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GS1 AIDC Fresh Foods Sold at Point-of-Sale Implementation Guideline

A guide to implement GTIN, GS1 Application Identifiers, and GS1 barcodes for fresh food trade items sold at POS

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1 Executive summary

The Food and Agriculture Organisation of the United Nations estimates that every year, approximately one-third of the world's food supply is lost or wasted!* How can we work to reduce this cost?

* The Food and Agriculture Organisation (FAO) of the United Nations, <http://www.fao.org/food-loss-and-food-waste/en/>

The growing sophistication of technology and management systems has led to demands for additional information to be carried by GS1 barcode symbols and captured at the retail point-of-sale. GS1 DataBar, GS1 DataMatrix and GS1 QR Code provide the path for the fresh food industry to respond to these new requirements.

While EAN/UPC barcodes will remain useful for product identification, other GS1 symbols enable expanded barcode implementation by meeting the objective of identifying small items and carrying more information than the standards and technology of current EAN/UPC barcodes used on fresh food trade items today. Today, most variable measure products are still labelled with an EAN/UPC barcode encoding a Restricted Circulation Number (RCN) that is 12 or 13 digits long and contains information about the weight or price of the variable measure item. However, an RCN is, at best case, unique at a national level. An RCN is not a GTIN (Global Trade Item Number). RCNs are GS1 identification numbers used for special applications in restricted environments, defined by the local GS1 Member Organisation (e.g., restricted within a country, company, or industry). They are allocated by GS1 for either internal use by companies or to GS1 Member Organisations for assignment based on business needs in their country (e.g., variable measure trade item identification, coupons). For more about RCN see [7.2](#)

More and more, variable measure items are being labelled with a GS1 barcode symbol encoding the GTIN, the weight of the product and other optional attributes. Migrating from RCNs to GTIN will enable retailers and suppliers to expand their business functionalities of the centre store to the perimeter and enable new financial opportunities within fresh food departments.

In 2014 GS1 DataBar became an open symbology and all scanning environments must be able to read these symbols. In 2019 GS1 DataMatrix and GS1 QR Code were also made available as data carriers for variable measure fresh foods. The decision to use EAN/UPC, or GS1 DataBar on variable measure products is left to the brand owner or bi-lateral use between trading partners. GS1 QR Code or GS1 DataMatrix on variable measure products can be done with a bi-lateral agreement between trading partners.

GS1 DataBar, GS1 DataMatrix, and GS1 QR Code can encode brand identification and additional data on fresh food products. This means Consumer and Food Safety programs can be instituted at the register and on the consumer receipt. Additional benefits from implementing GS1 DataBar for fixed measure and variable measure fresh foods; Automatic Markdowns at point-of-sale (POS), Expiration Date Management, Traceability to the POS, and Category Management. Similarly, for variable measure fresh foods, GS1 2D symbols can support these applications.

This Implementation Guide is specifically focused on process changes for fresh food point-of-sale applications for variable measure, fixed measure, as well as, loose produce trade items. It will provide retailers, suppliers and solution providers the necessary information to implement GTIN, GS1 Application Identifiers via GS1 DataBar, GS1 DataMatrix, or GS1 QR Code Symbols at point-of-sale. It will point to Fresh Foods Standards in the GS1 General Specifications.

2 Introduction

2.1 Purpose and scope of this document

2.1.1 Purpose

This document describes the Business Process Changes needed to encode and decode GTIN and/or additional data using GS1 DataBar barcodes for variable measure, fixed measure and loose produce fresh food trade items scanned at retail Point-of-Sale. It also describes the Business Process

Changes needed to encode and decode GTIN and additional data using GS1 DataMatrix or GS1 QR Code symbols for variable measure fresh foods.

Fresh Foods includes product categories such as: fruits, vegetables, meats, seafood, bakery and ready-to-serve food such as cheeses, cold cooked or cured meats, and salad, etc.

2.1.2 Scope

This document outlines what retailers and suppliers need to do in order to identify fresh food items at Retail POS and apply the corresponding GS1 barcodes. Specifically, it will cover what is required to;

- Move from the use of traditional Restricted Circulation Numbers (RCNs) such as Prefix 02, 20-29, to Global Trade Item Number (GTIN) and attribute information using GS1 Application Identifiers (AIs) for Variable Measure Trade Items.
- Apply GS1 Application Identifiers (AIs) to existing Fresh Food Fixed Measure Trade Items.
- Identify and label loose produce items with a GS1 approved POS data carrier (i.e., barcode symbol)

In order to migrate to GTIN identification, or to apply additional information to products at retail POS, implementation of GS1 DataBar, GS1 DataMatrix, or GS1 QR Code symbols will be required.

2.2 Who can use this document?

This is a practical guide for retailers, suppliers and solution providers to understand business opportunities, process changes and requirements needed to implement GTIN, GS1 Application Identifiers, GS1 DataBar, GS1 DataMatrix, GS1 QR Code and EAN/UPC symbols at point-of-sale on their fresh food trade items.

2.3 How do I use the document?

All readers are advised to read section 3 for general guidance.

New Users:

If GS1 standards are new to your company, please contact your local GS1 Member Organisation (www.gs1.org/contact).

Suppliers:

Read section 4 for Business Process changes required to implement GTIN, GS1 Application Identifiers and relevant GS1 barcodes at point-of-sale.

Retailers:

Read section 5 for Business Process changes required to implement GTIN, GS1 Application Identifiers and relevant GS1 barcodes at point-of-sale.

AIDC Equipment and Software Companies:

Read section 6 for requirements to implement GTIN, GS1 Application Identifiers and relevant GS1 barcodes at point-of-sale.

2.4 Important definitions

- **Fixed measure trade item** - An item always produced in the same pre-defined version (e.g., type, size, weight, contents, design) that may be sold at any point in the supply chain.
- **Loose produce trade items** - Are 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.
- **Variable measure trade item** - A trade item which may be traded without a pre-defined measure, such as its weight or length.

3 General guidance

3.1 GTIN explanation

The Global Trade Item Number (GTIN) is the GS1 standard for the unique identification of all trade items (consumer units and trade units), including fresh foods. The GTIN supports trade item identification for Business to Business (B2B) and Business to Consumer (B2C) processes. The GTIN is a GS1 key with a specific structure and allocation rules to assure global uniqueness. The GS1 General Specifications prescribe the specifications for the GTIN.

The figure below gives an overview of the GTINs that are used for labelling fresh foods. All parties in the process should be able to process these variants of the GTIN.

Figure 3-1 GTIN formats for use at POS

GTIN	GTIN format
GTIN-8	N7 + C
GTIN-12	N11 + C
GTIN-13	N12 + C

N – numeric digit

C – check digit

When any of these GTINs are encoded in a data carrier (i.e. barcode symbol) that encode a fixed-length data string of 14-digits, GTINs with less than 14-digits in length will add leading zeroes to create a 14-digit number. The leading zeroes simply act as filler characters. The presence or lack of these leading zeroes does not change the GTIN. These series of GTINs may be stored with or without leading zeroes in the same database field, depending on the requirements of the application.

