ISO-RFID eTAG-x
The ISO powered solution
for item tracking using RFID Tags
in compliance with ISO/IEC standards for Barcode.

ISO RFID eTAG-I –Electronic Item Tag
ISO RFID eTAG-P –Electronic Product Tag
ISO RFID eTAG-T –Electronic Transport Tag

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Drafting note:
This document was originally prepared by Raino Walli and Harald Oehlmann (EHIBCC & EDC TC) as the answer to rising demand for the availability of a HIBC[1] solution for RFID tagging powerful for cross industry applications. Since the last EAN/UCC Global specification (EPC[2]) has been designed for the EAN/UCC numbering system, the current approach now is open not only for use of the ASC MH 10 Data Identifier structure open for all business sectors.

Any comment or practical advise to it is appreciated. Comments will be passed to the Multi Industry Technical Committee for further review.

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First draft	03-11-26 Harald Oehlmann, Raino Walli
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Revision 2004-02-28	Annex compatibility's, TC
Revision 2004-03-16	Input vom DIN NI31.4 Meeting

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[1] HIBC is copyright of HIBCC
[2] EPC is copyright of EPC GLOBAL

Content

1. Foreword

Eurodata Council is an international acting association in liaison with associations of different sectors of industry and health care such as EDIFICE, CEFIC, ODETTE, SPECTARIS, FIDE, etc.. The current RFID initiative was found by the technical committee members both of EDC and EHIBCC. EHIBCC (the European Health Industry Business Communication Council) and HIBCC (Health Industry Business Communication Council - USA) are worldwide acting associations recognized by CEN, ANSI and ISO as standardization bodies. EHIBCC and HIBCC develop and maintain standards and guidelines for Health Care logistics and communication. The specifications have been prepared by the EHIBCC Technical committees consisting of members and technical experts of AIM and liaisons. The specification for use of the ISO RFID Tags take use of related ISO Standards for achievement of world wide functionality and interoperability with other industries standard solutions. It shall help to optimize supply chain management systems avoiding extra costs for additional numbering schemes by full use of the existing Barcode systems. The members of the co-operation associations have interest in wide spread use of the ISOIEC standards for RFID to achieve best efficiency in supply chain environments.

2. Introduction

This specification constitutes an add on to industries and HIBC Guidelines for cases where BARCODE or 2-dimensional symbologies do not full fill the requirements. The solution is designed to meet the general requirements for RFID product tagging and marking logistical units such as reusable containers or transport units.

The Technical Committee worked out a solution for effective and economic use which applies for industry as for health care and any related business sectors . Where the Electronic Product Code (EPC)[3] approach is reported to target to a centralized system with access to information stored in a central data base, the ISO RFIDx has been developed to maintain the practiced decentralized system with access to data through the manufacturer. It maintains continued use of any existing product numbering system to avoid any change in data bases of suppliers, distributors or users. The solution supplies full compatibility between Barcode and RFID applications to ease the implementation of RFID. It is directly associated with the relevant ISO/IEC RFID air interface and data protocol standards where the.

Any holder of a Company Identification Code (CIN) or Labeler Identification Code (LIC) issued according to ISO/IEC 15459 can use the system without any extra fee for a company or item identification around the world.

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[3] EPC is trademark/copyright of EPC Global.

