

Generic Set of Requirements for RFID labels in public libraries

NBLC Netherlands Association of Public Libraries

Version number EN - 01

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1 Purpose and realisation of this document

1.1 Purpose of this generic set of requirements

The purpose of this generic set of requirements is to define a standard for the use of Radio Frequency Identification Technology (RFID) in public libraries. in order (a.) to allow a central supply of RFID labels by suppliers for embodiment in lending materials and (b) to enable inter-library exchange of loan objects. Using RFID in libraries will generate a number of advantages. It will create possibilities to automate the logistic processes in libraries and possibilities to combine identification with the security handling of loan objects in a unified RFID label technology. To use RFID labels in libraries, they have to be embodied in books or other media. When applying a RFID system in a public library, also access gates, handheld readers and interfaces to the library automation system and self service desks can be part of the system.

.As indicated, some types of RFID labels contain a physical security control option, which is also named EAS (Electronic Article Surveillance) as this type of technology is widely used in shops. EAS enables to combine identification and security in a single computer chip. Also conventional tattle tape will still be applied for security handling in libraries. The choice between security combined with the RFID label and security with tattle tape will depend on the required level of security and the individual choice of a public library.

1.2 Realisation of this generic set of requirements

The Netherlands Association of Public Libraries NBLC has assigned its Task Force Library Automation to develop a "Generic Set of Requirements for RFID labels" for use in public libraries. For the realisation of this, a working group has been established with branch specialists. All members had specific experiences with the application of RFID. Because of this organisational set-up, representatives of Dutch libraries where RFID has already been introduced, have participated in this definition work. RFID knowledge has also been contributed by one of the suppliers of lending materials, NBD Biblion. The working group RFID was supported by consultants from M&I/Partners.

1.3 Version history

00-01	Draft document after second meeting of the working group	29 April 2003
00-02	Improvements in the document by M&I/Partners	14 May 2003
00-11	Remarks at the meeting of May 19	19 May 2003
00-30	Distributed to the working group RFID	21 May 2003
01	Set of Requirements approved by the membership of NBLC in its bi-annual	June 2003

	meeting	
EN-01	Translation into English	July 2003

2 Data model

The data model that is defined in this Set of requirements concerns the 'user data' in a RFID tag. Besides these 'user data', they are standard. or 'system' data in a tag such as the unique ID number that the chip manufacturer enters in the chip. Such standard or system data do not require a definition by a specific branch.

Reading of the 'user data' that are stored in the RFID label should be allowed to any party and may never be blocked by access control rules.

The data model consists of three parts:

Mandatory part	These data have a fixed location in the memory of the RFID chip; this part of the memory has to be filled with data
Optional part with fixed structure	These data Have a fixed location in the memory of the RFID chip; this part of the memory is not required to be filled with data.
Optional part with dynamic structure	This part has flexible memory size and has no fixed location in the chip; and can be filled with arbitrary data, to be determined by each individual Public Library; this part is net required.

2.1 Mandatory part

2.1.1 Data. model identifier

The data model identifier indicates which version of the data mode il used in a specific RFID chip.

Field name	Format	Type	Mandatory?	Who has write access?	Memory management	Reading process	Checksum
Data model identifier	2 positions	Numeric	Yes	Only by owner or a designated party	Write once	Standard	No

- Who owns the series of data model identifiers? Answer: the NBLC Association
- Who issues data model identifiers? Answer: the NBLC Association
- Who registers the data model identifiers that are issued? Answer: the NBLC Association

The data model identifier of the data mode! as described in this document has the temporary value 0.'01'. It is intended to name the 1st generation data model, distributed by this Generic Set of Requirements, with the identification number '01'.

2.1.2 Type identification

In the field "Type RFID label" is indicated whether the concerning computer chip serves to identify an object or a library user.

Field name	Format	Type	Mandatory?	Who has write access?	Memory management	Reading process	Checksum
Type of identification	1 positions	Boolean	Yes	Only by owner or a designated party	Write once	Standard reading	No

If the value of 'type of identification' is equal to '0', the label identifies an object.

If the value of 'type of identification' is equal to '1', the label identifies a library user.

In the case that the label identifies a human being instead of an object, this Generic Set of Requirements does not define the data model.

2.1.3 Object identifier

In this Generic List of Requirements, an object is defined as: A physical entity owned by a library.

An object can consist of one or more items.

Unique identification of an object

An object is identified by a number that should be unique in the Dutch language area. This unique number does not contain any structure or logic. The number is not made equal to an existing barcode number of an already owned object. We assume that by using 14 positions^[1], the amount of possible numbers will be sufficient for a period of 20 years, without having to re-use the numbers. numeric sequences are assigned to individual libraries or groups of libraries. It is however possible to assign sequences of object identifier to the suppliers to libraries.

