GSMP:
General Specifications Change Notification (GSCN)

The Global Language of Business

WR #	GSCN Name	Effective Date
19-077	Regulated traceability of tobacco products	May 2019

Associated Work Request (WR) Number:

18-000281

Background:

Create a restricted (e.g. not for use at point of sale) AIDC Application Standard to support Commission *Implementing Regulation (EU) 2018/574 on technical standards for the establishment and operation of a traceability system for tobacco products,(EU) 2018/574. See:* https://ec.europa.eu/health/tobacco/tracking_tracing_system_en .

GS1 General Specification Change:

The recommended changes are highlighted below in blue, relative to GS1 General Specifications version 19.1

Disclaimer

- GTIN-13
- For regulated healthcare non-retail applications also: GTIN-14

Rules

All rules in the sections that appear in figure 2.1.13-1 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 2.1.13-1 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 2.1.13-1 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. In the case of regulated healthcare consumer trade items, only GS1 DataMatrix is approved. See also section 4.16.

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 2.1.13-1. See note below figure 5.11.3.1-2 *GS1 symbol specification table 1 addendum for AI (8200)* related to reverse and mirror-image representation constraint.

Symbol placement

None defined.

Unique application processing requirements

For a description of processing requirements, see section 7.

2.1.14 European Regulation 2018/574, traceability of tobacco products

Commented [CJ1]: WR19-077 new section

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 other regulatory authorities (outside the EU) adopt the EC 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:

1. Unit packs (retail trade item consumer units) for traceability purposes (retail point of sale specifications are defined within separate application standard 2.1.3)
2. 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*.

3. 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."
4. Facilities defined by EU 2018/574 as "any location, building or vending machine where tobacco products are manufactured, stored or placed on the market"
5. 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 authorizes the GS1 identification key for use. As multiple ID Issuers may authorize the same GS1 identification key value, the UIC must be concatenated before the GS1 identification key to provides context for national authorization 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.
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 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.

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 *4.14*.

All the GTIN rules described in section *4.2.1*.

For general human readable interpretation rules see section *4.15*. 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 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 *5.11.3.12*, *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 *4.16*, 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 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 *4.2.1*.

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 5.11.3.12, *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.

Rules

Attributes

Required

Not applicable

Rules

See section 2.2.1.

Optional

See section 2.2.1.

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 *5.11.3.12*, *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 *2.3.2*.

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 *4.6*.

Attributes

Required

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

Rules

Per section *2.4*.

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 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 *2.4.6* and *3.7.12* Identification of a party - Global Location Number: AI (417).

Rules

All the GLN rules described in section *4.6*.

Attributes

Required

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

Rules

Per section *2.4*.

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*.

2.7 Summary of applications and operative scanning environments ~~for GS1 system symbols~~

The figure below provides a cross-reference for all system applications defined in section 2 and the GS1 symbol specification tables (SSTs) in section 5. The application where the barcode will be used needs to be determined prior to locating the correct symbol specification table (SST) entry. Use the "SST(s)" column to find the SST appropriate for the application area. Because most application areas provide a reference to two symbol specification tables based on the operative scanning environment, a decision must be made between the two. See the decision tree in figure *5.11.2.6-2* to determine the correct symbol specification table.

Figure 2.7-1. Areas of GS1 system application

Application	See section	SST(s)	Carrier choices
Fixed measure trade items scanned at retail POS using:	*2.1.3*		
▪ GTIN-12 or GTIN-13	*2.1.3.1*	1	UPC-A, EAN-13, GS1 DataBar Retail POS family
▪ GTIN-12 carried by a UPC-E barcode	*2.1.3.2*	1	UPC-E
▪ GTIN-8	*2.1.3.3*	1	EAN-8, GS1 DataBar Retail POS family
▪ Hardcover books and paperbacks scanned at retail POS using ISBN, GTIN-13, or GTIN-12	*2.1.3.4*	1	EAN-13, UPC-A, UPC-E. Options: EAN/UPC 2-digit or 5-digit add-on symbols
▪ Serial publications scanned at retail POS using ISSN, GTIN-13, or GTIN-12	*2.1.3.5*	1	EAN-13, UPC-A, UPC-E. Options: EAN/UPC 2-digit or 5-digit add-on symbols
▪ Fixed measure fresh food trade items scanned at retail POS	*2.1.3.6*	1	GS1 DataBar Omnidirectional, GS1 DataBar Stacked Omnidirectional, UPC-A, EAN-13, EAN-8
Fixed measure trade items scanned in general distribution and at retail POS	*2.1.4*	3	EAN/UPC, GS1 DataBar Retail POS family
Healthcare primary packaging (non-retail trade items)	*2.1.5*	6	GS1-128, GS1 DataMatrix, GS1 DataBar, EAN/UPC, ITF- 14, Composite Component
Healthcare secondary packaging (regulated healthcare retail consumer trade items)	*2.1.6*	8 or 10	GS1-128, GS1 DataMatrix, GS1 DataBar, EAN/UPC, ITF-14, Composite Component
Fixed measure trade items scanned in general distribution	*2.1.7*	2	EAN/UPC, ITF-14, GS1-128, GS1 DataBar
▪ Regulated healthcare trade items	*2.1.7*	8	GS1-128, GS1 DataBar, GS1 DataMatrix, EAN/UPC, ITF-14
▪ Manufacturing, maintenance, repair and overhaul trade items	*2.1.7*	4	GS1-128, GS1 DataMatrix, GS1 QR Code
Medical devices (non-retail trade items)	*2.1.8*	7	GS1 DataMatrix
Fixed measure trade items packed in several individual pieces not scanned at retail POS	*2.1.9*	2, 4	GS1-128, GS1 DataMatrix, GS1 QR Code
▪ Healthcare trade items	*2.1.9*	8 or 10	GS1-128
Variable measure trade items scanned in general distribution	*2.1.10*	2	GS1-128, GS1 DataBar Expanded, GS1 DataBar Expanded Stacked, ITF-14
Fixed measure trade items – restricted distribution applications	*2.1.11*		
▪ Company internal numbering – RCN-8 Prefix 0 or 2	*2.1.11.1*	1	EAN-8
▪ Company internal numbering – RCN- 13 GS1 Prefix 04 (RCN-12 U.P.C. Prefix 4)	*2.1.11.2*	1	EAN-13, UPC-A
▪ Company internal numbering – RCN- 12 U.P.C. Prefix 0 (LAC and RZSC)	*2.1.11.3*	1	UPC-E

Application	See section	SST(s)	Carrier choices
▪ GS1 Prefixes 02, 20 to 29 - Restricted Circulation	2.1.11.4	1	EAN-13 symbols
Variable measure fresh food trade items scanned at retail point-of-sale using GTIN	2.1.12.1	1	GS1 DataBar Expanded, GS1 DataBar Expanded Stacked
Variable measure trade items scanned at retail point-of-sale using Restricted Circulation Numbers	2.1.12.2	1	EAN-13, UPC-A
Trade item extended packaging applications	2.1.13	1 Adden-dum	GS1 DataMatrix, GS1 QR Code
▪ Regulated healthcare trade items	2.1.13	6, 7, 8,or 10	GS1 DataMatrix only
Regulated trade item, at unit pack level, per EU 2018/574 for tobacco traceability (GTIN + Third-Party Controlled Serialised Extension of GTIN)	2.1.16	12	GS1 DataMatrix, GS1 QR Code, GS1 DotCode
Regulated trade item, at standard trade grouping level, per EU 2018/574 for tobacco traceability (SGTIN)	2.1.16	12	GS1 DataMatrix, GS1 QR Code, GS1 128
Regulated logistics unit per EU 2018/574 for tobacco traceability (SSCC)	2.1.16	12	GS1 DataMatrix, GS1 QR Code, GS1 128
Logistics units - individual logistic units	2.2.1	5	GS1-128 As additional symbol: GS1 DataMatrix, GS1 QR Code
Logistics units - multiple logistic units (GSIN, GINC)	2.2.2, 2.2.3	5	GS1-128, GS1 DataMatrix, GS1 QR Code
Assets – Global Returnable Asset Identifier (GRAI)	2.3.1	9	GS1-128, GS1 DataMatrix, GS1 QR Code
▪ Permanent marking of GRAI	2.3.1 2.6.14	7	GS1 DataMatrix, GS1 QR Code
Assets – Global Individual Asset Identifier (GIAI)	2.3.2	9	GS1-128, GS1 DataMatrix, GS1 QR Code
▪ Permanent marking of GIAI	2.3.2 2.6.14	7	GS1 DataMatrix, GS1 QR Code
Locations and parties - Identification of a physical location	2.4.4	9	GS1-128, GS1 Data Matrix, GS1 QR Code, EPC/RFID
Service relationships	2.5	11	GS1 DataBar Expanded, GS1 DataBar Expanded Stacked, GS1-128, GS1 DataMatrix, GS1 QR Code
Coupons identified using the Global Coupon Number	2.6.2	1	GS1 DataBar Expanded, GS1 DataBar Expanded Stacked
Coupon identification for restricted geographic distribution (GS1 Prefix 99) GS1 common currency coupon identification (GS1 Prefixes 981 to 983)	2.6.3.3 2.6.3.4 2.6.3.5	1	EAN-13
Coupon code identification for use in North America (AI 8110, 8112)	2.6.3.6 2.6.3.7	(*)	GS1 DataBar Expanded, GS1 DataBar Expanded Stacked or digitally transmitted
Refund receipts	2.6.4	1	EAN-13
Electronic serial identifier for cellular mobile telephones (CMTI): AI(8002)	2.6.5	4	GS1-128
Payment slips	2.6.6	4	GS1-128
Customer specific articles	2.6.7	1	EAN-13, UPC-A, ITF-14, GS1-128
Custom trade item	2.6.8	4	GS1–128, GS1 DataBar, GS1 DataMatrix, GS1 QR Code
Global Document Type Identifier for document control	2.6.9	9	GS1-128, GS1 DataMatrix, GS1 QR Code

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Application	See section	SST(s)	Carrier choices
Internal applications	*2.6.10*	N/A	GS1–128, GS1 DataBar Expanded, GS1 DataMatrix, GS1 QR Code
Consumer trade item production control	*2.6.11*	N/A	GS1 DataBar, GS1 DataMatrix, GS1 QR Code, GS1-128, Composite Component
Component/part identification	*2.6.12*	N/A	GS1-128, GS1 DataMatrix, GS1 QR Code
Global Model Number	*2.6.13*	N/A	N/A
Permanently marked items	*2.6.14*	4, 7	GS1 DataMatrix, GS1 QR Code
(*) See *US Coupon Application Guideline Using GS1 DataBar Expanded Symbols* for the appropriate SST.			

3.2 GS1 Application Identifiers in numerical order

Figure 3.2-1. GS1 Application Identifiers

AI	Data Content	Format (1)	FNC1 required (4)	Data title
00	*Serial Shipping Container Code (SSCC)*	N2+N18		SSCC
01	*Global Trade Item Number (GTIN)*	N2+N14		GTIN
02	*GTIN of contained trade items*	N2+N14		CONTENT
10	*Batch or lot number*	N2+X..20	(FNC1)	BATCH/LOT
11 (2)	*Production date (YYMMDD)*	N2+N6		PROD DATE
12 (2)	*Due date (YYMMDD)*	N2+N6		DUE DATE
13 (2)	*Packaging date (YYMMDD)*	N2+N6		PACK DATE
15 (2)	*Best before date (YYMMDD)*	N2+N6		BEST BEFORE or BEST BY
16 (2)	*Sell by date (YYMMDD)*	N2+N6		SELL BY
17 (2)	*Expiration date (YYMMDD)*	N2+N6		USE BY OR EXPIRY
20	*Internal product variant*	N2+N2		VARIANT
21	*Serial number*	N2+X..20	(FNC1)	SERIAL
22	*Consumer product variant*	N2+X..20	(FNC1)	CPV
235	*Third Party Controlled, Serialised Extension of GTIN (TPX): AI (235)*	N3+X..28	(FNC1)	TPX
240	*Additional product identification assigned by the manufacturer*	N3+X..30	(FNC1)	ADDITIONAL ID
241	*Customer part number*	N3+X..30	(FNC1)	CUST. PART NO.
242	*Made-to-Order variation number*	N3+N..6	(FNC1)	MTO VARIANT
243	*Packaging component number*	N3+X..20	(FNC1)	PCN
250	*Secondary serial number*	N3+X..30	(FNC1)	SECONDARY SERIAL
251	*Reference to source entity*	N3+X..30	(FNC1)	REF. TO SOURCE
253	*Global Document Type Identifier (GDTI)*	N3+N13+X..17	(FNC1)	GDTI
254	*GLN extension component*	N3+X..20	(FNC1)	GLN EXTENSION COMPONENT
255	*Global Coupon Number (GCN)*	N3+N13+N..12	(FNC1)	GCN
30	*Variable count of items (variable measure trade item)*	N2+N..8	(FNC1)	VAR. COUNT
310n (3)	*Net weight, kilograms (variable measure trade item)*	N4+N6		NET WEIGHT (kg)
311n (3)	*Length or first dimension, metres (variable measure trade item)*	N4+N6		LENGTH (m)
312n (3)	*Width, diameter, or second dimension, metres (variable measure trade item)*	N4+N6		WIDTH (m)
313n (3)	*Depth, thickness, height, or third dimension, metres (variable measure trade item)*	N4+N6		HEIGHT (m)
314n (3)	*Area, square metres (variable measure trade item)*	N4+N6		AREA (m^2)
315n (3)	*Net volume, litres (variable measure trade item)*	N4+N6		NET VOLUME (l)
316n (3)	*Net volume, cubic metres (variable measure trade item)*	N4+N6		NET VOLUME (m^3)
320n (3)	*Net weight, pounds (variable measure trade item)*	N4+N6		NET WEIGHT (lb)
321n (3)	*Length or first dimension, inches (variable measure trade item)*	N4+N6		LENGTH (i)
322n (3)	*Length or first dimension, feet (variable measure trade item)*	N4+N6		LENGTH (f)

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AI	Data Content	Format [1]	FNC1 required [4]	Data title
323n [3]	*Length or first dimension, yards (variable measure trade item)*	N4+N6		LENGTH (y)
324n [3]	*Width, diameter, or second dimension, inches (variable measure trade item)*	N4+N6		WIDTH (i)
325n [3]	*Width, diameter, or second dimension, feet (variable measure trade item)*	N4+N6		WIDTH (f)
326n [3]	*Width, diameter, or second dimension, yards (variable measure trade item)*	N4+N6		WIDTH (y)
327n [3]	*Depth, thickness, height, or third dimension, inches (variable measure trade item)*	N4+N6		HEIGHT (i)
328n [3]	*Depth, thickness, height, or third dimension, feet (variable measure trade item)*	N4+N6		HEIGHT (f)
329n [3]	*Depth, thickness, height, or third dimension, yards (variable measure trade item)*	N4+N6		HEIGHT (y)
330n [3]	*Logistic weight, kilograms*	N4+N6		GROSS WEIGHT (kg)
331n [3]	*Length or first dimension, metres*	N4+N6		LENGTH (m), log
332n [3]	*Width, diameter, or second dimension, metres*	N4+N6		WIDTH (m), log
333n [3]	*Depth, thickness, height, or third dimension, metres*	N4+N6		HEIGHT (m), log
334n [3]	*Area, square metres*	N4+N6		AREA (m^2), log
335n [3]	*Logistic volume, litres*	N4+N6		VOLUME (l), log
336n [3]	*Logistic volume, cubic metres*	N4+N6		VOLUME (m^3), log
337n [3]	*Kilograms per square metre*	N4+N6		KG PER m^2
340n [3]	*Logistic weight, pounds*	N4+N6		GROSS WEIGHT (lb)
341n [3]	*Length or first dimension, inches*	N4+N6		LENGTH (i), log
342n [3]	*Length or first dimension, feet*	N4+N6		LENGTH (f), log
343n [3]	*Length or first dimension, yards*	N4+N6		LENGTH (y), log
344n [3]	*Width, diameter, or second dimension, inches*	N4+N6		WIDTH (i), log
345n [3]	*Width, diameter, or second dimension, feet*	N4+N6		WIDTH (f), log
346n [3]	*Width, diameter, or second dimension, yard*	N4+N6		WIDTH (y), log
347n [3]	*Depth, thickness, height, or third dimension, inches*	N4+N6		HEIGHT (i), log
348n [3]	*Depth, thickness, height, or third dimension, feet*	N4+N6		HEIGHT (f), log
349n [3]	*Depth, thickness, height, or third dimension, yards*	N4+N6		HEIGHT (y), log
350n [3]	*Area, square inches (variable measure trade item)*	N4+N6		AREA (i^2)
351n [3]	*Area, square feet (variable measure trade item)*	N4+N6		AREA (f^2)
352n [3]	*Area, square yards (variable measure trade item)*	N4+N6		AREA (y^2)
353n [3]	*Area, square inches*	N4+N6		AREA (i^2), log
354n [3]	*Area, square feet*	N4+N6		AREA (f^2), log
355n [3]	*Area, square yards*	N4+N6		AREA (y^2), log
356n [3]	*Net weight, troy ounces (variable measure trade item)*	N4+N6		NET WEIGHT (t)
357n [3]	*Net weight (or volume), ounces (variable measure trade item)*	N4+N6		NET VOLUME (oz)
360n [3]	*Net volume, quarts (variable measure trade item)*	N4+N6		NET VOLUME (q)
361n [3]	*Net volume, gallons U.S. (variable measure trade item)*	N4+N6		NET VOLUME (g)

AI	Data Content	Format [1]	FNC1 required [4]	Data title
362n [3]	Logistic volume, quarts	N4+N6		VOLUME (q), log
363n [3]	Logistic volume, gallons U.S.	N4+N6		VOLUME (g), log
364n [3]	Net volume, cubic inches (variable measure trade item)	N4+N6		VOLUME (i^3)
365n [3]	Net volume, cubic feet (variable measure trade item)	N4+N6		VOLUME (f^3)
366n [3]	Net volume, cubic yards (variable measure trade item)	N4+N6		VOLUME (y^3)
367n [3]	Logistic volume, cubic inches	N4+N6		VOLUME (i^3), log
368n [3]	Logistic volume, cubic feet	N4+N6		VOLUME (f^3), log
369n [3]	Logistic volume, cubic yards	N4+N6		VOLUME (y^3), log
37	Count of trade items or trade item pieces contained in a logistic unit	N2+N..8	(FNC1)	COUNT
390n [3]	Applicable amount payable or Coupon value, local currency	N4+N..15	(FNC1)	AMOUNT
391n [3]	Applicable amount payable with ISO currency code	N4+N3+N..15	(FNC1)	AMOUNT
392n [3]	Applicable amount payable, single monetary area (variable measure trade item)	N4+N..15	(FNC1)	PRICE
393n [3]	Applicable amount payable with ISO currency code (variable measure trade item)	N4+N3+N..15	(FNC1)	PRICE
394n [3]	Percentage discount of a coupon	N4+N4	(FNC1)	PRCNT OFF
400	Customer's purchase order number	N3+X..30	(FNC1)	ORDER NUMBER
401	Global Identification Number for Consignment (GINC)	N3+X..30	(FNC1)	GINC
402	Global Shipment Identification Number (GSIN)	N3+N17	(FNC1)	GSIN
403	Routing code	N3+X..30	(FNC1)	ROUTE
410	Ship to - Deliver to Global Location Number	N3+N13		SHIP TO LOC
411	Bill to - Invoice to Global Location Number	N3+N13		BILL TO
412	Purchased from Global Location Number	N3+N13		PURCHASE FROM
413	Ship for - Deliver for - Forward to Global Location Number	N3+N13		SHIP FOR LOC
414	Identification of a physical location - Global Location Number	N3+N13		LOC No
415	Global Location Number of the invoicing party	N3+N13		PAY TO
416	GLN of the production or service location	N3+N13		PROD/SERV LOC
417	Party GLN: AI (417)	N3+N13		PARTY
420	Ship to - Deliver to postal code within a single postal authority	N3+X..20	(FNC1)	SHIP TO POST
421	Ship to - Deliver to postal code with ISO country code	N3+N3+X..9	(FNC1)	SHIP TO POST
422	Country of origin of a trade item	N3+N3	(FNC1)	ORIGIN
423	Country of initial processing	N3+N3+N..12	(FNC1)	COUNTRY - INITIAL PROCESS.
424	Country of processing	N3+N3	(FNC1)	COUNTRY - PROCESS.
425	Country of disassembly	N3+N3+N..12	(FNC1)	COUNTRY - DISASSEMBLY
426	Country covering full process chain	N3+N3	(FNC1)	COUNTRY – FULL PROCESS
427	Country subdivision of origin	N3+X..3	(FNC1)	ORIGIN SUBDIVISION
7001	NATO Stock Number (NSN)	N4+N13	(FNC1)	NSN

