WR #	GSCN Name	Ratification Date
22-031	Future State Retail Application Standard Profiles (Barcode Conformance)	Jul 22

Associated Work Request (WR) Number:

21-001 Future State Application Standard Profiles request

Background:

The purpose of Application Standard Profiles (ASPs) is proposed to meet the needs of the GS1 community by making conformance requirements easy to find and easy to understand (for both existing and future applications).

NOTE: Within the GSCN, Section 8 subsections for ASP 1 to 4 have been updated to reflect the 2D in Retail MSWG agreements on the future state conformance requirements.

Disclaimer:

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")	11*X*	7*X*	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")	7*X*	7*X*	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")	9*X*	9*X*	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")	9*X*	7*X*	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	Left		Right		
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")	11*X*	7*X*	12*X*	5*X*	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")	11*X*	7*X*	12*X*	5*X*	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")	9*X*	9*X*	12*X*	5*X*	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")	9*X*	9*X*	12*X*	5*X*	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")	9*X*	7*X*	12*X*	5*X*	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")	9*X*	7*X*	12*X*	5*X*	1.5/06/ 660

(*)	These barcodes may only be printed using an X-dimension below 0.264 millimetre (0.0104 inch) under the following conditions: ▪ 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. ▪ 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).
(**)	▪ The minimum symbol height dimensions listed for all symbologies including EAN/UPC symbols do not include the human readable interpretation. ▪ 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. ▪ 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. ▪ The minimum heights of EAN/UPC symbols do not include the extended bars: see section 5.2.3.2 for dimensions of the extended bars. ▪ For GS1 DataBar Expanded Stacked symbols, the table reflects the minimum symbol height for symbols that are two rows in height.
(***)	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.
(****)	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).
(*****)	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.

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.

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	Minimum quality specification
	Minimum	Target	Maximum	For minimum X-dimension	For target X-dimension	For maximum X-dimension	Surrounding Symbol	
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.

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	Minimum quality specification
	Minimum	Target	Maximum	For minimum X-dimension	For target X-dimension	For maximum X-dimension	Surrounding Symbol	
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

~~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~~	~~Surrounding Symbol~~	
~~Data Matrix (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~~
~~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 Data Matrix and QR Code symbols be printed at 1.5 times the equivalent X-dimension allowed for linear symbols.

5.12.3.3 Symbol specification table 3 - Trade items scanned at general retail POS and general distribution

Figure 5.12.3.3-1. GS1 symbol specification table 3

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	0.495 (0.0195")	0.660 (0.0260")	0.660 (0.0260")	34.28 (1.350")	45.70 (1.800")	45.70 (1.800")	11*X*	7*X*	1.5/06/660
EAN-8	0.495 (0.0195")	0.660 (0.0260")	0.660 (0.0260")	27.35 (1.077")	36.46 (1.435")	36.46 (1.435")	7*X*	7*X*	1.5/06/660
UPC-A	0.495 (0.0195")	0.660 (0.0260")	0.660 (0.0260")	34.28 (1.350")	45.70 (1.800")	45.70 (1.800")	9*X*	9*X*	1.5/06/660
UPC-E	0.495 (0.0195")	0.660 (0.0260")	0.660 (0.0260")	34.28 (1.350")	45.70 (1.800")	45.70 (1.800")	9*X*	7*X*	1.5/06/660
GS1 DataBar Omni-directional (***)	0.495 (0.0195")	0.660 (0.0260")	0.660 (0.0260")	22.77 (0.897")	30.36 (1.196")	30.36 (1.196")	None	None	1.5/06/660
GS1 DataBar Stacked Omni-directional (***)	0.495 (0.0195")	0.660 (0.0260")	0.660 (0.0260")	47.03 (1.853")	62.70 (2.470")	62.70 (2.470")	None	None	1.5/06/660
GS1 DataBar Expanded	0.495 (0.0195")	0.660 (0.0260")	0.660 (0.0260")	16.83 (0.663")	22.44 (0.884")	22.44 (0.884")	None	None	1.5/06/660
GS1 DataBar Expanded Stacked	0.495 (0.0195")	0.660 (0.0260")	0.660 (0.0260")	35.15 (1.385")	46.86 (1.846")	46.86 (1.846")	None	None	1.5/06/660

