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**Information technology — Conformance  
testing for the biometric application  
programming interface (BioAPI) —**

**Part 1:  
Methods and procedures**

**iTeh STANDARD PREVIEW**  
*Technologies de l'information — Essai de conformité pour l'interface de  
programmation d'applications biométriques (BioAPI) —  
Partie 1: Méthodes et procédures*  
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ISO/IEC 24709-1:2007

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## Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

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

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

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

ISO/IEC 24709-1 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 37, *Biometrics*.

ISO/IEC 24709 consists of the following parts, under the general title *Information technology — Conformance testing for the biometric application programming interface (BioAPI)*:

- *Part 1: Methods and procedures* [ISO/IEC 24709-1:2007](https://standards.iso.org/standards/catalog/standards/sist/7253bbb2-94ff-446b-ba75-222833cd4fb1/iso-iec-24709-1-2007)
- *Part 2: Test assertions for biometric service providers*

The following parts are under preparation:

- *Part 3: Test assertions for BioAPI frameworks*
- *Part 4: Test assertions for biometric applications*

## Introduction

This part of ISO/IEC 24709 defines a conformance testing methodology for ISO/IEC 19784-1. It specifies three conformance testing models that enable conformance testing of each of the following BioAPI components: an application, a framework and a BSP. It also specifies an assertion language that is used for the definition of test assertions. Actual test assertions for each of the BioAPI components are defined in subsequent parts of ISO/IEC 24709.

This part of ISO/IEC 24709 also contains informative guidelines regarding general concepts related to establishing and administering a BioAPI conformance assessment and certification program. These informative guidelines identify the types of activities, responsibilities, services and documentation recommended for conducting conformity assessment and certification of BioAPI-conformant implementations. Further, this part of ISO/IEC 24709 provides informative guidelines for establishing a complete conformity assessment methodology for BioAPI specification.

Clause 6 describes the general test method and conformance testing models for BioAPI.

Clause 7 defines the assertion language, based on XML, used for definition of conformance test assertion.

Clause 8 defines the elements of the assertion language.

Clause 9 specifies the use of the standard BioAPI interface functions of BioAPI in conformance testing.

Clause 10 defines the built-in variables of the assertion language.

Clause 11 defines the test log using XML syntax. [ISO/IEC 24709-1:2007](https://standards.iteh.ai/catalog/standards/sist/7253bbb2-94ff-446b-ba75-222833cd4ff4/iso-iec-24709-1-2007)

Clause 12 defines the test report using XML syntax. <https://standards.iteh.ai/catalog/standards/sist/7253bbb2-94ff-446b-ba75-222833cd4ff4/iso-iec-24709-1-2007>

Clause 13 describes the general concept and structure of a BioAPI conformance test suite.

Annex A is normative, and defines the XML schema of the assertion language.

Annex B is normative, and defines the ASN.1 schema of the assertion language.

Annex C is normative, and defines the XML schema for the test log.

Annex D is informative, and describes a primer of a BioAPI test method implementation, including elements of the conformance test process and description of the test categories.

Annex E is informative, and describes a general framework for the overall BioAPI Conformity Assessment Process.

Annex F is informative, and provides the relationship diagrams for the assertion language.



The Bibliography references a number of standards organizations, including ISO, IEC, NIST and IEEE, and other organizations that have published a number of documents and white papers related to conformity assessments in general and conformance testing in particular.<sup>1)</sup>

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1) Rather than make normative references to these documents, this part of the ISO/IEC 24709 incorporates appropriate excerpts of their text, in some cases paraphrasing the text or adapting the provisions to the specific circumstances. Therefore, these documents are listed in the Bibliography or are referenced explicitly in the body text, as appropriate.

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# Information technology — Conformance testing for the biometric application programming interface (BioAPI) —

## Part 1: Methods and procedures

### 1 Scope

**1.1** This part of ISO/IEC 24709 specifies the concepts, framework, test methods and criteria required to test conformity of biometric products claiming conformance to BioAPI (see ISO/IEC 19784-1). Guidelines for specifying BioAPI conformance test suites, writing test assertions and defining procedures to be followed during the conformance testing are provided.

**1.2** This part of ISO/IEC 24709 is concerned with conformance testing of biometric products claiming conformance to BioAPI (see ISO/IEC 19784-1). It is not concerned with testing other characteristics of biometric products or other types of testing of biometric products (i.e. acceptance, performance, robustness, security, etc.). Testing by means of test methods which are specific to particular biometric products are not the subject of ISO/IEC 24709.