3. Scope

The EHIBCC Application standard for RFID item tagging shall enable "LIC" holders to use the company identification code not only in Barcode but also with modern RFID technologies. It specifies the methodology to enable unique identification for tracking and tracing any item where RFID is appropriate. It provides specific recommendations for world wide uniqueness from lowest item level up to any related information. The current specification will not change the HIBC Guidelines for Standard labeling but shall constitute an add on for the specific task of RFID tagging. It takes use of the practiced product numbering schemes avoiding mapping to additional numbering systems. It provides full compatibility with the Health Industry Barcode (HIBC) and with the Unique Identification Mark (UIM) as with all other standard numbering systems. The specification describes the key data elements to be carried in the RFID technology. It does not specify the technology with related RFID air interface, data protocol nor RFID Tag memory management because this is clearly described with the referenced ISO/IEC documents.
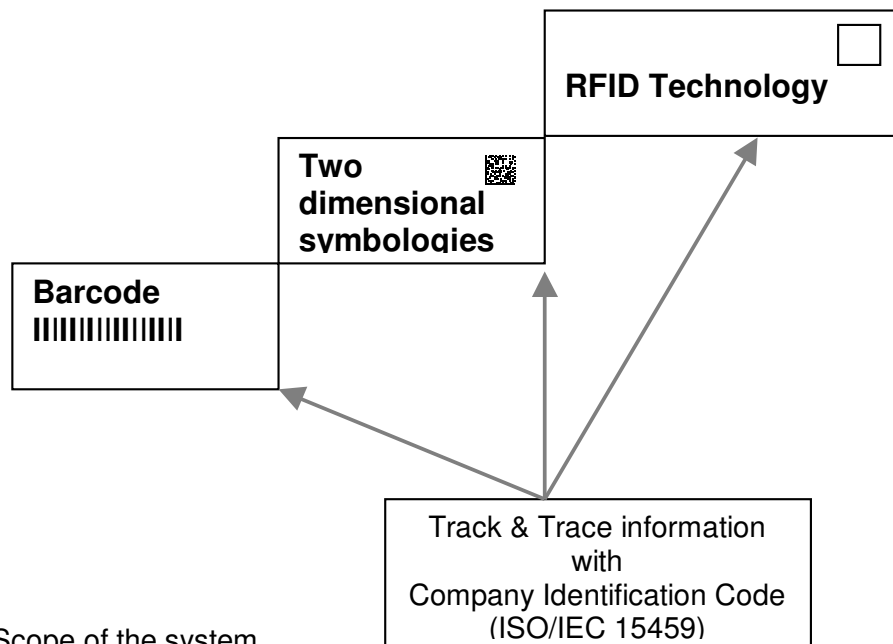
Schematic: Scope of the system
Same Track & Trace information ready to be carried with Barcode, 2D symbols or RFID applied with the same Company Identification Code avoiding any change in data bases.
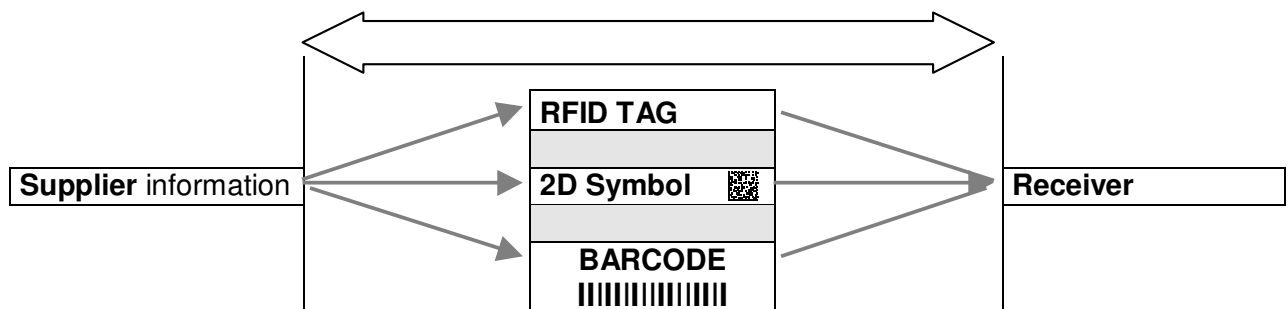
Schematic: Same supplier information for tracking and tracing items - different but compatible data carriers.

4. Normative references

The following referenced documents are indispensable for the application of this document.

ISO/IEC 19762	Information Technology — Harmonized Vocabulary
ISO/IEC 7816-6	Registration of Electronic Manufacturers for RFID tags
ISO 22742	Packaging - Barcode and 2D symbologies for product packaging
ISO/IEC 15418	Automatic Identification – International Specification - EAN.UCC Applications Identifiers and ASC Data Identifiers
ISO/IEC 15434	Automatic Identification and Data Capture Techniques – International Specification – Syntax for high capacity data carriers
ISO/IEC 15459	Automatic Identification and Data Capture Techniques – International Specification - unique identifier for item management
ISO/IEC 15961	Automatic identification – Radio Frequency Identification for item management – Data protocol: application interface
ISO/IEC 15962	Automatic identification – Radio Frequency Identification for item management – Data protocol: data encoding rules and logical memory functions
ISO/IEC 15963	Automatic identification – Radio Frequency Identification for item management – Unique identification for RF tags
ISO/IEC 18000-2	Automatic identification – Radio Frequency Identification for item management – Air Interface protocol 130 kHz
ISO/IEC 18000-3	Automatic identification – Radio Frequency Identification for item management – Air Interface protocol 13,56 MHz
ISO/IEC 18000-4	Automatic identification – Radio Frequency Identification for item management – Air Interface protocol 2,4 GHz
ISO/IEC 18000-6	Automatic identification – Radio Frequency Identification for item management – Air Interface protocol 870-930 MHz (UHF)
ANS ASC MH10	Data Application Identifiers
ANS HIBC 2	Health Industry Supplier Labeler Standard
DIN pre Norm	Unique Identification Mark (UIM)
HIBC Application Guidelines	EHIBCC/FIDE/SPECTARIS
UIM	EHIBCC Standard Unique Identification Mark (UIM)
UPN	Universal Product Number (Regulation of DOD US)

Note: The ISO/IEC specifications 15961-3 and 18000-2 to –6 are currently in FCD conditions, passing voting is assumed for 2004.

