AS ISO/IEC 19795.4:2025
ISO/IEC 19795-4:2008

Australian STANDARD®

STANDARDS Australia

Information technology — Biometric performance testing and reporting

Part 4: Interoperability performance testing



AS ISO/IEC 19795.4:2025

This Australian Standard® was prepared by IT-032, Biometrics and Identification. It was approved on behalf of Standards Australia's Standards Development and Accreditation Committee on 28 May 2025.

This Standard was published on 27 June 2025.

The following are represented on Committee IT-032:

Department of Defence (Australian Government)
Department of Foreign Affairs and Trade (DFAT)
Department of Home Affairs — Digital and Technology Policy Division
Photo Marketing Association
SITA

This Standard was issued for comment as DR AS ISO/IEC 19795.4:2025

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ISBN: 978 1 76175 231 5

AS ISO/IEC 19795.4:2025

ISO/IEC 19795-4:2008

Australian Standard®

Information technology — Biometric performance testing and reporting

Part 4: Interoperability performance testing

First published as AS ISO/IEC 19795.4:2025.

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This page explains the meaning of the language and structure of this Standard.

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Requirements

To conform to a Standard, all requirements in the Standard need to be met.

A requirement is any statement in the Standard which uses the word "shall".

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The following words are commonly used in Standards, but statements using them do not have to be followed to conform to the Standard:

(a) "should" means that something is recommended.

(b) "may" means that something is permitted.

(c) "can" means that something is possible.

Structure of Standards

A Standard always has the following parts:

(i) The Preface states who developed the Standard, what the Standard is aiming to do, and how it relates to other documents.

(ii) The Scope states what the Standard is about, what it covers and what it does not cover.

(iii) The Normative references clause lists other documents that are referenced in the Standard as part of requirements.

(iv) The Terms and definitions clause defines important terms to help with understanding the Standard.

A Standard may also include other parts, such as the following:

(1) A normative appendix sets additional requirements that need to be conformed to.

(2) An informative appendix provides additional information or guidance. An informative appendix provides additional information or guidance. They usually do not contain requirements. If an informative appendix does contain requirements, the Standard will explain when those requirements apply.

(3) A Bibliography lists documents referenced in the Standard but not as part of requirements.

Many Standards include notes. Notes provide recommendations and/or guidance only. They never contain requirements.

Preface

This Standard was prepared by the Standards Australia Committee IT-032, Biometrics and Identification.

The objective of this document is to prescribe methods for technology and scenario evaluations of multi-supplier biometric systems that use biometric data conforming to biometric data interchange format standards.

It specifies requirements needed to assess —

(a) performance available from samples formatted according to a standard interchange format (SIF);

(b) performance available when samples formatted according to a SIF are exchanged;

(c) performance available from samples formatted according to a SIF, relative to proprietary data formats;

(d) SIF interoperability by quantifying cross-product performance relative to single-product performance;

(e) performance available from multi-sample and multimodal data formatted according to one or more SIFs; and

(f) performance interoperability of biometric capture devices.

In addition, this document —

(i) includes procedures for establishing an interoperable set of implementations;

(ii) defines procedures for testing interoperability with previously established sets of implementations; and

(iii) gives testing procedures for the measurement of interoperable performance.

It does not —

(A) establish a conformance test for biometric data interchange formats; or

(B) provide test procedures for online data collection.

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(1) In the source text “this part of ISO/IEC 19795” and “this standard” are to be read as “this document”.

(2) A comma is to be read as a full point when referring to a decimal marker.

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The terms “normative” and “informative” are used in Standards to define the application of the appendices or annexes to which they apply. A “normative” appendix or annex is an integral part of a Standard, whereas an “informative” appendix or annex is only for information and guidance.

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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 19795-4 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 37, *Biometrics*.

ISO/IEC 19795 consists of the following parts, under the general title *Information technology — Biometric performance testing and reporting*:

— *Part 1: Principles and framework*

— *Part 2: Testing methodologies for technology and scenario evaluation*

— *Part 3: Modality-specific testing* [Technical Report]

— *Part 4: Interoperability performance testing*

Part 6: Testing methodologies for operational evaluation is under preparation.

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Introduction

The multi-part biometric data interchange format standard, ISO/IEC 19794, has been developed to foster interoperable exchange of biometric data. By defining open containers for image, signal and feature data, and constraining some of the properties of the samples, the standards enhance interoperability by requiring implementers to be able to handle a restricted set of all possible biometric samples. Examples of this are the template standards of ISO/IEC 19794-2 and ISO/IEC 19794-8 which embed compact processed data from fingerprint images. Only samples of the same format type (several of which can be defined in the same part of ISO/IEC 19794) are intended to be interchangeable.

One common assertion prior to SC 37's formulation of data interchange standards was that proprietary templates offer greater recognition performance than any likely standard on the grounds that the proprietary instances are the product of processes that embed considerable, private, intellectual property. The question of whether the emerging standards are sufficient then arises: that is, do they code data (feature, image, etc.) representations that allow matching with accuracy comparable to that available from the proprietary solutions?

