

GS1 General Specifications Standard

The foundational GS1 standard that defines how identification keys, data attributes and barcodes must be used in business applications.

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**GS1 General Specifications Standard

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| **3** | GSCN for 21-283  GSCN for 22-246  GSCN for 23-272  GSCN for 24-157 | Application standard Master UDI-DI for registration of certain type of devices within EUDAMED  Electronic health record patient demographics in GS1 barcodes Freight unit type AI  NHRN for AIDA (Italian Medicines Agency) |
| **4** | GSCN for 21-283  GSCN for 22-246  GSCN for 23-272  GSCN for 24-157 | Application standard Master UDI-DI for registration of certain type of devices within EUDAMED  Electronic health record patient demographics in GS1 barcodes Freight unit type AI  NHRN for AIDA (Italian Medicines Agency) |
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| **9** | GSCN for 21-283  GSCN for 22-246  GSCN for 24-004 | Application standard Master UDI-DI for registration of certain type of devices within EUDAMED  Electronic health record patient demographics in GS1 barcodes Medical device family definition |

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**Who should read the General Specifications?**

Technical experts working with the GS1 system should read these specifications. They provide a global reference document covering all technical aspects of the GS1 system. Their primary objective is to define the international standard upon which individual GS1 Member Organisations can develop user documentation.

**Navigator**

These specifications have been developed as a reference document aimed primarily at GS1 Member Organisations (who also produce local language user manuals) and system engineers developing software based upon GS1 system standards. All aspects of the GS1 system are summarised in section 1, which is recommended for those wishing to become familiar with the GS1 system logic and terminology.

Each application section mandates the use of system features defined elsewhere in this document, such as check digits, element strings, data carriers and barcode symbol placement. The sections of these *GS1 General Specifications* are:

■ **Section 1 Basics and principles of the GS1 system:** Provides an introduction to the core components of the GS1 system.

■ **Section 2 Application standards**: Provides a definition for each GS1 application using a template format. Each application is uniquely identified and contains a description, the associated GS1 key, its definition and links to relevant data structures and attributes (section 3), rules (section 4), carrier specifications (section 5), placement (section 6) and unique processing requirements (section 7).

■ **Section 3 GS1 Application Identifier definitions:** Describes the meaning, structure and function of the GS1 element strings so they can be correctly processed in users’ application programs.

■ **Section 4 Application rules:** Provides the rules for use of GS1 keys in their application environments. Differences in industries are included as well as the data relationship rules for GS1 Application Identifier use.

■ **Section 5 Data carriers:** Provides a detailed description of the data carriers that are endorsed by GS1. It includes symbol specification tables for use in the supply chain operational environment as well as the related barcode production and quality assessment required to achieve excellent scan rates.

■ **Section 6 Barcode placement:** Provides guidance on symbol placement as well as transport label standards and tag standards.

■ **Section 7 AIDC validation rules:** Provides rules for validating and processing GS1 element strings without human intervention. Check digit and calendar date algorithms are also included.

■ **Section 8 Application Standard Profiles** Provides a summary of current application and future state conformance requirements, organised in modular way to make it easier to find the relevant sections.

■ **Section 9 GS1 Standards glossary of terms** A standard vocabulary used throughout the GS1 system.

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GS1 General Specifications Standard

**1 Basics and principles of the GS1 system**

**1.1 The GS1 General Specifications**

**1.1.1 Introduction**

The GS1 system originated in the United States and was established in 1973 by the Uniform Product Code Council, subsequently known as the Uniform Code Council, Inc. (UCC). Following the success of this U.P.C. system, the European Article Numbering Association, subsequently known as EAN International, was established in 1977 to develop a compatible system for use outside North America. In February 2005, GS1 was officially launched as the successor to the organisations previously known as EAN and UCC, and the system became known under its current name: The GS1 system.

The GS1 system of standards aims to raise the efficiency of business processes and to provide cost savings through automation based on globally unique identification and digital information.

The GS1 system provides for the use of unambiguous identification keys to identify goods, services, assets, locations, etc. worldwide. These keys can be represented in data carriers, such as barcodes or EPC/RFID tags, to enable automatic data capture. They may also be used in electronic communications, improving speed and accuracy when sharing master data, transactional data and visibility event data.

The GS1 system is designed to overcome the limitations of using company-, organisation-, or sector-specific interfaces. It enables large scale deployment, flexibility in the selection of the most suitable system components and innovation − ultimately making trade much more efficient and responsive to customers.

The GS1 system is designed for use in any industry or trade sector, and changes to the system are introduced in a way that does not disrupt existing users.

This document defines the rules for the use of the GS1 system within Automatic Identification and Data Capture (AIDC) applications and technologies. It supersedes all previous AIDC technical documents provided and/or published by GS1 or its predecessor organisations. Every organisation using the GS1 standards is expected to conform fully to the *GS1 General Specifications*.

**1.1.2 Who should read these specifications**

The *GS1 General Specifications* are the foundational GS1 standard that defines how identification keys, data attributes and barcodes must be used in business applications.

The primary audience are technically oriented staff members of companies, solution providers and GS1 Member Organisations.

The standard is maintained in English and may be translated into other languages by local GS1 Member Organisations.

**1.1.3 Foundational standard**

These *GS1 General Specifications* are used as a foundation for other GS1 standards and services such as:

■ GS1 Registry Platform

■ GDSN

■ GS1 EDI (Electronic Data Interchange), including the GS1 EANCOM® and GS1 XML standards ■ GS1 EPCIS

The definitions in the *GS1 General Specifications* are the basis for the GS1 glossary.

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**1.1.4 Maintenance responsibility and management**

The GS1 Global Standards Management Process (GSMP) is the mechanism to approve the adoption of additions and changes to the *GS1 General Specifications*. The process is fully defined in the Global Standards Management Process Manual.

**1.1.5 Verbal forms used in normative statements**

In GS1 standards, normative statements are written using the verbal forms defined per the GS1 Style Guide. These include SHALL, SHALL NOT, SHOULD and SHOULD NOT. When these words are written in a normative statement, using the special meanings defined, they are written in all capitals to distinguish them from ordinary English use of the same words.

For a precise definition of these verbal forms, see the GS1 Style Guide. Briefly, their meanings are summarised as follows:

■ SHALL means that all conforming implementations must do what the statement says, otherwise the implementation is not conforming. No deviation is permitted.

■ SHOULD means that among several possibilities one is recommended as particularly suitable for a conforming implementation, without mentioning or excluding others. In other words, a conforming implementation is expected to do what the statement says, but might not if there is a good reason not to. It is similar to a MAY statement, but carries a stronger expectation that an implementation will usually do what the statement says.

**1.2 GS1 system principles**

The GS1 system embodies an open architecture approach. It has been carefully designed for modular expansion with minimal disruption to existing applications. Enterprise Resource Planning (ERP) and other supply chain application software drive implementation of the system. New user driven applications can be expected, and this document will be updated accordingly.

The maintenance of these specifications will be the responsibility of GS1 and will be in line with the GS1 Architecture Principles.

**1.3 Identification system policies**

The GS1 identification system provides the world a globally unique and unambiguous identification system for physical entities, parties and relationships exchanged in the supply chain. The policies that follow apply to all sectors making use of the GS1 Company Prefix in association with GS1 keys and the Application Identification System. These policies provide for the long-term integrity of the GS1 identification system so vital to the global supply chain.

**1.3.1 Mandatory identifiers**

All GS1 standards shall incorporate GS1 identification standards as mandatory identifiers exclusive of all other mandatory identifiers.

**1.3.2 Non-GS1 identifiers**

Non-GS1 identifiers may only be used with GS1 standards as additional identifiers (not alternates). Implementations using non-GS1 identifiers as primary identifiers are not compliant with GS1 standards.

**1.3.3 GS1 Company Prefix**

The GS1 Company Prefix is used exclusively within GS1 identification standards that may be expressed in GS1 approved barcode applications, in GS1 EDI messages, for global data synchronisation, network registration and in EPC tags within the header values reserved for the GS1 system. See section 1.4 for further details on the GS1 Company Prefix allocation.

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**1.3.4 Carrier independence**

GS1 identification keys are defined and utilised per GS1 definitions independent of data carrier (e.g., barcode, radio frequency identification (RFID), business message).

**1.3.5 GS1 business messages**

GS1 business messages or GS1 standards-based applications use GS1 identification keys for identification exclusive of GS1 data carrier features. Examples of data carrier features include the use of:

■ Modulo 103 GS1-128 symbol check character to secure data capture.

■ Function 1 Symbol Character (FNC1) in the second position of GS1-128 barcode or an Electronic Product Code (EPC) header value to discriminate between GS1 data content and data carrier overhead.

■ Separator characters or EPC parsing values to parse a decoded data string into significant data parts.

**Exception:** If an EPC user is using GS1 system and non-GS1 system headers to support an application, this policy does not apply, and advice should be sought on the use of EPC headers

to provide uniqueness among multiple numbering systems.

**1.4 The GS1 identification system**

**1.4.1 Global, open versus restricted**

**1.4.1.1 Global, open numbers (unrestricted distribution)**

Global, open is an identification number used in unrestricted distribution which signifies that such system data may be applied on goods to be processed anywhere in the world without restraint as to such things as country, company and industry.

**1.4.1.2 Restricted Circulation Numbers (RCNs)**

Restricted Circulation Numbers (RCNs) are GS1 identification numbers used for special applications in restricted environments, defined by the local GS1 Member Organisation (e.g., restricted within a country, company, or industry). They are allocated by GS1 for either internal use by companies or

to GS1 Member Organisations for assignment based on business needs in their country (e.g., variable measure trade item identification, coupons):

■ RCN-12 is a 12-digit Restricted Circulation Number.

■ RCN-13 is a 13-digit Restricted Circulation Number.

■ RCN-8 is an 8-digit Restricted Circulation Number.

Restricted circulation numbers (RCNs) SHALL only be encoded in EAN-8, EAN-13, UPC-A, or UPC-E barcodes. RCNs SHALL NOT be encoded using any Application Identifiers.

**1.4.2 GS1 Prefix**

The GS1 Prefix is a unique string of two or more digits, issued by the GS1 Global Office, and allocated to GS1 Member Organisations to issue GS1 Company Prefixes or allocated to other specific areas listed in figure 1.4.2-1. The main purpose of the GS1 Prefix is to allow decentralisation of the administration of identification numbers. GS1 Prefix ranges are shown in figure 1.4.2-1.

**Note**: As the GS1 Prefix varies in length, the issuance of a GS1 Prefix excludes all longer strings that start with the same digits from being issued as GS1 Prefixes.

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**Figure 1.4.2-1.** Synopsis of GS1 Prefix ranges

| GS1 Prefix range | Significance |
| --- | --- |
| 0000000 | Used to issue Restricted Circulation Numbers within a company |
| 0000001 –  0000099 | Unused to avoid collision with GTIN-8 |
| 00001 – 00009  0001 – 0009  001 – 019 | Used to issue GS1 Company Prefixes from which U.P.C. Company Prefixes can be derived |
| 02 | Used to issue Restricted Circulation Numbers within a geographic region |
| 03 | Used to issue GS1 Company Prefixes from which U.P.C. Company Prefixes can be derived |
| 04 | Used to issue Restricted Circulation Numbers within a company |
| 05 | GS1 US reserved for future use |
| 06 – 09 | Used to issue GS1 Company Prefixes from which U.P.C. Company Prefixes can be derived |
| 10 – 19 | Used to issue GS1 Company Prefixes |
| 20 – 29 | Used to issue Restricted Circulation Numbers within a geographic region |
| 300 – 950 | Used to issue GS1 Company Prefixes |
| 951 | Used to issue General Manager Numbers for the EPC General Identifier (GID) scheme as defined by the *EPC Tag Data Standard* |
| 952 | Used for demonstrations and examples of the GS1 system |
| 953 – 976 | Used to issue GS1 Company Prefixes |
| 977 | Allocated to ISSN International Centre for serial publications |
| 978 – 979 | Allocated to International ISBN Agency for books, a portion of 979 sub-allocated to International ISMN Agency for music |
| 980 | Used to issue GS1 identification of refund receipts |
| 981 – 983 | Used to issue GS1 coupon identification for common currency areas |
| 984 – 989 | Reserved for future GS1 coupon identification |
| 99 | Used to issue GS1 coupon identification |

**1.4.3 GS1-8 Prefix**

The GS1-8 Prefix is a unique string of two or more digits issued by GS1 Global Office and allocated to GS1 Member Organisations to issue GTIN-8s or allocated to other specific areas. GS1-8 Prefixes are shown in figure 1.4.3-1.

**Figure 1.4.3-1.** Synopsis of GS1-8 Prefixes

| GS1-8 Prefixes | Significance |
| --- | --- |
| 000 – 099 | Used to issue Restricted Circulation Numbers within a company |
| 100 – 199 | Used to issue GTIN-8s |
| 200 – 299 | Used to issue Restricted Circulation Numbers within a company |
| 300 – 951 | Used to issue GTIN-8s |
| 952 | Used for demonstrations and examples of the GS1 system |
| 953 – 976 | Used to issue GTIN-8s |
| 977 – 999 | Reserved for future use |

**1.4.4 GS1 Company Prefix**

A GS1 Company Prefix is a unique string of four to twelve digits used to issue GS1 identification keys. The first digits are a valid GS1 Prefix and the length of the GS1 Company Prefix SHALL be at least one longer than the length of the GS1 Prefix. The GS1 Company Prefix is issued by a GS1 Member Organisation or by GS1 Global Office, is based on a GS1 Prefix allocated to the issuer, and is allocated either to a GS1 user company or to the issuer itself (e.g., for issuing individual identification keys).

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A GS1 Company Prefix starting with a zero (‘0’) is used to generate GTIN-12s (as well as the other GS1 identification keys). A GS1 Company Prefix starting with a digit other than zero (‘0’) is used to generate GTIN-13s (as well as the other GS1 identification keys).

**Note**: As the GS1 Company Prefix varies in length, the issuance of a GS1 Company Prefix excludes all longer strings that start with the same digits from being issued as GS1 Company

Prefixes.

**1.4.5 U.P.C. Prefix**

A U.P.C. Prefix is derived from a GS1 Prefix that starts with zero (‘0’) by removing that leading zero. A U.P.C. Prefix is:

■ used to issue U.P.C. Company Prefixes;

■ reserved for Restricted Circulation Numbers; or

■ reserved for special functions.

U.P.C. Prefix ranges are shown in figure 1.4.5-1.

**Figure 1.4.5-1.** Synopsis of U.P.C. Prefix ranges

| GS1 Prefix range | U.P.C. Prefix range | Significance |
| --- | --- | --- |
| 0000000 | 000000 | Used to issue Restricted Circulation Numbers within a company |
| 0000001 –  0000099 | N/A | Unused to avoid collision with GTIN-8 |
| 00001 – 01999 | 0001 – 1999 | Used to issue U.P.C. Company Prefixes |
| 02 | 2 | Used to issue Restricted Circulation Numbers within a geographic region |
| 03 | 3 | Used to issue U.P.C. Company Prefixes, reserved for alignment with FDA Labeler Code |
| 04 | 4 | Used to issue Restricted Circulation Numbers within a company |
| 05 | 5 | Reserved for future use |
| 06 – 09 | 6 – 9 | Used to issue U.P.C. Company Prefixes |

**1.4.6 U.P.C. Company Prefix**

A U.P.C. Company Prefix is derived from a GS1 Company Prefix that starts with zero (‘0’) by removing that leading zero. A U.P.C. Company Prefix SHALL only be used to construct 12-digit trade item identifiers; see section 2 for details.

When a leading zero is added to a U.P.C. Company Prefix, it becomes a GS1 Company Prefix that may be used to issue all other GS1 identification keys.

**Note**: For example, the 6-digit U.P.C. Company Prefix 614141 is derived from the 7-digit GS1 Company Prefix 0614141.

**1.4.7 GS1 identification key**

A GS1 identification key is a unique identifier for a class of objects (e.g., trade items) or an instance of an object (e.g., logistic unit).

The type of the GS1 identification key is declared implicitly or explicitly by the data carrier or electronic message in which the key is used.

**Note**: For example:

■ in a barcode, the type is declared by the preceding GS1 Application Identifier (AI); □ in the case of EAN/UPC and ITF-14 symbologies, the AI (01) is implied;

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■ in electronic communication (EDI messages, EPCIS, semantic tags, etc.), the type is declared by the underlying schema or specification.

The type defines the syntax (character set and structure) of the value. At minimum, the GS1 identification key value contains one of the following:

■ a GS1 Prefix;

■ a GS1-8 Prefix (only for GTIN-8);

■ a GS1 Company Prefix;

■ a U.P.C. Prefix; or

■ a U.P.C. Company Prefix (only for GTIN-12).

**1.4.8 Character set**

The GS1 identification system supports three character sets; the specific character set depends on the identification key type. The three character sets are:

1. digit characters (‘0’ to ‘9’);

2. characters from the ISO/IEC 646 Table 1 – Unique graphic character allocations1, referred to within this standard as GS1 AI encodable character set 82 (see figure 7.11-1); and

3. digit characters (‘0’ to ‘9’), upper case alphabetic characters (‘A’ to ‘Z’), and three special characters (‘#’, ‘-’ and ‘/’), referred to within this standard as GS1 AI encodable character set 39 (see figure 7.11-2*).*

Regardless of the identification key type, the GS1 Prefix and (if applicable) the GS1 Company Prefix within any identifier use only the digit characters. Some identification key types that have a serial component also support different character sets for the serial component than for the portion that precedes it.

**Figure 1.4.8-1.** Synopsis of GS1 identification keys

| GS1 identification key type | Character set |
| --- | --- |
| Global Trade Item Number (GTIN) | Digit characters |
| Global Location Number (GLN) | Digit characters |
| Serial Shipping Container Code (SSCC) | Digit characters |
| Global Returnable Asset Identifier (GRAI) | Digit characters (before serial component)  GS1 AI encodable character set 82 (serial component) |
| Global Individual Asset Identifier (GIAI) | GS1 AI encodable character set 82 |
| Global Service Relation Number (GSRN) | Digit characters |
| Global Document Type Identifier (GDTI) | Digit characters (before serial component)  GS1 AI encodable character set 82 (serial component) |
| Global Identification Number for Consignment (GINC) | GS1 AI encodable character set 82 |
| Global Shipment Identification Number (GSIN) | Digit characters |
| Global Coupon Number (GCN) | Digit characters |
| Component/Part Identifier (CPID) | GS1 AI encodable character set 39 |
| Global Model Number (GMN) | GS1 AI encodable character set 82 |

As every identifier in the GS1 identification system is a string, even when it is composed only of digit characters, all characters including leading zeroes are significant.

**1.5 GS1 identification licensing**

A GS1 identification licence, GS1 Company Prefix, or individual GS1 identification key SHALL NOT be sold, leased, or given, in whole or in part, for use by any other company. This applies to:

1 While the ISO/IEC 646:1991 specification is not publicly available, the 6th edition of ECMA-6 corresponds to it and is available at https://www.ecma-international.org/publications-and-standards/standards/ecma-6/

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**■** GS1 Company Prefix licences, including any GS1 identification keys issued from the GS1 Company Prefix

**■** Individual GS1 identification key licences

See section 1.6 for additional guidelines that apply when a company changes legal status as a result of an acquisition, merger, partial purchase, split, or spin-off.

