RFID

ISO RFID application standards published in 2006

+ benefits for users in various business sectors

Heinrich Oehlmann
www.EurodataCouncil.org
RFID applications now
ODETTE LABEL & RFID
SSCC
340211551866500005
EAN No. 3648763263678
Best before
31.12.2004

Net weight:
283,24 kg
Batch:
3863
Count:
48
Where does ISO apply
ISO/IEC 15418 Identifiers for Unique Codes

ASC DI’s & EAN AI’s: Uniqueness for suppliers, supply chain ....................

• Jxxxx (JC100xx with EAN-AI) Unique Transport Unit – Agency/Company/Transport no.
  1Bxxx – Returnable Container ID
• Sxxx – Serial number (oder 25S – Agency/Company/Serial number)
  1Hxxx -- Worker ID
• 25Pxxx – Agency/Company/Product + 1Txxx Charge/Lot
  +xxx -- Company/Product/expiry/Charge
  JC101xxx – Company/Product
• Kxxx -- Referenze
• Lxxx Location

ORDER
<table>
<thead>
<tr>
<th>Datenfeld</th>
<th>Inhalt</th>
<th>DI</th>
<th>Datenfolge</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>Gewichtstxt</td>
<td>3S</td>
<td>3Sxxxxxxx...</td>
</tr>
<tr>
<td>97</td>
<td>Warengruppentxt</td>
<td>1T</td>
<td>1Tyyyyyy...</td>
</tr>
<tr>
<td>4</td>
<td>7. Artikel Packtyp</td>
<td>1J oder 6J</td>
<td>1JUNxxxxxxxxkyyyy...</td>
</tr>
<tr>
<td>z=9..13 digits</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Role of the CIN
ISO/IEC 15459
ISO/IEC 15459

ISO

CEN

NEN

A:

B:

C:

Issuing Agency

D:

Company

Item

Issues Agency Code

issues Company ID Code (CIN, LIC, ...)

issues item number

Products

Transport Units

Returnable Items
Unique ISO License Plate

ISO/IEC 15459

CEN

NNI

Issuing Agency

Company

Item X23467

JQCCHEMX23457

Copyright H.Oehlmann 06-01-18
<table>
<thead>
<tr>
<th>Registered Issuing Agencies</th>
<th>Agency Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEFIC-European Chemical Industry</td>
<td>QC</td>
</tr>
<tr>
<td>CEPE-Paper industries</td>
<td>PA</td>
</tr>
<tr>
<td>DUN-Dun&amp;Bradstreet</td>
<td>UN</td>
</tr>
<tr>
<td>EAN International</td>
<td>0-9</td>
</tr>
<tr>
<td>EDIFICE-European Elektronic Industries</td>
<td>LE</td>
</tr>
<tr>
<td>EHIBCC-Health Care</td>
<td>LH</td>
</tr>
<tr>
<td>EuroExpress Logistics</td>
<td>UT</td>
</tr>
<tr>
<td>EUROFER-Steel Industrie</td>
<td>ST</td>
</tr>
<tr>
<td>FIATA-Transportation</td>
<td>LF</td>
</tr>
<tr>
<td>GD Express Worldwide NV</td>
<td>TN</td>
</tr>
<tr>
<td>IBM EMEA</td>
<td>VIB</td>
</tr>
<tr>
<td>NEDLLOYD-UNITRANS</td>
<td>ND</td>
</tr>
<tr>
<td>Norsk Edipro</td>
<td>KNO</td>
</tr>
<tr>
<td>ODETTE-Automotive Industries</td>
<td>OD</td>
</tr>
<tr>
<td>UPU-Universal Postal Union</td>
<td>J</td>
</tr>
<tr>
<td>PTT-NL Nederlands Post</td>
<td>NL</td>
</tr>
<tr>
<td>SIEMENS International</td>
<td>SI</td>
</tr>
<tr>
<td>VAN GENT&amp;LOOS Intl.</td>
<td>VGL</td>
</tr>
</tbody>
</table>