How Global Trade Item Numbers (GTIN) work in GS1 approved data carriers in a 14-digit format

GTIN-13

1	2	3	4	5	6	7	8	9	10	11	12	13	14
0	GCP	GCP	GCP	GCP	GCP	GCP	GCP/IR	GCP/IR	GCP/IR	GCP/IR	GCP/IR	IR	C

GTIN-12

1	2	3	4	5	6	7	8	9	10	11	12	13	14
0	0	GCP	GCP	GCP	GCP	GCP	GCP	GCP/IR	GCP/IR	GCP/IR	IR	IR	C

GCP = GS1 Company Prefix number (assigned by GS1 Member Organisation)

IR = Item Reference number (assigned by your company)

C = Check Digit (calculated by GS1 check digit calculator on www.gs1.org)



Note: For more information on the GTIN and how an organisation should assign GTINs contact your GS1 Member Organisation

3.2 Benefits of implementing GTIN with attribute data

Consumers are increasingly demanding access to more information both online and on product labels and they expect retailers and regulators to protect them from purchasing expired, counterfeit, or unsafe products.

Along with consumer needs, retailers and suppliers also benefit from increased supply chain visibility, enhanced recall readiness abilities, and improved sales data.

Encoding additional attributes in the barcode, using Application Identifiers (see section 3.5), can make this possible as it enables automation and validation of product information throughout the supply chain up to the point-of-sale (POS). This data can, for example, include price, weight, best before date, lot/batch number, serial number.

The process of capturing GTIN + attributes at the item and order levels will enable the following:

- Consumer and Food Safety programs at the register and on the consumer receipt
- Improved quality control at shelf
- Food waste prevention/management
- Automatic Markdowns at point-of-sale
- Expiration Date Management: by encoding for example the Expiry Date, it becomes possible to prevent out of date products being sold at the POS automatically
- Traceability and more effective recalls
- Category/promotional Management
- Inventory replenishment and reduced out of stocks
- Returns management
- Improved pricing accuracy at point-of-sale (e.g., organic vs non-organic)
- Regulatory compliance
- Product authentication/anti-counterfeit

3.3 Migration from RCN to GTIN

Migrating from RCNs to GTIN will enable retailers and suppliers to expand their business functionalities of the centre store to the perimeter and enable new (financial) opportunities within fresh food departments.

A GTIN is a number that is unique on a global level and that can be exchanged internationally (GDSN, GS1 Registry Platform, omnichannel, etc). The use of GTIN (instead of an RCN) will enable international data exchange, e-commerce and will improve food safety, transparency and traceability throughout the supply chain.

3.4 Which barcode can I use?


The proliferation of barcodes and other methods of product identification and communication on-pack can cause confusion for consumers and trading partners, who expect a seamless experience of connecting products to relevant experiences in the digital world. GS1 is committed to partnering with industry to learn from existing use cases and provide leadership, guidance and support for on-pack solutions that allow businesses to adapt and scale over time.

There are several data carrier choices depending on the type of products (fixed measure, variable measure or loose produce) and the information being encoded.

Figure 3-2 POS Data Carrier Considerations


GS1 barcode	Fixed Measure		Loose Produce		Variable Measure	
	GTIN	GTIN+attributes	GTIN	GTIN+attributes	GTIN	GTIN+attributes
EAN/UPC	✓					
GS1 DataBar Omnidirectional	✓		✓		✓	
GS1 DataBar Stacked Omnidirectional	✓		✓		✓	
GS1 DataBar Expanded		✓		✓		✓

GS1 barcode	Fixed Measure		Loose Produce		Variable Measure	
GS1 DataBar Expanded Stacked		✓		✓		✓
GS1 QR Code (2D)				✓		✓
GS1 DataMatrix (2D)				✓		✓

 **Note:** RCN can only be encoded in EAN/UPC.

Please be aware that different regions have different requirements. Check with your trading partner for data carrier requirements. Note that 2D barcodes require imaging-based scanning capabilities.

For an overview of all data carriers see sample barcodes in [7.4.1](#).

 **Note:** To learn more about use of GS1 data carriers for other applications (e.g., healthcare, logistic units) please see section 2 of the *GS1 General Specifications*.

3.5 Attributes using Application Identifiers (AIs)

Unless you are using EAN/UPC as the data carrier you will need to use Application Identifiers (AIs). A GS1 Application Identifier (AI) is a numeric code of two or more characters that uniquely defines the format and meaning of the following information. The AI number preceding a piece of information supports its correct interpretation and processing. By means of AIs several pieces of information can be encoded in one barcode and correctly interpreted and processed.

The figure below is an extract of available AIs that are commonly used to support applications with fresh foods.

Figure 3-3 Common Application Identifiers for fresh food applications

AI	Data Content	Format*	FNC1 Required*	Data Title
01	Global Trade Item Number (GTIN)	N2+N14		GTIN
10	Batch or Lot Number	N2+X..20	(FNC1)	BATCH/LOT
11 (**)	Production Date (YYMMDD)	N2+N6		PROD DATE
13 (**)	Packaging Date (YYMMDD)	N2+N6		PACK DATE
15 (**)	Best Before Date (YYMMDD)	N2+N6		BEST BEFORE or SELL BY
17 (**)	Expiration Date (YYMMDD)	N2+N6		USE BY OR EXPIRY
21	Serial Number	N2+X..20	(FNC1)	SERIAL
30	Count of Items (Variable Measure Trade Item)	N2+N..8	(FNC1)	VAR. COUNT
310n (***)	Net weight, kilograms (Variable Measure Trade Item)	N4+N6		NET WEIGHT (kg)
320n (***)	Net weight, pounds (Variable Measure Trade Item)	N4+N6		NET WEIGHT (lb)
392n (***)	Applicable Amount Payable, single monetary area (Variable Measure Trade Item)	N4+N..15	(FNC1)	PRICE
393n (***)	Applicable Amount Payable with ISO Currency Code (Variable Measure Trade Item)	N4+N3+N..15	(FNC1)	PRICE
395n (***)	Amount payable per unit of measure single monetary area (variable measure trade item)	N4+N6	(FNC1)	PRICE/UoM

AI	Data Content	Format*	FNC1 Required*	Data Title
412	Purchased from Global Location Number	N3+N13		PURCHASE FROM
414	Identification of a Physical Location - Global Location Number	N3+N13		LOC No
422	Country of Origin of a Trade Item	N3+N3	(FNC1)	ORIGIN
8008	Date and Time of Production	N4+N8+N..4	(FNC1)	PROD TIME

*: Technical details about format and the FNC1 character can be found in the General Specifications

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

***: The fourth digit of this GS1 Application Identifier indicates the implied decimal point position.

Example:

- 3103 Net weight in kg with three decimal points

The figure below shows how data is structured for variable measure trade items sold at POS. The same data is encoded in the GS1 DataBar Expanded Stacked and the GS1 DataMatrix, for illustrative purposes.