5. eTAG system

The eTAG system covers items, products, transport units and related information to be carried with RFID Tags. It combines the technology independent numbering systems of HIBC and ASC MH 10 with the RFID technology related air interface and data protocol specifications. It specifies the data relevant elements for 3 key units which are Items, Products and Transport Units. Any of the type is designed to be carried in RFID Tags of the available frequencies, specified with the ISO/IEC Air Interface specifications.

5.1. The 3 key types of RFID Tags

Three key eHIBC types characterize the unique numbering system carried by RFID Tags.

	type	function	name
1.	Item RFID Tag	Serialized Item	eTAG I
2.	Product RFID Tag	Unique Product	eTAG P
3.	Transport RFID Tag	Serialized T. Unit	eTAG T

If HIBC Data apply the three RFID types are:

	type	function	name
1.	Item RFID Tag	Serialized Item	eHIBC I
2.	Product RFID Tag	Unique Product	eHIBC P
3.	Transport RFID Tag	Serialized T. Unit	eHIBC T

5.2. System layers and components

The system consists of several layers, which include:
- RFID Technology layer with its Air Interface, specified with the ISO/IEC 18000-x series
- Data protocol and RFID tag memory organization, specified with ISO/IEC 15961,2
- Unique RFID Tag ID of the Tag manufacturer, specified with ISO/IEC 15963
- Uniqueness of Item, Product and Transport Unit, specified with ISO/IEC 15459
- Data Identifiers, specified with ISO/IEC 15418, part ASC MH10
- Data according to application Item, Product or Transport labeling 1, 2 or 3.

A	RFID Technology			
	Air Interface	RFID TAG	ISO/IEC 18000-x	-2,3,4 or 6
	RFID Tag memory	Memory management	ISO/IEC 15962	
	RFID Data protocol	Data protocol	ISO/IEC 15961	
	Unique RFID Tag ID	UID	ISO/IEC 15963	
B	Data Layer for transmission			
	Rules for Unique Item ID's	Uniqueness	ISO/IEC 15459	
	Data Identifiers	DI's	ISO/IEC 15418	ASC MH10
	Data Elements	Data	Application	

5.2.1. The RFID technology layer Frequencies

RFID tags are available for different frequencies. The following frequencies and its technology Air Interface specifications apply:

Air Interface spec.	
frequency	*ISO/IEC*
130KHz	18000-2
13,56MHz	18000-3
2,4GHz	18000-4
870-930 MHz	18000-6

The following table shows the 3 key types of RFID tags with frequency index of the selected Air Interface:

				index	Available Air Interface	
				-x	*frequency*	*ISO/IEC*
type		*name*		-2	130KHz	18000-2
Item RFID Tag	Serialized Item	eTAG I-x		-3	13,56MHz	18000-3
Product RFID Tag	Unique Product	eTAG P-x		-4	2,4GHz	18000-4
Transport RFID Tag	Serialized T. Unit	eTAG T-x		-6	870-930 MHz	18000-6

Explaination: An eTAG I-2 is an Item RFID Tag with ISO/IEC 18000-3, 13,56MHz technology but an eTAG I-4 is an Item RFID Tag based on ISO/IEC 18000-4, 2,4GHz technology..

Examples if HIBC applies: An eHIBC I-3 is an Item RFID Tag with ISO/IEC 18000-3, 13,56MHz technology but an eHIBC I-4 is an Item RFID Tag based on ISO/IEC 18000-4, 2,4GHz technology..

5.2.2. Data protocol and RFID tag memory organisation, specified with ISO/IEC 15961,2

Data protocol and RFID tag memory management are technology depending issues where the following specifications apply always:
ISO/IEC 15961 Automatic identification – Radio Frequency Identification for item management – Data protocol: application interface,.
ISO/IEC 15962 Automatic identification – Radio Frequency Identification for item management – Data protocol: data encoding rules and logical memory functions

5.2.3. Unique RFID Tag ID (UID) of the Tag manufacturer, specified with ISO/IEC 15963

A unique RFID TAG ID is always supplied by the Electronic component manufacturer. It supplies uniqueness for the RFID Tag itself, used for technical purposes such as "Bulk Scanning". The Unique Tag ID might be transmitted through the interface optionally. The Tag UID is a fix programmed serial number and might be used as an elementary ID if no application data are necessary or available.

5.2.4. Uniquenes of Item, Product and Transport Unit, specified with ISO/IEC 15459

Cross enterprise, cross country uniqueness is specified with ISO/IEC 15459. It regulates the responsibility for issuing unique codes. Organizations registered with NNI.

ISO ..

