



The European B2B Forum for the Electronics Industry

EDIFICE Guideline

Radio Frequency Identification (RFID)

Issue 1

18 January 2010

Endorsed on March 4th 2010

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Publication Summary

Title:	Radio Frequency Identification (RFID) Guideline
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Issue number:	Issue 1
Date of Issue:	18 January 2010
Number of Pages:	21
Readership:	Public
Language:	English
Abstract:	The "EDIFICE RFID Guideline" is intended to provide a guideline on how to implement RFID in B2B processes for product marking, product package marking or transport package / shipment marking
Comment:	Comments and change requests to this document should be submitted to: EDIFICE ADC Group @ EDIFICE secretariat

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1. Comparison to previous issue

No existing previous issue.

2. Purpose

The “EDIFICE RFID Guideline” is intended to provide a guideline on how to implement RFID in B2B processes for product marking, product package marking or transport package / shipment marking.

This guideline aims to give companies guidance upon their investment in RFID trials/solutions that span over multiple possible usage areas (internally as well as externally) by providing a more precise implementation recommendation based on existing global standards. It will help to better understand RFID and ease the implementation of RFID applications, as much as possible, to complement to existing Barcode and 2D symbol based solutions.

If the provisions of this guideline are used:

- companies will realise cost benefits associated with global compliance, allowing products, packages and transport items/shipments to be recognised in multiple supply chains
- the market (e.g. for telecom, electronics, computing, etc.) is less likely to drift to non-standard formats and contents of RFID tags.
- multiple RFID-tags attached to the same element by different parties can be avoided, therefore cost reductions will be realised
- data element structures encoded in an RFID-tag will be compatible to those shown in bar-/2D coded media on the item
- RFID-solutions (encoded data-objects and corresponding business objects/processes) developed and implemented by companies using this guideline are less likely to become obsolete, as will company-specific solutions

This document provides valuable information on both conception phases as well as operational aspects. It gives advice on what has to be considered in the conception phase of an RFID project and it also provides operational aspects.

In all cases, testing of RFID tagged items and related applications is highly recommended as it will minimise the risks associated with electromagnetic incompatibility and frequency interferences

3. Scope

This guideline defines requirements for RFID marking in extended supply chains.

It provides recommendations for implementing RFID tagging on returnable transport items (RTIs), transport units, product packages and products in compliance with ISO and ISO/IEC standards.

To ensure compatibility to the EDIFICE labeling and bar coding guidelines, this guideline does not recommend usage of GS1 standards. If the products, packages and shipments that a company needs to tag are used in the consumer packaged goods (retail) industry, GS1 standards are applicable. See <http://www.gs1.org> for additional information.

Application standards for freight containers are not in scope of this guideline and can be found in ISO 17363, Supply chain applications of RFID – Freight containers.

4. Normative References and regulatory Standards

Unique Identification

- ISO/IEC 15459 Information technology -- Unique identifiers

Air Interface

- ISO/IEC 18000 Part 1 – Generic Parameters for Air Interface for Globally Accepted Frequencies
- ISO/IEC 18000 Part 3 - Parameters for Air Interface Communications at 13.56 MHz
- ISO/IEC 18000 Part 6 – Parameters for Air Interface Communications at 860 to 960 MHz

RFID Data Protocol

- ISO/IEC 15961: Information technology – Radio frequency identification for item management – Data protocol: application interface
- ISO/IEC 15962: Information technology - Radio frequency identification for item management - Data protocol: data encoding rules and logical memory functions
- ISO/IEC 15963: Information technology – Radio Frequency Identification for item management – Unique identification for RF tags;

Common Data Structures

- ISO/IEC 15418 Information technology -- GS1 Application Identifiers and ASC MH10 Data Identifiers and Maintenance
- ISO/IEC 15434 Syntax for high capacity media
- EPC Global Tag Data Standards

RFID Application standards

- ISO 17364 Supply chain applications of RFID -- Returnable transport items (RTIs)
- ISO 17365 Supply chain applications of RFID -- Transport units
- ISO 17366 Supply chain applications of RFID -- Product packaging
- ISO 17367 Supply chain applications of RFID -- Product Items

Application Technical Report, Guidelines

- ISO/IEC TR 24729-1 Information technology — Radio frequency identification for item management — Implementation guidelines – Part 1: RFID-enabled labels and packaging supporting ISO/IEC 18000-6C
- ATIS-0300096 RFID Guideline for Product, Product Package and Transport Unit Tagging

RFID Emblem

- ISO/IEC FCD 29160 Information technology — Radio frequency identification for item management — RFID Emblem

Regulatory Standards

The following list the regulation for use of RFID within Europe. Other regulations exist for other regions, defined by ITU.