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AI	Data Content	Format [1]	FNC1 required [4]	Data title
7002	*UN/ECE meat carcasses and cuts classification*	N4+X..30	(FNC1)	MEAT CUT
7003	*Expiration date and time*	N4+N10	(FNC1)	EXPIRY TIME
7004	*Active potency*	N4+N..4	(FNC1)	ACTIVE POTENCY
7005	*Catch area*	N4+X..12	(FNC1)	CATCH AREA
7006	*First freeze date*	N4+N6	(FNC1)	FIRST FREEZE DATE
7007	*Harvest date*	N4+N6..12	(FNC1)	HARVEST DATE
7008	*Species for fishery purposes*	N4+X..3	(FNC1)	AQUATIC SPECIES
7009	*Fishing gear type*	N4+X..10	(FNC1)	FISHING GEAR TYPE
7010	*Production method*	N4+X..2	(FNC1)	PROD METHOD
7020	*Refurbishment lot ID*	N4+X..20	(FNC1)	REFURB LOT
7021	*Functional status*	N4+X..20	(FNC1)	FUNC STAT
7022	*Revision status*	N4+X..20	(FNC1)	REV STAT
7023	*Global Individual Asset Identifier (GIAI) of an assembly*	N4+X..30	(FNC1)	GIAI – ASSEMBLY
703s [8]	*Number of processor with ISO Country Code*	N4+N3+X..27	(FNC1)	PROCESSOR # s
7040	*GS1 UIC with Extension 1 and Importer index*: AI (7040)	N4+N1X2+X3+X4	(FNC1)	UIC+EXT
710	*National Healthcare Reimbursement Number (NHRN) – Germany PZN*	N3+X..20	(FNC1)	NHRN PZN
711	*National Healthcare Reimbursement Number (NHRN) – France CIP*	N3+X..20	(FNC1)	NHRN CIP
712	*National Healthcare Reimbursement Number (NHRN) – Spain CN*	N3+X..20	(FNC1)	NHRN CN
713	*National Healthcare Reimbursement Number (NHRN) – Brasil DRN*	N3+X..20	(FNC1)	NHRN DRN
714	*National Healthcare Reimbursement Number (NHRN) – Portugal AIM*	N3+X..20	(FNC1)	NHRN AIM
... [5]	*National Healthcare Reimbursement Number (NHRN) – Country "A" NHRN*	N3+X..20	(FNC1)	NHRN xxx
723s [8]	*Certification reference*	N4+X2+X..28	(FNC1)	CERT # s
8001	*Roll products (width, length, core diameter, direction, splices)*	N4+N14	(FNC1)	DIMENSIONS
8002	*Cellular mobile telephone identifier*	N4+X..20	(FNC1)	CMT No
8003	*Global Returnable Asset Identifier (GRAI)*	N4+N14+X..16	(FNC1)	GRAI
8004	*Global Individual Asset Identifier (GIAI)*	N4+X..30	(FNC1)	GIAI
8005	*Price per unit of measure*	N4+N6	(FNC1)	PRICE PER UNIT
8006	*Identification of an individual trade item piece*	N4+N14+N2+N2	(FNC1)	ITIP or GCTIN [6]
8007	*International Bank Account Number (IBAN)*	N4+X..34	(FNC1)	IBAN
8008	*Date and time of production*	N4+N8+N..4	(FNC1)	PROD TIME
8009	*Optically Readable Sensor Indicator*	N4+X..50	(FNC1)	OPTSEN
8010	*Component/Part Identifier (CPID)*	N4+X..30	(FNC1)	CPID
8011	*Component/Part Identifier serial number (CPID SERIAL)*	N4+N..12	(FNC1)	CPID SERIAL
8012	*Software version*	N4+X..20	(FNC1)	VERSION
8013	*Global Model Number (GMN)*	N4+X..30	(FNC1)	GMN or BUDI-DI [7]
8017	*Global Service Relation Number to identify the relationship between an organisation offering services and the provider of services*	N4+N18	(FNC1)	GSRN - PROVIDER

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AI	Data Content	Format (1)	FNC1 required (4)	Data title
8018	*Global Service Relation Number to identify the relationship between an organisation offering services and the recipient of services*	N4+N18	(FNC1)	GSRN - RECIPIENT
8019	*Service Relation Instance Number (SRIN)*	N4+N..10	(FNC1)	SRIN
8020	*Payment slip reference number*	N4+X..25	(FNC1)	REF No
8110	*Coupon code identification for use in North America*	N4+X..70	(FNC1)	-
8026	*Identification of pieces of a trade item (ITIP) contained in a logistic unit: AI (8026)*	N4+N14+N2+N2	(FNC1)	ITIP CONTENT
8111	*Loyalty points of a coupon*	N4+N4	(FNC1)	POINTS
8112	*Positive offer file coupon code identification for use in North America: (AI 8112)*	N4+X..70	(FNC1)	-
8200	*Extended Packaging URL*	N4+X..70	(FNC1)	PRODUCT URL
90	*Information mutually agreed between trading partners*	N2+X..30	(FNC1)	INTERNAL
91 to 99	*Company internal information*	N2+X..90	(FNC1)	INTERNAL

NOTES:

(1): The first position indicates the length (number of digits) of the GS1 Application Identifier. The following value refers to the format of the data content. The following convention is applied:

- n implied decimal point position
- N numeric digit
- X any character in figure *7.11-1*
- N3 3 numeric digits, predefined length
- N..3 up to 3 numeric digits
- X..3 up to 3 characters in figure *7.11-1*

(2): If only year and month are available, DD must be filled with two zeroes.

(3): The fourth digit of this GS1 Application Identifier indicates the number of decimal places (and in that way the implied decimal point position).

Example:

- 3100 Net weight in kg without a decimal point
- 3102 Net weight in kg with two decimal places

(4): All GS1 element strings that begin with GS1 Application Identifiers not contained in the predefined table shown in figure *7.8.4-2* SHALL be separated by a separator character unless this element string is the last one to be encoded in the symbol. For details on the separator character see section *7.8.3*.

(5) An example to illustrate future additional National Healthcare Reimbursement Numbers (NHRNs). If additional NHRN AIs are required, a request for a new NHRN AI SHALL be made through GSMP.

(6) ITIP is the preferred data title for AI (8006) and GCTIN will have a sunset date of January 2020.

(7) For medical devices, the default, global data title is BUDI-DI

(8) The fourth digit of this GS1 Application Identifier indicates the sequence number, allowing for multiple occurrences of the AI.

Figure 3.5.3-1. Format of the element string

GS1 Application Identifier	Consumer product variant
2 2	X_1 ——— variable length ———→ X_{20}

The GS1 Application Identifier (22) indicates that the data field contains a consumer product variant.

Note: The consumer product variant, AI (22), differs from the internal product variant, element string AI (20), which is relevant only to the brand owner and any third party acting on its behalf.

The data transmitted from the barcode reader means that the element string denoting a consumer product variant has been captured. The consumer product variant must be processed together with the GTIN of the trade item (see section *4.14 Data relationships*).

When indicating this element string in the non-HRI text section of a barcode label, the following data title SHOULD be used: **CPV**

3.5.4 Third Party Controlled, Serialised Extension of GTIN (TPX): AI (235)

Commented [CJ5]: WR19-077 (new section)

The GS1 Application Identifier (235) indicates that the GS1 Application Identifier data field contains a Third Party Controlled, Serialised Extension of GTIN (TPX).

This identifier is assigned to an entity for its lifetime. When combined with a GTIN, a TPX uniquely identifies an individual item and forms a unit pack Unique Identifier (upUI) for tobacco traceability per EU 2018/574. The serial number field is alphanumeric and may include all characters contained in figure *7.11-1*. The Third Party determines the TPX, but the TPX shall begin with the ID Issuer Unique Identification Code (UIC), followed by GS1 UIC Extension 1, and GS1 UIC Extension 2.

- The UIC begins with one numeric digit followed by one alphanumeric character from figure *7.11-1*, GS1 AI encodable character set 82.
- The GS1 UIC Extension 1 is one alphanumeric character from figure *7.11-1*, GS1 AI encodable character set 82
- The GS1 UIC Extension 2 is one alphanumeric character from figure *7.11-1*, GS1 AI encodable character set 82 For users of the GS1 algorithm, the characters 0-9, A-Z, and a-e SHALL be used for GS1 UIC Extension 2. For users of a non-GS1 algorithm, characters f-z and special characters SHALL be used.

When encoded in a GS1 barcode the TPX SHALL be encoded before the GTIN.

Note: Use of a Manufacturer's Serial Number, AI (21), SHALL be the default choice in all trade item application standards, unless otherwise specified within an application standard. Third Party Controlled, Serialised Extension of GTIN (required by regulation) SHALL NEVER be used in conjunction with a Manufacturer's Serial Number.

Figure 3.5.4-1. Format of the element string

GS1 Application Identifier	Third Party Controlled, Serialised Extension of GTIN
235	X_1 ——— variable length ———→ X_{28}

The data transmitted from the barcode reader means that the element string denoting a Third Party Controlled, Serialised Extension of GTIN has been captured. As this element string is an attribute of a trade item, it must be processed together with the GTIN of the trade item to which it relates.

When indicating this element string in the non-HRI text section of a barcode label, this element string in the non-HRI text section of a barcode label, the following data title SHOULD be used (see also section *3.2*): **TPX**

as stand-alone information or in combination with the GS1 identification key to which it relates. When indicating this element string in the non-HRI text section of a barcode label, the following data title SHOULD be used: **LOC NO.**

3.7.10 Global Location Number of the invoicing party: AI (415)

The GS1 Application Identifier (415) indicates that the GS1 Application Identifier data field contains the Global Location Number (GLN) of the invoicing party.

The GS1 Company Prefix is allocated by GS1 Member Organisations to the company that allocates the GLN – here the invoicing party (see section *1.4.4*). It makes the number unique worldwide.

The structure and content of the location reference is at the discretion of the party who defined the location, in order to uniquely identify each location.

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

Note: This element string is mandatory on a payment slip. Together with the payment slip reference number, AI (8020), it uniquely identifies a payment slip.

Figure 3.7.10-1. Format of the element string

GS1 Application Identifier	GS1 Company Prefix →								← Location reference				Check digit
4 1 5	N_1	N_2	N_3	N_4	N_5	N_6	N_7	N_8	N_9	N_{10}	N_{11}	N_{12}	N_{13}

The data transmitted from the barcode reader means that the element string denoting the GLN of the invoicing party has been captured. This element string must be processed together with the payment slip reference number to which it relates (see section *4.14 Data relationships*). When indicating this element string in the non-HRI text section of a barcode label, the following data title SHOULD be used: **PAY TO**

3.7.11 GLN of the production or service location: AI (416)

The Application Identifier (416) indicates that the GS1 Application Identifier data field contains the Global Location Number (GLN) of the production or service location.

The GS1 Company Prefix is allocated by GS1 Member Organisations to the company that allocates the GLN (see section *1.4.4*).

The structure and content of the location reference is at the discretion of the party that defined the location.

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

Figure 3.7.11-1. Format of the element string

GS1 Application Identifier	GS1 Company Prefix →								← Location reference				Check digit
4 1 6	N_1	N_2	N_3	N_4	N_5	N_6	N_7	N_8	N_9	N_{10}	N_{11}	N_{12}	N_{13}

The data transmitted from the barcode reader means that the element string denoting the GLN of production or service location has been captured. This element string may be processed as stand-alone information or in combination with the GS1 identification key to which it relates. When indicating this element string in the non-HRI text section of a barcode label, the following data title SHOULD be used: **PROD/SERV LOC**

3.7.12 Party GLN: AI (417)

Commented [CJ6]: WR19-077 new section

The GS1 Application Identifier (417) indicates that the GS1 Application Identifier data field contains the Global Location Number (GLN) of a party. The GS1 Company Prefix (GCP) is allocated by GS1 Member Organisations to the company that allocates the GLN. The GCP makes the number unique

worldwide. The structure and content of the party reference is at the discretion of the party in order to uniquely identify themselves.

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

Figure 3.7.12-1. Format of the element string

GS1 Application Identifier	GS1 Company Prefix ⟶							⟵ Location reference				Check digit
4 1 7	N_1	N_2	N_3	N_4	N_5	N_6	N_7	N_8	N_9	N_{10}	N_{11}	N_{12}	N_{13}

The data transmitted from the barcode reader means that the element string denoting a Party GLN has been captured.

When indicating this element string in the non-HRI text section of a barcode label, this element string in the non-HRI text section of a barcode label, the following data title SHOULD be used: **PARTY**

3.7.13 Ship to - Deliver to postal code within a single postal authority: AI (420)

The GS1 Application Identifier (420) indicates that the GS1 Application Identifier data field contains the postal code of the addressee (national format). The postal code field contains the postal code of the addressee as defined by the appropriate postal authority. It is left justified and must not contain any fill characters.

Figure 3.7.13-1. Format of the element string

GS1 Application Identifier	Postal code
4 2 0	X_1——variable length——⟶X_{20}

The data transmitted from the barcode reader means that the element string denoting the national version of a postal code of the addressee of the transport unit has been captured. This element may be processed as stand-alone information or in combination with the GS1 identification key to which it relates. Restrictions apply to the use of AI (420) in combination with other AIs, see section 4.14 *Data relationships.* When indicating this element string in the non-HRI text section of a barcode label, the following data title SHOULD be used : **SHIP TO POST**

3.7.14 Ship to - Deliver to postal code with three-digit ISO country code: AI (421)

The GS1 Application Identifier (421) indicates that the GS1 Application Identifier data field contains the postal code of the addressee (international format). The ISO country code field contains the three-digit country number of the numerical international standard *ISO 3166*.

The national postal code field, which follows the three-digit ISO country code, contains the postal code of the addressee as defined by the appropriate postal authority. It is left justified and must not contain any fill characters.

Figure 3.7.14-1. Format of the element string

GS1 Application Identifier	ISO country code	Postal code
4 2 1	N_1 N_2 N_3	X_4—variable length—⟶X_{12}

The data transmitted from the barcode reader means that the element string denoting the international version of a postal code of the addressee of the transport unit has been captured. This element string may be processed as stand-alone information or in combination with the GS1 identification key to which it relates. Restrictions apply to the use of AI (421) in combination with other AIs, see section 4.14 *Data relationships.*

When indicating this element string in the non-HRI text section of a barcode label, the following data title SHOULD be used: **SHIP TO POST**

For a typical meat supply chain, the following sequence would be used:

- 7030: slaughterhouse.
- 7031: first deboning/cutting hall.
- 7032 to 7037: second through seventh processing location (cutting hall).
- 7038: slaughterhouse.
- 7039: slaughterhouse.

For a typical seafood supply chain, the following sequence would be used:

- 7030 vessel/aquaculture site.
- 7031 primary processor.
- 7032 secondary processor.

The ISO country code contains the three-digit country number of the numerical international standard *ISO 3166* that relates to the following approval number of processor.

If '999' is entered as the ISO country code it signifies that the subsequent data is a Global Location Number (GLN), and not an 'approval number'.

Note: The approval number is usually assigned by a national or pluri-national authority to processors in the food supply chain. These authorities may choose to use the Global Location Number (GLN) (see section 2.4) for this purpose. The approval number (or GLN) remains with the item regardless of whether or not it changes ownership or function.

Figure 3.8.16-1. Format of the element string

GS1 Application Identifier	ISO country code	Number of processor
7 0 3 s	N_1 N_2 N_3	X_4 ——variable length——› X_{30}

The data transmitted from the barcode reader means that the element string denoting the ISO country code and number of processor has been captured. As this element string is an attribute of a trade item, it must be processed together with the GTIN of the trade item to which it relates (see section 4.14 *Data relationships*).

When indicating this element string in the non-HRI text section of a barcode label, the following data title SHOULD be used: **PROCESSOR # s**

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

Commented [CJ7]: WR19-077 new section

The GS1 Application Identifier (7040) indicates that the GS1 Application Identifier data field contains the Unique Identification Code of an EU 2018/574 ID Issuer, the National Authority that appointed it (via the GS1 UIC Extension 1), and, if applicable, the Importer (via an Importer Index). The UIC begins with one numeric digit followed by one alphanumeric character from the ISO/IEC 646 invariant character set per section 7.11. The GS1 UIC Extension 1 is one alphanumeric character from the ISO/IEC 646 invariant character set per section 7.11. The Importer Index is one character and include A-Z, a-z, 0-9, - (hyphen), and _ (underscore). Underscore is used to indicate the importer index does not apply (null). The other characters identify up to 63 importers of a product per country of placement. This identifier is authorised for use by the ID Issuer as long as it meets minimum requirements established by GS1. The use of UIC is limited to application standard 2.1.14 European Regulation 2018/574, traceability of tobacco products. The UIC shall be used solely exclusively to facilitate identification of country level authorization for GS1 identification keys within illicit trade surveillance systems. The UIC shall not be used with GS1 identification keys for open, supply chain systems.

Figure 3.8.17-1. Format of the element string

GS1 Application Identifier	GS1 UIC with Extension 1 and Importer index		
	GS1 UIC	Extension 1	Importer index
7 0 4 0	N_1 X_2	X_3	X_4

The data transmitted from the barcode reader means that the element string denoting a Unique Identification Code has been captured.

When indicating this element string in the non-HRI text section of a barcode label, this element string in the non-HRI text section of a barcode label, the following data title SHOULD be used: **UIC+EXT**

3.8.18 National Healthcare Reimbursement Number (NHRN): AIs (710), (711), (712), (713), and (714)

The GS1 Application Identifiers (710), (711), (712), (713), and (714) indicate that the GS1 Application Identifier data field contains a National Healthcare Reimbursement Number, from the NHRN GS1 Application Identifier series, associated to the Global Trade Item Number (GTIN) of the trade item. The GS1 Application Identifiers (710), (711), (712), (713), and (714) indicate a specific NHRN from within the assigned series.

