

## MILITARY COMMITTEE LAND STANDARDIZATION BOARD (MCLSB)

18 November 2010

NSA(ARMY)1207(2010)AST/2290

MCLSB

### STANAG 2290 AST (EDITION 2) – NATO UNIQUE IDENTIFICATION OF ITEMS

#### References:

- A. NSA(ARMY)0036(2009)AST/2290 dated 14 January 2009 (Edition 1)
- B. NSA(ARMY)0086(2009)AST/2290 dated 20 January 2010 (Edition 2) (Ratification Draft 1)

1. The enclosed NATO Standardization Agreement, which has been ratified by nations as reflected in the NATO Standardization Document Database (NSDD), is promulgated herewith.
2. The references listed above are to be destroyed in accordance with local document destruction procedures.

#### ACTION BY NATIONAL STAFFS

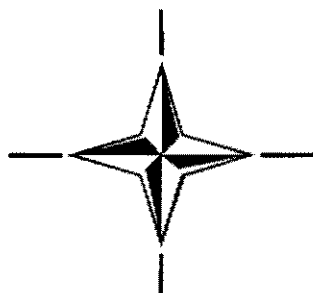
3. National staffs are requested to examine their ratification status of the STANAG and, if they have not already done so, advise the MCLSB NSA, through their national delegation as appropriate of their intention regarding its ratification and implementation.

A handwritten signature in black ink, appearing to read 'Cihangir AKSIT', is written over a faint, illegible background.

Cihangir AKSIT, TUR Civ  
Director, NATO Standardization Agency

Enclosure:  
STANAG 2290 AST (Edition 2)

**NORTH ATLANTIC TREATY ORGANIZATION**  
**(NATO)**



**NATO STANDARDIZATION AGENCY**  
**(NSA)**

**STANDARDIZATION AGREEMENT**  
**(STANAG)**

SUBJECT: NATO UNIQUE IDENTIFICATION OF ITEMS

Promulgated on 18 November 2010

A handwritten signature in black ink, appearing to read 'Cihangir AKSIT', is positioned above the printed name and title.

Cihangir AKSIT, TUR Civ  
Director, NATO Standardization Agency

## RECORD OF AMENDMENTS

No.	Reference/date of amendment	Date entered	Signature

## EXPLANATORY NOTES

### AGREEMENT

1. This STANAG is promulgated by the Director NATO Standardization Agency under the authority vested in him by the NATO Standardization Organisation Charter.
2. No departure may be made from the agreement without informing the tasking authority in the form of a reservation. Nations may propose changes at any time to the tasking authority where they will be processed in the same manner as the original agreement.
3. Ratifying nations have agreed that national orders, manuals and instructions implementing this STANAG will include a reference to the STANAG number for purposes of identification.

### RATIFICATION, IMPLEMENTATION AND RESERVATIONS

4. Ratification, implementation and reservation details are available on request or through the NSA websites (internet <http://nsa.nato.int>; NATO Secure WAN <http://nsa.hq.nato.int>).

### FEEDBACK

5. Any comments concerning this publication should be directed to NATO/NSA – Bvd Leopold III - 1110 Brussels - Belgium.

NATO STANDARDIZATION AGREEMENT  
(STANAG)

NATO UNIQUE IDENTIFICATION OF ITEMS

- Annexes:   A     Construction of Unique Item Identifier  
              B     Marking of Items with a Unique Item Identifier

Related Documents:

- STANAG 3150 - Codification – Uniform System of Supply Classification
- STANAG 3151 - Codification – Uniform System of Item Identification
- STANAG 4281 - NATO Standard Marking for Shipment and Storage
- STANAG 4329 - NATO Standard Barcode Symbolology
- AAP-6 - NATO Glossary of Terms and Definitions (English & French)
- AAP-23 - NATO Glossary of Packaging Terms and Definitions (English & French)
- ACodP-1 - Allied Codification Publication 1- NATO Manual on Codification
- ISO/IEC 15415 - Bar Code Print Quality Test Specification – Two-dimensional symbols
- ISO/IEC 15416 - Bar Code Print Quality Test Specification – Linear bar codes
- ISO/IEC 15418 - Information technology, Automatic identification and data capture techniques – EAN/UCC application identifiers and ASC MH10 data identifiers and maintenance
- ISO/IEC 15426-1 - Information technology -- Automatic identification and data capture techniques -- Bar code verifier conformance specification -- Part 1: Linear symbols
- ISO/IEC 15426-2 - Information technology -- Automatic identification and data capture techniques -- Bar code verifier conformance specification -- Part 2: 2D symbols
- 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 technology and data capture techniques – Unique identifiers for item management - Part 2: Registration procedures
- ISO/IEC 15459-3 - Information technology, Automatic identification technology and data capture techniques – Unique identifiers for item management - Part 3: Common rules for unique identification
- ISO/IEC 15459-4 - Information technology, Automatic identification technology and data capture techniques – Unique identifiers for item management - Part 4: Unique item

