



## General Specifications Change Notification (GSCN)

WR #	GSCN Name	Ratification Date
22-300	Deprecate "mutual agreed" language and X-dimensions	Dec 2022

### Associated Work Request (WR) Number:

### Background:

The GTIN Modernisation MSWG recognized that the 2D barcodes approved for POS in the ASPs and the 2D barcodes used for mutual agreement purposes are different. Also, the minimum X-dimensions for the 2D barcodes differ. This work request looks to deprecate the "mutually agree" language in the Application Standard for variable measure and X-dimension requirements.

### Disclaimer:

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

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

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

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



## Data carrier specification

### Carrier choices

The data carriers for this element string are:

- UPC-A barcode (carrying a GTIN-12)
- EAN-8 barcode (carrying GTIN-8)
- EAN-13 barcode (carrying a GTIN-13)
- GS1 DataBar Retail POS family (carrying GTIN-12 or GTIN-13)

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

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

See section [5.12.3.1](#), *GS1 symbol specification table 1*.

### Symbol placement

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

### Unique application processing requirements

Not applicable

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

Trade items intended for general distribution and point-of-sale scanning must carry a barcode of the EAN/UPC or GS1 DataBar symbology. ~~During a transition period, 2D barcodes may be applied in addition to the linear barcode. For a summary of all conformance requirements for this AIDC application standard, 2D data-carriers/barcodes, cross-application rules and related technical specifications, see section 8.3.~~

~~Therefore,~~ these trade items **SHALL be identified with support** GTIN-8s, GTIN-12s or GTIN-13s (see section [2.1.3](#)). For symbol X-dimensions, minimum symbol height and minimum symbol quality, see section [5.12.3.3](#), *GS1 symbol specification table 3*.



**Note:** Allocation of GTIN-8 to new trade items for this application SHALL conform to section 4.3.7

~~To support new applications additional GS1 approved data carriers (encoding additional data with the GTIN) may be applied with mutual agreement between trading partners. For information on how to manage multiple barcodes see section 4.16.~~

~~For a summary of all conformance requirements for this AIDC application standard, cross-application rules and related technical specifications, see section 8.3.~~



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

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

- Variable measure fresh food trade items using a GTIN and additional attributes encoded with GS1 DataBar Expanded or GS1 DataBar Expanded Stacked, ~~GS1 DataMatrix, or GS1 QR Code~~. See section [2.1.12.1](#). ~~During a transition period, 2D barcodes may be applied in addition to the linear barcode. For a summary of all conformance requirements for this AIDC application standard, 2D barcodes, cross-application rules and related technical specifications, see section 8.4.~~
  - Variable measure trade items using a Restricted Circulation Number (RCN) encoded with the EAN/UPC symbology family. See section [2.1.12.2](#).
- ✔ **Note:** GTINs SHALL be encoded with AI (01). Restricted Circulation Numbers (RCNs) SHALL NOT be encoded with AI (01) as RCNs are not GTINs.

~~To support new applications additional GS1-approved data carriers (encoding additional data with the GTIN) may be applied with mutual agreement between trading partners. For information on how to manage multiple barcodes see section [4.16](#).~~

~~For a summary of all conformance requirements for this AIDC application standard, cross-application rules and related technical specifications, see section [8.4](#).~~

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

##### Application description

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

- Consumer puts loose produce items into a bag and a barcoded label is produced and attached by the consumer.
- Staff attaches a barcode label, produced in store to pre-packed loose produce trade item.
- At the POS, loose produce is weighed and the price is calculated.

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

##### Variable measure fresh food

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

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

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

**GS1 key****Required**

The allowed key formats for this application are:

- GTIN-12
- GTIN-13

**Rules**

All GTIN rules described in section [4.3](#).

**Attributes****Required**

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

**Optional**

- See section [3.2](#) - *GS1 Application Identifiers in numerical order* for a complete list of all GS1 Application Identifiers. For instance, the amount payable and/or best before date may also be included.
- For more details related to GS1 Application Identifiers for fresh foods, refer to the [GS1 AIDC Fresh Foods Sold at Point-of-Sale Implementation Guideline](#).

