

ISO/IEC 29794-4

Information technology — Biometric sample quality —

Part 4: Finger image data

*Technologies de l'information — Qualité d'échantillon
biométrique —*

Partie 4: Données d'image de doigt

Second edition
2024-09

This is a preview of ISO/IEC 29794-4:2024. Click [here](#) to purchase the full version from the ANSI store.



COPYRIGHT PROTECTED DOCUMENT

© ISO/IEC 2024

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

This is a preview of ISO/IEC 29794-4:2024. [Click here to purchase the full version from the ANSI store.](#)

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Abbreviated terms	2
5 Conformance	2
6 Finger image quality measures	3
6.1 Overview.....	3
6.1.1 General.....	3
6.1.2 Methods for mapping to the desired value range.....	3
6.1.3 Constituent of local quality measures.....	4
6.1.4 Constituent of global quality measures.....	4
6.1.5 Image preprocessing.....	4
6.1.6 Image examples.....	7
6.2 Normative contributive quality components.....	7
6.2.1 General.....	7
6.2.2 Orientation certainty level.....	7
6.2.3 Local clarity.....	9
6.2.4 Frequency domain analysis (FDA).....	14
6.2.5 Ridge valley uniformity.....	15
6.2.6 Orientation flow.....	17
6.2.7 MU.....	19
6.2.8 MMB.....	19
6.2.9 Minutiae count in finger image.....	19
6.2.10 Minutiae count in centre of mass region.....	20
6.2.11 Minutiae quality based on local image mean.....	20
6.2.12 Minutiae quality based on local orientation certainty level.....	21
6.2.13 Region of interest image mean.....	22
6.2.14 Region of interest orientation map coherence sum.....	24
6.2.15 Region of interest relative orientation map coherence sum.....	25
6.2.16 Quality feature vector composition.....	25
6.3 Non-normative quality measures.....	28
6.3.1 General.....	28
6.3.2 Radial power spectrum.....	29
6.3.3 Gabor filter bank.....	30
6.4 Unified quality score.....	32
6.4.1 Methodology for combining quality components.....	32
6.4.2 Training method.....	32
7 Finger image quality block	33
7.1 Binary encoding.....	33
7.2 XML encoding.....	33
7.3 Quality algorithm identifiers.....	33
Annex A (normative) Conformance test assertions	35
Annex B (informative) Factors influencing fingerprint image quality	57
Annex C (informative) Area consideration	59
Bibliography	60

This is a preview of ISO/IEC 29794-4:2024. [Click here to purchase the full version from the ANSI store.](#)

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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives or www.iec.ch/members_experts/refdocs).

ISO and IEC draw attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO and IEC take no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO and IEC had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents and <https://patents.iec.ch>. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

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

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html. In the IEC, see www.iec.ch/understanding-standards.

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

This second edition cancels and replaces the first edition (ISO/IEC 29794-4:2017), which has been technically revised.

The main changes are as follows:

- algorithms for normalization of finger image quality components have been added, along with new quality algorithm identifiers for the unique identification of the quality measures defined in this document;
- [Annex A](#) has been technically revised to reflect a new conformance test set.

A list of all parts in the ISO/IEC 29794 series can be found on the ISO and IEC websites.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html and www.iec.ch/national-committees.

This is a preview of ISO/IEC 29794-4:2024. [Click here to purchase the full version from the ANSI store.](#)

This document specifies finger image quality measures. A reference implementation of the normative measures — NFIQ 2 — is available at Reference [16], which is described in more detail by the developers in Reference [1].

The quality of finger image data is determined by the degree to which the finger image data fulfils specified requirements for the targeted application. Information on quality is therefore useful in many applications. ISO/IEC 19784-1 allocates a quality field and specifies the allowable range for the scores, with a recommendation that the score be divided into four categories with a qualitative interpretation for each category. Finger image quality fields are provided in the finger image data interchange formats standardized in ISO/IEC 19794-4 and ISO/IEC 39794-4. Finger feature data interchange formats standardized in ISO/IEC 19794-2, ISO/IEC 19794-3, ISO/IEC 19794-8 and ISO/IEC 39794-2 provide finger image quality fields for the source image. To facilitate the interpretation and interchange of finger image quality scores, this document specifies how to calculate the finger image quality score of plain finger images with a spatial sampling rate of 196,85 px/cm and a bit depth of 8 bit for the greyscale pixel intensity values scanned from inked fingerprint cards or captured using optical area sensors based on frustrated total internal reflection.