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Information technology — Programming languages — Ada: Conformity assessment of a language processor

Technologies de l'information — Langages de programmation — Ada: Évaluation de conformité d'un processeur de langage

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

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 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 International Standard may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

International Standard ISO/IEC 18009 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 22, *Programming languages, their environments and system software interfaces*.

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Introduction

The Ada language community has a strong tradition of “compiler validation,” meaning **conformity assessment**. Originally, the validation program was administered under the auspices of the United States Department of Defense, as the use of “validated” compilers was a condition of usage in defense programs. Three key elements of this validation program were the conduct of **testing** by independent **testing laboratories**, resolution of any **test issues** by a single **authority** (the “Ada Validation Organization”), and world-wide acceptance of the “validation certificates” resulting from successful **conformity testing**. In 1998, the U.S. DoD elected to turn the responsibility for **conformity assessment** over to the private sector. This **International Standard** provides the basis for private sector **conformity assessment**. It is the intent of this **International Standard** to ratify existing practices for Ada **conformity assessment**.

In general terms, this **International Standard** states that independent **Ada Conformity Assessment Laboratories** (**ACAL**) would perform the **conformity assessment**. The various **ACALs** would collaborate on the formation or designation of a single **Ada Conformity Assessment Authority** (**ACAA**). The **ACAA** would manage and administer an **Ada Conformity Assessment Test Suite** (**ACATS**). Each **ACAL** would perform **conformity assessments** by applying the **ACATS** in accordance with an **Ada Conformity Assessment Procedure** (**ACAP**). Each **ACAL** would issue **certificates of conformity**. The **ACAA** would resolve any **test issues** that may arise during **conformity assessments** performed by **ACALs** and would approve **test reports** and **certificates of conformity** before they are issued to the **clients** of the **ACAL**.

The **ACAA** would act in the role of the current de facto “Ada Validation Organization” and its “Fast Reaction Team” and would also participate in the work of ISO/IEC JTC1/SC22/WG9 in order to apprise that group of possible defects discovered in the language **standard** as a result of **conformity assessment**.

This **International Standard** does not reuse an existing **test method** designed for any other language [as suggested by ISO/IEC Guide 2, 6.7.1] but instead describes a method that, although new to standardization, has a long de facto tradition within the Ada community. This method is based upon a well established method that has already been in uniformly applied usage for 15 years. Continuity with this tradition is considered essential to the success of the Ada language **standard**.

This **International Standard** has the following goals:

- This **International Standard** should permit a smooth transition from the current de facto method of “Ada compiler validation” to the standardized method.

- Users of Ada **processor certifications** should gain the same degree of assurance as is gained with the current de facto **certification** mechanism.

This **International Standard** was prepared by Working Group 9 (*Ada*) of Subcommittee 22 (*Programming languages, their environments and system software interfaces*) of Joint Technical Committee 1 (*Information technology*). It establishes **requirements** for assessing the **conformity** of Ada language **processors** to the **requirements** of the Ada language **standard**.

Portions of this **International Standard** are based upon U.S. Department of Defense procedures for Ada compiler “validation.” The co-operation of the U.S. DoD in contributing the appropriate documents is gratefully acknowledged.

ISO, IEC, JTC1 and SC22 have already prepared a number of **documents** related to **conformity assessment**. Rather than make normative references to these **documents**, this **International Standard** incorporates appropriate excerpts of their text, in some cases paraphrasing the text, changing the normative strength, or adapting the **provision** to the specific circumstances. In each case, the original source of the **provision** is noted in brackets. Therefore, these **documents** are listed in the bibliography of this **International Standard**, rather than in Clause 3, Normative reference.

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In order to relate better to the large body of existing work, particular attention has been paid to terminology. Terms defined in this **International Standard** have been presented in bold typeface.

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Information technology — Programming languages — Ada: Conformity assessment of a language processor

1 Scope

1.1 This **International Standard** establishes **requirements** for certifying an assessment that an Ada language **processor conforms** to the **requirements** of the Ada language **standard**, ISO/IEC 8652. It places **requirements** on the **organization** that performs the assessment, the assessment procedures, and the **test suite** used in the assessment. Finally, it places **requirements** on the form for the **certificate of conformity**.

1.2 This **International Standard** concerns only the **assessment of conformity** to the language **requirements** of ISO/IEC 8652. It does not concern the assessment of any other characteristics of a language **processor** or of the construction process used by the **manufacturer** of the language **processor**.

NOTE In the sense of [ISO/IEC Guide 23], the Ada language **standard**, ISO/IEC 8652, is to be regarded as a *standard for a specific property* rather than a *comprehensive product standard*.

1.3 This **International Standard** is intended to be primarily suitable for use by a **third party authority** although portions of it may also be applied by a supplier (first party) or by a user or purchaser (second party).

1.4 An Ada language **processor** may be claimed to **conform** to the **requirements** of ISO/IEC 8652 regardless of the application of this **International Standard**. This **International Standard** prescribes the method for obtaining a **certification** that an Ada language processor **conforms** to ISO/IEC 8652. Customers desiring to acquire a language **processor** certified as **conforming** should explicitly require that **certification** by citing this **International Standard**.

1.5 **Certification** should not be construed as guaranteeing that the certified product is free of **non-conformities** or defects; it only certifies that no evidence of **non-conformity** was found during the **certification** process.

2 Conformity

2.1 An Ada language **processor** is said to be “certified as conforming” if so assessed by an **Ada Conformity Assessment Laboratory** (**ACAL**) and the **Ada Conformity Assessment Authority** (**ACAA**). In performing this **certification**, the **ACAL** and the **ACAA** shall consider the results of **testing** performed by the **ACAL**. The **ACAL testing** shall be performed in accordance with the **Ada Conformity Assessment Procedure** (**ACAP**) using the **Ada Conformity Assessment Test Suite** (**ACATS**).

2.2 This International Standard places requirements upon the ACAL, ACAA, ACAP and ACATS.

NOTES

1 **Conformity** of an “implementation” of the Ada language **standard** is defined by subclause 1.1.3 of ISO/IEC 8652. The term “language **processor**” or “compiler” in this **International Standard** is to be regarded as synonymous with the term “implementation” as used in ISO/IEC 8652. This **International Standard** prescribes **requirements** for the assessment that a language **processor conforms** to the **requirements** of ISO/IEC 8652.

2 An **International Standard** on **test methods**, such as this one, does not imply any obligation to carry out any kind of **test**. It merely states the method by which the assessment, if required and referred to (for example, in the same or another **standard**, or in a **regulation**, or in contract documents), should be carried out. [ISO/IEC Directives, Part 2, subclause 6.5]

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3 Normative reference

The following **normative documents** contain **provisions** which, through reference in this text, constitute **provisions** of this **International Standard**. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this **International Standard** are encouraged to investigate the possibility of applying the most recent editions of the **normative documents** indicated below. For undated references, the latest edition of the **normative document** referred to applies. Members of ISO and IEC maintain registers of currently valid **International Standards**.

ISO/IEC 8652, *Information technology — Programming languages — Ada*.

4 Terms and definitions

For the purposes of this **International Standard**, the following terms and definitions apply.

4.1 Standardization

4.1.1
consensus
general agreement, characterized by the absence of sustained opposition to substantial issues by any important part of the concerned interests and by a process that involves seeking to take into account the views of all parties concerned and to reconcile any conflicting arguments

NOTE **Consensus** need not imply unanimity.