ISO/IEC 16022	- identification for supply chain management Information technology, Bar Code Symbology Specification - Data matrix
ISO/IEC 19762	- Harmonized Vocabulary
ATA CSDD	- Air Transport Association Consolidated Support Data Dictionary
SAE AS9132	Data Matrix Quality Requirements for Parts Marking
AECMMA EN 9132	- Data Matrix Quality Requirements for Parts Marking
GS1	- GS1 General Specifications

## AIM

1. The aim of this agreement is to standardize the Unique Identification (UID) of items using a Unique Item Identifier (UII) for use by NATO Forces. It specifies the standardized structure for the UII and provides guidance for the physical marking and content of a machine-readable Data Matrix symbol applied directly to the item or data plate/label and in a PDF-417 symbol on the first level of packaging.

## AGREEMENT

2. NATO and those Nations, hereafter referred to as “participating nations”, that choose to use UID to uniquely identify selected items for NATO purposes shall comply with the standards in this STANAG. Participating nations agree to implement the data format conventions contained in a conforming ECC 200 Data Matrix symbol as defined in STANAG 4329 and described in Annexes A and B.

## TERMS AND DEFINITIONS

3. The terms and definitions for this STANAG are defined in AAP-6, AAP-23 and ISO/IEC 19762. Additionally, the following terms are described for use with this STANAG:

- a. Unique Identification (UID) - system to create and assign a unique identifier to an item in order to differentiate one item from other like and unlike items in accordance with ISO/IEC 15459-3 and ISO/IEC 15459-4.
- b. Unique Item Identifier (UII) - set of data element(s) that, when concatenated, form a globally unique and unambiguous identifier.
- c. Unique Item Identifier (UII) Mark - machine-readable data carrier that contains the UII.
- d. Enterprise Identifier (EID) - unique code assigned by the Issuing Agency to an entity (organization or group). The entity is the one that is responsible for ensuring the unique identification of all qualified items.
- e. Issuing Agency Code (IAC) - code that identifies the issuing agency.
- f. Issuing Agency - organisation, recognized by the Nederlands Normalisatie Instituut (NEN), the ISO/IEC registration authority in accordance with ISO/IEC 15459-2, to issue an EID.

- g. Data Carrier - medium, such as bar code or Radio Frequency Identification (RFID), selected to record and often transport or communicate data.

## GENERAL

- 4. The content of this STANAG is based on international standards. It consists of the basic STANAG and two Annexes described below:
  - a. Annex A details the data elements required to uniquely identify items and the logic used to create the UII.
  - b. Annex B details the requirements for physical marking of items including the first level of packaging and subsequent machine reading of those markings.

## DETAILS OF THE AGREEMENT

- 5. The UII of an item shall not change over the life of the item even if the NSN, part number or related item description(s) should change due to modification, upgrade or repair.
- 6. The UII and its use, do not conflict with the NATO codification system as described in STANAG 3150, 3151 and ACodP1.
- 7. The UII acts as a data key to enable:
  - a. Retrieval of the data record(s) associated with the item, regardless of where the data is stored and the related logistics business processes.
  - b. Relation of the item to its attribute data, including the NSN, the nomenclature and the current part number.
- 8. Participating nations shall be capable of accepting, reading and passing both UII Constructs and any NATO recognized equivalents (See Annex A).
- 9. Each participating nation shall maintain a UII data reference capability (of national design) for their items. This contains the UII and its component data elements [IAC, EID, Original Part Number, Serial Number (Lot or batch number if required for serialization) and preferably the concatenated UII]. Activities that collect data about an item should be capable of associating the data with the UII. A database should be capable of using the concatenated UII (or the UII formed by the combination of its component data elements) to retrieve the data record associated with the item represented by the UII (e.g. NSN, Nomenclature and current part number). Data base utilization (storage, recall and use) of specific UII data is not required for compliance but is strongly recommended.
- 10. When a duplicate UII is identified, the discovering nation/NATO shall raise the matter with the appropriate entity(s) (organization or group).

