

## ISO 28560 Data Elements and How They Are Used

The table shows all the data elements that are currently approved for use.

N <sup>a</sup>	Name of the data element	Status	Display format	Lock
1	Primary item identifier	Mandatory	Variable length alphanumeric Character set = ISO/IEC 646 International Reference Version (IRV)	Should be locked
2	Content parameter	Optional	Bit mapped code	Optional
3 <sup>b</sup>	Owner institution (ISIL)	Optional	Variable length field (maximum of 16 characters) based on ISO 15511	Optional
4	Set information	Optional	{Total in set / part number} structure (maximum 255)	Optional
5	Type of usage	Optional	Single octet (coded list)	Optional
6	Shelf location	Optional	Variable length alphanumeric Character set = ISO/IEC 646 IRV	Optional
7	ONIX media format	Optional	Two uppercase alphabetic characters	Optional
8	MARC media format	Optional	Two lowercase alphabetic characters	Optional
9	Supplier identifier	Optional	Variable length alphanumeric Character set = ISO/IEC 646 IRV	Optional
10	Order number	Optional	Variable length alphanumeric Character set = ISO/IEC 646 IRV	Optional
11 <sup>b</sup>	ILL borrowing institution (ISIL)	Optional	Variable length field (maximum of 16 characters) based on ISO 15511	Not locked
12	ILL borrowing transaction number	Optional	Variable length alphanumeric Character set = ISO/IEC 646 IRV	Not locked
13	GS1 product identifier	Optional	Fixed length 13 numeric digit field	Optional
15	Local data A	Optional	Variable length alphanumeric Character set = ISO/IEC 646 IRV, or ISO/IEC 8859-1, or UTF-8	Optional
16	Local data B	Optional	Variable length alphanumeric Character set = ISO/IEC 646 IRV, or ISO/IEC 8859-1, or UTF-8	Optional
17	Title	Optional	Variable length alphanumeric Character set = ISO/IEC 646 IRV, or ISO/IEC 8859-1, or UTF-8	Optional
18	Product identifier local	Optional	Variable length Alphanumeric Char set = ISO/IEC 646 IRV	Optional
19	Media format (other)	Optional	Single octet (coded list)	Optional
20	Supply chain stage	Optional	Single octet (coded list)	Optional
21	Supplier invoice number	Optional	Variable length alphanumeric Character set = ISO/IEC 646 IRV	Optional
22	Alternative item identifier	Optional	Variable length alphanumeric Character set = ISO/IEC 646 IRV	Optional
23	Alternative owner institution	Optional	Variable length alphanumeric Character set = ISO/IEC 646 IRV	Optional
24	Subsidiary of an owner institution	Optional	Variable length alphanumeric Character set = ISO/IEC 646 IRV	Optional
25	Alternative ILL borrowing institution	Optional	Variable length alphanumeric Character set = ISO/IEC 646 IRV	Not locked
26	Local data C	Optional	Variable length alphanumeric Character set = ISO/IEC 646 IRV, or ISO/IEC 8859-1, or UTF-8	Optional

<sup>a</sup> This column specifies the data element number (N) or the Relative-OID value, i.e. the number identifying the data element, as defined in ISO 28560-1.

<sup>b</sup> The ISIL, as used for Relative-OID values 3 and 11, is presented and displayed according to the characters defined in ISO 15511. A special encoding scheme, as defined in ISO 28560-2, is used to compact efficiently the complex ISIL character string.

Data elements 14 and 27 to 31 are currently reserved and cannot be used.

Below we consider the description and function of individual data elements.

## Primary item identifier – Relative-OID 1

The **primary item identifier** is a mandatory data element defined in ISO 28560-1. It is usually equivalent to the code in the bar code prior to conversion to RFID.

Although the **primary item identifier** is likely to be shorter, the Tag Simulator sets an upper limit of 255 characters as defined in ISO 28560-2. Shorter codes and all-numeric codes will encode more efficiently, requiring less memory and enabling faster transactions across the air interface.

NOTE: this limit of 255 characters applies to all variable length data elements in ISO 28560-2.

Although locking the **primary item identifier** is optional, under normal circumstances this data element should be locked to prevent various forms of digital vandalism. ISO 28560-2 states that the primary item identifier shall be encoded as the first data element on the RFID tag to allow for faster transactions across the air interface. The Tag Simulator ensures that the **primary item identifier** is always included and always in the first position.

### Usage Guidance

- Leaving the **primary item identifier** unlocked runs the risk of this key data element being modified.