(*)	UPC-E and EAN-8 symbols are designed for use on small packages. Whenever space permits, UPC-A and EAN-13 symbols SHOULD be used.
(**)	The minimum symbol height dimensions listed for all symbologies including EAN/UPC symbols do not include the human readable interpretation. The minimum heights of EAN/UPC symbols do not include the extended bars: see section 5.2.3.2 for dimensions of the extended bars. 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.
(***)	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).

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

Figure 5.12.3.3-2 provides the size and quality criteria for 2D barcodes used on retail consumer trade items scanned at POS and in general distribution. The use of these barcodes SHALL be in addition to a 1D barcode required for retail POS and general distribution scanning.

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.

Figure 5.12.3.3-2. Symbol specification table 3 addendum 1 for 2D barcodes

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	Surrounding Symbol	
GS1 DataMatrix (ECC 200) (*)	0.743 (0.0292)	0.990 (0.0390")	0.990 (0.0390")	Height is determined by X-dimension and data that is encoded			1X on all four sides	1.5/20/660
Data Matrix (GS1 Digital Link URI) (ECC 200) (*)	0.743 (0.0292)	0.990 (0.0390")	0.990 (0.0390")	Height is determined by X-dimension and data that is encoded			1X on all four sides	1.5/20/660
QR Code (GS1 Digital Link URI) (*)	0.743 (0.0292)	0.990 (0.0390")	0.990 (0.0390")	Height is determined by X-dimension and data that is encoded			4X on all four sides	1.5/20/660

(*)	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.

8.2 ASP 1: Fixed measure trade items scanned at retail POS

ASP 1 applies to product packages that are intended for scanning at retail point-of-sale, are fixed measure (not sold on the basis of variable weight or variable measure) and are not intended for general distribution scanning. Examples include trade items sold at the retail check-out like milk, soup cans, a hat, a lamp, a tennis racket, a battery pack, or toy. The normative AIDC application standard for ASP 1 is sections 2.1.3.1, 2.1.3.2, or 2.1.3.3 (depending on identifier and symbol choice) for general retail products and 2.1.3.6 for fresh food products.

Note: ASP 1 does not apply to products distributed under control via a pharmacy or apothecary based on a physician's prescription nor does it apply to books and serial publications where additional identification, data carrier, specifications and/or rules apply.

Note: Some trade items like beverage cans bundled by plastic rings may not obscure the barcode on the individual can level as the product may be sold in quantities of one or one grouping (e.g., six-pack). In this case, the barcode on each beverage can require ASP 1 conformance but six-pack transactions, where the individual beverage cans barcode is scanned, may require a check-out quantity confirmation.

Figure 8.2.1 ASP 1 conformance requirements

Conformance requirements	General retail products	Fresh Food
Basis of conformance requirements	~~GS1 General Specifications S~~section 2.1.3.1 ~~GS1 General Specifications s~~Section 2.1.3.2 ~~GS1 General Specifications s~~Section 2.1.3.3	~~GS1 General Specifications s~~Section 2.1.3.6
Identifier choices	GTIN-8, GTIN-13, GTIN-12	GTIN-8, GTIN-13, GTIN-12
Mandatory attribute(s)	N/A	N/A
Optional attribute(s)	See section 3.2 for the list of GS1 Application Identifiers that may be used with the identifier	See section 3.2 for the list of GS1 Application Identifiers that may be used with the identifier
Mandatory choices for a d~~D~~ata carrier ~~choices~~	EAN-8, EAN-13, UPC-A, UPC-E, GS1 DataBar Omnidirectional, GS1 DataBar Stacked Omnidirectional, GS1 DataBar Expanded, GS1 DataBar Expanded Stacked	EAN-8, EAN-13, UPC-A, UPC-E, GS1 DataBar Omnidirectional,GS1 DataBar Stacked~~-~~Omnidirectional,GS1 DataBar Expanded, GS1 DataBar Expanded Stacked