(01)09512345678901(3103)001015(17)210115(3922)1655(10)ABC123

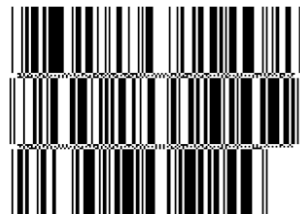
Global Trade Item Number - 09512345678901

Net weight, Kg – 1.015 Kg

Expiration date– 15 January 2021

Price to pay - \$16.55

Batch or Lot Number - ABC123



(01)09512345678901
(3103)001015
(17)210115
(3922)1655
(10)ABC123



(01)09512345678901
(3103)001015
(17)210115
(3922)1655
(10)ABC123

Figure 3-4 **GS1 Barcode Symbols for Fresh Foods**



Note: The samples above are not actual size and are for example only. Reference section 5.10.3 - Table 1 in the GS1 General Specifications for symbol specifications

4 Implementation guideline for suppliers

To start using GTIN or GTIN plus attributes on your products certain changes in your infrastructure might be required to make the keys work. Changing from RCNs to GTIN deliberations are also included in this chapter.

First you must decide whether you are required to mark a variable or fixed measure item as these two categories have different data requirements. Therefore, you find two sections below dealing with the respective product category.

4.1 Business process change for variable measure products

How you identify and label your products today at point-of-sale is changing.

You can start with the question of what information is required to globally identify your variable products and what attributes might be needed in addition to support certain use cases like traceability or waste management:

1. GTIN plus attributes (e.g., net weight) for the global identification of variable measure items
2. GTIN plus attributes for the global identification of variable measure items plus attributes for use cases (e.g., expiry date, lot number..)

To find the right attributes please see [Figure 3-3](#) which provides an overview of the commonly used data elements/application identifiers in this business environment.

4.1.1 Which barcode do I use for variable measure items?

Today, many companies still use the EAN/UPC Symbol with the Restricted Circulation Number (RCN) for variable measure products. This is going to change as using GTIN plus attributes means using GS1 barcodes which are able to encode GTIN plus attributes. These are:

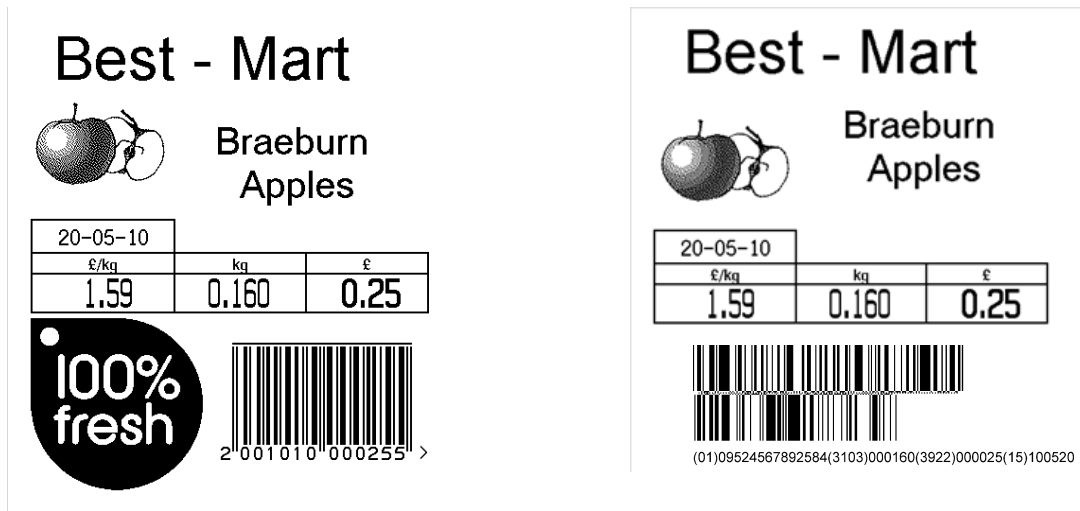
Barcode	Encoding Capacity	Reader requirements
GS1 DataBar Expanded	GTIN plus attributes	Laser or image based scanner
GS1 DataBar Expanded Stacked	GTIN plus attributes	Laser or image based scanner
GS1 DataMatrix	GTIN plus attributes	Image based scanner
GS1 QR Code	GTIN plus attributes	Image based scanner

Example labels are shown in the figure below.

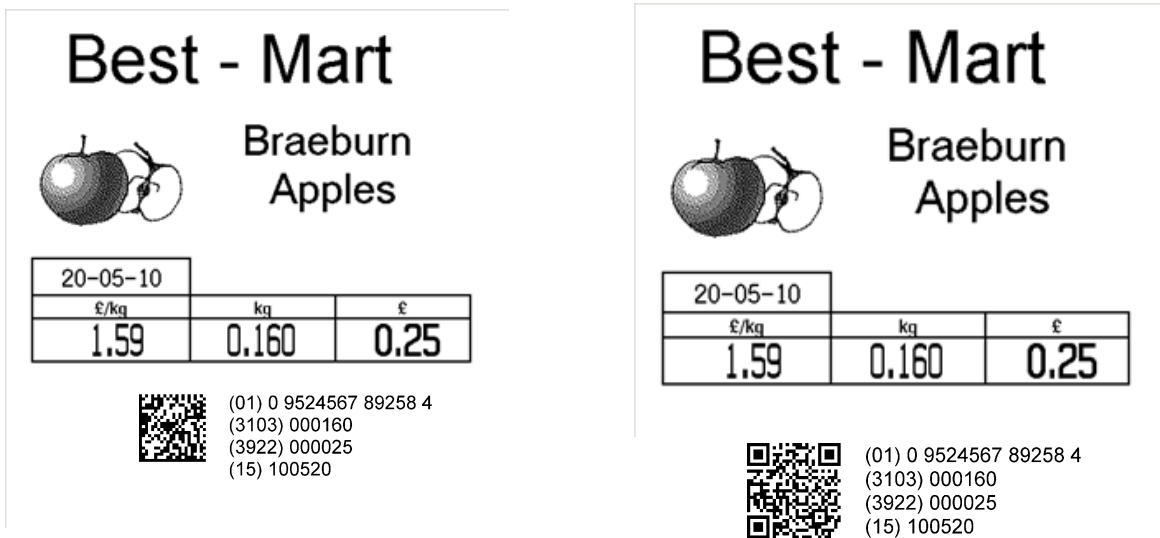
Figure 4-1 Examples

Label with EAN-13 encoding an RCN with prefix 02 /20-29

New Label with GS1 DataBar Expanded Stacked barcode with additional data



New Label with GS1 DataMatrix or GS1 QR Code encoding GTIN + attributes.



Note: The samples above are not actual size and are for example only. Reference section 5.10.3 - Table 1 in the GS1 General Specifications for symbol specifications

4.2 Fixed measure products

4.2.1 Which barcode do I use for fixed measure items?

If the supplier chooses to provide additional information about a fixed measure product sold at POS, such as its expiry date or batch number, GS1 DataBar Expanded or GS1 DataBar Expanded Stacked Symbols are used by industry. This process will require some form of on-demand or in-line printing. EAN/UPC Barcodes will remain an option when no extra data is required and there is sufficient space. If insufficient space is available, GS1 DataBar Omnidirectional or GS1 DataBar Stacked Omnidirectional can be used to encode GTIN only.

