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Information technology — Automatic identification and data capture techniques — Unique identification — Part 3: Common rules

Technologie d'information — Identification automatique et techniques de capture de données — Identification uniques — La partie 3: Règles commune

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Contents

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

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The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

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Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 31, *Automatic identification and data capture techniques* prepared ISO/IEC 15459-3.

ISO/IEC 15459 consists of the following parts, under the general title *Information technology — Automatic identification and data capture techniques— Unique identification*:

— *Part 1: Individual transport units*

— *Part 2: Registration procedures*

— *Part 3: Common rules*

— *Part 4: Individual products and product packages*

— *Part 5: Individual returnable transport items (RTIs)*

— *Part 6: Groupings*

Introduction

Unique identification can occur at many different levels, at item level, on the transport unit, on the returnable transport item, at grouping levels, and elsewhere. Such entities are often handled by several parties, both public and private, throughout their lifecycle. Each of these parties must be able to identify and trace such distinct entities so that reference can be made to associated information such as quality inspection data, the chemical substance contained, the batch or lot number of parts, components or raw materials, etc.

The information is often held on computer systems, and may be exchanged between parties involved via EDI (Electronic Data Interchange) and XML (eXtensible Markup Language) messages.

There are considerable benefits if the identity of the entity is represented as a bar code or other AIDC (Automatic Identification and Data Capture) media and attached to, or made a constituent part of, that which is being uniquely identified so that:

⎯ it can be read electronically, thus minimising errors;

⎯ one identity can be used by all parties;

⎯ each party can use the identity to look up its computer files to find the data associated with the entity.

All AIDC technologies have the potential to encode an identity. It is expected that application standards, using various automatic identification technologies, will be developed based upon the identity as a prime key. These application standards, which may include additional rules for which level of identification should be used, may be made available from the Issuing Agency.

The common rules for identities are defined in this part of ISO/IEC 15459.

Information technology — Automatic identification and data capture techniques — Unique identification — Part 3: Common rules

1   Scope

This part of ISO/IEC 15459 specifies the common rules applicable for unique identification that are required to ensure full compatibility across classes of identities.

2   Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 646, *Information technology — ISO 7-bit coded character set for information interchange*

ISO/IEC 9834-1, *Information technology — Open Systems Interconnection — Procedures for the operation of OSI Registration Authorities: General procedures and top arcs of the ASN.1 Object Identifier tree*

ISO/IEC 15418, *Information technology — Automatic identification and data capture techniques — GS1 Application identifiers and ASC MH 10 data identifiers and maintenance*

ISO/IEC 15434, *Information technology — Automatic identification and data capture techniques — Syntax for high-capacity ADC media*

ISO/IEC 15459-2, *Information technology — Automatic identification and data capture techniques — Unique identification — Part 2: Registration procedures*

ISO/IEC 19762-1, *Information technology — Automatic identification and data capture (AIDC) techniques — Harmonized vocabulary — Part 1: General terms relating to AIDC*

GS1 General Specifications*, GS1*

3   Terms, definitions and abbreviated terms

For the purposes of this document, the terms and definitions given in ISO/IEC 19762-1 and the following apply.

3.1   Definitions

- **entity:**   anything (physical or non physical) having a distinct existence

  NOTE   In the context of supply chain management it often refers to an item (product or service) which can be individually considered and identified

- **string:**   characters assigned to an entity constructed using the specific rules of the Issuing Agency to create an unambiguous number within the context of the specific parts of ISO/IEC 15459

  NOTE   The structure of the string is specified in ISO/IEC 15459-3 and begins with the IAC component in the ISO/IEC 15459 Register

- **qualifier:**   one or more characters referring to an entity, providing the meaning of the string data

  NOTE   Examples of qualifiers are DIs, AIs and OIDs

- **identity:**   the combination of qualifier and string which distinguishes an entity from other entities

NOTE   Some parts of this standard allow for multiple qualifier/string combinations as an identity

- **Issuing Agency:** an organization entrusted by the Registration Authority to assign company identifying numbers in line with the requirements of ISO/IEC 15459-2
- **Issuing Agency Code:** one or more characters assigned by the Registration Authority to an Issuing Agency making it recognizable and distinct from other issuing agencies
- **company identifying number:** one or more characters assigned by the Issuing Agency to an identity issuer making the issuer recognizable and distinct from other issuers
- **identification:**   the process (act) of assigning an identity to an entity
- **identifying:**   the process of recognizing an entity by accessing its identity

3.2 Abbreviated terms

AI   Application Identifier

AIDC   Automatic Identification and Data Capture

CIN   Company Identifying Number

DI   Data Identifier

IA   Issuing Agency

IAC   Issuing Agency Code

OID   Object Identifier

RA   Registration Authority

4   Distinguishing between identities

This International Standard recognizes types of identities, each type being used to identify a specific level, meaning, handling, role, etc. An organisation may adopt the usage of one or more such types.