Conformance requirements	General retail products	Fresh Food
Agreement on conformant data carriers in the future	Any one of the mandatory data carriers or any one of the data carriers below will be conformant in the future once POS system support for these three 2D data carriers below reached pervasive adoption and becomes part of the global application standards. In the migration period, one of the data carriers below may be used in addition to the mandatory data carrier selected. □ GS1 DataMatrix □ Data Matrix (GS1 Digital Link URI) □ QR Code (GS1 Digital Link URI)	Any one of the mandatory data carriers or any one of the data carriers below will be conformant in the future once POS system support for these 2D data carriers below reached pervasive adoption and becomes part of the global application standards. In the migration period, one of the data carriers below may be used in addition to the mandatory data carrier selected. □ GS1 DataMatrix □ Data Matrix (GS1 Digital Link URI) □ QR Code (GS1 Digital Link URI)
~~Carrier~~ Barcode production and quality specifications	Figure 5.12.3.1-1 Symbol specification table 1 Figure 5.12.3.1-3 Symbol specification table 1 addendum 2 for 2D barcodes ~~symbol specification table 1 in section 5.12.3.1~~	Figure 5.12.3.1-1 Symbol specification table 1 Figure 5.12.3.1-3 Symbol specification table 1 addendum 2 for 2D barcodes ~~symbol specification table 1 in section 5.12.3.1~~
Mandatory choices for GS1 ~~Data format/~~ syntax ~~(identifier syntax)~~	Plain, GS1 element string	Plain, GS1 element string
Agreement on conformant syntax in the future	Any one of the mandatory GS1 syntax or GS1 Digital Link URI syntax will be conformant in the future once the POS system support for interoperability between all three GS1 syntaxes has reached pervasive adoption and becomes part of the global application standards. GS1 Digital Link URI	Any one of the mandatory GS1 syntax or GS1 Digital Link URI syntax will be conformant in the future once the POS system support for interoperability between all three GS1 syntaxes has reached pervasive adoption and becomes part of the global application standards. GS1 Digital Link URI

Note: A data carrier with GS1 Digital Link URI to support consumer mobile devices may be used in addition to the mandatory POS data carriers selected.

Figure 8.2.2 ASP 1 cross-application rules

Cross-application rules	Description	GS1 General Specifications section
GTIN rules	Management of uniqueness, Allocating the numbers, GTIN Management definitions	4.3, 4.3.7
Licensing rules that may impact GTIN allocation	Additional requirements in the following sections apply when a company changes legal status as a result of an acquisition, merger, partial purchase, split, or "spin-off."	1.6

8.3 ASP 2: Fixed measure trade items scanned at retail POS and in general distribution

ASP 2 applies to product packages that are intended for scanning at retail point-of-sale, are fixed measure (not sold on the basis of weight or measure) but unlike ASP1 they are also intended for "general distribution scanning". Examples of these products might be a microwave oven or large bag of animal feed. The normative AIDC application standard for ASP 2 is section 2.1.4.

