WR #	GSCN Name		Effective Date
21-000118	GRAI Corrections & Clarifications		May 2021

Associated Work Request (WR) Number:

N/A

Background:

As part of continuous maintenance, it has been pointed out that the use of GRAI and the explanations surrounding this key has some inconsistencies. This WR is intended to clarify the use of GRAI and its explanation throughout the *General Specifications.*

Disclaimer:

GS1®, under its IP Policy, seeks to avoid uncertainty regarding intellectual property claims by requiring the participants in the Work Group that developed this **General Specifications Change Notification** to agree to grant to GS1 members a royalty-free licence or a RAND licence to Necessary Claims, as that term is defined in the GS1 IP Policy. Furthermore, attention is drawn to the possibility that an implementation of one or more features of this Specification may be the subject of a patent or other intellectual property right that does not involve a Necessary Claim. Any such patent or other intellectual property right is not subject to the licencing obligations of GS1. Moreover, the agreement to grant licences provided under the GS1 IP Policy does not include IP rights and any claims of third parties who were not participants in the Work Group.

Accordingly, GS1 recommends that any organisation developing an implementation designed to be in conformance with this Specification should determine whether there are any patents that may encompass a specific implementation that the organisation is developing in compliance with the Specification and whether a licence under a patent or other intellectual property right is needed. Such a determination of a need for licencing should be made in view of the details of the specific system designed by the organisation in consultation with their own patent counsel.

THIS DOCUMENT IS PROVIDED "AS IS" WITH NO WARRANTIES WHATSOEVER, INCLUDING ANY WARRANTY OF MERCHANTABILITY, NONINFRINGEMENT, FITNESS FOR PARTICULAR PURPOSE, OR ANY WARRANTY OTHER WISE ARISING OUT OF THIS SPECIFICATION. GS1 disclaims all liability for any damages arising from use or misuse of this Standard, whether special, indirect, consequential, or compensatory damages, and including liability for infringement of any intellectual property rights, relating to use of information in or reliance upon this document.

GS1 retains the right to make changes to this document at any time, without notice. GS1 makes no warranty for the use of this document and assumes no responsibility for any errors which may appear in the document, nor does it make a commitment to update the information contained herein.GS1 and the GS1 logo are registered trademarks of GS1 AISBL.

GS1 General Specifications Change:

3.9 GS1 Application Identifiers starting with digit 8

3.9.1 Roll products - width, length, core diameter, direction, splices: AI (8001)

The GS1 Application Identifier (8001) indicates that the GS1 Application Identifier data fields contain the variable attributes of a roll product. Depending on the method of production, some roll products cannot be numbered according to standard criteria that have been determined in advance. They are, therefore, classified as variable items. For those products where the standard trade measures are not sufficient, the following guidelines should be used.

The identification of a roll product consists of the Global Trade Item Number (GTIN) and the variable attributes. The basic product (e.g., a certain type of paper) is included as data in the GTIN-14 ID number (see section _2.1.11_), and the variables contain information about the special features of the particular item that has been produced. The variable values of a roll product, N1 to N14, consist of the following data:

- N1 to N4: slit width in millimetres (width of the roll)

- N5 to N9: actual length in metres

- N10 to N12: internal core diameter in millimetres

- N13: winding direction (face out 0, face in 1, undefined 9)

- N14: number of splices (0 to 8 = actual number, 9 = number unknown)

Figure 3.9.1-1. Format of the element string

GS1 Application Identifier	Variable values of a roll product				
8 0 0 1	N_1 N_2 N_3 N_4	N_5 N_6 N_7 N_8 N_9	N_{10} N_{11} N_{12}	N_{13}	N_{14}

The data transmitted from the barcode reader means that the element string denoting the variable attributes of the identification of a roll product trade item have been captured. This element string must be processed together with the GTIN of the trade item to which it relates (see section _4.14 Data relationships_). When indicating this element string in the non-HRI text section of a barcode label, the following data title SHOULD be used: **DIMENSIONS**

3.9.2 Cellular mobile telephone identifier: AI (8002)

The GS1 Application Identifier (8002) indicates that the GS1 Application Identifier data field contains the serial number of a cellular mobile telephone.

The serial number field is alphanumeric and may contain all characters contained in figure _7.11-1_. A national or pluri-national authority usually assigns the number. It uniquely identifies each mobile telephone within a given authority for special control purposes. It is not considered as an attribute of the identification of the telephone as a trade item.

