO/IEC 33002 independence typology is defined below. For conformity assessments for VSE profiles, the process assessment is to be performed by an assessment body, ensuring impartiality towards the objects for which conformity is to be assessed.

The Type A of independence (as defined in ISO/IEC 33002:2015, Annex A) shall be the one to be used to ensure these impartiality needs.

6.3 Competence of people

In the conformity assessment field as in any other, the competence of the people managing and carrying out the conformity assessment activities is of paramount importance. Whether the work is being carried out by the supplier, the purchaser or an independent body, there shall be a clear understanding of the knowledge, skills and experience necessary for those performing the conformity assessment tasks

ISO/IEC 33002 requires that assessors shall be competent on the basis of appropriate education, training and experience, including domain experience, to perform the required class of assessment and to make professional judgments.

Competencies of the assessment team responsible for the assessment of VSE profiles shall cover the following knowledge areas.

— Process modelling and assessment Models. This knowledge area shall address what a “process model” is, what types of process models exist, and how the content of a process model can be obtained. It shall also cover the “process modelling” concept, including the construction of PAMs.

— Inter-relationships between processes and process modelling. This knowledge area shall address the complex inter-relationships between processes and process modelling, input to understand measuring process quality characteristics and process measurement frameworks. This knowledge area shall also cover all ISO/IEC 33004 requirements

— Process Measurement and Evaluation. This knowledge area shall cover the “characteristics” of process performance, and the basics of measuring these characteristics. It shall include the content

of ISO/IEC 33003 for measurement frameworks as well as ISO/IEC 33020 for process capability and maturity assessment. It shall also include other characteristics, e.g. “process security”.

— Assessment Process. This knowledge area shall cover the assessment process for process capability as well as for organizational maturity. It shall include all ISO/IEC 33002 requirements.

— In addition and in particular for VSEs, an important knowledge area is about both the specific processes for VSEs. This knowledge area shall cover the VSE profile specifications (as contained in ISO/IEC 29110-4-1 for VSE software basic profile) and the specific process assessment model and maturity model defined in ISO/IEC/TR 29110-3-1.

Annex A provides additional competencies for the resources involved in these conformity assessments.

Every organization, whatever its role, shall operate a competence management system in which the required competences are laid down and the means of demonstrating that individuals meet the requirements are specified.

Assessment bodies may establish an agreement group with a peer assessment process implemented according to ISO/IEC 17040 Conformity assessment – General requirements for peer assessment of conformity assessment bodies and accreditation bodies.

The assessment team may be accompanied by observers. These observers are not members of the assessment team but people agreed by the assessment Sponsor to get knowledge of the assessment process and about the data collected. An observer does not play any part in an assessment but may access all the data gathering and evaluation activities. An observer does not need to have any specific assessor competencies. Observers will be also required to respect the confidentiality of the assessment. Depending on the context, the number of observers should be limited.

7 Process requirements

7.1 General

7.1.1 Introduction

Process requirements to be fulfilled by the certification body are contained in of ISO/IEC 17065:2012, Clause 7 and apply. In particular, the requirements of ISO/IEC 17065:2012, 7.1, apply.

The certification schema to be used for conformity assessments of VSE profiles requirements (e.g. ISO/IEC 29110-4-1 contains the VSE software profile specifications) will be detailed in this clause, complementing ISO/IEC 17065:2012, Clause 7 by the following requirements that further develop some of those requirements for this document as using process assessment and organizational maturity models for these purposes.

See Annex B, Figure B.1 where the process stages (each column) are based in typical processes certification flow according to ISO/IEC 17065.

NOTE Irrespective of the process defined, the process in ISO/IEC 17065:2012, Clause 7 is applicable without exclusion, and if any part of this document contradicts ISO/IEC 17065, then ISO/IEC 17065 is the applicable one.

The relationship of the different International Standards applicable to these process requirements is shown in Figure 2.