## Content parameter – Relative-OID 2

The **content parameter** is an optional data element used to declare the Relative-OID values that are encoded on the RFID tag, and is used as an OID index. It should be used if additional data elements are encoded on the RFID tag. If used, it can be an aid to faster reading, because it indicates the presence or absence of a particular data element. If the desired data element is encoded on the tag, then additional reading is required, whereas if the OID index indicates that it is not on the tag, the wasted transaction time can be eliminated.

If this data element is encoded on the RFID tag, ISO 28560-2 states that it should be in the second position so that the data capture system can be set up to read the **primary item identifier** and the **content parameter** in a single read process. However, as this is not mandatory, the Tag Simulator does allow it to be encoded in a different position.

### Usage Guidance

- Some templates with very few data elements have not included this data element.
- There is also an example of it being encoded in the third position, after the owner institution. This could be sensible if you are locking the **primary item identifier** and **owner institution**.

The OID index itself consists of a bit sequence, where each bit position is associated with a particular Relative-OID. If the bit position is set “1”, then the Relative-OID and associated data object is encoded on the RFID tag. As Relative-OID 1 is mandatory and Relative-OID 2 is this particular data element, the bit map begins at Relative-OID 3. The Tag Simulator automatically calculates the value of the **content parameter**.

### Usage Guidance

- The size of the OID index is determined by the highest numbered Relative-OID the template that is used. So if more data elements are likely to be encoded on the Tag in its life time. For example, if you are encoding **primary item identifier**, **content parameter**, **owner institution** and **MARC media format**, then the highest Relative-OID is 8. However, if you might later be recording information about inter-library loans, the highest Relative-OID will be 11, for the **ILL borrowing institution** or 12, if you are also encoding the **ILL borrowing transaction number**.
- The **content parameter** should not normally be locked because it will either prevent future updates to information on the RFID tag or will result in an OID index that does not reflect the data elements encoded on the tag. Therefore, the content parameter should be locked *only when it is certain* that no more changes are required. This data element provides no information about the sequence of the encoded data elements, nor their size.

### Owner institution (ISIL) – Relative-OID 3

The **owner institution** data element represents the ISIL code as specified in ISO 15511. The ISIL code is introduced into the RFID encoding process in a structure defined in accordance with the rules of ISO 15511. This means that the hyphen (present in every ISIL code following the two-character country code) is presented in the application commands.

ISO 28560-2 defines a complex encoding rule for the ISIL, which is automatically processed by the Tag Simulator.

Locking this data element is defined as optional in ISO 28560-2.

#### Usage Guidance

- Details of the ISIL registration can be found here: <http://biblstandard.dk/isil/>. National schemes to identify a library can become an ISIL by adding the appropriate prefix. Any library with an OCLC code, has by definition, an ISIL.
- There are two options for encoding the OCLC code: use the full 4-character prefix or the shorter prefix "O".
- Locking this **owner institution** data element is a library decision. Locking makes the loan item permanently associated with the particular library, Leaving it unlocked allows for a change of ownership and runs the risk of this key data element being modified.

### Set information – Relative-OID 4

The set information is presented in two components:

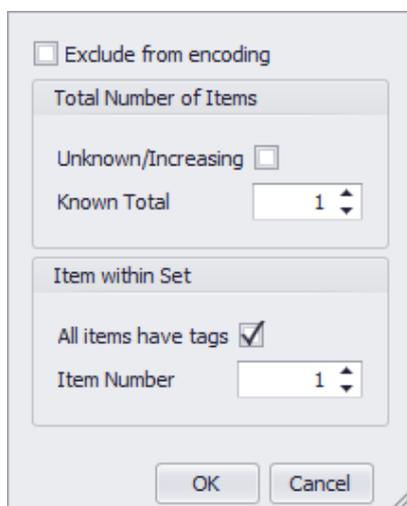
- the total number of parts;
- followed by the ordinal part number, with a maximum of 255 parts.

ISO 28560-1 defines various examples of encoding, particularly where not all the parts of the set carry an RFID tag. This results in a 2-digit, 4-digit, or 6-digit input code.

There are some special considerations:

- Where any item in the set does not carry a RFID tag, the first tagged item has ordinal = 0 to indicate such a set. All subsequent tagged items have their respective ordinal value. This way once the highest ordinal number of a tagged item is found it is possible to know how many items are not tagged.
- Series with an (as yet) unknown number of parts can also be identified and tagged. All tagged items are given the total of '0' to indicate that the number of parts is not fixed.

The Tag Simulator has a popup form to help you get through this complexity.