ISO/IEC 15459-2 requires Issuing Agencies to define rules that ensure that no identity issuer can allocate a duplicate identity within a given type. Organisations making use of an identity should ensure that identities for different types are treated as distinct references.

Mechanisms exist that distinguish between identities. ISO/IEC 15418 and ISO/IEC 9834-1 address three methods that achieve this distinction by the use of a specified character (or string of characters) that defines the structure and meaning of the data that follows. These are referred to in this standard as qualifiers. The qualifier identification methods are GS1 Application Identifiers (AI), ASC MH10 Data Identifiers (DI) and ISO/IEC 9834-1 Object Identifiers (OID). Each of these provides their own dictionary of qualifiers. Specifically for ISO/IEC 15459 the applicable OID is 1 0 15459 n, where the value n is under the auspices of this international standard. The qualifier component of an identity may use any of the above qualifier identification methods, as appropriate. See also Annex A.

NOTE 1   Identities always start with a qualifier (see the examples in the informative annexes of each part of ISO/IEC 15459.

NOTE 2   Qualifiers are essential distinguishing features for data capture applications.

NOTE 3   Each part of ISO/IEC 15459 specifically references the qualifiers (GS1 Application Identifiers (AI), ASC MH10 Data Identifiers (DI) and ISO/IEC 9834-1 Object Identifiers (OID)) that may be used within the specific identity type.

NOTE 4   The qualifier may specify a type (OID "1 0 15459 1" identifies the type "transport units") or a sub-type within the type (the DI "6J" identifies transport units consisting of identical items).

5 Identities

An identity is assigned to an individual entity, item, unit or grouping by an identity issuer. This shall be done in accordance with the rules set up by ISO/IEC 15459-2 and the Issuing Agency that authorized the identity issuer. Issuing Agencies are authorised and registered by the Registration Authority.

The following requirements apply to identities:

a)   an identity shall include a qualifier from one of the qualifier identification methods listed above.

b)   the string component of an identity shall start with one or more characters, the Issuing Agency Code (IAC), assigned to the Issuing Agency by the Registration Authority.

c)   the string shall conform to the format specified by ISO/IEC 15459-2 and the Issuing Agency for the qualifier to which it applies.

d)   the string shall be unambiguous within its qualifier in the sense that no issuer re-issues the string within the qualifier over the entire life cycle for the identified entity or until a sufficient period time has passed so that the identity has ceased to be of significance to any user.

e)   each qualifier shall require its own independent set of rules that enable the identities for this qualifier to be held in a separate field on a data base or be defined as a separate data element in an EDI message. For each qualifier the rules should minimally determine (1) the maximum length of the string for that qualifier and (2) the repertoire of characters that may be used in the string following the IAC.

f)   for some parts of this standard an identity may be made up from a combination of two or more qualifiers and their associated strings, according to rules defined by the Issuing Agency for the qualifier identification method. This is explained in each part.

It is recommended that the Issuing Agency provide application guidance to identity issuers (e.g. check-digit algorithms, selection of GS1 Application Identifier or ASC MH10 Data Identifier, etc).

5.1 Common rule for the length of an identity

The common rule for the length of an identity is that it should be kept as short as possible, enabling coding using different AIDC techniques (e.g. one line linear bar code, 2D symbol, RFID tag, etc.) within the same or across several applications. It is especially important to keep the identity short if one line linear bar codes are to be used as the size of the bar code depends on the number of characters to be encoded.

5.2 Common rule for the character set of an identity

The common rule for the character set of an identity is that it shall only contain upper-case alphabetic characters and numeric digits of the invariant character set of ISO/IEC 646, see Annex A.

Any data processing system shall be capable of processing identities using the full repertoire of permitted characters.

5.3 Compliance with ISO/IEC 15459

An organization can claim that it is compliant with ISO/IEC 15459 (all parts or a specific part) if it can allocate and process identities according to the rules defined in ISO/IEC 15459-3, Common rules, ISO/IEC 15459-2, Registration procedures and all or any other part.