## IMPLEMENTATION OF THE AGREEMENT

- 11. This STANAG is implemented when a Nation has issued the necessary orders or instructions to authorities and units concerned putting the procedures detailed in this agreement into effect.

## CONSTRUCTION OF A UNIQUE ITEM IDENTIFIER (UII)

### PURPOSE

1. This annex provides the conventions to be used when constructing the UII.

### GENERAL

2. The UII is based on a combination of data elements resulting from the serialization method used by the enterprise.

### REQUIREMENTS

3. Serialization. For NATO, there are two acceptable methods or Constructs of serialization:

- a. Serialization within the EID known as Construct 1:

- (1) This occurs when each item is assigned a serial number that is unique among all items identified under the same EID and is never used again.
- (2) The enterprise is responsible for ensuring unique serialization within the EID.

- b. Serialization within the Part Number, Lot/Batch or a combination of Part Number and Lot/Batch known as Construct 2:

- (1) Serialization with Part Number:

- (a) This occurs when an item is assigned a Serial Number that is unique within the original part number of the Enterprise.
- (b) The enterprise is responsible for ensuring unique serialization within the original part number.

- (2) Serialization within lot and/or batch numbers:

- (a) The lot or batch number is an identifying number assigned by the enterprise to a designated group of items, referred to as either a lot or a batch, all of which were manufactured under identical conditions (the same controlled conditions of production). Serialization schemes may treat lot and batch numbers as being either an interchangeable replacement for a part number or as an addendum to a part number.

(b) Serialization schemes that repeat serial numbers with each new lot or batch shall utilize Construct 2 and include the lot or batch number either in lieu of or as a suffix to the part number.

(c) Serialization schemes for lot and batch numbered items that utilize only unique serial numbers under the same EID may use either Construct 1 or 2.

Note: When lot/batch numbers are changed after assignment of the UII, and when required by STANAG 4281, the item and package markings shall include the current lot/batch numbers. The Construct 2 UII shall not change as a result of the lot/batch renumbering.

4. Uniqueness. Non-repeatable, worldwide uniqueness of the UII is achieved by ensuring the following:

- a. The UII shall not change over the life of the item.
- b. The component data elements of the UII (IAC, EID, Serial Number and if used, the Original Part Number) shall not change over the life of the item.
- c. The UII is globally unique in its concatenated form.
- d. The UII, once assigned to an item, shall not be transferred to another item or reused even if the original item is disposed.

5. Derivation of the UII. Depending on the method of serialization chosen by an Enterprise, the UII shall be derived from combining, in order from left to right, the discrete component data elements as described below in Table 1.

Construct 1	Serialization within an EID	IAC	EID		Serial Number
Construct 2	Serialization within a Part or Lot/Batch Number -	IAC	EID	Original Part Number or/and Lot/Batch Number	Serial Number

Table 1 – Construction of a UII

a. The IAC is assigned according to the registration procedures detailed in ISO/IEC 15459-2, under the current authority of the NEN.

(1) When including the UII data elements separately, the IAC does not need to be marked on the item as it can be derived from the data qualifier for the EID.

(2) The IAC for the GS1 Company Prefix need not be derived since it is contained in this Prefix and shall not be repeated when forming the concatenated UII.

(3) For items where the EID is an NCAGE, NATO Allied Committee 135 is the Issuing Agency. Entities interested in obtaining an NCAGE should contact their National Codification Bureau.



b. EIDs are uniquely assigned by an issuing agency which shall have an ISO assigned IAC and comply with procedures described in ISO/IEC 15459-2

## 6. Part Number Changes

a. When the current and original part numbers are different and the current part number is required for item configuration identification, the current part number shall be included in an additional or new part mark as an additional data element along with the UII component data elements. The UII of the existing item shall not change regardless of changes to a NSN or Supply Concept. Only the original part number is used in construction of the UII.

b. For instances in which the part number changes with new configurations (also known as part number roll), the current part number should be included on the item as a separate data element for traceability purposes. The UII remains unchanged even if a current part number is marked on the item. Assignment of a new part number does not change the UII.