[ISO/IEC Guide 2, 1.7]

4.2 Aims of standardization

4.2.1
fitness for purpose
ability of a product, process or service to serve a defined purpose under specific conditions [ISO/IEC Guide 2, 2.1]

4.3 Normative documents

4.3.1
document
any medium with information recorded on or in it [ISO/IEC Guide 2, 3.1]

4.3.2
normative document
document that provides rules, guidelines or characteristics for activities or their results

NOTES

1 The term "**normative document**" is a generic term that covers such **documents** as **standards**, **technical specifications**, codes of practice and **regulations**.

2 The terms for different kinds of **normative documents** are defined considering the **document** and its content as a single entity.

[ISO/IEC Guide 2, 3.1]

4.3.3
standard
document, established by **consensus** and approved by a recognized **body**, that provides, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context [ISO/IEC Guide 2, 3.2]

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4.3.4
International Standard
standard that is adopted by an **international standardizing/standards organization** and made available to the public [ISO/IEC Guide 2, 3.2.1.1]

4.3.5
technical specification
document that prescribes technical **requirements** to be fulfilled by a product, process or service

NOTES

1 A **technical specification** would indicate, whenever appropriate, the procedure(s) by means of which it may be determined whether the **requirements** given are fulfilled.

2 A **technical specification** may be a **standard**, a part of a **standard** or independent of a **standard**.

[ISO/IEC Guide 2, 3.4]

4.3.6
regulation
document providing binding legislative rules, that is adopted by an **authority** [ISO/IEC Guide 2, 3.6]

4.4 Bodies responsible for standards and regulations

4.4.1
body
legal or administrative entity that has specific tasks and composition

NOTE Examples of **bodies** are **organizations**, **authorities**, companies and foundations.

[ISO/IEC Guide 2, 4.1]

4.4.2
organization
body that is based on the membership of other **bodies** or individuals and has an established constitution and its own administration [ISO/IEC Guide 2, 4.2]

4.4.3
international standardizing organization
standardizing **organization** whose membership is open to the relevant national **body** from every country [ISO/IEC Guide 2, 4.3.2]

4.4.4
authority
body that has legal powers and rights

NOTE An **authority** can be regional, national or local.

[ISO/IEC Guide 2, 4.5]

4.5 Type of standards

4.5.1
testing standard
standard that is concerned with **test methods**, sometimes supplemented with other **provisions** related to **testing**, such as sampling, use of statistical methods, sequence of **tests** [ISO/IEC Guide 2, 5.3]

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4.5.2
product standard
standard that specifies **requirements** to be fulfilled by a product or a group of products, to establish its **fitness for purpose** [ISO/IEC Guide 2, 5.4]

4.6 Content of normative documents

4.6.1
provision
expression in the content of a **normative document**, that takes the form of a **statement**, an **instruction**, a **recommendation** or a **requirement**

NOTE These types of **provision** are distinguished by the form of wording they employ; e.g. **instructions** are expressed in the imperative mood, **recommendations** by the use of the auxiliary "should" and **requirements** by the use of the auxiliary "shall."

[ISO/IEC Guide 2, 7.1]

4.6.2
statement
provision that conveys information [ISO/IEC Guide 2, 7.2]

4.6.3
instruction
provision that conveys an action to be performed [ISO/IEC Guide 2, 7.3]

4.6.4
recommendation
provision that conveys advice or guidance [ISO/IEC Guide 2, 7.4]

4.6.5
requirement
provision that conveys criteria to be fulfilled [ISO/IEC Guide 2, 7.5]

4.6.6
exclusive requirement
requirement of a **normative document** that must necessarily be fulfilled in order to comply with that **document**

NOTE The term "mandatory requirement" should be used to mean only a **requirement** made compulsory by law or **regulation**.

[ISO/IEC Guide 2, 7.5.1]

4.6.7
optional requirement
requirement of a **normative document** that must be fulfilled in order to comply with a particular option permitted by that **document**

NOTE An **optional requirement** may be either

(a) one of two or more alternative **requirements**; or

(b) an additional **requirement** that must be fulfilled only if applicable and that may otherwise be disregarded.

[ISO/IEC Guide 2, 7.5.2]

4.6.8
deemed-to-satisfy provision
provision that indicates one or more means of compliance with a **requirement** of a **normative document** [ISO/IEC Guide 2, 7.6]

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4.6.9
descriptive provision
provision for **fitness for purpose** that concerns the characteristics of a product, process or service

NOTE A **descriptive provision** usually conveys design, constructional details, etc. with dimensions and material composition.

[ISO/IEC Guide 2, 7.7]

4.7 Conformity assessment in general

4.7.1
conformity
fulfillment by a product, process or service of specified **requirements** [ISO/IEC Guide 2, 12.1]

4.7.2
conformity assessment
any activity concerned with determining directly or indirectly that relevant **requirements** are fulfilled

NOTE Typical examples of **conformity assessment** activities are sampling, **testing** and **inspection**; evaluation, **verification** and **assurance of conformity** (**supplier's declaration**, **certification**); **registration**, **accreditation** and **approval** as well as their combinations.

[ISO/IEC Guide 2, 12.2; ISO/IEC Guide 7, 3.1]

4.7.3
conformity assessment body
body that conducts **conformity assessment** [ISO/IEC Guide 2, 12.3]

4.7.4
conformity assessment system
system that has its own rules of procedure and management for carrying out **conformity assessment**

NOTES

1 **Conformity assessment systems** may be operated at, for example, national, regional or international level.

2 Typical examples of **conformity assessment systems** are **testing** systems, **inspection** systems, and **certification** systems.

[ISO/IEC Guide 2, 12.4]

4.7.5
conformity assessment scheme
conformity assessment system as related to specified products, processes or services to which the same particular **standards** and rules, and the same procedure, apply

NOTE The term "program" is used in some countries to cover the same concept as "scheme."

[ISO/IEC Guide 2, 12.5]

4.7.6
access to a conformity assessment system
opportunity for an applicant to obtain **conformity assessment** under the rules of the system [ISO/IEC Guide 2, 12.6]

4.7.7
participant in a conformity assessment system
conformity assessment body that operates under the rules of the system without having the opportunity to take part in the management of the system [ISO/IEC Guide 2, 12.7]

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4.7.8
member of a conformity assessment system
conformity assessment body that operates under the rules of the system and has the opportunity to take part in the management of the system [ISO/IEC Guide 2, 12.8]

4.7.9
third party
person or **body** that is recognized as being independent of the parties involved, as concerns the issue in question

NOTE Parties involved are usually supplier (“first party”) and purchaser (“second party”) interests.

[ISO/IEC Guide 2, 12.9]

4.7.10
registration
procedure by which a **body** indicates relevant characteristics of a product, process or service, or particulars of a **body** or person, in an appropriate, publicly available list [ISO/IEC Guide 2, 12.10]

4.7.11
accreditation
procedure by which an authoritative **body** gives formal recognition that a **body** or person is competent to carry out specific tasks [ISO/IEC Guide 2, 12.11]

4.7.12
reciprocity
bilateral relationship where both parties have the same rights and obligations towards each other [ISO/IEC Guide 2, 12.12]

4.7.13
equal treatment
treatment accorded to products, processes or services originating in other countries that is no less favorable than that accorded to like products, processes or services of national origin, in a comparable situation [ISO/IEC Guide 2, 12.13]

4.8 Determination of characteristics

4.8.1
test
technical operation that consists of the determination of one or more characteristics of a given product, process or service according to a specified procedure [ISO/IEC Guide 2, 13.1]

4.8.2
testing
action of carrying out one or more **tests** [ISO/IEC Guide 2, 13.1.1]

4.8.3
test method
specified technical procedure for performing a **test** [ISO/IEC Guide 2, 13.2]

4.8.4
test report
document that presents **test** results and other information relevant to a **test** [ISO/IEC Guide 2, 13.3]

4.8.5
laboratory
body that calibrates and/or tests [ISO/IEC Guide 25, 3.1]

4.8.6
testing laboratory
laboratory that performs **tests**

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NOTE The term "**testing laboratory**" can be used in the sense of a legal entity, a technical entity or both.