A GS1 Company Prefix licensed from a GS1 Member Organisation entitles the GS1 identification licensee to allocate any of the GS1 identification keys:

■ Global Trade Item Number (GTIN)

■ Global Location Number (GLN)

■ Serial Shipping Container Code (SSCC)

■ Global Returnable Asset Identifier (GRAI)

■ Global Individual Asset Identifier (GIAI)

■ Global Service Relation Number (GSRN)

■ Global Document Type Identifier (GDTI)

■ Global Shipment Identification Number (GSIN)

■ Global Identification Number for Consignment (GINC)

■ Global Coupon Number (GCN)

■ Component/Part Identifier (CPID)

■ Global Model Number (GMN)

An individual GS1 identification key licence SHALL only be used as defined by the licensing GS1 Member Organisation.

**Note**: If a company holds licences for multiple GS1 Company Prefixes, it may have GS1 identification keys of any type issued from all of them.

**1.6 Licence management**

GS1 Member Organisations licence GS1 Company Prefixes and in some cases also licence individual GS1 identification keys (e.g., GTINs and GLNs) to companies.

Regardless of whether a GS1 Company Prefix or individual GS1 identification key has been issued by the GS1 Member Organisation, the standards on the use and reuse of GS1 identification keys apply at all times. See section 4 for the reuse rules that apply to GS1 identification keys.

Additional guidelines in the following sections apply when an organisation changes legal status due to an acquisition, merger, partial purchase, split, or spin-off.

GS1 Member Organisations may adapt the following guidelines if local laws require modifications.

GS1 identification licensees SHOULD notify their GS1 Member Organisation of any legal status change within one year of that change.

**Important**: When the company responsible for a GS1 Company Prefix or individual GS1 identification key changes, all parties involved in the transaction SHOULD maintain records of

all GS1 identification keys used to identify objects and ensure all GS1 allocation and non reuse rules are followed.

**1.6.1 Acquisitions and mergers**

During an acquisition or merger, a company may assume responsibility for the acquired company’s GS1 Company Prefix and/or individual GS1 identification key licences. In the situations where the licences transfer, the acquiring company can:

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**■** Use the acquired company’s GS1 Company Prefix(es) and GS1 identification key(s) **■** Issue GS1 identification keys using the newly acquired GS1 Company Prefix(es)

For example, products that the acquired company identified using its GS1 Company Prefix or individual GS1 identification key licences can still be produced using the same GTINs after the merger. Additionally, parties, locations, assets, and other objects identified with GS1 identification keys can continue to use those keys after the merger.

If a partial purchase occurs, where only a segment of a larger entity is acquired, the involved companies must determine whether GS1 identification licences are transferred based on their specific business requirements.

**1.6.2 Split or spin-off**

When a company splits into two or more separate companies, it is necessary for each GS1 Company Prefix or individual GS1 identification key licence of the original company to be transferred to only one of the new companies. If a company is left without a GS1 identification licence and has a requirement to identify products, locations, assets, etc., it will need to follow GS1 Member Organisation processes to apply for new GS1 Company Prefixes or individual GS1 identification key licences.

The decision on whether the new companies will take the original licences SHOULD minimise the impact on existing GS1 identification keys. The decision SHOULD be part of the legal arrangements of the new companies.

**1.6.3 GS1 identification keys transferred to an acquiring, partial purchase, or spin-off company**

If a company is being acquired by, merged or split from another company and has stock on hand, the stock’s existing Global Trade Item Numbers (GTINs) SHOULD be kept. Products that are produced after the acquisition or merger may keep the GTIN allocated before the acquisition if the acquiring company maintains the licence with the GS1 Member Organisation to use the applicable GS1 Company Prefix or GS1 identification key.

**Important**: See section 4 for the reuse rules that apply to GS1 identification keys.

**1.6.3.1 GS1 identification keys not transferred to acquiring, partial purchase or spin-off company**

If a company acquires a portion of another company or splits, but the GS1 Company Prefixes are not transferred, then the receiving company SHOULD change the GS1 identification keys associated with the acquired objects within one year.

It is not necessary for existing stocks of trade items or assets to be re-identified, unless legally required or agreed upon by the companies. However, when any of the acquired, partial purchase, split, or spin-off companies have items that are identified using GS1 identification keys allocated from a GS1 Company Prefix that it no longer holds, the company SHOULD re-identify those items using its own GS1 Company Prefix or GS1 identification key licences when new labelling or packaging is produced. Stakeholders SHOULD be notified well in advance of the changes.

At the earliest opportunity, the acquiring company SHOULD transition to new GS1 identification keys for all identified objects.

**Note**: The rules concerning the use of the seller’s GS1 identification keys SHOULD be taken into consideration when drawing up the purchase contract.

**Important:** See section 4 for the reuse rules that apply to GS1 identification keys.

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**1.7 Sunrise and sunset dates**

Expansion of both the breadth and reach of the GS1 system requires the introduction of new data carrier technologies and messaging techniques. While these are potentially disruptive, their use in GS1 global, open standards requires an agreed date at which they are globally accepted for use. This date is referred to as a sunrise date. Its use is accompanied by associated rules that may be unique to the circumstances. A sunrise date is agreed by users/members and approved by the GS1 Management Board.

Conversely, as a data carrier or messaging standard is no longer cost effective as determined by users and approved by the GS1 Management Board, it may be declared obsolete and removed from the *GS1 General Specifications*. This is termed the sunset date. It is accompanied by associated rules that may be unique to the circumstances.

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**2 Application standards**

**2.1 Trade items**

**2.1.1 Introduction**

A trade item is any item (product or service) upon which there is a need to retrieve predefined information and that may be priced, or ordered, or invoiced at any point in any supply chain. This definition covers services and products, from raw materials through to end user products, all of which may have predefined characteristics.

The identification and marking of trade items enable the automation of the point-of-sale (through Price Look Up (PLU) files), of goods receiving, inventory management, automatic re-ordering, sales analysis and a wide range of other business applications.

If the item is of variable measure, the respective measure or price information will often be of critical importance to business applications. Attributes relating to trade items (e.g., dates, lot number) are also available as standardised element strings.

Each trade item that is different from another in design and/or content is allocated a unique identification number, which remains the same as long as it is traded. The same identification number is given to all trade items sharing key characteristics. Such numbers must be treated in their entirety throughout the supply chain.

The serialised identification of trade items, which enables total connectivity of information and communication systems, is achieved through the use of GS1 Application Identifier AI (01) GTIN and AI (21) serial number.

Different standard solutions apply depending on the nature of the item and the scope of the user’s applications. The following sections determine the identification and symbol marking rules applicable to a particular trade item.

**2.1.1.1 Physical or non-physical trade items**

Non-physical trade items are usually called services. Services may be identified with a unique GS1 identification key for use in open trade applications or in restricted distribution environments.

**2.1.1.2 Open or restricted distribution**

The main benefit of the GS1 system for trade items is that it provides a unique and unambiguous identification number for every trade item, which is applicable worldwide in open environments. In addition, the system provides for other number series that may be exclusively used for restricted distribution (e.g., national use, company internal use). Restricted Circulation Numbers are available to GS1 Member Organisations’ members to help them develop solutions applicable within their territory.

**2.1.1.3 Fixed or variable measure**

Fixed measure trade items are those that are always produced in the same version and composition (e.g., type, size, weight, contents and design). Like a fixed measure trade item, a variable measure trade item is an entity with predefined characteristics, such as the nature of the product or its contents. Unlike a fixed measure trade item, a variable measure trade item has at least one characteristic that varies whilst other characteristics of the trade item remain the same. The variable characteristic may be weight, dimension, number of items contained, or volume information. The complete identification of a variable measure trade item consists of both an identification number and information about the variable data.

**2.1.1.4 Types of trade items**

Scanning at the retail point-of-sale (POS) is a major application of the GS1 system, and trade items that are intended to cross a point-of-sale are subject to specific rules. Scanning of trade items are broken into four groups based on the application and sector. If a trade item falls within more than

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one trade item category (listed below), the most restrictive rules apply, see the appropriate application standard.

■ **General retail consumer trade items** are intended to be sold at retail point-of-sale identified with a GTIN-13, GTIN-12 or GTIN-8 utilising omnidirectional linear barcodes. During a transition period, 2D barcodes may be applied in addition to the linear barcode. For information on how to manage multiple barcodes see section 4.15. For a summary of all conformance requirements for this AIDC application standard, 2D barcodes, cross-application rules and related technical specifications, see section 8.2.

■ **Regulated healthcare retail consumer trade items** are sold to the end consumers at a retail point-of-sale outlet (i.e., pharmacies). They are identified with a GTIN-13, GTIN-12 or GTIN-8 utilising linear or GS1 DataMatrix that can be scanned by image-based scanners.

■ **Non-retail trade items** are any trade item that does not cross retail POS. Commonly, these trade items will appear in mixed scanning environments (laser, image-based, etc.) depending on the application and industry sector. Typical examples include trade item groupings, direct part marked items, etc.

■ **Non-new trade items** are any trade item of the above types that are being made available for sale or use after the first use or consumer purchase (e.g., used, repurposed, refurbished, second life). For rules on identification of these types of trade items, see section 2.1.15.

**Note**: Non-new trade items would not normally include trade items that have been returned in their original packaging for a refund.

**2.1.1.5 Books and serial publications**

Published material (newspapers, magazines and books) requires special consideration due to the following factors:

■ A solution for published material should address the requirement to process returns (sorting and counting) to wholesalers and publishers. This implies the reading of a supplementary number that is not required for item identification.

■ The international systems, ISSN, ISBN and ISMN, already handle the numbering of publications and books.

**2.1.1.6 Single item or trade item grouping**

A trade item may be a single, non-breakable unit or a predefined grouping of a series of single items.

Trade items that are single, non-breakable units may be comprised of items that are not uniquely identified on the package and are not marked for individual sale (e.g., a bag of individually wrapped candies or toothbrushes of varying colours), which were referred to as “Random assortments” in versions of the GS1 General Specifications prior to v.23.

Trade item groupings may be present in a wide variety of physical forms, such as a fibreboard case, a covered or banded pallet, a film wrapped tray, or a crate with bottles. Trade items consisting of a single unit are identified with a Global Trade Item Number (GTIN). Trade item groupings of identical

or different units, each identified with a GTIN, are identified with a separate GTIN; the individual trade item GTIN, within any grouping, remains the same. Example: trade item A has the same GTIN whether it is sold as a single unit in a case of twelve or sold as a single unit in a case of twenty-four.

**2.1.1.7 Trade item assortments/bundles**

Trade item assortments/bundles are combinations of trade items. Trade item assortments/bundles can be classified as follows:

**■ Physical trade item assortments/bundles** are combinations of different trade items that are physically combined into a single trade item, thus creating a new trade item.

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**Note**: Combinations of the same trade items are either trade item groupings for general distribution (see sections 2.1.1.6 and 2.1.1.7) or pre-pack/multi-pack/set pack for apparel

and home fashion (see section 4.2.4.3.1).

**■ Virtual trade item assortments/bundles** are combinations of multiple (same or different) trade items that are not physically combined into a single trade item, but that are presented in selling environments as offers of combinations of multiple trade items (e.g., products or services).

**Note**: Across the GS1 General Specifications, there are a number of terms that are used to describe combinations (e.g., “grouping”, “trade item grouping”, “multi-pack”, “trade item

assortment/bundle”). Every effort has been made to ensure that these terms are used consistently, noting that some of these terms may have different colloquial meanings when used outside of the GS1 General Specifications.

**Note**: This section does not apply to regulated healthcare non-retail consumer trade items dispensed in a controlled environment (e.g., hospital, clinician’s office)

**Note**: Creation of trade item assortment/bundles must comply with all regulations and laws.

**2.1.1.7.1 Physical trade item assortments/bundles**

■ **Predefined:** A trade item assortment/bundle that comprises a fixed composition of two or more different trade items, each identified with a GTIN (see section 4.2). The trade items contained within may be trade items of one or more GTIN allocators.

Regardless of the contents of the trade item assortment/bundle, GTIN allocation is the responsibility of the organisation that creates the trade item assortment/bundle. Any change in the configuration is considered a new trade item.

**Predefined** Fixed composition of two or more trade items. Each trade item within has its own GTIN and could be sold individually.



**Example:** a predefined assortment/bundle contains a total of three trade items, always one of GTIN A, one of GTIN B and one of GTIN C.

■ **Dynamic:** A trade item assortment/bundle that comprises a variable composition of a fixed total count of two or more different trade items, each identified with a GTIN(see section 4.2). All the trade items and their GTINs will have been communicated to the buyer before trading takes place. The buyer has accepted that the GTIN allocator may change the trade item

assortment/bundle without any prior notice.

The trade items contained within the trade item assortment/bundle may be trade items of one or more GTIN allocators. Regardless of the contents, GTIN allocation for the trade item assortment/bundle is the responsibility of the organisation that creates the trade item assortment/bundle.

**Dynamic** There is a defined pool of trade items that may be in the trade item assortment/bundle. The quantity of each trade item in any instance of the trade item assortment/bundle is not guaranteed, but total number of trade items does not change. Each trade item within the assortment has its own GTIN and could be sold individually.

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**Example:** a dynamic assortment/bundle could contain any three trade items with three different GTINs, each from a pool of trade items that have been defined for use in the dynamic trade item assortment/bundle, as long as there are always three trade items within the trade item assortment/bundle.

**2.1.1.7.2 Virtual trade item assortment/bundle**

**Virtual trade item assortment/bundle:** A combination of multiple (same or different) trade items that are NOT physically combined into a single trade item. Virtual trade item assortments/bundles are most often related to the listing/selling practice of virtually combining multiple trade items into a number of offers for sale, typically in online environments. Each individual trade item within a virtual trade item assortment/bundle SHALL be identified with a GTIN (see section 4.2). The virtual trade item assortment/bundle itself does not require assignment of a GTIN, as it is not a physical combination of trade items and is not itself a new trade item.

**Note**: Virtual trade item assortments/bundles are not stocked as single trade items. Sales of virtual trade item assortments/bundles are fulfilled by assembling the purchased quantity of

each individual trade item at the time of order fulfilment.

**Figure 2.1.1.7.2-1** Trade item assortment/bundle summary

|  | Assortment/bundle type | Graphic | Assortment GTIN?  (Y/N) | Item mix:  fixed/varied | Physically combined together?  (Y/N) | Item  GTINs?  (Y/N) |
| --- | --- | --- | --- | --- | --- | --- |
| **Physical** | **Predefined**  A trade item  assortment/bundle that comprises a fixed composition of two or more  different trade  items, each  identified with a GTIN |  | Y | Fixed | Y | Y |
| **Dynamic**  A trade item  assortment/bundle that comprises a variable  composition of a fixed total count of two or more  different trade  items, each  identified with a GTIN |  | Y | Varied | Y | Y |

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|  | Assortment/bundle type | Graphic | Assortment GTIN?  (Y/N) | Item mix:  fixed/varied | Physically combined together?  (Y/N) | Item  GTINs?  (Y/N) |
| --- | --- | --- | --- | --- | --- | --- |
| **Virtual** | A combination of multiple trade  items that are  NOT physically  combined into a single trade item. |  | N | Fixed | N | Y |

**2.1.1.8 Regulated healthcare trade items (RHTI)**

Regulated healthcare trade items (RHTI) are pharmaceutical or medical device trade items that are sold or dispensed in a controlled environment such as in a retail pharmacy, hospital pharmacy, etc.

**2.1.1.8.1 Marking levels of regulated healthcare trade items**

For regulated healthcare trade items (RHTI) three levels of identification have been developed: ■ Minimum level of AIDC marking.

■ Enhanced level of AIDC marking.

■ Highest level of AIDC marking.

The identification solution for each of these levels may differ between the category of “pharmaceuticals” (which includes biologics, vaccines, controlled substances, clinical trial pharmaceuticals and therapeutic nutritional products) versus the category of “medical devices” (which includes all classes of medical devices) and may also differ by configuration or packaging level (trade items direct marked, primary packaging, secondary packaging, case/shipper, pallet, logistics unit).

The standards in section 2.1.6 define the data required by packaging level and by product type. For purposes of AIDC marking, the brand owner is responsible for determining the proper assignment of each regulated healthcare retail consumer trade item to either the pharmaceutical or medical device

category in accordance with local regulatory requirements. Additionally, within some use cases, or under the requirement of some regulations, certain medical devices will require direct part marking (DPM) of the AIDC data carrier. For more details on the application of DPM with medical devices see section 2.1.8.

**2.1.1.8.2 National Healthcare Reimbursement Numbers**

National Healthcare Reimbursement Number (NHRN) is the term for identification numbers used on pharmaceutical and/or medical devices, where required by national or regional regulatory organisations, for product registration purposes and/or for the management of reimbursement. For compliance with a national/regional regulatory or industry requirement where the GTIN will not meet the current need, the trade item SHALL be identified with GTIN and the applicable GS1 Application Identifier for NHRN.

See sections 2.1.5, 2.1.6 and 3.8.19 for a complete description of the structure and rules of use of the GS1 Application Identifier for NHRN.

**2.1.1.9 Single trade items composed of several physical parts**

Because of its physical nature, a trade item may be packed in separate physical parcels. For example, furniture equipment may be composed of several pieces (e.g., a sofa and two armchairs, which cannot be ordered or sold separately). A specific standard solution is available to identify and symbol mark each component of a trade item composed of several physical parts.

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**2.1.1.10 GTIN data string**

A GTIN may be an eight, twelve, thirteen or fourteen-digit string. These strings will be unique when they incorporate a GS1 Company Prefix, U.P.C. Company Prefix or GS1-8 Prefix as required and if they are always treated as a data string of digits plus a final check digit. The check digit is explained in section 7.9. Its verification ensures that the number is correctly composed.

**Figure 2.1.1.10-1.** Overview of GTIN formats

GTIN Formats

‹─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─

──────────────────────────────────›

(GTIN-8) (GTIN-12) (GTIN-13) (GTIN-14)

|  |  |  |  |  |  | N1 | N2 | N3 | N4 | N5 | N6 | N7 | N8 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | N1 | N2 | N3 | N4 | N5 | N6 | N7 | N8 | N9 | N10 | N11 | N12 |
|  | N1 | N2 | N3 | N4 | N5 | N6 | N7 | N8 | N9 | N10 | N11 | N12 | N13 |
| N1 | N2 | N3 | N4 | N5 | N6 | N7 | N8 | N9 | N10 | N11 | N12 | N13 | N14 |

When any of these GTINs is encoded in a data carrier that must encode a fixed-length data string of 14-digits, the GTINs less than 14-digits in length must be prefixed by leading zeroes that simply act as filler digits.

**Figure 2.1.1.10-2.** 14-digit representation of the four GTIN formats

added zero(es)

‹─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─

right aligned GTIN string

──────────────────────────────────›

(GTIN-8) (GTIN-12) (GTIN-13) (GTIN-14)

| 0 | 0 | 0 | 0 | 0 | 0 | N1 | N2 | N3 | N4 | N5 | N6 | N7 | N8 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 0 | N1 | N2 | N3 | N4 | N5 | N6 | N7 | N8 | N9 | N10 | N11 | N12 |
| 0 | N1 | N2 | N3 | N4 | N5 | N6 | N7 | N8 | N9 | N10 | N11 | N12 | N13 |
| N1 | N2 | N3 | N4 | N5 | N6 | N7 | N8 | N9 | N10 | N11 | N12 | N13 | N14 |

The presence or lack of these leading zeroes does not change the GTIN concerned.