- ETSI TR 102 436, Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD) intended for operation in the band 865 MHz to

868 MHz; Guidelines for the installation and commissioning of Radio Frequency Identification (RFID) equipment at UHF

- ETSI TR 102 449, Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Overview of Radio Frequency Identification (RFID) Tags in the telecommunications industry

5 Introduction

5.1 Supply chain layers

The "supply chain" is a multi-level concept that covers all aspects of taking a product from raw materials to a final product including shipping to a final place of sale, use, maintenance, potentially disposal or reverse logistics/returned goods. Each of these levels covers many aspects of dealing with products and the business process for each level is both unique and overlapping with other levels.

Figure 1 below provides a graphical representation of the layers within a "supply chain". The figure is a conceptual model of possible supply chain relationships, not a one-for-one representation of physical things. Although several layers in Figure 1 have clear physical counterparts, some common supply chain physical items fit in several layers depending on the use case. For example, a repetitively used pallet under constant ownership would be covered by ISO 17364 as an RTI; a pallet that is part of a consolidated unit load would be covered by ISO 17365 as a transport unit; and a pallet that is integral to a single item would be covered by ISO 17366 as product packaging.

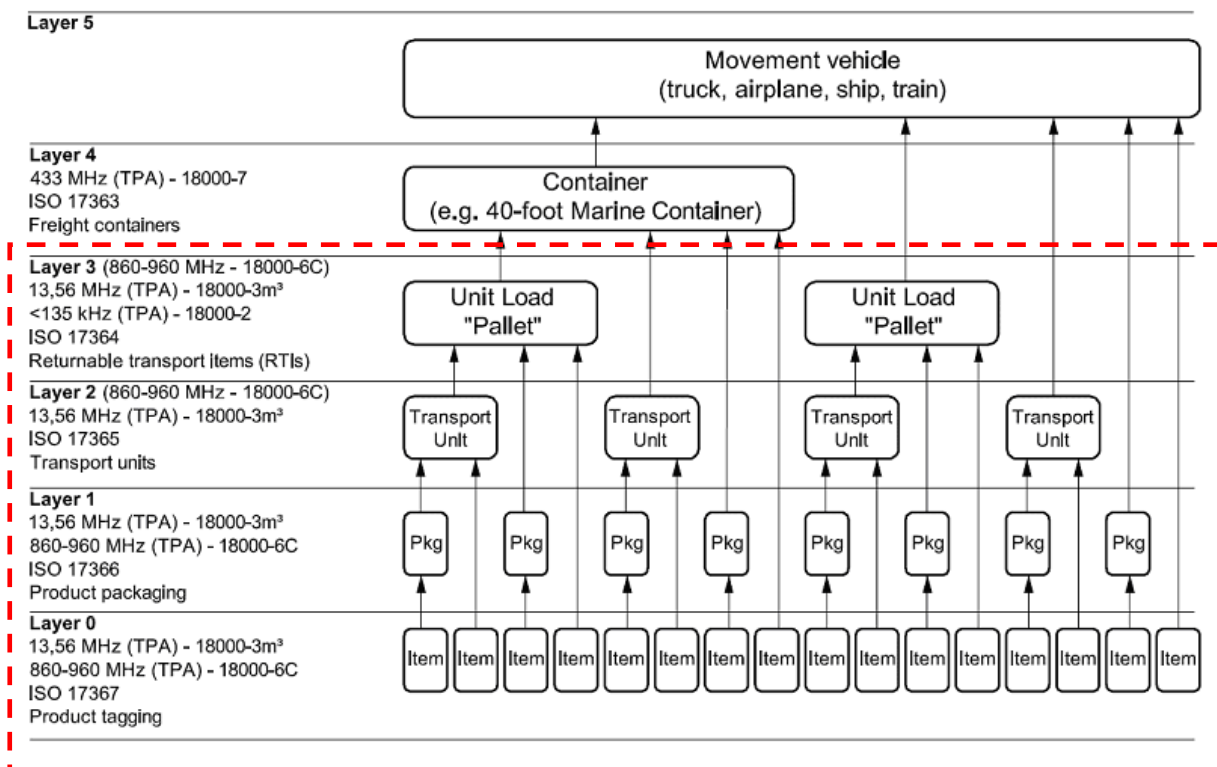


Figure-1: Supply chain layers (Source ISO 17363)

The scope of this guideline includes Layers 3,2,1 and 0 within the dotted line. Layers 5 and 4 are not in the scope of this guideline.