[ISO/IEC Guide 2, 13.4]

4.9 Conformity evaluation

4.9.1
conformity evaluation
systematic examination of the extent to which a product, process or service fulfills specified **requirements** [ISO/IEC Guide 2, 14.1]

4.9.2
inspection
conformity evaluation by observation and judgment accompanied as appropriate by measurement, **testing** or gauging [ISO/IEC Guide 2, 14.2]

4.9.3
inspection body
body that performs **inspection** [ISO/IEC Guide 2, 14.3]

4.9.4
verification
confirmation by examination and provision of evidence that specified **requirements** have been met [ISO/IEC Guide 25, 3.8]

4.9.5
conformity testing
conformity evaluation by means of **testing** [ISO/IEC Guide 2, 14.4]

4.9.6
type testing
conformity testing on the basis of one or more specimens of a product representative of the production [ISO/IEC Guide 2, 14.5]

4.10 Assurance of conformity

4.10.1
assurance of conformity
activity resulting in a **statement** giving confidence that a product, process or service fulfills specified **requirements**

NOTE For a product, the **statement** may be in the form of a **document**, a label or other equivalent means. It may also be printed in or applied on a communication, a catalogue, an invoice, a user instructions manual, etc. relating to the product.

[ISO/IEC Guide 2, 15.1]

4.10.2
supplier's declaration
procedure by which a supplier gives written assurance that a product, process or service **conforms** to specified **requirements**

NOTE In order to avoid any confusion, the expression "self-certification" should not be used.

[ISO/IEC Guide 2, 15.1.1]

4.10.3
certification
procedure by which a **third party** gives written assurance that a product, process or service **conforms** to specified **requirements** [ISO/IEC Guide 2, 15.1.2]

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4.10.4
certification body
body that conducts **certification**

NOTE A **certification body** may operate its own **testing** and **inspection** activities or oversee these activities carried out on its behalf by other **bodies**.

[ISO/IEC Guide 2, 15.2]

4.10.5
certificate of conformity
a **document** issued under the procedures of a **third party certification** system and attesting that a product or service is in **conformity** with specific **standards** or other **technical specifications** [ISO/IEC Guide 23, 3.2; ISO/IEC Guide 2, 15.5]

4.10.6
mark of conformity
a legally registered certification mark applied by or issued under the procedures of a **third party certification** system for a product or service which is in **conformity** with specific **standards** or other **technical specifications** [ISO/IEC Guide 23, 3.1; superseding ISO/IEC Guide 2, 15.6]

4.11 Approval and recognition arrangements

4.11.1
approval
permission for a product, process or service to be marketed or used for stated purposes or under stated conditions [ISO/IEC Guide 2, 16.1]

4.11.2
type approval
approval based on **type testing** [ISO/IEC Guide 2, 16.1.1]

4.11.3
recognition arrangement
agreement that is based on the acceptance by one party of results, presented by another party, from the implementation of one or more designated functional elements of a **conformity assessment system**

NOTES

1 Typical examples of **recognition arrangements** are **testing** arrangements, **inspection** arrangements and **certification** arrangements.

2 **Recognition arrangements** may be established at, for example, national, regional or international level.

3 An agreement limited to declaration of equivalence of procedures without acceptance of results does not meet the above definition.

[ISO/IEC Guide 2, 16.2]

4.11.4
multilateral arrangement
recognition arrangement that covers the acceptance of each other's results by more than two parties [ISO/IEC Guide 2, 16.5]

4.12 Accreditation of conformity assessment bodies and persons

4.12.1
accreditation system
system that has its own rules of procedure and management for carrying out **accreditation**

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NOTE **Accreditation** of **conformity assessment bodies** is normally awarded following successful assessment and is followed by appropriate surveillance.

[ISO/IEC Guide 2, 17.1]

4.12.2
accreditation body
body that conducts and administers an **accreditation system** and grants **accreditation** [ISO/IEC Guide 2, 17.2]

4.12.3
accredited body
body to which **accreditation** has been granted [ISO/IEC Guide 2, 17.3]

4.12.4
accreditation criteria
set of **requirements** that is used by an **accreditation body**, to be fulfilled by a **conformity assessment body** in order to be accredited [ISO/IEC Guide 2, 17.4]

4.13 Programming language processor test methods

4.13.1
configuration
host and target computers, any operating system(s) and software used to operate a **processor** [ISO TR 9547, 2.1]

4.13.2
extension
a facility in the implemented language that is not given in the language **standard** but that does not cause any ambiguity or contradiction when added to the language **standard** (although, in some languages, it may serve to lift a restriction) [ISO TR 9547, 2.2]

4.13.3
implementation defined
dependent on the **processor** but required by the language **standard** to be defined and documented by the implementer [ISO TR 9547, 2.3]

4.13.4
processor
a compiler, translator or interpreter working in combination with a **configuration** [ISO TR 9547, 2.4]

4.13.5
test program
a sequence of characters intended to be submitted to a **processor** in order to determine whether or not this **processor** exhibits a specific instance of a certain property [ISO TR 9547, 2.7]

4.13.6
test suite
a reference set of **test programs** that is designed to assess **conformity** of a **processor** with a language **standard** [ISO TR 9547, 2.9]

4.13.7
test tools
any additional means that can improve the efficiency, the reliability and the ease of use of the different phases of **testing** (e.g. implementation of the **test suite**, ensuring integrity, processing of the **test suite**, collecting **test** results, analysis of **test** results, producing a **test report**) [ISO TR 9547, 2.10]

4.13.8
required documents
the set of **documents** required by the programming language **standard** [ISO TR 9547, 2.11]

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4.13.9
subset
a **subset** S of a programming language L is a programming language such that every program in S

— is also a program in L and

— has the same meaning in S as it has in L

[ISO TR 9547, 2.12]

4.14 Miscellaneous

4.14.1
quality manual
a **document** stating the quality policy, quality system and quality practices of an **organization**

NOTES

1 The **quality manual** may call up other documentation relating to the **organization**'s quality arrangements.

2 The **quality manual** may be a distinct part of other documentation.

[ISO/IEC Guide 25, 3.10]

4.14.2
Core Language
the **provisions** of clauses 1-13 and Annexes A, B, and J of ISO/IEC 8652

NOTE **Conformity** to the **Core Language** is required by any Ada language **processor**.

[ISO/IEC 8652, 1.1.2]

4.14.3
Specialized Needs Annexes
Annexes C through H of ISO/IEC 8652

NOTE An Ada language **processor** may **conform** to some or none of these Annexes.