Field name	Format	Type	Required?	Who has write access?	Memory management	Reading process	Checksum
Object identifier	14 positions	Numeric	Yes	Only by owner or a designated party	Write once	Standard reading	Yes ^[2]

- Who is owner the sequence of object identifiers? Answer: the NBLC Association
- Who issues object identifiers? Answer: the NBLC Association issues object identifiers to corporation registered with the NBLC.
- Who registers issued sequences of object identifiers? Answer: the NBLC Association
- Who registers issued object identifiers? Answer: Parties registered with the NBLC Association to whom sequences of object identifiers have been delivered
- Who writes object identifiers in a RFID-chip? Answer: The party that is chosen by the owner of the object and the RFID-label The chosen party could either be a supplier of loan material to libraries or a distributor of a label.

2.1.4 Item identifier

A loan object may consist of more than one item. All the items of an object have the: same object identifier, but within the object they have a unique item. identifier. If the object consists of one *item*, the item is equal to the object itself.

The unique: number includes two components; a digit for the sequential number of the item. and a digit to indicate the total number of items. If the objects consists of one itemn the item identifier is equal to '0000'.

Field name	Format	Type	Required?	Who has write access?	Memory management	Reading process	Checksum
Item identifier	4 positions	Numeric	Yes	The party that supplies RFID labels to libraries	Write once	Standard reading	No

There is no owner of the sequence of item identifier, the item identifier are not registered.

2.1.4.1 Examples of objects and items

A book is an object and consists of one item. The object and item identifier look; for example, as follows:

Object identifier	Item identifier
12435678901234	0000

A double-CD for loan is an object with more than one item. For example *it* might consist of 4 items: two *disc-items*; a booklet and a cover. The object and item identifier could look as follows:

Object	Object Identifier	Item identifier
CD1	. 12345678901234	0104
CD2	12345678901234	0204-
Booklet	12345678901234	0304
Cover	12345678901234	0404

2.1.5 Library identifier

The standard as described in this document is designed for use in the Dutch language area. To identify libraries in the Netherlands, the usage of the draft ISO 15511 standard.(also named International Standard Identifier for libraries and Related Organizations) has been chosen.

In this Generic Set of Requirements, requirements are yet only agreed for libraries in Netherlands territory. The first positions are entered as 'NL'. The next 6 positions include the existing NBLC debtor's number. The last 8 positions include '00000000', We do not make statements about identification of libraries in Belgium.

Field name	Format	Type	Required?	Who has write access?	Memory management	Reading process	Checksum
Library identifier	16 positions	First 2 positions alpha numeric,	Yes	A party designed by the object owner	Write once	Standard reading	Yes[3]

		next 14 positions numeric					
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- Who is owner the numeric sequence? Answer: Until adopting ISIL as final ISO standard: the NBLC Association. After adoption: the ISIL coordinator for the Netherlands.
- Who issues numbers? Answer: Until adopting ISIL as final ISO standard: the NBLC Association in accordance with NBD Bibliion. After adoption: a body designated by the ISIL coordinator for the Netherlands. (It is Likely that this will be NBLC again).
- Who registers issued numbers? Answer: Until adopting ISIL as final ISO standard: the NBLC Association in accordance with NBD Bibliion. .After adoption the ISIL coordinator for the Netherlands.
- Who write numbers in a RFID chip: A body that designed by the owner of the object and the RFID label.

2.2 Optional part with fixed structure

2.2.1 Barcode

In this field, the existing barcode of an object or item can be stored. In a hybrid environment (use of bath barcode and RFID) and during the migration period from barcode to RFID technology this field can be used.

Field name	Format	Type	Required?	Who has write access?	Memory management	Reading process	Checksum
Barcode	14 positions	Numeric	No	Determined by the library	Determined by the library	No standard reading	Included un barcode

- Who is owner the barcode sequence? Answer: The public library or the party assigned by the public library.
- Who issues barcodes? Answer The public library or the party assigned by the public library.
- Who registers issued barcodes? Answer: The public library or the party assigned by the public library.
- Who write barcodes in a RFID chip: The public library or the party assigned by the public library.

2.2.2 Logistic party identifier

In this field, we identify the logistic party.

Field name	Format	Type	Required?	Who has write access?	Memory management	Reading process	Checksum
Logistic party identifier	2 positions	Numeric	Yes, if using a logistic number	Supplier of objects	Determined by the supplier	No standard reading	No

- Who is owner the logistic party identifier sequence? Answer: The NBLC Association.
- Who issues logistic party identifiers? Answer The NBLC Association.
- Who registers issued logistic party identifiers? Answer: The NBLC Association.
- Who write logistic party identifiers in a RFID chip: Answer: Is determined by the owner of the object an the RFID label.