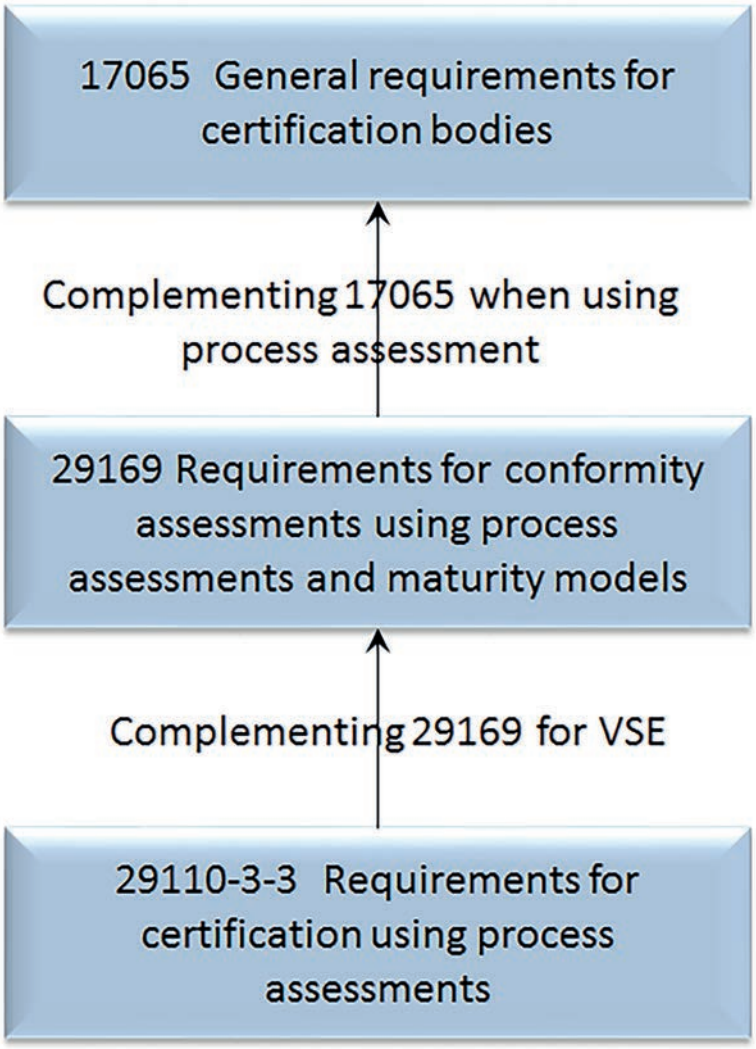

Figure 2 — Dependency of applicable International Standards

ISO/IEC 29169 is also applicable to this document. It defines the application of a conformity assessment methodology, based on the existing published ISO/IEC standards and guides, to process capability and organizational process maturity in order to support an environment which encourages worldwide recognition of conformity assessment results.

ISO/IEC 29169 already requires the following for conformity assessments performed using process assessment of process quality and organizational process maturity models that for VSE profiles are as follows.

a) A process assessment (so called in this document 'certification assessment') shall be planned and performed in accordance with the requirements of ISO/IEC 33002:2015, Clause 4 and in accordance with the requirements of ISO/IEC 29169:2016, Clause 7.

b) Review and attestation activities including the issuing of a statement of conformity shall be performed in accordance with ISO/IEC 29169:2016, Clause 9 and also ISO/IEC 17065.

c) VSE profiles conformity assessment, does not consider the issue of a supplier declaration of conformity according to ISO/IEC 17050-2:2004 as described in ISO/IEC 29169:2016, Clause 9.

d) Where continuing assurance is needed or desirable to maintain the validity of an assessment result, periodic surveillance activities shall be performed in accordance with ISO/IEC 29169:2016, Clause 10 and ISO/IEC 17065.

e) A process assessment shall be performed by a body that meets the requirements outlined in Clauses 4, 5 and 6.

