



BSI Standards Publication

IT Security techniques — Hash-functions

Part 3: Dedicated hash-functions

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National foreword

This British Standard is the UK implementation of ISO/IEC 10118-3:2018. It supersedes BS ISO/IEC 10118-3:2004+A1:2006, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee IST/33/2, Cryptography and Security Mechanisms.

A list of organizations represented on this committee can be obtained on request to its secretary.

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© The British Standards Institution 2018
Published by BSI Standards Limited 2018

ISBN 978 0 580 93283 0

ICS 35.030

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 November 2018.

Amendments/corrigenda issued since publication

Date	Text affected
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Fourth edition
2018-10

IT Security techniques — Hash- functions —

Part 3: Dedicated hash-functions

*Techniques de sécurité IT — Fonctions de brouillage —
Partie 3: Fonctions de brouillage dédiées*



Reference number
ISO/IEC 10118-3:2018(E)

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Published in Switzerland

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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.

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).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents) or the IEC list of patent declarations received (see <http://patents.iec.ch>).

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.

This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 27, *IT Security techniques*.

This fourth edition cancels and replaces the third edition (ISO/IEC 10118-3:2004), which has been technically revised. It also incorporates the Amendment ISO/IEC 10118-3:2004/Amd1:2006 and Technical Corrigendum ISO/IEC 10118-3:2004/Cor1:2011.

The main changes compared to the previous edition are as follows:

- SHA-3, STREEBOG and SM3 hash-functions have been included;
- SHA-3 extendable-output functions have been included;
- cautionary notes for hash-functions with short hash-codes have been added.

A list of all parts in the ISO/IEC 10118 series can be found on the ISO website.

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.

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IT Security techniques — Hash-functions —

Part 3: Dedicated hash-functions

1 Scope

This document specifies dedicated hash-functions, i.e. specially designed hash-functions. The hash-functions in this document are based on the iterative use of a round-function. Distinct round-functions are specified, giving rise to distinct dedicated hash-functions.

The use of Dedicated Hash-Functions 1, 2 and 3 in new digital signature implementations is deprecated.

NOTE As a result of their short hash-code length and/or cryptanalytic results, Dedicated Hash-Functions 1, 2 and 3 do not provide a sufficient level of collision resistance for future digital signature applications and they are therefore, only usable for legacy applications. However, for applications where collision resistance is not required, such as in hash-functions as specified in ISO/IEC 9797-2, or in key derivation functions specified in ISO/IEC 11770-6, their use is not deprecated.

Numerical examples for dedicated hash-functions specified in this document are given in [Annex B](#) as additional information. For information purposes, SHA-3 extendable-output functions are specified in [Annex C](#).

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 10118-1, *Information technology — Security techniques — Hash-functions — Part 1: General*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 10118-1 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1

block

bit string of length L_1 , i.e., the length of the first input to the round-function

3.2

word

string of bits

3.3

circulant matrix

matrix with the property that each row, apart from the first, consists of the right cyclic shift by one position of the row immediately above it