2.2.3 Logistic number

In this field, the supplier of objects and items can store its own logistic information[4]. The structure of this information is determined by the supplier itself.

Field name	Format	Type	Required?	Who has write access?	How to write?	Reading process	Checksum
Logistic number	10 positions	Numeric	No	Supplier of objects	Determined by the supplier	No standard reading	No

- Who is owner the logistic party number sequence? Answer: Suppliers[5] registered and authorized by the NBLC.
- Who issues logistic party numbers? Answer: Suppliers registered and authorized by the NBLC.
- Who registers issued logistic numbers? Answer: Suppliers registered and authorized by the NBLC.
- Who write logistic party numbers in a RFID chip: Answer: This is determined by the owner of the object an the RFID label.

2.3 Dynamic part

In this part, all information should be stored in the memory in accordance with the ASN-1 standard. The ASN-1 standard defines a dynamic data structure using a 'tag, length and value" system. Tags refer ta data

fields that were not defined in part 2.1 or 2.2 of this Generic Set of Requirements. Public libraries can choose themselves which dynamic data they want to add to the RFID label. A standardization committee issues tag numbers, monitors the unambiguity and grants requests for new tag numbers. It is recommended to use tag definitions that are as much as possible in accordance with the definitions set out in the new NCIP protocol of ANSI.

Some examples of tags that can be included in the dynamic part are: .

- Branch identifier
- Medium type
- Date related to Inter-library Lending

3 Security

The 'RFID chip' has to include a field that can be used for the Electronics Article Surveillance (EAS) function. Libraries are free to use this function[\[6\]](#).

The BAS function of RFID labels has to be switch on and off according to a standardized procedure[\[7\]](#).

Access to the EAS function can be protected with a user ID if desired[\[8\]](#).

4 Additional requirements

4.1 Communication between reader and label

The communication between the reader and the RFID label should comply with the ISO 15693-2 standard. When the ISO 18000-3 standard is endorsed this standard will replace ISO 15693. ISO 18000-3 complies with ISO 15693-2 technology.

The frequency of the: communication between the reader and label is 13.56 MHz.

4.2 Communication between reader and library automation system

The communication between the RFID reader and the library automation system is not described in this Generic List of Requirements. Such a description will be part of to the so-called 'Branch Formula' for Dutch library automation systems that has been organised by the NBLC Association.

4.3 Physical characteristics

The physical characteristics of the RFID labels have to comply with the ISO 15693-1 standard. In this standard, temperature resistance and electromagnetic field strength are preset. The life of a RFID label has to be 20 years as a minimum.

Reference to existing standard.

ISO 15511-2002 (ISIL), <http://www.iso.ch>

NCIP Protocol, <http://www.niso.org>

ASN-1 protocol, <http://www.asn1.org>

ISO 15693-1, <http://www.iso.ch>

ISO 15693-2, <http://www.iso.ch>

ISO 18000-3, <http://www.iso.ch>

Appendix 1: Overview of mandatory and optional fields

Mandatory part

Field name	Format	Type	Mandatory?	Who has write access?	Memory management	Reading process	Checksum
Data model	2 positions	Numeric	Yes	Only by	Write once	Standard	No

identifier				owner or a designated party			
Type of identification	1 positions	Boolean	Yes	Only by owner or a designated party	Write once	Standard reading	No
Object identifier	14 positions	Numeric	Yes	Only by owner or a designated party	Write once	Standard reading	Yes
Item identifier	4 positions	Numeric	Yes	The party that supplies RFID labels to libraries	Write once	Standard reading	No
Library identifier	16 positions	First 2 positions alpha numeric, next 14 positions numeric	Yes	A party designed by the object owner	Write once	Standard reading	Yes

Optional part

Field name	Format	Type	Required?	Who has write access?	Memory management	Reading process	Checksum
Barcode	14 positions	Numeric	No	Determined by the library	Determined by the library	No standard reading	Included un barcode
Logistic party identifier	2 positions	Numeric	Yes, if using a logistic number	Supplier of objects	Determined by the supplier	No standard reading	No
Logistic number	10 positions	Numeric	No	Supplier of objects	Determined by the supplier	No standard reading	No

[1] An amount of 14 positions implies a thousand billion objects. This assumes a total number of 1400 Libraries in the Netherlands, with an average of 71,4 billion objects per library.

[2] Additionnal discussion required with the supplier of RFID, such as Nedap, 3M or Knotech.

[3] Additional discussion required with the supplier of RFID, such as Nedap, 3M or Knotech.

[4] For example a NBD order member.

[5] These are NBD Biblion, Van Laarhoven, etc. that have been issued a logistic party identifier.

[6] Usage condition: Place label in the proximity of to reader and do not move outside the reading area during RAS action.

[7] Additional discussion required with the supplier of RFID labels or systems.

[8] Additional discussion required with the supplier of RFID systems.