**Issuing Agency Codes**

ISO/IEC 15459  
+ EN 1572

**Issuing Agency**

ISO  
CEN  
NNI

**Company**

**GOOGLE:**
Issuing Agency Codes
ISO/IEC 15459
EN1572_register.html
Role of the CIN

Dispatch advise
Company: Smith
LIC: S321
1 Washer 265781
3 Screws 095645
9 Parts X2659711
Unique by ISO

ISO-DI+EHIBCC+Company+Serial number = UIM

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ISO Data structures supplying uniqueness

<table>
<thead>
<tr>
<th>ISO/IEC 15418</th>
<th>ASC Data Identifiers and EAN Application Identifiers</th>
<th>STATUS</th>
<th>Stabil</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISO/IEC 15434</td>
<td>Syntax for High Capacity Media (2D-Code, RFID)</td>
<td>Revision 2006</td>
<td></td>
</tr>
<tr>
<td>ISO/IEC 15459</td>
<td>Unique Identifier for ITEMS (before just for Transport Units)</td>
<td>Revision 2006</td>
<td></td>
</tr>
</tbody>
</table>

....just a number is a no name -1234567890123?
Other sectors, e.g.

ELECTRONIC Industry
Sectors in the move: AERO SPACE

ISO TC 20 WG 13
DRAFT 202-03-27

PRODUCT IDENTIFICATION -
Integrated Data Processing Part Management

Comments to:
ATA AIR TRANSPORT ASSOCIATION OF
AMERICA, 1301 PENNSYLVANIA AVE. N.W.
PHONE: (202) 626-4039

Permanent Bar Code Product / Parts Identification

In order that automated processes may be used to identify and facilitate "cradle to grave" tracking of product/ parts, an industry task force has defined a Permanent Bar Code Specification that uses Code 39, Code 128, and Data Matrix symbology. **Code 128 is the preferred symbology for permanent product/part identification using labels, nameplates, and/or tags.** If space does not permit using Code 128, use Data Matrix symbology. **For direct part marking, Data Matrix is the preferred symbology.**
Tire and Wheel Label and Radio Frequency Identification (RFID) Standard

**Figure 3. Rectangular Data Matrix Symbol with HRI**

<table>
<thead>
<tr>
<th>Rectangular Data Matrix</th>
<th>(215) W2CU_XLT1101</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;X&quot; = 0.20</td>
<td>(SN01) A (S) 1234</td>
</tr>
<tr>
<td>0.040 quiet zone</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 4. Data Matrix Symbol with .040” Element Size**

<table>
<thead>
<tr>
<th>DataMatrix</th>
<th>(215) W2CU_XLT1101</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;X&quot; = 0.040</td>
<td>(SN01) A (S) 1234</td>
</tr>
<tr>
<td>0.040” quiet zone</td>
<td></td>
</tr>
<tr>
<td>(215) W2CU_XLT1101</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 5. QR Code Symbol with .020” Element Size**

<table>
<thead>
<tr>
<th>QR Code</th>
<th>(215) W2CU_XLT1101</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;X&quot; = 0.020</td>
<td>(SN01) A (S) 1234</td>
</tr>
<tr>
<td>0.020” quiet zone</td>
<td></td>
</tr>
<tr>
<td>ECC H</td>
<td></td>
</tr>
<tr>
<td>(215) W2CU_XLT1101</td>
<td></td>
</tr>
<tr>
<td>(SN01) A (S) 1234</td>
<td></td>
</tr>
<tr>
<td>(S) 000001</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 6. QR Code Symbol with .040” Element Size**

<table>
<thead>
<tr>
<th>QR Code</th>
<th>(215) W2CU_XLT1101</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;X&quot; = 0.040</td>
<td>(SN01) A (S) 1234</td>
</tr>
<tr>
<td>0.160” quiet zone</td>
<td></td>
</tr>
<tr>
<td>ECC H</td>
<td></td>
</tr>
<tr>
<td>(215) W2CU_XLT1101</td>
<td></td>
</tr>
<tr>
<td>(SN01) A (S) 1234</td>
<td></td>
</tr>
<tr>
<td>(S) 000001</td>
<td></td>
</tr>
</tbody>
</table>