A: CEN — CEN & ISO authorize NNI to register organizations

B: NNI — Netherlands Normalization Institute issues Agency Codes

C: Organisation — issues a company code for the labeller

D: Labeler — responsible for uniqueness of its items

E: Item to Transport Unit
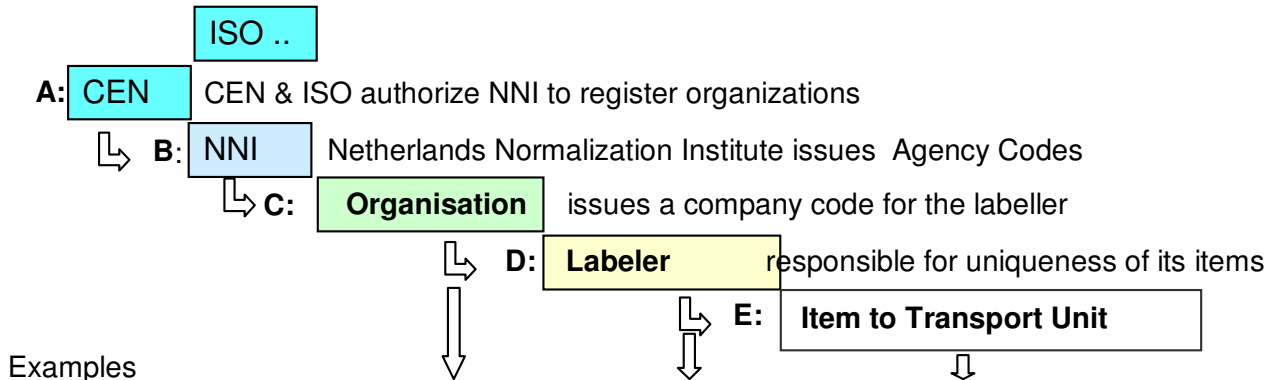
Examples

Data Identifier See chapter DI's	Issuing Agency Code	Labeler ID Code	Example of a serialized item code
For item or Product or Transport unit	LH: HIBCC/EHIBCC	E999	C20406089
	LE: EDIFICE	IBM	1030507K
	00: EAN (numeric)	121234567	1234567891

Note: The full list of Issuing Agencies and its codes are accessible under
www.nen.nl/cgi-bin/index.pl?/nl/pro/line/EN1572_register.html
Note: The Labeler is responsible for the final uniqueness of the code making sure that his serial number is unambiguous within his enterprise.

5.2.5. Same company Identification Code for Barcode and RFID eTag

Same Company Identification Code is used for unique company identification for consistency reasons.

Table for illustration: One common Labeler Identification Code for both Barcode and RFID

Barcode			RFID
	data	data	
	CIN		

5.2.6. Data Identifiers and data elements specified with ISO/IEC 15418, part ASC MH10

For identification of the data elements Data Identifier shall be used specified with ISO/IEC 15418, part ASC MH10.

The following Data Identifiers apply as access key to uniqueness:

DI	description	Structure according to ISO/IEC 15459
25P	world wide unique product code	DI – Issuing Agency Code – Company ID – Product code
25S	world wide unique serial number	DI – Issuing Agency Code – Company ID – Serial number
25T	world wide unique lot number	DI – Issuing Agency Code – Company ID – Lot number
nJ	World wide unique transport unit	DI – Issuing Agency Code – Company ID – Transport Unit no.
18V	World wide unique vendor code	DI – Issuing Agency Code – Company ID – Organisational unit

Additional DI's for additional information and optional concatenation:

30P	First Level	Supplier assigned such as Packaging level (HIBC: 30P 0 to 9)
Q	Quantity	
14D	Expiration Date	The expiration date in the format YYYYMMDD.
1T	Lot	Lot Number
S	Serial Number	Serial Number
2L	Ship to Code	e.g. Postal code
		other DI's like Production Date etc. selected according to product
		Stock temperature data

Additional data elements for control purposes may be required

		Stock temperature min
		Stock temperature max
		Stock temperature min overrun
		Stock temperature max overrun

6. Data elements for the RFID Item Tag "eTAG- I"

The Item RFID Tag eTAG I specifies pure identity of an item by its unique serial number headed by company ID, Issuing Agency ID and the appropriate DI.
In case of a single item a unique serialized number applies, in case of more than one item of a batch a unique lot number applies.

6.1. Unique serialized number

The heading data Identifier for a unique serial number is the DI "25S" followed by Issuing Agency code, company ID and serial number..
The example shows a unique serial number build with the Code of the Issuing Agency EHIBCC

	DI	Issuing Agency Code	Company ID 4 an	Serial number 1-13an
world wide unique serial number	25S	LH	A234	123456789

The unique serial number "25SLHA12323456789" is ready to be carried both via Barcode, 2D symbologies or with RFID.