[ISO/IEC 8652, 1.1.2]

4.15 Terms and definitions of this International Standard

4.15.1
Ada Conformity Assessment Process
the process by which **conformity** of Ada language **processors** to the language **standard**, ISO/IEC 8652, is assessed

4.15.2
Ada Conformity Assessment Procedure (ACAP)
detailed **provisions**, **instructions**, **requirements** and descriptions of processes regarding all aspects of the **Ada Conformity Assessment Process** collected in a **document**

4.15.3
Ada Conformity Assessment Laboratory (ACAL)
an independent **testing laboratory** conducting **conformity assessment tests** in accordance with this **International Standard**

4.15.4
Ada Conformity Assessment Authority (ACAA)
an **organization** that ensures world-wide commonality of the **Ada Conformity Assessment Process**

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4.15.5
Ada Conformity Assessment Test Suite (ACATS)
the **test suite** used in the **Ada Conformity Assessment Process**

4.15.6
certification by derivation
registration of **conforming processors** obtained by adaptive and perfective maintenance from a **processor** for which **conformity** of the **processor** was successfully assessed by **witness-testing** on the same or a closely related **configuration**

4.15.7
certification by extension
registration of a **conforming processor** on **configurations** closely related to the **configuration** on which **conformity** of the **processor** was successfully assessed by **witness-testing**

4.15.8
Declaration of Conformity
a statement, signed by an authorized officer of the **manufacturer** of an Ada language **processor**, asserting that the **manufacturer** has no knowledge of an intentional deviation of the Ada language **processor** from the Ada language **standard**

4.15.9
client
an **organization** that obtains **conformity assessment** services from an **ACAL**

4.15.10
manufacturer
an **organization** responsible for the production and maintenance of a language **processor**

4.15.11
self-testing
the processing of an appropriately customized version of the **ACATS**, but not under the observation of an **ACAL**

4.15.12
test issue
any disagreement between an **ACAL** and its **client** over the conduct of the **conformity assessment** and, in particular, any disagreement over the **fitness for purpose** of any **test** in the **ACATS**

4.15.13
witness testing
the processing of an appropriately customized version of the **ACATS** under the observation of an **ACAL**

5 General

The **provisions** of this **International Standard** create a framework in which **conformity assessment** of Ada language **processors** to the Ada language **standard**, ISO/IEC 8652, can be conducted world-wide, while ensuring complete uniformity in **test methods**, **assessment** criteria, and **test issue** resolution, thus facilitating international **recognition arrangements** of **test reports** and **certificates of conformity**.

6 Ada Conformity Assessment Laboratory (ACAL)

6.1 General requirements

In accordance with the **provisions** of [ISO/IEC Guide 25, 1.1], this subclause sets out the general **requirements** in accordance with which a **laboratory** has to demonstrate that it operates, if it is to be recognized as competent to carry out specific **tests**. In this subclause the **provisions** of [ISO/IEC Guide 25] have been tailored to **Ada**

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Conformity Assessment Laboratories (ACAL). Additional **provisions** specific to **Ada Conformity Assessment Laboratories** are given in subclause 6.2.

6.1.1 Organization and management

6.1.1.1 The **laboratory** shall be legally identifiable. It shall be organized and shall operate in such a way that its permanent, temporary and mobile facilities meet the **requirements** of this **International Standard**. [ISO/IEC Guide 25, 4.1]

6.1.1.2 The **laboratory** shall

a) have a managerial staff with the authority and resources needed to discharge its duties;

b) have arrangements to ensure that its personnel are free from any commercial, financial and other pressures which might adversely affect the quality of their work;

c) be organized in such a way that confidence in its independence of judgment and integrity is maintained at all times;

d) have a technical manager (however named) who has overall responsibility for the technical operations;

e) have a quality manager (however named) who has responsibility for the quality system and its implementation. The quality manager shall have direct access to the highest level of management at which decisions are taken on **laboratory** policy or resources, and to the technical manager. In some **laboratories**, the quality manager may also be the technical manager or deputy technical manager;

f) where appropriate, participate in interlaboratory comparisons and proficiency testing programs.

[ISO/IEC Guide 25, 4.2]

6.1.2 Quality system and review

6.1.2.1 The **laboratory** shall establish and maintain a quality system appropriate for the needs of **conformity testing** of Ada language **processors**. The elements of this system shall be documented. The quality documentation shall be available for use by the **laboratory** personnel. The **laboratory** shall define and document its policies and objectives for, and its commitment to, good laboratory practice and quality of **testing** services. The **laboratory** management shall ensure that these policies and objectives are documented in a **quality manual** and communicated to, understood, and implemented by all **laboratory** personnel concerned. The **quality manual** shall be maintained current under the responsibility of the quality manager. [ISO/IEC Guide 25, 5.1]

6.1.2.2 The **quality manual**, and related quality documentation, shall state the **laboratory**'s policies and operational procedures established in order to meet the **requirements** of this **International Standard**. The **quality manual** and related quality documentation shall also contain:

a) a quality policy statement, including objectives and commitments, by top management;

b) the organization and management structure of the **laboratory**, its place in any parent **organization** and relevant organizational charts;

c) the relations between management, technical operations, support services and the quality system;

d) procedures for controlled maintenance of documentation;

e) job descriptions of key staff and reference to the job descriptions of other staff;

f) identification of the **laboratory**'s approved signatories (where this concept is appropriate);

g) the **laboratory**'s scope of **tests**;

h) reference to the **test** procedures used;

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i) procedures to be followed for feedback and corrective action whenever **testing** discrepancies are detected, or departures from documented policies and procedures occur;

j) procedures for dealing with complaints;

k) procedures for protecting confidentiality and proprietary rights;

l) procedures for audit and review.

NOTE "Top management" refers to the highest level of management of the **laboratory**.

[ISO/IEC Guide 25, 5.2]

6.1.2.3 The quality system adopted to satisfy the **requirements** of this **International Standard** shall be reviewed at least once a year by the management to ensure its continuing suitability and effectiveness and to introduce necessary changes or improvements. [ISO/IEC Guide 25, 5.4]

6.1.2.4 All review findings and any corrective actions that arise from them shall be documented. The quality manager shall ensure that these actions are discharged within the agreed timescale. [ISO/IEC Guide 25, 5.5]

6.1.3 Personnel

6.1.3.1 The **laboratory** shall have sufficient personnel, having the necessary education, training, technical knowledge and experience for their assigned functions. [ISO/IEC Guide 25, 6.1]

6.1.3.2 The **laboratory** shall ensure that the training of its personnel is kept up-to-date. [ISO/IEC Guide 25, 6.2]

6.1.3.3 Records on the relevant qualifications, training, skills and experience of the technical personnel shall be maintained by the **laboratory**. [ISO/IEC Guide 25, 6.3]

6.1.4 Handling of test items

6.1.4.1 The **laboratory** shall have a documented system for uniquely identifying the Ada language **processors** to be tested, to ensure that there can be no confusion regarding the identity of such **processors** at any time. [ISO/IEC Guide 25, 11.1]

6.1.5 Records

6.1.5.1 The **laboratory** shall maintain a record system to suit its particular circumstances and comply with any applicable **regulations**. It shall retain on record all original observations, calculations and derived data, **test report** and **certificate of conformity** for an appropriate period. The records for each **test** shall contain sufficient information to permit its repetition. The records shall include the identity of personnel involved in **testing**. [ISO/IEC Guide 25, 12.1]

6.1.5.2 All records, certificates and reports shall be safely stored, held secure and in confidence to the **client**, unless specified otherwise by this **International Standard**. [ISO/IEC Guide 25, 12.2]

6.1.6 Certificates and reports

6.1.6.1 The results of each **conformity testing** carried out by the **laboratory** shall be reported accurately, clearly, unambiguously and objectively, in accordance with the **instructions** of the **Ada Conformity Assessment Procedure** (**ACAP**, see clause 9). The results shall be reported in a **test report** and should include all the information necessary for the interpretation of the **test** results and all information required by the method used. [ISO/IEC Guide 25, 13.1]

6.1.6.2 Each **test report** shall include at least the following information:

a) a title, e.g. "Test Report";

b) name and address of **laboratory**, and location where the **testing** was carried out;

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c) unique identification of the **test report** (such as a serial number) and of each page, and the total number of pages;

d) name and address of **client**, where appropriate;

e) unambiguous identification of the Ada language **processor** tested;

f) name and address of the **manufacturer** of the Ada language **processor** (if different from **client**);

g) **configuration** in which the Ada language **processor** was tested;

h) option settings under which the Ada language **processor** was tested;

i) date of **test**;

j) unambiguous identification of the **Ada Conformity Assessment Test Suite** (**ACATS**) version used in **testing**;

k) identification of any **Specialized Needs Annexes** to which **conformity** was tested;

l) any deviations from, additions to or exclusions from the **test method**, and any other information relevant to a specific **test**, such as test parameterization;

m) any failures identified;

n) any additional information as specified by the **ACAP**;

o) signature and title, or an equivalent identification of the person(s) accepting responsibility for the content of the **test report** and date of issue.