Pictures: MICHELIN
ISO/IEC JTC 1/
SC 31
Automatic Data Capture
Barcode, 2D, RFID
Status: ISO/IEC JTC 1/SC 31/WG 4 RFID

AIR Interface’s ISO/IEC 18000er Series

<table>
<thead>
<tr>
<th>ISO/IEC 18000-2</th>
<th>&lt;135KHz</th>
<th>Ready</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISO/IEC 18000-3</td>
<td>13,56 MHz</td>
<td>Ready</td>
</tr>
<tr>
<td>ISO/IEC 18000-4</td>
<td>2,4GHz</td>
<td>Ready 04-09-29</td>
</tr>
<tr>
<td>ISO/IEC 18000-6</td>
<td>UHF 860-960MHz</td>
<td>Ready 04-09-29 + C 2006</td>
</tr>
<tr>
<td>ISO/IEC 18000-7</td>
<td>433MHz</td>
<td>Ready Verlag 04-09-29</td>
</tr>
</tbody>
</table>

Data protocol ISO/IEC 1569x-Serie

<table>
<thead>
<tr>
<th>ISO/IEC 15691</th>
<th>Data protocol: Application interface</th>
<th>Ready 04-10-27</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISO/IEC 15962</td>
<td>Data protocol: Data encoding rules and logical memory functions</td>
<td>Ready 04-10-27</td>
</tr>
<tr>
<td>ISO/IEC 15963</td>
<td>RFID - Unique identification for RF tags</td>
<td>Ready 04-09-29</td>
</tr>
</tbody>
</table>

Data information: ISO/IEC 15418, 15459
Where are the Application Standards
## Application Standards 2006

<table>
<thead>
<tr>
<th>BARCODE &amp; 2D</th>
<th>RFID</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISO 22742</td>
<td></td>
</tr>
<tr>
<td>Product &amp; Package</td>
<td>ISO 17966</td>
</tr>
<tr>
<td>Product/Items</td>
<td>ISO 17967</td>
</tr>
<tr>
<td>ISO 15394</td>
<td></td>
</tr>
<tr>
<td>Transport Units</td>
<td>ISO 17965</td>
</tr>
<tr>
<td>Returnable Transport Items</td>
<td>ISO 17964</td>
</tr>
<tr>
<td>ISO 17963</td>
<td></td>
</tr>
<tr>
<td>Freight Containers</td>
<td>ISO 17963</td>
</tr>
</tbody>
</table>

**EURODATA COUNCIL**
The Layers of Logistic Units (Radio Frequency Identification - RFID)

ISO TC122/TC104

Layer 5 (5.8-5.9 GHz)
ISO TC 204
ISO 15627 - Data Link Layer
ISO 15628 - Application Layer
ISO 18253 - DSRC Res Mgr

Layer 4 (UHF)
ISO TC 104 (ISO 10374)
ISO TC 104 (ISO 18185)
ISO TC 104 (ISO 23389)

Layer 3 (UHF)
ISO TC 122 (TBD)
ANSI MH10.8.4
AIAG (TBD)
EIA (TBD)
EAN.UCC GTAG

Layer 2 (UHF)
ISO TC 122 (TBD)
ANSI MH10.8.8
AIAG (TBD)
EIA (TBD)

Layer 1 (None)
ISO 22742, ....

Layer 0 (None)
ISO 15459, ....

Unit Load “Pallet”
Transport Unit
Pkg
Item

Freight Containers
ISO 17363
activ 433MHZ
passiv UHF

Returnable Cont’s
ISO 17364
UHF + 13,56

Transport Units
ISO/WD 17365
UHF + 13,56

Product Packaging
ISO/WD 17366
13,56 + UHF

Product Tagging
ISO/WD 17367
13,56 & LF

Vehicles, Airplanes

EURODATA COUNCIL

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UHF 860-960MHz

13,56 MHz
Reasoning for 13,56 MHZ

In order to make the series of ISO 1736x applicable world-wide, it is essential to include the 13.56 MHz frequency range in the standards. The following aspects are the basic considerations for this:

• The UHF, frequency spectrum in Region 1 (865.6 – 867.6MHz) is presently not allowed in many European countries and will not be in future. The same in many countries of Asian area. Therefore it will not be possible to use RFID globally on a large scale.