7.1.2 Class 2 assessments (from ISO/IEC 33002)

Organizations are assessed using a process assessment conformant to the requirements of ISO/IEC 33002 and employing an Organizational Maturity Model based upon a conformant Process Assessment Model (in particular using the VSE Process Assessment Model in the annexes of ISO/IEC/TR 29110-3-1). Additional requirements are needed to ensure that the approach followed provides adequate and representative coverage of the organizational scope addressed in the assessment.

Three Classes of Process Assessment are identified in ISO/IEC 33002, but the Classes of assessment to be used for the VSE conformity assessments shall be Class 2 assessments (as defined in ISO/IEC 33002).

For a Class 2 assessment, specific requirements are defined relating to the planning, collection and validation of data, the rating of process attributes, and the recording of the level of independence of the assessment team. Refer to ISO/IEC 33002:2015, 4.6.3.

A 'certification' assessment shall be performed in accordance with the requirements of

— ISO/IEC 33002:2015, Clause 4.

The assessment process defined in this clause incorporates the requirements of ISO/IEC 33002:2015, Clause 4 with some re-ordering of text. Any assessment claiming conformity under this document shall be performed according to the requirements of this assessment process.

7.2 Application

The requirements of ISO/IEC 17065:2012, 7.2, apply.

In particular, any assessment claiming conformity under this document shall be performed according to the requirements of the assessment process defined in ISO/IEC 33002:2015, 4.4 for the process assessment input data gathering

7.3 Application review

The requirements of ISO/IEC 17065:2012, 7.3, apply.

7.4 Evaluation

7.4.1 Introduction

The requirements of ISO/IEC 17065:2012, 7.4, apply.

In particular any assessment claiming conformity under this document shall be performed according to the requirements of the assessment process defined in ISO/IEC 33002 as detailed in the following subclauses.

7.4.2 Plan the certification assessment

A plan for the assessment shall be developed and documented, as specified in ISO/IEC 33002:2015, 4.2.1.

The assessment input shall be defined prior to the data collection phase of an assessment and approved by the sponsor of the assessment or the sponsor's delegated authority.

In addition to the content specified in ISO/IEC 33002:2015, 4.4, the assessment input shall include the following elements:

a) explicit identification of the Class of assessment (Class 2 for certification of VSE profiles) and an explanation of the reason for the selection of the Class of assessment;

b) explicit identification of the TYPE of Assessment Body and the independence of the assessment team performing the assessment (Type A for certification of VSE profiles).

NOTE See Clause 6 for more details about the selection of Type A Assessment Body for these certification purposes.

In addition to the roles and responsibilities as defined in ISO/IEC 33002:2015, 4.3, the following minimum sizes of the assessment team shall apply:

1) for a Class 2 assessment, at least one member shall be a Lead Assessor;

2) for Type A independent Assessment Body the assessment team (e.g. a team of one Lead Assessor) shall be independent of the organization unit being assessed.

In addition to the content specified in ISO/IEC 33002:2015, 4.3 and 4.4, the assessment input shall include the following elements:

1) In defining the assessment purpose the assessment of process capability and organizational maturity shall be defined, and include explanation of the rating of process capability or organizational maturity level (already in ISO/IEC/TR 29110-3-1:2015, Annex A).

2) The Organizational Maturity Model to be employed for the assessment shall be recorded together with the identification of the specified Process Assessment Model(s) on which it is based, and the highest level of organizational maturity to be investigated (organizational maturity only). The Measurement Framework and the Process Assessment and Maturity Models to be used are the ones provided in ISO/IEC/TR 29110-3-1:2015, Annex A.