[ISO/IEC Guide 25, 13.2]

6.1.6.3 Upon successful **conformity testing**, the **test** results should be summarized in a **certificate of conformity**, in accordance with the **instructions** of the **ACAP**. See also subclause 8.2.6.

6.1.6.4 Each **certificate of conformity** shall include at least the following information:

a) a title, e.g. “Certificate of Conformity”;

b) unique identification of the **certificate of conformity** (such as a serial number);

c) unambiguous identification of the Ada language **processor** tested;

d) name and address of the **manufacturer** of the Ada language **processor**;

e) **configuration** in which the Ada language **processor** was tested;

f) unambiguous identification of the **Ada Conformity Assessment Test Suite** (**ACATS**) version used in **testing**;

g) reference to the appropriate **standards**;

h) name and address of the issuing **laboratory**;

i) identification of any **Specialized Needs Annexes** to which **conformity** was tested;

j) other summary information as specified by the **ACAP**;

k) signature and title, or an equivalent identification of the person(s) accepting responsibility for the content of the **certificate of conformity** and date of issue.

[ISO/IEC Guide 23, 7.2]

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6.1.6.5 Particular care and attention shall be paid to the arrangement of the **certificate of conformity** and of the **test report**, especially with regard to presentation of the **test** data and ease of assimilation by the reader. There shall be a standard format of the **certificate of conformity** and of the **test report** for all Ada **conformity tests**. [ISO/IEC Guide 25, 13.4]

6.1.6.6 Material amendments to a **test report** or **certificate of conformity** after issue shall be made only in the form of a further **document**, or data transfer including the statement "Supplement to Test Report or Certificate of Conformity, serial number… [or as otherwise identified]," or equivalent form of wording. Such amendments shall meet all the relevant **requirements** of subclause 6.1.5 of this **International Standard**. [ISO/IEC Guide 25, 13.5]

6.1.6.7 The **laboratory** shall ensure that, where **clients** require transmission of **test** results by telephone, telex, facsimile or other electronic or electromagnetic means, staff follows documented procedures that ensure that the **requirements** of this **International Standard** are met and that confidentiality is preserved. [ISO/IEC Guide 25, 13.7]

6.1.7 Sub-contracting of testing

6.1.7.1 Where a **laboratory** sub-contracts any part of the **testing**, this work shall be placed with a **laboratory** complying with these **requirements**. The **laboratory** shall ensure and be able to demonstrate that its sub-contractor is competent to perform the activities in question and complies with the same criteria of competence as the **laboratory** in respect of the work being sub-contracted. The **laboratory** shall advise the **client** in writing of its intention to sub-contract any portion of the **testing** to another party. [ISO/IEC Guide 25, 14.1]

6.1.7.2 The **laboratory** shall record and retain details of its investigation of the competence and compliance of its sub-contractors and maintain a register of all sub-contracting. [ISO/IEC Guide 25, 14.2]

6.1.8 Outside support services and supplies

6.1.8.1 Where the **laboratory** procures outside support services and supplies, other than those referred to in this **International Standard**, in support of **test**, the **laboratory** shall use only those outside support services and supplies that are of adequate quality to sustain confidence in the **laboratory**'s **tests**. [ISO/IEC Guide 25, 15.1]

6.1.8.2 Where no independent assurance of the quality of outside support services or supplies is available, the **laboratory** shall have procedures to ensure that purchased equipment, materials and services comply with specified **requirements**. The **laboratory** should, whenever possible, ensure that purchased equipment and consumable materials are not used until they have been **inspected** or otherwise **verified** as complying with any **standard** specifications relevant to the **tests** concerned. [ISO/IEC Guide 25, 15.2]

6.1.8.3 The **laboratory** shall maintain records of all suppliers from whom it obtains support services or supplies required for **tests**. [ISO/IEC Guide 25, 15.3]

6.1.9 Complaints

6.1.9.1 The **laboratory** shall have documented policy and procedures for the resolution of complaints received from **clients** or other parties about the **laboratory**'s activities. A record shall be maintained of all complaints and of the actions taken by the **laboratory**. [ISO/IEC Guide 25, 16.1]

6.1.9.2 Where a complaint, or any other circumstance, raises doubt concerning the **laboratory**'s compliance with the **laboratory**'s policies or procedures, or with the **requirements** of this **International Standard** or otherwise concerning the quality of the **laboratory**'s **tests**, the **laboratory** shall ensure that those areas of activity and responsibility involved are promptly reviewed. [ISO/IEC Guide 25, 16.2]

6.1.9.3 In addition, the **laboratory** shall comply with the specific **requirements** set forth by this **International Standard** on complaints relating to the **test method**.

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6.2 Specific requirements for Ada Conformity Assessment Laboratories (ACAL)

6.2.1 Each **ACAL** shall enter into a **bilateral arrangement** with the **ACAA** (see clause 7) and abide by the procedures maintained and rulings issued by the **ACAA**. The **ACAA** shall have the right to audit **conformity** of each **ACAL** to the procedures and rulings issued by the **ACAA**.

6.2.2 Each **ACAL** shall recognize and accept **certificates of conformity**, **test reports** and **test** results produced by other **ACALs** in accordance with this **International Standard**.

6.2.3 Each **ACAL** shall comply with the **Ada Conformity Assessment Process** set forth by this **International Standard** and with the **Ada Conformity Assessment Procedure** (**ACAP**) formulated co-operatively by the **ACAA** and the **ACALs**.

6.2.4 Each **ACAL** shall be able to prove its **conformity** with the **requirements** imposed on **ACALs** by this **International Standard**.

6.2.5 An **ACAL** or any of its sub-contractors shall not have organizational ties to a **manufacturer**, supplier, or vendor of an Ada language **processor**.

6.2.6 Each **ACAL** shall offer all services specified in subclause 8.2.

7 Ada Conformity Assessment Authority (ACAA)

7.1 General requirements

7.1.1 A single **Ada Conformity Assessment Authority** (**ACAA**) shall be designated by agreement of the various **ACALs**. The designation of the **ACAA** shall be reaffirmed by the **ACALs** once every two years.

7.1.2 The **ACAA** shall be operated by a sponsor. An **organization** that produces Ada language **processors** for commercial gain shall not be the sponsor, but an association of such **organizations** may be the sponsor if it establishes procedures for operating the **ACAA** in a manner that does not favor suppliers of Ada language **processors**, either individually or as a group.

7.1.3 The **ACAA** shall establish procedures for its governance and shall execute those procedures.

7.1.4 The **ACAA** shall establish procedures for the designation, management and maintenance of the **Ada Conformity Assessment Test Suite** (**ACATS**, see clauses 8 and 10) and shall ensure that those procedures are appropriately executed.

7.1.5 The **ACAA** shall manage the evolution of the **ACATS** in response to technical issues arising from its use.

7.1.6 The **ACAA** shall manage the evolution of the **ACATS** in response to revisions of the Ada language **standard**.