Annex A
(informative)

Invariant Character Set of ISO/IEC 646

The difference between the invariant character set (table of ASCII values shared among all countries) versus national variants, i.e. Canada, China, Germany, Denmark, Great Britain, Hungary, Japan, Malta, Norway, Sweden, United States, and the former Yugoslavia can be seen in table A.1. Those characters recommended are shown unshaded. Those characters shown unshaded or light shading represent the "invariant character set of ISO/IEC 646". Those characters shown with dark shading represent values that are made available for national variants.

HEX	DEC	ASCII / ISO 646	HEX	DEC	ASCII / ISO 646	HEX	DEC	ASCII / ISO 646
00	00	NUL	30	48	0	60	96	`
01	01	SOH	31	49	1	61	97	a
02	02	STX	32	50	2	62	98	b
03	03	ETX	33	51	3	63	99	c
04	04	EOT	34	52	4	64	100	d
05	05	ENQ	35	53	5	65	101	e
06	06	ACK	36	54	6	66	102	f
07	07	BEL	37	55	7	67	103	g
08	08	BS	38	56	8	68	104	h
09	09	HT	39	57	9	69	105	i
0A	10	LF	3A	58	:	6A	106	j
0B	11	VT	3B	59	;	6B	107	k
0C	12	FF	3C	60	<	6C	108	l
0D	13	CR	3D	61	=	6D	109	m
0E	14	SO	3E	62	>	6E	110	n
0F	15	SI	3F	63	?	6F	111	o
10	16	DLE	40	64	@	70	112	p
11	17	DC1	41	65	A	71	113	q
12	18	DC2	42	66	B	72	114	r
13	19	DC3	43	67	C	73	115	s
14	20	DC4	44	68	D	74	116	t
15	21	NAK	45	69	E	75	117	u
16	22	SYN	46	70	F	76	118	v
17	23	ETB	47	71	G	77	119	w
18	24	CAN	48	72	H	78	120	x
19	25	EM	49	73	I	79	121	y
1A	26	SUB	4A	74	J	7A	122	z
1B	27	ESC	4B	75	K	7B	123	{
1C	28	FS	4C	76	L	7C	124	|
1D	29	GS	4D	77	M	7D	125	}
1E	30	RS	4E	78	N	7E	126	~
1F	31	US	4F	79	O	7F	127	DEL
20	32	SP	50	80	P			
21	33	!	51	81	Q			
22	34	"	52	82	R			
23	35	#	53	83	S			
24	36	$	54	84	T			
25	37	%	55	85	U			
26	38	&	56	86	V			
27	39	'	57	87	W			
28	40	(	58	88	X			
29	41	)	59	89	Y			
2A	42	*	5A	90	Z			
2B	43	+	5B	91	[			
2C	44	,	5C	92	\			
2D	45	-	5D	93	]			
2E	46	.	5E	94	^			
2F	47	/	5F	95	_			

Values shown unshaded are specifically supported by this standard.

Table A.1 — Invariant Character Set of ISO/IEC 646

Annex B
(informative)