Barcode	Encoding Capacity	Reader requirements	Remark
---------	-------------------	---------------------	--------

GS1 DataBar	GTIN only	Laser or imaged based scanner	For small and round produce
GS1 DataBar Stacked	GTIN only	Laser or imaged based Scanner	For small and round produce
GS1 DataBar Expanded	GTIN plus attributes	Laser or image based scanner	
GS1 DataBar Expanded Stacked	GTIN plus attributes	Laser or image based scanner	

4.3 Loose produce trade items

Loose produce (trade items sold by weight or by piece) are presented to the consumer in a display such as boxes or cases, to be picked by the consumer and weighed or counted at the POS. Depending on the size and nature of the item they may carry a label. For more information on labelling of fruit and vegetable, see the [GS1 Fresh Fruit & Vegetable Labelling Consumer Units Guideline](#).

Loose Produce trade items are trade items which are identified with a GTIN or a GTIN and attributes. For more information regarding which barcode to use see [Figure 3-2](#). At the retailer’s discretion, these fresh foods items can be processed as fixed or variable measure products.

- ✔ **Note:** Products identified as fixed measure - reference Fixed measure fresh food items scanned at retail POS of the GS1 General Specifications, section 2.
- ✔ **Note:** Products identified as variable measure, reference Variable measure fresh good trade items scanned at POS using GTIN of the GS1 General Specifications, section 2.

For the choice of the right barcode please see the respective section [4.2.1](#) or [4.1.1](#) depending on the decision to be processed as fixed or variable measure product.



4.4 Supplier readiness checklist

Product information

1. GTIN Management
 - Do you have your GS1 Company Prefix to create GTINs?
 - Can your system handle GTIN for consumer items?
 - Can your system handle different trading partner requirements for product identification including GTIN and any retailer-specific numbering system? For example, a GTIN and attributes represented in a GS1 DataMatrix and also a retailer-specific number system represented in a EAN/UPC symbol?
 - Assign GTINs to all your consumer level trade items for retail POS sale
2. Do you have data elements for all Application Identifiers you may have to encode / produce?

Order processing

1. Can your order processing system manage any additional data required for customer required AIs?
2. Can your order processing system handle GTINs?

Scheduling

1. Have you determined a transition plan and can your scheduling method handle this plan?
2. Do you anticipate and have plans in place to manage different labelling needs based on different customer adoption timelines?

Scale system items

1. Can your scale systems produce GS1 DataBar Expanded, GS1 DataMatrix, or GS1 QR Code Symbols?
2. Ensure GTINs for all your consumer level trade items for retail POS sale
3. Determine AI requirements for all customers
 - a. Can all your customer needs be satisfied with a common set of AIs?
 - b. If a common set of AI's is not possible is there a subset of AIs for all levels?
4. Determine the size of the GS1 DataBar, GS1 DataMatrix, or GS1 QR Code Symbol with required Human Readable Interpretation (HRI).
5. Evaluate the new label layout and real estate requirements with the GS1 DataBar, GS1 DataMatrix, or GS1 QR Code in mind.
6. Determine if label stock or packaging changes will be required
 - a. If stock change is required arrange for new stock?
 - b. If new stock is required determine transition strategy?
7. Determine software ability of scale to handle any new data requirements for an item
 - a. Can the scale manage GTINs?
 - b. Can the scale manage the data for the AIs required for an item?
8. Determine data elements that must be managed for a customer
 - a. Can the scale manage the data for the AIs required for a customer?
 - b. Are customer requirements consistent across all items?
9. Can your scanning systems, being employed for barcode validation handle the GS1 DataBar, GS1 DataMatrix, or GS1 QR Code Symbols?
10. Have you determined a transition plan and can your scale software handle this plan?

Logistics issues and upstream processes: Transition from RCN to GTIN plus additional data using GS1 Application Identifiers

1. When moving from RCN's to GTIN consideration should be given to how this may impact your current system applications and processes.

There may be a requirement to alter existing applications to support the inclusion and processing of different customer requirements at the consumer level within a GS1DataBar Expanded, GS1 DataBar Expanded Stacked, GS1 DataMatrix or GS1 QR Code that is different to the way it has been processed using a RCN.

Moving from a customer specified product identification to GTIN will require internal system application changes to manage trade items produced according to customer requirements for accurate order fulfilment and shipping.

2. Have you determined a transition plan and can your storage and logistics systems handle this plan?

4.5 Scale label readiness

When evaluating your Scale Labelling readiness, be sure you have all GS1 Application Identifiers you need or applicable in your software.

- ✔ **Note:** For a list of Suggested Application Identifiers for variable measure fresh food products – see section [3.5](#)

Local government regulations may require specific data. You should also ensure additional data interface between ERP system and scale are ready and updated. Your systems should be able to print EAN/UPC, GS1 DataBar Expanded, GS1 DataMatrix and GS1 QR Code Symbols per GS1 General Specifications.

- ✔ **Note:** For Symbol Specifications for GS1 DataBar Expanded, GS1 DataBar Expanded Stacked, GS1 DataMatrix and GS1 QR Code symbols reference GS1 General Specifications, section 5.10.3.1, Table 1

You also need to determine if your current label stock (size and coating) or packaging requires changes for GS1 DataBar Expanded, GS1 DataBar Expanded Stacked, GS1 DataMatrix, or GS1 QR Code symbols.

- ✔ **Note:** For Required Attribute data for Variable Measure Fresh Food Trade Items scanned at point-of-sale - reference GS1 General Specifications section 2.
- ✔ **Note:** For Human Readable Interpretation label information – reference GS1 General Specifications, section 4.

4.6 Scanner readiness

Scanners must be compliant and enabled for GS1 DataBar Expanded and GS1 DataBar Expanded Stacked, GS1 DataBar Omnidirectional, GS1 DataBar Stacked Omnidirectional, GS1 DataMatrix, GS1 QR Code Symbols. Note that reading GS1 DataMatrix or GS1 QR Code symbols requires image based scanning. Sample POS GS1 symbol samples are shown in section 7.5.

4.7 How to allocate and when to change the GTIN

With the Business Process Change of migrating from RCNs to GTIN, suppliers will be required to create GTINs for each product sold at POS. When assigning GTIN for these products, suppliers must follow the GTIN Management Standard (<https://www.gs1.org/1/gtinrules/en/>) and the additional Fresh Foods sector-specific rules (<https://www.gs1.org/1/gtinrules/en/tree/32/fresh-foods>)

- ✔ **Note:** For the Fresh Foods sector-specific rules at point-of-sale information – See [7.1](#)

4.8 How to manage non-POS product that may go to POS

A brand owner is the responsible party for identification of their trade items using GS1 standards. They must identify and segment inventories with different GTINs according to [GTIN Management Standard](#) and commercial agreements. This does not mean that a trade item intended by the brand owner for use at POS or not at POS will never be used by a downstream trading partner in a manner not intended. This exception cannot be managed by GS1 standards compliance, but only by bilateral commercial agreements.



5 Implementation guide for retailers

5.1 Business process changes

How you identify, label, sell and capture data of fresh food trade items scanned at point-of-sale is changing.