**Note**: GTINs may be stored with or without leading zeroes in the same database field, depending on the requirements of the particular application.

**Note**: A GTIN-12 may start with one, two or three leading zeroes. These zeroes are meaningful since they are part of the U.P.C. Company prefix, and therefore these must be

preserved when storing the GTIN-12 in a database field. For the list of U.P.C. Prefix ranges see section 1.4.

**2.1.2 Fixed measure trade items – open supply chain**

Fixed measure trade items are those that are always produced in the same version and composition (e.g., type, size, weight, contents, design). The identification number identifies the item unambiguously. Every trade item that is different from another in any respect is assigned a separate Global Trade Item Number (GTIN).

**2.1.3 Fixed measure trade items scanned at retail POS**

A fixed measure consumer trade item that is intended to be read at retail point-of-sale (POS) SHALL be identified with a GTIN-8, GTIN-12, or GTIN-13. It SHALL carry a barcode from the EAN/UPC family or the GS1 DataBar® retail POS family. During a transition period, 2D barcodes may be applied in addition to the linear barcode. For information on how to manage multiple barcodes see section 4.15. For a summary of all conformance requirements for this AIDC application standard, 2D barcodes, cross-application rules and related technical specifications, see section 8.2

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**2.1.3.1 Fixed measure trade items scanned at retail POS using GTIN-12 or GTIN-13 Application description**

**Figure 2.1.3.1-1.** GTIN-12/GTIN-13 data structure

(GTIN-13) (GTIN-12)

| GS1 Company Prefix  Item reference  Check  ─────────────────────›  ‹────────────────────  digit | | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| N1 | N2 | N3 | N4 | N5 | N6 | N7 | N8 | N9 | N10 | N11 | N12 | N13 |
| U.P.C. Company Prefix  Item reference  Check  ──────────────────›  ‹────────────────────  digit | | | | | | | | | | | | |
|  | N1 | N2 | N3 | N4 | N5 | N6 | N7 | N8 | N9 | N10 | N11 | N12 |

The GS1 Company Prefix is allocated by a GS1 Member Organisation to a system user. It makes the ID number unique worldwide but does not identify the origin of the item. Any valid GS1 Company Prefix, other than ones starting with a zero, may be used to issue a GTIN-13 and any valid U.P.C Company Prefix may be used to issue a GTIN-12. The GS1 Prefixes used for this purpose can be found in section 1.4.

The item reference is assigned by the system user, who must observe the rules in section 4.

The check digit is explained in section 7.9. Its verification, carried out automatically by the barcode reader, ensures that the number is correctly composed.

**GS1 key**

***Required***

The allowed key formats for this application are:

■ GTIN-12

■ GTIN-13

***Rules***

All the GTIN rules described in section 4.

**Attributes**

***Required***

Not applicable

***Optional***

For all the GS1 Application Identifiers (AI) that can be used with a GTIN, see section 3.

***Rules***

Not applicable

**Data carrier specification**

***Carrier choices***

The data carriers for this element string are:

■ UPC-A barcode (carrying a GTIN-12).

■ EAN-13 barcode (carrying a GTIN-13).

■ GS1 DataBar Retail POS family (carrying GTIN-12 or GTIN-13 represented in a fixed-length data string of 14 digits by adding leading zeroes).

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**Note**: During a transition period, 2D barcodes may be applied in addition to the linear barcode. For a summary of all conformance requirements for this AIDC application

standard, 2D barcodes, cross-application rules and related technical specifications, see section 8.2.

***Symbol X-dimensions, minimum symbol height and minimum symbol quality*** See section 5.12.3.1, *GS1 symbol specification table 1*.

***Symbol placement***

All the symbol placement guidelines are defined in section 6.

**Unique application processing requirements**

For a description of processing requirements, see section 7.

**2.1.3.2 Fixed measure trade items scanned at retail POS using GTIN-12 carried by a UPC-E barcode**

**Application description**

Some GTIN-12s beginning with the U.P.C. Prefix 0 may be represented in a small symbol called the UPC-E barcode. The GTIN-12 is condensed into a barcode consisting of six symbol character positions. For application processing, the GTIN-12 must be transformed into its full length by the barcode reader software or by the application software. There is no six-digit UPC-E barcode. See section 7.10 for UPC-E barcode options.

**GS1 key**

***Required***

■ GTIN-12

***Rules***

All the GTIN rules described in section 4.

**Attributes**

Not applicable

**Data carrier specification**

***Carrier choices***

■ UPC-E (carrying a GTIN-12 in six explicitly encoded digits using zero-suppression techniques).

**Note**: During a transition period, 2D barcodes may be applied in addition to the linear barcode. For a summary of all conformance requirements for this AIDC application

standard, 2D barcodes, cross-application rules and related technical specifications, see section 8.2.

***Symbol X-dimensions, minimum symbol height and minimum symbol quality*** See section 5.12.3.1*, GS1 symbol specification table 1*.

***Symbol placement***

All the symbol placement guidelines defined in section 6.

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**Unique application processing requirements**

For a description of processing requirements, see section 7.

**2.1.3.3 Fixed measure trade items scanned at retail POS using GTIN-8**

**Application description**

The GTIN-8 is available for items whose packaging does not include enough available space to permit the use of an EAN-13 symbol. GTIN-8s are individually assigned by GS1 Member Organisations on request. figure 2.1.3.3-1 shows the data structure of a GTIN-8.

**Figure 2.1.3.3-1**. GTIN-8 data structure

| GS1-8 Prefix  Item reference  Check  ─────────────›  ‹─────────────  digit | |
| --- | --- |
| N1 N2 N3 N4 N5 N6 N7 | N8 |

The GS1-8 Prefix is a unique string of two or more digits issued by GS1 Global Office. See section 1.4.3 for the GS1-8 Prefixes used in this element string.

The item reference is assigned by the GS1 Member Organisation. The GS1 Member Organisations provide procedures for obtaining GTIN-8s.

The check digit is explained in section 7.9. Its verification, carried out automatically by the barcode reader, ensures that the number is correctly composed.

**GS1 key**

***Required***

■ GTIN-8

***Rules***

All the GTIN rules described in section 4.

**Attributes**

***Required***

Not applicable

***Optional***

For all the GS1 Application Identifiers (AI) that can be used with a GTIN, see section 3.

***Rules***

Not applicable

**Data carrier specification**

***Carrier choices***

■ EAN-8 (carrying a GTIN-8).

■ GS1 DataBar Retail POS family (carrying a GTIN-8).

**Note**: During a transition period, 2D barcodes may be applied in addition to the linear barcode. For a summary of all conformance requirements for this AIDC application

standard, 2D barcodes, cross-application rules and related technical specifications, see section 8.2.

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***Symbol X-dimensions, minimum symbol height and minimum symbol quality*** See section 5.12.3.1*, GS1 symbol specification table 1*.

***Symbol placement***

All the symbol placement guidelines defined in section 6.

**Unique application processing requirements**

For a description of processing requirements, see section 7.

**2.1.3.4 Hardcover books and paperbacks scanned at retail POS using ISBN, GTIN-13, or GTIN-12**

**Application description**

When identifying books and paperbacks a company may identify them in the same manner as any other retail trade items (see section 2.1.3). However, the recommended option is to use the International Standard Book Number (ISBN numbering system). The GS1 Prefixes 978 and 9792 have been allocated to ISBN (http://www.isbn-international.org/), which allocates numbers from these ‘Bookland’ prefixes.

**Note**: ISBNs SHALL NOT be allocated to non-book products even if the products are related to a book (e.g., teddy bears, coffee mugs, T-shirts, etc. related to a book launch). Such non

book products SHALL be identified and barcoded in the same manner as any other retail trade item (see section 2.1.3). A trade item grouping of identical book items would normally be identified according to section 2.1.7.2*.* However, an ISBN may also be used to create a 14- digit GTIN with an indicator to identify a trade item grouping of identical book items (refer to section 2.1.7.2) provided that the publisher that issues the 14-digit GTIN is a member of a GS1 organisation or is authorised to act through an agreement between its local GS1 Member Organisation and the local organisation representing publishers.

**GS1 key**

***Required***

The allowed key formats for this application are:

■ ISBN using GS1 Prefix 978 or 979

■ GTIN-12

■ GTIN-13

***Rules***

All the GTIN rules described in section 4.

**Attributes**

***Required***

Not applicable

***Optional***

Some publishers may wish to communicate additional information in a barcode in order to meet their internal requirements. For example, publishers may wish to include an edition variant (e.g., unchanged reprint, price increase), which is not distinguished by the ISBN, GTIN-13, or GTIN-12.

2 Within GS1 Prefix 979 a subset 9790 has been allocated to the International ISMN Agency for notated music.

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The GS1 system provides an additional two- or five-digit symbol, called an add-on symbol that can be included on the item just to the right of the main symbol.

A two-digit or five-digit add-on number provides more information about a particular publication of the printed item, but it is not required for the identification of the title itself.

This figure shows the format of a two-digit add-on:

**Figure 2.1.3.4-1.** Two-digit add-on format

| Supplementary information |
| --- |
| N1 N2 |

The supplementary information consists of numeric data of any structure and meaning. It is the publisher's responsibility to define the numbering scheme. The data carrier for this element string is the two-digit add-on symbol.

The system recognises this element string by the symbology identifier **]E1**. The two-digit add-on symbol must be jointly used with a UPC-A, UPC-E or EAN-13 barcode. It is never scanned alone, and the data from both barcodes can be used together for processing.

This figure shows the format of a five-digit add-on:

**Figure 2.1.3.4-2.** Five-digit add-on format

| Supplementary information |
| --- |
| N1 N2 N3 N4 N5 |

The supplementary information consists of numeric data of any structure and meaning. It is the publisher's responsibility to define the numbering scheme. The data carrier for this element string is the five-digit add-on symbol.

The system recognises this element string by the symbology identifier **]E2**. The five-digit add-on symbol must be jointly used with a UPC-A, UPC-E or EAN-13 barcode. It is never scanned alone, and the data from both barcodes can be used together for processing.

***Rules***

Add-on symbols involve the following constraints:

■ They SHOULD NOT contain information that should rightly be looked up using the item’s GTIN-13 (or GTIN-12).

■ The reading of the add-on symbol by the retailer's point-of-sale system is optional. ■ The use of the add-on symbol is the responsibility of each publisher.

**Data carrier specification**

***Carrier choices***

Individual books and paperbacks SHOULD be marked with an EAN-13, UPC-A, or UPC-E barcode that complies with the print quality specifications applicable to all GS1 system barcodes. The EAN/UPC 2-digit or 5-digit Add-on symbols are options used with the above EAN/UPC symbols.

Groupings of identical book items and paperbacks SHOULD be marked with GS1-128 or ITF-14, see section 2.1.7.2.

**Note**: When identifying serial publications, see section 2.1.3.5.

***Symbol X-dimensions, minimum symbol height and minimum symbol quality*** See section 5.12.3.1, *GS1 symbol specification table 1*.

***Symbol placement***

All the symbol placement guidelines defined in section 6.4.

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**Unique application processing requirements**

For description of processing requirements, see section 7.

**2.1.3.5 Serial publications scanned at retail POS using ISSN, GTIN-13, or GTIN-12**

**Application description**

The first and recommended option is to make use of the International Standard Serial Number (ISSN) system. The GS1 Prefix 977 is used for encoding the ISSN assigned to a particular item without its check digit.

The second option is to identify serial publications in the same manner as any other trade item: using the GTIN-13 or GTIN-12 data structure.

The third option involves using a special GS1 Company Prefix (assigned by a GS1 Member Organisation within its territory), the publication number and the price of the publication (provided that the national legislation allows this). With this option, the price is placed in clearly defined positions and is directly usable in the country of publication. However, as soon as the item leaves the country, the price has no direct significance, and the GTIN must be interpreted in a general way without being broken down internally.

**Figure 2.1.3.5-1.** Format of the element string

| GS1 Prefix | ISSN (without its check digit) | Variant | Check digit |
| --- | --- | --- | --- |
| 9 7 7 | N4 N5 N6 N7 N8 N9 N10 | N11 N12 | N13 |

The variant digits N11 and N12 may be used to express variants of the same title for issues with a different price or to identify different issues of a daily within one week. Normal title takes value 00.

**GS1 key**

***Required***

The allowed key formats for this application are:

■ ISSN using GS1 Prefix 977

■ GTIN-12

■ GTIN-13

***Rules***

All the GTIN rules described in section 4.

**Attributes**

***Required***

Not applicable

***Optional***

Some publishers may wish to communicate additional information in a barcode in order to meet their internal requirements.

A two-digit or five-digit add-on number provides more information about a particular publication of the printed item, but it is not required for the identification of the title itself.

This figure shows the format of a two-digit add-on:

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**Figure 2.1.3.5-2.** Two-digit add-on format

| Supplementary information |
| --- |
| N1 N2 |

GS1 recommends the use of the following number assignment:

■ Dailies (or more generally publications with several issues a week): The publications of each day of the week are considered separate trade items that must be identified with a separate identification number represented in an EAN-13, UPC-A, or UPC-E symbol. The two-digit add-on number should only be used to represent the applicable week, which, together with the GTIN-13 or GTIN-12, establishes the day within the year.

■ Weeklies: Number of the week (01 – 53).

■ Bi-weeklies: Number of the first week of the respective period (01 – 53). ■ Monthlies: Number of the month (01 – 12).

■ Bi-monthlies: Number of the first month of the respective period (01 – 12). ■ Quarterlies: Number of the first month of the respective period (01 – 12).

■ Seasonal period: First digit = last digit of the year; second digit = 1 spring, 2 summer, 3 autumn, 4 winter.

■ Bi-annual period: First digit = last digit of the year; second digit = number of the first season of the respective period.

■ Annuals: First digit = last digit of the year; second digit = 5.

■ Special intervals: Consecutively numbered from 01 to 99.

The add-on number is carried by a two-digit add-on symbol that is placed to the right of the symbol and parallel to it. The add-on symbol must comply with the print quality specifications applicable to all GS1 system barcodes. For example, the X-dimension applied to the main barcode must also be applied to the add-on symbol.

Serial publications can also use a five-digit add-on number carried by a five-digit add-on symbol. The reading of the add-on symbol at a point-of-sale is optional. The add-on symbol must not be used to encode information that should be contained within the Global Trade Item Number (GTIN). The add-on symbol provides additional information about a particular publication of a printed item, and it is the publisher’s responsibility to define the numbering scheme. This figure shows the format of a five-digit add-on:

**Figure 2.1.3.5-3.** Five-digit add-on format

| Supplementary information |
| --- |
| N1 N2 N3 N4 N5 |

Information that can be encoded in the five-digit add-on symbol includes the actual date of issue, in order to differentiate between successive issues.

The five-digit add-on symbol is placed to the right of the main symbol and parallel to it. The add-on symbol must comply with the print quality specifications applicable to all GS1 system barcodes. For example, the X-dimension applied to the main symbol also must be applied to the add-on symbol.

***Rules***

When using a five-digit add-on symbol, a two-digit add-on symbol cannot also be used. **Data carrier specification**

***Carrier choices***

Serial Publications SHOULD be marked with an EAN-13, UPC-A, or UPC-E barcode that complies with the print quality specifications applicable to all GS1 system barcodes. The EAN/UPC two-digit or five digit add-on symbols are options used with the above EAN/UPC symbols.

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***Symbol X-dimensions, minimum symbol height and minimum symbol quality*** See section 5.12.3.1, *GS1 symbol specification table 1*.

***Symbol placement***

All the symbol placement guidelines defined in section 6.4.

**Unique application processing requirements**

For a description of processing requirements, see section 7.

**2.1.3.6 Fixed measure fresh food trade items scanned at retail POS**

**Application description**

Fresh foods includes product categories such as: fruits, vegetables, meat, seafood, bakery and ready-to-serve food such as cheeses, cold cooked or cured meats and salad, etc.

In this application there are different scenarios:

■ Loose produce: Picked as an each – sold as an each.

■ Fresh food: Pre-packed with same weight or count.

**Loose produce trade items sold as an each**

Loose produce are fruits and vegetables which are delivered to the store loose, in boxes or cases. Loose produce can then be displayed on the shelf allowing for the consumer to pick the product quantities needed. If loose produce has been defined to be sold by the each then they are treated in the same way as the retailer sells a can of soup or beans.

From a brand owner’s perspective, the trade item is a fixed measure trade item identified with a GTIN with no additional attributes necessary to complete transaction.

**Pre-packed fresh food trade items**

When fresh foods trade items, whether loose produce or cut from a bulk item or cut into pieces are pre-packaged as a fixed measure trade item then the trade item is also treated like any other fixed measure trade item identified with a GTIN with no additional attributes necessary to complete transaction.

**GS1 key**

***Required***

The allowed key formats for this application are:

■ GTIN-8

■ GTIN-12

■ GTIN-13

***Rules***

All the GTIN rules described in section 4.

**Attributes**

***Required***

Not applicable

***Optional***

For all the GS1 Application Identifiers (AI) that can be used with a GTIN, see section 3.

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***Rules***

Not applicable.

**Data carrier specification**

***Carrier choices***

The data carriers for this element string are:

■ UPC-A barcode (carrying a GTIN-12)

■ EAN-8 barcode (carrying GTIN-8)

■ EAN-13 barcode (carrying a GTIN-13)

■ GS1 DataBar Retail POS family (carrying GTIN-12 or GTIN-13)

The GS1 DataBar symbols encode a 14-digit numeric string. When encoding GTIN-8, GTIN-12 or GTIN-13 in GS1 DataBar symbols zero-fill with six, two, or one zeroes to the left of the GTIN.

***Symbol X-dimensions, minimum symbol height and minimum symbol quality*** See section 5.12.3.1, *GS1 symbol specification table 1*.

***Symbol placement***

There are no specified rules for symbol placement on loose produce scanned at POS.

**Unique application processing requirements**

Not applicable

**2.1.4 Fixed measure trade items scanned in general distribution and at retail POS**

Trade items intended for general distribution and retail point-of-sale scanning SHALL carry a barcode from the EAN/UPC or GS1 DataBar retail POS family.

These trade items SHALL be identified with GTIN-8, GTIN-12 or GTIN-13 (see section 2.1.3). For symbol X-dimensions, minimum symbol height and minimum symbol quality, see section 5.12.3.3, *GS1 symbol specification table 3.* During a transition period, 2D barcodes may be applied in addition to the linear barcode. For information on how to manage multiple barcodes see section 4.15. For a summary of all conformance requirements for this AIDC application standard, 2D barcodes, cross application rules and related technical specifications, see section 8.3.

**Note**: Allocation of GTIN-8 to new trade items for this application SHALL conform to section 4.2.7

**2.1.5 Healthcare primary packaging (non-retail trade items)**

**Application description**

Healthcare primary packaging trade items are pharmaceutical and medical products or their packages presented to support the point-of-care (direct consumption based on right product, dose and route of administration). Because the product is never scanned at retail POS, the use of symbologies beyond EAN/UPC and the use of GTIN-14 data structure is permitted.

These products, which may be packaged in a sterile packaging system or in a non-sterile packaging system, are only marked when the package is intended for dispensing to the consumer in a hospital or equivalent facility (e.g., field hospital, nursing home, home healthcare).