Unique identities overview

B.1 ISO/IEC 15459 overview to link the different parts

To figure below gives an overview of the different parts included in this standard with a "graphical" interpretation for the unique identification of entities of different types.
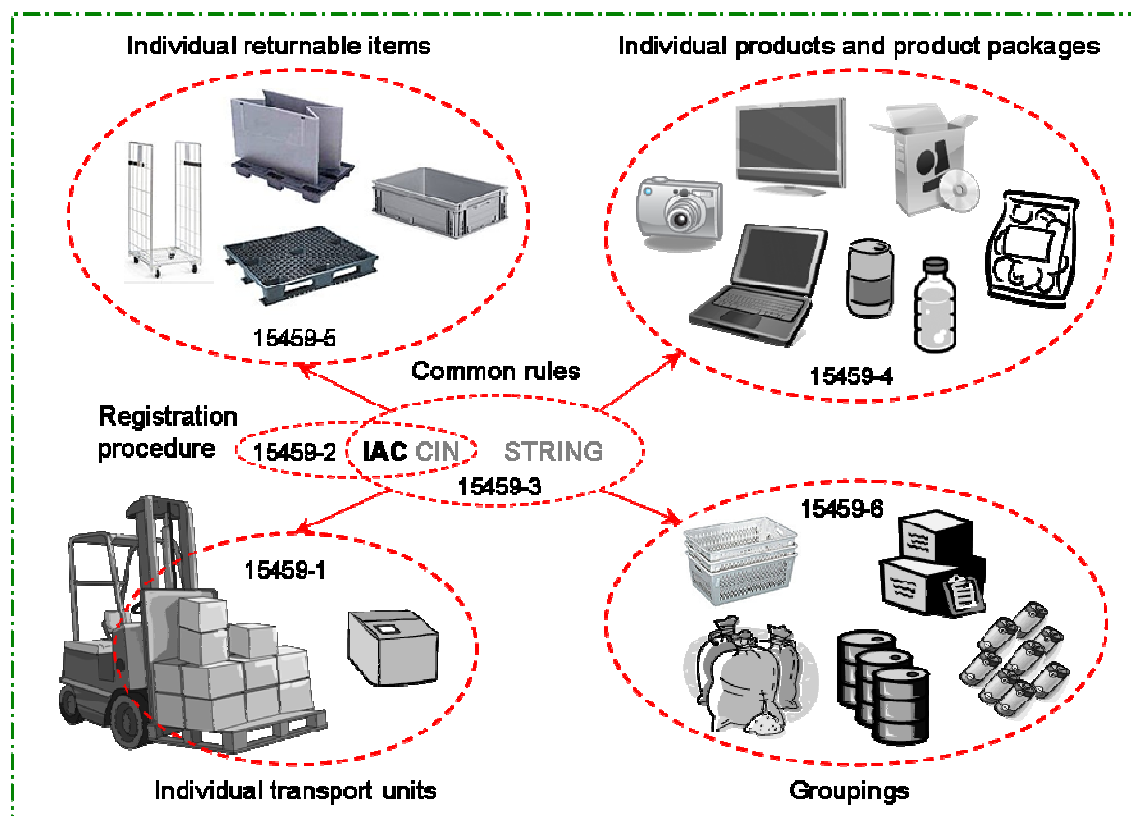

Figure B.1 — Overview of parts within ISO/IEC 15459

Annex C
(informative)

Identity constructs

C.1 Ways of achieving unique identification

Entities may be assigned an identity to each instance of the same type, i.e. serialization.

When using unique identification, an identity shall only contain one company identifier (i.e. IAC + CIN) together with either

  a) a serial component alone or

  b) a part number or similar extended with a serial component to disambiguate the entity or

  c) a part number of similar combined with a separate serial component

C.1.1   Identity using serial component

Unique identification can be achieved by using a string of a company identifier followed by one entity reference data field, i.e. use of only a serial component which is unambiguous across the enterprise for all entity types (e.g. DI "25S" or AI "8004").

IAC   CIN   SERIAL

serial reference unambiguous within the company (e.g. serial #) allocated to the entity by the identity issuer

CIN assigned to an identity issuer by an IA
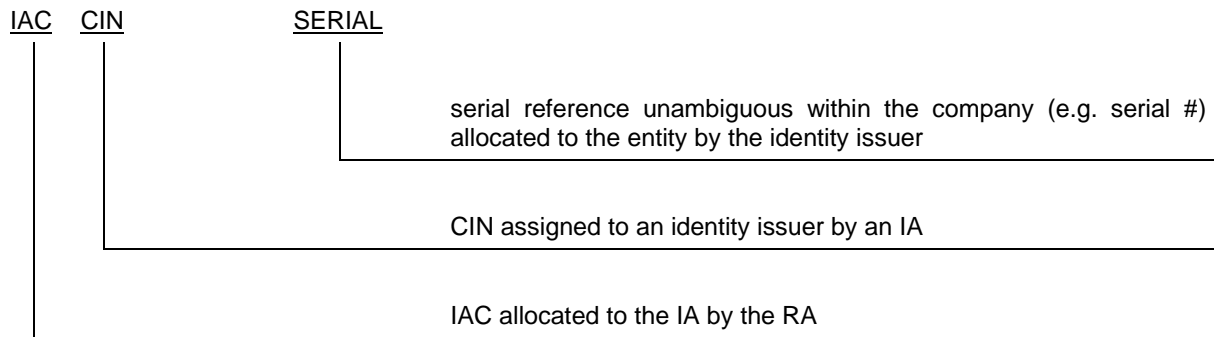
IAC allocated to the IA by the RA