Figure 8.3.1 ASP 2 conformance requirements

Conformance requirements	Fixed Measure POS and General Distribution
Basis of conformance requirements	GS1 General Specifications Section 2.1.4
Identifier choices	GTIN-8, GTIN-13, GTIN-12
Mandatory attribute(s)	N/A
Optional attribute(s)	See section 3.2 for the list of GS1 Application Identifiers that may be used with the identifier
Mandatory choices for a data carrier ~~Data carrier choices~~	EAN-8, EAN-13, UPC-A, ~~or~~ UPC-E, GS1 DataBar Omnidirectional, GS1 DataBar Stacked Omnidirectional, GS1 DataBar Expanded, GS1 DataBar Expanded Stacked
Agreement on conformant data carriers in the future	Any one of the mandatory data carriers or any one of the data carriers below will be conformant in the future once POS and general distribution system support for these three 2D data carriers below reaches pervasive adoption and becomes part of the global application standards. In the migration period, one of the data carriers below may be used in addition to the mandatory data carrier selected. □ GS1 DataMatrix □ Data Matrix (GS1 Digital Link URI) □ QR Code (GS1 Digital Link URI)
~~Carrier~~ Barcode production and quality specifications	Figure 5.12.3.3-1. Symbol specification table 3 Figure 5.12.3.3-2 Symbol specification table 3 addendum 1 for 2D barcodes ~~symbol specification table 3 in section 5.12.3.3~~
Mandatory choices for GS1 ~~Data format /~~syntax ~~(identifier syntax)~~	Plain, GS1 element string
Agreement on conformant syntax in the future	Any one of the mandatory GS1 syntax or GS1 Digital Link URI syntax will be conformant in the future once the POS system support for interoperability between all three GS1 syntaxes has reached pervasive adoption and becomes part of the global application standards. GS1 Digital Link URI

Note: A data carrier with GS1 Digital Link URI to support consumer mobile devices may be used in addition to the mandatory POS data carriers selected.

8.4 ASP 3: Variable measure trade items scanned at retail POS

ASP 3 applies to product packages that are intended for scanning at retail point-of-sale and identified with a GTIN, are variable measure (sold on the basis of weight or measure) and are not intended for general distribution scanning. Examples include fruits, vegetables, dairy items, bakery items, meat and poultry sold by weight or measure. The normative AIDC application standard for ASP 3 is GS1 General Specifications section 2.1.12.

Figure 8.4.1 ASP 3 conformance requirements

Conformance requirements	Variable measure fresh food using GTIN + count/weight	Variable measure fresh food using RCN
Basis of conformance requirements	~~GS1 General Specifications s~~Section 2.1.12.1	~~GS1 General Specifications s~~Section 2.1.12.2
Identifier choices	GTIN-13, GTIN-12	RCN-13, RCN-12
Mandatory attribute(s)	~~Must~~ SHALL have at least one of the following: AI(30/AI(31nn)/AI(32nn)/AI(35nn)/AI(36n)	N/A
Optional attribute(s)	See section 3.2 for the list of GS1 Application Identifiers that may be used with the identifier	N/A
Mandatory choices for a ~~Data~~ data carrier ~~choices~~	GS1 DataBar Expanded, GS1 DataBar Expanded Stacked	EAN-13, UPC-A
Agreement on conformant data carriers in the future	Any one of the mandatory data carriers or any one of the data carriers below will be conformant in the future once POS system support for these three 2D data carriers below reaches pervasive adoption and becomes part of the global application standards. In the migration period, one of the data carriers below may be used in addition to the mandatory data carrier selected. □ GS1 DataMatrix □ Data Matrix (GS1 Digital Link URI) □ QR Code (GS1 Digital Link URI)	N/A
Barcode production and quality ~~Carrier~~ specifications	Figure 5.12.3.1-1 Symbol specification table 1 Figure 5.12.3.1-3 Symbol specification table 1 addendum 2 for 2D barcodes ~~symbol specification table 1 in section 5.12.3.1~~	Figure 5.12.3.1-1 Symbol specification table 1 ~~symbol specification table 1 in section 5.12.3.1~~
Mandatory choices for GS1 ~~Data format/~~ syntax ~~(identifier syntax)~~	~~Plain,~~ GS1 element string	Plain
Agreement on conformant syntax in the future	GS1 element string or GS1 Digital Link URI syntax will be conformant in the future once the POS system support for interoperability between these syntaxes has reached pervasive adoption and becomes part of the global application standards.	N/A

Note: A data carrier with GS1 Digital Link URI to support consumer mobile devices may be used in addition to the mandatory POS data carriers selected.