**Rules**

Not applicable.

**Data carrier specification****Carrier choices**

- GS1 DataBar Expanded
- GS1 DataBar Expanded Stacked
- ~~GS1 DataMatrix~~
- ~~GS1 QR Code~~



**Note:** ~~During a transition period, 2D barcodes may be applied in addition to the linear barcode. For a summary of all conformance requirements for this AIDC application standard, 2D barcodes, cross-application rules and related technical specifications, see section 8.4. GS1 2D barcodes are not universally scannable at retail POS. Before using GS1 DataMatrix or GS1 QR Code barcodes for this application, trading partners SHALL mutually agree to have the ability to scan and process the required data.~~



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

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

See section [5.12.3.1](#), *GS1 symbol specification table 1*.

**Symbol placement**

None



**5.12.3.1 Symbol specification table 1 - Trade items scanned in general retail POS and not general distribution**

**Figure 5.12.3.1-1.** GS1 symbol specification table 1

Main 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	
EAN-13	0.264 (0.0104")	0.330 (0.0130")	0.660 (0.0260")	18.28 (0.720")	22.85 (0.900")	45.70 (1.800")	11X	7X	1.5/06/660
EAN-8	0.264 (0.0104")	0.330 (0.0130")	0.660 (0.0260")	14.58 (0.574")	18.23 (0.718")	36.46 (1.435")	7X	7X	1.5/06/660
UPC-A	0.264 (0.0104")	0.330 (0.0130")	0.660 (0.0260")	18.28 (0.720")	22.85 (0.900")	45.70 (1.800")	9X	9X	1.5/06/660
UPC-E	0.264 (0.0104")	0.330 (0.0130")	0.660 (0.0260")	18.28 (0.720")	22.85 (0.900")	45.70 (1.800")	9X	7X	1.5/06/660
GS1 DataBar Omni-directional (****)	0.264 (0.0104")	0.330 (0.0130")	0.660 (0.0260")	12.14 (0.478")	15.19 (0.598")	30.36 (1.195")	None	None	1.5/06/660
GS1 DataBar Stacked Omni-directional (***) (****)	0.264 (0.0104")	0.330 (0.0130")	0.660 (0.0260")	25.10 (0.988")	31.37 (1.235")	62.70 (2.469")	None	None	1.5/06/660
GS1 DataBar Expanded	0.264 (0.0104")	0.330 (0.0130")	0.660 (0.0260")	8.99 (0.354")	11.23 (0.442")	22.44 (0.883")	None	None	1.5/06/660
GS1 DataBar Expanded Stacked (****)	0.264 (0.0104")	0.330 (0.0130")	0.660 (0.0260")	18.75 (0.738")	23.44 (0.923")	46.86 (1.845")	None	None	1.5/06/660
GS1 DataMatrix	0.375 (0.0148)	0.625 (0.0246)	0.990 (0.0390)	Height is determined by the X-dimension and data that is encoded			1X on all four sides		1.5/08/660
GS1 QR Code	0.375 (0.0148)	0.625 (0.0246)	0.990 (0.0390)	Height is determined by the X-dimension and data that is encoded			4X on all four sides		1.5/08/660

Main symbol(s) Specified Plus Add-on 2 or 5	X-dimension mm (inches)			(**) Minimum symbol height for given X mm (inches)			Quiet Zone	Min separation between symbols	Max separation between symbols	Quiet Zone	Min. Quality Spec.
	(*) Minimum	Target	Maximum	For min. X-dimension	For target X-dimension	For max. X-dimension					
EAN-13 + 2	0.264 (0.0104")	0.330 (0.0130")	0.660 (0.0260")	18.28 (0.720")	22.85 (0.900")	45.70 (1.800")	11X	7X	12X	5X	1.5/06/ 660
EAN-13 + 5	0.264 (0.0104")	0.330 (0.0130")	0.660 (0.0260")	18.28 (0.720")	22.85 (0.900")	45.70 (1.800")	11X	7X	12X	5X	1.5/06/ 660
UPC-A + 2	0.264 (0.0104")	0.330 (0.0130")	0.660 (0.0260")	18.28 (0.720")	22.85 (0.900")	45.70 (1.800")	9X	9X	12X	5X	1.5/06/ 660
UPC-A + 5	0.264 (0.0104")	0.330 (0.0130")	0.660 (0.0260")	18.28 (0.720")	22.85 (0.900")	45.70 (1.800")	9X	9X	12X	5X	1.5/06/ 660
UPC-E + 2	0.264 (0.0104")	0.330 (0.0130")	0.660 (0.0260")	18.28 (0.720")	22.85 (0.900")	45.70 (1.800")	9X	7X	12X	5X	1.5/06/ 660
UPC-E + 5	0.264 (0.0104")	0.330 (0.0130")	0.660 (0.0260")	18.28 (0.720")	22.85 (0.900")	45.70 (1.800")	9X	7X	12X	5X	1.5/06/ 660