Figure 3.9.2-1. Format of the element string

GS1 Application Identifier	Serial number
8 0 0 2	X_1 ——— variable length ———> X_{20}

The data transmitted from the barcode reader means that the element string denoting an electronic serial identifier of a cellular mobile telephone has been captured. This element string is normally processed as stand-alone information.

When indicating this element string in the non-HRI text section of a barcode label, the following data title SHOULD be used: **CMT NO.**

3.9.3 Global Returnable Asset Identifier (GRAI): AI (8003)

The GS1 Application Identifier (8003) indicates that the GS1 Application Identifier data field contains the GRAI (Global Returnable Asset Identifier). The GRAI is used to identify returnable assets.

The GS1 Company Prefix (see section *1.4.4*) is allocated by GS1 Member Organisations to the company that allocates the GRAI – the asset owner or manager of the returnable asset. It makes the number unique worldwide.

~~A zero in the leftmost position is added to generate an even number of 14 digits which enables efficient encoding.~~

When using AI (8003), a leading zero SHALL be required before the GRAI. This zero was originally added to support efficient use in GS1-128. The zero is mandatory for all GS1 barcodes that can encode AI (8003).

The structure and content of the asset type is at the discretion of the asset owner or manager.

The check digit is explained in section *7.9*. Its verification, which must be carried out in the application software, ensures that the number is correctly composed.

The optional serial component is assigned by the asset owner or manager. It identifies an individual asset within a given asset type. The field is alphanumeric and may contain all characters listed in figure *7.11-1*.

Figure 3.9.3-1. Format of the element string

GS1 Application Identifier	Lead zero	Global Returnable Asset Identifier (GRAI)			
		GS1 Company Prefix	Asset type	Check digit	Serial component (optional)
8 0 0 3	0	0 N_1 N_2 N_3 N_4 N_5 N_6 N_7 N_8 N_9 N_{10} N_{11} N_{12}		N_{13}	X_1 variable X_{16}

The data transmitted from the barcode reader means that the element string denoting the GRAI has been captured. When indicating this element string in the non-HRI text section of a barcode label, the following data title SHOULD be used: **GRAI**

3.9.4 Global Individual Asset Identifier (GIAI): AI (8004)

The GS1 Application Identifier (8004) indicates that the GS1 Application Identifier data field contains a GIAI (Global Individual Asset Identifier). The GIAI is used for the unique identification of individual assets.

Note: Note: This element string must never be used to identify the entity as a trade item or logistic unit. If an asset is transferred between parties, the GIAI cannot be used for ordering the asset. However, asset identification may be exchanged between parties for the purpose of traceability.

The GS1 Company Prefix (see section *1.4.4*) is allocated by GS1 Member Organisations to the company that allocates the GIAI – here the asset owner or manager. It makes the number unique worldwide.

The structure and content of the individual asset reference is at the discretion of the asset owner or manager. It may contain all characters listed in figure *7.11-1*.

Figure 3.9.4-1. Format of the element string

GS1 Application Identifier	Global Individual Asset Identifier (GIAI)		
	GS1 Company Prefix	Individual asset reference	
8 0 0 4	N_1 ... N_i	X_{i+1} ... variable length	$X_{j\ (j<=30)}$

The data transmitted from the barcode reader means that the element string denoting a GIAI has been captured. When indicating this element string in the non-HRI text section of a barcode label, the following data title SHOULD be used: **GIAI**

3.11 Compatibility of EPC Tag Data Standard and GS1 General Specifications

The GS1 Application Identifiers, defined in this section of the *GS1 General Specifications*, may be used in GS1 barcodes in line with the application standards outlined in section 2. GS1 Application Identifiers may also be used in EPC/RFID tags as defined in the latest version of the *EPC Tag Data Standard*.

> **Note**: Some EPC Binary Coding Schemes are unable to encode the full serial number values defined in section 3. See Table 12-2 of the *EPC Tag Data Standard* for limitations imposed on serial numbers within the EPC Binary Coding Schemes.

4.5 Rules for GS1 asset identifiers

4.5.1 General rule

4.5.1.1 GS1 asset identifiers

GS1 asset identifiers can be used to identify any fixed assets of a company. It is left to the discretion of the issuer to determine whether the Global Returnable Asset Identifier (GRAI), AI (8003), or Global Individual Asset Identifier (GIAI), AI (8004), is more suitable for the application concerned.

4.5.1.2 Lead time in reusing GS1 asset identifiers

Asset identifiers must not be used for any other purpose and must remain unique for a period well beyond the lifetime of the relevant records. If a company assigns asset identifiers to trade items supplied to its customers, the company must ensure that the asset identifiers are never reused.