**1.3** This part of ISO/IEC 24709 is applicable to the development and use of conformance test method specifications, BioAPI conformance test suites and conformance testing programs for BioAPI-conformant products. It is intended primarily for use by testing organizations, but may be applied by developers and users of test assertions and test method implementations.

### 2 Conformance

**2.1** A BioAPI conformance test suite conforming to this part of ISO/IEC 24709 shall support one or more conformance testing models (see 6.2) and shall be able to execute any valid test assertion for the testing model(s) that it supports, and that are written in the assertion language specified in Clauses 7 through 10.

**NOTE** There is no restriction on the form or structure of a BioAPI conformance test suite, in terms of the number of software components, the tasks performed by each software component, or the content and form of the information exchanged between software components.

**2.2** A BioAPI conformance test suite shall be able to verify the syntactic correctness of any package (see 7.1.6) containing assertions or activities (or both) for any conformance testing model, including the testing models that the implementation does not support (if any).

**2.3** For each supported conformance testing model, a BioAPI conformance test suite shall be able to perform the actions (specific to a computing platform) necessary to interact with an implementation under test, making function calls to the standard BioAPI interface functions exposed by the implementation under test and receiving function calls from it.

**NOTE 1** In the conformance testing model for BioAPI applications, it is not required that the BioAPI conformance test suite be able to start or stop the execution of the implementation under test, but needs a mechanism to detect the starting or ending of the application under test.

**NOTE 2** It is not required that a BioAPI conformance test suite be able to test all implementations of the base standard that claim conformance to the base standard. This includes, but is not limited to, the case when the implementation of the base standard was created for a computing platform different from the one for which the BioAPI conformance test suite

was created, and the case where the implementation of the base standard depends on a hardware device that is not available on the computing system where the test is to be run.

**2.4** A BioAPI conformance test suite shall produce a test log (see Clause 11) and test report (see Clause 12) for each implementation tested.

**2.5** If a BioAPI conformance test suite is unable to perform the test of an implementation of the base standard, this shall be recorded in the test report in these terms rather than as non-conformance of the implementation under test.

**2.6** A BioAPI conformance test suite shall provide a means for a user to enter all the data necessary as input to a test.

**NOTE** This includes the identification of the assertion to be processed (package name and assertion name), the list of all the input parameters of the assertion, and all the other information that is to be included in a test report (see Clause 12).

### 3 Normative references

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

ISO/IEC 19784-1, *Information technology — Biometric application programming interface — Part 1: BioAPI specification*

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### 4 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 19784-1 and the following apply.  
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**4.1 abstract test engine**  
conceptual machine capable of performing conformance tests on an instance of a standard BioAPI component

**4.2 base standard**  
standard for which a test method specification is written and/or a test method implementation is developed

**4.3 BioAPI conformance test suite**  
test software used to ascertain conformance to a specification or a standard that is in conformance with ISO/IEC 19784-1

**4.4 BioAPI conformity statement**  
statement that describes conformity of an Implementation Under Test against relevant BioAPI requirements

**4.5 certification**  
acknowledgement that a validation has been completed and the criteria established by the certifying organization have been met

**4.6 conformance**  
fulfillment by a product, process or service of all relevant specified conformance requirements [ISO/IEC 13210:1999]

**4.7****conformance requirement**

requirement stated in a base standard that identifies a specific requirement in a finite, measurable and unambiguous manner

NOTE 1 A conformance requirement by itself or in conjunction with other conformance requirements corresponds to an assertion.

NOTE 2 Adapted from ISO/IEC 13210:1999.

**4.8****conformity assessment**

any activity concerned with determining directly or indirectly that relevant requirements are fulfilled

**4.9****implementation under test**

software and hardware, located on one or more system, which implement the standard(s) being tested

**4.10****standard BioAPI component**

BioAPI application, BioAPI framework or biometric service provider, as specified in ISO/IEC 19784-1

NOTE 1 See 6.1.3.8.

NOTE 2 Although a biometric function provider is also a BioAPI component according to ISO/IEC 19784-1, it is not included in this definition because ISO/IEC 19784-1 does not specify any biometric function provider interfaces.

**4.11****standard BioAPI interface**

any one of the interfaces specified in ISO/IEC 19784-1, which one standard BioAPI component exposes to another standard BioAPI component

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NOTE See 6.1.3.8.

**4.12****test assertion****assertion**

specification for testing a conformance requirement in an Implementation Under Test in the form of software or procedural methods that generate the test results (also named test outcomes or test verdicts) used for assessment of the conformance requirement

**4.13****test case**

specification of the actions required to achieve a specific test purpose or combination of test purposes

NOTE Adapted from the definition of “abstract test case” in ISO/IEC 9646-1:1994.