See section 4.15.1 *Multiple barcode management practices for consumer trade items – all sectors* and section 4.15.3 *Multiple barcode management practices for healthcare* if the product is intended for scanning at general retail and also must meet regulatory requirements for this application section based on multiple market use. If an item is a regulated healthcare retail consumer trade

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item and also a non-retail trade item then the barcode marking for regulated healthcare retail consumer trade items is required at a minimum.

**GS1 key**

***Required***

The allowed key formats for this application are:

■ GTIN-8

■ GTIN-12

■ GTIN-13

■ GTIN-14

***Rules***

All the GTIN rules described in section 4.

If the regulated healthcare retail consumer trade item to be marked on the primary packaging does not also have secondary packaging, then the primary packaging markings in this section do not apply and are replaced by the required markings in the secondary packaging section (2.1.6).

***Example:*** *a bottle of 50 pharmaceutical tablets (the primary package) is not enclosed into a carton (which would represent the secondary packaging). In this instance, the secondary packaging markings are required on the primary packaging level.*

If the required AIDC marks are placed directly on the part, then those AIDC marks (e.g., barcode, human readable interpretation) satisfy the requirements for primary package marking. If those marks are functional (scannable) through the primary packaging, then no additional AIDC marks are required on the primary package.

If the product to be marked has primary packaging that is a blister pack containing several individual pharmaceutical items, for instance a blister pack of 12 pills or tablets, the following rules apply:

■ GTIN is the only required mark.

■ In addition to the GTIN rules described in section 4, see section 4.2.7 for rules on deploying GTIN-8.

**Attributes**

***Required***

**Figure 2.1.5-1.** Overview of required attributes

| AIDC marking level for regulated  healthcare trade  items | Key | Batch/lot  number -  AI (10) | Expiration  date – AI  (17) | Serial number – AI (21) | Other |
| --- | --- | --- | --- | --- | --- |
| Minimum  (pharmaceutical  only) | GTIN-8, GTIN-12, GTIN-13, or GTIN 14 | No | No | No | None |
| Enhanced  (med device only) | GTIN-8, GTIN-12, GTIN-13, or GTIN 14 | Yes | Yes | No | None |
| Highest –  pharmaceutical  brand owner AIDC marking | GTIN-8, GTIN-12, GTIN-13, or GTIN 14 | No | No | No | None |
| Highest – medical device - brand  owner AIDC  marking | GTIN-8, GTIN-12, GTIN-13, or GTIN 14 | Yes | Yes | Yes | Active potency, AI (7004), for  kits with  pharmaceuticals |

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| AIDC marking level for regulated  healthcare trade  items | Key | Batch/lot  number -  AI (10) | Expiration  date – AI  (17) | Serial number – AI (21) | Other |
| --- | --- | --- | --- | --- | --- |
| Highest – hospital AIDC marking of  pharmaceutical | GTIN-8, GTIN -12, GTIN -13, or GTIN -14 | No | Yes,  Expiration  date and  time, AI  (7003), if  needed for short life  items | Yes | None |
| Highest – hospital AIDC marking of  certain medical  devices (see section 2.1.8) | GRAI, AI (8003), or GIAI, AI (8004), is optional if GTIN, AI (01), + serial number, AI (21), is not marked on the product. | No | No | GRAI, AI  (8003), or  GIAI, AI  (8004), is  optional if  GTIN, AI (01), + serial  number, AI  (21), is not  marked on the product. |  |

To manage healthcare data requirements within GS1 EPC/RFID tags, see section 3.11 and the most recent version of the *EPC Tag Data Standard*.

***Optional***

For compliance with a national/regional regulatory or industry requirement where the GTIN will not meet the need, a regulated healthcare trade item may be identified with GTIN and AI (710), AI (711), AI (712), AI (713), AI (714), AI (715) and AI (716) National Healthcare Reimbursement Number, see section 3.8.19.

***Rules***

All the GTIN rules described in section 4.

National Healthcare Reimbursement Number AI (710), AI (711), AI (712), AI (713), AI (714) AI (715) and AI (716) must always be used with the GTIN.

***Human readable interpretation***

For human readable interpretation rules see section 4.14*.* For HRI rules specific to regulated healthcare retail consumer trade items, see section 4.14.1.

**Data carrier specification**

***Carrier choices***

**Figure 2.1.5-2.** Carrier choices

| **Preferred option(s) (this is the long-term direction for AIDC marking)** | GS1 DataMatrix symbology  GS1-128 symbology  GS1 DataBar symbology  **NOTE:** If a product package serves multiple markets and in one market the specifications in section 2.1.3 apply, then the specification for 2.1.3 must be followed for encoding GTIN (at a minimum) and the rules for use of multiple symbols in section 4.15 apply. |
| --- | --- |
| **Option in addition to the barcode** | EPC/RFID tag. GS1 expects the barcode as the minimum requirement for packaging however EPC/RFID is an approved AIDC carrier which can be deployed in addition to the barcode. |
| **Other acceptable options (GS1 strongly supports existing options for**  **symbol marking as a** | The following symbols have been permitted by GS1 and therefore could appear on some existing packages. For that reason, GS1 does not want to preclude them as an option, particularly where GTIN without additional data (Minimum ID) |

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| **guiding principle and therefore supports all previous AIDC marking specifications)** | is required. With that said, symbols that allow all the data to be concatenated into one symbol are the preferred option.  EAN/UPC symbology family (UPC-A, UPC-E, EAN-8 and EAN-13) may be used to encode the GTIN-8, GTIN-12 or GTIN-13 Identification. ITF-14 symbols may be used where printing conditions require the application of a less demanding symbology. It may not be used when attribute information is required. ITF-14 symbols can encode the GTIN-8, GTIN-12, GTIN-13, or GTIN-14 of the item. It is not used to encode attribute information.  GS1 Composite Component is also used in combination with linear symbols by GS1 and therefore remains a legitimate option however, GS1 DataMatrix is preferred based on its ability to encode all information in one symbol and do so efficiently in terms of print speed and panel size. |
| --- | --- |

***Symbol X-dimensions, minimum symbol height and minimum symbol quality*** See section 5.12.3.6, GS1 symbol specification table 6*.*

***Symbol placement***

All the symbol placement guidelines defined in section 6.

**Unique application processing requirements**

For a description of processing requirements, see section 7.

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**2.1.6 Healthcare secondary packaging (regulated healthcare retail consumer trade items)**

A regulated healthcare retail consumer trade item not intended to be scanned in high volumes per consumer transaction at retail, but does require additional data beyond GTIN to support regulatory requirements. This means, these trade items support:

■ GTIN-8, GTIN-12, or GTIN-13 data structures.

■ GTIN attributes such as batch/lot number, expiration dates, or serial numbers.

They may be marked with GS1 DataMatrix that require imaging-based scanners or linear symbologies such as GS1 DataBar or GS1-128. If an item is a general retail consumer trade item and regulated healthcare retail consumer trade item, then the barcode marking for general retail is required at a minimum.

**GS1 key**

***Required***

The allowed key formats for this application are:

■ GTIN-8

■ GTIN-12

■ GTIN-13

GS1 firmly endorses the use of GTIN in all markets, however there are instances where GS1 Member Organisations have allocated a portion of their numbering capacity to identification schemes administered nationally by external agencies.

These coding schemes while recognised within the GS1 system framework by the assignment of a GS1 Prefix are defined, in Healthcare, as National Trade Items Numbers (NTINs) rather than Global Trade item Numbers (GTINs). NTINs are unique with respect to GTINs as their values are a subset of all possible values of GTIN. However, their definition, allocation and life cycle rules are defined by an organisation external to GS1.

The degree to which NTIN definitions and rules are compatible with those of GTIN is specific to each national definition. Whilst NTIN will always provide globally unique identification within the GTIN pool of numbers, this does not mean NTIN provides the same level of interoperability as GTIN with other GS1 standards, such as GDSN and ONS. In markets where NTIN is adopted exclusively of GTIN, the reciprocal nature of GTIN identification and marking across markets is lost and becomes problematic where one package which should serve multiple markets (e.g., common language) requires multiple NTINs rather than one GTIN.

***Rules***

See the GTIN rules in section 4.2.

**Attributes**

***Required***

**Figure 2.1.6-1.** Overview of required attributes

| AIDC marking level for regulated  healthcare trade items | Key | Batch/lot  number -  AI (10) | Expiration  date – AI  (17) | Serial number – AI (21) | Other |
| --- | --- | --- | --- | --- | --- |
| Minimum –  Pharmaceutical & medical device | GTIN-8, GTIN  12, or GTIN-13 | No | No | No | None |
| Enhanced –  Pharmaceutical & medical device | GTIN-8, GTIN  12, or GTIN-13 | Yes | Yes | No | None |

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| AIDC marking level for regulated  healthcare trade items | Key | Batch/lot  number -  AI (10) | Expiration  date – AI  (17) | Serial number – AI (21) | Other |
| --- | --- | --- | --- | --- | --- |
| Highest – Brand  owner AIDC  marking | GTIN-8, GTIN  12, or GTIN-13 | Yes | Yes | Yes | Potency AI  (7004)  (for  pharmaceutical, and for medical device kits with pharmaceuticals) |
| Highest – Hospital AIDC marking of pharmaceuticals | GTIN-8, GTIN  12, or GTIN-13 | No | Yes, AI  (7003) if  needed for short life  items | Yes | None |
| Highest - Hospital AIDC marking of certain medical  devices (see  section 2.1.8) | GRAI, AI (8003), or GIAI, AI  (8004), is  optional if GTIN, AI (01), + serial number, AI (21), is not marked on the product. | No | No | GRAI, AI (8003), or GIAI, AI  (8004), is  optional if GTIN, AI (01), + serial number, AI (21), is not marked on the product. |  |

To manage healthcare data requirements within EPC/RFID tags, see section 3.11 and the most recent version of the *EPC Tag Data Standard*.

***Optional***

For compliance with a national/regional regulatory or industry requirement where the GTIN will not meet the need, a regulated healthcare trade item may be identified with GTIN and AI (710), AI (711), AI (712), AI (713), AI (714), AI (715) and AI (716) National Healthcare Reimbursement Number. See section 3.8.19 for details on the use of AI (710), AI (711), AI (712), AI (713), AI (714), AI (715) and AI (716).

***Rules***

National Healthcare Reimbursement Number AI (710), AI (711), AI (712), AI (713), AI (714), AI (715) and AI (716) must always be used with the GTIN.

**Data carrier specification**

***Carrier choices***

See the “data carrier specification carrier choices” recommendations on preferred options, options in addition to the barcode and other acceptable options found at the end of section 2.1.5.

***Symbol X-dimensions, minimum symbol height and minimum symbol quality***

For regulated healthcare consumer trade items scanned in retail pharmacy and general distribution or non-retail pharmacy and general distribution see section 5.12.3.8, *GS1 symbol specification table 8*.

For regulated healthcare retail consumer trade items not scanned in general distribution see section 5.12.3.10, *GS1 symbol specification table 10*.

***Symbol placement***

All the symbol placement guidelines defined in section 6.

**Unique application processing requirements**

For a description of processing requirements, see section 7.

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**2.1.7 Fixed measure trade items scanned in general distribution**

Every trade item that is different from another in any respect is assigned a unique Global Trade Item Number (GTIN). This includes trade item groupings of retail and non-retail trade items that are also trade items, and non-retail single units. For example, each of the packaging types in the figure below, if traded, is assigned a separate GTIN.

**Figure 2.1.7-1**. Example of GTIN numbering options

| Trade item | GTIN numbering options | | | |
| --- | --- | --- | --- | --- |
| GTIN-8 | GTIN-12 | GTIN-13 | GTIN-14 |
| Single product A | X | X | X |  |
| 50 x product A  (Trade item  grouping) |  | X | X | X |
| 50 x product A  (Trade item  grouping, e.g.,  display case) |  | X | X | X |
| 100 x product A  (Trade item  grouping) |  | X | X | X |
| Single product B | X | X | X |  |
| 50 x product A  50 x product B |  | X | X |  |

If, at any time, the trade item is shipped or transported as an independent logistic unit, at the time of shipment it SHOULD additionally be identified with an SSCC. The combination of a GTIN and a serial number (also known as SGTIN) does not replace the SSCC as the identifier of a logistic unit.

If, in addition to the item being identified by GTIN, the item also has a product model, then this product model is identified with a Global Model Number (GMN). See section 2.6.13 for the application standard on GMN.

**2.1.7.1 Identification of a trade item that is a single product**

**Application description**

The manufacturer or supplier has the option of assigning a unique GTIN-8, GTIN-12, GTIN-13 or in the case of regulated healthcare trade items and trade items used in manufacturing and maintenance, repair & overhaul (MRO) processes, a GTIN-14 to a trade item that is a single product as shown in figure 2.1.7-1. Restricted Circulation Numbers (RCNs) SHALL NOT be used in this element string.

**GS1 key**

***Required***

The allowed key formats for this application are:

■ GTIN-8

■ GTIN-12

■ GTIN-13

■ For regulated healthcare trade items and trade items used in manufacturing and maintenance, repair & overhaul (MRO) processes: GTIN-14.

***Rules***

See the GTIN rules described in section 4.

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**Attributes**

***Required***

For regulated healthcare consumer trade items the following levels of AIDC marking are specified.

**Figure 2.1.7.1-1**. Overview of required attributes

| AIDC marking level for regulated healthcare trade items | Key | Batch/lot  number -  AI (10) | Expiration  date – AI (17) | Serial  number  – AI (21) | Other |
| --- | --- | --- | --- | --- | --- |
| Minimum | GTIN-8,  GTIN-12,  GTIN-13, or GTIN-14 | No | No | No | None |
| Enhanced | GTIN-8,  GTIN-12,  GTIN-13, or GTIN-14 | Yes | Yes | No | None |
| Highest – Brand owner AIDC marking | GTIN-8,  GTIN-12,  GTIN-13, or GTIN-14 | Yes | Yes | Yes | Potency AI (7004) for  pharmaceutical, and for medical device kits with pharmaceutical (cases only for both situations) |
| Highest – Hospital AIDC marking of pharmaceutical | GTIN-8,  GTIN-12,  GTIN-13, or GTIN-14 | No | AI (7003) for short-life  products | Yes | None |
| Hospital AIDC marking of medical devices | No | No | No | No | None |

To manage healthcare data requirements within EPC/RFID tags, see section 3.11 and the most recent version of the *EPC Tag Data Standard*.

***Optional***

Not applicable

***Rules***

Not applicable

**Data carrier specification**

***Carrier choices***

■ Symbols from the EAN/UPC symbology family (UPC-A, UPC-E, may be used to encode the GTIN 12, EAN-13 to encode the GTIN-13 and, if the size requirements are met, EAN-8 to encode the GTIN-8 of the trade item that is a single product).

■ ITF-14 symbols may be used where printing conditions require the application of a less demanding symbology. ITF-14 symbols can encode the GTIN-12, or GTIN-13 of the item.

■ A GS1-128 barcode or GS1 DataBar barcode with GS1 Application Identifier (01) may be used to encode a GTIN that identifies the trade item if the printing conditions allow. The choice of one of these symbologies is particularly relevant if there is a need to encode attribute information in addition to the identification number.

Some scanning systems may be able to handle 2D barcodes as well as linear barcodes. In these environments, GS1 DataMatrix and GS1 QR Code may be used in addition to linear symbols. For information on how to manage multiple barcodes see section 4.15.

For trade items used in manufacturing and maintenance, repair & overhaul (MRO) processes the following data carrier choices take precedence over the carrier choices above: GS1-128, GS1 DataMatrix, GS1 QR Code and EPC/RFID.

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For healthcare, the following carrier selections take precedence over the carrier choices above and apply to all regulated healthcare retail consumer trade items.

**Figure 2.1.7.1-2.** Healthcare carrier choices

| **Preferred option(s) (this is the long-term direction for AIDC marking)** | First preference: GS1-128 symbology. After Jan 2010, GS1 DataBar is permitted for use on all trade items and therefore may be encountered in general distribution however use of GS1-128 is preferred as the scanners in the field today pervasively support it.  Second preference: When one linear symbol cannot accommodate the field length of the data (exceeds 48 characters), two symbols should be used.  Third option: Where the package or label size does not permit the use of the first two options, GS1 DataMatrix symbology are permitted but should be avoided wherever possible if the package could be scanned by a mounted conveyorised scanner. |
| --- | --- |
| **Option in addition to the barcode** | See the “data carrier specification carrier choices” recommendations on options in addition to the barcode at the end of section 2.1.5*.* |
| **Other acceptable options (GS1 strongly supports existing options for symbol marking as a guiding principle and**  **therefore supports all**  **previous AIDC marking**  **specifications)** | See the “data carrier specification carrier choices” recommendations on other acceptable options found at the end of section 2.1.5*.* |

***Symbol X-dimensions, minimum symbol height and minimum symbol quality***

For multi-sector use except for retail or regulated healthcare trade items see section 5.12.3.2, *GS1 symbol specification table 2*.

For regulated healthcare non-retail consumer trade items see section 5.12.3.8, *GS1 symbol specification table 8*.

For manufacturing and MRO processes see 5.12.3.4, *GS1 symbol specification table 4*.

***Symbol placement***

All the symbol placement guidelines defined in section 6.

**Unique application processing requirements**

For a description of processing requirements, see section 7.

**2.1.7.2 Trade item groupings of identical trade items**

**Application description**

A trade item grouping that is a predefined grouping of identical trade items. The manufacturer or supplier has the option of either assigning a unique GTIN-13 or GTIN-12 to each trade item grouping or assigning a unique GTIN-14. These 14-digit GTINs incorporate the GTIN (less its check digit) of the trade item contained in each grouping. The check digit for each GTIN-14 is then recalculated.

The indicators have no meaning. The digits do not have to be used in sequential order, and some may not be used at all. The GTIN-14 structure for trade item groupings creates extra numbering capacity.

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GTIN-8 based

GTIN-12 based

GTIN-13 based

**Figure 2.1.7.2-1.** GTIN-14 data structures

| Global Trade Item Number (GTIN) | | |
| --- | --- | --- |
| Indicator | GTIN of contained trade items  (without check digit) | Check  digit |
| N1 | 0 0 0 0 0 N7 N8 N9 N10 N11 N12 N13 | N14 |
| N1 | 0 N3 N4 N5 N6 N7 N8 N9 N10 N11 N12 N13 | N14 |
| N1 | N2 N3 N4 N5 N6 N7 N8 N9 N10 N11 N12 N13 | N14 |

The indicator is a digit with a value of 1 to 8. It is assigned as required by the company that constructs the identification number. It can provide up to eight separate GTIN-14s to identify trade item groupings.

The check digit is explained in section 7.9. Its verification, usually carried out automatically by the barcode reader, ensures that the number is correctly composed.

**Figure 2.1.7.2-2.** Different groupings of the same trade item

| Indicator | GTIN of trade item  contained in the grouping, less its check digit | New check digit | Description | Quantity |
| --- | --- | --- | --- | --- |
|  | 061414112345 | 2 | Trade item | Single |
| 1 | 061414112345 | 9 | Trade item grouping | A grouping |
| … | … | … | … | … |
| 8 | 061414112345 | 8 | Trade item grouping | Another grouping |
| Indicators 1 to 8 may be used to create new GTIN-14s. When these eight indicators have been used, further groupings must be identified with either a GTIN-13 or GTIN-12. Indicator digit 9 is reserved for variable measure trade items, see section 2.1.10. | | | | |

For packaging configuration hierarchies that include a retail consumer trade item identified with a GTIN-13, GTIN-12, or GTIN-8, this GTIN must always be one of the relevant levels of packaging contained, usually the lowest level (see note below related to GTIN-14 assignment on the primary packaging). Restricted Circulation Numbers must not be used in this element string.