A second issue, interoperability, arises in those applications where standardized data are generated and matched by different institutions and systems. If a company’s feature extraction subsystem processes acquired samples to produce ISO/IEC 19794-x compliant instances, then can other companies' comparison subsystems attain performance comparable with that obtained from the originator's own comparison subsystem? A further question is then whether a third company can successfully recognize enrolment and user samples from two different sources.

This part of ISO/IEC 19795 defines tests to specifically address absolute performance, sufficiency, and interoperability available from biometric data formatted to comply with established standards, particularly those developed in the various parts of ISO/IEC 19794. However, because this part of ISO/IEC 19795 references interchange formats generically, by referencing only their black box generation and use, it also applies to other open standards. One consequence of this approach is that the success of a test is predicated on the correctness and appropriateness of lower-level data elements and values, i.e. conformance to the respective standards. Therefore, the approach here is to require conformance testing as an integral part of the test. This is achieved by referencing formal published conformance tests or profiles of standards. For instance, an interoperability test of the ISO/IEC 19794-5 face format might reference an application profile of its Token image, which in turn might rely on ISO/IEC 15444-1 (JPEG 2000 core coding system).

This part of ISO/IEC 19795 conceives of the following three kinds of tests:

— **online:** a scenario test in which a volunteer population enrols on suppliers' products and subsequently uses suppliers' verification or identification implementations to make genuine and impostor attempts;

— **offline:** a technology test in which an archived corpus of captured samples, not necessarily collected with any intent to simulate the operational conditions of a particular application, is used as input to suppliers' enrolment, verification or identification products to make genuine and impostor attempts;

— **hybrid:** a test in which the sample corpus is collected online under conditions which attempt to simulate the operational conditions of a particular application, and is then processed offline.

In each case, an interoperability test needs to embed multi-supplier generation, exchange, and comparison of samples of the standard interchange format. Online collection from a live population is appropriate when the biometric capture device, and/or the subject interaction with the biometric capture device, is considered to have a material effect on the interoperable performance of the intended application. An offline test is appropriate when a representative corpus of samples is already available (for example passport photographs to be converted into Token instances of ISO/IEC 19794-5). An offline test may be appropriate when the collection of representative data is neither practical nor necessary to determine the interoperable performance of specific subsystems, such as feature extraction and/or comparison.

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In all cases, an interoperability test must enrol subjects on one or more products and verify or identify on one or more others. This should involve subjects making transactions as themselves (genuine trials) and as one or more other people (impostor trials). If a large enough population is available, a disjoint impostor population can be used. Since online tests can become onerous on the test population when many products and impostor attempts are needed, hybrid and offline testing allow execution of many zero-effort impostor attempts.

In an interoperability performance test, J generators of standardized biometric data blocks (BDBs) are applied to the samples assembled as part of a hybrid or offline test. By applying K comparison subsystems to the standard BDBs, up to KJ^2 verification or identification trials are conducted, each following ISO/IEC 19795-2. The BDB may be an image or signal, or a standardized template. Optional encodings allowed by the standard interchange format should be fully specified. This might be achieved by normatively referencing one of the ISO/IEC 24713-x profiles. If the format in question is an image, a subsequent internal (usually proprietary) template would be used, but its existence here is subsumed by the notion of a black-box comparison of two instances of the given format.

The test advanced by this part of ISO/IEC 19795 demarcates the generic aspects of interoperability from the meaning associated with each particular biometric format of ISO/IEC 19794-x.

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Information technology — Biometric performance testing and reporting

Part 4: Interoperability performance testing

1 Scope

This part of ISO/IEC 19795 prescribes methods for technology and scenario evaluations of multi-supplier biometric systems that use biometric data conforming to biometric data interchange format standards.

It specifies requirements needed to assess

— performance available from samples formatted according to a standard interchange format (SIF),

— performance available when samples formatted according to a SIF are exchanged,

— performance available from samples formatted according to a SIF, relative to proprietary data formats,

— SIF interoperability, by quantifying cross-product performance relative to single-product performance,

— performance available from multi-sample and multimodal data formatted according to one or more SIFs, and

— performance interoperability of biometric capture devices.

In addition, this part of ISO/IEC 19795

— includes procedures for establishing an interoperable set of implementations,

— defines procedures for testing interoperability with previously established sets of implementations, and

— gives testing procedures for the measurement of interoperable performance.

It does not

— establish a conformance test for biometric data interchange formats, or

— provide test procedures for online data collection.

2 Conformance

An interoperability performance test conforms to this part of ISO/IEC 19795 if it satisfies the requirements specified in Clauses 6, 7, 8 and 9 of this part of ISO/IEC 19795 and the requirements specified in the clauses of ISO/IEC 19795-2 referenced in Table 1.

Table 1 — Conformity with ISO/IEC 19795-2

Structure of ISO/IEC 19795-4 test	ISO/IEC 19795-2 conformance
Online (8.2.1.3)	Clause 7 (Scenario evaluation)
Hybrid (8.2.1.4)	Clause 6 and Clause 7
Offline (8.2.1.2)	Clause 6 (Technology evaluation)

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