The screenshot shows a dialog box with the following controls:

- Exclude from encoding
- Total Number of Items**
  - Unknown/Increasing
  - Known Total:
- Item within Set**
  - All items have tags:
  - Item Number:
- OK button
- Cancel button

Once [OK] is clicked, the Tag Simulator takes care of the encoding process.

#### **Usage Guidance**

- Although it is possible to encode a set 1 of 1, the library might decide that this is unnecessary as the absence of the encoded **set information** data element achieves the same.

### **Type of usage – Relative-OID 5**

The type of usage codes are fully defined in ISO 28560-1 to address the following broad categories:

- Acquisition item
- Item for circulation
- Item not for circulation
- For local use
- Discarded item
- Patron card
- Library equipment
- Also codes reserved for future use

The code comprises of two alphanumeric characters that are entered into our software. However, these are encoded on the RFID tag as a single hexadecimal value so our software tests for characters within this range. It is important that only the type of usage codes that are supported by ISO 28560-1 and any updates are encoded on the tag. Assuring this level of compliance is the responsibility of the RFID system supplier.

#### **Usage Guidance**

- Two sub-categories under item for circulation can be used to determine whether the returned item can or cannot be processed through automatic sortation.
- Another two codes determine whether the item can be issued or returned while the RFID system is offline from the LMS/ILS. This is particularly useful for age restricted material, and can be used to temporarily stop automatic processing on self-service kiosks.
- Patron cards are also included, even though ISO 28560 provides no other rules for encoding on such cards. If encoding rules are developed possibly using one of the local data fields, then different classes of patron (particularly based on age) can supported.
- The fact that there is a set of codes for library equipment can mean that an additional RFID application for asset control can easily be used which is independent of the main RFID circulating and LMS/ILS system, but using available RFID hardware.

### **Shelf location – Relative-OID 6**

The structure of the shelf location code is not defined in any of the standards, and is left as a local decision. Because it is a variable length field, with no constraint set by the standard other than the general 255 character limit, we have used that limit even though it is unrealistically high for this data element.

#### **Usage Guidance**

- A typical code to apply to the shelf location is the item's call number. This approach has already been used in data models in Australia. This can be based on the Library of Congress code.
- Other options include the Dewey Decimal classification, specialist catalogue codes, general subject matter classification and author, and physical location.
- Automatic sortation is an obvious application for shelf location being encoded on the tag. The granularity of the code and/or decisions made by automatic sortation need to be aligned. The details need to be discussed with your system vendor.

### **ONIX media format – Relative-OID 7**

The current list comprises of nearly 100 codes and is available from EDItEUR at the following URL:

[http://www.editeur.org/files/ONIX%20for%20books%20-%20code%20lists/ONIX\\_BookProduct\\_CodeLists\\_Issue\\_20.pdf](http://www.editeur.org/files/ONIX%20for%20books%20-%20code%20lists/ONIX_BookProduct_CodeLists_Issue_20.pdf)

Relevant codes are in list 7 *Product Form Code* and consist of two uppercase letters. Our software checks this basic rule, but as the code list is continually being improved, it is important to use the latest list.

Although some of the codes are specifically for retail, many of them are appropriate for libraries that make use of ONIX codes.

#### **Usage Guidance**

- Each library that uses the ONIX Product Form Code needs to decide which particular codes are relevant for its application. There is no requirement for every single item to be encoded with this data element, and it might be more appropriate to provide codes for items that require specific handling or storage.
- Another use might be for non-circulating stock, or even for some type of asset.

### **MARC media format – Relative-OID 8**

This code is created from two codes found at the following URL:

<http://www.loc.gov/marc/bibliographic/bdleader.html>

The first lowercase letter is taken from the list for 06 - Type of record, and the second from the list for 07 - Bibliographic level. Our software checks for two lowercase characters, but as the code list is continually being improved, it is important to use the latest list.

#### **Usage Guidance**

- In the absence of a particular code for items in locked cases, implementations in Australia use the code "gm".

### **Supplier identifier – Relative-OID 9**

The **supplier identifier** is assigned by the library to identify the supplier of the library material as part of the purchase transaction. It may be left permanently written to the tag or it may be used only temporarily during an acquisitions process.

#### **Usage Guidance**

- The use of this data element assumes that the supplier is carrying out the encoding of RFID tags to the library's instructions.
- This data element should be encoded after data elements that are required for normal circulation and stock control purposes.
- The **supplier identifier** may be deleted once the material has been received. Alternatively, if retained it can be used to distinguish between suppliers.