Figure C.1 — Identity using a single entity reference

C.1.2   Identity using a serial extension component

Another way of creating unique identification is to combine entity reference data fields behind a company identifier (i.e. IAC + CIN), e.g. a part number followed by a serial number which is unambiguous within the given part number (e.g. DI "25S" or AI "8004").
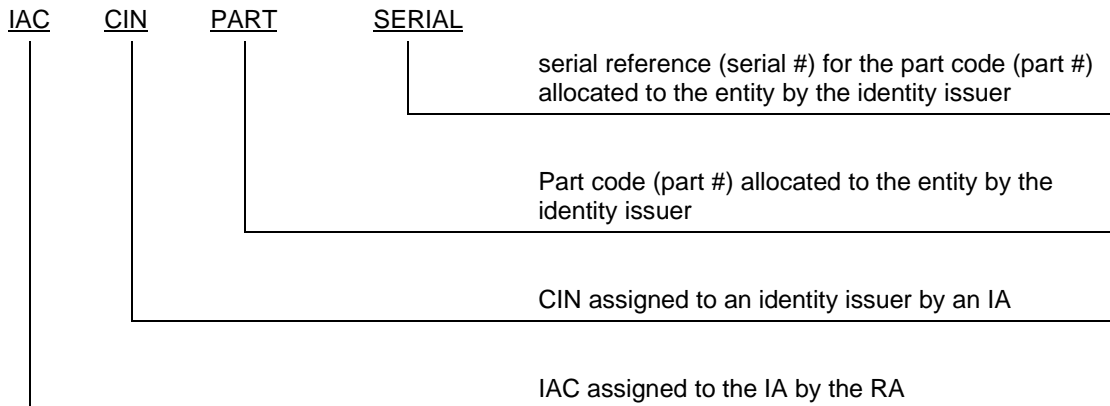
IAC   CIN   PART   SERIAL

serial reference (serial #) for the part code (part #) allocated to the entity by the identity issuer

Part code (part #) allocated to the entity by the identity issuer

CIN assigned to an identity issuer by an IA

IAC assigned to the IA by the RA

Figure C.2 — Identity using a serial extension

C.1.3 Identity using a separate serial component

This form of unique identification is made by combining two or more entity reference data fields behind a company identifier (i.e. IAC + CIN), e.g. part number followed by one or more serial component(s) each with its qualifier where each component is unambiguous in the context of the other component(s) (e.g. DI "25P+S" or AI "01+21").
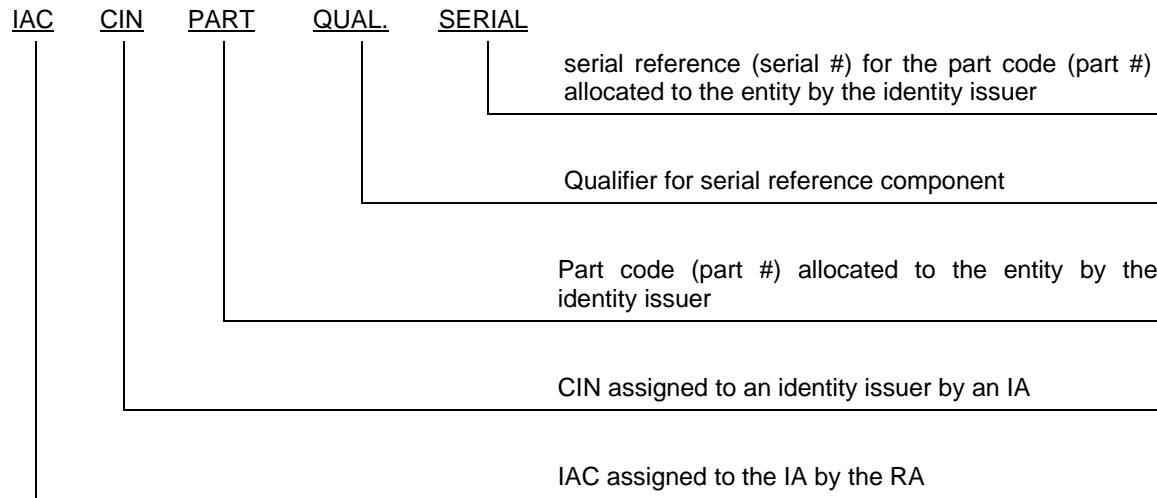
```
IAC    CIN    PART    QUAL.    SERIAL
                                    serial reference (serial #) for the part code (part #)
                                    allocated to the entity by the identity issuer

                               Qualifier for serial reference component

                        Part code (part #) allocated to the entity by the
                        identity issuer

                CIN assigned to an identity issuer by an IA

        IAC assigned to the IA by the RA
```