7.1.7 The **ACAA** shall review the **test reports** produced by any **ACAL** in the execution of the **Ada Conformity Assessment Process** and shall authorize each **certificate of conformity**.

7.1.8 The **ACAA** shall ensure the public availability of **test reports** and **certificates of conformity** for successful **conformity assessments**, unless their confidentiality has been requested in accordance with subclause 8.2.5.7.

7.1.9 The **ACAA** shall manage the resolution of technical and procedural issues arising from the execution of the **Ada Conformity Assessment Process** by any **ACAL**.

7.1.10 The **ACAA** shall establish liaison arrangements with appropriate **standards organizations** to provide defect reports arising from **conformity testing** activities.

7.1.11 The **ACAA** shall be responsive to ISO/IEC and its working group for the Ada language **standard** on the addition, modification, or deletion of **tests** in the **ACATS** and on the interpretation of the Ada language **standard** relating to the resolution of technical issues arising in the execution of the **Ada Conformity Assessment Process**.

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7.1.12 The **ACAA** shall maintain a publicly available list of Ada language **processors** that have been assessed as **conforming** by an **ACAL** in accordance with this **International Standard**.

7.1.13 The **ACAA** shall produce and maintain the **Ada Conformity Assessment Procedure** (**ACAP**) in collaboration with the **ACALs**.

7.1.14 The **ACAA** shall establish an expiration policy for **certificates of conformity** and shall document this policy in the **ACAP**.

8 Ada Conformity Assessment Process

The process of assessing **conformity** applies the **test method** to Ada language **processors**. This clause specifies the **requirements** on this process when it is performed by an **ACAL** that documents the results in a **test report** and possibly a **certificate of conformity**. This clause also specifies **requirements** on the process to certify the **conformity** of **processors** that are closely related to **processors** tested by an **ACAL**.

The **test method** of ascertaining **conformity** of an Ada language **processor** consists of

a) an **Ada Conformity Assessment Test Suite** (**ACATS**) of correct and incorrect Ada programs to be submitted to the **processor** for analysis and execution, where appropriate;

b) documentation of the **test suite**, describing test categories, test objectives for each individual **test**, applicability of individual **tests** to certain classes of **configurations** for which the Ada language **processor** is intended, instructions on how to run the **test suite**, and the expected results of running the individual **tests** on a **conforming processor**;

c) the **Ada Conformity Assessment Procedure** (**ACAP**) to be established and documented co-operatively by the **ACAA** and the **ACALs**, detailing the **Ada Conformity Assessment Process** within the framework set forth by this **International Standard**. In particular, the **ACAP** includes unambiguous **instructions** on the interpretation of the results to be obtained by running the **test suite** on a **conforming processor**.

8.1 General requirements

8.1.1 The Ada language **processor** to be tested, including selected options, and the **configuration** relevant to the **testing** shall be fully specified. [ISO TR 9547, 3.1]

8.1.2 A single copy of the Ada language **processor** shall be tested on a single **configuration**, using a uniform setting of its options. [ISO TR 9547, 3.2]

NOTE But note subclause 8.2.7.

8.1.3 The information given in the **required documents** should be **inspected** for **conformity** to the language **standard** and should be compared with the results of **testing**. [ISO TR 9547, 4.3.1]

8.1.4 The output from the Ada language **processor** that has been tested with the **test suite** shall be analyzed in accordance with clearly defined rules set forth in the **ACAP**. These rules shall give criteria for objective evaluation of all possible outputs, which may include no output at all, for each **test program** in the **test suite**. [ISO TR 9547, 4.3.1]

8.1.5 The results of **testing conformity** to the **standard** shall be analyzed and compiled in a **test report**. The report shall provide and summarize all the information pertaining to the **testing** of **conformity** to the language **standard** (setup of **testing**, actual **testing**, major events during **testing**). The **test report** shall report on the outcome of all applicable **tests** in the **test suite**. [ISO TR 9547, 4.3.1]

8.1.6 There should be no exclusivity or intellectual property rights affecting the use of the **test suite**, **test tools**, or **test method**. [ISO TR 9547, 8.1(5)]

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8.1.7 The **test method** shall be flexible enough to allow for all **configurations** on which **processors** may be tested. In any case, **conformity** shall be determined solely on the basis of the **test suite** and should not be dependent on the ability to utilize any particular tool. [ISO TR 9547, 8.1(6)]

8.1.8 The **provisions** made in this **International Standard** and the **ACAP** for dealing with questions concerning defects in the **test suite** and interpretations of the Ada language **standard** shall be followed. [ISO TR 9547, 8.1(9)]

8.2 Conduct of the testing

8.2.1 General requirements

8.2.1.1 Subclause 1.1.2 of ISO/IEC 8652 identifies a **Core Language**, to which any Ada language **processor** must **conform**, and several **Specialized Needs Annexes**, to which a **processor** may **conform** individually. Correspondingly, Ada **conformity testing** shall assess **conformity** of any **processor** to the **Core Language**, and **conformity** to individual **Specialized Needs Annexes** only for those **processors**, for which such **conformity** has been declared by the **manufacturer** of the **processor**.

8.2.1.2 Conformity testing shall be performed by an **ACAL** in accordance with the **ACAP** and under the terms of a formal agreement with a **client**. The **client** will normally, but need not, be the **manufacturer** of the Ada language **processor** to be tested.

8.2.1.3 Conformity testing shall include the following steps, described in subsequent subclauses:

a) obtaining a customized **test suite** and **self-testing**

b) optional evaluation of **self-test** results by the **ACAL**

c) **witness testing**

d) documentation of the results of **testing**

e) issuing the **certificate of conformity**, if applicable

8.2.2 Obtaining a customized test suite and self-testing

8.2.2.1 The **ACAL** shall prepare a customization of the **ACATS** suitable for use with the **processor** under test, using information provided by the **client**.

8.2.2.2 The **client** shall perform a **self-testing** of the **processor** by running the customized copy of the **ACATS** on it.

8.2.3 Evaluation of self-test results

8.2.3.1 The **client** may submit the results of the **self-testing** to the **ACAL** for evaluation. The format of the submitted results shall be specified by the **ACAL**.

8.2.3.2 An **ACAL** may require the submission of **self-test** results for evaluation prior to **witness testing**.

8.2.3.3 The **client** shall provide sufficient information with submitted **self-test** results to permit the **ACAL** to identify the **processor** under test, along with the expected circumstances and results of **witness testing**.

8.2.3.4 The **ACAL** shall evaluate the submitted results of the **self-testing** and notify the **client** of the result of the evaluation.

8.2.3.5 The **ACAL** shall facilitate the identification, submission to the **ACAA**, and resolution of any **test issues** arising before or during the evaluation of **self-test** results. The **ACAP** shall specify the types of issues that may be resolved by the **ACAL** without submitting them to the **ACAA**. Issues whose resolution depends on interpretation of the Ada language **standard**, ISO/IEC 8652, shall be resolved only by the **ACAA**.

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8.2.4 Witness testing

The process by which an **ACAL** assesses **conformity** of an Ada language **processor** is termed **witness testing**. **Witness testing** is a required step of **conformity testing**. This subclause specifies the related **requirements**.

8.2.4.1 **Witness testing** shall take place in the physical presence of qualified **ACAL** personnel and under their constant supervision.

8.2.4.2 The **ACAL** shall verify the identification of the **configuration**.

8.2.4.3 The **ACAL** shall verify the identification of the Ada language **processor**.

8.2.4.4 The **ACAL** shall observe the loading of its customized **ACATS** onto the host system of the **configuration** under test.

8.2.4.5 The customized **ACATS** used in **witness testing** shall include only **tests** that examine **conformity** to the **Core Language** and to **Specialized Needs Annexes** of ISO/IEC 8652, to which the **manufacturer** has claimed **conformity** of the Ada language **processor**.

