

Australian Standard[®]

**Information technology—Biometric data
interchange formats**

Part 6: Iris image data



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- AUSTROADS
 - Attorney General's Department
 - Australian Business Limited
 - Australian Electrical and Electronic Manufacturers Association
 - Centrelink
 - The Biometric Institute
-

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OF

AS ISO/IEC 19794.6—2007

**Information technology—Biometric data interchange formats
Part 6: Iris image data**

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NOTES

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PREFACE

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

The objective of this Standard is to make available to the Australian biometrics community the core ISO SC37 standards published over the last 24 months, specifically the biometric data interchange formats iris image data.

This Standard is identical with, and has been reproduced from ISO/IEC 19794-6:2005, *Information technology— Biometric data interchange formats—Part 6: Iris image data*

As this Standard is reproduced from an international standard, the following applies:

- (a) Its number appears on the cover and title page while the international standard number appears only on the cover
- (b) In the source text ‘this part of ISO/IEC 19794’ should read ‘this Australian Standard’.
- (c) A full point substitutes for a comma when referring to a decimal marker.

Reference to International Standard

Australian Standard

ISO/IEC

AS ISO/IEC

15444	Information technology—JPEG 2000 image coding system	15444	Information technology—JPEG 2000 image coding system
19785	Information technology—Common Biometric Exchange Formats Framework	19785	Information technology—Common Biometric Exchange Formats Framework
19785-1	Part 1: Data element specification	19785.1	Part 1: Data element specification
19794	Information technology—Biometric data interchange formats	19794	Information technology—Biometric data interchange formats
19794-1	Part 1: Framework	19794-1	Part 1: Framework

Only international references that have been adopted as Australian Standards have been listed.

The term ‘informative’ has been used in this Standard to define the application of the annex to which it applies. An ‘informative’ annex is only for information and guidance.

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INTRODUCTION

The purpose of this document is to define a standard for exchange of iris image information. This part of ISO/IEC 19794 contains a specific definition of attributes, a data record format for storing and transmitting the iris image and certain attributes, a sample record, and conformance criteria.

Currently, exchange of iris information between equipment from different vendors can only be done using a large-scale image of the entire eye. This is expensive in storage and bandwidth. To provide interoperability among vendors, it is necessary to define a standard, compact representation of a human iris.

The biometric data record specified in this part of ISO/IEC 19794 shall be embedded in a CBEFF-compliant structure in the CBEFF Biometric Data Block (BDB).

AUSTRALIAN STANDARD

**Information technology — Biometric data
interchange formats —****Part 6:
Iris image data****1 Scope**

This part of ISO/IEC 19794 specifies two alternative image interchange formats for biometric authentication systems that utilize iris recognition.

The first is based on a rectilinear image storage format that may be a raw, uncompressed array of intensity values or a compressed format such as that specified by ISO/IEC 15444.

The second format is based on a polar image specification that requires certain pre-processing and image segmentation steps, but produces a much more compact data structure that contains only iris information.

Data that comply with either one of the iris image formats specified in this part of ISO/IEC 19794 are intended to be embedded in a CBEFF-compliant structure in the CBEFF Biometric Data Block (BDB) as specified in ISO/IEC 19785-1.

2 Conformance

Conformity with this part of ISO/IEC 19794 requires compliance with one of the data formats described in clause 6. Recommended image quality criteria described in Annex A are expressed in terms of resolution, contrast, noise level, etc. Because iris recognition applications may have varying image quality requirements, four different levels of image quality are defined in Annex A. In general, the highest image quality level is recommended for high-volume, high-security applications where the lowest possible recognition error rates are required. Lower levels of image quality are appropriate for less demanding applications in which higher error rates can be tolerated but camera cost is a critical factor.

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 19785-1, *Information technology — Common biometric exchange formats framework — Part 1: Data element specification*

ISO/IEC 10918 (all parts), *Information technology — Digital compression and coding of continuous-tone still images*

ISO/IEC 15444 (all parts), *Information technology — JPEG 2000 image coding system*

ISO/IEC 14495 (all parts), *Information technology — Lossless and near-lossless compression of continuous-tone still images*

ISO/IEC 19794-1, *Information technology — Biometric data interchange formats — Part 1: Framework*

4 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 19794-1 and the following apply.

4.1

binary large object

BLOB

large block of binary data, typically an image or video file, that may have to be handled in a special way

4.2

continuous tone image

image whose components have more than one bit per sample

4.3

crop

reduce the size of an image by removing unimportant parts of it, typically the outer regions

4.4

grey scale

continuous-tone image that has one component, which is luminance

4.5

iris

coloured annular ring in the front portion of the eye comprised of muscular and connective tissue and pigment cells that defines and controls the central opening of the pupil

4.6

limbus

outer boundary of the iris where it is joined to the sclera

4.7

line pair

lp

measure of spatial feature content, which when associated with a fixed distance measurement provides an estimate of spatial frequency

4.8

pixel

single picture element, one of an n by m matrix of picture elements where m is the number of columns and n is the number of rows

4.9

pupil

opening in the centre of the eye that serves as a variable light aperture and defines the inner boundary of the iris

4.10

raw

image file format in which the image is stored in the same format in which it is stored in video memory, typically one byte (for monochrome images) per picture element or three bytes (for color images) per picture element

4.11

resolution

number of picture elements (pixels) per unit distance in the object plane or image plan, specified as the number of pixels per millimetre at the object plane, that is on the eye

4.12

round

mathematical function applied to a number x such that $\text{round}(x)$ is the integer that is closest in value to x

4.13**sclera**

white outer covering of the eye peripheral to the iris

5 Symbols and abbreviated terms**5.1****JPEG**

compression standard for continuous-tone images [ISO/IEC 10918]

5.2**JPEG2000**

enhanced compression standard [ISO/IEC 15444]

5.3**JPEG-LS**

lossless/near-lossless compression standard for continuous-tone images [ISO/IEC 14495]

6 Iris image format specification**6.1 General**

The iris image format specification defines header and data structures that support storage of the iris image in rectilinear or polar coordinates.

The biometric data record specified in this part of ISO/IEC 19794 shall be embedded in a CBEFF-compliant structure in the CBEFF Biometric Data Block (BDB) as specified in ISO/IEC 19785-1. The CBEFF_BDB_format_owner assigned by the CBEFF Registration Authority to JTC1 SC37 in accordance with ISO/IEC 19785-2 shall be used. This is the sixteen-bit value 0x0101 (hexadecimal 101 or 257 decimal). It is recommended that iris image data transmitted or stored in accordance with this part of ISO/IEC 19794 be encrypted and signed to protect privacy and integrity of the data. The CBEFF structure supports such encryption and signing.

One of the two following CBEFF_BDB_format_type values shall be used in the CBEFF Header. The sixteen-bit value 0x0009 shall be used for records that represent the iris image in rectilinear coordinates and the sixteen-bit value 0x000B shall be used for records that represent the iris image in polar coordinates. These CBEFF_BDB_format_type values have been registered in accordance with ISO/IEC 19785-2.

The CBEFF_BDB_biometric_type value may be used in the CBEFF Header. If used, the value entered shall be the type value assigned to iris by the patron format.

The CBEFF_BDB_biometric_subtype value may be used in the CBEFF Header if the iris data record contains data from only one eye. If used, the value entered shall be 0x00 to indicate that no information is given, 0x01 to indicate right eye, and 0x02 to indicate left eye.

6.2 Image compression**6.2.1 General**

The iris image shall be transmitted and stored in one of several possible formats described in the following subclauses.