3) In defining the scope of the assessment, the following issues shall be also specifically addressed:

   a) The specific VSE Profile (for example the profile specifications defined in ISO/IEC 29110-4-1) to_be included in the assessment scope shall be specified (this already includes the set of processes, and the relevant capability levels scope of the assessment).

   b) An assessment shall be performed against a defined and declared organization scope. The scope may include:

      — One or more site locations;

      — One or more geographic units;

      — One or more product lines;

      — One or more application domains;

      — One or more business units;

      — One or more companies;

      — An entire organization.

   c) The identification and rationale for selection of the process instances to be examined shall be defined for each of the processes within the scope of the assessment.

   d) The set of process instances shall be representative of the defined organization scope. For a Class 2 assessment, a minimum of two process instances shall be identified for each process within the scope of the assessment. Where there is fewer than the required number of process instances available in the organization, all process instances shall be selected. The target number of process instances for each process shall be at least 20 % of the process instances performed during the last 12 months.

4) An organization that does not perform the minimum set of processes in the basic process set specified in an Organizational Maturity Model (in ISO/IEC/TR 29110-3-1:2015, Annex A) shall not be assessed for organizational maturity based upon that model (organizational maturity only).

7.4.3 Collect the data

Objective evidence required for evaluating the processes within the scope of the assessment shall be collected in a systematic manner, applying the requirements listed in ISO/IEC 33002:2015, 4.2.2.

An organization that does not have two process instances for the substantive majority of processes in the basic process set specified in an Organizational Maturity Model shall not be assessed for organizational maturity based upon that model (organizational maturity only).

In the collection of data from the identified process instances, the following criteria shall be satisfied:

a) For each process attribute of each process in the scope of the assessment, across the set of process instances, objective evidence drawn both from evaluation of work products and from testimony of performers of the process shall be collected.

b) For each process instance, objective evidence drawn both from evaluation of work products and from testimony of performers of the process shall be collected for each process within the scope of the assessment.

7.4.4 Validate the data

The data validation approach for the assessment shall ensure that the requirements of ISO/IEC 33002 are met in respect of every process instance identified in the assessment scope.

The data validation approach for the assessment shall ensure that the data collection coverage requirements are satisfied (as per ISO/IEC 33002 requirements).

7.4.5 Derive results

The approach to process attribute rating for the assessment shall ensure that the requirements of ISO/IEC 33002 are met in respect of each process and process attribute within the scope of the assessment, and that an organizational process capability and/or organization maturity level ratings are determined (as appropriate).

For a Class 2 assessment, the approach to process attribute rating shall satisfy the following conditions:

a) The process attribute rating for every process attribute within the assessment scope using the approach defined in ISO/IEC/TR 29110-3-1:2015, Annex A for process capability levels. shall be characterized for each process instance, based on validated data;

b) Where a process attribute rating cannot be characterized for the highest process attribute rating (fully achieved as defined in ISO/IEC/TR 29110-3-1:2015, Annex A) for any process instance, the issue(s) resulting in the lack of achievement shall be documented as a gap in performance;

c) Following the completion of rating of all of the processes within the assessment scope, the assessment team shall determine the set of process profiles and process capability levels;

d) Following the determination of the process capability levels, the assessment team shall determine the maturity level (optional) according to the selected maturity model (already in ISO/IEC/TR 29110-3-1:2015, Annex A).

7.4.6 Report the assessment

Following completion of an assessment, an assessment report shall be documented, reported and issued to the assessment sponsor or their delegated representative.

An assessment report shall also be maintained that meets the minimum requirements of ISO/IEC 33002:2015, 4.2.5 and Annex B that includes the proposed content of the assessment report.

7.5 Review

The requirements of ISO/IEC 17065:2012, 7.5 apply.

The conclusion of the review stage is a recommendation for a statement of conformity to be issued. The recommendation should make reference to the report and to any other findings from the review which substantiates the conformity of the object with the specified requirements. (ISO/IEC 29169)

7.6 Certification decision

The requirements of ISO/IEC 17065:2012, 7.6, apply.

7.7 Certification documentation

The requirements of ISO/IEC 17065:2012, 7.7, apply.

