Barcode specifications – Suppliers to Australian food manufacturing industry

Fact Sheet

In order to enable cost-effective adoption by food manufacturers, GS1 Australia's Supply Chain Improvement Project initiative has prepared these voluntary guidelines for use by any company to barcode product and supplemental information through the use of GS1 barcodes.

The Global Trade Item Number (GTIN) can be represented in an ITF-14 or a GS1-128 barcode for use on trade items being supplied to the Australian Food Manufacturing Industry. If any attribute data such as production date, batch number or other date codes etc are required to be scanned then the GS1-128 barcode should be used. For companies wishing to print the barcode directly on the carton, particularly on corrugated cardboard, the ITF-14 symbol is more suitable because the printing requirements are less demanding. Pre-printing or direct print by thermal transfer or ink-jet may be possible.

This fact sheet should be read in conjunction with **The Numbering and Barcoding Guidelines for Suppliers to the Food Manufacturing Industry.**

The GS1-128 barcode

The GS1-128 barcode is used to encode a GTIN-14, a GTIN-13 or a GTIN-12, and may also encode attribute data using Application Identifiers (AIs). The GS1-128 barcode is intended for scanning in a General Distribution Scanning environment.

When encoding a GTIN-13 or GTIN-12 in a GS1-128 barcode, one or two filler zero(s) respectively must be added in front of the GTIN.

Figure 1: GTIN-13 with a filler zero encoded in a GS1-128 barcode

The ITF-14 barcode

The ITF-14 barcode is used to encode a GTIN-14, a GTIN-13 or a GTIN-12.

When encoding a GTIN-13 or GTIN-12 in an ITF-14 barcode, one or two filler zero(s) respectively must be added in front of the GTIN.

Figure 2: GTIN-13 with a filler zero encoded in an ITF-14 barcode

Note: Barcode images are not to scale.

Bearer bars

Bearer bars are bars abutting the tops and bottoms of the bars in a barcode, or a frame surrounding the entire symbol used to equalize 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. For more information about the bearer bar please contact GS1 Australia.

Magnification (X-dimension)

The size of the GS1-128 barcode depends on:

- the X-dimension (module width) chosen
- the number of characters encoded
- the number of non-numeric characters in the data

For GS1-128 and ITF-14 barcodes that are to be scanned in a General Distribution Scanning environment the X-dimension range is 0.495mm to 1.02mm (magnifications between 48.7% and 100%).

Printing at the higher end of the magnification range is recommended. Regardless of the scanning environment, ITF-14 barcodes with a magnification less than 62.5% (X-dimension 0.64mm) should not be printed directly onto corrugated fibreboard.

If packaging or printing constraints do not allow for the minimum magnification and height to be obtained, please discuss with your trading partner.

Height of Bars

For scanning in a General Distribution (automated) Scanning environment, the minimum bar height for both GS1-128 and ITF-14 barcodes is 32mm.

Quiet Zones

All types of barcodes have Quiet Zones before the first bar and after the last bar. This Quiet Zone is extremely important and must be respected. The size of the Quiet Zone area varies depending on the symbol size and type of the barcode. Any print within Quiet Zones can prevent the reading of the barcode symbol.

It is recommended to always allow slightly more than the minimum required Quiet Zone to allow for any possible ink spread or registration issues.

Human Readable Interpretation (HRI)

The HRI should be placed below the barcode, must show all digits encoded in the barcode and be grouped together wherever physically possible. A clearly legible font shall be used, e.g. OCR-B. This typeface is a recommendation only and alternative type fonts and character sizes are acceptable provided the digits are clearly legible.

Parentheses shall surround AIs in HRI but are not encoded in the GS1-128 barcode.

Concatenation

Concatenation (stringing data elements together) is an effective means for presenting multiple element strings in a single GS1-128 barcode and is used to conserve label space and optimise scanning operations when permitted by the application standard.

Maximum Length

The length of the GS1-128 barcode must never exceed 165mm in length, including the Quiet Zones.

When concatenating data strings, the maximum number of characters in the GS1-128 barcode must not exceed 48 characters.

Application Identifiers for suppliers to the Food Manufacturing Industry

GS1-128 symbols are built up of data fields, which are defined using Application Identifiers (AIs). These AIs are standardised and always precede the data fields. They give the meaning of the information, the data format and the length (fixed or variable) of the data field. For example, the first data field may state what the article is. The next data field states the best before date.