(*)	<p>These barcodes may only be printed using an X-dimension below 0.264 millimetre (0.0104 inch) under the following conditions:</p> <ul style="list-style-type: none"><li>■ The allowance for X-dimensions between 0.249 millimetre (0.0098 inch) and 0.264 millimetre (0.0104 inch) is only applicable to on demand (e.g., thermal, laser) print processes. For all other printing processes, an X-dimension of 0.264 millimetre (0.0104 inch) is attainable and is the minimum allowable size.</li><li>■ When printing a minimum symbol with any method of printing, the area provided for printing the symbol and the required Quiet Zone SHOULD never be less than the area required for an X-dimension of 0.264 millimetre (0.0104 inch).</li></ul>
(**)	<ul style="list-style-type: none"><li>■ The minimum symbol height dimensions listed for all symbologies including EAN/UPC symbols do not include the human readable interpretation.</li><li>■ When printing a minimum symbol with any method of printing, the bar height SHALL never be truncated below the minimum as listed in the table above.</li><li>■ Because of the operative scanning environment for EAN/UPC symbols, there is a direct relationship between the symbol's height and width. This means the minimum symbol height listed is tied to the minimum, target and maximum X-dimension listed. There is no maximum for the height, but if the maximum X-dimension is used, the symbol height must be equal to or greater than those listed in the Minimum Symbol Height column.</li><li>■ The minimum heights of EAN/UPC symbols do not include the extended bars: see section <a href="#">5.2.3.2</a> for dimensions of the extended bars.</li><li>■ For GS1 DataBar Expanded Stacked symbols, the table reflects the minimum symbol height for symbols that are two rows in height.</li></ul>
(***)	<p>In addition to the factors above related to digital printing, one other exception is permitted; For loose produce being weighed at the point-of-sale (POS) using GS1 DataBar Stacked Omnidirectional minimum X-dimension of 0.203 millimetre (0.0080 inch) is permitted but may produce scanning performance reduction. However, for POS, this performance drop off is not noticeable when the product must be weighed at the point-of-sale. Even with a slower scanning performance to conduct the transaction, the weighing process takes longer than the scanning process. For that reason, a lower minimum X-dimension should never be used on products crossing point-of-sale which are not weighed as loose produce during the scan event.</p>
(****)	<p>The current symbol specification for GS1 DataBar Omnidirectional (minimum height 33X) and GS1 DataBar Stacked Omnidirectional (minimum height 69X) indicate a square aspect ratio for the symbol segments. To enhance scanning performance, in an omnidirectional scanning environment, an over square aspect ratio SHALL be used following the example of the EAN/UPC symbology specification and rigorous field test of the GS1 DataBar symbology (46X or 95X).</p>
(*****)	<p>For North American coupon codes using GS1 DataBar Expanded Stacked in 2 row and 3 row configurations the X-dimension may be as low as 0.0080" (0.203mm) as long as a minimum overall bar height of 1.020" (25.91mm) is maintained. X-dimensions less than 0.0100" (.254mm) might not always be feasible for all GS1 DataBar coupon barcodes due to variables, such as printing process, symbol orientation and material. Due to the time sensitive nature of the coupon printing process, these variables should be considered during the design and barcode origination processes. Barcode verification should always be done from printing press proofs.</p>