**Note**: For regulated healthcare trade items on the primary packaging, the phrase “usually the lowest level” SHALL be interpreted as allowing for the use of GTIN-14 on packaging

configurations below the retail consumer trade item level, if one exists. This interpretation may not be applied to other trade item categories such as Do It Yourself (DIY) or Foodservice.

Any product package which will encounter scanning or product listing for sale at point-of-sale SHALL be identified according to retail point-of-sale specifications.

When a GTIN change at the retail consumer trade item level is required, the GTIN change must be made at all configuration levels above the retail consumer trade item level. Where there is an association between primary packaging and retail consumer trade item levels and GTIN-14 assignment is used on the primary packaging, the GTIN-14 assigned to the primary packaging is based on the retail level GTIN. There are three scenarios to consider for the relationship of these GTIN assignments:

- If changes to the primary packaging drive the change of the GTIN assigned to the retail consumer trade item level, the GTIN of the primary packaging will change.

- If changes to retail consumer trade item level GTIN are not caused by a change in primary packaging, the GTIN at the primary package level may or may not change per the discretion of the brand owner.

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- If additional retail level package(s) are introduced beyond the original retail package or replace the original retail package, the GTIN-14 on the primary packaging may remain tied to the original retail level GTIN.

**GS1 key**

***Required***

The allowed key formats for this application are:

■ GTIN-12

■ GTIN-13

■ GTIN-14

**Note**: Product groupings created prior to 2023 may be identified with a GTIN-8. Starting on 1 January 2023, GTIN-8 SHALL NOT be used for application.

***Rules***

All the GTIN rules described in section 4.

**Attributes**

***Required***

For regulated healthcare non-retail consumer trade items the following levels of AIDC marking are specified:

**Figure 2.1.7.2-3**. Required attributes

| AIDC marking level for regulated healthcare trade items | Key | Batch/lot  number -  AI (10) | Expiration  date – AI  (17) | Serial  number – AI (21) | Other |
| --- | --- | --- | --- | --- | --- |
| Minimum | GTIN-12, GTIN 13, or GTIN-14 | No | No | No | None |
| Enhanced | GTIN-12, GTIN 13, or GTIN-14 | Yes | Yes | No | None |
| Highest – Brand owner AIDC marking | GTIN-12, GTIN 13, or GTIN-14 | Yes | Yes | Yes | Potency AI (7004) for pharmaceutical, and for medical device kits with pharmaceutical (cases only for both situations) |
| Highest – Hospital AIDC marking of  pharmaceutical | GTIN-12, GTIN 13, or GTIN-14 | No | AI (7003)  for short  life  products | Yes | None |
| Hospital AIDC marking of medical devices | No | No | No | No | None |

To manage healthcare data requirements within EPC/RFID tags, see section 3.11 and the most recent version of the *EPC Tag Data Standard*.

***Optional***

Not applicable

***Rules***

Not applicable

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**Data carrier specification**

***Carrier choices***

■ For multi-sector use symbols from the EAN/UPC symbology family (UPC-A, UPC-E and EAN-13) may be used to encode the GTIN-12 or GTIN-13 of the trade item grouping.

■ ITF-14 symbols may be used on trade item groupings where printing conditions require the application of a less demanding symbology. ITF-14 symbols can encode the GTIN-12, GTIN-13, or GTIN-14 of the item.

■ A GS1-128 barcode or GS1 DataBar barcode with GS1 Application Identifier (01) may be used to encode a GTIN-12, GTIN-13, or GTIN-14 that identifies the trade item if the printing conditions allow. The choice of one of these symbologies is particularly relevant if there is a need to encode attribute information in addition to the identification number.

Some scanning systems may be able to handle 2D barcodes as well as linear barcodes. In these environments, GS1 DataMatrix and GS1 QR Code may be used in addition to linear symbols. For information on how to manage multiple barcodes see section 4.15.

For trade items used in manufacturing and maintenance, repair & overhaul (MRO) processes the following data carrier choices take precedence over the carrier choices above: GS1-128, GS1 DataMatrix, GS1 QR Code and EPC/RFID.

For healthcare the carrier selections noted at the end of section 2.1.7.1 take precedence over the carrier choices above and apply to all regulated healthcare retail consumer trade items.

***Symbol X-dimensions, minimum symbol height and minimum symbol quality***

For multi-sector use other than regulated healthcare trade items see section 5.12.3.2, *GS1 symbol specification table 2*.

For regulated healthcare non-retail consumer trade items see section 5.12.3.8, *GS1 symbol specification table 8*.

For manufacturing and MRO processes see 5.12.3.4, *GS1 symbol specification table 4*.

***Symbol placement***

All the symbol placement guidelines defined in section 6.

**Unique application processing requirements**

For a description of processing requirements, see section 7.

**2.1.7.3 Trade item groupings of mixed trade items**

**Application description**

A trade item grouping that is a predefined grouping of two or more different trade items. For example:

■ Product C is a grouping of Product A (GTIN ‘A’) and Product B (GTIN ‘B’), and is identified with either a GTIN-12 or GTIN-13, GTIN ‘C.’

■ GTIN ‘C’ could then be used to construct a GTIN-14 for a trade item grouping comprised of Product C.

As shown in figure 2.1.7.3-1, the GTIN-12s 614141234561 and 614141345670 identify the two trade items in the trade item assortment/bundle identified by the GTIN 614141456789.

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**Figure 2.1.7.3-1**. Example of trade item grouping of mixed trade items

| Indicator | GTIN of trade item less its check digit | Check digit | Description | Quantity |
| --- | --- | --- | --- | --- |
|  | 061414123456  061414134567 | 1  0 | Retail consumer trade item (Product A)  Retail consumer trade item (Product B) | Single  Single |
|  | 061414145678 | 9 | Retail consumer trade item (Product C) | Trade item  assortment/bundle |
| 1 | 061414145678 | 6 | Trade item grouping | A grouping of the trade item assortment/bundle |
| … | … | … | … | … |
| 8 | 061414145678 | 5 | Trade item grouping | Another grouping of the trade item  assortment/bundle |
| The indicators 1 to 8 may be used to create new GTIN-14s. When these eight indicators have been used, further groupings must be identified with either a GTIN-13 or GTIN-12. Indicator digit 9 is reserved for variable measure trade items, see section 2.1.10. | | | | |

**GS1 key**

***Required***

The allowed key formats for this application are:

■ GTIN-12

■ GTIN-13

■ GTIN-14

***Rules***

All the GTIN rules described in section 4; in addition, the GTIN-14 is valid for trade item groupings only when the trade item contained is a trade item assortment/bundle of two or more different trade items.

**Attributes**

Not applicable

**Data carrier specification**

***Carrier choices***

■ Symbols from the EAN/UPC symbology family (UPC-A, UPC-E and EAN-13) may be used to encode the GTIN-12 or GTIN-13 of the trade item grouping.

■ ITF-14 symbols may be used on trade item groupings where printing conditions require the application of a less demanding symbology. ITF-14 symbols can encode the GTIN-12, GTIN-13, or GTIN-14 of the item.

■ A GS1-128 barcode or GS1 DataBar barcode with GS1 Application Identifier (01) may be used to encode a GTIN-12, GTIN-13, or GTIN-14 that identifies the trade item if the printing conditions allow. The choice of one of these symbologies is particularly relevant if there is a need to encode attribute information in addition to the identification number.

Some scanning systems may be able to handle 2D barcodes as well as linear barcodes. In these environments, GS1 DataMatrix and GS1 QR Code may be used in addition to linear barcodes. For information on how to manage multiple barcodes see section 4.15.

For trade items used in manufacturing and maintenance, repair & overhaul (MRO) processes the following data carrier choices take precedence over the carrier choices above: GS1-128, GS1 DataMatrix, GS1 QR Code and EPC/RFID.

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For healthcare, the carrier selections noted at the end of section 2.1.7.1 take precedence over the carrier choices above and apply to all regulated healthcare retail consumer trade items.

***Symbol X-dimensions, minimum symbol height and minimum symbol quality***

For multi-sector use other than regulated healthcare trade items see section 5.12.3.2, *GS1 symbol specification table 2*.

For regulated healthcare non-retail consumer trade items see section 5.12.3.8, *GS1 symbol specification table 8*.

For manufacturing and MRO processes see 5.12.3.4, *GS1 symbol specification table 4*.

***Symbol placement***

All the symbol placement guidelines defined in section 6.

**Unique application processing requirements**

For a description of processing requirements, see section 7.

**2.1.8 Medical devices (non-retail trade items)**

**Application description**

Within this application are the rules and recommendations for the direct part marking (DPM) of medical devices for the Automatic Identification and Data Capture (AIDC) management, including medical devices that are reprocessed (within the micro-logistics cycle of use, including cleaning and sterilisation).

Medical devices SHOULD be identified with GTIN and any appropriate GS1 Application Identifiers used for production control, as determined by the responsible entity for the device. For medical devices that are reprocessed, GTIN and serial number are recommended for manufacturers that use DPM to enable traceability throughout the product life cycle.

Also, for hospitals or instrument owners that mark medical devices that are reprocessed, GTIN and serial number are recommended for all hospital/instrument owner marking. Some existing in-house legacy systems already use GS1 asset identifiers (GIAI or GRAI, see section 2.3), which are compliant with GS1 standards.

**Note**: Only one GS1 key (GTIN or GIAI/GRAI) SHOULD be marked on a single instrument. **GS1 key**

***Required***

The allowed key formats for this application are:

■ GTIN-12

■ GTIN-13

■ GTIN-14

■ GRAI

■ GIAI

***Rules***

■ All the GTIN rules described in section 4.

■ All the GIAI and GRAI application rules described in section 4.4.

■ If the AIDC marking on the medical device may be seen and scanned when placed in the protective packaging after sterilisation, the protective packaging will not have to be AIDC marked.

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**Attributes**

***Required***

Not applicable

***Optional***

When using GTIN-12, GTIN-13, or GTIN-14 to identify a medical device that is reprocessed, a serial number is recommended to complete the identification. To manage GS1 healthcare data requirements within EPC/RFID tags, see section 3.11 and the *EPC Tag Data Standard*.

***Rules***

Not applicable

**Data carrier specification**

***Carrier choices***

Medical devices (non-retail trade items), when direct marked, SHALL be marked with GS1 DataMatrix symbology. See section 2.6.14 for more details.

***Symbol X-dimensions, minimum symbol height and minimum symbol quality*** See section 5.12.3.7, *GS1 symbol specification table 7*.

***Symbol placement***

All the symbol placement guidelines defined in section 6.

**Unique application processing requirements**

For a description of processing requirements, see section 7.

**2.1.9 Fixed measure trade items packed in several individual pieces not scanned at retail POS**

**Application description**

The trade item includes two or more pieces that are marked for non-POS scanning purposes such as inventory management, theft prevention, or quality control. The identifier of each individual piece consists of the Global Trade Item Number (GTIN) of the trade item, the piece number and the total count of pieces in the trade item. The GTIN on all pieces of the trade item must be the same.

**GS1 key**

***Required***

The Global Trade Item Number (GTIN) is the GS1 identification key used to identify trade items. For the identification of pieces of a trade item, additional information is provided with a piece number and the total number of pieces. See section 3.2, Identification of an individual trade item piece: AI (8006).

***Rules***

■ AI (8006) SHALL NOT be used for the identification of a single trade item piece.

■ AI (8006) SHALL NOT be used for the identification of pieces that are themselves trade items, such as spare parts.

■ The value of AI (8006) of all pieces of a trade item SHALL contain the same GTIN, the same total number of pieces and a different piece number.

■ When the pieces of a trade item are packaged together, the value of the GTIN marked on the package SHALL be the same as the GTIN marked on the contained physical units.

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■ For trade items that pass the point-of-sale, all of the pieces of the trade item SHALL be packaged or presented together and identified with the GTIN.

Also see the GTIN rules described in section 4.

**Attributes**

***Required***

Not applicable.

***Optional***

See section 3 for an overview of all GS1 Application Identifiers and their intended usage.

***Rules***

See section 4.13 *Data relationships*. If used, optional AIs on all pieces of a trade item and on the trade item itself SHALL be identical.

**Data carrier specification**

***Carrier choices***

For multi-sector use except for regulated healthcare retail consumer trade items, data carriers used to represent each individual piece using the GS1 Application Identifier AI (8006) are GS1-128, GS1 DataMatrix, GS1 QR Code and EPC/RFID.

For healthcare, the following carrier selections take precedence over the carrier choices above and apply to all regulated healthcare retail consumer trade items.

**Figure 2.1.9-1.** Healthcare carrier choices

| Preferred option | GS1-128 symbology |
| --- | --- |
| Option in addition to the barcode | See the recommendations on "Options in addition to the barcode" at the end of section 2.1.5 |

***Symbol X-dimensions, minimum symbol height and minimum symbol quality***

See section 5.12.3.2, *GS1 symbol specification table 2* and 5.12.3.4, *GS1 symbol specification table 4*.

***Symbol placement***

All the symbol placement guidelines defined in section 6.

**Unique application processing requirements**

For a description of processing requirements, see section 7.

**2.1.10 Variable measure trade items scanned in general distribution**

**Application description**

Trade items may be of variable measure either because the production process does not guarantee consistency in weight, size, or length (e.g., carcasses of meat, whole cheeses) or because the items are created to meet a special order that states a quantity (e.g., textiles ordered by the metre, glass ordered by the square metre).

Only trade items that are sold, ordered, or produced in quantities that can vary continuously, are covered by the rules outlined in this section. Trade items that are sold in discrete and predefined bands (e.g., as a nominal weight) are treated as fixed measure trade items.

A trade item must be considered a variable measure trade item if its measure is variable at any point in the supply chain. For example, a supplier may sell and invoice chickens in cases of 15 kilograms each; therefore, the quantity of contained chickens will vary. The customer, a retailer in

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this example, may need to know the exact number of chickens contained in each case in order to organise the distribution to his stores. In this example, the supplier should source mark the trade item by using a variable measure Global Trade Item Number (GTIN) and the variable count element string.

Variable measure trade items scanned in general distribution are identified with a GTIN-14 beginning with ‘9’. The digit 9 in the indicator position indicates that the item identified is a variable measure trade item that is not scanned at POS.

**Note**: See section 2.6.8 for the GTIN-14 beginning with a '9' in combination with AI (242) Made-to-Order variation number and its use in the manufacturing and maintenance, repair &

overhaul (MRO) environment.

Unlike GTIN-14s beginning with indicator 1 to 8 which are used to identify fixed measure trade items (see section 2.1.7.2 *Trade item groupings of identical trade items*), this GTIN-14 is not derived from the GTIN (without check digit) of the contained trade items. The GTIN-14 must be processed in its entirety and not broken down into its constituent elements.

**Figure 2.1.10-1.** Format of the element string

(GTIN-14)

| Global Trade Item Number (GTIN) | | |
| --- | --- | --- |
| Indicator | GS1 Company Prefix  Item reference  ─────────────›  ‹───────────── | Check digit |
| 9 | N2 N3 N4 N5 N6 N7 N8 N9 N10 N11 N12 N13 | N14 |

The check digit is explained in section 7.9. Its verification, usually carried out automatically by the barcode reader, ensures that the number is correctly composed.

Any trade item of a given composition where the quantity/measure information cannot be pre determined for any reason is a variable measure trade item. The most frequent types are shown in the figure below.

**Figure 2.1.10-2.** Main types of variable measure trade items

| Type | Item description |
| --- | --- |
| **A** | Items traded in bulk, neither portioned nor pre-packed for retail sale, ordered in any quantity, and that are delivered as variable measure trade items (e.g., fish, fruit, vegetables, cables, carpets, timber, fabrics) The identification number denotes the item as a trade entity containing any quantity of the given product and, if applicable, the form of packaging. Weight or dimensions complete the identification of the individual unit. |
| **B** | Trade items ordered and delivered by piece (wrapped or unwrapped) and invoiced by weight or measure because weight or measure varies due to the nature of the product or due to the manufacturing process (e.g., whole cheese, sides of bacon, beef carcasses, fish, sausages, ham, chicken, cauliflower, motion picture films) The identification number denotes the item as a particular predefined entity and, if applicable, denotes the form of packaging. Price or weight or dimensions complete the identification of the individual item. |
| **C** | Portioned trade items, pre-packed for sale by weight to the consumer, not fixed in quantity. (e.g., meat, cheese, vegetables, fruit, fillets of fish, sliced poultry, cold cuts)  The identification number denotes the item type according to business practice and the form in which it is packed. Price weight or dimension completes the identification of the individual unit. |
| **D** | Trade items with selectable dimensions where GS1 system standard numbering does not make sense to cover the multiplicity of all variations (e.g., wooden planks, carpeting)  The identification number denotes the predefined basic trade item. The applicable dimension(s) completes the identification of the individual unit. |
| **E** | Composition of a fixed number of trade items that are Type B or Type C (e.g., a trade item containing 10 chickens (Type B).)  The identification number denotes the trade item grouping as an entity and, if applicable, its form of packaging. The total weight of all items contained completes the identification of the particular trade item. |
| **F** | Trade items made to customer specifications, restricted in use to the Maintenance, Repairs and Operations industrial supply sector, and sold business-to-business.  The identification number denotes a base custom item. The specific variation is identified by the Made-to-Order variation number. (See in section 3.2 for the list of all GS1 Application Identifiers). |

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**GS1 key**

***Required***

GTIN-14 with indicator digit 9.

***Rules***

The GTIN-14 with the indicator 9 is used to identify a variable measure trade item. The presence of the variable measure information is mandatory for the complete identification of a variable measure trade item. The digit 9 in the first position is an integral part of the GTIN.

The GTIN-14 data structure beginning with indicator 9 is not used on an item intended to cross the retail point-of-sale. Numbering of variable measure fresh food trade items intended to cross retail point-of-sale is defined in section 2.1.12.

**Attributes**

***Required***

The GTIN-14 identifies a variable measure trade item with respect to its fixed attributes or characteristics. To complete the identification of a variable measure trade item, the presence of an element string representing a trade measure is mandatory.

***Optional***

Applicable trade measures depend on the nature of the product. They may be a quantity, a weight, or any dimension.

■ An element string with GS1 Application Identifier (30) is used if the variable measure of the trade item is the number of items contained. In order to generate a short barcode, always enter an even number of digits in the data field “variable count of items” by inserting a leading zero if necessary. Concatenation of this element string with the GTIN of the item enhances the accuracy of the application. See section 3.6.1, *Variable count of items: AI (30)*.

■ An element string with GS1 Application Identifiers (31nn), (32nn), (35nn) and (36nn) is used if the variable measure of the respective trade item is weight, dimension, area, or volume. Only one element string of a given unit of measure may be applied on a particular item. Several element strings containing trade measures are possible on a particular item if the item is available in either unit of measure and if the applicable unit of measure is not distinguished for ordering and billing. This might apply if weight must be expressed in kilograms and pounds, see section 3.2, *Trade measures: AIs (31nn), (32nn), (35nn), (36nn)*.

■ An element string with GS1 Application Identifier (8001) contains the predefined variable fields of a roll product and it may be used for those variable roll products where the trade measures AI (31nn), (32nn), (35nn), (36nn) are not sufficient. The GTIN-14 can denote a basic roll product.