Based on a positive recommendation, a statement of conformity shall be issued. The statement of conformity provides unequivocal identification of the object (the VSE processes) and of the specified requirements with which it has been found to conform (VSE profile).

A statement of conformity for VSE profiles is to be issued by a third party (Type A of independence) body, and it is generally referred to as a "certificate of conformity".

Any certificate of conformity issued shall contain at minimum the following information (Note that those items marked up by "*" are to be part of the headline information of the certificate):

— A certificate unique identifier (*);

— A certificate issue date (*);

— A certificate validity period (or valid until date) (*);

— Identification of the organizational unit (*);

— The address of the organizational unit (when more than one location *);

— The scope of supply of the organizational unit (*);

— Identification of the body performing the assessment (assessment body);

— The Category of independence of the body performing the assessment (assessment body): Type A;

— The class of assessment: Class 2;

— Identification of the applicable standard(s) (requirements): VSE profiles, for example, the one contained in ISO/IEC 29110-4-1 (*);

— Identification of the process assessment model(s) (*);

— Identification of the process measurement framework, e.g. the one in ISO/IEC/TR 29110-3-1;

— Identification of the maturity model (if applicable), e.g. the one in ISO/IEC/TR 29110-3-1 (*);

— The processes in the scope of the assessment;

— The process profile or the process quality level (if relevant) for each process and/or the organizational process maturity level achieved (if relevant);

— The signature of the lead assessor and/or body performing the assessment (assessment body) (*).

Where the scope of conformity assessment does NOT include periodic surveillance in accordance with Clause 10, then the certificate validity period (or valid until date) shall state: 'no validity period specified'.

Where the scope of conformity assessment does include periodic surveillance in accordance with Clause 10, then the certificate validity period shall be defined as a three year period and after which a full re-assessment shall take place.

It is general practice to issue a certificate of conformity in two parts; one part with the headline information and one part as an addendum with the detailed information. If a certificate of conformity is issued in multiple parts, each certificate shall reference the other parts.

(ISO/IEC 29169)

7.8 Directory of certified products

The requirements of ISO/IEC 17065:2012, 7.8 apply.

7.9 Surveillance

7.9.1 Introduction

The requirements of ISO/IEC 17065:2012, 7.9 apply.

Where continuing assurance to maintain the validity of an assessment result is needed, the scope of conformity assessment shall be extended to include periodic surveillance within a defined cycle.

At annual intervals between the initial assessment and the re-certification assessment after three years, a surveillance assessment shall be performed by the assessment body. Therefore, there shall be two surveillance assessments during a 3-year certification cycle.

If performed, and as required in ISO/IEC 29169, the surveillance assessment shall be performed according to a defined class of assessment with reference to ISO/IEC 33002:2015, 4.6 (a Class 2 assessment for VSE profiles) except that a minimum of one process instance shall be identified for each process within the scope of the assessment and the assessment may be performed by a single lead assessor.

The surveillance assessments shall cover all processes and capability levels within the scope of the certificate of conformity during the defined certification cycle, but not necessarily on each surveillance visit. For VSE profiles (maturity level) conformity assessments, at minimum the Basic Process Set of processes plus a defined (by the Assessment Body) subset of the Extended Process Set of processes shall be included within the scope of any surveillance assessment for processes within the scope of surveillance assessment.

Other requirements for this surveillance assessment are defined in ISO/IEC 29169:2016, Clause 10.

7.9.2 Process improvement reviews

7.9.2.1 General

At minimum six months following a certification assessment or surveillance assessment, and at maximum before the next assessment or surveillance assessment, a process improvement review may also be performed by the assessment body.

There can be three process improvement reviews in the middle of the 3-year certification cycle. Each review will typically last one day as a class 3 assessment. The process improvement review may be conducted using remote virtual conference/meeting facilities.