**4.14****test method implementation**

software, procedures or other means used to measure conformance

**4.15****test method specification**

document that expresses the required functionality and behavior of a base standard as assertions and provides the complete set of conforming test result codes

[ISO/IEC 13210:1999]

**4.16**  
**test purpose**

prose description of a narrowly defined objective of testing, focusing on a single conformance requirement, as specified in the appropriate product specification

NOTE Adapted from ISO/IEC 13210:1999 and ISO/IEC 9646-1:1994.

**4.17**  
**test report**

document that presents test results and other information relevant to the execution of the test methods against an Implementation Under Test

**4.18**  
**test result code**  
**test verdict**

value that describes the result of a test

NOTE Adapted from ISO/IEC 13210:1999.

**4.19**  
**validation**

process of testing software for conformance to a specific specification

**5 Abbreviations**

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For the purposes of this document, the following abbreviations apply.

<b>API</b>	Application Programming Interface
<b>BCS</b>	BioAPI Conformity Statement <a href="https://standards.iteh.ai/catalog/standards/sist/7253bbb2-94ff-446b-ba75-222833cd4ff4/iso-iec-24709-1-2007">ISO/IEC 24709-1:2007</a>
<b>BIR</b>	Biometric Information Record
<b>BSP</b>	Biometric Service Provider
<b>CBEFF</b>	Common Biometric Exchange Formats Framework
<b>CTS</b>	BioAPI Conformance Test Suite
<b>IUT</b>	Implementation Under Test
<b>SPI</b>	Service Provider Interface
<b>UUID</b>	Universally Unique Identifier

## 6 Conformance testing methodology

### 6.1 General

#### 6.1.1 Implementation under test

**6.1.1.1** The Implementation Under Test (IUT) is the object that is being tested for conformity. For BioAPI specifications it is the software that has 'implemented' the specification. The software and supporting hardware constitute the IUT and shall be listed in both the test report and certificate of conformity.

**6.1.1.2** Biometric products claiming to conform to the BioAPI specification are expected to conform to all the applicable conformity requirements in the Conformity clause of the BioAPI specification (Clause 5 of the specification). These requirements can be:

- a) Mandatory requirements: these are to be observed in all cases;
- b) Conditional requirements: these are to be observed if the conditions set out in the specification apply;
- c) Optional requirements: these can be selected to suit the implementation, and are to be observed if selected.

**6.1.1.3** To evaluate the conformity of a biometric product, it is necessary to have a statement of the capabilities that have been implemented in conformance with the BioAPI specification, so that the implementation can be tested for conformity against relevant requirements, and against those requirements only. Such a statement is called a BioAPI Conformity Statement (BCS), and shall be prepared by the IUT supplier prior to the beginning of the Conformance Testing. At a minimum, the BCS shall contain an itemized list of all mandatory, optional, and conditional conformity requirements of the BioAPI specification included in the IUT.

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**6.1.2 Test method** <https://standards.iteh.ai/catalog/standards/sist/7253bbb2-94ff-446b-ba75-222833cd4ff4/iso-iec-24709-1-2007>

**6.1.2.1** For conformance testing to be meaningful, all BioAPI implementations must be tested in the same manner. Conformance testing reflects the essence of technical requirements of BioAPI specifications and measures whether a Biometric product faithfully implements the specification.

**6.1.2.2** For the purpose of this standard, conformance testing is "black box" testing of the functionality of a BioAPI implementation. Neither the internal structure nor source code of a candidate implementation is examined.

**6.1.2.3** Considering the complexity of the BioAPI specification, and many possible ways of implementing BioAPI-conformant products, the feasible strategy is to use falsification testing methodology. This strategy as implemented in this Part of ISO/IEC 24709 includes the following steps:

- a) Analyze the BioAPI specification, and develop documented test cases in form of test assertions. Test cases may be further grouped to form test scenarios. The test assertions are documented in other parts of ISO/IEC 24709.
- b) The test assertions may be realized in the form of executable test scripts, which, in combination with applicable data files, will constitute a BioAPI conformance test suite (CTS)
- c) An IUT will be subjected to various combinations of legal and illegal inputs, and compare the resulting output to a set of corresponding "expected results."
- d) Test results will be evaluated using pass/fail criteria.

**6.1.2.4** Falsification testing can only demonstrate non-conformity, i.e., if errors are found, non-conformance of the IUT shall be proven, but the absence of errors does not necessarily imply the converse. This test