8.2.4.6 The entire customized **ACATS** shall be run on a single copy of the Ada language **processor** on a single **configuration**, applying a single set of option settings of the Ada language **processor**.

8.2.4.7 The **ACAL** shall monitor all activities needed for running the customized **ACATS** on the **processor** on both the host and target system of its **configuration**.

8.2.4.8 The **ACAL** shall evaluate the results of running the customized **ACATS** on the **processor** under test. The **witness testing** shall be successful only if the evaluation of all **tests** shows **conformity**.

8.2.4.9 The **client** shall provide a written **Declaration of Conformity**, signed by an authorized officer of the **manufacturer** of the Ada language **processor**, stating that the **manufacturer** has no knowledge of an intentional deviation from the Ada language **standard** in the **processor** under test.

8.2.5 Documentation of test results

8.2.5.1 The **ACAL** shall prepare a draft **test report** on the outcome of the **witness testing**.

8.2.5.2 The **test report** shall **conform** to the **requirements** of subclause 6.1.6.

8.2.5.3 The **ACAL** shall provide the **client** with the opportunity to review the draft **test report**.

8.2.5.4 The **ACAL** shall update the draft **test report** to account for **client** comments as appropriate.

8.2.5.5 If the **ACAL** determines that **witness testing** is successfully completed, then it shall present the revised **test report** for **ACAA** review and concurrence.

8.2.5.6 If the **ACAL** determines that the results of **witness testing** reveal **non-conformity**, the **ACAL** shall document the (unsatisfactory) results of **testing** in the **test report** and shall deliver a copy to the **client** only.

8.2.5.7 By default, the **test report** of a successful assessment and the associated **certificate of conformity**, if issued, shall be publicly available. A written request for confidentiality by a **client** or **manufacturer** to the **testing ACAL** shall, however, be honored by the **ACAL** and **ACAA** by suppressing all public information about the assessment.

8.2.6 Issuing the certificate of conformity

8.2.6.1 Each **ACAL** shall establish a policy of whether it will issue **certificates of conformity**. If an **ACAL** does elect to issue **certificates of conformity**, all **provisions** of subclause 8.2.6 apply.

NOTE It is recognized that a **requirement** to provide a **certificate of conformity** would not be implementable by all ISO and IEC member **bodies** because of national, legal or other **provisions**. [ISO/IEC Guide 23, 8]

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8.2.6.2 Upon determination that the **processor** under test has successfully completed **witness testing**, as specified in all applicable procedures **documents** and the **ACATS** documentation, the **ACAL** shall issue and sign a **certificate of conformity** and present it to the **ACAA** for its concurrence and signature.

8.2.6.3 A **certificate of conformity** shall not be issued for any **processor** for which a **test** result indicates a **non-conformity** to the **Core Language**, unless otherwise determined by the **ACAA test issue** resolution process.

8.2.6.4 The **ACAL** shall deliver the **certificate of conformity** and a signed copy of the **test report** to the **client**.

8.2.7 Certification of closely related processors

It is recognized that **witness testing** is an expensive process, that language **processors** are subjected to on-going perfective and adaptive maintenance, and that **testing** cannot possibly be conducted on all **configurations**, on which the **processor** can be reasonably expected to show identical behavior. Therefore a process is established that allows conveying the status of a **conforming**, **witness-tested** Ada language **processor** to closely related **processors** operating on a range of compatible **configurations**. This subclause specifies the primary **requirements** for this process.

8.2.7.1 The **ACAP** shall specify the **requirements** and means of extending the certified status of an **ACAL**-tested **processor** for a given **configuration** to the same **processor** operating on closely related **configurations**. This **certification by extension** shall require:

— that the **manufacturer** file a **Declaration of Conformity** with the respective **ACAL**, specifying the range of **configurations**;

— that the target instruction set architecture and target operating system of the additional **configurations** be the same as or a superset of those of the **ACAL**-tested **processor**;

— that the receiving **ACAL** and the **ACAA** do not find the claim of compatible **configurations** unreasonable by applying the general perception of the computer market rather than an in-depth analysis.

8.2.7.2 The **ACAP** shall specify the **requirements** and means of extending the certified status of an **ACAL**-tested **processor** to another, closely related ("derived") **processor**, obtained by perfective or adaptive maintenance, on the same or closely related **configurations**. This **certification by derivation** shall require:

— that the **manufacturer** file a **Declaration of Conformity** with the respective **ACAL**, specifying the range of **configurations**;

— that the **processor** be derived from the **ACAL**-tested **processor** by performing maintenance activities, including adaptations to different host **configurations**;

— that the **client** certify that it has tested the derived **processor** on one **configuration** and that the **test** results are equivalent to those obtained by the **ACAL** when **witness-testing** the **processor** from which this **processor** is derived, and substantiate this claim as requested by the **ACAL**;

— that the target instruction set architecture and target operating system of any additional **configurations** be the same as or a superset of those of the **ACAL-**tested **processor**;

— that the receiving **ACAL** and the **ACAA** do not find the claim of compatible **configurations** unreasonable by applying the general perception of the computer market rather than an in-depth analysis.

8.2.7.3 The **ACAP** shall define equivalent **test** results in such a way as to require:

— that the **test** results of the derived **processor** uses the same customized **ACATS** as the **ACAL** used for **witness-testing** of the tested **processor**, with limited modifications defined in the **ACAP**;

— that every **test** passed by the **ACAL**-tested **processor** is also passed by the derived **processor**.

8.2.7.4 The **ACAP** shall define a procedure by which a **third party** can demonstrate to the **ACAA** that a **processor** for which **certification by derivation** or **certification by extension** has been granted produces **test**

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results that show a **non-conformity** of the **processor** on a **configuration** within the range of **configurations** specified for the **certification**. The **ACAP** shall also specify the remedial actions in case such **non-conformity** can be demonstrated. They shall at least include, but not be limited to, removal or correction of any **ACAA**-maintained public record of the incorrect **certification**.

8.3 Test issue management

8.3.1 The **ACAA** shall arbitrate procedural issues brought to it by an **ACAL** and a **client** in a timely manner.

8.3.2 The **ACAA** shall analyze technical **test issues** raised by an **ACAL**, a **client** of an **ACAL**, or any other party, submit them to advisory groups as needed, and issue resolutions of the issues in a timely manner. [ISO TR 9547, 8.1(9)]

8.3.3 **ACAA test issue** resolutions shall include, but not be limited to, the following categories:

— rejection: the **test** must be processed satisfactorily according to the applicable documents and procedures;

— test withdrawal: the **test** is found to be flawed and is no longer to be used for **conformity testing** (a corrected version may be reintroduced at some later time);

— modification: the **test** code, processing, or evaluation is modified.

8.3.4 The **ACAA** shall maintain public lists of withdrawn and modified **tests**. Whenever the **ACAA** resolves a **test issue** that results in the withdrawal or modification of a **test**, it shall add the **test** to the appropriate one of these lists. Each entry on the list of modified **tests** shall specify an effective date. As of the effective date, all **conformity assessments** must respect the change denoted by that entry. The effective date shall be chosen to minimize the negative impact on **conformity assessments** in progress. In general, the effective date should be no less than three months after publication.

8.4 Marks of conformity

This **International Standard** does not deal with **marks of conformity**. Adoption of such marks is left to the individual **ACAL**. It is recommended, however, that, if **marks of conformity** are issued for **conforming** Ada language **processors**, such marks be issued to **processors certified by extension** or **derivation** as well.

