BS ISO 28560-3:2024

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Information and documentation — RFID in libraries

Part 3: Fixed length encoding

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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 ISO 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).

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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 Technical Committee ISO/TC 46, *Information and documentation*, Subcommittee SC 4, *Technical interoperability*.

This fourth edition cancels and replaces the third edition (ISO 28560-3:2023), of which it constitutes a minor revision.

The change is as follows:

— in 7.4.4, “1: Acquisition extension block” has been corrected to read as “1: Library extension block.”

A list of all parts in the ISO 28560 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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Introduction

Libraries are implementing radio frequency identification (RFID) as item identification to replace bar codes. RFID streamlines applications like user self-service, security, and materials handling. This standard data model for encoding information on RFID tags increases the cost-effectiveness of the technology within libraries, particularly through greater interoperability of RFID tags and equipment, and enhance support for resource sharing between libraries.

This document deals with the encoding of a basic set of data elements in a fixed length format and the rest of the data elements in optional extension blocks. ISO 28560-1 defines the set of mandatory and optional data elements.

ISO 28560-2 and this document are mutually exclusive with respect to an RFID tag being applied to a loan item. In other words, the RFID tag is encoded according to the rules of this document, or to the rules of ISO 28560-2, or to some proprietary rules. Depending on the technologies being used, and other features of tags that are claiming compliance with ISO 28560-2, the reading system might achieve a degree of interoperability.

This document provides essential standards-based information about RFID in libraries. Ongoing advice needs to be provided because of the evolving nature of RFID technology, and the opportunities to migrate between different types of legacy system and encoding rules of this document.

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Information and documentation — RFID in libraries —

Part 3: Fixed length encoding

1 Scope

This document provides a data model and encoding rules for the use of radio frequency identification (RFID) tags for items appropriate for the needs of all types of libraries (including national, academic, public, corporate, special, and school libraries).

This document specifies the rules for encoding

— a subset of data elements taken from the total set of data elements listed in ISO 28560-1 into a basic block, and

— other data elements into extension blocks onto the RFID tag.

A source of additional information about implementation issues is provided in Annex A.

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 28560-1, *Information and documentation — RFID in libraries — Part 1: Data elements and general guidelines for implementation*

ISO/IEC 10646, *Information technology — Universal coded character set (UCS)*

ISO/IEC 18000-3, *Information technology — Radio frequency identification for item management — Part 3: Parameters for air interface communications at 13,56 MHz*

ISO/IEC 18046-3, *Information technology — Radio frequency identification device performance test methods — Part 3: Test methods for tag performance*

ISO/IEC 18047-3, *Information technology — Radio frequency identification device conformance test methods — Part 3: Test methods for air interface communications at 13,56 MHz*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 28560-1 and the following apply.

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

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

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3.1
basic block
data block occupying the first 272 bits of the RFID tag

Note 1 to entry: If the RFID tag is limited to 256 bits (i.e. 32 bytes), the basic block is truncated.

3.2
byte
8-bit byte
group of eight consecutive bits

Note 1 to entry: A byte can represent one *character* (3.3) or be part of a representation of a character.

3.3
character
one or more *bytes* (3.2)

3.4
CRC
cyclic redundancy check
value calculated from the data on the tag

3.5
data block
container for encoding data elements, *CRC* (3.4), filler, and end mark

3.6
end block
data block (3.5) containing the end mark terminating the information on the RFID tag

3.7
extension block
optional *data block* (3.5) following the *basic block* (3.1)

3.8
field
entry in a *data block* (3.5)

3.9
filler data block
optional *data block* (3.5) that can be inserted to align other data blocks on *page* (3.11) boundaries

3.10
fixed length field
field (3.8) of prescribed size in a *data block* (3.5)

3.11
page
minimum data unit that can be read from or written to a tag

Note 1 to entry: This is measured in *bytes* (3.2).

3.12
string
sequence of *characters* (3.3)

3.13
unsigned integer
binary value of a number of consecutive bits

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3.14
variable length field
field (3.8) of variable size in a *data block* (3.5)

4 Requirements

4.1 Data elements

The data elements shall be as defined and compliant with those listed in ISO 28560-1.

NOTE There is a degree of flexibility in using locally defined codes that enable enhancements and variations to be implemented while still complying with the basic set of data elements.

4.2 RFID air interface

4.2.1 Air interface conformance

The air interface for compliant tags shall be in accordance with the specification for Mode 1.

For migration purposes, additional non-compliant air interfaces used in legacy systems can be supported during a transition period, which is permitted to remain in place for years, as necessary.

The air interface conformance shall be tested in accordance with ISO/IEC 18047-3.

4.2.2 Tag performance

Where there are requirements for test tag performance, these shall be performed in accordance with ISO/IEC 18046-3.

4.3 Data protocol

The fixed length encoding described in this document does not require a separate data protocol.

5 General encoding rules

5.1 Distinguishing from other applications and encodings

The value of the application family identifier (AFI) is used to distinguish tags for library applications from other applications. The values of AFI for library applications are defined in ISO 28560-1.

ISO 28560-1 describes how the data storage format identifier (DSFID), if present in the system memory as a programmable register, is used to distinguish tags in the library application area, i.e. with the same AFI.

Tags encoded according to this document shall be programmed with the value $3E_{HEX}$ in the DSFID register if the tag contains a programmable DSFID register.

This document is not able to encode the DSFID if the tag does not contain a programmable DSFID register. In this case, ISO 28560-2 encodes the DSFID in the first byte of the working area of the tag. To take this situation into account, the content parameter (see Table 1) shall not take the value 6 on RFID tags encoded according to this document.

If and only if the tag does not contain a programmable DSFID register, it is permissible to distinguish tags encoded according to this document from other encodings by verifying the cyclic redundancy check (CRC) encoded in the basic block (see 7.2).

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