Use of the NHRN GS1 Application Identifier, associated to the GTIN of the trade item, is needed for compliance with a national/regional regulatory or industry requirement where the GTIN will not meet the need.

GTIN is the GS1 identifier for pharmaceutical and medical device trade items. The GS1 Application Identifier for National Healthcare Reimbursement Number is provided to meet regulatory or industry requirements until they are amended to accept the GTIN as a compliant identifier.

Within this application are the rules and recommendations for the association of NHRNs to the Global Trade Item Number (GTIN) where regulatory requirements require an NHRN for product identification, registration or reimbursement purposes.

There are a number of known NHRNs but at this time not all are required to be encoded within the data carrier found on the trade item. Flexibility for additional assigned NHRN AIs has been provided if required.

The National Healthcare Reimbursement Number GS1 Application Identifier is an initial step in a migration path to the most efficient method to identify trade items. GS1 recommends that Healthcare stakeholders faced with national numbers:

a. Use GTIN for all supply chain and reimbursement purposes (GTIN used in the data carrier and as the NHRN) as this is the most efficient and effective way for all stakeholders to identify trade items.

b. Use GTIN, cross-referenced to an NHRN in an existing database, in the case of an existing system of NHRNs (i.e. GTIN used in the data carrier with the NHRN found via cross-reference).

c. Use GTIN with an associated NHRN (GTIN and NHRN both used in the data carrier via the NHRN AI) as an intermediate solution for those who cannot use "a" or "b". GS1 only recommends this as a migration path to noted options "a" or "b".

Important:

- There is a mandatory association of the National Healthcare Reimbursement Number Application Identifier with the GTIN.
- The NHRN is usually assigned by a national authority to healthcare brand owners for specific trade items and SHALL only be used for compliance to regulatory requirements where the GTIN alone will not meet the requirements.
- Additional individual NHRN AIs can only be assigned by GS1 and only in response to a work request being submitted through GSMP.

4.14 Data relationships

This section defines the rules for allowed combinations of element strings on the same physical entity, irrespective of the data carrier(s) applied to the entity. The rules are application-neutral, which means that they apply to all applications listed in section 2 and to any other application where multiple element strings are combined on the same physical entity.

The rules are presented in two tables:

1. Invalid pairs of element strings, indicating which combinations of element strings are not allowed on the same physical entity.
2. Mandatory pairs of element strings, indicating which element strings must occur in combination with one or more other element strings.

Note: In both tables, the GS1 Application Identifiers (AIs) are used to indicate the element string. But when evaluating the rule the complete element string, i.e. the AI and the data field, needs to be taken into account.

Note: GTINs encoded in an EAN/UPC and ITF-14 symbols are to be regarded as element strings prefixed by an inferred AI (01).

Note: Duplicate element strings (e.g., two serial numbers, two batch/lot numbers, two Extended Packaging URLs) MAY appear on the same physical entity (for example in multiple barcodes). In that case they SHALL have the same value in each occurrence on that entity.

4.14.1 Invalid pairs of element strings

This section defines the pairs of element strings that SHALL NOT appear together on the same physical entity. The table does not provide a finite list of all possible rules, only situations that have proven to pose difficulties in practice are included.

Some explanation on figure *4.14.1-1*:

- The table is sorted by AI value, with the lowest AI value displayed in the first column.
- Multiple AIs may be listed in the first or third column, separated by commas. This means that the same rule applies to all listed AIs.
- The rules work in both directions, e.g., if it states AI (01) SHALL NOT be combined with AI (37) this implies that AI (37) SHALL NOT be combined with AI (01).

Figure 4.14.1-1. Invalid pairs of element strings

Invalid pairs of element strings				Rule
AI	Designation	AI	Designation	
01	GTIN	01	GTIN	All occurrences of GTIN SHALL have one value. It is for example not allowed to include GTINs of other packaging levels.
01	GTIN	02	GTIN of contained trade items	GTIN of contained trade items is intended to list the trade items contained in a logistic unit, and SHALL NOT be used to identify the contents of a trade item.
01	GTIN	37	Count of units contained	The count of units contained SHALL only be used with GTIN of contained trade items or trade item pieces.
01	GTIN	255	Global Coupon Number	A trade item SHALL NOT also be identified as a coupon.
21	Serial Number	235	Third Party Controlled, Serialised Extension of GTIN	Only one type of serial number SHALL be used with GTIN.

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Invalid pairs of element strings				Rule
AI	Designation	AI	Designation	
420	Ship to postal code, single postal authority	421	Ship to postal code with ISO country code	Only one ship to postal code SHALL be applied on the same physical entity.
422, 423, 424, 425	Country of origin, initial processing, processing, or disassembly	426	Country of full processing	Country of origin, initial processing, processing, or disassembly SHALL NOT be used in combination with country of full processing, since this would lead to ambiguous data.
390n	Amount payable – single monetary area	391n	Amount payable – with ISO currency code	Only one amount payable element string SHALL be applied on a payment slip.
390n	Coupon value	394n, 8111	Percentage discount of a coupon, Loyalty points of a coupon	The element strings coupon value, percentage discount of a coupon and loyalty points of a coupon SHALL NOT be applied in combination.
392n	Amount payable for a variable measure trade item – single monetary area	393n	Amount payable for a variable measure trade item and ISO currency code	Only one amount payable element string SHALL be applied on a variable measure trade item.
394n	Percentage discount of a coupon	8111	Loyalty points of a coupon	The element strings percentage discount of a coupon and loyalty points of a coupon SHALL NOT be applied in combination.
8006	ITIP	01	GTIN	The GTIN SHALL NOT be used in combination with the identification of an individual trade item piece. The GTIN of the trade item to which the individual trade item piece belongs is contained in the element string.
8006	ITIP	37	Count of units contained	The count of units contained SHALL only be used with GTIN of contained trade items or trade item pieces.
8018	GSRN for the recipient	8017	GSRN for the provider	Only one Global Service Relation Number (recipient or provider) SHALL be applied at one time for identification of an individual in a given service relationship
8026	Identification of a trade item piece contained in a logistic unit	02, 8006	GTIN of contained trade items, Identification of an individual trade item piece	Identification of the trade item piece contained in a logistic unit SHALL NOT be used in combination with GTIN of contained trade items or identification of an individual trade item piece.

4.14.2 Mandatory association of element strings

This section defines the element strings that mandate the appearance of another element string on the same physical entity.

Note: This does not necessarily mean that the element strings need to appear in the same data carrier. For example, multiple GS1-128 barcode symbols may be used in combination on a GS1 Logistic Label.

Some explanation on figure *4.14.2-1*:

- The table is sorted by AI value, with the AI that is the trigger for the rule displayed in the first column. This means that this table cannot be read in both directions. For example, a rule that states AI (17) must be used together with AI (01), does not imply that AI (01) can only be used together with AI (17), since it can also be used with other AIs.
- Multiple AIs may be listed in the first column, separated by commas. This means that the rule applies to all of the listed AIs (element strings).

- The same AI can occur in the first column multiple times, in different rows. This means that depending on the value of the element string different rules need to be applied.
- When multiple AIs are included in the third column, this is always done with an AND, OR or XOR logical operator between them:
  - AND means that both element strings SHALL appear on the physical entity
  - OR means that one or both of the element strings SHALL appear on the physical entity.
  - XOR means that one of the element strings SHALL appear on the physical entity, and the other element string SHALL NOT.

Figure 4.14.2-1. Mandatory association of element strings

If element string		Then mandatory associated element string	Rule
AI	Designation	AI	
01 with N_1 = 0	GTIN of a variable measure trade item scanned at POS	30 OR 3nnn*	The GTIN of a variable measure trade item scanned at POS SHALL occur in combination with: ▪ variable count of items; or ▪ a trade measure Note: Master data will be needed to determine whether the GTIN represents a variable measure trade item scanned at POS. Also see the note below this table.
01 with N_1 = 9, 02 with N_1 = 9	GTIN of a variable measure trade item not scanned at POS	30 OR 3nnn* OR 8001	The GTIN of a variable measure trade item not scanned at POS SHALL occur in combination with: ▪ variable count of items; or ▪ a trade measure; or ▪ the dimensions of a roll product. Note: The first position of the GTIN is "9" for such trade items. Also see the note below this table.
01 with N1 = 9	GTIN of a custom trade item.	242	The GTIN of a custom trade item SHALL be used in combination with the Made-to-Order variation number. Note: The first position of the GTIN is "9" for such trade items.
02	GTIN of contained trade items	00 AND 37	The GTIN of contained trade items SHALL occur in combination with an SSCC and the count of the trade items.
10	Batch/lot number	01 XOR 02 XOR 8006 XOR 8026 ***	Batch/lot number SHALL occur in combination with: ▪ a GTIN; or ▪ a GTIN of contained trade items; or ▪ an ITIP ▪ an ITIP of contained trade item pieces
11, 13, 15, 16, 17	Production date, packaging date, best before date, sell by date, expiration date (of a trade item)	01 XOR 02 XOR 8006 XOR 8026 ***	These dates SHALL occur in combination with: ▪ a GTIN; or ▪ a GTIN of contained trade items; or ▪ an ITIP ▪ an ITIP of contained trade item pieces
12	Due date	8020 AND 415	The due date SHALL occur in combination with the payment slip reference number and the GLN of the invoicing party
17	Expiration date (of a coupon)	255	The expiration date of a coupon SHALL occur in combination with the GCN.
20	Internal product variant	01 XOR 02 XOR 8006 XOR 8026 ***	Internal product variant SHALL occur in combination with: ▪ a GTIN; or ▪ a GTIN of contained trade items; or ▪ an ITIP ▪ an ITIP of contained trade item pieces

If element string		Then mandatory associated element string	Rule
AI	Designation	AI	
21	Serial number	01 XOR 8006***	The serial number SHALL occur in combination with: ▪ a GTIN; or ▪ an ITIP Note: SGTIN is a common term for the combination of GTIN and serial number.
22	Consumer product variant	01	The consumer product variant SHALL occur in combination with a GTIN of a retail consumer trade item.
235	Third Party Controlled Serialised Extension of GTIN	01	The Third Party Controlled Serialised Extension of GTIN SHALL occur in combination with a GTIN of a trade item.
240	Additional product identification	01 XOR 02 XOR 8006 XOR 8026 ***	The additional product identification SHALL occur in combination with: ▪ a GTIN; or ▪ a GTIN of contained trade items; or ▪ an ITIP ▪ an ITIP of contained trade item pieces
241	Customer part number	01 XOR 02 XOR 8006 XOR 8026 ***	The customer part number SHALL occur in combination with: ▪ the GTIN; or ▪ the GTIN of contained trade items; or ▪ an ITIP ▪ an ITIP of contained trade item pieces
242	Made-to-Order variation number	(01 with N_1 = 9) XOR (02 with N_1 = 9) XOR (8006 with N_1 = 9) XOR (8026 with N_1 = 9) ***	The Made-to-Order variation number SHALL occur in combination with: ▪ the GTIN; or ▪ the GTIN of contained trade items; or ▪ an ITIP ▪ an ITIP of contained trade item pieces Note: The GTIN must relate to a custom trade item. The first position of the GTIN is "9" for such trade items.
243	Packaging Component Number	01	The Packaging Component Number SHALL occur in combination with the GTIN
250	Secondary serial number	(01 XOR 8006***) AND 21	The secondary serial number SHALL occur in combination with the serial number and: ▪ a GTIN; or ▪ an ITIP
251	Reference to source entity	01 XOR 8006***	The reference to source entity SHALL occur in combination with: ▪ a GTIN; or ▪ An ITIP
254	GLN extension component	414	The GLN extension component SHALL occur with the Identification of a physical location (GLN).
30	Variable count of items	01 XOR 02	The variable count of items SHALL occur with: ▪ a GTIN; or ▪ a GTIN of contained trade items. Note: The GTIN must relate to a variable measure trade item.
3nnn*	Trade measures	01 XOR 02	Trade measures SHALL occur in combination with: ▪ a GTIN; or ▪ a GTIN of contained trade items. Note: The GTIN must relate to a variable measure trade item.

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If element string		Then mandatory associated element string	Rule
AI	Designation	AI	
3nnn**	Logistic measures	00 OR 01	Logistic measures SHALL occur in combination with: ▪ an SSCC ▪ a GTIN
337n	Kilograms per square metre	01	Kilograms per square metre SHALL occur in combination with a GTIN.
37	Count of units contained	00 AND (02 XOR 8026)	The count of units contained SHALL occur in combination with the SSCC and: ▪ GTIN of contained trade items, or ▪ ITIP of contained trade item pieces.
390n	Amount payable – single monetary area	8020 AND 415	The amount payable (single monetary area) SHALL occur in combination with the payment slip reference number and the GLN of the invoicing party.
390n	Coupon value – single monetary area	255	The coupon value (single monetary area) SHALL occur in combination with the Global Coupon Number.
391n	Amount payable – with ISO currency code	8020 AND 415	The amount payable (with ISO currency code) SHALL occur in combination with the payment slip reference number and the GLN of the invoicing party.
392n	Applicable amount payable - single monetary unit	01 AND (30 XOR 3nnn*)	The applicable amount payable (single monetary area) SHALL occur in combination with the GTIN and either: ▪ variable count of items; or ▪ a trade measure. Note: The GTIN must relate to a variable measure trade item.
393n	Applicable amount payable – with ISO currency code	01 AND (30 XOR 3nnn*)	The applicable amount payable (with ISO currency code) SHALL occur in combination with the GTIN and either: ▪ variable count of items; or ▪ a trade measure. Note: The GTIN must relate to a variable measure trade item.
394n	Percentage of a coupon	255	The percentage of a coupon SHALL occur in combination with the Global Coupon Number.
403	Routing code	00	The routing code SHALL occur in combination with an SSCC.
415	GLN of the invoicing party	8020	The GLN of the invoicing party SHALL occur in combination with the payment slip reference number.
422	Country of origin	01 XOR 02 XOR 8006 XOR 8026 ***	The country of origin SHALL occur in combination with: ▪ a GTIN; or ▪ a GTIN of contained trade items; or ▪ an ITIP ▪ an ITIP of contained trade item pieces
423	Country of initial processing	01 XOR 02	The country of initial processing SHALL occur in combination with: ▪ a GTIN; or ▪ a GTIN of contained trade items.
424	Country of processing	01 XOR 02	The country of processing SHALL occur in combination with: ▪ a GTIN; or ▪ a GTIN of contained trade items.
425	Country of disassembly	01 XOR 02	The country of disassembly SHALL occur in combination with: ▪ a GTIN; or ▪ a GTIN of contained trade items.
426	Country of full processing	01 XOR 02	The country of full processing SHALL occur in combination with: ▪ a GTIN; or ▪ a GTIN of contained trade items.

If element string		Then mandatory associated element string	Rule
AI	Designation	AI	
427	Country subdivision of origin	(01 XOR 02) AND 422	The country subdivision of origin SHALL occur in combination with the country of origin and: ▪ a GTIN; or ▪ a GTIN of contained trade items.
7001	NATO stock number	01 XOR 02 XOR 8006 XOR 8026 ***	The NATO stock number SHALL occur in combination with: ▪ a GTIN; or ▪ a GTIN of contained trade items; or ▪ an ITIP ▪ an ITIP of contained trade item pieces
7002	UN/ECE meat carcasses and cuts classification	01 XOR 02	The UN/ECE meats carcasses and cuts classification SHALL occur in combination with: ▪ a GTIN; or ▪ a GTIN of contained trade items.
7003	Expiration date and time	01 XOR 02	The expiration date and time SHALL occur in combination with: ▪ a GTIN; or ▪ a GTIN of contained trade items.
7004	Active potency	01 AND 10	The expiration date and time SHALL occur in combination with the batch/lot number and the GTIN.
7005	Catch area	01 XOR 02	The catch area SHALL occur in combination with: ▪ a GTIN; or ▪ a GTIN of contained trade items.
7006	First freeze date	01 XOR 02	The first freeze date SHALL occur in combination with: ▪ a GTIN; or ▪ a GTIN of contained trade items.
7007	Harvest date	01 XOR 02	The harvest date SHALL occur in combination with: ▪ a GTIN; or ▪ a GTIN of contained trade items.
7008	Species for fishery purposes	01 XOR 02	The species for fishery purposes SHALL occur in combination with: ▪ a GTIN; or ▪ a GTIN of contained trade items.
7009	Fishing gear type	01 XOR 02	The fishing gear type SHALL occur in combination with: ▪ a GTIN; or ▪ a GTIN of contained trade items.
7010	Production method	01 XOR 02	The production method SHALL occur in combination with: ▪ a GTIN; or ▪ a GTIN of contained trade items.
703(s)	Number of processor	01 XOR 02	The number of processor SHALL occur in combination with: ▪ a GTIN; or ▪ a GTIN of contained trade items.
710, 711, 712, 713, 714	National Healthcare Reimbursement Number	01	National Healthcare Reimbursement Number(s) SHALL occur in combination with the GTIN.
7020	Refurbishment lot ID	(01 XOR 8006***) AND 416	The refurbishment lot ID SHALL occur in combination with the GLN of production/service location and: ▪ a GTIN; or ▪ an ITIP
7021	Functional status	01 XOR 8006***	The functional status SHALL occur in combination with: ▪ a GTIN; or ▪ an ITIP

If element string		Then mandatory associated element string	Rule
AI	Designation	AI	
7022	Revision status	(01 XOR 8006***) AND 7021	The revision status SHALL occur in combination with the functional status and: ▪ a GTIN; or ▪ an ITIP
723s	Certification reference	01 XOR 8004	Certification reference SHALL occur in combination with: ▪ a GTIN; or ▪ a GIAI
8001	Dimensions of roll products	01	Dimensions of roll products SHALL occur in combination with the GTIN. Note: The GTIN must relate to a variable measure trade item.
8005	Price per unit of measure	01 XOR 02	The price per unit of measure SHALL occur in combination with: ▪ a GTIN; or ▪ a GTIN of contained trade items. Note: The GTIN must relate to a variable measure trade item.
8007	International Bank Account Number	8020 AND 415	The International Bank Account Number SHALL occur in combination with the payment slip reference number and the GLN of the invoicing party.
8008	Date and time of production	01 XOR 02	The date and time of production SHALL occur in combination with: ▪ a GTIN; or ▪ a GTIN of contained trade items.
8009	Optically readable sensor indicator	01 OR 00	The Optically Readable Sensor Indicator Number SHALL occur in combination with the GTIN or SSCC. Note the two data elements may or may not appear in the same data carrier.
8011	CPID serial number	8010	The CPID serial number SHALL occur in combination with the CPID.
8012	Software Version	01 XOR 8006***	The software version SHALL occur in combination with: ▪ a GTIN; or ▪ an ITIP
8019	Service Relation Instance Number	8017 XOR 8018	The Service Relation Instance Number SHALL occur in combination with: ▪ the GSRN for the provider; or ▪ the GSRN for the recipient.
8020	Payment slip reference number	415	The payment slip reference number SHALL occur in combination with the GLN of the invoicing party.
8026	ITIP of contained pieces	00 AND 37	The ITIP of contained pieces SHALL occur in combination with an SSCC and the count of the pieces.
8111	Loyalty points of a coupons	255	Loyalty points of a coupon SHALL occur in combination with the GCN.
8200	Extended packaging URL	01	The extended packaging URL SHALL occur in combination with the GTIN.