The scope of the process improvement review can include a review of the following items as for surveillance assessments:

— Progress on the findings and process improvement opportunities identified during the last assessment;

— Changes made to the process management system;

— Progress and status of process improvements from other relevant sources;

— Results of performed audits, measurement analysis, lessons learned, problem trend analysis and causal analysis. Implemented changes shall be sampled to ensure adherence to continuing process capability.

The outcome of the review may be a set of review meeting minutes and an action list (where necessary).

7.9.2.2 Pre-assessments

Prior to the formal assessment activity, a pre-assessment activity may optionally be performed with the goal of identifying indicative gaps in practice and performance. A pre-assessment if performed shall be according to a defined class of assessment (a Class 2 assessment for VSE profiles) with reference to ISO/IEC 33002:2015, 4.6 with the exception that a minimum of only one process instance need be identified for each process within the scope of the assessment and the assessment need only be performed by an assessment team comprising at minimum a single lead assessor. A pre-assessment if performed shall result in an assessment report which may contain a reduced content but which shall detail any weaknesses and potential improvements to be considered for implementation by the organization. (ISO/IEC 29169)

7.10 Changes affecting certification

The requirements of ISO/IEC 17065:2012, 7.10 apply.

7.11 Termination, reduction, suspension or withdrawal of certification

The requirements of ISO/IEC 17065:2012, 7.11 apply.

7.12 Records

The requirements of ISO/IEC 17065:2012, 7.12, apply.

7.13 Complaints and appeals

The requirements of ISO/IEC 17065:2012, 7.13, apply.

8 Management system requirements

The requirements of ISO/IEC 17065:2012, Clause 8, apply.

Annex A
(normative)

Competencies for resources

A.1 Personal attributes

The certification body shall ensure that all personnel granting certification and the assessors possess the following personal attributes. The personnel shall be:

a) ethical, i.e. fair, truthful, sincere, honest and discreet;

b) open-minded, i.e. willing to consider alternative ideas or points of view;

c) diplomatic, i.e. tactful in dealing with people;

d) observant, i.e. actively observing physical surroundings and activities;

e) perceptive, i.e. aware of and able to understand situations;

f) versatile, i.e. able to readily adapt to different situations;

g) tenacious, i.e. persistent and focused on achieving objectives;

h) decisive, i.e. able to reach timely conclusions based on logical reasoning and analysis;

i) self-reliant, i.e. able to act and function independently whilst interacting effectively with others;

j) acting with fortitude, i.e. able to act responsibly and ethically, even though these actions may not always be popular and may sometimes result in disagreement or confrontation;

k) open to improvement, i.e. willing to learn from situations, and striving for better assessment results.

A.2 Competence requirements

A.2.1 General considerations

The certification body shall have processes to ensure that personnel have appropriate knowledge relevant to system and software processes.

It shall determine the competence required for each technical area (as relevant for the specific certification scheme), and for each function in the certification activity.

It shall determine the means for the demonstration of competence prior to carrying out specific functions.

A.2.2 Competence requirements for personnel granting certification

A.2.2.1 General

The certification body should ensure that the personnel who take the decision on granting certification have the same education, system and/or software processes training, assessment training and work experience as required for an assessor as mentioned above.

NOTE It is not mandatory for personnel granting certification to have or to maintain assessment experience.

A.2.2.2 Competences

The certification body should ensure that personnel granting certification demonstrate the ability to apply knowledge and skills in the following areas:

a) system and/or software processes standards or other documents used for the assessment (Process assessment model);

b) the application of system and/or software processes standards (e.g. ISO/IEC/IEEE 12207);

c) implementation of system and/or software processes and the ability to assess the effectiveness of their implementation (e.g. through the applicant's working experience);

d) corrections and corrective actions to be taken with regards to system and/or software processes;

e) laws and regulations relevant to system and/or software processes, in order to be able to conduct an effective assessment;

f) system and/or software products, processes and practices;

g) assessment and review of an assessment report for accuracy and completeness relevant system and/or software processes requirements;

h) assessment and review of the effectiveness of corrective actions;

i) the certification process.