When using GS1-128 barcodes for raw materials and ingredients to the food manufacturing industry it is recommended that the following information should be encoded in the barcode on every level of packaging:

1. Item Identifier (GTIN)
2. Date (Production, Packaging, Expiration or Best Before)
3. Production Information (Batch/Lot Number or Serial Number)

Table 1: Recommended AIs for GS1-128 barcodes

Recommended AIs for Suppliers to the Food Manufacturing Industry			
ITEM IDENTIFIER	GTIN	AI (01)	14-digit number used to identify individual trade items
	GTIN of Trade Item Contained in a Logistics Unit	AI (02)	14-digit number used to identify the GTIN of items contained in a logistics unit
DATE	Production Date or	AI (11)	Production or assembly date determined by the manufacturer. The date may refer to the trade item itself or to items contained. For fresh foods, this may be the packing or packaging date. The format for the data field is YYMMDD.
	Packaging Date or	AI (13)	Date when the goods were packed as determined by the packager. The date may refer to the trade item itself or to items contained. The format for the date field is YYMMDD.
	Best Before Date or	AI (15)	The date on the label or package signifies the the end of the period which the product will retain specific quality attributes or claims even though the product may continue to retain positive quality attributes after this date. The format for the date field is YYMMDD.
	Use By Date	AI (17)	Signifies the last date in which the quality attributes expected by the manufacturer are guaranteed. The product should not be used after this date. For food, the date will indicate the possibility of a direct health risk resulting from the use of the product after this date. The format for the date field is YYMMDD.
PRODUCTION INFORMATION	Batch/Lot Number or	AI (10)	Associates an item with information the manufaturer considers relevant for traceability of the trade item. The Batch/Lot number is 1-20 characters and is alpha-numeric, a machine number, a time or an internal production code
	Serial Number	AI (21)	Where appropriate, a supplier might also choose to include AI 21 in place of a batch number. Serial numbers are 1-20 characters and are alpha-numeric
WEIGHTS AND MEASURES	Count of Items (Variable Measure Trade Item)	AI (30)	The count of items contained within a variable measure trade unit. It is variable length and may have to 8 digits.
	NET Weight, Kilograms (Variable Measure Trade Item)	AI (310x)	(Net Weight Kilos) Net weight should be used when the product is variable in weight. The format for this is 6 digits with a decimal point in the required position of the six digit field. ((e.g AI (3103) 000500 = 500 Kgs NET Weight))
	Length or First Dimension, Metres (Variable Measure Trade Item)	AI (311x)	(Length or first Dimension metres). This AI should be used when the product is variable in length. The format for this is 6 digits with a decimal point in the required position of the six digit field. ((e.g AI (3113) 000500 = 500 Metres))
	NET Volume, litres (Variable Measure Trade Item)	AI (315x)	(Net Volume litres) Net volume should be used when the product is variable in volume. The format for this is 6 digits with a decimal point in the required position of the six digit field. ((e.g AI (3153) 000500 = 500 NET Litres))
	Count of trade items contained in a logistics unit	AI (37)	It is mandatory to assoicate this with AI (02). This information refers to the identification number of the contained trade items. This AI is of variable length of up to 8 digits.
LOGISTICS UNIT	Serial Shipping Container Code (SSCC)	AI (00)	Indicates a Serial Shipping Container Code (SSCC). The SSCC is used to identify logistics units. The GS1 Company prefix of the physical builder of the logistics unit is used which makes the SSCC unique worldwide but does not identify the origin of the unit.

Barcode Examples

Figure 3: Encoding GTIN, Production Date and Batch Number

AI (01) 09312345678907 denotes the GTIN.

AI (11) 160715 signifies a production date of July 15, 2016 (YYMMDD).

AI (10) ABC123DEF denotes the batch/lot number.

Figure 4: Encoding GTIN, Best Before Date, Net Weight and Serial Number

AI (01) 99312345678900 denotes the variable measure GTIN.

AI (15) 170815 signifies a best before date of August 15, 2017.

AI (3102) 000500 denotes a net weight of 5.00 kilos.

AI (21) HIJ12345 denotes the serial number.

If packaging or printing constraints exist, the GS1 concatenated barcode can be stacked as in the below example.

Figure 5: Encoding GTIN, Best Before Date, Net Weight and Serial Number in a stacked barcode

Note: Barcode images are not to scale.

Table 2: Barcode dimensions

Magnification	X-dimension	Width ITF-14	Width GS1-128	Bar Height	Quiet Zones
50%	0.51	61.21	68.07	32.00	5.08
55%	0.56	67.34	74.88	32.00	5.59
60%	0.61	73.46	81.68	32.00	6.10
62.5%	0.64	76.52	85.08	32.00	6.35
65%	0.66	79.58	88.49	32.00	6.60
70%	0.71	85.70	95.30	32.00	7.11
75%	0.76	91.82	102.11	32.00	7.62
80%	0.81	97.94	108.91	32.00	8.13
85%	0.86	104.06	115.72	32.00	8.64
90%	0.91	110.19	122.53	32.00	9.14
95%	0.97	116.31	129.33	32.00	9.65
100%	1.02	122.43	136.14	32.00	10.16

Please note that the width for the GS1-128 barcode dimensions listed above refer to a GTIN-14 only and have no other attribute data encoded.

Location of the barcode on Trade Items

Productivity and scanning accuracy improve considerably when the barcode location is predictable. Consistency in the location of the barcode achieves maximum productivity in any scanning environment.