*	The AIs for trade measures are set out in section 3.6.2 *Trade measures: AIs (31nn, 32nn, 35nn, 36nn)*
**	The AIs for logistics measures are set out in section 3.6.3 *Logistic measures: AIs (33nn, 34nn, 35nn, 36nn)*
***	If used in combination with the identification of trade item pieces (ITIP), the optional AIs on all individual pieces of the trade item SHALL be identical.

Note: Exception for point-of-sale. See figure 2.7–1. *Areas of GS1 system application*.

5.1 Introduction

A data carrier is a means of representing data in machine readable form. Data carriers that are endorsed by GS1 are described in sections 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 5.10; barcode production and quality assessment are covered in section 5.11.

The GS1 system specifies the data carrier used to represent any given element string. Section 2 covers rules indicating which data carrier should be used to represent which element strings in particular applications. The GS1 system uses the following data carriers:

- The EAN/UPC symbology family of barcodes (UPC-A, UPC-E, EAN-13, and EAN-8 barcodes and the two- and five-digit add-on symbols) can be read omnidirectionally. These symbols must be used for all items that are scanned at the point-of-sale and may be used on other trade items.

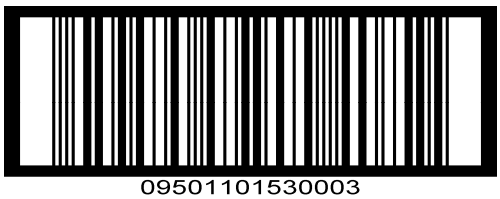
Figure 5.1-1. UPC-A and EAN-13 barcodes

UPC-A

EAN-13

- ITF-14 (Interleaved 2-of-5) barcodes carry ID numbers only on trade items that are not expected to pass through the point-of-sale. ITF-14 symbols are better suited for direct printing onto corrugated fibreboard.

Figure 5.1-2. ITF-14 barcode



- The GS1-128 barcode is a subset of the Code 128 barcode symbology. Its use is exclusively licenced to GS1. This extremely flexible symbology encodes element strings using GS1 Application Identifiers.

Figure 5.1-3. GS1-128 barcode

- GS1 DataBar is a family of linear symbologies used within the GS1 system. This family of linear symbologies in most cases implicitly encodes GS1 Application Identifier (01) and in the case of GS1 DataBar Expanded explicitly encodes element strings using GS1 Application Identifiers.

Figure 5.1-4. GS1 DataBar Omnidirectional barcode

- Composite Component symbols do not exist in isolation. The primary identification number is always encoded in the linear symbol and supplementary GS1 Application Identifier element strings are encoded in the two-dimensional (2D) component where they take up less space.

Figure 5.1-5. GS1 DataBar Stacked Omnidirectional barcode with a Composite Component

- Data Matrix ISO version ECC 200 is the only version that supports GS1 system data structures, including Function 1 Symbol Character (FNC1). Implementation of GS1 DataMatrix SHALL be done per approved GS1 system application standards, such as those for regulated healthcare retail consumer trade items.

Figure 5.1-6. GS1 DataMatrix barcode

- GS1 QR Code, is a subset of *ISO/IEC 18004:2015*. QR Code supports GS1 system data structures, including Function 1 Symbol Character (FNC1). Implementation of GS1 QR Code SHALL be done per approved GS1 system application standards.

Figure 5.1-7. GS1 QR Code barcode

- GS1 DotCode, supporting GS1 system data structures is supported by the AIM DotCode Specification, Rev 3.0, August 2014. Per the specification, *"Message segments that begin with a pair of digits, without an FNC1 either before or immediately following those two digits are regarded as conveying GS1 formatted data by excluding Function 1 Symbol Character."* Implementation of GS1 DotCode SHALL be done per approved GS1 system application standards.

Figure 5.1-8. GS1 DotCode barcode

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5.1.1 International standards

A number of national and regional standardisation bodies have developed barcode technical standards. The International Organisation for Standardisation (ISO) has published standard barcode symbology specifications via a subcommittee of ISO/IEC JTC1 (International Organisation for Standardisation/International Electrotechnical Commission Joint Technical Committee 1).

GS1 is actively involved in developing these standards. The objective is for GS1 system standards to remain fully compatible with relevant published national, regional, and international symbology standards. The pertinent documents for section 5 include the latest published version of:

- **Section 5.1**: *ISO/IEC 15424: Information technology; automatic identification and data capture techniques; data carrier/symbology identifiers*.
- **Section 5.2**: *ISO/IEC 15420: Information technology; automatic identification and data capture techniques; bar code symbology specifications; EAN/UPC*.
- **Section 5.3**: *ISO/IEC 16390: Information technology; automatic identification and data capture techniques; bar code symbology specifications; ITF-14*.
- **Section 5.4**: *ISO/IEC 15417: Information technology; automatic identification and data capture techniques; bar code symbology specifications; GS1-128 Symbology specifications*.
- **Section 5.5**: *ISO/IEC 24724: Information technology; automatic identification and data capture techniques; GS1 DataBar bar code symbology specification.*
- **Section 5.6**: *ISO/IEC 16022: Information technology; automatic identification and data capture techniques; Data Matrix bar code symbology specification.*
- **Section 5.7**: *ISO/IEC 18004:2015: Information technology; automatic identification and data capture techniques; QR Code bar code symbology specification.*
- **Section 5.*8:*** *AIM Rev 3.0, August 2014: Information technology; automatic identification and data capture techniques; bar code symbology specification - DotCode.*
- **Section 5.98**: *ISO/IEC 24723: Information technology; automatic identification and data capture techniques; EAN.UCC Composite bar code symbology specification.*
- **Section 5.109**: Bar Code Production and Quality Assessment:
  - *ISO/IEC 15415: Information technology; automatic identification and data capture techniques; bar code print quality test specification; two-dimensional symbols*.
  - *ISO/IEC 15416: Information technology; automatic identification and data capture techniques; bar code print quality test specification; linear symbols*.
  - *ISO/IEC 15419: Information technology; automatic identification and data capture techniques; bar code digital imaging and printing performance testing.*
  - *ISO/IEC 15421: Information technology; automatic identification and data capture techniques; bar code master test specifications.*
  - *ISO/IEC 15426-1: Information technology; automatic identification and data capture techniques; bar code verifier conformance specification - Part 1: Linear symbols.*
  - *ISO/IEC 15426-2: Information technology; automatic identification and data capture techniques; bar code verifier conformance specification - Part 2: Two-dimensional symbols.*
  - *ISO 1073-2: Alphanumeric character sets for optical recognition – Part 2: Character set OCR-B Shapes and dimensions of the printed image.*
  - *ISO/IEC TR 29158: Information technology; Automatic identification and data capture techniques; direct part marking (DPM) Quality Guideline.*
- **All sections**: *ISO/IEC 646: Information technology; ISO 7-bit coded character set for information interchange.*

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5.1.2 Symbology identifiers

The symbology identifier is not encoded in the barcode but is generated by the decoder after decoding and is transmitted as a preamble to the data message.

All scanning equipment has the ability to recognise the symbology that has been scanned. Some scanners have the optional feature of being able to transmit a symbology identifier. The symbology identifier is a three-character data string comprising a flag character, code character, and a modifier character. The symbology identifiers used in the GS1 system are shown in figure *5.1.2-1*.

Figure 5.1.2-1. Structure of the symbology identifiers

Character	Description
]	The flag character (which has an ASCII value of 93). This denotes that the two characters following it are Symbol Identifier characters.
c	The code character. This denotes the type of symbology.
m	The modifier character. This indicates the mode in which the symbology is used.

Note: If used, the symbology identifier is transmitted as a prefix to the data message.

Figure 5.1.2-2. ISO/IEC 15424 symbology identifiers used in the GS1 system

Symbology identifier (*)	Symbology format	Content
]E0	EAN-13, UPC-A, or UPC-E	13 digits
]E1	Two-digit add-on symbol	2 digits
]E2	Five-digit add-on symbol	5 digits
]E3	EAN-13, UPC-A, or UPC-E with add-on symbol (**)	15 or 18 digits
]E4	EAN-8	8 digits
]I1	ITF-14	14 digits
]C1	GS1-128	Standard AI element strings
]e0	GS1 DataBar	Standard AI element strings
]e1	GS1 Composite	Data packet containing the data following an encoded symbol separator character.
]e2	GS1 Composite	Data packet containing the data following an escape mechanism character.
]d2	GS1 DataMatrix	Standard AI element strings
]Q3	GS1 QR Code	Standard AI element strings
]J1	GS1 DotCode	Standard AI element strings

Commented [CJ12]: WR19-077

(*)	Symbology identifiers are case sensitive.
(**)	Barcodes with add-on symbols may be considered either as two separate symbols, each of which is transmitted separately with its own symbology identifier, or as a single data packet. The system designer SHALL select one of these methods, but the method using symbology identifier **]E3** is preferable for data security.

5.9 Two dimensional barcodes – GS1 DotCode symbology

Commented [CJ13]: WR19-077 new section

5.9.1 Introduction

This section provides a summary description and overview of the GS1 DotCode symbology. A more detailed technical specification can be found in the *Information Technology – Automatic Identification and Data Capture Techniques – Bar Code Symbology Specifications – DotCode, Rev 3.0, August 2014* which is available from AIM. When AIM DotCode encodes GS1 system data, it is referred to as GS1 DotCode.

The GS1 system has adopted GS1 DotCode based on its ability to encode GS1 identification keys while printing the barcode inline at high production speeds. Implementation of GS1 DotCode SHALL be per approved GS1 system application standard section 2.1.14.

5.9.2 GS1 DotCode symbology

The technical description of GS1 DotCode contained within this section provides additional information based on *AIM DotCode Specification*. It is provided as a further aid in the development of specific applications.

Not supported for the GS1 system: Structured append

This feature allows files of data to be represented logically and continuously in DotCode symbols. These may be scanned in any sequence to enable the original data to be correctly reconstructed.

Not supported for the GS1 system: Extended channel interpretations

This mechanism enables data using character sets other than the default encodable set (e.g., Arabic, Cyrillic, Greek) and other data interpretations (e.g., compacted data using defined compression schemes) or other industry-specific requirements to be encoded.

5.9.2.1 Data transmission and symbology identifier prefixes

The GS1 system requires the use of symbology identifiers. GS1 DotCode uses the symbology identifier of "]J1" (see figure below) for GS1 system compliant symbols. This indicates that Application Identifier (AI) data is encoded equivalent to the symbology identifier "]C1" for GS1-128 symbols,]d2 for GS1 DataMatrix symbols,]Q3 for QR Code symbols, and "]e0" for GS1 DataBar and Composite symbols. For more information on symbology identifiers, see the International standard *ISO/IEC 15424 Information technology — Automatic identification and data capture techniques — Data Carrier Identifiers*.

For example, a GS1 DotCode symbol encoding AI (01) element string 10012345678902 produces the transmitted data string "]J10110012345678902." Data transmission follows the same principles that apply to the concatenation of AI element strings in any GS1 barcode that encodes Application Identifiers (see section 7.8).

Figure 5.9.2.1-1. Symbology identifier for GS1 DotCode

	Message content	Separator
]Jm	Standard AI element strings	None

5.9.2.2 Width and height of a module (X)

The range of the X-dimensions will be defined by the application specification, having due regard to the availability of equipment for the production and reading of symbols and complying with the general requirements of the application.

The X-dimension SHALL be constant throughout a given symbol. The X-dimension refers to both the width and height of the modules.

5.9.2.3 Symbol quality grade

The International Standard *ISO/IEC 15415 Information technology - Automatic identification and data capture techniques – Bar code symbol print quality test specification - Two-dimensional symbols methodology* SHALL be used for measuring and grading GS1 DotCode Symbols as augmented in the AIM DotCode Specification.

Minimum symbol grades for GS1 DotCode are specified in individual applications standards in section *2* which refer to symbol specification tables in section *5.11.3.12*.

5.9.2.4 Advice for selecting the symbology

GS1 DotCode SHALL only be used to meet the requirements of the EU tobacco traceability regulation EU 2018/574 as set out in section *2.1.14*.

5.9.2.5 Human readable interpretation of GS1 DotCode symbols

For human readable interpretation rules see section *4.15*.

refer to a range of sizes below, at, or above the nominal dimension (100% magnification) for EAN/UPC symbols used in the omnidirectional scanning environment. The symbol specification tables (SSTs) do not use magnification values and instead list the target, minimum, and maximum values for the symbol's X-dimension and height.

5.11.2.3 Laser versus image based scanning

Most scanners based on laser technology can scan all linear symbologies in the GS1 system. New laser and linear array scanners are even capable of scanning GS1 DataBar and Composite Component symbols. 2D Imaging technology, such as array scanners and vision systems, are capable of scanning all symbols in the GS1 system, including GS1 approved 2D symbols (GS1 DataMatrix and GS1 QR Code). Note that linear imagers, like laser scanners, cannot scan approved 2D symbols; only 2D or array imaging scanners can scan GS1 approved 2D symbols, as well as camera based or vision systems.

5.11.2.4 Printing considerations

The functional and operative bands provide printers and labellers with the flexibility needed to produce quality symbols over a wide range of processes. Once a scanning operational environment is determined and the allowable specification range is known, the printer should be consulted for guidance on:

- The minimum recommended symbol size based on printing press or print characterisation tests.
- Colour/substrate considerations (e.g., separate print station for symbol or double ink layer).
- The optimum orientation of the symbol on the printed web (the direction of movement of the media in relation to a printing plate on a printing press).
- Direct part marking, such as is done by dot peening on items, requires special considerations for material properties.
- Laser or chemically etched parts with low contrast or light marked elements on a dark background (e.g., circuit boards and electronic components, medical instruments, surgical implants).
- High-speed ink jet printed parts and components where the marked dots cannot form a scannable linear symbol.
- Very small items that require a symbology with a square aspect ratio and/or cannot be marked within the allocated packaging space by existing GS1 DataBar and Composite symbols.

5.11.2.5 Packaging considerations

Once a scanning operational environment is determined and the allowable symbol characteristics are known, the package designer should be consulted to:

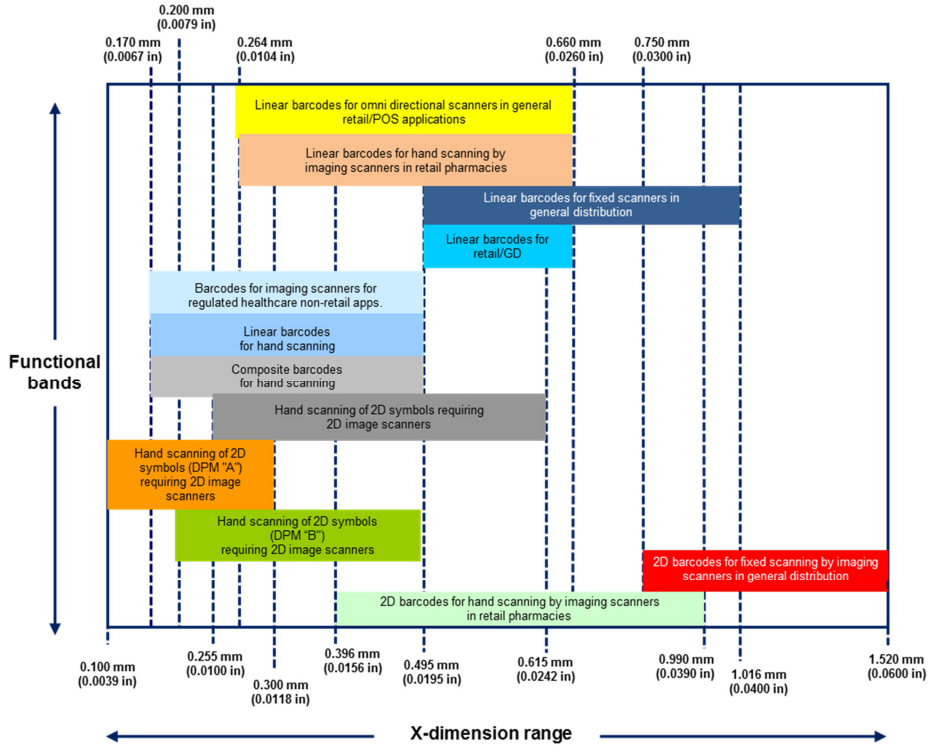
- Ensure the symbol will not be obstructed by other graphics or package design parameters (e.g., folds, creases, corner wraps, flaps, laminates, embossed logos/patterns, text).
- Ensure that only the symbol intended for scanning will be scanned (e.g., obscure all symbols on the individual units within larger trade items so that the individual units' symbols do not scan instead of the larger unit's symbol).

Section 6 contains complete information on symbol placement criteria to meet quality and ergonomic needs.

5.11.2.6 GS1 system scanner functional operative bands

Symbol selection and specifications for AIDC application standards are centralised in the symbol specification tables. In establishing X-dimension specifications for symbol specification tables, the scanner functional operative bands below are normative as they illustrate X-dimension ranges deployed by industry based on GS1 standards. The twelve scanner functional bands that have evolved to meet user needs are illustrated in the figure below.

Figure 5.11.2.6-1. GS1 scanner functional operative bands



Note: Figure not to scale and target size for each functional band can be found in the symbol specification tables (see section *5.11.3*)

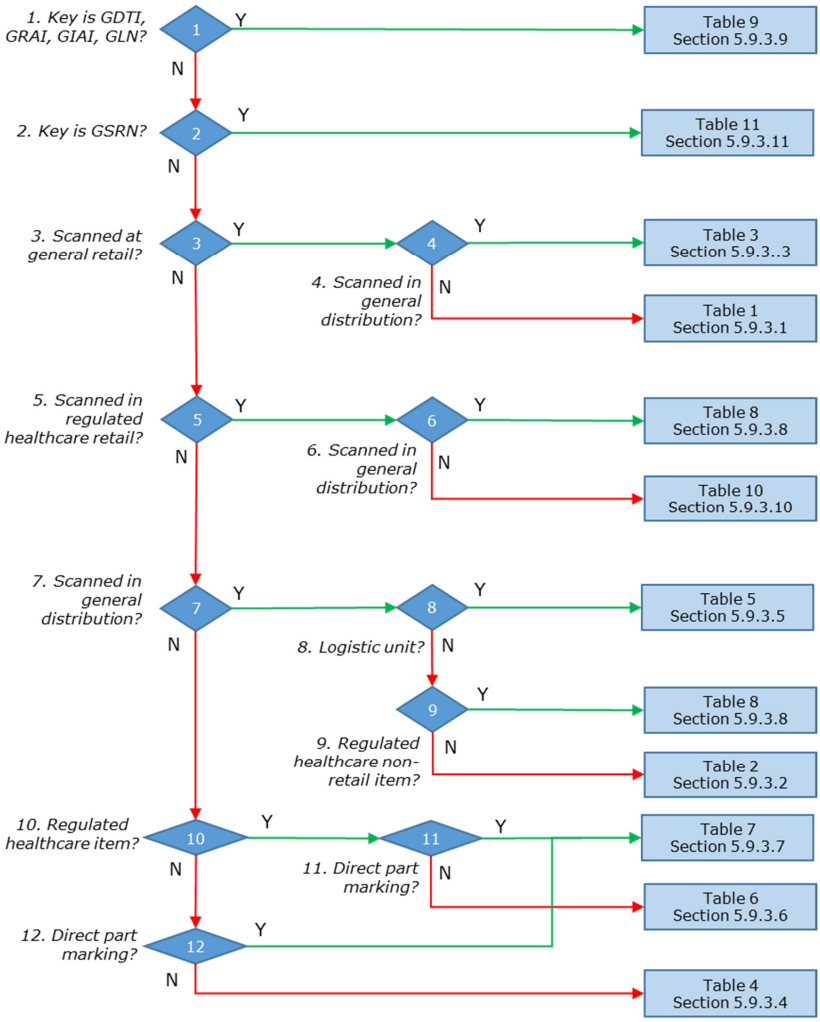
The scanner functional bands

- The omnidirectional scanners for general retail/POS band is primarily intended for general retail consumer trade items to provide orientation-free scanning in high-volume check-out lanes. Scanners are designed to read over-square symbols such as EAN/UPC and GS1 DataBar Retail POS family. The approximate average distance between scanner and symbol is 100 millimetres (4 inches).
- The linear barcodes for imaging scanners for retail pharmacies band is intended for regulated healthcare consumer trade items sold in a pharmacy or apothecary that is a separate retail store or a "controlled" area for distribution of healthcare trade items inside a larger retail operation. This band allows for the use of 2D symbols but this functional band shows the X-dimension ranges used for linear barcodes. Over the counter trade items that are sold in retail pharmacy but also general retail are marked according to general retail scanning specifications.
- The fixed scanners in general distribution band is primarily intended to facilitate automated scanning of trade items packaged for transport and logistic units using fixed mount scanners. In this environment it is essential to maintain symbol height and location to achieve acceptable scan rates.