5.2 Data Information for RFID

The data information determines the applicable data structure by application. This guideline is restricted to the area of Item and Supply Chain Management. Typical steps for finding the best solution and carrying data information are:

- Define information
- Define the application
- Define the Unique Item Identifier (UII) according to the appropriate ISO/IEC 15459-n series of standards
- Define data to be carried
- Select AIDC media
- Use the appropriate application standard for the selected application area, i.e. Product Package, Transport Unit or Returnable Transport Item.
- Encode the data information per ISO/IEC 15418 and data transfer syntax per ISO/IEC 15434

Define → application	ITEM	Package	Transport Unit	Returnable Transport Item
define UII → acc. to standard	ISO/IEC 15459-4	ISO/IEC 15459-4	ISO/IEC 15459-1	ISO/IEC 15459-3
define data →	data information to be carried			
Data structure →	ISO/IEC 15418			
Data Syntax → High Capacity	ISO/IEC 15434			

Table-1: RFID for Supply Chain Management

5.3 Tag Data Structure

Figure 2 shows the memory segments and structure of a tag's memory. It is comprised of the UII (Unique Item Identifier), the TID (Tag Identifier), the User memory section and a certain, reserved memory segment for specific purposes.

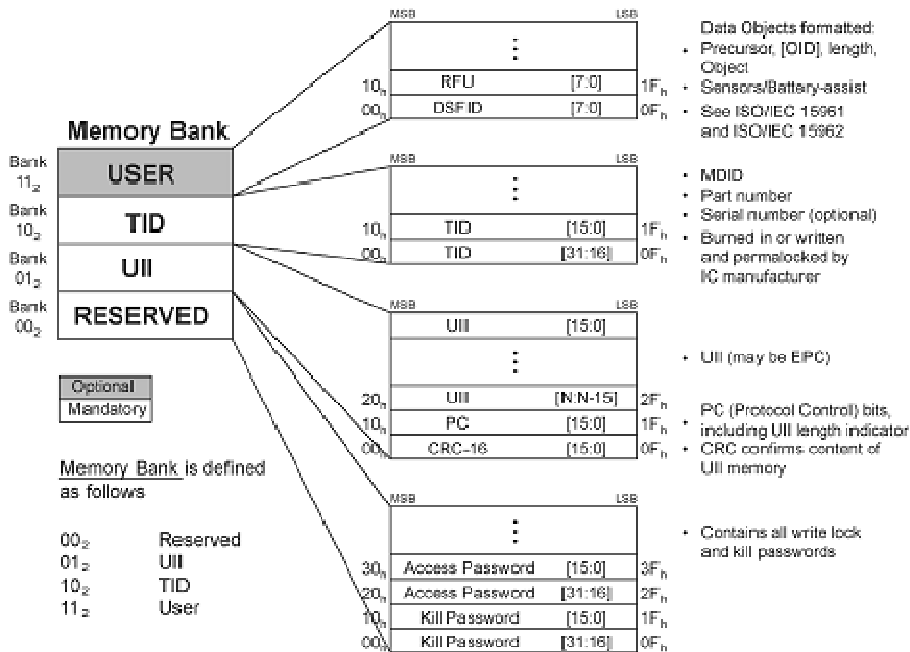


Figure-2: Tag data structure according to ISO/IEC 18000 – 6C / 18000 - 3 Mode 3

5.3.1 UII

Figure 3 shows a high level UII illustration – for details refer to the respective standards. It is recommended to use standard ASCII encoding (6,7 or 8 bit in line with the ISO standards)

Illustration of location EPC/AFI-Flag Bit 17 within bank 01 (18000-6C)