The barcodes can be positioned anywhere along the face of the carton ensuring that the following GS1 recommendations are followed:

- The lower edge of the vertical bars of the GS1-128 and ITF-14 barcode (not the bottom of the surrounding horizontal bearer bar of an ITF-14 barcode) are exactly 32mm from the lower edge of the base of the carton
- No part of the barcode (including the bearer bars on an ITF-14 barcode) and Quiet Zones is closer than 19mm to any vertical edge

Figure 5: Location of an ITF-14 barcode on a Trade Item

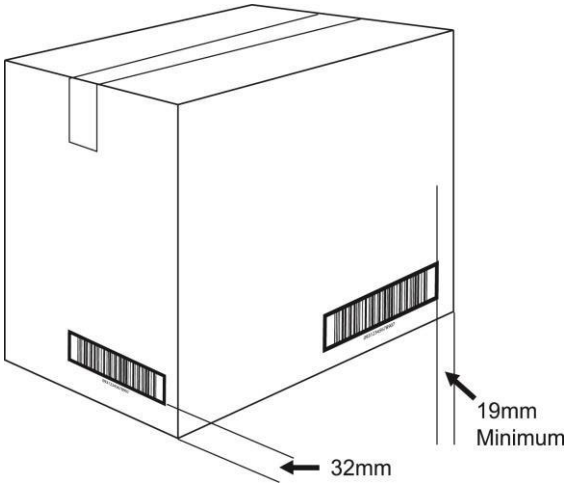


Figure 6: Location of the barcode on large bulky bags

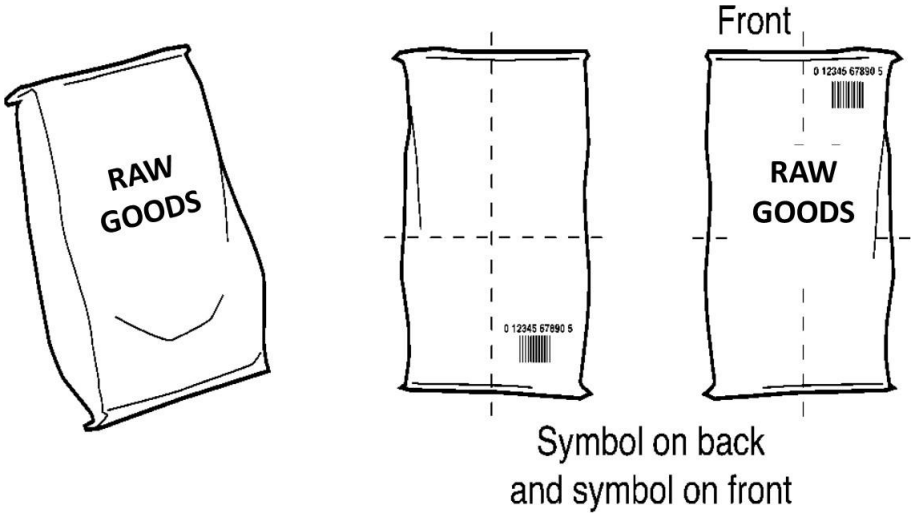
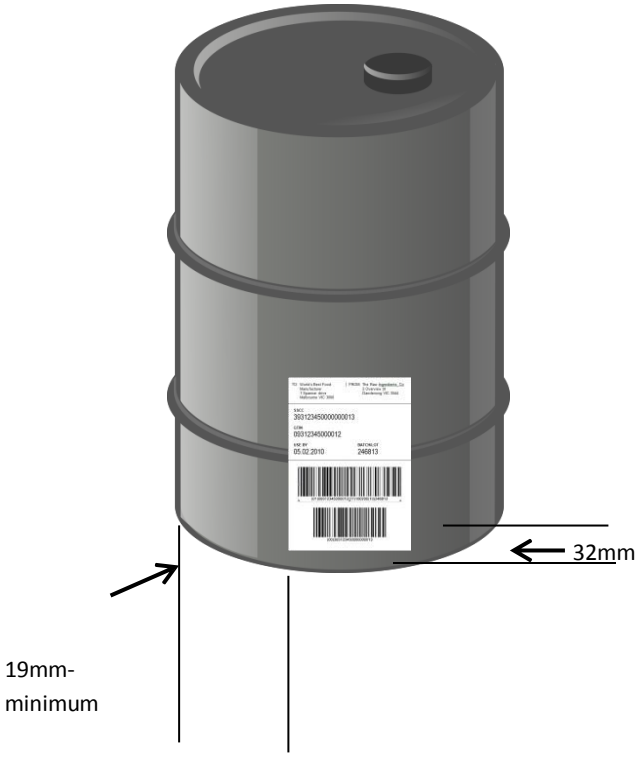


Figure 7: Location of the barcode on large bulk items



For examples of the barcode symbol location on logistics units please refer to **The Numbering and Barcoding Guidelines for Suppliers to the Food Manufacturing Industry**.

For further information please contact GS1 Australia on 1300 BARCODE (1300 227 263) or contact the Food and Beverage Team, Customer Engagement on foodbeverage.team@gs1au.org