Figure 8.4.2 ASP 3 cross-application rules

Cross-application rules	Description	GS1 General Specifications section
GTIN rules	Management of uniqueness, Allocating the numbers, GTIN Management definitions	4.3
Licensing rules that may impact GTIN allocation	Additional requirements in the following sections apply when a company changes legal status as a result of an acquisition, merger, partial purchase, split, or "spin-off."	1.6
Data relationships	Rules for allowed combinations of element strings on the same physical entity, irrespective of the data carrier(s) applied to the entity.	4.14
Human readable interpretation	Human readable interpretation (HRI) rules are provided to standardise printing requirements and facilitate training of staff on how to deal with GS1 AIDC data carriers that fail to scan or read.	4.15
Multiple barcode	When additional barcodes are introduced into an existing scanning environment or business application existing barcodes must remain acceptable. This section provides a set of management practices intended to permit the use of multiple barcodes on the same package.	4.16
Symbol placement used in POS	This section provides guidelines for barcode placement on trade items that will be scanned at point-of-sale.	6.3

Figure 8.4.3 ASP 3 related technical specifications

Related technical specifications	Description	GS1 General Specifications section
GS1 Application Identifiers in numerical order	This section describes the meaning, structure and function of the GS1 system element strings so they can be correctly processed in users' application programmes. An element string is the combination of a GS1 Application Identifier and a GS1 Application Identifier data field. Also see GS1 Application Identifiers browser	3.2
Linear barcodes - EAN/UPC	EAN/UPC Barcodes were the first type of barcodes used on a global scale to support the retail check out process.	5.2
Linear barcodes - GS1 DataBar	GS1 DataBar is a family of linear symbologies used within the GS1 system.	5.5
Barcode production and quality assessment	This section has quality specifications and will evolve to meet the changes to data carriers and their use within the GS1 system.	5.12
Check digit calculations	This section describes the algorithm used for check digit calculations	7.9

8.5 ASP 4: Retail consumer trade item with extended packaging

Information on a product package can be extended in many ways when the consumer scans a barcode to reach web resources online. For example, a shopper scans a box of packaged pasta to find a selection of recipes. For new extended packaging applications, a web-enabled approach using GS1 Digital Link URI syntax and QR Code or Data Matrix is used. For this reason, the ASP focuses solely on the forward-looking approach. Prior to the GS1 Digital Link URI standard, GS1 approved two approaches to reach extended packaging applications that were available within the GS1 system of standards. All legacy implementations of these approaches remain conformant but new implementations SHALL use the GS1 Digital Link URI approach. The normative AIDC application standard for ASP 4 is GS1 General Specifications section 2.1.13.

Figure 8.5.1 ASP 4 conformance requirements

Conformance requirements	General retail products GS1 Digital Link URI
Basis of conformance requirements	~~GS1 General Specifications s~~Section 2.1.13.1 for GS1 Digital Link URI
Identifier choices	GTIN-8, GTIN-13, GTIN-12
Mandatory attribute(s)	N/A
Optional attribute(s)	See section 3.2 for the list of GS1 Application Identifiers that may be used with the identifier
~~**Data** **Mandatory choices for a data carrier** **choices**~~	QR Code (GS1 Digital Link URI ~~only~~), Data Matrix (GS1 Digital Link URI ~~only~~)
~~**Carrier** **Barcode production and quality** **specifications**~~	Figure 5.12.3.1-3 Symbol specification table 1 addendum 2 for 2D barcodes ~~symbol specification table 1 in section 5.12.3.1 addendum 2 for GS1 Digital Link URI~~
~~**Mandatory choices of GS1** **Data format/** **syntax** **(identifier syntax)**~~	Section 6.1 GS1 Digital Link URI (GS1 Digital Link URI standard - https://www.gs1.org/standards/gs1-digital-link)