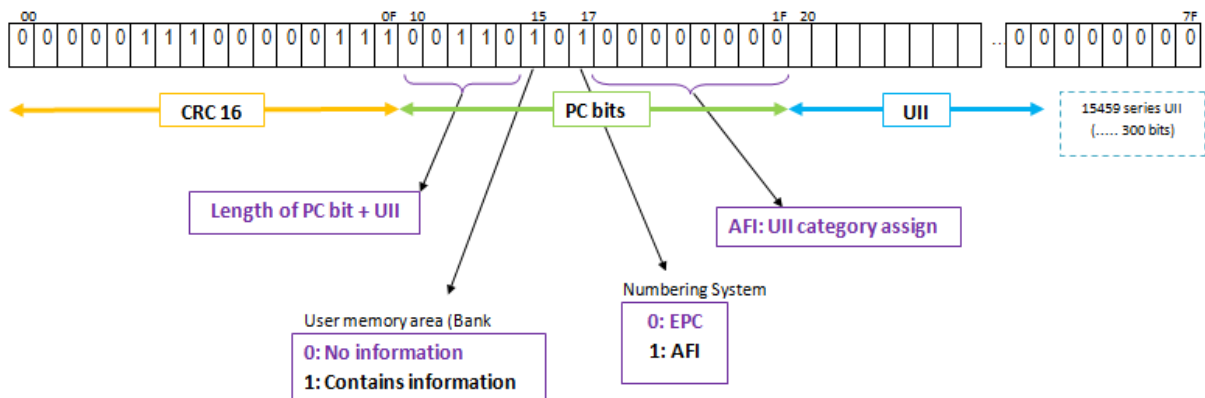


Figure-3: UII bank data example (Source: Qued Systems)

CRC 16: cyclical redundancy check

CRC-16 is a method for detecting errors in the received data by grouping the bytes of data into a block and calculating the CRC. This is usually done by the data link protocol and the calculated CRC is appended to the end of the data link layer frame. Although the calculation may be done by software, it is usually performed by hardware which is much simpler than the software approach. The RFID tag will have this inherent capability.

PC bits: Protocol Control

The PC bits contain several pointers that allow the RFID system to determine details of the application. See Figure-3.

Note: AFI assignments are subject to publication according ISO/IEC 15961 and maintenance is to be controlled by NEN. At the date of publication of this EDIFICE guideline the NEN AFI document for public access is still pending. It will be added to this guideline as soon as available.

5.3.2 TID

TID uniquely distinguishes between tags.
TIDs are assigned by the tag manufacturers.

Note: Some TID may contain the Manufacturer number only which is not compliant with ISO 15963. According to the standard the TID should contain Manufacturer number + individual tag number.

5.3.3 User Memory

User Memory can contain additional information that is not needed for all types of applications, i.e. it is process and user dependant.

The usage of User Memory is therefore optional.

5.4 Data length requirements of Unique Item Identifiers for AIDC Media

The length of the mandatory data element for unique code is specified by the individual application standard according to cross industries requirements.

Table-2 gives an overview of the different UIIs and their application standards

Application & data length requirements for UII's					
	Transport Unit TU	Product Package	Item	Returnable Unit RTI	Grouping
UII	ISO/IEC 15459-1		15459-4	15459-5	15459-6
Barcode	ISO 15394	ISO 22742			
RFID	ISO 17365	ISO 17366	ISO 17367	ISO 17364	
Data length (ASCII an)	20, max.35	32	max. 50	20, max.50	20,max.50

Table-2: Data length for Unique Identifiers according to ISO&IEC AIDC and application standards RFID-Chip selection with capacity for Unique Identifiers

Selecting a RFID Tag, the memory size for UII as well as for user data, are key criteria for the application. According to the availability of RFID Chips and in view of the market development it is not recommended to try to change a UII just to make it fit in a low capacity chip. The most efficient way for a given infrastructure to encode a data element in a chip is to use the given data element for both Bar Code and for RFID (see chapter interoperability). Table-3 gives an overview of the UII size, application and tag availability.

UII size	Applications	Availability*
96 bits	Small size for applications with typically numeric UIIs and high number of tags or existing applications using EPC numbers	highest
128 bits	Medium size for applications where not the max. data length is required or for numeric data	high
240 bits	Fits to most applications	high
352 bits	Satisfies every application for SCM	lower
496 bits	Max. UII size according to ISO/IEC 18000-3.1 M2 and 18000-6C	low

** availability as of 2009*

Table-3: typical memory sizes for UII's reserved in a RFID chip

6 Returnable Transport Items

Requirements for RFID tagging of returnable transport items not specified in this chapter shall comply with ISO 17364.

6.1 Physical Requirements on Tag

This guideline specifies that ISO/IEC 18000-6 Type C compliant tag (UHF 860-960MHz) shall be used, except when additional capabilities are required for the application (e.g., TOTAL tags or sensors). A future revision of ISO/IEC 18000-6 will address these additional capabilities.

6.2 Tag content

6.2.1 Unique Identifier

The unique identifier for returnable transport items shall be built as an International Unique Identifier (IUI) with Data Identifier "25B", as defined in ISO 17364 and the related part of ISO/IEC 15459.