## 7. Rules for constructing a UII

a. The UII shall be constructed using only the specified data elements (see Table 1). All Data qualifiers, i.e. application identifiers, data identifiers and text element identifiers, shall be removed from the data string.

b. Any spaces contained in the component data elements shall be deleted.

c. All special characters shall be deleted from the EID.

d. All special characters, except for dashes “-” and forward slashes “/” shall be deleted from the original part number and serial number.

e. The UII shall only contain uppercase English alphabet characters A through Z, numeric characters 0 through 9, and the special characters “-” and “/”. Use of the letters I, L, O and Q are discouraged from future use.

f. The concatenated UII shall not exceed 50 characters in length.

g. Once the UII has been concatenated, it shall not be deconstructed to determine the original elements or method of construct.

h. The specific data qualifier used to identify the serial number shall indicate whether Construct 1 or Construct 2 were used to originally build the UII.

8. Issuing Agency Codes and Enterprise Identifiers Authorized for Use in Unique Item Identification. Table 2 below contains a list of IACs and the associated EIDs approved by NATO for use.

Issuing Agency Code	Issuing Agency	Enterprise Identifier
0 - 9	GS1 Global Office	GS1 Company Prefix
LB	Telcordia Technologies, Inc	ATIS-0322000
UN	Dun & Bradstreet	DUNS
D	Allied Committee 135	NCAGE/CAGE
LH	European Health Industry Business Communications Council	EHIBCC
LD	Department of Defense	DoDAAC

**Table 2. Issuing Agency Codes**

9. Data Qualifiers used in the construction of a UUI. Table 3 presents the list of data qualifiers used to identify data used to construct a UUI. The data qualifier for Serial Number also indicates the Item Unique Identification (IUID) construct used.

Table 3. Data Qualifiers for IUID Usage

Data Element	Data Identifier (DI) ISO/IEC 15418	Application Identifier (AI) ISO/IEC 15418	Text Element Identifier (TEI) ATA CSDD
Enterprise Identifier CAGE/NCAGE DUNS GS1 Company Prefix DoDAAC Other Agencies	17V 12V 3V 7L 18V	- - - - -	MFR , SPL or CAG DUN EUC - -
Serial Number within Enterprise Identifier	-	-	SER or UCN
Serial Number within Original Part Number (or Serial Number within Lot/Batch Number)	S	-	SEQ
Original Part Number	1P	-	PNO
Lot/Batch Number	1T	-	LOT , LTN or BII
IUID using a Single Data Element Complete UII UII not including the IAC (CAGE + Serial Number within CAGE) IUID Equivalents VIN ESN GRAI GIAI	25S 18S I 22S - - -	- - - - 8002 8003 8004	UID USN or UST - - -
Commonly included data elements not used to construct the UII			
Current Part Number	30P	240	PNR
Other Traceability Number (Lot/Batch Number when not part of the UII )	30T	-	-

Table 3 Usage Notes:

- a. Data identifier 18V – the concatenation of the IAC + EID. This data identifier is used for EIDs, assigned by an issuing agency (having a registered IAC) that is not listed in Table 3.
- b. Data Identifier 25S - defined as the identification of a party to a transaction (as identified by data identifier 18V), followed by a supplier assigned serial number (For UII purposes, this has to be unique serialization within the EID that assigns the UII data elements). Thus, for UII purposes, 25S must represent the following string of concatenated elements – IAC + EID + Unique serial number within the EID,

which directly corresponds to a concatenated UII using serialization within the enterprise.

c. Data Identifier 18S - In the case where the EID is the CAGE Code, data identifier 18S may be used. 18S is defined as the concatenation of the CAGE Code (EID) + Unique serial number within the CAGE Code. This data element does not contain the IAC, which must be added in decoding to form a concatenated UII using serialization within the enterprise.