- Linear barcodes for both retail and general distribution band covers trade items in specific packaging suitable for transport purposes in General distribution scanning, but that are also scanned as General Retail consumer trade items. See the overlap area between EAN/UPC retail and general distribution (Retail/GD) in figure *5.11.2.6-1*.
- The imaging scanners for non-retail regulated healthcare trade items band is intended for non-retail regulated healthcare consumer trade items sold outside of the retail channel. For example these X-dimension bands should be used for products destined for hospitals or nursing homes that will never be scanned in a retail pharmacy.
- The linear barcodes for hand scanning band is intended for non-retail trade items using a linear barcode.
- The Composite Component barcodes for hand scanning band is intended for non-retail trade items using Composite Component barcodes which are, in effect, a multi-row 2D linear barcode. In general, the rule is that Composite Components SHALL be printed at the same X-dimension as their linear host. GS1 DataMatrix symbols SHALL be printed at X-dimensions that are 50 percent greater than corresponding linear symbols with Composite Components. Therefore, the bands for linear symbols and Composite Components are very similar in X-dimension and if the same scanner types are chosen, as in the case of Composite symbols, the bands become one.
- The 2D barcodes for automated scanning by imaging scanners in general distribution band has been added to show the X-dimension band used by those who support general distribution of regulated healthcare consumer trade items which may be marked with GS1 DataMatrix.
- 2D barcodes for imaging scanners for retail pharmacy band is intended for regulated healthcare consumer trade items sold in a pharmacy or apothecary that is a separate retail store or a "controlled" area for distribution of healthcare trade items inside a larger retail operation. This band allows for the use of linear symbols but this functional band shows the X-dimension ranges used for 2D barcodes. Over the counter trade items that are sold in retail pharmacy but also general retail are marked according to general retail scanning specifications.
- Today, there is no functional band for mobile devices as the variables of symbol selection, data, operative scanning environment, and allowable symbol specifications for size would require a detailed table solely for mobile devices. At this time, the assumption for mobile devices is that they will support all currently approved symbols, symbol data scenarios, and symbol size specifications however where testing and/or practical experience shows a constraint, this will be addressed in GS1 standards.

Figure 5.11.2.6-2. GS1 symbology operational environment decision tree

Commented [CJ14]: !!! WR19-077 ==> SST12 still to be added ==> under question 9



Note: 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.

Figure 5.11.2.6-3. Summary of the symbol specification tables per following figure *5.11.2.6-2* GS1 symbology operational environment decision tree

Symbol spec. tables	General retail POS	Retail pharmacy	* Non-retail pharmacy	Non-retail Non-healthcare	General distribution	Direct part marking	Logistics unit (SSCC)	GIAI, GRAI, GLN	GSRN
Table 1	Yes				No				
Table 2				Yes	Yes				
Table 3	Yes				Yes				
Table 4				Yes	No				
Table 5					Yes		Yes		
Table 6			Yes		No				
Table 7			Yes	Yes	No	Yes			
Table 8		Yes	Yes		Yes				
Table 9					No			Yes	
Table 10		Yes			No				
Table 11									Yes
Table 12	No	No	No	No	Yes	No	No	No	No
* Table 6 should be used for products scanned at bedside									

5.11.3 GS1 symbol specification tables

In order to find the correct barcode specification, you must:

- Find the appropriate GS1 system application area using figure *5.11.2.6-1*.
- If the application area references two symbol specification tables, use the decision tree in figure *5.11.2.6-2* to determine which one to use.

The figure below provides a quick reference list of the symbol quality parameters depending on their type and their application.

Figure 5.11.3-1. Quick reference on symbol quality

Symbology	Application or ID key	ISO (ANSI) symbol grade	Aperture	Wavelength
EAN/UPC	GTIN-8	1.5 (C)	See symbol specification tables 1, 2, 3, 4, 6, 8 and 10 for values	660 nm +/-10
EAN/UPC	GTIN-12	1.5 (C)	See symbol specification tables 1, 2, 3, 4, 6, 8 and 10 for values	660 nm +/-10
EAN/UPC	GTIN-13	1.5 (C)	See symbol specification tables 1, 2, 3, 4, 6, 8 and 10 for values	660 nm +/-10
GS1-128	GTIN-12, GTIN-13, GTIN-14	1.5 (C)	See symbol specification tables 2, 4, 5, 6, 8, 9 and 10 for values	660 nm +/-10
GS1-128	SSCC	1.5 (C)	10 mils	660 nm +/-10
ITF-14 (<0.635 mm (0.025 in.) X)	GTIN-12, GTIN-13, GTIN-14	1.5 (C)	See symbol specification tables 2, 4, 6, 8, and 10 for values	660 nm +/-10
ITF-14 (≥0.635 mm (0.025 in.) X)	GTIN-12, GTIN-13, GTIN-14	0.5 (D)	20 mils	660 nm +/-10
Composite	GTIN-8, GTIN-12, GTIN-13, GTIN-14 and other AIs	1.5 (C)	6 mils	660 nm +/-10
GS1 DataBar	GTIN-8, GTIN-12, GTIN-13, GTIN-14 and other AIs	1.5 (C)	See symbol specification tables 1, 2, 3, 4, 6, 8, 10 and 11	660 nm +/-10
GS1 DataMatrix	Direct part marking, regulated healthcare retail or non-retail consumer trade items extended packaging	1.5 (C)	See symbol specification tables 6, 7, 8, 9, 10 and 11 Table 1 Addendum for values.	660 nm +/-10
GS1 QR Code	Direct part marking, custom trade item, extended packaging GDTI, and GSRN	1.5 (C)	See symbol specification table 1 Addendum, 7, 9, and 11 for values.	660 nm +/-10
GS1-128, GS1 DataMatrix, GS1 QR Code, GS1 DotCode	Supporting European Regulation 2018/574 *on technical standards for the establishment and operation of a traceability system for tobacco products*	3.5 (A)	See symbol specification tables 12	660 nm +/- 10

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5.11.3.12 Symbol specification table 12 – Tobacco trade items and logistics units for European Regulation 2018/574 *on technical standards for the establishment and operation of a traceability system for tobacco products*

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Figure 5.11.3.12-1. GS1 system symbol specification table 12

Symbol(s) specified	(*) X-dimension mm (inches)			(**) Minimum symbol height for given X mm (inches)			Quiet Zone		(****) Minimum quality specification
	Minimum	Target	Maximum	For minimum X-dimension	For target X-dimension	For maximum X-dimension	Left	Right	
Trade Items at EU 2018/574 Unit Pack Level									
GS1 DataMatrix (ECC 200) (*)	0.380 (0.0150")	0.380 (0.0150")	0.990 (0.0390")	Height is determined by X-dimension and data that is encoded			1X on all four sides		3.5/08/660
GS1 QR Code (*) (**)	0.380 (0.0150")	0.380 (0.0150")	0.990 (0.0390")	Height is determined by X-dimension and data that is encoded			4X on all four sides		3.5/08/660
GS1 DotCode (***)	0.380 (0.0150")	0.380 (0.0150")	0.990 (0.0390")	Height is determined by X-dimension and data that is encoded			3X on all four sides		3.5/08/660
Trade Item Groupings (unit pack aggregations per at EU 2018/574)									
GS1 DataMatrix (ECC 200) (*)	0.750 (0.0295")	0.750 (0.0295")	1.520 (0.0600")	Height is determined by X-dimension and data that is encoded			1X on all four sides		3.5/20/660
GS1 QR Code (*) (**)	0.750 (0.0295")	0.750 (0.0295")	1.520 (0.0600")	Height is determined by X-dimension and data that is encoded			4X on all four sides		3.5/20/660
GS1-128 (****)	0.495 (0.0195")	0.495 (0.0195")	1.016 (0.0400")	31.75 (1.250")			10X	10X	3.5/10/660
Logistic units (unit pack aggregations with a transport unit per at EU 2018/574)									
GS1 DataMatrix (ECC 200)	0.750 (0.0295")	0.750 (0.0295")	1.520 (0.0600")	Height is determined by X-dimension and data that is encoded			1X on all four sides		3.5/20/660
GS1 QR Code (*)(**)	0.750 (0.0295")	0.750 (0.0295")	1.520 (0.0600")	Height is determined by X-dimension and data that is encoded			4X on all four sides		3.5/20/660
GS1-128	0.495 (0.0195")	0.495 (0.0195")	0.940 (0.0370")	31.75 (1.250")			10X	10X	3.5/10/660

(*)	2D X-dimension - Optical effects in the image capture process require that the GS1 DataMatrix and GS1 QR Code symbols be printed at 1.5 times the equivalent printing X-dimension allowed for linear symbols.
(**)	an optical device-readable QR Code with a recovery capacity of approximately 30%. Barcodes conforming to ISO/IEC 18004:2015 with the error correction level H shall be presumed to fulfil the requirements set out in this point;
(***)	an optical device-readable DotCode with the error detection and correction equivalent to or higher than those provided with the Reed-Solomon error correction algorithm with the number of check characters (NC) equal to three plus the number of data characters (ND) divided by two (NC = 3 + ND / 2).
(****)	The minimum quality grade of 3.5 is per the European Regulation 2018/574. It is noted that this quality grade is significantly higher than the typical 1.5 grade required for other symbols in other GS1 application standards.

Note: See section 2.7 to ensure the correct symbol specification table is used.

5.11.5.10.7 GS1 QR Code

Determining symbol quality for items marked with GS1 QR Code symbols involves a specialised approach due to the physical nature of the marking and the optical systems used to read those marks. The minimum symbol quality grade for GS1 QR Code symbols SHALL be specified by the application specification. The overall grade is shown in the form minimum grade/aperture/measuring wavelength.

Grade/Aperture/Light/Angle

Where:

- **"Grade"** is the overall symbol grade as defined in *ISO/IEC 15415 Information technology - Automatic identification and data capture techniques - Bar code print quality test specification - Two-dimensional symbols* (e.g., the arithmetic mean to one decimal place of the Scan Reflectance Profile or scan grades). For GS1 QR Code, the grade number may be followed by an asterisk, *, which indicates that the surroundings of the symbol contain extremes of reflectance that may interfere with reading. For most applications, this should be specified as causing the symbol to fail.
- **"Aperture"** is the diameter in thousandths of an inch (to the nearest thousandth) of the synthetic aperture defined in *ISO/IEC 15415 Information technology - Automatic identification and data capture techniques - Bar code symbol print quality test specification - Two-dimensional symbols*.
- **"Light"** defines the illumination: A numeric value indicates the peak light wavelength in nanometres (for narrow band illumination); the alphabetic character W indicates that the symbol has been measured with broadband illumination ("white light"), the spectral response characteristics of which must imperatively be defined or have their source specification clearly referenced.
- **"Angle"** is an additional parameter defining the angle of incidence (relative to the plane of the symbol) of the illumination. It SHALL be included in the reporting of the overall symbol grade when the angle of incidence is other than 45 degrees. Its absence indicates that the angle of incidence is 45 degrees.

The aperture is normally specified as being 80 percent of the minimum X-dimension allowed for the application.

5.11.5.10.8 GS1 DotCode

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The minimum symbol quality grade for GS1 DotCode symbols SHALL be specified by the application specification. The overall grade is shown in the form minimum grade/aperture/measuring wavelength/angle.

Grade/Aperture/Light/Angle

Where:

- **"Grade"** is the overall symbol grade as defined in ISO/IEC 15415 Information technology - Automatic identification and data capture techniques - Bar code print quality test specification - Two-dimensional symbols. For GS1 DotCode, the grade number may be followed by an asterisk, *, which indicates that the surroundings of the symbol contain extremes of reflectance that may interfere with reading. For most applications, this should be specified as causing the symbol to fail.
- **"Aperture"** is the diameter in thousandths of an inch (to the nearest thousandth) of the synthetic aperture defined in ISO/IEC 15415 Information technology - Automatic identification and data capture techniques - Bar code symbol print quality test specification - Two-dimensional symbols.
- **"Light"** defines the illumination: A numeric value indicates the peak light wavelength in nanometres (for narrow band illumination); the alphabetic character W indicates that the symbol has been measured with broadband illumination ("white light"), the spectral response characteristics of which must imperatively be defined or have their source specification clearly referenced.

"Angle" is an additional parameter defining the angle of incidence (relative to the plane of the symbol) of the illumination. It SHALL be included in the reporting of the overall symbol grade when the angle of incidence is other than 45 degrees. Its absence indicates that the angle of incidence is 45 degrees.

5.11.5.11 Possible causes of less-than-perfect verification grades

5.11.5.11.1 Reflectance parameters

Symbol contrast is governed by the reflectance of the substrate and ink. A symbol printed in black ink on a white paper will almost certainly achieve the top grade 4 for symbol contrast, as white papers typically have reflectance in excess of 75 percent, and black ink will usually have about 3 to 8 percent reflectance. Coloured backgrounds or coloured inks will affect the result. Highly glossy materials may also appear to have a lower background reflectance than expected. The worst case may be when printing on a corrugated brown fibreboard material, which may have a reflectance in a range between 27 and 40 percent, so even with a very dense, low reflectance ink it can never achieve better than the minimum passing grade 1 for symbol contrast (grade 1 includes symbol contrast values from 20 to 39 percent).

The causes of low symbol contrast and the solutions are:

- Background too dark: Use lighter or less glossy material, or change background colour (if printed) to one with higher reflectance.
- Bars too light: Change bar colour for one with lower reflectance, and increase ink weight or print head temperature (thermal printing) (Watch for consequential increase in bar widths).
- Show-through of contents: Use more opaque material for package, or print opaque white underlay prior to printing symbol.
- Show-through of imprint: Use more opaque labels.

Minimum reflectance, or Rmin, must always be equal to or less than half the highest reflectance value, Rmax. In practice, this means that the reflectance of at least one bar must meet this criterion. For example, if Rmax is 70 percent, at least one bar must have a reflectance of 35 percent or less. A symbol that fails on this parameter will almost certainly have a low symbol contrast grade also. The cause of and solution for Rmin being too high include:

- Bars too light: Change bar colour to one with lower reflectance, and increase ink weight or print head temperature (thermal printing) (Watch for consequential increase in bar widths).

Minimum Edge Contrast (ECmin) will always be lower than symbol contrast, but will only be a problem in itself if it approaches or drops below 15 percent (the pass/fail threshold). However, low edge contrast (EC) values, acceptable under this criterion, may still cause low modulation (MOD) grades. The causes of a low value of ECmin and the possible remedies are:

- Local variations in background reflectance (e.g., fragments of darker material in a recycled material): Use a more consistent substrate or one with higher reflectance.
- Local variations in inking of the bars: Adjust press settings to ensure even inking.
- Show-through of contents: Use more opaque material for package, or print opaque white underlay prior to printing symbol.
- Elements adjoining the edge in question are excessively narrow relative to the measuring aperture used: Increase X-dimension; ensure correct measuring aperture is used; ensure correct bar width adjustment (BWA) applied to film master/original symbol; print bars marginally narrower than spaces of same modular dimension.

Modulation, being calculated as the percentage of symbol contrast represented by the ECmin, will be reduced for the same reasons as when ECmin is low in the symbol. A scanner will tend to see spaces as narrower than bars and also to see narrow elements as less distinct than wider ones. Consequently, if there is significant bar loss, modulation will be reduced. Measuring with an aperture that is too large for the X-dimension will also reduce modulation.

The causes of a low value of modulation (often listed as "MOD" on verification reports) and the possible remedies are:

5.11.7.4 GS1 barcode verification template for two dimensional symbols

<NAME> Issue date <Date of Issue>
<Line one address>
<Line two address>
<Town>
<Postcode>

Product Description: <Brand and Name of Product>
Type of barcode: <Symbol Type>
Data encoded: < Data encoded>
Print Method: <Print Method>
Number of barcodes on product: <Number of Symbols>

Please Note: **These assessments are based on meeting the minimum GS1 standards. To ensure efficient scanning, the barcode should exceed the minimum.**

Testing summary of the two dimensional symbol

GS1 General Specifications for two dimensional symbols, environments tested:
PASS or FAIL or Not assessed Healthcare items (healthcare retail consumer item or healthcare non-retail consumer item or healthcare trade item)
PASS or FAIL or Not assessed Direct part marking (DPM)
PASS or FAIL or Not assessed Extended packaging

Complies to GS1 symbol location recommendations	In/out spec (& comment on business critical issue)
ISO symbol grade	ISO <x.x>/06/660 (0.0 – 4.0) PASS/FAIL

Business critical comments

Technical analysis of the two dimensional symbol

GS1 parameters	Comment reference	Values	Within standard range	Required
Symbol structure			✓	Dependent on symbol encoded
Matrix size		NN X NN	✓	
X-dimension/ cell size		mm (inch)	✓	
Data structure			✓	Dependent on structure encoded
Validity of GS1 Company Prefix			✓	
Human readable			✓	

ISO/IEC parameters	Comment reference	ISO grade 4 to 0	Within standard range	Required
Overall ISO grade			✓	
Decode		PASS/FAIL	✓	
Cell contrast/Symbol contrast		4 - 0	✓	
Cell modulation/ Modulation		4 - 0	✓	
Axial nonuniformity		4 - 0	✓	
Grid Nonuniformity		4 - 0	✓	
Unused Error Correction (UEC)		4 - 0	✓	
Print growth (horizontal) informative only		0%-100%	Non-graded	
Print growth (vertical) informative only		0%-100%	Non-graded	
Fixed pattern damage		4 - 0	✓	
Clock track and solid area regularity*		4 - 0	✓	
Quite Zones (QZL1, QZL2)*		4 - 0	✓	
L1 and L2*		4 - 0	✓	
Format information**				
Version information**				

Educational comments [1]

Notes (informative localised)

It is the responsibility of the GS1 Company Prefix licensee or GS1 identification key licensee to ensure the correct use of the GS1 Company Prefix and the correct allocation of the data content.