6.2. Unique lot number

The heading data Identifier for a unique serial number is the DI "25T" followed by Issuing Agency code, company ID and serial number.
The example shows a unique serial number build with the Code of the Issuing Agency EHIBCC

	DI	Issuing Agency Code	Company ID 4 an	Lot number 1-13an
world wide unique lot number	25T	LH	A234	234567890

The full data element of the unique lot number to be carried is "25TLHA234234567890"

7. Data element for the RFID Product Tag "eTAG- P"

A product RFID Tag carries a unique product code. It implies the unique Labeler Identification Code and the product number of the supplier.

	DI	Issuing Agency Code	Company ID 4 an	Product code 1 to 13an
world wide unique product code	25P	LH	ABCD	C23456789

The unique Product Code of the sample "25PLHABCDC23456789" is ready to be carried with the data carrier If additional information applies the required data elements shall be concatenated, such as package level. For traceability a serial or lot number shall be concatenated.

7.1. Unique Product Code applied with a serialized number

According to application a serial number may be add for traceability purposes. In this case the data element shall be concatenated where the appropriate Data Identifier for the additional data element is "S" followed by the serial number itself. In case of lot tracking the Data Identifier is "1T" followed by the lot number.

8. Data elements for the RFID transport tag "eTAG- T" – Serialized Unique Transport unit

The Unique Transport serial number is structured according to ISO/IEC 15459. where the rules are specified by the issuing agency supplying the company identification code. Example:

	DI	Issuing Agency Code	Company ID 4 an	Serial number 1-20an
world wide unique serial number	J	LH	ABCD	F23456789

The unique serial number of the transport unit of the example above is "JLHABCDF23456789" which is ready to be carried either with Barcode as with RFID.

8.1. Use of different transport and its packaging levels.

The single DI "J" is the default value for specifying the following data as data elements of a transport unit. There are options to specify the packaging level and potential related EDI messages or mixed or like item pallets.

DI	
J	Unique Transport Item
1J	Lowest packaging level, unbreakable unit
2J	Highest packaging level where several "1J" units apply
etc.	See ISO/IEC 15459

9. RFID Technology specifics

9.1. UID - Unique Identification for RFID tag electronics

RFID tags need a fixed unique code just for technical purposes to differ between each tags and to enable bulk scanning. The UID is a hard ware based fixed number which might be used as an access key to data if appropriate, but it does not inform about item related data. The UID is assigned by the tag manufacturer according to ISO/IEC 15963 Automatic identification – Radio Frequency Identification for item management – Unique identification for RF tags. It includes either a Electronic manufacturer code according to ISO/IEC 7816-6 or another issuing agency code. It is unchangeable.

9.2. Data elements stored in the RFID tag

The data elements will be stored in a tag according to the rules specified with
ISO/IEC 15961Automatic identification – Radio Frequency Identification for item management – Data protocol: application interface and
ISO/IEC 15962 Automatic identification – Radio Frequency Identification for item management – Data protocol: data encoding rules and logical memory functions.

ISO/IEC 15961 specifies the Application Family Identifier AFI and Sub Family ID ASF for the application, Data Format ID for identification of the usage of the Data Identifiers, 15962 the RFID specific memory storage.

Table Data elements in a RFID Tag

RFID Tag type	ISO/IEC 15963	& ISO/IEC 7816-6	ISO/IEC 15961, 15962				ISO/IEC 15418 ASC MH10		Application	
	Fixed UID with IC manufacturer ID		AFI	AFS	Access method	Data format	DI	Optional data	Data (examples)	options
eTAG-I	RFID Tag (IC) Manufacturers responsibility		11	1	0	10	25S		LHA23412345678Z	
eTAG-P			11	2	0 or 1	10	25P	1T, S,.Q	LHA234M2345678	
eTAG-T			11	1	0 or 1	10	J	2L	LHA234C234567	

Note: The access method for the data in the RFID Tag is set loading the tag. The flag for the access method 0 is linear, 1 is for use of the directory in the RFID tag. The Data format ID 10 is for usage of the ASC MH 10 Data Identifiers (see ISO/IEC 15961).

9.2.1.   Examples how data are stored in a RFID Tag.

The example 1 shows a RFID tag with Unique Transport Number but not using a directory, example 2 shows a RFID tag with Unique Transport Number using a directory for quick access for single data elements.

Table with 2 examples of the content of a RFID Tag without or with directory

Example 1 no directory			Example 2 with directory		
AFI	11		AFI	11	
ASF	2		ASF	2	
Access linear	0		Access with directory	1	
Data format DI	10		Data format DI	10	
DI	J		DI	J	
Data	LHABCDF23456789		Data	LHABCDF23456789	
Stored as	11:2:0:10:J:LHABCDF23456789				

Note: A directory enables direct access to specific data requested, such as Serial Number only.

9.3. RFID tag specific memory

RFID tags are either preprogrammed or programmable during the application. Specific functions enable to identify the electronic component and stored data.