d. Application Identifier 8004 - The GIAI is up to 30 characters and is a combination of the GS1 Company Prefix and an Individual Asset Reference, which is assigned by the holder of this Prefix. A serialized Global Trade Identification Number (GTIN™) may also be converted to a GIAI using GS1 procedures.

e. Data Identifier 30P - current part number *is not* part of the UII. It is an additional data element that may be encoded in the ISO 15434 syntax and placed on the item in a separate data matrix symbol, or, in the case of severe space limitations, it may be encoded in the same data matrix along with the UII data elements (see MIL-STD-130). Use 1P when original part number *is* part of the UII.

f. Data Identifier 30T - identifies a lot/batch number that *is not* part of the UII. It is an additional data element that may be encoded in the ISO 15434 syntax and placed on the item in a separate data matrix symbol, or, in the case of severe space limitations, it may be encoded in the same data matrix along with the UII data elements (see MIL-STD-130). Use 1T when lot/batch number *is* part of the UII.

10. Creating a UII for partially identified in-service items. When creating the UII for in-service items where one or more data elements are missing, the following rules shall be applied. The new EID/Part Number/Serial Number combination shall be verified for uniqueness prior to the assignment of the UII.

- EID. Use the EID assigned to the enterprise or organization tasked with physically marking the item with the UII.
- Part Number. Ensure that the Technical Authority (TA) or In-Service Engineer verifies or provides an appropriate Part Number. If this differs from the Original Part Number, a new Serial Number shall be provided.
- Serial Number. Have the TA assign a new Serial Number according to the Enterprise procedures.

Note: If the item is unidentifiable, a UII should not be assigned.

11. UII Equivalents. NATO recognizes the following as UII equivalents:

- a. Global Individual Asset Identifier (GIAI)
- b. Global Returnable Asset Identifier (GRAI), when assets are serialized,
- c. Vehicle Identification Number (VIN), and
- d. Electronic Serial Number (ESN) – used only when applied to cell phones.

Note: UII equivalents shall be properly encoded in the ECC 200 Data Matrix as described in Annex B and shall be compatible with the NATO and national UID data bases.

12. Use of single data element (also known as “concatenated”) UIIs. When reading a data string that contains one of the ten single data element identifiers (shown on the sixth row of Table 3) the reader shall assume that the data following that particular identifier is the UII and shall not attempt to construct an UII.

## MARKING OF ITEMS

### PURPOSE

1. The purpose of this Annex is to describe the marking methodology for items assigned a UII and when appropriate their first level packaging. Annex B covers the specification for the data carrier used to contain the UII and related data elements, the syntax and semantics of the machine- readable data and the symbol quality required for the purposes of UID.

### GENERAL

#### 2. Data Matrix and Content

- a. The required data elements (see Table 1) shall be encoded in an ISO/IEC 16022 compliant ECC200 Data Matrix Symbol (see STANAG 4329).
- b. The UII is not required to be marked on the item as a separate data element. If the enterprise chooses to do so, the component data elements shall also be marked on the item as discrete data elements, in addition to the UII. The package marking requirements of STANAG 4281 apply.
- c. The Data Qualifiers in Table 4 shall only be used once in a UID Data Matrix symbol. Inclusion of optional data in the Data Matrix symbol shall use a data qualifier not listed in Table 4.

Type of Data Qualifier	Data Qualifier	Enterprise Identifier	Encoded Data String
Data Identifier	17V	NCAGE (ADBCB)	17VADBCB
Text Element Identifier	DUN	DUNS (234098744)	DUN 234098744

Table 4 - Use of Data Qualifiers for EID

3. Packages containing a UII marked item or items shall also have the item's UII encoded on the outside of the package in a machine-readable PDF 417 symbol conforming to STANAG 4281 and the syntax and semantics of STANAG 2495.