• HF 13.56 MHz can be used world wide without such restrictions. In addition to this, HF has advantages because it offers a homogeneous field of interrogation (without reflections) resulting in a clearly defined reading area and therefore provides a higher read reliability and read rates.

• Concerning privacy aspects, UHF requires careful consideration because of the possibility of long distance eavesdropping (up to several kilometers), which is not the case with 13.56 MHz.
### RF ID Frequencies for Supply Chain applications

<table>
<thead>
<tr>
<th>Supply chain</th>
<th>LF &lt;135KHz 18000-2</th>
<th>13,56 MHz 18000-3, M1</th>
<th>433 MHz 18000-7</th>
<th>UHF 18000-6C</th>
</tr>
</thead>
<tbody>
<tr>
<td>17363 FreightContainer</td>
<td></td>
<td></td>
<td>YES</td>
<td></td>
</tr>
<tr>
<td>17364 Returnable Transport Item</td>
<td>Yes, with trade partner agreement</td>
<td>Yes, with trading partner agreement</td>
<td></td>
<td>YES</td>
</tr>
<tr>
<td>17365 Transport Unit</td>
<td></td>
<td>Yes, with trading partner agreement</td>
<td></td>
<td>YES</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-where UHF is not available, 13.56</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17366 Product Package</td>
<td></td>
<td></td>
<td>YES</td>
<td>Yes, with trading partner agreement</td>
</tr>
<tr>
<td>17367 Product</td>
<td>Yes, with trade partner agreement</td>
<td></td>
<td>YES</td>
<td></td>
</tr>
</tbody>
</table>
Next meeting
26 July 2006,
BELLVUE-
Washington
Achievement:
ISO enables interoperability between Barcode & RFID
Alternative idea's?
... third party Data Base communication

A to B com. (EDl)

AB+Info

AB

AB

ACB+Info

... third party Data Base communication
One ISO RFID - different numbers

Industry numbers
with variables

ISO

EPC

EAN numbers
without variables

Info by third party
Basic RFID user information structure

PC bit \( 1_{\text{HEX}} \)

- \( "1" \)
- \( "0" \)

AFI
- Unique Parts Identification
- License Plate
- Returnable Transport Item
- ...

EPC
- SGTIN
- SSCC
- GRAI
- ...

EPCglobal
ISO RFID TAG
+ compatible to current Barcode Solutions
+ „license free“ for every CIN holder:
  CEFIC, Dun&Bradstreet, EHIBCC, EDIFICE, EAN, FIATA, ODETTE, STEEL, UPU, ....

EPC Electronic Product Code
a „REFERENCE TO“ concept „licensed by EAN/UCC“
(copyright EPC Global)

EAN System
ISO/IEC 15963 Unique Tag ID
ISO/IEC 15961/2 RFID Data Protocol

Chance: Interoperability

ISO Global

EPC User Group

8 Bit Header & ISO Data AI‘s+DI‘s

ISO

EPC

ISO

EPC

8 Bit Header & EPC Code

EURODATA COUNCIL
Restriktions ???

Funnel up side down, why ...
...why not going the ISO way:

Every unique Code:

+ win
win
+ win
The benefits of using ISO standards

- Enables Uniqueness around the world by unique ID’s
- Enables tracking and tracing through different sectors
- Enables interoperability Barcode & RFID
- Cost efficient compatibility with existing infrastructure
- Just integration - No need to change systems
- Open and no charge options
- Accepted by all ISO member countries
ISO powered RFID TAG

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

Source: www.EurodataCouncil.org
RFID

Thank You

Heinrich Oehlmann
www.EurodataCouncil.org

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