The industry is migrating from current Restricted Circulation Numbers (RCNs) to GTIN (Global Trade Item Number) plus additional data. (This data can include for example; pack weight, price, best-before-date, or batch number). The use of GTINs and additional data to replace RCNs requires the use of GS1 DataBar, GS1 QR Code, or GS1 DataMatrix symbols.

Retailers need to be ready to process GTINs and additional data at POS. This is a major change from the present use of RCNs. Retailers will need to ensure their front-end systems can handle the additional data and process their desired data at POS appropriately. For example, you will be able to use this extra data, such as best-before- date or expiry date, automatically to prevent out-of-date products being sold to your customers. It is recommended to have the scanner pass all data encoded in the GS1 barcode to your POS Application software. When processing the encoded AIs, remember they may come in any order.

- 
Note: Reference section 7 of the GS1 General Specifications for more details
- 
Note: For Identification of a Variable Measure Trade Item (GTIN): AI (01) - reference GS1 General Specifications, section 3

How to make these process changes are highlighted in the upcoming sections.

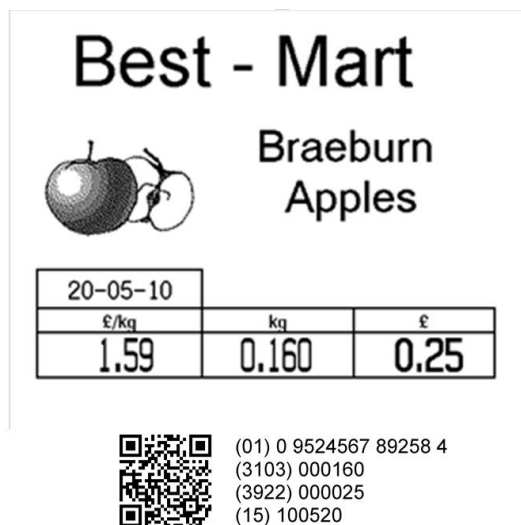
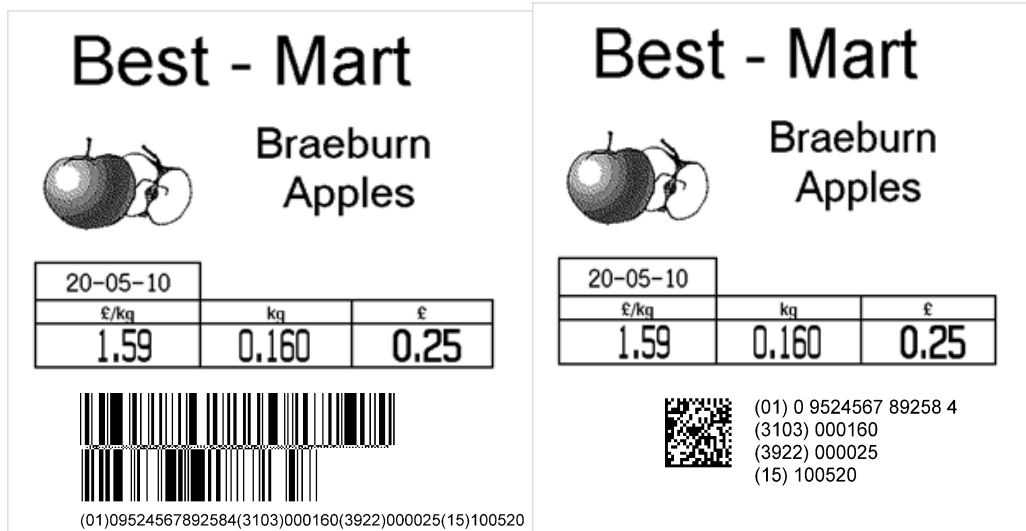
To illustrate what the new barcodes will look like, here are examples of the labels used now, and the labels to be used with GS1 DataBar, GS1 QR Code, and GS1 DataMatrix symbols. The labels now for variable measure products simply encode an RCN, while the new label encodes the GTIN for the product, and any additional attributes.

Figure 5-1: Current label using EAN-13 encoding an RCN with a Prefix 02 / 20-29



✔ **Note:** The sample above is not actual size and is for example only. Reference section 5 - Table 1 in the *GS1 General Specifications* for symbol specifications.

Figure 5-2: New labels using a GS1 DataBar Expanded Stacked, GS1 DataMatrix, and GS1 QR Code encoding GTIN plus additional attributes



✔ **Note:** The sample above is not actual size and is for example only. Reference section 5 - Table 1 in the *GS1 General Specifications* for symbol specifications

5.2 Variable measure products

5.2.1 In-store labelled products

5.2.1.1 Which barcode do I use for variable measure items?

Today, many companies still use the EAN/UPC Symbol with the Restricted Circulation Number (RCN) for variable measure products. When companies begin using GTIN plus attributes, they will use a different GS1 barcode. These barcodes are:

Barcode	Encoding Capacity	Reader requirements
GS1 DataBar Expanded	GTIN plus attributes	Laser or image based scanner
GS1 DataBar Expanded Stacked	GTIN plus attributes	Laser or image based scanner
GS1 DataMatrix	GTIN plus attributes	Image based scanner
GS1 QR Code	GTIN plus attributes	Image based scanner

5.2.2 Pre-packed / Pre-labelled products

You may continue to use EAN/UPC barcodes that encode the RCNs used now, however it is recommended to be ready to use GS1 DataBar, GS1 QR Code, and GS1 DataMatrix symbols. GS1 DataBar Expanded, GS1 QR Code, and GS1 DataMatrix symbols for variable measure products will encode a GTIN plus additional data (AIs).

When your software and hardware are ready and want GTIN plus additional data, you need to contact your suppliers to inform them of your readiness so they too can be ready on their end to support your needs. It is recommended to acquire sample labels from your suppliers prior to the product arriving in-store in order to verify decodability of Application Identifiers (AIs) encoded.

For pre-packed / pre-labelled product from your suppliers, they are responsible for ensuring that they allocate different GTINs to the different product lines they supply you.



Note: For the Fresh Foods sector-specific rules at point-of-sale information – See [7.1](#)



Note: For Application Standards for Fresh Food Trade Items Scanned at point-of-sale – reference GS1 General Specifications, section 2

5.3 Fixed measure products

5.3.1 Which barcode do I use for fixed measure items?

If suppliers choose to provide additional information, such as expiry date or batch number, for use at POS, GS1 DataBar Expanded, or GS1 DataBar Expanded Stacked, will be used to encode GTIN plus attribute data.

EAN/UPC barcodes will remain an option when no additional data is required and there is sufficient space. If insufficient space is available, GS1 DataBar Omnidirectional or GS1 DataBar Stacked Omnidirectional can be used to encode the GTIN.

5.4 Loose produce trade items

Loose Produce trade items are trade items which are identified with a GTIN. At the retailer's discretion, loose produce can be sold as fixed or variable measure products.

If this product is to be identified as variable measure, see variable measure section [5.2](#).

- When a loose produce item is further processed in-store and repackaged, it may be sold by the retailer as a fixed measure trade item, then it is treated as a Fixed Measure Trade Item and follows - Loose Produce Trade Items Scanned at point-of-sale of the GS1 General Specifications section 2.
- However, if loose produce is sold as a variable measure trade item, then it is treated as Variable Measure Trade Item and follows - Variable Measure Fresh Food Trade Items Scanned at point-of-sale Using GTIN of the GS1 General Specifications section 2.