Figure C.3 — Identity using a separate serial component

Annex D
(informative)

Identities on different levels

D.1 Guide to determination of identity

As it sometimes can be difficult to differentiate and classify an entity or group of entities, the following can be used as guideline when defining the level to be identified:

- Product (entity, item)   Anything that you use or sell

- Product Package   One or many products in its packaging. A package can contain other packages

- Transport Unit   Products or product packages grouped together using the same transportation packaging

- Returnable Transport Item   A packaging for transportation, storage, handling and product protection which is returned for reuse

For a level there are identities that are to be used on a single entity or group of entities and to be able to choose an appropriate qualifier the following should be considered;

- Individual   Identity assigned to an individual product, product package, transport unit or returnable transport unit and that remains unchanged during the life cycle of that entity

- Group   Identity assigned to a group of products, product packages, transport units or returnable transport units

    o Physical group   Quantity of entities for which the identity is assigned related to physical characteristics and/or physical handling and remains unchanged during the life cycle, e.g. Type; identity assigned to identify type of product or product package, Batch; identity assigned to group a quantity of entities of same or different types

    o Logical group   Quantity of entities for which the identity is assigned for a logistic purpose and can be subject for change over time/life cycle, e.g. Shipment; identity assigned to a quantity of products, products packages or transport units shipped together, Address; identity assigned to a quantity of products, products packages or transport units being at the same location

D.2 Hierarchy of identification

Identification can be done on several levels, which can be identified by the qualifier within the identity, but as the same qualifiers can be used on several levels in a hierarchy it is of importance to know and understand this implication when assigning and using identities to individual or group of entities.

Therefore it is also important to give each type of identity a title and descriptive text that explains in human readable what the identity is to identify.
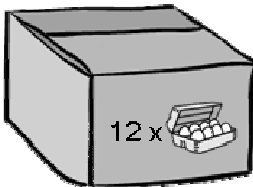
Qualifier	Title (of qualifier)	Description
String		What the identity is to identify

Table D.1 — Qualifier, Title and Description and String
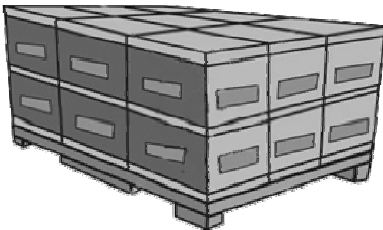
AI or DI	Shipment no.	Description
String		Identity for a shipment

AI or DI	License plate	Description
String		Identity for an individual transport unit

AI or DI	Product no.	Description
String		Product type C (e.g. box with 12 cartons)

AI or DI	Serial	Description
String		Identity for a single entity
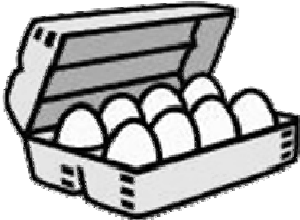
AI or DI	Product no.	Description
String		Product type B (e.g. carton with 8 eggs)

AI or DI	Serial no.	Description
String		Identity for a single entity

AI or DI	Product no.	Description
String		Product type A (e.g. eggs)

AI or DI	Batch no.	Description
String		Identity for a group of entities

Figure D.1 — Hierarchy of identification

Bibliography

[1]   ISO/IEC Directives, Part 2: Rules for the structure and drafting of International Standards, 2004

[2]   ISO 7372, Trade data interchange — Trade data elements directory

[3]   ISO/IEC 15459-1, Information technology — Automatic identification and data capture techniques — Unique identification — Part 1: Individual transport units

[4]   ISO/IEC 15459-2, Information technology — Automatic identification and data capture techniques — Unique identification — Part 2: Registration procedures

[5]   ISO/IEC 15459-4, Information technology — Automatic identification and data capture techniques — Unique identification — Part 4: Individual products and product packages

[6]   ISO/IEC 15459-5, Information technology — Automatic identification and data capture techniques — Unique identification — Part 5: Individual returnable transport items (RTIs)

[7]   ISO/IEC 15459-6, Information technology — Automatic identification and data capture techniques — Unique identification — Part 6: Groupings

[8]   ISO 21067, Packaging — Vocabulary