9.4. Low to High Capacity RFID tags

Due to different memory sizes of tags the appropriate volume of data can be stored.

9.5. Low capacity tags up to 128 bit

If low memory tags are to be used, the single data element should be used. For traceability purposes typical single data elements are as follows.

DI		
25S	For eTAG-I - Unique Items	Access to company and its serial number
25T	For eTAG-P – Unique Products	Access to company and its product code
J	For eTAG-T - Unique Transport Units	Access to company and its transport serial no.

9.6. Medium capacity tags more than 128 bit

Medium Capacity of more than 128 bit allow storage of concatenated information, such as Unique Product Code plus serial or lot number, quantity, packaging level, etc.. The use of the Memory Directory will enable quick access to single data elements.

9.7. High capacity tags

High capacity RFID tags may allow storage of several hundred bytes. ISO/IEC 15962 applies for data protocol and memory control.

10. RFID Read/write features

The specification just covers the Barcode compatible data to be carried in an RFID tag, but not every application related features of an tag. This is up to mutual agreements with partners.

11. Annexes

## 11.1. Interoperability with other systems

The usage of the ISO/IEC standards for item management guaranty full interoperability between the systems.
Other compatible RFID systems are typically
- Barcode
- UPN (Universal Product Number concept of DoD-US)
- EPC[4]
- Vicinity Cards
- Container tags
  etc.

11.2. Barcode / RFID data carrier compatibility

Both with Barcode as with the RFID tag same data might be relevant to carry. Compatibility is given by use of the ASC MH 10 Data Identifiers with both technologies on data element level. The data base in the computer may not even differ between the data carried via Barcode or RFID.
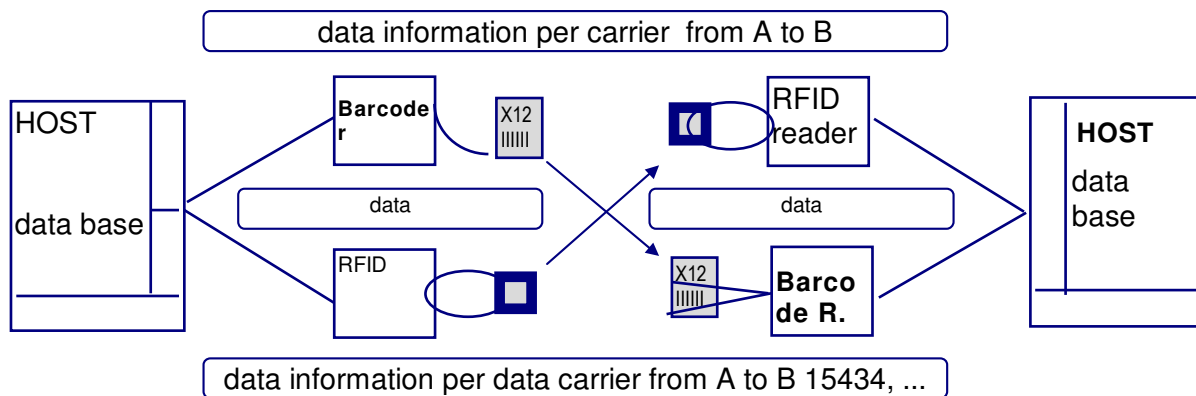
11.3. UPN (Unique Product Number) compatibility

UPN regulations accept either a alpha numeric product code of 1-13 characters which fits in the HIBC or DI structure or in a EAN or UCC structure.
The sample shall illustrate how the UPN fits in the scheme using the DI 25P used as with RFID.

	DI	Issuing Agency Code	Company ID	Product code
HIBC product code	25P	LH (for EHIBCC)	4 an	1 to 13an
EAN/UCC product	25P	If numeric Company ID than EAN/UCC:	7 n max	5 n

11.4. Compatibility to Electronic Product Codes (EPC)[5]

Where the ISO RFID eTAG system is designed to carry alpha numeric product codes the EPC system is designed to carry the EAN/UCC data elements where the product code is numeric. Due to the Unique UID flag any system is compatible to each other.

Table vertical Illustration eHIBC & EPC contents

RFID type	UID & control flags ISO/IEC 15963 15961, 15962	DI/ Header	Company ID	Unique product	Unique serial no.	Unique Transport Unit	Inter-pretation
eTAG-I	x	25S LH	4an		1-13an		
eTAG-P	x	25P LH	4an	1-13an			ASCII
eTAG-T	x	J LH	4an			1-20an	
EPC GIAI	x	14	20 - 40		63 - 42		
EPC SGTIN	x	14	20 - 40	24 - 4	38		BIT
EPC SSCC	x	14	20 - 40			32 - 17	

Table horizontal Illustration eHIBC & EPC contents

Data	eTAG -I	eTAG -P	eTAG-T	EPC GIAI Bit	EPC SGTIN Bit	EPC SSCC Bit
DI/Header	25S LH	25P LH	J LH	14	14	14
Company ID	4an	4an	4an	20 - 40	20 - 40	20 - 40
Unique Product No.		1-13an			24-4	
Unique Serial No.	1-13an			62 - 42	38	
Unique Transport No.			1-20an			37-17

Illustration Bit to decimal representation (excerpt)
The following table will illustrate the relation between BIT and decimal digits as an excerpt of a full BIT to decimal table.