***Rules***

An element string with GS1 Application Identifier (30) SHOULD never be used to indicate the quantity contained in a fixed measure trade item. However, if it appears on a fixed measure trade item, it SHOULD NOT invalidate the trade item identification.

An element string with GS1 Application Identifier (8001) must never be used together with other element strings representing trade measures.

**Data carrier specification**

***Carrier choices***

Variable measure trade items not crossing a point-of-sale SHOULD be marked with an ITF-14 barcode, GS1-128 barcode or GS1 DataBar barcode.

Some scanning systems may be able to handle 2D barcodes as well as linear barcodes. In these environments, GS1 DataMatrix and GS1 QR Code may be used in addition to linear symbols. For information on how to manage multiple barcodes see section 4.15.

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***Symbol X-dimensions, minimum symbol height and minimum symbol quality*** See section 5.12.3.2, *GS1 symbol specification table 2*.

***Symbol placement***

All the symbol placement guidelines defined in section 6.

**Unique application processing requirements**

For a description of processing requirements, see section 7.

**Examples of variable measure trade item numbering and symbols**

In the examples in the subsections that follow, the following factors apply:

■ In order to be illustrative, all examples show the same presentation (e.g., price list, order, delivery, invoice and recording in a data file).

■ GS1-128 barcodes are used.

■ The examples are given to demonstrate the correct use of a given GS1 Application Identifier when used. When AI (02) is not used, information about the shipment must be received using Electronic Data Interchange (EDI) or other means prior to its physical receipt.

***Example 1: Traded by piece***

The following example shows the order and delivery of an item traded by piece and invoiced by weight.

■ The supplier’s catalogue contains one entry: one salami weighing ~ 500 grams.

■ The order for 100 units is delivered in three boxes. Each box is marked with an SSCC (Serial Shipping Container Code) and, optionally, with information on the content of the box, expressed as follows:

□ AI (02) indicates the variable measure Global Trade Item Number (GTIN) of the units contained within the box.

□ AI (3101) indicates the total weight of the items contained within the box.

□ AI (37) indicates the count of items contained within the box.

■ The three boxes may be stored on a pallet that may itself be marked with an SSCC and, optionally, with information on the contents of the pallet, expressed as follows:

□ AI (02) indicates the variable measure GTIN of the units contained within the pallet. □ AI (3101) indicates the total weight of the items contained within the pallet.

□ AI (37) indicates the count of items contained within the pallet.

■ The invoice refers to the GTIN and quantity delivered and shows the total weight and the price per kilogram. The GTIN and quantity of the invoice match the GTIN and quantity of the order.

**Figure 2.1.10-3**. Example 1: Traded by piece, invoiced by weight

| Process | Description | Element strings used/symbol marking of the items |
| --- | --- | --- |
| Supplier’s catalogue | 1 Salami ~ 500 g | GTIN 97612345000018 |
| Order | 100 salamis | 100 x 97612345000018 |
| Delivery | three logistic units  Unit 1 = 33 salamis, 16.7 kg  Unit 2 = 33 salamis, 16.9 kg  Unit 3 = 34 salamis, 17.1 kg | Unit 1: 00 376123450000010008  02 97612345000018 3101 000167 37 33  Unit 2: 00 376123450000010015  02 97612345000018 3101 000169 37 33  Unit 3: 00 376123450000010022  02 97612345000018 3101 000171 37 34 |
|  | If delivery is made on a pallet | Pallet: 00 376123450000010039  02 97612345000018 3101 000507 37 0100 |

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| Process | Description | Element strings used/symbol marking of the items |
| --- | --- | --- |
| Invoice | GTIN of items and the total weight (50.7 kg) + the price per kg | 100 x 97612345000018; 50.7 kg x price per kg |

| Data file logistic units | Identification of logistic unit (SSCC) | GTIN of contained trade items | Total trade  weight of  content (grams) | Number of  units  contained |
| --- | --- | --- | --- | --- |
| Either pallet | 376123450000010039 | 97612345000018 | 50700 | 100 |
| or individual units | 376123450000010008 | 97612345000018 | 16700 | 33 |
|  | 376123450000010015 | 97612345000018 | 16900 | 33 |
|  | 376123450000010022 | 97612345000018 | 17100 | 34 |

| Data file trade items | GTIN of trade item | Total trade weight (grams) | Number of trade items |
| --- | --- | --- | --- |
| One record per  identification number | 97612345000018 | 50700 | 100 |

An element string with an GS1 Application Identifier (410) represents the Global Location Number (GLN) of the recipient of a logistic unit. The GLN refers to the address where a particular transport unit identified with an SSCC is to be delivered. This element string is used in single leg transport operations. A logistic unit may include a barcode carrying the GLN of the unit’s intended destination. When scanning this element string, the data transmitted may be used to retrieve the related address and/or to sort the item by destination.

***Example 2: Traded by trade item grouping***

The following example shows the order and delivery of an item traded by trade item grouping and invoiced by weight.

■ The supplier’s catalogue contains one entry: one case of 20 steaks weighing ~ 200 grams each.

■ The order is for three cases. Each case delivered is marked with the Global Trade Item Number (GTIN) of a single case followed by the actual weight of the items contained.

■ The three cases may be stored on a pallet that may itself be marked with an SSCC (Serial Shipping Container Code) and, optionally, with information on the contents of the pallet, expressed as follows:

□ AI (02) indicates the variable measure GTIN of the units contained within the pallet. □ AI (3102) indicates the total weight of the items contained within the pallet.

□ AI (37) indicates the count of cases contained within the pallet.

■ The invoice refers to the GTIN and quantity delivered and shows the total weight and the price per kilogram. The GTIN and quantity of the invoice match the GTIN and quantity of the order.

**Figure 2.1.10-4.** Example 2: Traded by trade item grouping, invoiced by weight

| Process | Description | Element strings used/symbol marking of the items |
| --- | --- | --- |
| Supplier’s  catalogue | 1 case of 20 steaks ~ 200 g  vacuum packed | GTIN 97612345000117 |
| Order | Three cases | 3 x 97612345000117 |
| Delivery | Three trade items  Unit 1: weight = 4.150 kg  Unit 2: weight = 4.070 kg  Unit 3: weight = 3.980 kg | Unit 1: 01 97612345000117 3102 000415 Unit 2: 01 97612345000117 3102 000407 Unit 3: 01 97612345000117 3102 000398 |
|  | If delivery is made on a pallet | Pallet: 00 376123450000010091  02 97612345000117 3102 001220 37 03 |
| Invoice | GTIN of items and the total weight (12.20 kg) + the price per kg | 3 x 97612345000117; 12.2 kg x price per kg |

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| Data file logistic units | Identification of logistic unit (SSCC) | GTIN of contained trade items | Total trade  weight of  content (grams) | Number of  units  contained |
| --- | --- | --- | --- | --- |
| Pallet | 376123450000010091 | 97612345000117 | 12200 | 3 |

| Data file trade items | GTIN of trade item | Total trade weight | Number of trade items |
| --- | --- | --- | --- |
| One Record | 97612345000117 | 12200 | 3 |

***Example 3: Traded in bulk***

The following example shows an order and delivery of an item traded in bulk.

■ The supplier’s catalogue contains one entry: cabbage unwrapped sold in bulk by kilogram.

■ The order is for 100 kilograms. It is delivered in two cases. Each case is marked with the Global Trade Item Number (GTIN) of the cabbage followed by the actual weight of the items contained.

■ The two cases may be stored on a pallet that may itself be marked with an SSCC (Serial Shipping Container Code).

■ The invoice refers to the GTIN as ordered and shows the total weight and the price per kilogram. The delivered weight may be verified as being close to the ordered quantity.

**Figure 2.1.10-5.** Example 3: Traded in bulk

| Process | Description | Element strings used/symbol marking of the items |
| --- | --- | --- |
| Supplier’s  catalogue | Cabbage unwrapped sold in bulk by kilogram | GTIN 97612345000049 |
| Order | 100 kg of cabbage | 100 kg x 97612345000049 |
| Delivery | Two trade items  Unit 1: weight = 42.7 kg Unit 2: weight = 57.6 kg | Unit 1: 01 97612345000049 3101 000427  Unit 2: 01 97612345000049 3101 000576 |
|  | If delivery is made on a pallet | Pallet: 00 376123450000010107 |
| Invoice | GTIN of item and the total weight (100.3 kg) + the price per kg | 97612345000049 100.3 kg x price per kg |

| Data file logistic units | Identification of logistic unit (SSCC) | GTIN of contained trade items | Total trade  weight of  content (grams) | Number of  units  contained |
| --- | --- | --- | --- | --- |
| Pallet | 376123450000010107 | 97612345000049  97612345000049 | 42700  57600 | 1  1 |

| Data file trade items | GTIN of trade item | Total trade weight (grams) | Number of trade items |
| --- | --- | --- | --- |
| One record per trade item | 97612345000049  97612345000049 | 42700  57600 | 1  1 |

***Example 4: Traded by trade item grouping***

The following example shows an order of variable measure trade items by case that are invoiced by the number of pieces delivered.

■ The supplier’s catalogue contains one entry: one case of ~ 10 cabbages sold by piece.

■ The order is for two cases. Each case delivered is marked with the Global Trade Item Number (GTIN) of a single case followed by the actual count of the items contained.

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■ The two cases may be stored on a pallet that may itself be marked with an SSCC (Serial Shipping Container Code) and, optionally, with information on the contents of the pallet, expressed as follows:

□ AI (02) indicates the variable measure GTIN of the units contained within the pallet. □ AI (30) indicates the total count of the items contained within the pallet.

□ AI (37) indicates the count of cases contained within the pallet.

■ The invoice refers to the GTIN as ordered and delivered and the total count of items.

**Figure 2.1.10-6**. Example 4: Traded by trade item grouping, invoiced by piece

| Process | Description | Element strings used/symbol marking of the items |
| --- | --- | --- |
| Supplier’s  catalogue | Case containing ~10 cabbages sold by pieces | GTIN 97612345000285 |
| Order | Two cases | 2 x 97612345000285 |
| Delivery | Unit 1: 11 pieces  Unit 2: 12 pieces | Unit 1: 01 97612345000285 30 11  Unit 2: 01 97612345000285 30 12 |
|  | If delivery is made on a pallet | Pallet: 00 376123450000010138  02 97612345000285 30 23 37 02 |
| Invoice | GTIN of the trade item and the total quantity | 2 x 97612345000285 23 pieces x price per piece |

| Data file logistic units | Identification of logistic unit (SSCC) | GTIN of contained trade items | Total number of pieces  contained in the trade item | Number of  units  contained |
| --- | --- | --- | --- | --- |
| Pallet | 376123450000010138 | 97612345000285 | 23 | 2 |

| Data file trade items | GTIN of trade item | Total number of  pieces | Number of trade items |
| --- | --- | --- | --- |
| One Record | 97612345000285 | 23 | 2 |

***Example 5: Traded in bulk***

The following example shows a product that can be purchased from a supplier or sold to a customer by any length in metres.

■ The supplier’s catalogue contains one entry: cable T49 sold in metres.

■ The order is for one length of cable of 150 metres. The delivered package is marked with the Global Trade Item Number (GTIN) of the cable followed by the actual length of cable contained.

■ The invoice refers to the GTIN as ordered and delivered and the total length.

**Figure 2.1.10-7.** Example 5: Traded in bulk

| Process | Description | Element strings used/symbol marking of the items |
| --- | --- | --- |
| Supplier’s  catalogue | Cable T49 sold in any length in MTR | GTIN 97612345000063 |
| Order | One trade item of 150 MTR | 97612345000063 x 150 MTR |
| Delivery | One trade item, 150 MTR | 01 97612345000063 3110 000150 |
| Invoice | GTIN of the trade item and the total quantity | 1 x 97612345000063 150 x price per MTR |

| Data file trade items | GTIN of trade item | Total trade length (metres) |
| --- | --- | --- |
| One record | 97612345000063 | 150 |

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**2.1.11 Fixed measure trade items – restricted distribution applications**

This section describes applications where the item identification is defined only in a closed environment. However, within their closed environment these items may be processed along with trade items identified with Global Trade Item Numbers (GTINs) defined for open trade.

These identification numbers are known as Restricted Circulation Numbers (RCNs) and may be 8, 12 or 13 digits in length. Eight-digit numbers are known as RCN-8s, 12-digit numbers as RCN-12s and 13-digit numbers as RCN-13s.

The regulations established by GS1 Member Organisations for their country or assigned area should be observed for the allocation of these Restricted Circulation Numbers:

■ When assigned to company internal use, the structure and management of the numbers represented in the element strings of this section are the responsibility of the user. Number changes and reuse of expired numbers must be managed by the user based on their requirements.

■ When centrally administrated within a geographic area, the GS1 Member Organisation determines the structure and manages number allocation based on user requirements.

Restricted circulation fixed measure trade items are defined only in a closed environment. Therefore, the distribution of trade items marked in this way is restricted to a given geographic region or for use within a company. These items are either marked in the store by the retailer or are marked at the source by the supplier.

GS1 Member Organisations may assign one or several of the GS1 Prefixes 02, 20 through 29 for the identification of fixed measure trade items with RCN-13s or RCN-12s for use within a given geographic region or for use within a company.

Restricted circulation numbers (RCNs) SHALL only be encoded in EAN-8, EAN-13, UPC-A, or UPC-E symbols. RCNs SHALL NOT be encoded using any Application Identifiers.

**2.1.11.1 Company internal numbering – RCN-8 Prefix 0 or 2**

**Application description**

This element string uses an RCN-8 Prefix of 0 or 2. It provides two million identification numbers, which can be assigned for internal use in a company. When the RCN-8 Prefix is 0, the element string is sometimes called a velocity code because it is quicker to key enter.

This element string is for internal use in a company. The numbers are assigned by individual companies and do not provide unique identification if they leave the company premises.

**Figure 2.1.11.1-1.** Data structure RCN-8 Prefix 0 or 2

| RCN-8 Prefix | Item reference | Check digit |
| --- | --- | --- |
| N1 | N2 N3 N4 N5 N6 N7 | N8 |

The RCN-8 Prefixes 0 or 2 are system identifiers that show that the item identification number is under the sole control of the assigning company and that it is for internal item distribution.

The item reference is allocated by the company that uses the element string. The positions N2 to N7 may contain any digit.

The check digit is explained in section 7.9. Its verification, carried out automatically by the barcode reader, ensures that the number is correctly composed.

The data transmitted from the barcode reader means that one fixed measure trade item with a GTIN-8 has been captured.

**Note**: In addition to trade item identification, this element string may be used for any purpose that is supported by the company's equipment supplier.

**Note**: In some environments where numbers may have to be key entered, the EAN-8 barcode carrying RCN-8s (and the RCN-8 Prefix 0) may be confused with the numbers carried

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by a UPC-E barcode. If such a risk exists, it is preferable to use the RCN-8 Prefix 2 capacity for internal use.

**GS1 key**

Not applicable

**Attributes**

Not applicable

**Data carrier specification**

***Carrier choices***

■ EAN-8 (carrying a RCN-8)

***Symbol X-dimensions, minimum symbol height and minimum symbol quality*** See section 5.12.3.1, *GS1 symbol specification table 1*.

***Symbol placement***

Not applicable

**Unique application processing requirements**

Not applicable

**2.1.11.2 Company internal numbering – RCN-13 GS1 Prefix 04 (RCN-12 U.P.C. Prefix 4)**

**Application description**

Any company in the world may use this element string for company internal trade item numbering. If the RCN-12 U.P.C. Prefix 4 is being applied, the user company may structure the trade item number.

Although this element string is mainly used for the identification of trade items, it may be used for any purpose as long as it is kept within a restricted environment. This element string is for a company’s internal use. Because any company may use this element string, it does not provide unique identification of a trade item if it leaves the company’s premises.

**Figure 2.1.11.2-1.** Data structure RCN-13 Prefix 04

| GS1 Prefix | Item reference | Check digit |
| --- | --- | --- |
| 0 4 | N3 N4 N5 N6 N7 N8 N9 N10 N11 N12 | N13 |

The GS1 Prefix 04 is a system identifier showing that the identification number is under the sole control of the assigning company and that it is for internal trade item distribution.

The item reference is assigned by the company that uses the element string. Positions N3 to N12 may contain any digit.

The check digit is explained in section 7.9. Its verification, carried out automatically by the barcode reader, ensures that the number is correctly composed.

The data transmitted from the barcode reader means that one fixed measure trade item with a RCN 13 or RCN-12 has been captured.

**GS1 key**

Not applicable

**Attributes**

Not applicable

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**Data carrier specification**

***Carrier choices***

■ EAN-13 (carrying RCN-13)

■ UPC-A (carrying RCN-12)

***Symbol X-dimensions, minimum symbol height and minimum symbol quality*** See section 5.12.3.1, *GS1 symbol specification table 1*.

***Symbol placement***

Not applicable

**Unique application processing requirements**

Not applicable

**2.1.11.3 Company internal numbering – RCN-12 U.P.C. Prefix 0 (LAC and RZSC)**

**Application description**

The U.P.C. Company Prefix 0 includes a reserved capacity for company internal numbering, using Local Assigned Codes (LACs) or Retailer Zero-Suppression Codes (RZSCs), which are carried by a UPC-E barcode. U.P.C. Company Prefixes 000000 and 001000 to 007999 are used in this feature. For details, see the figure below.

Although this element string is mainly used for the identification of trade items in restricted distribution, it may be used for any purpose as long as it is kept within a restricted environment.

This element string is for a company’s internal use. Because any company may use this element string, it does not provide unique identification of a trade item if it leaves the company’s premises.

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**Figure 2.1.11.3-1.** UPC-E barcode option for the identification of GTINs for company internal distribution GTIN-12 Identification Number of Trade Item Check

Digit Represented in

UPC-E Symbol Positions

1 2 3 4 5 6 N1 N2 N3 N4 N5 N6 N7 N8 N9 N10 N11 N12

(0) 0 0 1 0 0 0 0 0 0 0 5 2 0 1 0 0 0 '5' (0) 0 0 7 9 9 9 0 0 0 0 9 7 0 7 9 9 9 '9'

LAC version = 35000 UPC-E Bar Code Applications

(0) 0 0 1 0 0 0 0 0 1 0 0 4 0 1 1 0 0 '0' (0) 0 0 5 0 0 0 0 0 9 9 9 2 0 5 9 9 9 '0'

RZSC version = 4500 UPC-E Bar Code Applications

(0) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 '0' (0) 0 0 0 0 0 0 0 0 9 9 9 7 0 0 9 9 9 '0'

Velocity version = 1000 UPC-E Bar Code Applications

In figure 2.1.11.3-1, each number position must only contain the digits shown in the upper and lower lines of each section and those in-between. On decoding, the extension to full length is determined by the value of the number in single quotes in the column represented in UPC-E barcode positions.

The check digit applies to the entire length of the RCN-12. In the UPC-E barcode, it is implicitly represented by the parity combination of the six symbol characters that are actually encoded. The check digit and how to calculate it is explained in section 7.9. Its verification, carried out automatically by the barcode reader, ensures that the number is correctly composed

**GS1 key**

Not applicable

**Attributes**

Not applicable

**Data carrier specification**

***Carrier choices***

UPC-E (carrying RCN-12 with GS1 Prefix 00 and digits 01 to 07 in the next two positions).

***Symbol X-dimensions, minimum symbol height and minimum symbol quality*** See section 5.12.3.1, *GS1 symbol specification table 1*.