**Note:** See section [2.7](#) to ensure the correct symbol specification table is used.



[Figure 5.12.3.1-1 The table above](#) is used to determine the appropriate specifications for printing and quality control of the barcode used in the retail point-of-sale for products. In addition to the symbol used at general retail POS, an additional 2D symbol may be used to carry AI (8200). As AI (8200) has a mandatory association with GTIN, the GTIN within the symbol ensures compatibility with direct or indirect mode. GS1 DataMatrix is approved for all applications including regulated healthcare trade items covered by SSTs 6, 7, 8, 10 and 11, but for general retail consumer trade items, either GS1 QR Code or GS1 DataMatrix are GS1 approved options. When using 2D symbols to carry AI (8200) on general retail trade items, the following specifications are required. For additional barcodes that carry GS1 Digital Link URIs (i.e. QR Code and Data Matrix), see figure [5.12.3.1-3](#) below.

Commented [DM20]: WR22-031



**Figure 5.12.3.1-2.** GS1 symbol specification table 1 addendum 1 for AI (8200)

Symbol(s) specified	X-dimension mm (inches)			Minimum symbol height for given X mm (inches)			Quiet Zone Surrounding Symbol	Minimum quality specification
	Minimum	Target	Maximum	For minimum X-dimension	For target X-dimension	For maximum X-dimension		
GS1 DataMatrix (ECC 200) (*)	0.396 (0.0150")	0.495 (0.0195")	0.743 (0.0293")	Height is determined by X-dimension and data that is encoded			1X on all four sides	1.5/12/660
GS1 QR Code (*)	0.396 (0.0150")	0.495 (0.0195")	0.743 (0.0293")	Height is determined by X-dimension and data that is encoded			4X on all four sides	1.5/12/660

(\*) 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 X-dimension allowed for linear symbols.

Figure 5.12.3.1-3 provides the size and quality criteria for 2D barcodes used on retail consumer trade items scanned at POS. The use of these barcodes SHALL be in addition to a 1D barcode required for retail POS.

**Note:** Application Standard Profiles in section 8 provide information on conformance requirements for future use of 2D barcodes at retail POS without a mandatory 1D barcode.

Commented [DM21]: WR22-031

**Figure 5.12.3.1-3.** Symbol specification table 1 addendum 2 for GS1 Digital Link 2D barcodes

Symbol(s) specified	X-dimension mm (inches)			Minimum symbol height for given X mm (inches)			Quiet Zone Surrounding Symbol	Minimum quality specification
	Minimum	Target	Maximum	For minimum X-dimension	For target X-dimension	For maximum X-dimension		
GS1 DataMatrix (ECC 200) (*)	0.396 (0.0150")	0.495 (0.0195")	0.990 (0.0390")	Height is determined by X-dimension and data that is encoded			1X on all four sides	1.5/12/660
Data Matrix (GS1 Digital Link URI) (ECC 200) (*) (**)	0.396 (0.0150")	0.495 (0.0195")	0.990 (0.0390")	Height is determined by X-dimension and data that is encoded			1X on all four sides	1.5/12/660
QR Code (GS1 Digital Link URI) (*) (**)	0.396 (0.0150")	0.495 (0.0195")	0.990 (0.0390")	Height is determined by X-dimension and data that is encoded			4X on all four sides	1.5/12/660

(\*) 2D X-dimension - Optical effects in the image capture process require that the Data Matrix and QR Code symbols be printed at 1.5 times the equivalent X-dimension allowed for linear symbols.

(\*\*) GS1 Digital Link URI syntax SHALL use the uncompressed form.

Commented [DB22]: Formatting issue - double table. Needs to be checked

Commented [DM23R22]: Note for Publications team

Commented [DM24]: WR22-031

Commented [DM25]: WR22-309

**Note:** The dimensional and quality specifications in figure 5.12.3.1-3 reflect the requirements within a read range typical of mobile device scanning of consumer trade item packaging.

**Note:** For trading partners with the ability to scan and process GTIN encoded in GS1 DataMatrix or GS1 QR Code barcodes for variable measure fresh food trade items, a minimum X-dimension of 0.375 mm (0.0148 inches) is permitted and SHALL be done through mutual agreement.