A.2.3 Competence requirements for VSE process assessors

A.2.3.1 General

The competences of assessors shall be recorded. The certification body shall provide evidence of a successful evaluation of assessor's competences.

The certification body shall ensure that assessors demonstrate the ability to apply knowledge and skills in the following aspects:

a) Assessment principles, procedures and techniques

   To enable the assessment team to apply appropriately the assessment principles, procedures and techniques to different assessments and to ensure that assessments are conducted in a consistent and systematic manner, the lead assessor shall be able to fulfil all the assessment requirements as specified in ISO/IEC 33002.

b) System and software standards for VSE and normative documents

   Personnel involved in VSE ISO/IEC 29110 assessments shall have knowledge of

   — relevant standards of ISO/IEC 29110 family,

   — ISO/IEC 29110 normative documents used in system and software processes and their application,

   — the application of system and/or software processes in the development, maintenance and management of system and/or software in different organizations,

   — interaction between the components of system and/or software processes, and

   — system and/or software processes standards, applicable procedures or other documents used as assessment criteria.

c) Organizational situations

To enable the assessor to comprehend the organization's operational context, his/her knowledge and skills should cover

— organizational size, structure, functions and relationships,

— general business processes and related terminology,

— cultural and social customs of the assessed organizational unit, and

— the VSE's software or system processes characteristics and context.

d) Applicable laws, regulations and other requirements relevant to the discipline

To enable the assessor to work with, and to be aware of, the requirements that apply to the organization being assessed, his/her knowledge and skills should cover

— local, regional and national codes, laws and regulations,

— contracts and agreements, and

— other requirements to which the organization subscribes.

NOTE It is not necessary for each individual to have the same competence; however the collective competence of the group needs to be sufficient to achieve the objective of these functions.

A.2.3.2 Work experience

The certification body shall ensure that the Lead assessor has relevant work experience in the system and/or software industry, including in system and/or software development life cycle processes functions, within system and/or software development or maintenance, assessment or enforcement, or the equivalent.

A.2.3.3 Assessment experience

The certification body shall ensure that the Lead assessor has performed system and/or software processes assessments in organizations under the leadership of a qualified assessor.

For maintaining the qualification of the assessor, the certification body shall ensure that assessors have all the necessary competences updated.

A.3 Selection of the assessment team

The certification body shall ensure that the system and/or software processes assessment team have competences in the application of system and/or software processes required by the assessment.

Annex B
(informative)

Typical third-party certification process

Figure B.1 represents a typical third-party certification process where the process steps (each column) are based in typical processes certification flow according to ISO/IEC 17065.

The first step (first column) is the agreement for certification. It contains both the application and application review steps of ISO/IEC 17065.

The second step is the Certification Assessment, with the complete evaluation activities (see 7.4) and including the Review (see 7.5), the Certification decision (see 7.6) and the Certification documentation (see 7.7).

After the first certification stage, the Surveillance Assessment stages are performed (columns 3 and 4 in Figure B.1) (corresponding to 7.9). Continuous improvement is the purpose of these the Surveillance steps. At least annually, re-assessments are performed. The surveillance re-assessments cover all processes and capability levels within the scope of the certificate of conformity during the defined certification cycle, but not necessarily on each surveillance visit. On the third year, a new complete certification is performed.

The final part of the Certification process is the more comprehensive Re-certification assessment (4th column in Figure B.1) at the conclusion of the third surveillance year. Based on this assessment, there will be a recommendation made on certification renewal (for another 3-year cycle), together with any adjustment required to the ongoing surveillance plan, based on observed trends throughout the certification cycle.