#### 4. Syntax and Semantics

- a. Data qualifiers (semantics) will define each machine-readable data element marked on the item. Data qualifiers utilized shall be selected from ISO/IEC 15418 or the ATA CSDD.
- b. For Serialization within the Part Number (Construct 2), the original part number shall remain marked on the item for the life of the item.

c. The IAC shall be derived from the data qualifier for the EID if it is not already provided. The IAC is not required to be marked on the item.

d. The encoded data string shall conform to the syntax of ISO/IEC 15434 and using the format codes 05 (application identifiers), 06 (data identifiers), or 12 (text element identifiers). Currently, some legacy markings used a format code of "DD" to indicate "TEI". With the exception of these legacy markings use of format code DD is not authorized in conjunction with this STANAG.

e. The encoded data string shall utilize the syntax of ISO/IEC 15434. Format codes 05 (AI), 06 (DI) and 12 (TEI) (including the legacy DD (TEI) as noted above) are authorized for use with UII marking. An example of this syntax is shown in the following examples:

(1) Raw data

CAGE Code	ABCDE
Original Part Number	13579FG
Serial Number	2468

(2) Raw Data with Semantics

CAGE Code	17VABCDE
Original Part	Number1P13579FG
Serial Number	S2468

f. Raw Data with Semantics and Syntax are then concatenated into a single data string and the encapsulated in a ISO/IEC 15434 envelope as shown below:

$[ ] >^R /_S 06^G /_S 17VABCDE^G /_S 1P13579FG^G /_S S2468^R /_S^E O_T$

It is this data string with envelope that is encoded into the Data Matrix. Validation of the encoded data string may be accomplished by use of a 2D verifier or an imager programmed to deliver an un-interpreted data string.

5. The following are examples of various data strings with the envelope and concatenated UII:

a. If the data string starts with  $[ ] >^R /_S 06^G /_S 17V$ , the 06 indicates use of Data Identifiers and therefore the IAC is determined by the Data Identifier, 17V in this case. Then using Table 2 the actual IAC can be determined. The full data string with envelope and sample data would read:

$[ ] >^R /_S 06^G /_S 17V0CVA5^G /_S 1P42023435^G /_S S10936^R /_S^E O_T$ ;

The concatenated UII (IAC + EID + Serial) would read:

"D0CVA54202343510936"

Encoded data string with envelope:

"[]><sup>R</sup>/<sub>S</sub>06<sup>G</sup>/<sub>S</sub>17V0CVA5<sup>G</sup>/<sub>S</sub>1P42023435<sup>G</sup>/<sub>S</sub>S10936<sup>R</sup>/<sub>S</sub><sup>E</sup>o<sub>T</sub>"

UII = D0CVA54202343510936

b. If the data string starts with []><sup>R</sup>/<sub>S</sub>06<sup>G</sup>/<sub>S</sub>12V, the 06 indicates use of Data Identifiers and therefore the IAC is determined by the Data Identifier, 12V which in this case means DUNS Number. Then using Table 2 the actual IAC can be determined to be "UN". The full data string with envelope and sample data would read:

"[]><sup>R</sup>/<sub>S</sub>06<sup>G</sup>/<sub>S</sub>12V077991289<sup>G</sup>/<sub>S</sub>1P42023435<sup>G</sup>/<sub>S</sub>S10936<sup>R</sup>/<sub>S</sub><sup>E</sup>o<sub>T</sub>";

The concatenated UII (IAC + EID + Serial) would read:

"UN0779912894202343510936"

Encoded data string with envelope:

"[]><sup>R</sup>/<sub>S</sub>06<sup>G</sup>/<sub>S</sub>12V077991289<sup>G</sup>/<sub>S</sub>1P42023435<sup>G</sup>/<sub>S</sub>S10936<sup>R</sup>/<sub>S</sub><sup>E</sup>o<sub>T</sub>"

UII = UN0779912894202343510936

c. If the data string starts with []><sup>R</sup>/<sub>S</sub>05<sup>G</sup>/<sub>S</sub>8003, then the 05 indicates use of GS1 rules and therefore the IAC=EID=GS1 company prefix. The full data string with envelope and sample data would read:

"[]><sup>R</sup>/<sub>S</sub>05<sup>G</sup>/<sub>S</sub>8003654321142023435<sup>R</sup>/<sub>S</sub><sup>E</sup>o<sub>T</sub>"

The concatenated UII would read "654321420234535"

Encode data string with envelope:

"[]><sup>R</sup>/<sub>S</sub>05<sup>G</sup>/<sub>S</sub>8003654321142023435<sup>R</sup>/<sub>S</sub><sup>E</sup>o<sub>T</sub>"