BIT	decimal digits
14	4
20	6
24	7
34	10
40	12
...	...

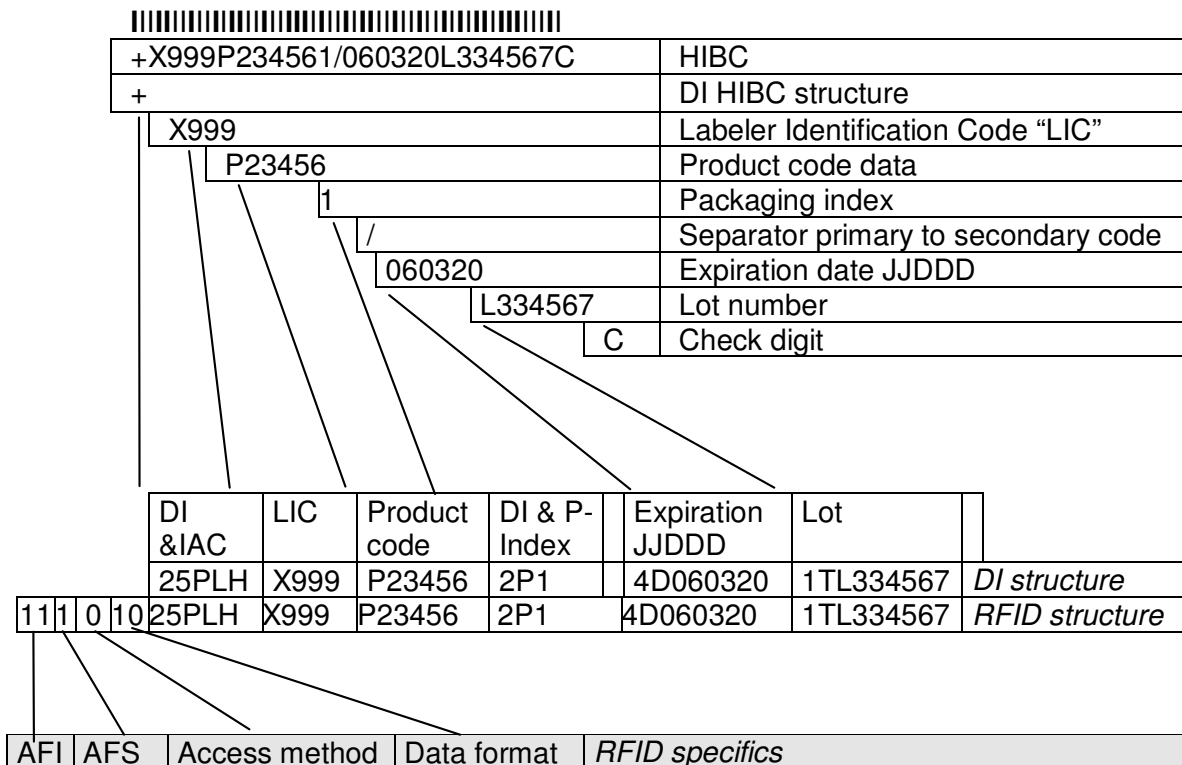[5] EPC is trademark/copyright of EPC Global.

11.5. Conversion from Health Industriy Barode to eHIBC RFID

Conversion from HIBC in to eHIBC does not require to convert the data but to bring the data in the RFID compatible format. The RFID compatible format is the "DI" format where any single HIBC data element can be interpreted with.

Mapping table data elements of HIBC Barcode to RF compatible DI format.

HIBC			Interpretaion with DI's according to ISO/IEC 15418 part ASC MH 10 Data Identifiers
DI HIBC Product Code	+	25P	DI "25P" plus IAC for HIBC codes
Labeler Identification Code LIC	4an	4an	LIC
Product Code	1-13an	1-13an	Product Code
Packaging Index 0-8	0 to 8	2P 0 to 8	DI 2P plus index
Packaging Index 9	9	Q	See category "Q" Quantity
Separator	/		RFID specific Separator
Flags for Secondary Code	$ ($$)	Not applicable	
Lot number	data	1T	DI "1T" plus data
Expiration Date Julian calendar	YYDDD	4D	DI "4D" plus date format YYDDD
Expiration Date other formats		nD	See category 4 "Date"
Quantity field	2 or 5 n	See Q	
Check digit Mod. 43	1n	Not applicable	

