



**International  
Standard**

**ISO/IEC 24787-1**

**Information technology — On-card  
biometric comparison —**

**Part 1:  
General principles and  
specifications**

*Technologies de l'information — Comparaison biométrique sur  
cartes —*

*Partie 1: Principes généraux et spécifications*

**First edition  
2024-06**



**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](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

Published in Switzerland

# Contents

	Page
<b>Foreword</b> .....	<b>iv</b>
<b>Introduction</b> .....	<b>v</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms and definitions</b> .....	<b>1</b>
<b>4 Abbreviated terms</b> .....	<b>3</b>
<b>5 Conformance</b> .....	<b>4</b>
<b>6 Biometric data handling and encoding</b> .....	<b>5</b>
<b>7 Architecture of biometric verification using an ICC</b> .....	<b>5</b>
7.1 General.....	5
7.2 Off-card biometric comparison.....	5
7.3 On-card biometric comparison (sensor-off-card).....	6
7.4 Work-sharing on-card biometric comparison.....	6
7.5 Biometric system-on-card.....	7
<b>8 Framework for on-card biometric comparison</b> .....	<b>8</b>
8.1 General.....	8
8.2 Application selection using AID.....	8
8.3 Data for on-card biometric comparison.....	8
8.3.1 General.....	8
8.3.2 Format of biometric data.....	9
8.3.3 Specific data objects.....	10
8.3.4 Use of biometric reference for multiple applications (informative).....	12
8.4 Processes.....	14
8.4.1 Enrolment and re-enrolment.....	14
8.4.2 Biometric verification.....	14
8.4.3 Biometric comparison process and decision.....	14
8.5 Termination.....	15
<b>9 Security policies for on-card biometric comparison</b> .....	<b>15</b>
9.1 Minimum security policies for on-card biometric comparison.....	15
9.1.1 General.....	15
9.1.2 Minimum security policies.....	15
9.1.3 Retry counter management.....	15
9.2 Security policies for multiple on-card biometric comparison applications.....	16
9.2.1 Taxonomy of biometric comparison applications used in ICC.....	16
9.2.2 Security policy for universal verification mechanism (SP1).....	16
9.2.3 Security policy for shared biometric reference with independent verification mechanism (SP2).....	17
9.2.4 Security policy for independent applications (SP3).....	18
<b>Annex A (informative) Sample APDU for on-card biometric comparison</b> .....	<b>19</b>
<b>Annex B (informative) Example for implementation of global biometric reference</b> .....	<b>22</b>
<b>Annex C (informative) Examples of security status transition model</b> .....	<b>27</b>
<b>Annex D (informative) Considerations for security mechanisms in on-card biometric comparison</b> .....	<b>30</b>
<b>Annex E (informative) Example of biometric information template including CBEFF-3 data elements</b> .....	<b>32</b>
<b>Bibliography</b> .....	<b>35</b>

## 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.

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](http://www.iso.org/directives) or [www.iec.ch/members\\_experts/refdocs](http://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](http://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](http://www.iso.org/iso/foreword.html). In the IEC, see [www.iec.ch/understanding-standards](http://www.iec.ch/understanding-standards).

This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 17, *Cards and security devices for personal identification*.

This first edition cancels and replaces ISO/IEC 24787:2018, which has been technically revised. ISO/IEC CD 24787 has been split into two parts: ISO/IEC 24787-1 and ISO/IEC 24787-2.

The main changes are as follows:

- Previous [Clause 9](#) “Work-sharing on-card biometric comparison procedure” and other subclauses related to work-sharing have been moved to ISO/IEC 24787-2.

A list of all parts in the ISO/IEC 24787 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](http://www.iso.org/members.html) and [www.iec.ch/national-committees](http://www.iec.ch/national-committees).

## Introduction

On-card biometric comparison provides a more secure biometric verification method than one where a biometric comparison is carried out outside a secure cryptographic device. Storing biometric reference data in a secure integrated circuit card (ICC) for on-card biometric comparison means that the reference is not available at any external interface once it has been stored in the ICC, mitigating the risk of extraction and misuse by an unauthorized party.

ISO/IEC 7816-11 and ISO/IEC 19785-3 cover technologies for off-card and simple on-card biometric comparison. The ISO/IEC 17839 series covers biometric system-on-card.



# Information technology — On-card biometric comparison —

## Part 1: General principles and specifications

### 1 Scope

This document provides requirements and general principles and specifications for a biometric comparison methodology suitable for the on-card environment.

This document establishes

- architectures of biometric comparison using an ICC,
- on-card biometric comparison, both in sensor-off-card systems and as part of biometric system-on-card, and
- security policies for on-card biometric comparison.

This document does not establish

- requirements for off-card biometric comparison,
- requirements for biometric system-on-card (defined in the ISO/IEC 17839 series),
- work-sharing on-card biometric comparison (defined in ISO/IEC 24787-2), or
- modality-specific requirements for storage and comparison.

### 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 2382-37:2022, *Information technology — Vocabulary — Part 37: Biometrics*

ISO/IEC 7816-4, *Identification cards — Integrated circuit cards — Part 4: Organization, security and commands for interchange*

ISO/IEC 7816-11:2022, *Identification cards — Integrated circuit cards — Part 11: Personal verification through biometric methods*

ISO/IEC 19785-3:2020, *Information technology — Common Biometric Exchange Formats Framework — Part 3: Patron format specifications*

ISO/IEC 19794 (all parts), *Information technology — Biometric data interchange formats*

ISO/IEC 29794 (all parts), *Information technology — Biometric sample quality*

ISO/IEC 39794 (all parts), *Information technology — Extensible biometric data interchange formats*