For the data structure of the Globally Unique Identifiers refer to EDIFICE GUI (<http://repository.edifice.org/gui-bim.aspx>)

The AFI for a Returnable Transport Item (RTI) shall be A3 or if the RTI contains hazardous materials, A8 shall be used.

6.2.2 Data format of user data memory

The data format of the user data memory shall conform to ISO/IEC 15961 and ISO/IEC 15962 and ISO/IEC 15434. The data contained shall employ Data Identifiers per ISO/IEC 15418.

6.2.3 Mandatory data elements in user data memory

As of the publication date of this guideline no mandatory elements have been identified for user data memory.

6.2.4 Optional data elements in user data memory

It is up to the supplier to add additional data elements without any limitations, as long as data structure according ISO/IEC 15434 and data semantics according ISO/IEC 15418 are respected. The reading systems should support use of optional data elements (that could be contained in the tag) in order to communicate additional information.

Note: User data directly linked to the RTI identified by Data Identifier "25B" are related to the RTI, and not to the products on the RTI. User data linked to items on the RTI should be included in a tag or tags for those items (e.g., transport items, packages, products). Use Data Identifier "F" to represent hierarchy.

6.3 RFID Emblem

The RFID label shall include an RFID emblem indicating that RFID is contained as identification technology. Preferred marking shall be according to ISO/IEC 29160 with number "B1".



6.4 Tag placement

The general rules for tag placement on an RTI should be according ISO/IEC TR 24729-1.

Note: Detailed rules will be included in the next release of this guideline.

7 Transport units

Requirements for RFID tagging of transport units items not specified in this chapter shall comply with ISO 17365. The Application Family Identifier is defined in ISO/IEC 15962.

RFID shall focus on the identification of the shipment (as complement to current bar code labels) and not as a replacement for the shipment documentation.

7.1 Physical Requirements on Tag

This guideline specifies that an ISO/IEC 18000-6 Type C compliant tag (UHF 860-960MHz) shall be used, except when additional capabilities are required for the application (e.g., TOTAL tags or sensors). An ISO/IEC 18000-6 Type D compliant tag shall be used for these additional capabilities.

7.2 Tag content

7.2.1 Unique Identifier

The unique identifier for transport units shall be built as International Unique Identifier (IUI) with Data Identifier "J" or "nJ" with "n" in 1..6, as defined in ISO 17365 and ISO/IEC 15459.

The AFI for a transport unit shall be A2 or if the transport unit contains hazardous materials, A7 shall be used.

7.2.2 Data format of user data memory

The data format of the user data memory shall conform to ISO/IEC 15434. The data contained shall employ Data Identifiers per ISO/IEC 15418.

7.2.3 Mandatory data elements in user data memory

There are no mandatory data elements required in user data memory.

7.2.4 Optional data elements in user data memory

It is up to the supplier to add additional data elements without any limitations, as long as data structure according ISO/IEC 15434 and data semantics according ISO/IEC 15418 are respected. The reading systems should support use of optional data elements (that could be contained in the tag) in order to communicate additional information.

K	K: Customer purchase order number
14K	14K: Customer purchase order number plus line number
2K	Bill of Lading/Waybill/Shipment Identification Code assigned by Supplier/Shipper.
3K	Bill of Lading/Waybill/Shipment Identification Code assigned by Carrier
P	Item Identification Code assigned by Customer
1P	Item Identification Code assigned by Supplier
2P	Code assigned to specify the revision level for an Item (e.g. engineering change level, edition or revision)

11P	10-character CLEI code for telecommunications equipment
25P	Identification of a party to a transaction as identified in 18V, followed by the supplier assigned part number.
18V	Identification of a party to a transaction in which the data format consists of two concatenated segments. The first segment is the unique code assigned to an issuing agency by NNI in accordance with ISO/IEC 15459, the second segment is a unique entity identification assigned in accordance with rules established by the issuing agency
Q	Quantity, Number of Pieces, or Amount (numeric only) (unit of measure and significance mutually defined)
7Q	Quantity, Amount, or Number of Pieces in the format: Quantity followed by the two character ANSI X12.3 Data Element Number 355 Unit of Measurement Code
13Q	# of #
nS	(n=3, 4, 5, 6 or 7) Package identification not globally unique.

if there is only one product code in the transport unit and the item information (e.g., 1P, 25P, 11P, etc.) is included in the user memory, then Q or 7Q shall also be included in the user memory.. In case of a mixed load, if the user wants to include item information, then Data Identifier F shall be in the user memory to indicate the hierarchy.