Rejection of products should not necessarily be based only on an out of specification results

Barcode verifiers are measuring devices and are tools that can be used for assisting in quality control. The results are not absolute in that they do not necessarily prove or disprove that the barcode will scan.

This report may not be amended after issue. In the event of a dispute over contents the version held at [TESTING AGENCY] will be deemed to be the correct and original version of this report.

* GS1 DataMatrix Only, see *ISO/IEC 15415*

** GS1 QR Code Only, see *ISO/IEC 15415*,

all others are both for GS1 DataMatrix and GS1 QR Code and GS1 Dotcode

Important Note (normative localised)

This Verification Report may contain privileged and confidential information intended only for the use of the addressee named above. If you are not the intended recipient of this report you are hereby notified that any use, dissemination, distribution or reproduction of this message is prohibited. If you received this message in error please notify [TESTING AGENCY].

Disclaimer (legal localised)

This report does not constitute evidence for the purpose of any litigation, and [TESTING AGENCY] will not enter into any discussion, or respond to any correspondence in relation to litigation.

Every possible effort has been made to ensure that the information and specifications in the Barcode Verification Reports are correct, however, [TESTING AGENCY] expressly disclaims liability for any errors.

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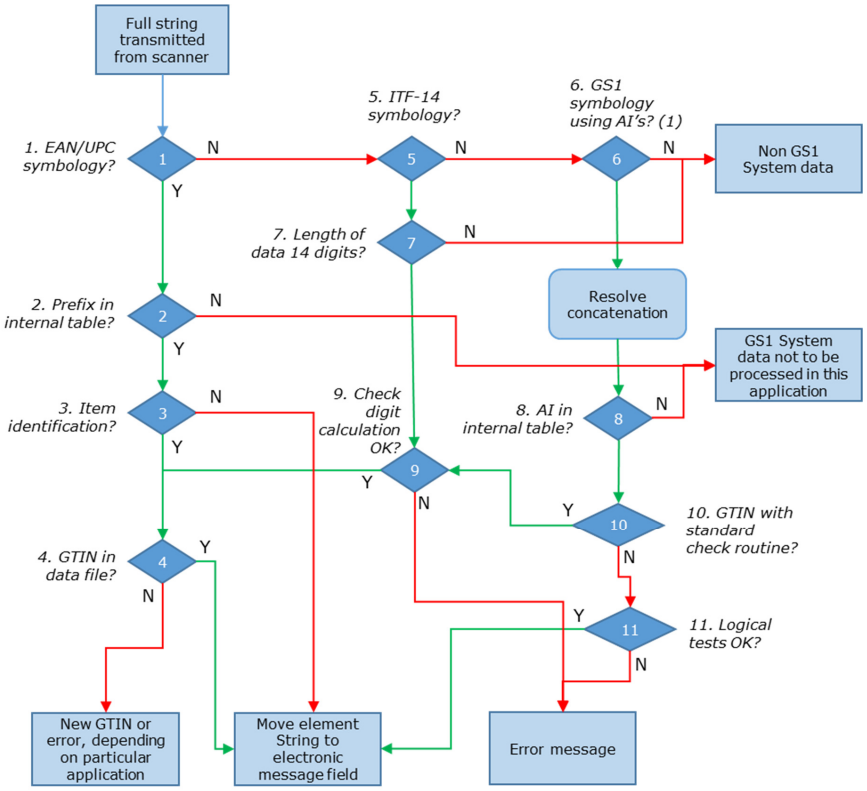
[1] Educational comments are based on the technical analysis of the symbol. In this comment box the operator comments on what the problem is and how to make the symbol better by explaining the parameter's meanings.

7.2.1 Analysis of the data carrier and plausibility test for element strings

Figure 7.2.1-1. Test procedure



(1) GS1 symbologies that encode data using GS1 Application Identifiers include GS1-128, GS1 DataMatrix, GS1 QR Code, GS1 DotCode, GS1 DataBar and Composite and are shown in 7.8. For further details on any of the actions in figure 7.2.1-1, see the sections 7.2.2, 7.2.3, 7.2.4, 7.2.5, 7.2.6, 7.2.7, and 7.2.8.

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7.2.2 Symbology identification

Each transmitted full string consists of a symbology identifier and one or more element strings (see section 3). The identifiers of barcode symbologies are stated in section 5.

7.2.3 Prefix in internal table

System users may generate an internal table showing the GS1 Prefixes of element strings they wish to process. This table also serves to sort out the element strings representing item identification numbers in order to check their presence in the data file. Details on the respective prefixes are stated in section 3.

7.2.4 Item Identification

The symbols in the EAN/UPC symbology family contain identification data for trade items and special data structures (e.g., coupons). Whether an element string contains the identification of a trade item is determined by the GS1 Prefix. System users must determine the specific structure and meaning of prefixes 20 to 29 as defined by their GS1 Member Organisation.

7.2.5 GS1 Application Identifier (AI) in internal table

The element strings using GS1 Application Identifiers cover a wide range of applications. In order to keep the amount of programming on a reasonable level, it is possible to ignore processing of unwanted element strings. This is achieved by establishing an internal table with only the GS1 Application Identifiers intended for processing.

7.2.6 Length of Data 14 Digits

ITF-14 barcodes are used to represent trade item identification numbers. As the use of the general ITF symbology is not exclusive to the GS1 system a check to ensure the symbol encodes 14-digit reference field is recommended.

7.2.7 Check digit calculation and other system checks

In EAN/UPC symbology, the check digit verifies reading and decoding of barcodes as well as Global Trade Item Numbers (GTINs). This is performed automatically by the barcode reader.

Barcode readers processing ITF-14 symbols may be programmed to verify the GTIN's check digit as well. If this recommended verification has been performed, it is indicated by the symbology identifier **]I1** (see section 5). For data transmitted from ITF-14 symbols with symbology identifier **]I0**, the GTIN's check digit SHALL be verified separately.

GS1-128 and GS1 DataBar have an integral symbol check character that verifies correct decoding of scanned data while GS1 DataMatrix, ~~and~~ GS1 QR Code and GS1 DotCode have a Reed Solomon error checking and correction feature. If an element string encoded in one of these symbol types includes a check digit, the check digit will not normally be verified by the barcode reader and SHALL be verified separately. While the data security provided by the symbol check character or error checking guarantees proper decoding of the entire element string, correctness of the contained identification number is achieved by having the application software verify the ID number's check digit. Other logical tests checks are recommended for reasonable data content, such as verifying:

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- Data field ranges (e.g., month < 13 and > 00).
- The maximum length of a variable length element string.
- No alphanumeric characters in numeric only fields.
- Correct GS1 Prefixes.

7.2.8 Move element string to message field

Several element strings may be scanned in a single transaction. In order to verify the correctness and completeness of the transmitted data, each element string is transferred to a message record. If an element string does not include a GS1 Application Identifier, verification of the message is simplified if a GS1 Application Identifier is internally assigned. Global Trade Item Numbers (GTINs) that are carried by EAN-13, UPC-A, UPC-E or ITF-14 barcodes may be denoted with an internally assigned AI (01). Other element strings may be assigned "ghost" GS1 Application Identifiers.

7.7 Element strings represented in data carriers

Scanned element strings are decoded as a full string by the reading device and are then transmitted for processing in the application software. The full string is composed of a symbology identifier and one or more element strings. The meaning of an element string is also determined by the data carrier in which it is represented.

A synopsis by data carrier of the element strings described in these specifications is shown in figure *7.7-1*, which also provides an overview of the sequential number range of trade items by data carrier.

The element strings encoded in any GS1 symbology that uses GS1 Application Identifiers (such as GS1-128, GS1 DataMatrix, GS1 DataBar, GS1 QR Code, GS1 DotCode and GS1 Composite) are composed of one or more GS1 Application Identifiers and one or several data fields. The GS1 Application Identifier denotes the contents and structure of the respective data fields, see section *3*. Section *7.8* provides more information on the data processing aspects.

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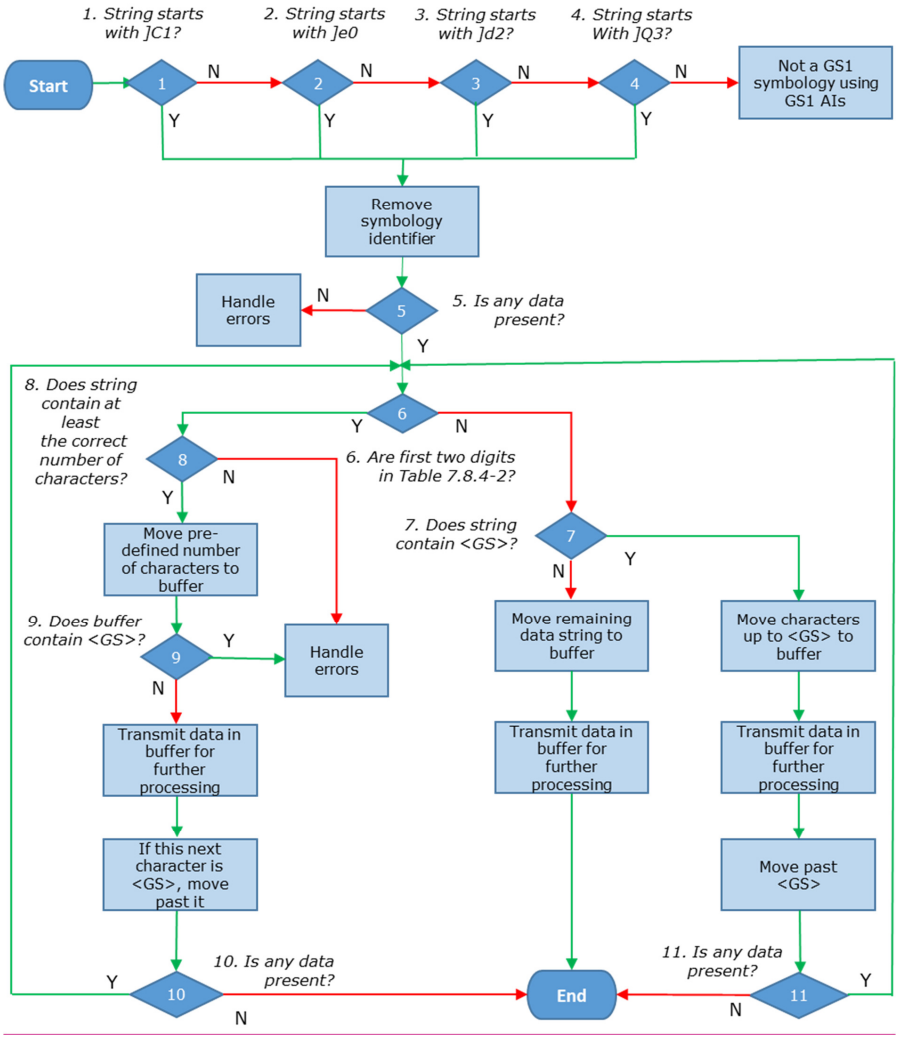
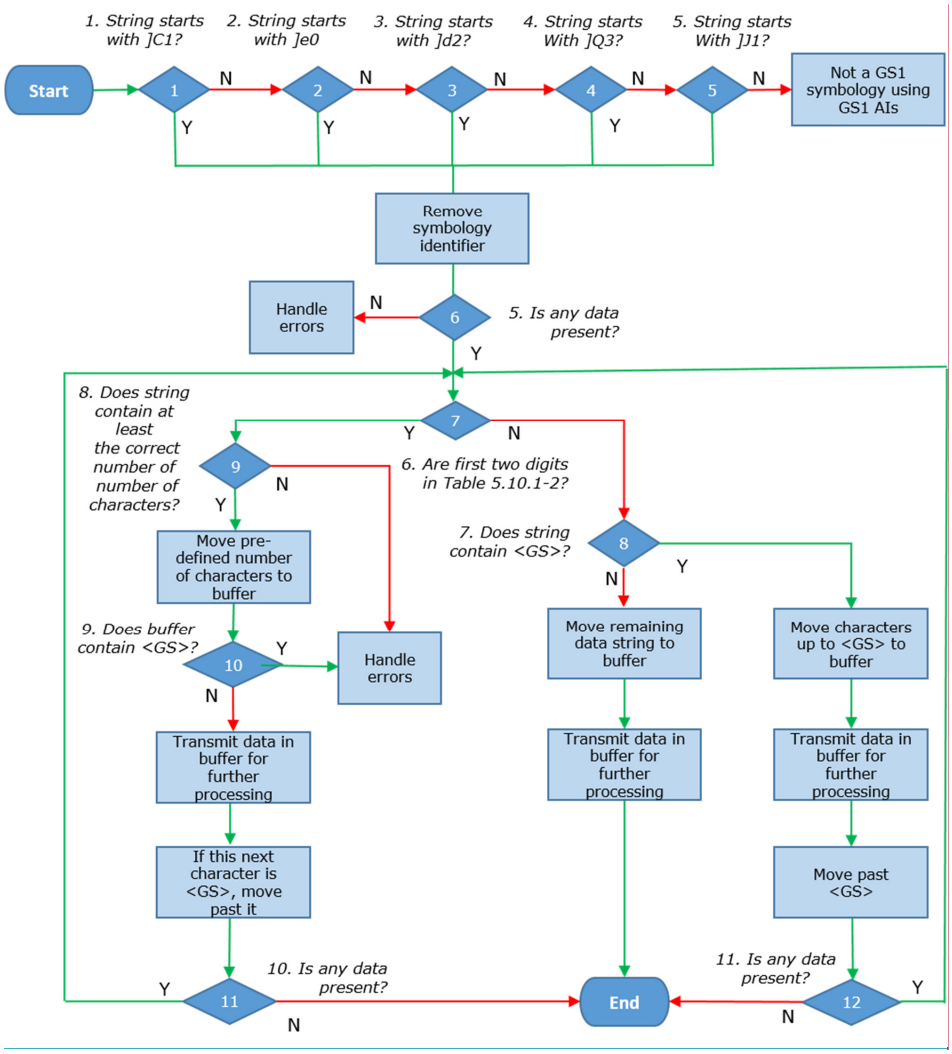
7.8 Processing of data from a GS1 symbology using GS1 Application Identifiers

Figure 7.8-1. Data processing overview





This system logic holds true for any GS1 symbology using GS1 Application Identifiers. The symbology identifiers listed in figure 7.8-1 are:

- **]C1** = GS1-128.
- **]e0** = GS1 DataBar and GS1 Composite symbols.
- **]d2** = GS1 DataMatrix.
- **]Q3** = GS1 QR Code.
-]J1 = GS1 DotCode

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7.8.1 General

Any GS1 symbology using GS1 Application Identifiers may represent several element strings in concatenated form (see section 5).

For processing as shown in figure 7.3-1, it is necessary to separate each element string, which is performed by the processing routine illustrated in figure 7.8-1.

7.8.2 Element strings with predefined lengths using GS1 Application Identifiers

Representation of more than one element string in a GS1 symbology using GS1 Application Identifiers may require the use of a separator character between the different element strings to mark their end.

However, in order to enable printing of smaller barcodes, some element strings have been predefined in length, so that their end is determined, and a separator character SHOULD NOT be used. These element strings are shown in the predefined table in figure 7.8.4-2. All other element strings, even if defined as fixed length in section 3, are not of predefined length and are formally variable length fields which require a separator character if followed by another element string.

A separator character SHOULD NOT be used at the end of the last element string represented in a barcode or for certain AI combinations defined by the symbology specification (e.g., some types of GS1 DataBar).

7.8.3 The separator character and its value

In GS1-128 symbology: The Function 1 Symbol Character (FNC1) SHOULD be the separator character, and the control character <GS> (ASCII value 29 (decimal), 1D (hexadecimal)) may be an alternative.

In GS1 DataMatrix and GS1 DotCode symbology: The Function 1 Symbol Character (FNC1) or the control character <GS> SHALL be the separator character.

In GS1 QR Code symbology: The control character <GS> or the character '%' (ASCII value 37 (decimal), 25 (hexadecimal)) SHALL be the separator character.

In GS1 DataBar and GS1 Composite symbology: The Function 1 Symbol Character (FNC1) SHALL be the separator character.

The value of the decoded separator character transmitted in the decoded data string is always control character <GS> (ASCII value 29 (decimal), 1D (hexadecimal)). It is important to note that some receiving systems may convert/interpret the control character <GS> as something other than ASCII value 29 (decimal), 1D (hexadecimal).

All element strings not included in the predefined table shown in figure 7.8.4-2 MUST be separated by a separator character when followed by another element string in a single barcode.

7.8.4 The basic structure of GS1 barcodes using GS1 Application Identifiers and concatenation

GS1 barcode symbologies that use GS1 Application Identifiers generally have a particular symbol character to indicate that the data is encoded according to the GS1 Application Identifier rules. For example, the GS1-128 symbology uses the Function 1 Symbol Character (FNC1) in the position immediately following the start character. This character pattern is reserved for GS1 system applications worldwide and makes it possible to distinguish GS1-128 barcodes from Code 128 symbols encoding non-GS1 data.

8.1 GS1 glossary of terms and definitions

The glossary lists the terms and definitions that are applied in this document. Please refer to the *www.gs1.org/glossary* for the online version.

Term	Definition
2-dimensional symbology	Optically readable symbols that must be examined both vertically and horizontally to read the entire message. Two-dimensional symbols may be one of two types: matrix symbols and multi-row symbols. Two-dimensional symbols have error detection and may include error correction features.
acceptance criteria	An allowance for a small measurement variation between commercial verifiers or operators during barcode verification testing.
active potency	Represents the measured actual ("Active") potency of a biologic such as haemophilia products.
add-on symbol	A barcode used to encode information supplementary to that in the main barcode.
adjacent symbols	Multiple barcodes placed next to one another without infringing on Quiet Zones.
aggregated packaging (per EU 2018/574)	Any packaging containing more than one unit packet of tobacco products. For GS1, this may be either a trade item grouping or logistics unit.
AIM DotCode	A two-dimensional barcode symbology rendered by printing dots per the AIM DotCode Specification.
allocation	The association of an issued GS1 Prefix, GS1 Company Prefix, or GS1 identification key with an entity or object in accordance with the GS1 rules and policies.
alphanumeric (an)	Describes a character set that contains alphabetic characters (letters), numeric digits (numbers), and other characters, such as punctuation marks.
aperture	A physical opening that is part of the optical path in a device such as a scanner, photometer, or camera. Most apertures are circular, but they may be rectangular or elliptical.
asset type	A component of the Global Returnable Asset Identifier (GRAI), assigned by the asset owner or manager, in order to create a unique GRAI.
attribute	An element string that provides additional information about an entity identified with a GS1 identification key, such as batch number associated with a Global Trade Item Number (GTIN).
autodiscrimination	The capability of a reader to automatically recognise and decode multiple barcode symbologies.
automatic identification and data capture (AIDC)	A technology used to automatically capture data. AIDC technologies include barcodes, smart cards, biometrics and RFID.
auxiliary patterns	Components of the EAN/UPC symbology. The centre guard bar pattern, the left guard bar pattern, and the right guard bar pattern are examples of these.
bar gain/loss	The increase/decrease in bar width due to effects of the reproduction and printing processes.
barcode	A symbol that encodes data into a machine readable pattern of adjacent, varying width, parallel, rectangular dark bars and pale spaces.
barcode verification	The assessment of the printed quality of a barcode based on ISO/IEC standards using ISO/IEC compliant barcode verifiers.
Basic UDI - Device Identifier (BUDI-DI)	The Basic UDI - Device Identifier (BUDI-DI) is a unique identifier specific to a medical device product model and is represented by GS1's Global Model Number (GMN).
batch/lot	The batch or lot number associates an item with information the manufacturer considers relevant for traceability of the trade item. The data may refer to the trade item itself or to items contained in it.
bearer bars	Bar abutting the tops and bottoms of the bars in a barcode or a frame surrounding the entire symbol, intended to equalise the pressure exerted by the printing plate over the entire surface of the symbol and/or to prevent a short scan by the barcode reader.
brand owner	The organisation that owns the specifications of a trade item, regardless of where and by whom it is manufactured. The brand owner is normally responsible for the management of the Global Trade Item Number (GTIN).
carrier (logistics)	The party that provides freight transportation services or a physical or electronic mechanism that carries business information.
Character Set 39	The set of characters found in *ISO 646*: Unique Graphic Character Allocations which includes numeric, alphabetic upper-case, plus the characters "#", "-", and "/".