Figure 8.5.2 ASP 4 cross-application rules

Cross-application rules	Description	GS1 General Specifications section
GTIN rules	Management of uniqueness, Allocating the numbers, GTIN Management definitions	4.3, 4.3.7
Licensing rules that may impact GTIN allocation	Additional requirements in the following sections apply when a company changes legal status as a result of an acquisition, merger, partial purchase, split, or "spin-off."	1.6
Data relationships	Rules for allowed combinations of element strings on the same physical entity, irrespective of the data carrier(s) applied to the entity.	4.14
Human readable interpretation	Human readable interpretation (HRI) rules are provided to standardise printing requirements and facilitate training of staff on how to deal with GS1 AIDC data carriers that fail to scan or read.	4.15
Multiple barcode	When additional barcodes are introduced into an existing scanning environment or business application existing barcodes must remain acceptable. This section provides a set of management practices intended to permit the use of multiple barcodes on the same package.	4.16

9.1 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
acceptance criteria	An allowance for a small measurement variation between commercial verifiers or operators during barcode verification testing.
add-on symbol	A barcode used to encode information supplementary to that in the main EAN/UPC barcode.
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 to its corresponding entity or object in accordance with the GS1 rules and policies.
alphanumeric	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.
Application Standard Profile	A template that records conformance requirements of existing and any future AIDC application standards, the normative decisions (MSWG, ISO, Regulation, …), maintains centralisation of cross-application rules and related technical specifications.
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	Additional information about an entity identified with a GS1 identification key.
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 or square dark and light spaces.
barcode verification	The assessment of the printed quality of a barcode based on ISO/IEC standards using ISO/IEC compliant barcode verifiers.
base unit	In a hierarchy of trade item groupings, the consumer trade item level or unit of use.
Basic Unique Device Identifier – Device Identifier (UDI-DI)	The Basic UDI - DI is a unique identifier specific to a medical device product family. It is represented by GS1's Global Model Number (GMN).
batch/lot	Associates an item with information the manufacturer considers relevant for traceability of the trade item.
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 partial 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).
Character Set 39	A subset of characters found in *ISO 646*: Unique Graphic Character Allocations which includes numeric, alphabetic upper-case, plus the characters "#", "-" and "/".
Character Set 82	A subset 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 character pair	A final character pair calculated from the other characters of the Global Model Number. These characters are used to check that the data has been correctly composed and transmitted.
check digit	Numeric character calculated from data and appended as part of the data string to ensure that the data is correctly composed and transmitted.

Term	Definition
codeword	A symbol character value. An intermediate level of coding between source data and the graphical encodation in the symbol.
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	The 2D symbol component of a GS1 composite symbol.
concatenation	The representation of several element strings in one barcode.
Conformant	The state in which a system meets a specified standard.
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 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 single numeric digit, alphabetic character or punctuation mark, or control character, which represents meaningful information.
data field	A field that contains a GS1 identification key, an RCN, or attribute information
Data Matrix (GS1 Digital Link URI)	Data Matrix encoding data using GS1 Digital Link URI syntax.
Data Matrix symbology	A standalone, two-dimensional matrix symbology that is made up of square modules arranged within a perimeter finder pattern. Data Matrix using ECC 200 error correction is the only version that supports GS1 system identification keys, 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.
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 saving 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.
dynamic assortment	A trade item that comprises a variable composition of a fixed count of two or more different trade items, each identified with a GTIN.~~with a fixed total count, where the count of each trade item contained may change.~~
EAN/UPC symbology	A family of barcodes including EAN-8, EAN-13, UPC-A and UPC-E barcodes as well as the 2- and 5-digit add-ons. 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)	An economic operator is a business or other organisation which supplies goods, works or services within the context of market operations. Related to requirement for EOID for each country in which a party operates a facility.