Note: If, instead of the Data Identifier J, nS (n=3, 4, 5, 6 or 7) is used on the printed (vs. the RFID tag) transport package label or despatch note, then nS shall be included in the user memory..

7.3 RFID Emblem

The RFID label shall include an RFID emblem indicating that RFID is contained as identification technology. Preferred marking shall be according to ISO 29160 with number "B3".



7.4 Tag placement

The general rules for tag placement on a transport unit shall be according ISO/IEC TR 24729-1.

8. Product packaging

Requirements for RFID tagging of products not specified in this chapter shall comply with ISO 17366. The Application Family Identifier is defined in ISO/IEC 15962.

Note: The product number and serial number of the package may be different than the product numbers and serial numbers of the products contained within this package. A

package containing more than one product or not serialised products may have its own identity / serial number with data identifier "25S" different from the included products serial numbers.

8.1 Physical Requirements on Tag

This guideline specifies that ISO/IEC 18000-6 Type C compliant tag (UHF 860-960MHz) shall be used, except when additional capabilities are required for the application (e.g., TOTAL tags or sensors). An ISO/IEC 18000-6 Type D compliant tag shall be used for these additional capabilities.

8.2 Tag content

8.2.1 Unique Identifier

The unique identifier for product packages shall be built as International Unique Identifier (IUI) with Data Identifier "25S", as defined in ISO 17366 and ISO/IEC 15459.

For a unit package for a single serialised product, the serial number on the product package label shall match the serial number on the product, otherwise a globally unique serial number on the label identifying only the package shall be assigned using the Data Identifier 25S. This globally unique serial number on the label shall be the same as the Unique Identifier encoded in the RFID tag.

8.2.2 Data format of user data memory

The data format of the user data memory shall conform to ISO/IEC 15434. The data contained shall employ Data Identifiers per ISO/IEC 15418.

8.2.3 Mandatory data elements in user data memory

If the user memory is used, it shall contain at least the following data elements:

1P*	Item Identification Code assigned by Supplier
11P*	Common Language Equipment Identification (CLEI) assigned by the manufacturer to some telecommunications equipment
25P*	Identification of a party to a transaction as identified in 18V, followed by the supplier assigned part number.
Q**	Quantity, Number of Pieces, or Amount (numeric only) (unit of measure and significance mutually defined
7Q**	Quantity, Amount, or Number of Pieces in the format: Quantity followed by the two character ANSI X12.3 Data Element Number 355 Unit of Measurement Code

** Identifiers can be used in parallel as they are used for the identification of the same product. At least one of these identifiers must be used.*

*** At least one of these identifiers must be used.*

8.2.4 Optional data elements in user data memory

It is up to the supplier to add additional data elements without any limitations, as long as data structure according ISO/IEC 15434 and data semantics according ISO/IEC 15418 are respected. The reading systems should support use of optional data elements (that could be contained in the tag) in order to communicate additional information.

11D	Manufacturing week, format YYYYWW
12D	Manufacturing date, format YYYYMMDD
4L*	Country of Origin, two-character ISO 3166 country code
P	Item Identification Code assigned by Customer
2P	Code assigned to specify the revision level for an Item (e.g. engineering change level, edition or revision)
11P	10-character CLEI code for telecommunications equipment
25P	Identification of a party to a transaction as identified in 18V, followed by the supplier assigned part number.
S**	Serial number or code assigned by the Supplier to an entity for its lifetime, (e.g., computer serial number, traceability number, contract tool identification)
18V**	Identification of a party to a transaction in which the data format consists of two concatenated segments. The first segment is the unique code assigned to an issuing agency by NNI in accordance with ISO/IEC 15459, the second segment is a unique entity identification assigned in accordance with rules established by the issuing agency
F***	Looping Header as defined in Section VI of ANS MH10.8.2

If there is a mix of Country of Origins (Data Identifier 4L) within one package, this shall be reflected on the included content (lower level product packages or products) and not on the package containing the mix. See * for Data Identifier F.*

***If the Unique Identifier in the RFID tag (which uses 25S) does not match the serial number on the printed product package label for single serialised products, then the user data memory shall include the serial number (S) and the company identification number (18V) that is printed on the product package label.*

****If multiple serial numbers and/or countries of origin for one or more than one products are included in the package, then hierarchy using the Data Identifier F should be used. If there is insufficient space in the tag for the serial numbers, then, as a minimum, part numbers and quantity should be included.*

8.3 RFID Emblem

The RFID label shall include an RFID emblem indicating that RFID is contained as identification technology. Preferred marking shall be according to ISO 29160 with number "B5".