UII=654321420234535

d. If the data string starts with []><sup>R</sup>/<sub>S</sub>12<sup>G</sup>/<sub>S</sub>CAG^, the 12 indicates the use of Text Element Identifiers and therefore the IAC is a CAGE or NCAGE Code. The IAC is "D". The full data string with envelope and sample data would read:

"[]><sup>R</sup>/<sub>S</sub>12<sup>G</sup>/<sub>S</sub>CAG^0CVA5<sup>G</sup>/<sub>S</sub>SER^10936<sup>R</sup>/<sub>S</sub><sup>E</sup>o<sub>T</sub>";

The concatenated UII (IAC + EID + Serial) would read:

"D0CVA510936"

Encoded data string with envelope:

"[]><sup>R</sup>/<sub>S</sub> 12<sup>G</sup>/<sub>S</sub>CAG^0CVA5<sup>G</sup>/<sub>S</sub>SER^10936<sup>R</sup>/<sub>S</sub><sup>E</sup>o<sub>T</sub>";

UII = D0CVA510936



Notes:

1. In examples a through d above the  $R/S$ ,  $G/S$ , and  $E_{OT}$  are non-printable hexadecimal characters.

2. In example d above the symbol ^ indicates a mandatory blank space.

## 5. Symbol Quality

a. 2D Machine Readable Information (MRI) symbology, when applied, shall be at least a "3.0 (grade B)" as delineated in ISO/IEC 15416 or ISO/IEC 16022 and maintain a minimum "1.5 (grade C)" quality over the service life of the item marked. ISO/IEC 15426, ISO/IEC 15426-1 and ISO/IEC 16022 provide specific conformance requirements and conformance testing criteria.

b. The Data Matrix Symbol shall be ECC 200 from ISO/IEC 16022.

c. For direct part markings, minimum cell sizes and quality levels for dot peen, laser and electro-chemical etching markings shall be:

(1) In accordance with appropriate tables in ISO 16022.

(2) At the 'acceptable' level as described in, SAE AS9132/AECMMA EN 9132 (Annex C) for dot peening.

(3) In accordance with requirements described in the appropriate tables of SAE AS 9132/AECMMA EN 9132 for electro-chem. etching. Module/cell size should be no smaller than 0.127mm (.005 in) Module/cell sizes below 0.127mm (.005 in) may require special reading equipment but shall be no smaller than 0.076mm (.003 in.).

d. For printing, minimum cell size will be within a range of 0.19 mm (0.0075 inch) to 0.38 mm (0.015 inch). For acceptance, the symbol shall have a minimum print quality of 3.0/05/660, where the minimum grade is 3.0, measured with an aperture size of 0.127 mm (reference number 05 from ISO/IEC 15416) with a light source wave length of 660 nm + or - 10 nm. The methodology for measuring the print quality shall be as specified in ISO/IEC 16022 and ISO/IEC 15415.

e. The permanency and legibility of the UII data carrier, identification plates, tags or labels used shall be as permanent as the normal life expectancy of the item and be capable of withstanding the environmental tests and cleaning procedures specified for the item to which it is affixed. Legibility of human readable information shall be as required by STANAG 4281.

f. Information contained on identification plates shall be of a colour that is in contrast to the colour of the surface of the plate. Identification tag marking, when used, shall be permanent to the extent required for utilization of the item.

g. For the human readable information aspect of MRI, the recommended and minimum text character heights are:

	Character Height (Centimetres)	Character Height (Inches)	Character Height (Points)
Recommended	0.2 cm	0.08 in	5.76 pts
Minimum	0.125 cm	0.05 in	3.6 pts

Table 5

h. Identification tags. Metal and stiff plastic identification tags, along with their provisions for being attached, shall have all burrs and sharp edges removed.

i. Deleterious effect. Marking of items shall be accomplished in a manner that will not adversely affect the life and utility of the item.

6. The reading of the UII data carrier requires the use of an imager rather than a bar code scanner. Imagers are backward compatible to linear and 2D bar codes and are capable of reading each of the bar codes used by NATO.

7. If the UID symbol (Data Matrix) or additional MRI is unreadable and if the human readable data qualifiers and data elements are adjacent to the symbol, the data elements shall be manually inputted to derive the UII.