Commented [DM18]: WR22-423

Term	Definition
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	A subset of Data Matrix which uses the function that allows the encoding of element strings.
GS1 Digital Link URI	A Web URI syntax for expressing GS1 identifier keys and attributes in a format using GS1 Application Identifiers and GS1 Application Identifier data fields as specified in the GS1 Digital Link standard.
GS1 DotCode	A subset of AIM DotCode which uses the function that allows the encoding of element strings.
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 element string	A syntax for expressing GS1 identifier keys and attributes in a format using GS1 Application Identifiers and GS1 Application Identifier data fields.
GS1 Global Office (GS1 GO)	GS1 is a neutral, not-for-profit organisation that provides global standards for efficient business communication. The Global Office, located in Brussels (Belgium) and Ewing, NJ (USA) is the guardian, and provides an open, user-driven, forum for ongoing maintenance and development, of the GS1 standards, guidelines and statues.
GS1 Global Standards Management Process (GSMP)	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 licensee	The person (natural or legal) to which the right to use a GS1 Company Prefix or a GS1 identification key has been granted through an agreement with a GS1 Member Organisation or GS1 Global Office, acting as licensor. GS1 identification licensees may use the licensed GS1 Company Prefix or GS1 identification key, subject to any terms and conditions in place when the licence was granted or set by the licensor from time to time, until such time as the agreement under which the licence was granted expires or in perpetuity if the agreement has no expiration date.
GS1 Member Organisation (GS1 MO)	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	A subset of QR Code which uses the function that allows the encoding of element strings.
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, GS1 QR Code, GS1 DotCode and GS1Composite.
GS1 syntax	A data structure used within the GS1 system of standards for representing data elements. GS1 syntax include plain syntax, GS1 element string, GS1 Digital Link URI, and Electronic Product Code (EPC) URI.
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 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 which uses the function that allows the encoding of element strings.
GS1-8 Prefix	A unique string of two or more digits issued by GS1 Global Office and allocated to GS1 Member Organisations to issue GTIN-8s or allocated to issue RCN-8s (see RCN-8).
GTIN allocator	The party that warrants the trade item declarations about a trade item to which they allocate a GTIN. This is the party who is the licensee of the GTIN applied to a specific trade item.

Commented [DM20]: WR21-256

Commented [DM21]: WR22-423

Term	Definition
point-of-care (POC)	Location where dispensing or use of a non-retail, regulated healthcare pharmaceutical or medical device to or for a patient occurs.
point-of-sale (POS)	Refers to the retail checkout where omnidirectional linear barcodes must be used to support high-volume laser-based scanning or low volume checkout where linear barcodes (or for regulated healthcare trade items, GS1 DataMatrix) are used with image-based scanners.
predefined assortments	A trade item that comprises a fixed composition of two or more different trade items, eached identified with a GTIN.~~with a fixed total count, where the count of each trade item contained does not change.~~
price verifier digit	A digit calculated from the price element in a Restricted Circulation Number (RCN) that is used to check that the data has been correctly composed.
product model	A base product design or specification from which a trade item is derived.
QR Code (GS1 Digital Link URI)	QR Code encoding data using GS1 Digital Link URI syntax
QR Code symbology	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 and follows the stop character of a linear barcode or surrounds a 2D symbol.
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 radio frequency power is supplied to an antenna, an electromagnetic field is created that then is able to propagate through space. A radio frequency signal that can be processed by a radio frequency receiver. Many wireless technologies are based on radio frequency field propagation.
radio frequency identification (RFID)	A technology that uses radio frequency electromagnetic fields or waves to automatically identify and track tags attached to objects. An RFID system consists of RFID tags and readers. When triggered by a radio frequency electromagnetic interrogation signal from a nearby RFID reader, the RFID tag transmits digital data, usually a unique identifier like an EPC, back to the reader.
~~random assortment~~	~~A trade item that comprises two or more products that are not identified by a GTIN and are not intended for individual sale.~~
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 (i.e., bottles and crates).
regular expression	A sequence of characters that specifies a search pattern that is usually used by string-searching algorithms for search / find-and-replace operations on strings or for validation of string input.~~A sequence of characters that specifies a search pattern. Usually, such patterns are used by string-searching algorithms for "find" or "find and replace" operations on strings, or for input validation.~~
regulated healthcare non-retail consumer trade item	A regulated healthcare 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 life cycle, 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 an 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).

Commented [DM24]: WR22-423

Commented [DM25]: WR22-423