***Symbol placement***

Not applicable

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**Unique application processing requirements**

It is possible to create a false UPC-E barcode if the encodation rules are not properly observed. Whether the digits represented in a UPC-E barcode can be expanded correctly to an RCN-12 may be verified by the tests shown in section 7.10.

**2.1.11.4 GS1 Prefixes 02, 20 to 29 - Restricted distribution**

**Application description**

The GS1 Prefixes 02, 20 to 29 are reserved for identification purposes within a restricted geographic area. Each GS1 Member Organisation is entitled to assign the prefixes to be used for these element strings in its country or assigned area:

■ for the identification of variable measure trade items or fixed measure trade items.

■ for internal numbering of variable measure trade items or fixed measure trade items by a particular company.

**Note**: Suppliers manufacturing their own label products for several different customers should use unique GS1 system numbering to distinguish their customers. If this is not done,

the supplier will not be able to use Electronic Data Interchange (EDI) or electronic catalogues.

Although this element string is mainly used for the identification of trade items, it may be used for any purpose as long as it is kept within a restricted environment.

This element string is for use within a GS1 Member Organisation's geographic region. The GS1 Member Organisation may assign a company a GS1 Prefix for use externally throughout a region or may assign the prefix for use internally within a region. The numbers are never unique if they leave the region and, if assigned for a company’s internal use, are not unique if they leave the company or region.

**Figure 2.1.11.4-1.** Format of the element string

| GS1 Prefix | Item reference | Check digit |
| --- | --- | --- |
| 0 2 | N3 N4 N5 N6 N7 N8 N9 N10 N11 N12 | N13 |
| 2 N2 | N3 N4 N5 N6 N7 N8 N9 N10 N11 N12 | N13 |

The GS1 Prefix must be in the series 02, 20 to 29. A particular prefix may be assigned either for use on fixed measure trade items for restricted distribution or for variable measure trade items (see section 2.1.12).

The item reference is assigned by the company that uses the element string. Positions N3 to N12 may contain any digit.

The check digit is explained in section 7.9. Its verification, carried out automatically by the barcode reader, ensures that the number is correctly composed.

The data transmitted from the barcode reader means that one fixed measure trade item with a RCN 13 or RCN-12 has been captured.

**GS1 key**

Not applicable

**Attributes**

Not applicable

**Data carrier specification**

***Carrier choices***

■ EAN-13

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***Symbol X-dimensions, minimum symbol height and minimum symbol quality*** See section 5.12.3.1, *GS1 symbol specification table 1*.

***Symbol placement***

Not applicable

**Unique application processing requirements**

Not applicable

**2.1.12 Variable measure trade items scanned at retail POS**

This section describes applications for variable measure trade items that are scanned at retail point of-sale. Two main applications exist:

■ Variable measure fresh food trade items using a GTIN and additional attributes encoded with GS1 DataBar Expanded or GS1 DataBar Expanded Stacked. See section 2.1.12.1. During a transition period, 2D barcodes may be applied in addition to the linear barcode. For a summary of all conformance requirements for this AIDC application standard, 2D barcodes, cross-application rules and related technical specifications, see section 8.4. GTINs SHALL be encoded with AI (01).

■ Variable measure trade items using a Restricted Circulation Number (RCN) SHALL be encoded in EAN/UPC barcodes. See section 2.1.12.2.

For information on how to manage multiple barcodes see section 4.15.

**2.1.12.1 Variable measure fresh food trade items scanned at retail POS using GTIN**

**Application description**

Like a fixed measure trade item, a variable measure trade item is an entity with predefined characteristics, such as the nature of the product or its contents. Unlike a fixed measure trade item, a variable measure trade item has one measure that varies continuously while other characteristics remain the same. In the case of fresh food trade items variable measure may be weight, length, number of items contained, or volume. There are different ways to handle the process for variable measure fresh food. For example:

■ Consumer puts loose produce items into a bag and a barcoded label is produced and attached by the consumer.

■ Staff attaches a barcode label, produced in store to pre-packed loose produce trade item. ■ At the POS, loose produce is weighed and the price is calculated.

It is at the discretion of the retailer how the price is calculated and which process is chosen.

**Variable measure fresh food**

Variable measure loose produce trade items are trade items which may be identified with a GTIN and additional data. The retailer decides how to handle Variable measure fresh food trade items sold at POS. Generally, the individual item(s) (i.e. loose produce) are put into a bag by the customer or by staff and are scanned (if a label is generated in store) or weighed at POS to generate the price. The attributes of variable measure trade items are barcoded when the trade item is weighed or measured in store. If the variable measure trade item is weighed at POS when presented to the cashier the price is generated in the register and directly added to the other products to complete the transaction.

**Variable measure pre-packed fresh food trade items**

These are Variable measure fresh foods trade items, either loose produce or cut from a bulk item, that are pre-packaged with differing weight or other variable measure using GTIN and attributes. The label put on the trade item encoding GTIN plus variable measure information and/or price is determined by the retailer.

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**GS1 key**

***Required***

The allowed key formats for this application are:

■ GTIN-12

■ GTIN-13

***Rules***

All GTIN rules described in section 4.2.

**Attributes**

***Required***

See section 3.6.1 and 3.6.2, a variable count or a trade measure (AIs (30), (31nn), (32nn), (35nn), (36nn))

***Optional***

■ See section 3.2 *- GS1 Application Identifiers in numerical order* for a complete list of all GS1 Application Identifiers. For instance, the amount payable and/or best before date may also be included.

■ For more details related to GS1 Application Identifiers for fresh foods, refer to the GS1 AIDC Fresh Foods Sold at Point-of-Sale Implementation Guideline.

***Rules***

Not applicable.

**Data carrier specification**

***Carrier choices***

■ GS1 DataBar Expanded

■ GS1 DataBar Expanded Stacked

**Note**: During a transition period, 2D barcodes may be applied in addition to the linear barcode. For a summary of all conformance requirements for this AIDC application standard,

2D barcodes, cross-application rules and related technical specifications, see section 8.4.

**Note**: GS1 data carriers using AIs encode a 14-digit numeric string. When encoding GTIN-13 or GTIN-12 after AI (01), zero-fill with one or two zeroes to the left of the GTIN.

***Symbol X-dimensions, minimum symbol height and minimum symbol quality*** See section 5.12.3.1, *GS1 symbol specification table 1*.

***Symbol placement***

None

**Unique application processing requirements**

None

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**2.1.12.2 Variable measure trade items scanned at retail POS using RCN**

**Application description**

Restricted circulation variable measure trade items are those sold in random quantity against a fixed price per unit quantity and intended to cross a point-of-sale (e.g., apples sold at a fixed price per kilogram). These items are either marked in the store by the retailer or are marked at the source by the supplier. National solutions are available for this purpose.

GS1 Member Organisations SHOULD assign one or several of the GS1 Prefixes 02, 20 through 29 for the identification of variable measure trade items in their territory. GS1 Member Organisations SHOULD make part of this capacity available to user companies for company internal applications.

The data fields available after the relevant GS1 Prefix (defined by the GS1 Member Organisation for their territory) can be structured in a variety of ways to represent the product type, net weight, calculated price, or number of units. Equipment is commercially available for automatically weighing items, calculating an item price from the unit price and printing the information as a barcode label. The scanning equipment and applications can then be programmed to use the prefix as an instruction to decode the ensuing data fields according to the particular structure adopted.

The first row in the figure below shows the structure specified by GS1 US for North America. The same structure is used by many other GS1 Member Organisations. The next two rows do not show predetermined structures. Examples of recommended structures are given in the figure 2.1.12.2-2 below. GS1 Member Organisations choose appropriate structures for use within their geographic area.

**Figure 2.1.12.2-1.** Format of the element string

| GS1 Prefix | Item reference | Price verifier digit | Item price | Check digit |
| --- | --- | --- | --- | --- |
| 0 2 | N3 N4 N5 N6 N7 | N8 | N9 N10 N11 N12 | N13 |
| 0 2 | N3 N4 N5 N6 N7 N8 N9 N10 N11 N12 | | | N13 |
| 2 N2 | N3 N4 N5 N6 N7 N8 N9 N10 N11 N12 | | | N13 |

The item reference is usually assigned by the company that scans the element string at its point-of sale. However, some countries may specify their own standard numbering systems for variable measure products administered by their GS1 Member Organisation or by a trade association.

The price verifier digit is the result of a special calculation, and its verification ensures correct reading of the price. For details, see section 7.9. Security of reading this element string without a price verifier digit depends on the element string’s check digit (see section 7.9).

The item price is the price of the trade item in the relevant currency with an implied decimal point defined by the trading partners or the relevant GS1 Member Organisation. A different format is required for each position of the implied decimal point. Multiple formats require an unambiguous way to differentiate each format, and separate GS1 Prefixes may be assigned to accomplish this.

The check digit is explained in section 7.9. Its verification, carried out automatically by the barcode reader, ensures that the data corresponds with the verification rules.

**Figure 2.1.12.2-2**. Examples of alternative data structures

| Item reference | Price verifier digit | Item price |
| --- | --- | --- |
| Item reference | | Item price |
| Item reference | Measure  verifier digit | Item measure |
| Item reference | | Item measure |

When the price (or weight) of an item is encoded using this element string, a price verifier digit or a measure verifier digit SHOULD be used. The measure verifier digit is calculated from the digits in the item measure field in the same way that the price verifier digit is calculated from the item price digits (see section 7).

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The item measure is a measurement of the trade item with a defined unit of measure and an implied decimal point position. The unit of measure and decimal point position are defined within the relevant geographic area for each GS1 Prefix and/or format code. The item measure may be weight only if local weights and measures regulations permit.

The data transmitted from the barcode reader means that data about a variable measure trade item has been captured. The barcode reader normally performs the price verifier digit and the measure verifier digit calculation. Failing this, the calculation must take place in the application software.

Although each GS1 Member Organisation and/or user is free to develop a solution for numbering variable measure trade items, the GS1 system provides recommended structures that provide a degree of equipment standardisation. These formats may include an item reference, the retail price of the item and a price check digit. The recommended structures are shown in the figure below.

**Figure 2.1.12.2-3**. Recommended data structures

| GS1 Prefix | Recommended data structures (exact structure determined by GS1 Member Organisation) | Check digit |
| --- | --- | --- |
| 0 2  or  2 0 – 2 9 | I I I I I V P P P P | C |
| I I I I V P P P P P | C |
| I I I I I I P P P P | C |
| I I I I I P P P P P | C |

The GS1 Prefix is administered by each GS1 Member Organisation and denotes the format and meaning of a particular element string, where:

■ **I..I** = Item reference.

■ **V** = Price check digit calculated according to the algorithm specified in section 7.9. ■ **P..P** = Price in local currency.

■ **C** = Check digit calculated according to the standard algorithm in section 7.9.

**Note**: The price field may contain zero, one, or two implied decimal places depending on the monetary unit used. The decimal point, which is not included in the barcode, must

nevertheless be taken into account by the marking equipment when printing the human readable interpretation on the label.

GS1 Member Organisations may choose to implement a national solution for variable measure trade items branded by the supplier for retail. Any national branded variable measure solution requires GS1 Member Organisations to manage the allocation of the item number at a national level.

**GS1 key**

Not applicable

**Attributes**

Not applicable

**Data carrier specification**

***Carrier choices***

■ UPC-A (carrying RCN-12)

■ EAN-13 (carrying RCN-13)

***Symbol X-dimensions, minimum symbol height and minimum symbol quality*** See section 5.12.3.1, *GS1 symbol specification table 1*.

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***Symbol placement***

Not applicable

**Unique application processing requirements**

Not applicable

**2.1.13 Trade item extended packaging applications**

The information obtained from a consumer trade item’s packaging can be extended when consumers using mobile devices scan barcodes on the package, which leads them to more information or an application. This standard provides a standardised packaging solution, which will lead to brand owner authorised information.

Independent of whether a trade item is retail or non-retail, fixed or variable measure, if it is sold to the end consumer and utilises GTIN-based identification, then it is within the scope of this application.

This application standard has three approaches to enable extended packaging applications, ■ GS1 Digital Link URI syntax (2.1.13.1)

□ For new extended packaging applications, the GS1 Digital Link URI syntax is encoded in QR Code or Data Matrix.

■ GS1 element string (AI-based) syntax (2.1.13.2)

□ Prior to the GS1 Digital Link standard, GS1 approved two approaches to reach extended packaging applications that were available within the GS1 system of standards.

- An indirect mode of look-up via GTIN

This relies upon mobile device applications (apps) to use the GTIN encoded in

EAN/UPC, GS1 DataBar, GS1 DataMatrix, or GS1 QR Code. This approach remains

valid, but its implementation is limited by the lack of support for attributes of GTIN and the need to conduct a look-up to find a Web-based resource (indirect mode).

- A direct mode of look-up utilising GS1 element string (AI-based) syntax approach that relies upon AIs (01) and (8200) to produce a product URL

This uses the GTIN and an additional GS1 Application Identifier (8200) to produce a product URL. This approach can be used to reach brand owner authorised information or applications via direct mode, but implementation has been limited at the global

level by the need for an app to construct the URL from the decoded data.

For a summary of all conformance requirements for this AIDC application standard, cross-application rules and related technical specifications, see section 8.5.

**2.1.13.1 GS1 Digital Link URI syntax for extended packaging applications for trade items**

The GS1 Digital Link standard (DL) provides a packaging solution that can lead to brand owner authorised information. It uses a Web URI syntax to encode GS1 data, (e.g., GTIN and attribute data) in QR Code or Data Matrix barcodes. GTIN SHALL be expressed as 14 digits, with leading zeroes serving as filler digits, as defined by the *GS1 Digital Link Standard: URI Syntax*, and shown in the examples below. The *GS1 Digital Link Standard: URI syntax* is a ratified GS1 technical standard, see https://www.gs1.org/standards/gs1-digital-link.

Although the GS1 Digital Link standard offers a compressed form of the GS1 Digital Link URI syntax, this application SHALL use the uncompressed form. For example, GTIN 09506000134369 can be encoded in a QR Code or Data Matrix to form a GS1 DL URI

https://example.com/01/09506000134369.

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**Figure 2.1.13.1-1.** Examples of QR Code and Data Matrix with GS1 DL URI Syntax  

**Note**: The example.com domain name (reserved in RFC 2606) is used in the example as a place holder for any domain name.

As the GS1 DL encodes GS1 data in barcodes using a Web URI syntax, it differs from previous ‘direct’ and ‘indirect’ approaches described in section 2.1.13.2 because it explicitly encodes a resolvable Web URI. The GS1 Digital Link URI syntax also differs from the previous approaches in that it supports all GTIN attributes and provides standardised concatenation of multiple element strings.

**GS1 key**

***Required***

The allowed key formats for this application are:

■ GTIN-8

■ GTIN-12

■ GTIN-13

***Rules***

*See the GTIN rules described in section* 4.

**Attributes**

***Required***

Not Applicable

***Optional***

See section 3 for the overview of all GS1 Application Identifiers that may be used with trade items

**Data carrier specification**

***Carrier choices***

■ QR Code

■ Data Matrix

***Symbol X-dimensions, minimum symbol height and minimum symbol quality*** See 5.12.3.1, Symbol specification table 1 addendum 2 for GS1 Digital Link. ***Symbol placement***

For additional barcodes that carry GS1 DL URIs (i.e. QR Code and Data Matrix), see section 4.15.1.

**Unique application processing requirements**

For a description of processing steps, see section 7 and the GS1 Digital Link standard .

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**2.1.13.2 GS1 element string syntax for extended packaging applications for trade items**

The GS1 element string syntax provides an extended packaging solution that can lead to brand owner authorised information. The GTIN is the primary GS1 key used to access GS1 B2C data standards and services and all GS1 application standards for consumer trade items require GTIN, therefore this standard makes normative reference to the sections in the *GS1 General Specifications* related to consumer trade items in the figure below.

In addition to using GTIN and indirect mode to reach trusted data, the URL AI (8200) with GTIN can be used to reach brand owner authorised information or applications via direct mode. GTIN and AI (8200) are encoded as separate data elements in the barcode but once decoded they are processed in a standard fashion by concatenating the following three strings: the contents of AI (8200), followed by a slash (/) character, followed by the GTIN expressed as 14 numeric digits. For example, where a trade item’s GTIN, when expressed as 14 digits is 01234567890128 and the URL for direct mode access to information is http://example.com/01234567890128.

When encoded in the symbol, the sequence for encoding is (01) 01234567890128 (8200) http://example.com, but when processed the URL, a slash and the GTIN are combined to arrive at http://example.com/01234567890128.

The example provided is not intended to constrain the brand owner to the use of http URL schema, the .com top-level domain, or the specific structure of URL illustrated. Any URL may be used, and in processing the slash character and 14-digit GTIN are appended.

These values are also expressed in non-HRI text on the label (see section 4.14). If GTIN attributes beyond AI (8200) are encoded together with GTIN and PRODUCT URL they are processed and expressed in text on the label as http://brandownerassignedURL.com/gtin/serialnumber where serial number equals up to 20 alphanumeric digits.

**Figure 2.1.13.2-1.** Overview of related normative sections

| Section | Title | General retail POS | Regulated  healthcare: retail POS | Regulated  healthcare: non  retail / POC |
| --- | --- | --- | --- | --- |
| 2.1.3 | Fixed measure trade items scanned at retail POS | Yes |  |  |
| 2.1.3.6 | Fixed measure fresh food trade items  scanned at retail POS | Yes |  |  |
| 2.1.4 | Fixed measure trade items scanned in  general distribution and at retail POS | Yes |  |  |
| 2.1.5 | Healthcare primary packaging (non-retail trade items)\* |  |  | Yes |
| 2.1.6 | Healthcare secondary packaging (regulated healthcare retail  consumer trade  items)\* |  | Yes |  |
| 2.1.7.1 | Fixed measure trade items scanned in  general distribution - identification of a  trade item that is a single product\* |  |  | Yes |
| 2.1.12.1 | Variable measure  fresh food trade items scanned at retail  point-of-sale using GTIN | Yes |  |  |

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| Section | Title | General retail POS | Regulated  healthcare: retail POS | Regulated  healthcare: non  retail / POC |
| --- | --- | --- | --- | --- |
| **\*Important:** For healthcare applications AI (8200) will be deprecated on 31 December 2026, healthcare applications SHALL NOT utilise AI (8200) after this date | | | | |

**GS1 key**

***Required***

The allowed key formats for this application are:

■ GTIN-8

■ GTIN-12

■ GTIN-13

■ For regulated healthcare non-retail applications also: GTIN-14

***Rules***

All rules in the sections that appear in figure 2.1.13.2-1 apply as described in each section. **Attributes**

***Required***

For the purpose of direct mode, AI (8200) must be used in combination with GTIN when brand owners provide extended packaging information or applications.

***Optional***

For the purpose of indirect mode, all attributes in the sections which appear in the figure in section 2.1.13 apply as described in each section.

***Rules***

All rules in the sections that appear in figure 2.1.13.2-1 apply as described in each section. **Data carrier specification**

***Carrier choices***

For the purpose of supporting indirect mode, all carrier choices in the sections which appear in the figure 2.1.13.2-1 apply as described in each section.

For the purpose of direct mode, in addition to the symbol required for indirect mode, when AI (8200) is used, GS1 DataMatrix and GS1 QR Code are the only approved data carriers. See also section 4.15.