8.4 Tag placement

The general rules for tag placement on a product package should be according ISO/IEC TR 24729-1.

9 Product tagging

Requirements for RFID not specified in this guideline shall comply with ISO 17367. The Application Family Identifier is defined in ISO/IEC 15962.

9.1 Physical Requirements on Tag

This guideline specifies that an ISO/IEC 18000-6 Type C compliant tag (UHF 860-960MHz) shall be used, except when additional capabilities are required for the application (e.g., TOTAL tags or sensors). An ISO/IEC 18000-6 Type D compliant tag shall be used for these additional capabilities.

Note: HF could be used if there are technical requirements and in agreement between Trading Partners

9.2 Tag content

9.2.1 Unique Identifier

The unique identifier for products shall be built as International Unique Identifier (IUI) with Data Identifier 25S, as defined in ISO 17366 and ISO/IEC 15459.

For a product having a globally unique serial number, then this globally unique serial number shall be the same as the Unique Identifier encoded in the RFID tag. This globally unique serial number shall be printed on the product label in human readable text and in a printed machine readable symbol with Data Identifier 25S.

9.2.2 Data format of user data memory

The data format of the user data memory shall conform to ISO/IEC 15434. The data contained shall employ Data Identifiers per ISO/IEC 15418.

9.2.3 Mandatory data elements in user data memory

If the user memory is used, it shall contain at least the following data elements:

1P* Item Identification Code assigned by Supplier

- 11P*** Common Language Equipment Identification (CLEI) assigned by the manufacturer to some telecommunications equipment
- 25P*** Identification of a party to a transaction as identified in 18V, followed by the supplier assigned part number.

** Identifiers can be used in parallel as they are used for the identification of the same product. At least one of these identifiers must be used.*

9.2.4 Optional data elements in user data memory

It is up to the supplier to add additional data elements without any limitations, as long as data structure according ISO/IEC 15434 and data semantics according ISO/IEC 15418 are respected. The reading systems should support use of optional data elements (that could be contained in the tag) in order to communicate additional information.

- 11D** Manufacturing week, format YYYYWW
- 12D** Manufacturing date, format YYYYMMDD
- 4L** Country of Origin, two-character ISO 3166 country code
- 2P** Code assigned to specify the revision level for an Item (e.g. engineering change level, edition or revision)
- S*** Serial number or code assigned by the Supplier to an entity for its lifetime, (e.g., computer serial number, traceability number, contract tool identification)
- 18V*** Identification of a party to a transaction in which the data format consists of two concatenated segments. The first segment is the unique code assigned to an issuing agency by NNI in accordance with ISO/IEC 15459, the second segment is a unique entity identification assigned in accordance with rules established by the issuing agency
- 25T*** Identification of a party to a transaction as identified in 18V, followed by the supplier assigned traceability number.

**If the Unique Identifier in the RFID tag (which uses 25S) does not match the serial number for the product (e.g., not serialised product or serial number is not globally unique), then the user data memory shall include the serial number (S) or batch number (1T) and the company identification number (18V) or globally unique batch number (25T) that is printed on the product label.*

9.3 RFID Emblem

The RFID label shall include an RFID emblem indicating that RFID is contained as identification technology. Preferred marking shall be according to ISO 29160 with number "B7".



9.4 Tag placement

The general rules for tag placement on a product shall be according ISO/IEC TR 24729-1.

Annex A: Application Family Identifier (AFI)

The Application Family Identifier is defined in ISO/IEC 15962, Information technology— Automatic identification and data capture techniques ----Radio frequency identification (RFID) for item management. ISO/IEC 15962 specifies that the application will define the specific AFI. Below is a table of the AFIs assigned for the ISO 1736x series of standards.