#### **Avoid this Usage**

- Some libraries have suggested encoding details of the supplier of their RFID system in this data element. Leading consultants can see no advantage of so doing.

### **ILL Borrowing Institution – Relative-OID 11**

If two libraries participate in a scheme of inter-library loans, and both make use of RFID, then this data element can be useful to record details of the borrowing institute and to use this data element on return to the owner library. This data element represents the ISIL code as specified in ISO 15511. It needs to follow the complex encoding rule for the ISIL as defined in ISO 28560-2. This encoding rule is supported automatically by the Tag Simulator.

This data element should not be locked, to ensure that the loan item could be shared with a different borrowing institution at some future date.

**Usage Guidance**

- Details of the ISIL registration can be found here: <http://biblstandard.dk/isil/>. National schemes that are used to identify a library can become an ISIL by adding the appropriate prefix.
- Any library with an OCLC code, has by definition, an ISIL. There are two options for encoding the OCLC code: use the full 4-character prefix or the shorter prefix "O".

**Avoid this Usage**

- Locking the data element for the ILL borrowing institution will render it impossible to lend the item to another library without replacing the RFID tag.

**GS1 Product Identifier – Relative-OID 13**

The GS1 Product Identifier is commonly used to identify retail products in many parts of the world. For a number of years, the ISBN-13 has had an identical code structure to the GS1 GTIN-13, and as such is a perfect subset of the GS1 system.

The GTIN-13 includes the encoding of:

- The ISBN, with prefixes 978 and 979.
- The International Standard Serial Number (ISSN) with the prefix 977.
- The International Standard Music Number (ISMN) with the prefix 979.
- Using national or other code structures when applied to other media products such as CDs, DVDs, periodical publications, and music.

Irrespective of the code structure, every GTIN-13 provides a universally ambiguous means of identifying a product to the title level and sometimes to the edition level.

Whereas in all parts of the world a GTIN-13 with a prefix 977, 978 or 979 is always a 13-digit number, some parts of the world represent the code on other products in what is known as a UCC code. Although this is most common in North America, the code is also seen in a minority of cases elsewhere in the world. If the number under the bar code on a product is less than 13 digits long, it is important to ensure that it is expanded to 13 digits. The basic rules for the most common representations are:

- If the code is 12 digits long, then add a leading '0'.
- If the code is 10 digits long, then a trailing check digit needs to be calculated to the GS1 rules and the leading digits '00' need to be added.

**Usage Guidance**

- This data element may be used to link to external databases that are not based on the more common bibliographic sources.
- In some countries (e.g. the United States of America) there is some concern about including this data element because of possible privacy concerns while the item is in circulation.
- In other areas (e.g. the European Union) where privacy is a concern, the primary item identifier, being more unique, is considered to be a greater risk than encoding the ISBN-13 or any other GTIN-13 because there are multiple instances of these.
- A library needs to consider the legal and cultural implications of using this data element.

**Local data A – Relative-OID 15****Local data B – Relative-OID 16****Local data C – Relative-OID 26**

By definition, these are "local"; but the question arises as to what does this mean? Let's consider three systems domains:

- If a library uses any of these data elements unilaterally, then the RFID system supplier might not be able to support the data element and more importantly its function. This is fine if the function is supported by a completely different application. An example is described in the Usage Guidance.

- If a library and its RFID system supplier agree to a functional use and encoding rules, then this should work within the library, but possibly not be useful in other libraries that read the tag on a different system. There is still the issue of support from the LMS/ILS.
- If a library and its RFID system supplier agree to a functional use and the data can be supported by the LMS/ILS through one of the interfaces, then it could be a useful development. However, what might be better in the long term is to bring the intended function to the attention of the committee responsible for supporting ISO 28560 by contacting [rfid@bs.dk](mailto:rfid@bs.dk) with the intended purpose. Then one of the members of the committee in your country could discuss this in detail with you and see if the standard can be extended.

#### **Usage Guidance**

- If the RFID tags are used for purposes other than for circulating material (e.g. library assets, which can be supported with specific Type of Usage codes), then there could be a function that is independent of the main application. Using the library equipment / asset example, a local data element could be used for data of purchase, or with safety equipment with the expiry date.

#### **Avoid this Usage**

- Some libraries have suggested using one of these data elements to count the number times an item has been through the checkout as a means of helping with the weeding process. From an RFID perspective, this is poor use of the technology. If the tag is to be used as the prime source of these counts, that the data element needs to be read a checkout to find the number of previous times it has been checked out, then re-written with the next higher number.