9 Ada Conformity Assessment Procedure (ACAP)

Throughout this **International Standard** reference is made to and **requirements** are imposed on the **ACAP**. The **ACAP** is described in a **document** developed co-operatively by the **ACAA** and the **ACALs**. It provides detailed **provisions**, **instructions**, **requirements** and descriptions of processes regarding all aspects of the **Ada Conformity Assessment Process**. It is intended to ensure utmost commonality of the **Ada Conformity Assessment Process**, regardless of which **ACAL** performs the assessment. The **ACAP** is a framework on which the operating procedures of each **ACAL** shall be based.

9.1 General requirements

9.1.1 The **ACAP** shall contain sufficient detail to ensure that all aspects of the **Ada Conformity Assessment Process** that may impact the result of the assessment are handled identically regardless of which **ACAL** performs the process.

9.1.2 The **ACAP** shall be publicly available.

9.1.3 The **ACAP** shall be reviewed periodically and adjusted as needed to cover previously unforeseen issues.

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10 Ada Conformity Assessment Test Suite (ACATS)

10.1 General requirements

10.1.1 A single **test suite** shall be maintained by the **ACAA** and used by each **ACAL** in performing its work. The initial **test suite** shall be the current version of the **test suite** known as the "Ada Compiler Validation Capability (ACVC)" **test suite** that has been in use for assessing **conformity** of Ada language **processors** since 1983 and is in general **conformity** with the **provisions** of this clause.

10.1.2 Revisions of the **test suite** should be undertaken as deemed necessary by the **ACALs** and upon any revision of the Ada language **standard**. [ISO TR 9547, 8.1(8)]

10.1.3 The **test suite** shall be designed to test **conformity** of **processors** by submitting **test programs** to them. Each **test** shall exercise some rules of the language **standard** and their interaction. The **test suite** shall be designed for **conformity testing** and not for assessing other aspects of the Ada language **processor**. [ISO TR 9547, 4.1]

10.1.4 The **test suite** should cover all aspects of the language **standard** and should investigate implementation issues only as far as **conformity** is concerned. [ISO TR 9547, 4.1]

10.1.5 The **test suite** should not be too large; the economical aspects should be taken into account (e.g. relative costs of **conformity** versus development cost of an implementation.) [ISO TR 9547, 4.1]

10.1.6 The **test suite** shall be written in such a way that it can be readily maintained under version control and subject to a review procedure. [ISO TR 9547, 4.1]

10.1.7 The **test suite** shall be designed so as to take into account the separable **conformity** to **Specialized Needs Annexes** of ISO/IEC 8652. Thus the **test suite** shall be modular. [ISO TR 9547, 4.1]

10.1.8 The **test suite** shall contain **test programs** that are in accordance with the rules of the language **standard**. It shall also contain **test programs** that are not in accordance with the rules of the language **standard**, in those situations where the language **standard** specifies syntactic or semantic properties that must be rejected. **Test programs** to be rejected should clearly identify the offending constructs. **Test programs** that must not be rejected shall be made as far as possible self-checking and hence report the success or failure by a message. [ISO TR 9547, 4.1]

10.1.9 The execution of the **test programs** shall be practical. The execution of the **test suite** should not take too much time, should not use excessive system resources, and should not cost too much to run. [ISO TR 9547, 8.1(4)]

10.1.10 The **test programs** shall, as far as possible, be independent of each other, and their sequence of execution shall not influence each other's results. [ISO TR 9547, 4.1]

10.1.11 Each **test program** should have a single objective related to the **requirements** of the Ada language **standard**, ISO/IEC 8652.

10.1.12 Each **test program** shall have a unique identifier.

10.2 Design of test suite

10.2.1 Each **test program** should be written in such a way that its understanding is facilitated by the use of clear documentation in it that includes:

— comments that are clear, concise;

— reference to clauses of the language **standard**;

— clear statements of assumptions made in **test suite** design. [ISO TR 9547, 5.2]

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10.2.2 The **test suite** should be written in such a way that its understanding is facilitated by the use of clear coding style.

10.2.3 The **test suite** should be written in such a way that it is very easily adapted to technical aspects specified in the language **standard** that are **implementation defined**, for example:

— implementation parameters (for example, use of the largest integer supported);

— maximum and minimum parameter values with a reasonable selection in between (for instance, measure of nesting depth);

— use of features that are optional;

— numeric precision;

— use of files and external data;

— input and output facilities. [ISO TR 9547, 5.2]

10.2.4 The **test suite** should be written in such a way as to minimize the use of features which could be restricted by **configuration** or implementation characteristics. Where such features are used in the **test suite** for assessing other aspects of **conformity**, reasonableness should be exercised with regard to capacity limitations (e.g. numerical values, size of arrays). [ISO TR 9547, 5.2]

10.2.5 The **test suite** should also be designed to use a minimum set of simple constructs of the language to establish a context in which to test advanced features. The latter should only be used where specifically needed for a particular **testing** purpose. **Test programs** that do not **conform** to the language **standard** should deviate from it only as necessary in order to satisfy specific **testing** objectives. [ISO TR 9547, 5.2]

10.2.6 The **test suite** should be portable to different **configurations**. A small **configuration** should not be penalized. Thus, each single program should be able to run on a small **configuration**, as well as on a large one. The result of **testing** (i.e., pass or fail) should not be influenced by the program's size. [ISO TR 9547, 5.6]

10.2.7 The **ACATS** documentation and internal test documentation shall clearly specify the criteria for determining the result of each **test**. The result of applying these criteria shall indicate that the **test** is passed, failed, or not applicable to the **processor** under test. The interpretation of these results as pertains to **conformity** may be determined by **ACAA** issue resolutions and other conditions specified in the **ACAP**.

10.2.8 Where features of the language are not covered by the **test suite**, the **test suite** documentation should include a statement (or list) to this effect. [ISO TR 9547, 5.4]

10.2.9 Special care should be taken to document the **testing** strategy (if any) for language **extensions** in the **test suite**. [ISO TR 9547, 5.4]

10.3 Maintenance and revision of the test suite

10.3.1 **Provisions** shall be made by the **ACAA** for maintenance and revision of the **ACATS** through a public review and according to a published timetable. [ISO TR 9547, 6]

10.3.2 For substantive additions to the **ACATS** there shall be a public review period of at least six months.

10.3.3 There shall be a clearly defined date by which substantive additions or modifications to the **ACATS** are applied in **conformity testing**.

10.4 Availability of the test suite

10.4.1 The **ACATS** and tools shall be available in one or more machine-readable formats that are generally used within the industry. Consideration should be given to the use of ISO **standards**. [ISO TR 9547, 7]

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10.4.2 The **ACATS** and its documentation shall be made available to the general public for a cost not to exceed the cost of reproduction and shipment.

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Bibliography

ISO/IEC Guide 2:1996, *Standardization and related activities—General vocabulary*.

ISO/IEC Guide 7:1994, *Guidelines for drafting standards suitable for use for conformity assessment*.

ISO/IEC Guide 23:1982, *Methods of indicating conformity with standards for third-party certification systems*.

ISO/IEC Guide 25:1990, *General requirements for the competence of calibration and testing laboratories*.

ISO/IEC Guide 58:1993, *Calibration and testing laboratory accreditation systems—General requirements for operation and recognition.*

ISO/IEC Guide 61:1996, *General requirements for assessment and accreditation of certification/registration bodies.*

ISO/IEC Guide 65:1996, *General requirements for bodies operating product certification systems.*

ISO TR 9547:1988, *Programming language processors—Test methods—Guidelines for their development and acceptability*.

ISO/IEC TR 10034:1990, *Guidelines for the preparation of conformity clauses in programming language standards*.

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