AFI (Hex)	Assignment	ISO Standard
A1	17367_Non-EPC	ISO 17367 – Supply chain applications of RFID – Product tagging
A2	17365_Non-EPC	ISO 17365 – Supply chain applications of RFID – Transport unit
A3	17364_Non-EPC	ISO 17364 – Supply chain applications of RFID – Returnable transport item
A4	17367_HazMat	ISO 17367 – Supply chain applications of RFID – Product tagging (HazMat)
A5	17366_Non-EPC	ISO 17366 – Supply chain applications of RFID – Product packaging
A6	17366_HazMat	ISO 17366 – Supply chain applications of RFID – Product packaging (HazMat)
A7	17365_HazMat	ISO 17365 – Supply chain applications of RFID – Transport unit (HazMat)
A8	17364_HazMat	ISO 17364 – Supply chain applications of RFID – Returnable transport item (HazMat)
A9	17363_Non-EPC	ISO 17363 – Supply chain applications of RFID – Freight container
AA	17363_HazMat	ISO 17363 – Supply chain applications of RFID – Freight container (HazMat)

Table-4: Definition of AFI values and application

Annex B: AIDC Overview and Principles

Automatic Identification & Data Capture (AIDC) carriers (media) have been standardised by ISO/IEC JTC 1/SC 31 in order to carry data information which is unique and can be used cross country and cross industry. In order to find the most practical solution, any AIDC system design should begin with a strategic approach explaining the needs and usage for storing data in a specific data carrier.

Interoperability between bar code and RFID

For applications where a bar code infrastructure is available and in practical use, the same data can be carried by bar code as with RFID. The ISO & ISO/IEC specifications enable interoperability in order to ease the migration from one technology to the other and to enable back up systems e.g. bar code or two-dimensional (2D) symbols for the RFID tag. The interoperability refers to the data information where the encoding scheme could differ between the technologies. Some features cannot be supported by every technology. For example, reading and writing of sensors and data logging. Such specific features will be offered by specific technologies without interoperability of the data information but can be used as an add-on with system compatibility.

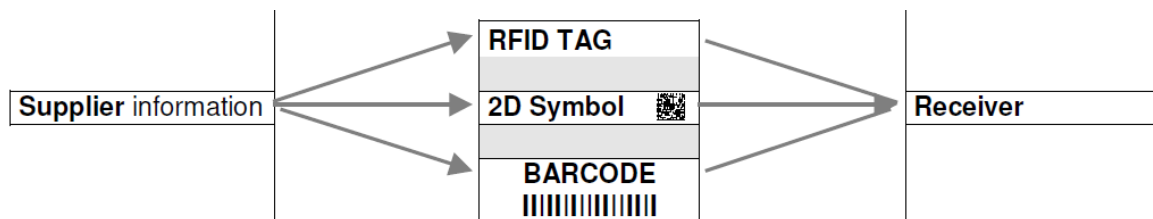


Figure B-1: ISO & ISO/IEC standards provide the means for interoperability between different data carrier and ease the migration from one technology to the other

The hierarchy of unique identification

Item and supply chain management applications require unique structures and unique codes. Where the structures are supplied by ISO/IEC, the responsibility for uniqueness has been assigned to a hierarchical scheme for any unique item identification. The hierarchical structure has been specified with ISO/IEC 15459 Unique Identifiers series of standards as follows:

ISO/IEC (A) authorises (B) the Registration Authority (as defined in ISO/IEC 15459-2) to register Issuing Agencies (C) and assign them an Issuing Agency Code (IAC). The registered Issuing Agency is entitled to issue a Company Identification Number (CIN) according to a specified scheme. Companies (D), each having received a registered CIN, are in the position to mark their items (E) with their own unique codes without the danger of overlapping with any other companies' item codes.

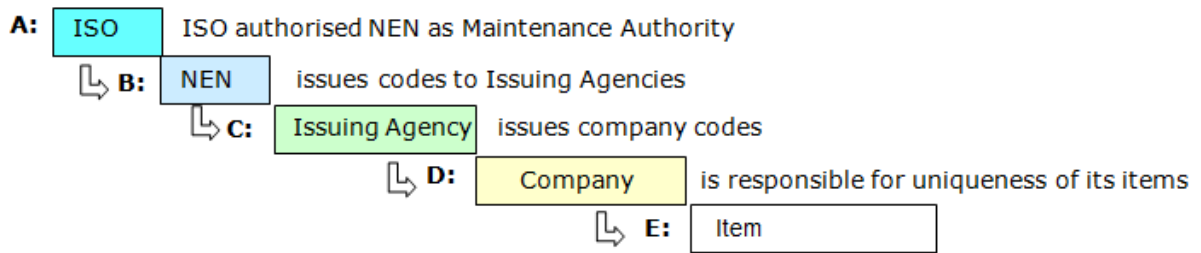


Figure B-2: Hierarchy of uniqueness of unique identification

Each Issuing Agency specifies its own rules for the structure of company codes and for the data structures. EDIFICE is assigned the IAC of "LE." For a complete list of Issuing Agencies and their associates codes see: www2.nen.nl/getfile?docName=196579