For loose produce you can use GS1 DataBar Omnidirectional or GS1 DataBar Stacked Omnidirectional to encode GTIN only. To encode GTIN and additional attributes you can use GS1 DataBar Expanded, GS1 DataBar Expanded Stacked, GS1 QR Code or GS1 DataMatrix.

- ✓ **Note:** Refer to section 5.9 and section 7.1 for further guidance on how to allocate a GTIN for fresh foods.

5.5 Retailer Readiness Checklist

1. Is your Scanner Hardware capable, configured, and activated to process GS1 DataBar and/or GS1 QR Code and GS1 DataMatrix formats and all AIs?
(Scanners include POS lanes, self-checkout, self-scan, hand-held units in POS lane or on the sales floor and backroom)
2. Is your POS Software capable of processing the GS1 DataBar GS1 QR Code, and GS1 DataMatrix data content using GS1 Application Identifiers (e.g., best-before-date, batch number, lot number, weight)? (POS Software includes cashier lanes, unattended lanes (self-checkout, self-scan and home shopping applications))
- ✓ **Note:** Your POS systems should have the ability to accept multiple AIs and process only those relevant to your POS processes.
 - For Analysis of the Data Carrier and Plausibility Test for Element Strings - reference GS1 General Specifications, section 7
3. Is your POS Transaction Log capable of downstream processing and utilisation of the POS transaction data containing the additional GS1 Application Identifiers present such as the net weight, batch/lot, serial number, etc?
4. Is your Host Systems Software/Master Data capable of supporting all forms of GTIN and AIs? Is it capable of managing one or more GTINs assigned to a stock keeping unit reference?
5. Is your Scale/Labelling Software capable of handling all forms of GTIN and required AIs?
6. Are all relevant GTINs listed in your POS System?
7. Is your hardware equipment and software application for price verification, product receiving, inventory recording / checking capable of reading and processing GTIN and additional GS1 AIs in GS1 DataBar, GS1 QR Code, and GS1 DataMatrix required?
8. POS applications need to accommodate the key entry of required AIs in Human Readable Interpretation (HRI) to meet retailer requirements. When barcodes fail to scan, any prompting of key entry or other processes needs to be considered for both checkout staff and self-scanning customers.
 - For Human Readable Interpretation label information – reference GS1 General Specifications, section 4
9. Determine POS process for loose produce in a bag which has a barcode on each individual item and is sold as variable measure. For example, one approach might be to force key entry of a quantity for items sold by piece, and another might be to delay scaled weight slightly when an item is scanned and weighed (versus keyed PLU and weighed which may be instant).
10. List the different fresh food product types potentially involved in your GS1 DataBar, GS1 QR Code, or GS1 DataMatrix implementation – and identify how they are sourced and sold:

- Pre-packed consumer ready for shelf products, labelled and priced, from your supplier
 - Pre-labelled consumer ready for shelf products, labelled and priced, from your supplier
 - Pre-packed products, labelled and not-priced, from your supplier
 - Pre-packed products, not labelled and not-priced, from your supplier
 - In-store 'weight-wrap labelled' packs (via in-store pre-packing)
 - In-store counter-served packs (via counter scales)
 - Loose Produce
11. Define the objectives that you would ideally like to achieve – for each type of product identified above. (This defines the data which is required to be encoded on the GS1 DataBar, GS1 QR Code, or GS1 DataMatrix symbol).
- Loose Produce encodes the GTIN to ensure correct identification at POS
 - Identify quantity or weight of items sold at full price, and if applicable, also any sold at a reduced price (mark-down). This may require both the pack weight and the price to be encoded on consumer pack.
 - At the checkout, stop sales of any packs past their sell-by dates. This requires additional data other than GTIN for example best-before-date to be encoded.
 - For product safety recall / stop (requires additional data other than GTIN for example, batch or lot number to be encoded on the consumer pack)
12. Map out the end-to-end process for each product type:
- Ensure that there is clarity on where all of the data comes from, how it moves through the complete supply chain and how it is used in the store or head office systems.
 - Use this to confirm the requirements with both the supply chain and any solution providers
 - This – along with quantifying the business benefits, can also help in any business case justification

5.6 POS software readiness

POS software needs to be capable of processing and storing the GS1 Application Identifiers (AIs), e.g. weight, best-before-date. The POS Software must be capable to both process your specifically required additional data and effectively ignore all remaining additional information that you do not require. (See section [6.3.1](#) for more information). This is a major change from the present use of RCNs. You will need to ensure your front-end systems can handle the additional data and process your desired data at POS appropriately. For example, you will be able to use this extra data, such as best-before-date or expiry date, automatically to prevent out-of-date products being sold to your customers. Likewise, a batch/lot code can be used to prevent the sale of a recalled item to be sold to your customers. This data may need to come from other systems and link to the POS software. When processing the encoded AIs, remember they may come in any order, and that your POS hardware/software may be capable of delivering only the attributes you require.

- ✔ **Note:** Reference section 7 of the GS1 General Specifications for more details
- ✔ **Note:** For Identification of a Variable Measure Trade Item (GTIN): AI (01) - reference GS1 General Specifications, section 3
- ✔ **Note:** More detailed information on POS software Readiness can be found in section 6.3 of this Guide

Your back-end software solutions such as those that process and consume POS transaction log data may also need to be able to process the GTIN and additional GS1 AIs. Based on your POS system capabilities your back end system may be required to parse additional GTIN attributes required.

POS software must also be capable of handling key entry of the data in the GS1 DataBar, GS1 QR Code, or GS1 DataMatrix, in the event the barcode does not scan. You will need to evaluate your process for handling the key entry of additional data beyond GTIN. Furthermore, it is important to ensure that your front-end cashiers are trained on how to key enter the label's Human Readable Interpretation, both the GTIN and additional data, in this situation.

- ✔ **Note:** For Human Readable Interpretation label information - reference GS1 General Specifications, section 4

With respect to the maintenance of your master data relationships with the presence of GTIN in the GS1 DataBar, GS1 QR Code, or GS1 DataMatrix, your product management solutions will need to support one or more item references (GTINs, RCNs, etc.) when a stock-keeping unit is used to represent a commoditised consumer product. For example, a stock-keeping unit for loose bananas should contain the GTINs for each of your chosen suppliers and any RCNs that may be utilised in the supply chain.

As you may receive product from your variable measure trading partner, you will want to be familiar with minimum required data (GTIN + Variable Count / Trade Measure) encoded in a GS1 DataBar Expanded, GS1 QR Code, or GS1 DataMatrix, as well as the Human Readable Interpretation label information.

- ✔ **Note:** For Required Attribute data for Variable Measure Fresh Food Trade Items scanned at point-of-sale - reference GS1 General Specifications, section 2

For further information please contact your local GS1 Member Organisation at www.gs1.org/contact

5.7 Scanner readiness

POS scanners (fixed bioptic, hand scanner, and presentation) must be capable and activated for the GS1 barcodes that your company and your trading partners have selected. This could include:

- GS1 DataBar Expanded and GS1 DataBar Expanded Stacked
- GS1 DataBar Omnidirectional
- GS1 DataBar Stacked Omnidirectional
- GS1 QR Code
- GS1 DataMatrix

Many scanners are capable of reading these GS1 symbols, but could be currently installed at the retailer's location without this functionality enabled (i.e., not yet "turned on").