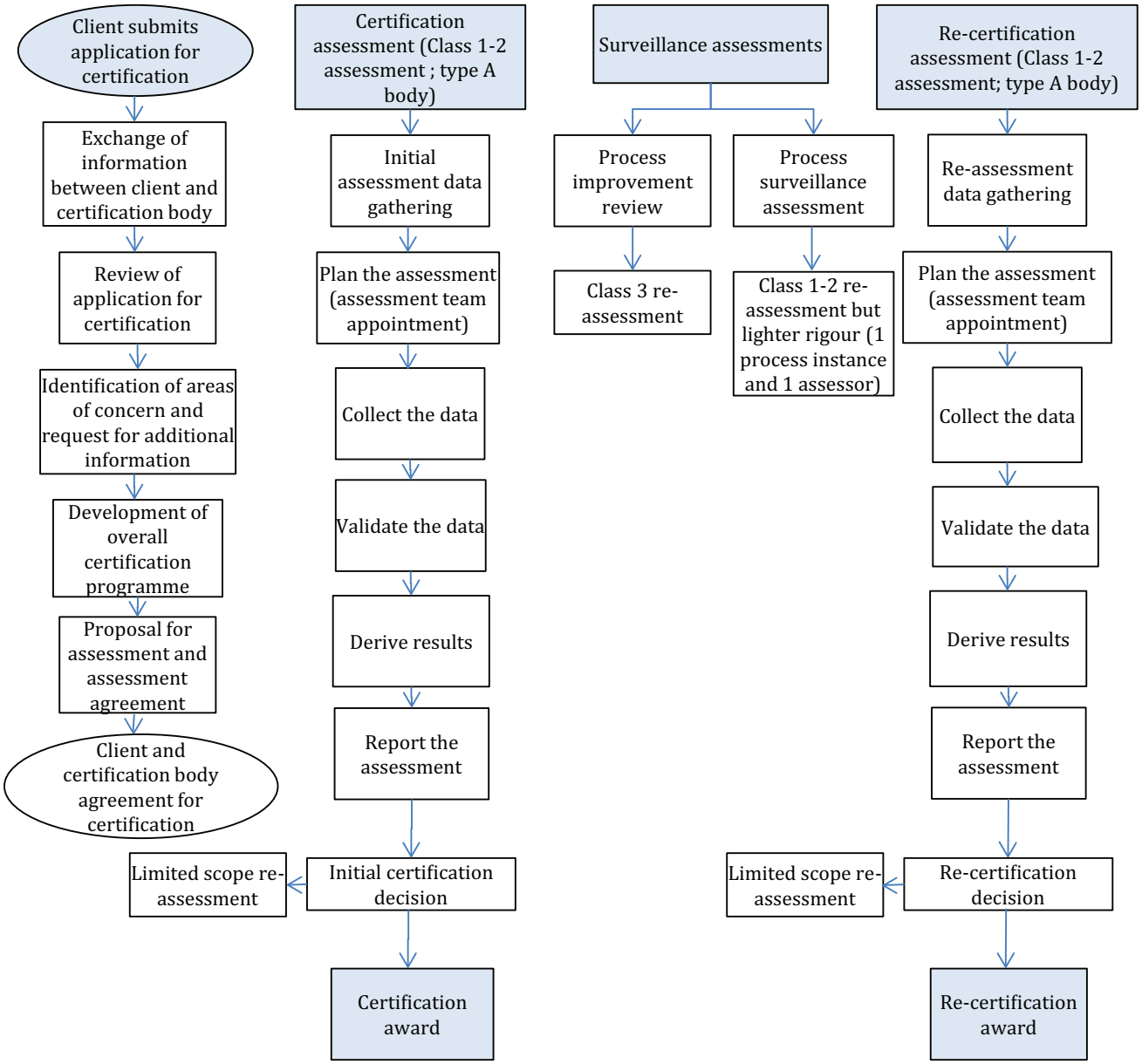

Figure B.1 — Typical (informative) third-party certification process

In Figure B.1, the oval form expresses external activity, and the square expresses activity in the third-party certification process.

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