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Term	Definition
Character Set 82	The set of characters found in *ISO 646*: Unique Graphic Character Allocations which includes numeric, alphabetic upper-case and lower-case, plus twenty special characters but excluding "space".
check digit	A final digit calculated from the other digits of some GS1 identification keys. This digit is used to check that the data has been correctly composed. (See GS1 check digit calculation.)
component/part	An item that is intended to undergo at least one further transformation process to create finished goods for the purpose of downstream consumption
Component/Part Identifier (CPID)	The unique identifier for a component/part, comprising a GS1 Company Prefix and a component/part reference
Composite Component	This term is used to refer to the 2D symbol component within a composite symbol.
Composite symbology	A GS1 system composite symbol consists of a linear component (encoding the item's primary identification) associated with an adjacent Composite Component (encoding attribute data, such as a batch number or expiration date). The composite symbol always includes a linear component so that the primary identification is readable by all scanning technologies, and so that imager scanners can use the linear component as a finder pattern for the adjacent 2D Composite Component. The composite symbol always includes one of three multi-row 2D Composite Component versions (e.g., CC-A, CC-B, CC-C) for compatibility with linear- and area-CCD scanners and with linear and rastering laser scanners.
concatenation	The representation of several element strings in one barcode.
configuration level	Assignment or grouping of trade items that includes one or more of the same trade item.
consignment	A grouping of logistic or transport units assembled by a freight forwarder or carrier to be transported under one transport document (e.g., waybill)
consumer product variant (CPV)	An alphanumeric attribute of a GTIN assigned to a retail consumer trade item variant for its lifetime.
country subdivision	Principle administrative divisions, or similar areas, of a country included in *ISO 3166-1*. Examples are a state in the US, a region in France, a canton in Swiss.
coupon	A voucher that can be redeemed at the point-of-sale for a cash value or free item.
Coupon Extended barcode	A supplemental barcode, used only in North America, that can be printed on a coupon to provide additional information, such as offer codes, expiration dates, and household identification numbers.
coupon instance ID	The identification of a unique instance of a digital coupon.
coupon issuer	Party issuing the coupons, bearing the commercial and financial responsibility for the coupons.
customer	The party that receives, buys, or consumes an item or service.
data character	A letter, digit, or other symbol represented in the data field(s) of an element string.
data field	A field that contains a GS1 identification key, an RCN, or attribute information
Data Matrix	A standalone, two-dimensional matrix symbology that is made up of square modules arranged within a perimeter finder pattern. Data Matrix ISO version ECC 200 is the only version that supports GS1 system identification numbers, including the Function 1 Symbol Character (FNC1). Data Matrix symbols are read by two-dimensional imaging scanners or vision systems.
data titles	Data titles are the abbreviated descriptions of element strings which are used to support manual interpretation of barcodes.
default front	The side of a retail consumer trade item that is used as the starting point to capture dimensional attributes for the purpose of data alignment.
digital coupon	A digital coupon is an electronic presentation, that is distributed and presented without manifesting as "paper" or in other hard-copy form, and that can be exchanged for a financial discount or for loyalty points when making a purchase.
direct mode	Mobile device information retrieval function when the barcode contains either the address (URL) of the content or service, or the content itself, in-line.
direct part marking (DPM)	Direct part marking refers to the process of marking a symbol on an item using an intrusive or non-intrusive method.
direct print	A process in which the printing apparatus prints the symbol by making physical contact with a substrate (e.g., flexography, ink jet, dot peening).
document type	A component of a Global Document Type Identifier (GDTI) assigned by the document issuer to create a unique GDTI.

Term	Definition
dynamic assortment	An assortment that comprises a fixed count of a changing assortment of two or more different retail consumer trade items, each identified with a unique GTIN. All of the retail consumer trade items and their GTINs will have been communicated to the recipient before trading takes place and are declared on the package. The recipient has accepted that the supplier may change the assortment without any prior notice.
EAN/UPC Composite symbology family	A family of barcodes comprising the UPC-A Composite symbology, UPC-E Composite symbology, EAN-8 Composite symbology, and EAN-13 Composite symbology.
EAN/UPC symbology	A family of barcodes including EAN-8, EAN-13, UPC-A, and UPC-E barcodes. Although UPC-E barcodes do not have a separate symbology identifier, they act like a separate symbology through the scanning application software. See also EAN-8 barcode, EAN-13 barcode, UPC-A barcode, and UPC-E barcode.
EAN-13 barcode	A barcode of the EAN/UPC symbology that encodes GTIN-13 or RCN-13.
EAN-8 barcode	A barcode of the EAN/UPC symbology that encodes GTIN-8 or RCN-8.
economic operator (per EU 2018/574)	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. Related to requirement for EOID for each country in which a party operates a facility.
electronic commerce	The conduct of business communications and management through electronic methods, such as electronic data interchange (EDI) and automated data collection systems.
electronic message	A composition of element strings from scanned data and transaction information assembled for data validation and unambiguous processing in a user application.
Electronic Product Code (EPC)	An identification scheme for universally identifying physical objects (e.g., trade items, assets, and locations) via RFID tags and other means. The standardised EPC data consists of an EPC (or EPC Identifier) that uniquely identifies an individual object, as well as an optional filter value when judged to be necessary to enable effective and efficient reading of the EPC tags.
element	A single bar or space of a barcode.
element string	The combination of a GS1 Application Identifier and GS1 Application Identifier data field.
encounter	Situation on the uninterrupted course of which one or more healthcare provider or individual providers delivers healthcare services to a subject of care
enhanced level of AIDC marking (for regulated healthcare trade items)	A level within a graduated system of AIDC trade item marking that provides GTIN plus attribute information
episode of care	An encounter or series of encounters related to the detection and subsequent care for a particular healthcare requirement.
EU 2018/574	A European Union Regulation on the traceability of tobacco products
even parity	A characteristic of the encodation of a symbol character whereby the symbol character contains an even number of dark modules.
Extended Packaging	An approach to giving consumers access to additional information or services about trade items through their mobile device. It is the ability to retrieve additional information about the trade item through mobile devices or in general between link a trade item with virtual information or services.
extension digit	The first digit within the SSCC (Serial Shipping Container Code) which is allocated by the user and is designed to increase the capacity of the SSCC.
facility (per EU 2018/574)	Any location, building or vending machine where tobacco products are manufactured, stored or placed on the market.
finished consumer trade item	A product after all production and packaging processes are completed and it is ready for distribution to the end consumer.
fixed length	Term used to describe a data field in an element string with an established number of characters.
fixed measure trade item	An item always produced in the same predefined version (e.g., type, size, weight, contents, design) that may be sold at any point in the supply chain.
freight forwarder	The party that arranges the carriage of goods including connected services and/or associated formalities on behalf of the shipper (consignor) or consignee.
fresh foods	Trade items in the following product categories: fruits, vegetables, meats, seafood, bakery and ready to serve food such as cheeses, cold cooked or cured meats, and salad, etc. Fresh foods are defined as food that is not preserved by canning, dehydration, freezing or smoking.

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Term	Definition
full string	The data transmitted by the barcode reader from reading a data carrier, including the symbology identifier as well as the encoded data.
Function 1 Symbol Character (FNC1)	A symbology character used in some GS1 data carriers for specific purposes.
general distribution scanning	Scanning environments that include barcoded trade items packaged for transport, logistic units, assets, and location tags.
general retail consumer trade item	A retail consumer trade item identified with a GTIN-13, GTIN-12 or GTIN-8 utilising omnidirectional linear barcodes that can be scanned by high-volume, omnidirectional scanners.
GINC	See Global Identification Number for Consignment.
GLN extension component	The GLN extension component is used to identify internal physical locations within a location which is identified with a GLN (stores, factories, buildings, etc.).
Global Coupon Number (GCN)	A GS1 identification key that provides a globally unique identification for a coupon, with an optional serial number
Global Document Type Identifier (GDTI)	The GS1 identification key used to identify a document type. The key comprises a GS1 Company Prefix, document type, check digit, and optional serial number.
Global Electronic Party Information Registry (GEPIR®)	A web-browser interface and a machine to machine set of protocols for GS1 Member Organisation (MO) membership databases to communicate company information for selected GS1 keys including information about the allocation of the GS1 Company Prefixes used to create GS1 keys and/or individually assigned GS1 keys. Created in 1997 as a tool for MO staff, GEPIR's initial scope was to provide a search engine for member addresses and phone numbers using MO GS1 Company Prefix (GCP) databases as the source of information. In more recent versions, GEPIR also provides a very limited set of information on parties (GLNs) and trade items (GTINs).
Global Identification Number for Consignment (GINC)	The GS1 identification key used to identify a logical grouping of logistic or transport units that are assembled to be transported under one transport document (e.g., waybill). The key comprises a GS1 Company Prefix and the freight forwarder's or carrier's transport reference.
Global Individual Asset Identifier (GIAI)	The GS1 identification key used to identify an individual asset. The key comprises a GS1 Company Prefix and individual asset reference.
Global Location Number (GLN)	The GS1 identification key used to identify physical locations or parties. The key comprises a GS1 Company Prefix, location reference, and check digit.
Global Model Number (GMN)	The GS1 identification key used to identify a product model. The key comprises a GS1 Company Prefix and model reference.
Global Returnable Asset Identifier (GRAI)	The GS1 identification key used to identify returnable assets. The key comprises a GS1 Company Prefix, asset type, check digit, and optional serial number.
Global Service Relation Number (GSRN)	The Global Service Relation Number is the GS1 identification key used to identify the relationship between an organisation offering services and the recipient or provider of services. The key comprises a GS1 Company Prefix, service reference and check digit.
Global Shipment Identification Number (GSIN)	The GS1 identification key used to identify a logical grouping of logistic or transport units that are assembled by the consignor (seller) for a transport shipment from that consignor to one consignee (buyer) referencing a despatch advice and/or BOL. The key comprises a GS1 Company Prefix, shipper reference and check digit.
Global Trade Item Number® (GTIN®)	The GS1 identification key used to identify trade items. The key comprises a GS1 Company Prefix, an item reference and check digit.
GS1 AIDC data carrier	A means to represent data in a machine readable form; used to enable automatic reading of the element strings as specified for use by GS1.
GS1 Application Identifier	The field of two or more digits at the beginning of an element string that uniquely defines its format and meaning.
GS1 Application Identifier data field	The data used in a business application defined by one GS1 Application Identifier.
GS1 B2C Trusted Source of Data (TSD)	A GS1 managed network concept that leverages GTIN (product identification) and GDSN (product information) and would support the communication of authentic product data provided by brand owners to retailers, internet application providers, government, and consumers and shoppers using internet and mobile devices (phones, laptops, etc.).
GS1 check digit calculation	An algorithm used by the GS1 system for the calculation of a check digit to verify accuracy of data. (e.g., modulo 10 check digit, price check digit).

Term	Definition
GS1 Common Currency Coupon Code	An identification number for coupons issued in a common currency area (e.g., the euro currency) that uses the Coupon Code-13 data structure.
GS1 Company Prefix	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 must be at least one longer than the length of the GS1 Prefix. The GS1 Company Prefix is issued by a GS1 Member Organisation. 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. See also U.P.C Company Prefix.
GS1 Company Prefix licensee	The entity to which a GS1 Company Prefix is licenced.
GS1 DataBar Composite symbology family	A family of symbols comprising all the GS1 DataBar barcodes when an accompanying Composite Component is printed directly above the linear component.
GS1 DataBar Expanded barcode	A barcode that encodes any GS1 identification key plus attribute data, such as weight and "best before" date, in a linear symbol that can be scanned omnidirectionally by suitably programmed point-of-sale scanners.
GS1 DataBar Expanded Stacked barcode	A barcode that is a variation of the GS1 DataBar Expanded barcode that is stacked in multiple rows and is used when the normal symbol would be too wide for the application.
GS1 DataBar Limited barcode	A barcode that encodes a GTIN with a leading digit of zero or indicator digit of one in a linear symbol; for use on small items that will not be scanned at the point-of-sale.
GS1 DataBar Omnidirectional barcode	A barcode that encodes a GTIN. It is designed to be read by omnidirectional scanners.
GS1 DataBar Retail POS family	The members of the GS1 DataBar symbology family designed to be read in segments by omnidirectional scanners at retail POS: GS1 DataBar Omnidirectional; GS1 DataBar Stacked Omnidirectional; GS1 DataBar Expanded; GS1 DataBar Expanded Stacked.
GS1 DataBar Stacked barcode	A barcode that is a variation of the GS1 DataBar Truncated barcode that is stacked in two rows and is used when the GS1 DataBar Truncated barcode would be too wide for the application.
GS1 DataBar Stacked Omnidirectional barcode	A barcode that is a variation of the GS1 DataBar symbology that is stacked in two rows and is used when the GS1 DataBar Omnidirectional symbol would be too wide for the application. It is designed to be read by omnidirectional checkout scanners.
GS1 DataBar Truncated barcode	A barcode that is a truncated version of the GS1 DataBar Omnidirectional barcode. It is used when the GS1 DataBar Omnidirectional barcode would be too tall for small item marking applications. It is not intended for omnidirectional checkout scanning.
GS1 DataBar®	A family of barcodes, including GS1 DataBar Omnidirectional; GS1 DataBar Stacked Omnidirectional; GS1 DataBar Expanded; GS1 DataBar Expanded Stacked GS1 DataBar Truncated, GS1 DataBar Limited, and GS1 DataBar Stacked symbols.
GS1 DataMatrix	GS1 implementation specification for use of Data Matrix
GS1 DotCode	GS1 implementation specification for use of AIM DotCode
GS1 EANCOM®	The GS1 standard for Electronic Data Interchange (EDI) that is a detailed implementation guideline of the UN/EDIFACT standard messages using the GS1 identification keys.
GS1 Global Standards Management Process	GS1 created the Global Standards Management Process (GSMP) to support standards development activity for the GS1 system. The GSMP uses a global consensus process to develop supply chain standards that are based on business needs and user-input
GS1 identification key	A unique identifier for a class of objects (e.g., a trade item) or an instance of an object (e.g., a logistic unit).
GS1 identification key licensee	The entity to which a GS1 identification key is licenced.
GS1 Member Organisation	A member of GS1 that is responsible for administering the GS1 system in its country (or assigned area). This task includes, but is not restricted to, ensuring user companies make correct use of the GS1 system, have access to education, training, promotion and implementation support and have access to play an active role in GSMP.
GS1 Prefix	A unique string of two or more digits issued by GS1 Global Office and allocated to GS1 Member Organisations to issue GS1 Company Prefixes or allocated to other specific areas.
GS1 QR Code	GS1 implementation specification for use of QR Code
GS1 symbologies using GS1 Application Identifiers	All GS1 endorsed barcode symbologies that can encode more than a GTIN namely GS1-128, GS1 DataMatrix, GS1 DataBar and Composite.

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Term	Definition
GS1 system	The specifications, standards, and guidelines administered by GS1.
GS1 UIC Extension 1	Character that follows and extends the EU 2018/574 UIC to identify a country of ID Issuer's appointment and operation.
GS1 UIC Extension 2	Character that follows GS1 UIC Extension 1 and extends the EU 2018/574 UIC to identify whether a GS1 or non-GS1 based algorithm is used.
GS1 XML	The GS1 standard for extensible markup language (XML) schemas providing users with a global business messaging language of e-business to conduct efficient internet-based electronic commerce.
GS1®	Based in Brussels, Belgium, and Princeton, USA, it is the organisation that manages the GS1 system. Its members are GS1 Member Organisations.
GS1-128 symbology	A subset of Code 128 that is utilised exclusively for GS1 system data structures.
GS1-8 Prefix	A unique string of three digits issued by GS1 Global Office and allocated to GS1 Member Organisations to issue GTIN-8s or allocated to issue RCN-8s (see RCN-8).
GSIN	See Global Shipment Identification Number.
GTIN plus attribute(s) flag	A trigger in systems to determine if additional processing is required by a barcode user for a given GTIN.
GTIN-12	The 12-digit GS1 identification key composed of a U.P.C. Company Prefix, item reference, and check digit used to identify trade items.
GTIN-13	The 13-digit GS1 identification key composed of a GS1 Company Prefix, item reference, and check digit used to identify trade items.
GTIN-14	The 14-digit GS1 identification key composed of an indicator digit (1-9), GS1 Company Prefix, item reference, and check digit used to identify trade items.
GTIN-8	The 8-digit GS1 identification key composed of a GS1-8 Prefix, item reference, and check digit used to identify trade items.
guard bar pattern	An auxiliary pattern of bars and spaces corresponding to start or stop patterns in barcode symbologies, and serving to separate the two halves of EAN-8, EAN-13, and UPC-A symbols.
healthcare primary packaging	The first level of packaging for the product marked with an AIDC data carrier either on the packaging or on a label affixed to the packaging. For non-sterile packaging, the first level of packaging can be the packaging in direct contact with the product. For sterile packaging, the first level of packaging can be any combination of the sterile packaging system, May consist of a single item or group of items for a single therapy such as a kit. For packaging configurations that include a retail consumer trade item, primary packaging is a packaging level below the retail consumer trade item.
healthcare provider	An organisation or facility that delivers healthcare to a subject of care. Corresponds to "care delivery organisation", "healthcare organisation", etc.
healthcare secondary packaging	A level of packaging marked with an AIDC carrier that may contain one or more primary packages or a group of primary packages containing a single item.
highest level of AIDC marking (for regulated healthcare trade items)	A level within a graduated system of AIDC trade item marking that provides GTIN, serialisation, and potentially other attribute information.
House Waybill Number	A freight forwarder's document used mainly as a control for the goods within the freight forwarder's own service system.
human readable interpretation(HRI)	Characters, such as letters and numbers, which can be read by persons and are encoded in GS1 AIDC data carriers confined to a GS1 standard structure and format. The human readable interpretation is a one-to-one illustration of the encoded data. However start, stop, shift and function characters, as well as the symbol check character, are not shown in the human readable interpretation.
identification number	A numeric or alphanumeric field intended to enable the recognition of one entity versus another.
Importer index (per EU 2018/574)	Character to identify the presence or absence of an importer within the EU 2018/574 EOID, FID, and MID. This means either the absence of an importer (null) or presence of one importer out of up to 63 importer possibilities per country, per GTIN.
indicator	A digit from 1 to 9 in the leftmost position of the GTIN-14.
indirect mode	Mobile device information retrieval function when the code contains an identifier, which needs to be resolved to obtain the content or service. Resolving an identifier means looking it up, typically at a network service, to determine the corresponding content or service.