Example of a HIBC Barcode converted in to Data elements compatible with RFID

+X999P234561/060320L334567C	HIBC
+	DI HIBC structure
X999	Labeler Identification Code "LIC"
P23456	Product code data
1	Packaging index
/	Separator primary to secondary code
060320	Expiration date JJDDD
L334567	Lot number
C	Check digit

	DI &IAC	LIC	Product code	DI & P-Index	Expiration JJDDD	Lot	
	25PLH	X999	P23456	2P1	4D060320	1TL334567	*DI structure*
11 1 0 10	25PLH	X999	P23456	2P1	4D060320	1TL334567	*RFID structure*

AFI	AFS	Access method	Data format	*RFID specifics*

12.   Annex Glossary of terms

- **ANSI**

American National Standards Institute

- **ANSI/MH 10**

An ANSI accredited committee responsible for the development of American national standards on unit-load & transport-package sizes, package testing standard, definitions & terminology, standardization of unit-load height, sacks & multi-wall bag standards, coding & labeling of unit-loads.

- **ANSI/MH 10/SC 8**

An ANSI accredited committee responsible for the development of American national standards on the coding and labeling of transport packages and unit loads, product packaging, and radio frequency identification for returnable containers. ANSI/MH 10/SC 8 serves as the U.S. Technical Advisory Group (TAG) to ISO TC 122.

- **ASCII**

American Standard Code for Information Interchange: a computer code, as described in ISO 646, consisting of 128 alphanumeric and control characters, each encoded with 7 bits (8 including parity check), used for the exchange of information between computerized systems.

- **character**

See Character Set, Data Character, Symbol Character, Human Readable Character.

- **character set**

The total range of letters, numbers, and symbols that can be encoded in a particular symbology. See Code Page, Code Set.

- **CIN**

Company Identification Code, assigned by an Issuing agency (see IAC) under the rules of ISO/IEC 15459.

- **coded character set**

A set of unambiguous rules establishing a character set and the relationship between the characters of the set and their byte values.

- **Data Identifier (DI)**

A specified character string which defines the specific intended use of the data that immediately follows. The identifier shall be an alphabetic character or an alphabetic character preceded by up to three numeric characters as defined by ANSI MH10.8.2, Data Application Identifier Standard. A character (or set of characters) within a machine-readable symbol that defines the general category or specific use of the data that is encoded in the same machine-readable symbol. See ISO/IEC 15418/ANSIMH10.8.2.

- **EPC**

Electronic Product Code, copyright by EPC Global, promoted for EAN/UCC RFID solutions.

- **HIBC**

Health Industry Bar Code.

supported by HIBCC (Health Industry Business Communications Council), Arizona, Biltmore Circle, Suite 127, Phoenix, Arizona 85016, EHIBCC (European Business Communication Council), Jozef Israels Laan 3, NL 2596 AM The Hague, phone +31 70 3244754, www.ehibcc.com, EHIBCC-D, Koesener Str. 85, D-06618 Naumburg, phone +49 3445 78114 0, www.HIBC.de

- **Issuing Agency Code (IAC)**
Code assigned by the Netherlands Standardization Institute for Associations which qualified for issuing Company Identification Codes according to ISO/IEC 15459, such as EHIBCC, etc.

- **Labeler Identification Code (LIC)**
The LIC is registered with EHIBCC under the rules of ISO/IEC 15459 for the purpose of building unique numbers for items and shipments.

- **reader**
A device used to capture the data encoded in a machine-readable symbol or other automatic data capture media. Machine-readable symbol readers consist of two parts: the transducer that sends signals proportional to the reflectivity of each successive element of the symbol to the decoder, that examines the signals from the scanner and translates them into recognizable or computer-compatible data. The decoder itself is sometimes called a reader.

- **serial number**
A code assigned by the Supplier to an entity for its lifetime, (e.g., computer serial number, traceability number, contract tool identification)

- **structure**
The order of data elements in a message.

- **supplier**
In a transaction, the party that produces, provides, or furnishes an item or service.

- **symbology identifier**
A sequence of characters, generated by the decoder and prefixed to the decoded data transmitted by the decoder, that identifies the symbology from which the data has been decoded. See ISO/IEC 15424, *International Specification - Data Carrier/Symbology Identifiers.*

- **traceability identification**
A code assigned to identify or trace a unique group of entities (e.g., lot, batch, item, revision/version or serial number).

- **two-dimensional (2D) symbols**
Machine-readable symbols that must be examined both vertically and horizontally to read the entire message. Two dimensional symbols may be one of two types: matrix symbols and multi-row symbols. Two dimensional symbols have error detection and may include error correction features.

- **UPN**
Universal Product Number is the term of the regulations of the US Department of Defense for coding Health Care products either with HIBC ore UCC Bar Code.

13.   Copyrights and Patents

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