***Symbol X-dimensions, minimum symbol height and minimum symbol quality***

To determine the appropriate specifications for printing and quality control, see the GS1 symbol specification table(s) referred to in each application standard shown in figure 2.1.13.2-1.

***Symbol placement***

None defined.

**Unique application processing requirements**

For a description of processing requirements, see section 7.

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**2.1.14 European Regulation 2018/574, traceability of tobacco products**

This application standard provides a normative GS1 response to a specific regulatory requirement. It covers identification and marking of various entities per the *Commission Implementing Regulation (EU) 2018/574 on technical standards for the establishment and operation of a traceability system for tobacco products,* https://ec.europa.eu/health/tobacco/tracking\_tracing\_system\_en . If regulatory authorities outside the EU adopt the EU approach, this application standard is intended to support their efforts and enable global interoperability.

The regulation specifies where ISO/IEC 15459 compliant GS1 identification keys can be used to identify:

4. Unit packs (retail trade item consumer units) for traceability purposes (retail point of sale specifications are defined within separate application standard 2.1.3)

5. Aggregates defined as “*any packaging containing more than one unit packet of tobacco products*” (trade item groupings), including:

a. Trade item grouping (e.g., higher level aggregations of unit packs such as cartons and cases) defined within separate application standards 2.1.4 or 2.1.7.

b. Logistic units (e.g., aggregation of unit packs as transport units) defined within separate application standard 2.2.1.

6. Economic operators defined by EU 2018/574 as “any natural or legal person who is involved in the trade of tobacco products, including for export, from the manufacturer to the last economic operator before the first retail outlet” and where “Economic operators and operators of first retail outlets shall apply for an economic operator identifier code from the ID issuer competent for each Member State in which they operate at least one facility.”

7. Facilities defined by EU 2018/574 as “any location, building or vending machine where tobacco products are manufactured, stored or placed on the market”

8. Machines defined as “the equipment used for the manufacture of tobacco products which is integral to the manufacturing process”

The regulation also specifies ISO/IEC, AIM and GS1 compliant barcodes for unit packs and aggregations as well as ISO/IEC 15415 and 15416 print quality minimums.

The regulation introduces an extension of ISO/IEC 15459 Issuing Agency Codes (IACs) to identify the Member State appointed ID Issuer called the Unique Identification Code (UIC). As EU 2018/574 extends the IAC function to identify ID Issuers, GS1 will assign ID Issuer Unique Identification Codes (UICs) from its Issuing Agency Code allocation. GS1 identification keys will be used as they are currently used and their ‘values’ will remain unchanged for supply chain functions and systems as GS1 identification keys are already pervasively deployed and, in the case of Unit Pack Unique Identifier (upUI), already used for EU-CEG 2015/2186’s Tobacco Product Number *registrations.* Additionally, a GS1 identification key shall not become an EU 2018/574 compliant identifier for economic operators, facilities, or machines until GS1 validates the key and an appointed ID Issuer authorises the GS1 identification key for use. As multiple ID Issuers may authorise the same GS1 identification key value, the UIC must be concatenated before the GS1 identification key to provides context for national authorisation of a GS1 identification key to create an Economic Operator ID (EOID), Facility ID (FID), or Machine ID (MID).

In order to address the EU 2018/574 requirements while not modifying previously assigned values within GS1 identification keys, the following specifications are established.

**GS1 Issuing Agency Code-based, ID Issuer Unique Identification Code (with Extensions)**

1. One ID Issuer Unique Identification Code (UIC) SHALL be licensed to each ID Issuer that adopts a GS1 standards-based approach to EU 2018/574 identification. NOTE: UICs assigned by GS1 SHALL begin with a numeric character in the first position of the ID Issuer Unique Identification Code. Issuing Agency Codes 0 through 9 are allocated exclusively to GS1 and shall not be used in the first position of an ISO/IEC compliant identifier unless allocated by GS1.

2. A GS1 ID Issuer UIC SHALL be added before a GS1 identification key to form EU 2018/574 compliant economic operator identifiers (EOIDs), facility identifiers (FIDs) and machine identifiers (MIDs), while permitting use of GS1 identification keys without UIC to support open, supply chain business processes.

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3. The same AI SHALL be used for the UIC independent of its use with EOID, FID, or MID and the ID Issuer UIC value SHALL be the same whether used within upUI, EOID, FID, or MID and independent of the country where the ID Issuer (individual legal entity) operates.

4. As GS1 identification keys are international and because ID Issuer UIC is the same for all countries where it operates, a GS1 UIC Extension 1 SHALL directly follow the UIC. The GS1 UIC Extension 1 permits an ID Issuer to operate in all 28 EU Member States. An additional capacity of up to 54 countries is held in reserve for the potential adoption of solutions outside the EU of the EU 2018/574 approach. Of this 54, GS1 is holding 20 to allow capacity for geopolitical change.

5. GS1 supports GS1 and non-GS1 TPX algorithms. To communicate which algorithm is being used. GS1 UIC Extension 2 provide 41 alphanumeric characters each to GS1-based and non-GS1 based algorithm users.

**unit pack Unique Identifier (upUI)**

1. The UIC SHALL appear in the first position of the Third Party Controlled, Serialised Extension of GTIN (TPX) and SHALL be licensed, along with GS1 UIC Extensions 1 and 2, to each ID Issuer for the duration of their appointment by an official National Authority. GS1 UIC Extension 1 indicates the Member State where the ID Issuer is operating and UIC Extension 2 indicates whether a GS1 or non-GS1 algorithm is used. These two provisions are required to ensure identifiers are unique across National Authorities and between entities who are appointed as ID Issuer by each National Authority over time.

2. TPX SHALL appear before GTIN to accommodate the UIC. This will require an additional Group Separator character after the TPX (as the TPX is a non-predefined element string). Inclusive of the Group Separator character and AI, the maximum TPX element string length SHOULD NOT exceed 21 barcode symbol characters to accommodate high-speed production (e.g., two symbol characters for the GS1 Application Identifier and the first digit of the TPX, plus 19 alphanumeric for the remaining TPX data element).

**Aggregated unit packs (aUIs) offered as trade items (referred to as trade item groupings by GS1)**

1. Serialised GTINs (SGTINs), as determined by brand owners, SHALL be used.

2. As SGTINs are assigned by economic operators, they SHALL NOT be preceded by the UIC to form the aUI for trade item use in the EU 2018/574 system.

**Aggregated unit packs at transport unit level (referred to as logistic units by GS1)** 1. Serial Shipping Container Codes (SSCCs), as assigned by economic operators, SHALL be used.

2. As SSCCs are assigned by economic operators, they SHALL NOT be preceded by the UIC to form the aUI for trade item use in the EU 2018/574 system.

**Economic Operator ID (EOID)**

1. GLNs, as assigned by economic operators, SHALL be submitted within Economic Operator ID Request messages for ID Issuer authorization.

2. When authorised by the ID Issuer, the GLN SHALL be preceded by the UIC, GS1 UIC Extension 1 and Importer index to form the EOID for use in the EU 2018/574 system.

3. GLNs without the UIC SHALL continue to be used, as is, within GS1 Data Sharing Standards to support existing supply chain requirements.

**Facility (FID)**

1. GLNs, as assigned by economic operators, SHALL be submitted within Facility ID Request messages for ID Issuer authorization.

2. When authorised by the ID Issuer, the GLN SHALL be preceded by the UIC, GS1 UIC Extension 1 and Importer index to form the FID for use in the EU 2018/574 system.

3. GLNs without the UIC SHALL continue to be used, as is, within GS1 Data Sharing Standards to support existing supply chain requirements.

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**Machine ID (MID)**

1. GIAIs, as assigned by economic operators, SHALL be submitted within Machine ID Request messages for ID Issuer authorization.

2. When authorised by the ID Issuer, the GIAI SHALL be preceded by the UIC, GS1 UIC Extension 1 and Importer index to form the MID for use in the EU 2018/574 system.

3. GIAIs without the UIC SHALL continue to be used, as is, within GS1 Data Sharing Standards to support existing supply chain requirements.

**2.1.14.1 Trade Items at EU 2018/574 Unit Pack Level**

**GS1 identification key**

***Definition***

To identify trade items at unit pack level:

1. The GTIN-8 is the 8-digit GS1 identification key composed of a GS1-8 Prefix, item reference and check digit used to identify trade items.

2. The GTIN-12 is the 12-digit GS1 identification key composed of a U.P.C. Company Prefix, item reference and check digit used to identify trade items.

3. The GTIN-13 is the 13-digit GS1 identification key composed of a GS1 Company Prefix, item reference and check digit used to identify trade items.

**Note**: EU 2015/2186 specifies GTIN, UPC-12 and EAN-13 as a product number. UPC-12 is a legacy term replaced by GTIN-12. EAN-13 is a legacy term replaced by GTIN-13. GTIN-8 is

another legitimate structure of GTIN for retail-consumer trade items. As GTIN-14 is not permitted on retail consumer trade items as the value for GTIN in the EAN/UPC and upUI barcodes MUST be the same, GTIN-14 is not permitted for the EU 2018/574 unit pack Unique Identifier.

***Rules***

GTIN is used exclusively within GS1 traceability solutions (e.g., GS1 EPCIS-based solutions.)

When an additional barcode (beyond the retail point-of-sale barcode) is required to support inline printing, the GTIN in both barcodes SHALL be the same value per section 4.13.

All the GTIN rules described in section 4.

For general human readable interpretation rules see section 4.14*.* The regulation requires human readable text to reflect the characters which must be key entered in order to make a repository look-up. To reduce confusion of customs and other regulatory users GS1 Application Identifiers SHALL NOT be printed where the human readable text used for repository look-up is clearly indicated on the package.

**Attributes**

***Required***

For unit pack level, Third Party Controlled Serialised Extension of GTIN (TPX)

***Rules***

This solution supports interoperability by specifying Global Trade Item Number (GTIN) as the primary identification key for ‘product code’ within the unit level Unique Identifier (EU 2018/574 term for the serialised product code). After GTIN, all other requirements are met with the Third Party Controlled Serialised Extension of GTIN (TPX) as an attribute of GTIN.

The Unit Pack Unit Identifier (upUI) shall be up to 50 characters per EU 2018/574, but should be the shortest length possible that accommodates explicit encoding of the GTIN element string. This

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because GTIN provides backwards compatibility for the retail supply chain and the shortest length possible enables reliable high-speed printing.

**Note** Where the TPX is intended for high-speed, inline printing, the TPX data element should not exceed 20 alphanumeric characters. When encoded in a barcode, the 14-digit GTIN and Application Identifier (01) require eight symbol characters because numeric characters are encoded in barcodes at twice the efficiency of alpha or special characters. This means the total encoded characters for GTIN and TPX, when allocated for high-speed production lines, should not exceed 29 symbol characters.

The TPX SHALL always be encoded before GTIN to comply with EU 2018/574 UIC specifications. AI (21) Serial Number SHALL NOT be used when AI (235) is used.

***Optional***

For EU 2018/574 unit packs, a timestamp is optional within the data carrier.

If timestamp is encoded as a separate element string, AI (8008), date and time of production, to hourly precision, SHALL be used. If encoded, the AI (8008) element string to hourly precision (12 numeric characters, 8008YYMMDDhh) will require six barcode symbol characters in addition to mandatory GTIN and required TPX element strings (which should not exceed 29 symbol characters).

If timestamp is encoded, it may be omitted from the HRI adjacent to the data carrier unless the ID Issuer specifies that the timestamp is required to retrieve repository information related to the upUI.

If timestamp is not encoded, it MUST be shown in HRI below the data carrier.

In HRI, the TPX SHALL appear in the first position.

In the non-HRI text, the timestamp SHALL appear in the last position and be clearly separated from GTIN where AI (8008) is not encoded. Only GTIN, TPX and optionally timestamp, SHALL be permitted per EU 2018/574 in the data carrier for the unit pack Unique Identifier.

**Data carrier specification**

***Carrier choices, per EU 2018/574, for trade items at EU 2018/574 unit pack level*** ■ GS1 DotCode

**Note**: GS1 DotCode use is restricted to this application standard and only the unit level.

■ GS1 DataMatrix

■ GS1 QR Code

***Symbol X-dimensions, minimum symbol height and minimum symbol quality*** See section 5.12.3.12, *GS1 system symbol specification table 12*.

***Symbol placement***

For this application, a symbol is required on unit packs in addition to the symbol used at retail POS, therefore 4.15, Rule 4 Non-Adjacent Placement should be followed.

**Unique application processing requirements**

For a description of processing requirements, see section 7.

**2.1.14.2 Aggregated unit packs (aUIs) offered as trade items (referred to as trade item groupings by GS1)**

**GS1 identification key**

***Definition***

Within a GS1 based implementation, aggregated level UIs shall be generated and issued directly by the economic operator. A GTIN allocated by brand owners and a serial number determined by brand

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owners supports aggregate Unique Identifier (aUI) per EU 2018/574. To identify trade item groupings (unit pack aggregation - cartons, cases), see sections 2.1.4 or 2.1.7.

***Rules***

GTIN is used exclusively within GS1 traceability solutions (e.g., GS1 EPCIS-based solutions.) All the GTIN rules described in section 4.

**Attributes**

***Required***

AI (21) Serial Number.

***Rules***

Not applicable

***Optional***

For all the GS1 Application Identifiers (AI) that can be used with a GTIN, see section 3. **Data carrier specification**

***Carrier choices, per EU 2018/574, for trade item grouping*** *(unit pack aggregation into cartons, cases)*

■ GS1 DataMatrix

■ GS1 QR Code

■ GS1-128

**Note**: GS1-128 should be used, at a minimum, where the trade item grouping will encounter supply chain systems beyond those covered by this regulation. Where a trade item grouping

will also be sold at retail point-of-sale (e.g., carton of cigarettes), a barcode specified for POS (see section 2.1.4.) SHALL be used in addition to those introduced by this regulation. If the barcode specified for the regulation becomes specified for retail point-of-sale, one barcode will suffice.

***Symbol X-dimensions, minimum symbol height and minimum symbol quality*** See section 5.12.3.12, *GS1 system symbol specification table 12*.

***Symbol placement***

All the symbol placement guidelines defined in section 6.

**Unique application processing requirements**

For a description of processing requirements, see section 7.

**2.1.14.3 Aggregated unit packs at transport unit level (referred to as logistic units by GS1) GS1 identification key**

***Definition***

Within a GS1 based implementation, aggregated level UIs shall be generated and issued directly by the economic operator. SSCC, as allocated by economic operators, supports aggregate Unique Identifier (aUI) for transport units per EU 2018/574. To identify logistics units (unit pack aggregation transport units), per ISO/IEC 15459-1, see section 2.2.1.

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***Rules***

See section 4.3

**Attributes**

***Required***

Not applicable

***Rules***

See section 4.3.

***Optional***

Not applicable

**Data carrier specification**

***Carrier choices, per EU 2018/574, for logistic units (unit pack aggregation into transport units)***

■ GS1 DataMatrix

■ GS1 QR Code

■ GS1-128

**Note**: Use of GS1-128 should be used, at a minimum, where the logistics will encounter supply chain systems beyond those covered by this regulation.

***Symbol X-dimensions, minimum symbol height and minimum symbol quality*** See section 5.12.3.12, *GS1 system symbol specification table 12*.

***Symbol placement***

All the symbol placement guidelines defined in section 6.

**Unique application processing requirements**

For a description of processing requirements, see section 7.

**2.1.14.4 Machine Identification per at EU 2018/574 (referred to as individual asset by GS1) GS1 identification key**

***Definition***

Within a GS1 based implementation, machines (individual assets) are identified in two steps. First, the economic operator provides a Global Individual Asset Identifier (GIAI), which is validated by GS1. In parallel, ID Issuer validates all other attributes of the Machine ID (MID) Request. Once validated, the ID Issuer UIC, GS1 UIC Extension 1 and Importer index are concatenated before the GIAI to form the MID. To identify individual assets, see sections 2.3.2 and 3.9.4 Global Individual Asset Identifier (GIAI): AI (8004).

***Rules***

See section 4.4.

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**Attributes**

***Required***

GS1 UIC with Extension 1 and Importer index AI (7040)

***Optional***

Not applicable

**Data carrier specification**

Not applicable for EU 2018/574.

**Unique application processing requirements**

For a description of processing requirements, see section 7.

**2.1.14.5 Facility per at EU 2018/574 (referred to as physical location by GS1) GS1 identification key**

***Definition***

Within a GS1 based implementation, facilities (physical locations) are identified in two steps. First, the economic operator provides a Global Location Number (GLN), which is validated by GS1. In parallel, the ID Issuer validates all other attributes of the Facility ID (FID) Request. Once validated, the ID Issuer UIC, GS1 UIC Extension 1 and Importer index are concatenated before the GLN to form the FID. To identify physical locations, see sections 2.4 and 3.7.9 Identification of a physical location - Global Location Number: AI (414).

***Rules***

All the GLN rules described in section 4.5.

**Attributes**

***Required***

GS1 UIC with Extension 1 and Importer index AI (7040)

***Rules***

Per section 4.5

***Optional***

Not applicable

**Data carrier specification**

Not applicable for EU 2018/574.

**Unique application processing requirements**

For a description of processing requirements, see section 7.

**2.1.14.6 Economic operator per at EU 2018/574 (referred to as party by GS1) GS1 identification key**

***Definition***

Within a GS1 based implementation, economic operators (parties) are identified in two steps. First, the economic operator provides a Global Location Number (GLN), which is validated by GS1. In

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parallel, the ID Issuer validates all other attributes of the Economic Operator ID (EOID) Request. Once validated, the ID Issuer UIC, GS1 UIC Extension 1 and Importer index are concatenated before the GLN to form the EOID. To identify parties, see sections 2.4.5 and 3.7.12 Identification of a party - Global Location Number: AI (417).

***Rules***

All the GLN rules described in section 4.5.

**Attributes**

***Required***

GS1 UIC with Extension 1 and Importer index AI (7040)

***Rules***

Per section 4.5.

***Optional***

Not applicable

**Data carrier specification**

Not applicable for EU 2018/574.

**Unique application processing requirements**

For a description of processing requirements, see section 7.

**2.1.15 Identification of non-new trade items**

**Application description**

**Background**

All new trade items that are identified using the GS1 system will have been issued a GTIN prior to their first use or consumer purchase. The GTIN is the same for all instances of the same trade item. In addition to the GTIN, some trade items have additional, more granular identification information, such as consumer product variant (CPV), a batch/lot number and/or a serial number. Each of these more granular GS1 identification key components are always associated to the GTIN. In most cases, the GTIN is present on the packaging of a new trade item and encoded in a barcode (see section 4.13.2).

Some new trade items have barcodes or RFID tags that include one or more pieces of more granular identification information in addition to the GTIN. For example, an RFID tag that is encoded with GS1 identification will include the GTIN and the serial number of a new trade item. Another example is 2D barcodes, such as a QR Code with a GS1 Digital Link URI, which can also include more granular GS1 identification key components in addition to the GTIN.

**Trade item declarations and offer declarations**

**■** Trade item declarations

Any trade item has trade item declarations (see section 4.2.2.2) that is the set of all information that is on the label and in the original packaging. Trade item declarations are declared by the original GTIN allocator (the party that assigned the GTIN to the trade item before the first use or consumer purchase).

**■** Offer declarations

Any trade item that is being listed for sale has a set of offer declarations, which is the set of all information declared (or agreed to) by the seller about the trade item (inclusive of price, availability, terms of sale, claims, condition of the item, shipping information, returns information, etc).

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