Imaging scanners are necessary to read the data held within GS1 QR Code and GS1 DataMatrix symbols because laser-based scanners are not capable of reading them.

This may require investment. Investment decisions should always be based on balanced considerations of benefits versus the investments. For example, depending on your generation of scanner, you may need a firmware upgrade or a chip set exchange. Be sure to do an assessment of all scanning equipment to determine the status of each piece and only activate the barcodes you will be reading. You may need to contact your equipment vendor to validate and enable the required functionality.

Additionally, retail systems will need to be able to process the additional data in order to generate new and expanded value for retailers and consumers. Such considerations should also include other types of scanning such as consumer self-scanning at POS using dedicated smart devices in-store, automated distribution scanners, retailer handheld terminals used for online order fulfilment or retailer-hosted applications available on smartphones of consumer. For more information on scanner investment see GS1 position paper

https://www.gs1.org/sites/default/files/docs/barcodes/2d_position_paper-release13feb_002.pdf.

Sample POS GS1 symbol samples are shown in section 7.5.

5.8 Scale label readiness

When evaluating your Scale Labelling readiness, be sure you have all GS1 Application Identifiers you need or "applicable" in your software.

- ✔ **Note:** For a list of Suggested Application Identifiers for variable measure fresh food products – see section [3.5](#)

Local government regulations may require specific data. You should also ensure additional data interface between ERP system and scales are ready and updated. Your systems should be able to print both EAN/UPC, and GS1 DataBar Expanded, GS1 QR Code, or GS1 DataMatrix symbols per GS1 General Specifications.

- ✔ **Note:** For Symbol Specifications for GS1 DataBar Expanded and Expanded Stacked Symbols, GS1 QR Code and GS1 DataMatrix - reference GS1 General Specifications, section 5 Table 1

You also need to determine if your current label stock (size and coating) or packaging requires changes to accommodate GS1 DataBar Expanded and Expanded Stacked, GS1 QR Code, or GS1 DataMatrix symbols.

For further information please contact your local GS1 Member Organisation at www.gs1.org/contact.

- ✔ **Note:** For Required Attribute data for Variable Measure Fresh Food Trade Items scanned at point-of-sale - reference GS1 General Specifications, section 2
- ✔ **Note:** For Human Readable Interpretation label information – reference GS1 General Specifications, section 4

5.9 How to allocate and when to change the GTIN

The brand owner assigns a GTIN and follows the [GTIN Management Standard](#) for Trade Items and/or the Fresh Foods sector-specific rules at point-of-sale information in [7.1](#).

- When a different configuration of a fresh food trade item requires separate identification for POS, a new GTIN will be assigned.
- ✔ **Note:** If the retailer is reconfiguring a trade item in-store, that already is assigned a GTIN and the reconfigured item requires separate identification from the original trade item GTIN, the retailer will be responsible for new GTIN assignment.
- ✔ **Note:** For the Fresh Foods sector-specific rules at point-of-sale information – See [7.1](#)

5.10 How to manage Non-POS product that may go to POS

A brand owner is the responsible party for identification of their trade items in GS1 standards. They must identify and segment inventories with different GTINs according to [GTIN Management Standard](#) and commercial agreements. This does not mean that a trade item intended by the brand owner for use at POS or not at POS will never be used by a downstream trading partner in a manner not intended. This exception cannot be managed by GS1 standards compliance, but only by bilateral commercial agreements.

6 Implementation guide for AIDC equipment and software companies

6.1 Scanners

Scanners must be compliant and enabled to read and auto-discriminate the barcode symbols listed in Figure 3-2.

6.2 Label printer equipment (includes printers with or without scales)

Any label printer equipment used for this application should be capable of printing the barcode symbols listed in section 3.4 using all GS1 Application Identifiers. At minimum, they should include the list of suggested AIs for Fresh Foods.

- ✔ **Note:** For a list of Suggested Application Identifiers for variable measure fresh food products – see section [3.5](#)

Some GS1 Application Identifiers identify fixed length data fields, while others support variable length data fields. To obtain more information about the entire list of recognised GS1 Application Identifiers with their corresponding GS1 Application Identifier data fields and length rules, please refer to the GS1 General Specifications section 3.

- ✔ **Note:** For Required Attribute data for Variable Measure Fresh Food Trade Items scanned at point-of-sale – reference General Specifications, section 2
- ✔ **Note:** For Human Readable Interpretation label information – reference GS1 General Specifications, section 4
- ✔ **Note:** For maximum and minimum barcode dimensions - reference GS1 General Specifications, section 5

6.3 Retailers and software companies at POS

6.3.1 Processing GS1 Application Identifiers (AIs)

If you want to process some or all GS1 Application Identifiers encoded in a GS1 DataBar Expanded, GS1 DataBar Expanded Stacked, GS1 QR Code, or GS1 DataMatrix symbol:

- It is recommended to have the scanner pass all Application Identifiers to your POS Application software. At this point, the retailer will specify which GS1 Application Identifiers they want processed from the POS Application software.

For example, the POS may only be interested in GTIN and Expiry Date. One supplier may have the expiry date as the 4th Application Identifier in their barcode. Another may have Expiry Date as the 5th Application Identifier. The retailers' POS processing will need to accurately pass the "uninteresting" AIs and data between GTIN and Expiry Date. This approach implies that the POS software understands at least the data length implied by, and associated with, each AI. This applies to AIs that are not currently being processed. Because the standard generally allows AI's beyond the GTIN to be in any order within the barcode.

- It is recommended the POS application understands the symbology identifier along with the AIs and barcode data. This further allows the POS to be certain which barcode it is processing.

Notes:

- Application Identifiers are of different lengths.
- Data fields may be fixed or variable in length.

- Software solutions should be based on the latest table of GS1 Application Identifiers
- Solution Providers should make a provision for updating GS1 AIs with each software maintenance cycle.
- ✔ **Note:** For a complete list of all GS1 Application Identifiers, their length and data titles – reference GS1 General Specifications, section 3 GS1 Application Identifiers in Numerical Order.
- ✔ **Note:** For further guidance on processing element strings reference GS1 General Specifications, section 7.2

6.3.2 Processing key entry of data on labels

In the event that the GS1 approved POS data carrier does not scan, POS Software must be capable of handing the key entry of the barcode information. This includes the key entry of the GTIN information, as well as additional information that may appear with GS1 DataBar Expanded, GS1 QR Code, or GS1 DataMatrix symbols.