All issuers of asset identifiers must ensure that asset identifiers (GRAIs, GIAIs) allocated for medical devices/equipment used for treatment of a patient SHALL never be reused.

Also, GIAIs that are marked directly on safety critical components and parts, such as used in rail, SHALL never be reused.

4.5.1.3 Responsibility

The asset owner or manager is responsible for the issuance and allocation of GS1 asset identifiers.

✅ **Note:** The term 'asset manager' includes manufacturers that issue and allocate asset identifiers to be used during the full lifetime of the asset. Furthermore, best practices may dictate that the trade item manufacturer applies the asset identifiers issued by the asset owner or manager during the manufacturing process (see section *2.3*).

4.5.2 Allocating Global Returnable Asset Identifiers (GRAIs): AI (8003)

The structure of the element string for a Global Returnable Asset Identifier (GRAI) can include two parts: the mandatory identification of an asset type and an optional serial component, to distinguish individual assets within the same asset type (see section *2.3.1*)

Figure 4.5.1.3-1. Format of the element string

GS1 Application Identifier	Lead zero	Global Returnable Asset Identifier (GRAI)				
		GS1 Company Prefix →	← Asset type	Check digit	Serial component (optional)	
8 0 0 3	0	0 N_1 N_2 N_3 N_4 N_5 N_6 N_7 N_8 N_9 N_{10} N_{11} N_{12}		N_{13}	X_1 variable	X_{16}

Formatted: GS1_Body, Space After: 0 pt

The exact method used to allocate the GRAI is left to the discretion of the issuing organisation. However, a unique number, the asset type, must be assigned for each type of asset being identified, and for ease of administration, the GS1 system recommends that numbers be allocated sequentially and not contain classifying elements.

When it is not possible to assign an asset type (e.g., for museum exhibits), or when the type of asset is not required by the application (e.g., when the item is only used for a single type of asset), then the Global Individual Asset Identifier (GIAI), AI (8004), SHOULD be used.

When using AI (8003), a leading zero SHALL be required before the GRAI. To encode the following examples of identification keys in a GS1-128 barcode a zero in the leftmost position must be added to generate the defined length for the 14-digit asset identification number field.

4.5.2.1 Identical assets identification

A single Global Returnable Asset Identifier (GRAI) SHOULD be assigned to a series of identical assets.

Figure 4.5.2.1-1. Examples of GRAI excluding serial number

Asset type	GRAI*
50 litre aluminium beer keg	1234567890005
10 litre aluminium beer keg	1234567890012
10 litre wooden beer keg	1234567890029

*The leading zero required before the GRAI when used with AI (8003) is not required when displayed as non-HRI text.

4.5.2.2 Serial component (optional)

The asset owner or manager assigns the optional serial component. It denotes an individual asset within a given asset type. The field is alphanumeric and is used to distinguish individual assets with the same asset types.

Figure 4.5.2.2-1. Examples of GRAI including serial component

Asset Type	GRAI (incl. the serial component)*
50 litre aluminium beer keg	12345678900051234AX01
50 litre aluminium beer keg	12345678900051234AX02
50 litre aluminium beer keg	12345678900051234AX03

*The leading zero required before the GRAI when used with AI (8003) is not required when displayed as non-HRI text.

4.5.3 Allocating Global Individual Asset Identifiers (GIAIs): AI (8004)

The Global Individual Asset Identifier (GIAI) is structured according to the figure below.

Figure 4.5.3-1. Format of the element string

GS1 Application Identifier	Global Individual Asset Identifier (GIAI)		
	GS1 Company Prefix	Individual asset reference	
8 0 0 4	N_1 ... $\qquad\qquad N_i$	X_{i+1} ... $\qquad$ variable length	$X_{j\,(j<=30)}$

The exact method used to allocate the GIAI is left to the discretion of the issuing organisation. However, each GIAI must be unique for each individual asset being identified and, for ease of administration, the GS1 system recommends that GIAIs be allocated sequentially and not contain classifying elements.

4.5.4 Change of asset ownership

Asset identification numbers are used in a diverse range of business applications ranging from tracking the movements of reusable packaging trays to recording the life-cycle history of aircraft parts. If a company sells an asset to another company then the asset identifier SHOULD ideally be replaced by another Global Individual Asset Identifier (GIAI) or Global Returnable Asset Identifier (GRAI) or be removed. It is permissible for the asset identifier to remain on the item when the ownership changes if the new owner takes responsibility for the GS1 Company Prefix associated with the asset identifier, or when the asset identifier was assigned by the manufacturer. For further information regarding changes of ownership, please refer to section *1.6*.