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Term	Definition
individual asset	An entity that is part of the inventory of assets for a given company. (See also returnable asset.)
individual asset reference	A component of the Global Individual Asset Identifier (GIAI) assigned by the asset owner or manager to create a unique GIAI.
individual provider	Any person who provides or is a potential provider of a health care service to a subject of care
inner trade item grouping	Intermediate package of multiples of the same trade item or a predefined assortment of trade items. An inner trade item grouping may or may not be sold at POS. (In some regions may also be referred to as inner pack).
Interleaved 2-of-5 symbology	Barcode symbology used for the ITF-14 barcode.
inverse exponent	The GS1 Application Identifier digit that denotes the implied decimal point position in an element string.
issuance	The generation of a GS1 Prefix, GS1 Company Prefix, or GS1 identification key in accordance with GS1 rules and policies.
item reference	A component of the Global Trade Item Number (GTIN) assigned by the brand owner to create a unique GTIN.
ITF symbology	See Interleaved 2-of-5 symbology.
ITF-14 barcode	ITF-14 (a subset of Interleaved 2-of-5) barcodes carry GTINs only on trade items that are not expected to pass through the point-of-sale.
kit	A collection of different regulated healthcare items assembled for use in a single therapy.
leading zero(s)	Digits (always zeroes) which must be placed in the leftmost position(s) of a data string when GTIN-8, GTIN-12, or GTIN-13 are encoded in an GS1 AIDC data carrier that requires 14-digits or when used for the same intent in other data structures such as GRAI.
levels of AIDC marking	A graduated system of AIDC marking. The graduated system is defined as minimum, enhanced and highest levels of AIDC marking.
linear barcode	Barcode symbology using bars and spaces in one dimension.
local assigned code (LAC)	A particular use of the UPC-E barcode for restricted distribution.
location reference	A component of a Global Location Number (GLN) assigned by the party that defined the location to create a unique GLN.
logistic measures	Measures indicating the outside dimensions, total weight, or volume inclusive of packing material of a logistic unit. Also known as gross measures.
logistic unit	An item of any composition established for transport and/or storage that needs to be managed through the supply chain. It is identified with an SSCC.
loose produce	Fruits and vegetables which are delivered to the store loose, in boxes or cases, and then put into a bag or selected individually by the customer for purchase.
magnification	Different sizes of barcodes based on a nominal size and a fixed aspect ratio; stated as a percentage or decimal equivalent of a nominal size.
measure verifier digit	A digit calculated from the measure field in a Restricted Circulation Number (RCN) encoded using the EAN/UPC symbology. Used to check that the data has been correctly composed.
medical device	Any instrument, apparatus, implement, machine, appliance, implant, in vitro reagent or calibrator, software, material or other similar or related article, intended by the manufacturer to be used, alone or in combination, for human beings for any medical purpose.
minimum level of AIDC marking (for regulated healthcare trade items)	A level within a graduated system of AIDC trade item marking that provides GTIN with no attribute information.
model reference	A component of the Global Model Number (GMN) assigned by the brand owner to create a unique GMN.
module	The narrowest nominal width unit of measure in a barcode. In certain symbologies, element widths may be specified as multiples of one module. Equivalent to X-dimension.
modulo 10	The name of the algorithm – a simple checksum formula in the public domain – used to create a check digit for those GS1 identification keys that require one.
modulo 103 GS1-128 symbol check character	A number, which results from a modulo calculation, that is encoded in the GS1-128 barcode as a self-checking symbol character. It is created automatically by software as a symbol overhead character and is not expressed in the human readable interpretation.

Term	Definition
multiple unit blister/package	Immediate package for a medicine with more than one single unit. Package which fully encloses the pill/caplet/capsule. Each dosage form may be individually packaged. The individually blistered dosage forms are attached to each other in one strip.
National Healthcare Reimbursement Number (NHRN)	National and/or regional 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 healthcare provider reimbursement.
National Trade Item Number (NTIN)	A coding scheme, administered in the healthcare sector by a national organisation for which a GS1 Prefix has been issued to permit its uniqueness within the GTIN pool but without assurance of full compatibility with GTIN functionality. The result is a product identification number assigned by a third party (not the brand owner or manufacturer). Example: the CIP (Club Inter Pharmaceutique) in France administered by the French Health Products Safety Agency (AFSSAPS).
natural base	The side of a non-retail consumer trade item package that is used as a reference point for capturing dimensional attributes for the purpose of data alignment.
non-HRI text	Characters such as letters and numbers that can be read by persons and may or may not be encoded in GS1 AIDC data carriers and are not confined to a structure and format based on GS1 standards (e.g., a date code expressed in a national format that could be used to encode a date field in a GS1 AIDC data carrier, brand owner name, consumer declarations).
odd parity	A characteristic of the encodation of a symbol character whereby the symbol character contains an odd number of dark modules.
omnidirectional linear barcode	A linear barcode symbol designed to be omnidirectionally read in segments by suitably programmed high-volume omnidirectional point-of-sale (POS) scanners.
packaging component	Entities such as bottles, caps, and labels to package a consumer trade item.
packaging component number	GTIN attribute used to establish a relationship between a finished consumer trade item and packaging components.
payment slip	The end customer's notification of a demand for payment for a billable service (e.g., utility bill) comprising an amount payable and payment conditions.
point-of-care (POC)	Dispensing or use of a non-retail, regulated healthcare pharmaceutical or medical device to a patient based on right product, dose, and route of administration.
point-of-sale (POS)	Refers to the retail checkout where omnidirectional barcodes must be used to enable very rapid scanning or low volume checkout where linear or 2D matrix barcodes are used with image-based scanners.
predefined assortments	An assortment that comprises a fixed count of two or more different trade items, each identified with a unique GTIN that is declared on the package. The trade items contained within the assortment may be trade items of one or more manufacturers. When an assortment contains items from multiple manufacturers the GTIN requirement for the assortment is the responsibility of the organisation that creates the assortment. Any change in the configuration of the assortment is considered a new trade item.
price check digit	A digit calculated from the price element in a Restricted Circulation Number (RCN) encoded using the EAN/UPC symbology. Used to check that the data has been correctly composed.
price verifier digit	See price check digit.
primary barcode	The barcode containing the identification number of the item (e.g., GTIN, SSCC). Used to determine the placement of any additional barcode information.
product model	A base product design or specification from which a trade item is derived.
QR Code	A two-dimensional matrix symbology consisting of square modules arranged in a square pattern. The symbology is characterised by a unique finder pattern located at three corners of the symbol. QR Code symbols are read by two-dimensional imaging scanners or vision systems.
Quiet Zone	A clear space which precedes the start character of a barcode and follows the stop character. Formerly referred to as "clear area" or "light margin".
Quiet Zone Indicator	A greater than (>) or less than (<) character, printed in the human readable field of the barcode, with the tip aligned with the outer edge of the Quiet Zone.
radio frequency	Any frequency within the electromagnetic spectrum associated with radio wave propagation. When a radio frequency current is supplied to an antenna, an electromagnetic field is created that then is able to propagate through space. Many wireless technologies are based on radio frequency field propagation.

Term	Definition
radio frequency identification (RFID)	A data carrier technology that transmits information via signals in the radio frequency portion of the electromagnetic spectrum. A radio frequency identification system consists of an antenna and a transceiver, which read the radio frequency and transfer the information to a processing device, and a transponder, or tag, which is an integrated circuit containing the radio frequency circuitry and information to be transmitted.
random assortment	An assortment that comprises 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 colours of tooth brushes).
RCN-12	A 12-digit Restricted Circulation Number (see Restricted Circulation Number).
RCN-13	A 13-digit Restricted Circulation Number (see Restricted Circulation Number).
RCN-8	An 8-digit Restricted Circulation Number (see Restricted Circulation Number)
refund receipt	A voucher produced by equipment handling empty containers (bottles and crates).
regulated healthcare non-retail consumer trade item	A consumer trade item not intended for scanning at POS and identified with a GTIN-14, GTIN-13, GTIN-12 or GTIN-8 utilising linear or 2D matrix barcodes that can be scanned by image-based scanners.
regulated healthcare retail consumer trade item	A regulated healthcare trade item to be sold to the end consumer at a regulated healthcare retail point-of-sale (pharmacy). They are identified with a GTIN-13, GTIN-12 or GTIN-8 utilising linear or 2D matrix barcodes that can be scanned by image-based scanners.
regulated healthcare trade item	Pharmaceuticals or medical devices that are sold or dispensed in a controlled environment (e.g., retail pharmacy, hospital pharmacy).
responsible entity	The party responsible for the safety and effectiveness of the medical product at a moment in time in its lifecycle, according to the approved regulatory file (including labelling) and regulatory/legal/professional obligations associated with the medical product. (e.g., brand owner, repackager, hospital pharmacy, etc.)
Restricted Circulation Number (RCN)	Signifies a GS1 identification number used for special applications in restricted environments, either defined by local GS1 Member Organisations (for regional applications such as variable measure product identification and, couponing) or by a company (for internal applications).
retail consumer trade item variant	A variation of change to a retail consumer trade item (which may itself be a homogeneous or predefined assortment of other retail consumer trade items) which does not require a new GTIN, but where identification of the variation may be required.
retailer zero-suppression code	A group of ID numbers (separate from Local Assigned Codes), that enable the use of UPC-E barcodes in a closed system environment (not for open supply chain applications).
returnable asset	A reusable entity owned by a company that is used for transport and storage of goods. It is identified with a GRAI.
scanner	An electronic device to read barcode and convert them into electrical signals understandable by a computer device.
separator character	Special character(s) that are defined as part of GS1 symbologies and used to separate concatenated element strings, based on their positioning in the GS1 barcodes.
serial number	A code, numeric or alphanumeric, assigned to an individual instance of an entity for its lifetime. Example: microscope model AC-2 with serial number 1234568 and microscope model AC-2 with serial number 1234569. A unique individual item may be identified with the combined Global Trade Item Number (GTIN) and serial number.
serial reference	A component of the Serial Shipping Container Code (SSCC) assigned by the physical builder or brand owner of the logistic unit to create a unique SSCC.
Serial Shipping Container Code (SSCC)	The GS1 identification key used to identify logistics units. The key comprises an extension digit, GS1 Company Prefix, serial reference, and check digit.
service reference	A component of the Global Service Relation Number (GSRN) assigned by the brand owner to create a unique GSRN.
service relation instance number (SRIN)	An attribute to the GSRN which allows to distinguish different encounters during a service relationship.
shipment	A grouping of logistics and transport units assembled and identified by the seller (sender) of the goods travelling under one despatch advice and/or Bill of Lading to one customer (recipient).
short life items	An item, preparation or reconstituted product with limited use/shelf life, such as in healthcare a cytotoxic medicine, that has undergone some manipulation, such as addition of a diluent, in order to make it administrable to a specified patient.

Term	Definition
single shipping/retail consumer trade item	A retail consumer trade item that is also regarded as a shipping item and is one to a carton (e.g., a bicycle or a television).
single unit	Single item of medicine/medical device without any package, for example the single tablet in a blister or bottle, the syringe as such.
single unit package/blister	A healthcare primary package that contains one discrete pharmaceutical dosage form, i.e. a tablet, a certain volume of a liquid or that is the immediate package for a medical device like a syringe. A number of single units may be attached to each other, but are easy to separate through a perforation.
special characters	Special characters that are designated by the symbology specification.
sterile packaging system	A combination of the sterile barrier system (the minimum package that prevents ingress of microorganisms and allows aseptic presentation of the product at the point of use) and the protective packaging (configuration of materials designed to prevent damage to the sterile barrier system and its contents until the point of use).
subject of care	Any person who uses or is a potential user of a health care service, subjects of care may also be referred to as patients or health care consumers
substrate	The material on which a barcode is printed.
supplier	The party that produces, provides, or furnishes an item or service.
symbol	The combination of symbol characters and features required by a particular symbology, including Quiet Zone, start and stop characters, data characters, and other auxiliary patterns, which together form a complete scannable entity; an instance of a symbology and a data structure.
symbol character	A group of bars and spaces in a symbol that is decoded as a single unit. It may represent an individual digit, letter, punctuation mark, control indicator, or multiple data characters.
symbol check character	A symbol character or set of bar/space patterns included within a GS1-128 or GS1 DataBar symbol, the value of which is used by the barcode reader for the purpose of performing a mathematical check to ensure the accuracy of the scanned data. It is not shown in human readable interpretation. It is not input to the barcode printer and is not transmitted by the barcode reader.
symbol contrast	An *ISO/IEC 15416* parameter that measures the difference between the largest and smallest reflectance values in a Scan Reflectance Profile (SRP).
symbology	A defined method of representing numeric or alphabetic characters in a barcode; a type of barcode.
symbology element	A character or characters in a barcode used to define the integrity and processing of the symbol itself (e.g., start and stop patterns). These elements are symbology overhead and are not part of the data conveyed by the barcode.
symbology identifier	A sequence of characters generated by the decoder (and prefixed to the decoded data transmitted by the decoder) that identifies the symbology from which the data has been decoded.
trade item	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.
trade item grouping	A predefined composition of trade item(s) that is not intended for point-of-sale scanning. It is identified with a GTIN-14, GTIN-13, or GTIN-12.
trade measures	Net measures of variable measure trade items as used for invoicing (billing) the trade item.
truncation	Printing a symbol shorter than the symbology specification's minimum height recommendations. Truncation can make the symbol difficult for an operator to scan.
Unique Device Identifier (UDI)	A series of numeric or alphanumeric characters that is created through a globally accepted device identification and coding standard. It allows the unambiguous identification of a specific medical device on the market. The UDI is comprised of the UDI-DI and the UDI-PI. The word 'Unique' does not imply serialisation of individual production units.
Unique Device Identifier – Device Identifier (UDI-DI)	A unique identifier specific to a medical device trade item represented by a Global Trade Item Number (GTIN).
Unique Device Identifier – Production Identifier (UDI-PI)	A numeric or alphanumeric code that identifies the unit of device production. The different types of UDI-PIs include serial number, lot number, software identification and manufacturing or expiry date or both types of date.

Term	Definition
Unit of Use UDI-DI (UoU UDI-DI)	The Unit of Use UDI-DI serves to associate the use of a device with a patient in instances in which a UDI is not labelled on the individual device at the level of its actual use on a patient. For example, three clips (which do not carry a physical UDI marking themselves) are contained in a cartridge which is packaged inside a container, which does carry a labelled UDI.
U.P.C. Company Prefix	A GS1 Company Prefix starting with a zero ('0') becomes a U.P.C. Company Prefix by removing the leading zero. A U.P.C. Company Prefix is used to issue GTIN-12.
U.P.C. Prefix	A GS1 Prefix starting with a zero ('0') becomes a U.P.C. Prefix by removing the leading zero. A U.P.C. Prefix is used to issue U.P.C. Company Prefixes or allocated to other specific areas.
Unique Identification Code (UIC) (per EU 2018/574)	Identifier of an EU 2018/574 ID Issuer that begins with an ISO 15459 Issuing Agency Code.
unit of use	Refers to an individual unit package that is used to make up the patient-specific prescription that is prescribed for administering to a patient.
unrestricted distribution	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.
UPC-A barcode	A barcode of the EAN/UPC symbology that encodes GTIN-12 and RCN-12.
UPC-E barcode	A barcode of the EAN/UPC symbology representing a GTIN-12 in six explicitly encoded digits using zero-suppression techniques.
variable measure trade item	A trade item which may be traded without a predefined measure, such as its weight or length.
wide-to-narrow ratio	The ratio between the wide elements and the narrow elements in a barcode symbology such as ITF-14 that has two different element widths.
X-dimension	The specified width of the narrowest element of a barcode.

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8.2 GS1 abbreviations

Abbreviation	Term
ADC	Automatic Data Capture
AI	GS1 Application Identifier
AIDC	Automatic Identification and Data Capture
aUI	aggregate Unique Identifier (per EU 2018/574)
BUDI-DI	Basic UDI - Device Identifier
DPM	Direct Part Marking
EAN	EAN International, now called GS1
EDI	Electronic Data Interchange
EOID	Economic Operator Identifier (per EU 2018/574)
EPC	Electronic Product Code
EU	European Union
FID	Facility Identifier (per EU 2018/574)
FNC1	Function 1 Symbol Character
GCN	Global Coupon Number
GCP	GS1 Company Prefix
GDSN	Global Data Synchronisation Network
GDTI	Global Document Type Identifier
GEPIR	Global Electronic Party Information Registry
GIAI	Global Individual Asset Identifier
GINC	Global Identification Number for Consignment
GLN	Global Location Number
GMN	Global Model Number
GPC	Global Product Classification

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Abbreviation	Term
GRAI	Global Returnable Asset Identifier
GRCTI	General Retail Consumer Trade Item
GS1 key	GS1 identification key
GSIN	Global Shipment Identification Number
GSMP	Global Standards Management Process
GSRN	Global Service Relation Number
GS1 UIC EXT	GS1 UIC Extension
GTIN	Global Trade Item Number
HRI	Human Readable Interpretation
ISBN	International Standard Book Number
ISO	International Organization for Standardization
ISSN	International Standard Serial Number
ITIP	Identification of Trade Item Pieces
LAC	Local Assigned Code
NHRN	National Healthcare Reimbursement Number
NTIN	National Trade Item Number
RCN	Restricted Circulation Number
RFID	Radio Frequency Identification
RHTI	Regulated healthcare trade item
RSS	Reduced Space Symbology
RZSC	Retailer Zero-Suppression Code.
SKU	Stock Keeping Unit
SRIN	Service Relation Instance Number
SSCC	Serial Shipping Container Code
TPX	Third Party Controlled, Serialised Extension of GTIN (restricted to EU 2018/574 regulatory use)
UIC	Unique Identification Code (per EU 2018/574)
upUI	unit pack Unique Identifier (per EU 2018/574)
UDI	Unique Device Identifier
UDI-DI	Unique Device Identifier – Device Identifier
UDI-PI	Unique Device Identifier – Production Identifier
UoU	Unit of Use

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8.3 Legacy (retired) terms

When terms are replaced or retired by GS1, they are maintained within this section for a minimum of five years. The legacy terms are supplied to point GS1 stakeholders to new terminology. The period of five years ensures harmonisation with external standards bodies whose standards make normative reference to the *GS1 General Specifications*.

Legacy term	Current term
Coupon-12	See RCN-12
Coupon-13	See RCN-13
EAN	GS1
EAN International	GS1 Global Office
Interleaved 2 of 5	ITF-14 Symbol
Number System Character	See U.P.C. Prefix
print gain/loss	bar gain/loss