The Global Language of Business

GS1 General Specifications Standard

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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

1.1.3 Foundational standard

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.

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.

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.

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.

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.

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).

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 (^{\prime}0^{\prime}) 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.

1.4.6 U.P.C. Company Prefix

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;

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:

\* digit characters ('0' to '9');

\* 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

\* 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.

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:

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/