Some considerations with key entry:

- Determine how the cashier should be instructed to enter the pertinent information for the GTIN and additional information. For instance, a cashier might be prompted for particular pieces of additional information, such as expiration or best-before date. Alternatively, the cashier might be prompted for all of the additional information available and the POS Software could parse out the required additional information.
- Consider how to prompt cashiers to locate additional information on the barcode, either through using the HRI (Human Readable Interpretation) or additional non-human readable text available on the barcode.
- Consider how to prompt consumers to get assistance.
- Local regulations may determine what is key-entered.
- ✔ **Note:** For Human Readable Interpretation label information – reference GS1 General Specifications, section 4

6.3.3 Handling master data relationships

With respect to the maintenance of your master data relationships with the presence of GTIN in a GS1 DataBar, GS1 QR Code, or GS1 DataMatrix, your product management solutions will need to support one or more item references (GTINs, RCNs, etc.) when a stock-keeping unit (SKU) is used to represent a commoditised consumer product.

For example, an SKU for loose bananas should contain the GTINs for each of your chosen suppliers and any RCNs that may present in the supply chain.

This might affect such areas as:

- Inventory Processing Software
- Product Look Up operations

7 Appendix





7.1 Fresh foods GTIN Management

- Note:** When assigning GTIN for these products, suppliers must follow the GTIN Management Standard (<https://www.gs1.org/1/gtinrules/en/>) and the additional Fresh Foods sector-specific rules (<https://www.gs1.org/1/gtinrules/en/tree/32/fresh-foods>)
- Note:** The [GTIN Management Standard](#) is intended for global use. Exceptions may occur only when local regulatory or legal requirements mandate otherwise.



When a different configuration of a fresh food trade item requires separate identification for POS, a new GTIN will be assigned. Specific examples of rules can be found in the figure below:

- Note:** If the retailer is reconfiguring a trade item in-store, that already is assigned a GTIN and the reconfigured item requires separate identification from the original trade item GTIN, the retailer will be responsible for new GTIN assignment.

	Rule	NEW GTIN Required	Example	Diagram
1.1	Where a fresh food pre-packed package item differs in weight, is sold by weight but ordered by specific separate pack size a new / unique GTIN will be assigned to each type of pack size.	Yes	Pre-packaged chicken drumsticks, each package differs in weight, sold by weight but ordered by specific pack size (GTIN A = 10pk and GTIN B = 14pk)	
1.2	Where a loose produce item is sold as an each (product 1), then cut and packaged to be sold by weight (product 2), product 1 and 2 require separate unique GTINs.	Yes	A whole watermelon is sold for \$4.00 each. The retailer decides to cut the watermelon into halves and sell the quarters for \$1.99 per kilo/pound	
1.3	Where a loose produce item is sold as an each or weight (product 3), is then packaged in-store and sold as a fixed measure (product 4), product 3 and 4 require separate unique GTINs	Yes	An apple sold by each or weight for 1.29 per kilo/pound. It is then packed in-store as a fixed measure container and sold as 3.00 for a 4 pack of apples.	

	Rule	NEW GTIN Required	Example	Diagram
1.4	Where a bulk fresh food item of fixed or variable measure, not intended for point-of-sale, (product 5), is cut and packaged in-store and sold by weight (product 6), product 5 and 6 will require separate GTINs based on the requirement to use Indicator digit 9 in a GTIN-14 on product 5 and the requirement to use GTIN-12 or GTIN-13 on product 6 because it will be scanned at point-of-sale.	Yes	A wheel of cheese (not intended for point-of-sale) is ordered by a GTIN-14 inclusive of Indicator digit 9, is cut and packaged in variable weight packages in the deli department and sold by weight, will require a new GTIN, either GTIN-12 or GTIN-13 at point-of-sale.	 Product 5 with GTIN G  Product 6 with GTIN H <hr/>  Product 7 with GTIN I  Product 8 with GTIN J
		Yes	Bulk chicken breast (not intended for POS) is ordered by a GTIN-14 inclusive of Indicator digit 9, then packaged into individual variable weight packages and sold by weight, will require a new GTIN, either GTIN-12 or GTIN-13 at point-of-sale.	

When different configurations of fresh food items do not require separate identification at POS use the same GTIN. Specific examples of Rules include:

	Rule	NEW GTIN Required	Example	Diagram
2.1	Where a loose produce item (product 9) is placed in a bag (product 10) by the consumer, product 9 and 10 have the same GTIN.	No	Loose Produce items presented for sale at the POS, either individually or in a bag (placed by the consumer) will be identified with the same GTIN. Placing the loose produce items in a bag by the consumer does not change the GTIN.	 Product 9 with GTIN K  Product 10 with GTIN K

GTIN Allocation and Responsibility for Branded Items and Unbranded Items can be found in section 4 of the GS1 General Specifications.

7.2 Restricted Circulation Number (RCN) examples

Restricted circulation numbers begin with 02 or 20-29. GS1 Member Organisations can use these digits to assign national numbers or allocate some of these numbers for members to use within their organisation. The meaning and structure of the GS1 prefixes 20 to 29 can vary across markets

because of local applications not related to variable measure fresh foods. Contact the local GS1 Member Organisation(s) for more information on assigned meaning(s). For more detail on Restricted Circulation numbers, see the General Specifications, section 1.4.

Illustrative example RCNs encoding price or weight of variable weight item

If the item is packaged/labelled by the supplier (as brand owner), the item can have a 13-digit national number assigned by its local GS1 member organisation. In these examples the range 28 and 29 are used by a member organisation to assign national numbers.

<div style="background-color: #76b82a; color: white; padding: 5px; margin-bottom: 5px;">PRICE</div> <div style="background-color: #76b82a; color: white; padding: 5px; margin-bottom: 5px;">295 AAAAA EEEE C</div>  <div style="margin-top: 5px;">2 956250 101005</div> <div style="color: #00a0e3; font-weight: bold; margin-top: 5px;">Price €1</div>	<div style="background-color: #f1a333; color: white; padding: 5px; margin-bottom: 5px;">WEIGHT</div> <div style="background-color: #f1a333; color: white; padding: 5px; margin-bottom: 5px;">28 AAAAA QQQQ C</div>  <div style="margin-top: 5px;">2 862501 010005</div> <div style="color: #00a0e3; font-weight: bold; margin-top: 5px;">Weight 1 kg</div>
---	---

Legend	
A	assigned by GS1 Member Organisation
E and Q	assigned by brand owner and created within scaling/labelling systems, as this part contains weight or price.
C	Check digit

7.3 GS1 URLs for further barcode information

- GS1 DataBar barcodes www.gs1.org/barcodes/databar
- GS1 Two-dimensional (2D) barcode www.gs1.org/barcodes/2d
- GS1 DataMatrix Guideline www.gs1.org/standards/gs1-datamatrix-guideline/25#2-Encoding-data+2-1-The-encoding-structures
- GS1 2D Barcode Verification Process Implementation Guideline www.gs1.org/docs/barcodes/2D_Barcode_Verification_Process_Implementation_Guideline.pdf

7.4 How GS1 DataBar, GS1 QR Code and GS1 DataMatrix can be used - Business case examples

The following examples can enable Consumer and Food Safety Programs at the point-of-sale for your fixed and variable measure fresh products.

7.4.1 Expiration date management – Stopping a transaction at POS

GTIN + Expiration Date enables the POS to determine if the product is out-dated, hence stopping the sale or allowing the exchange of a fresher one. A pop-up message could appear on the register screen. See examples below:



(01)08801114111116
(17)101220

- **(01) GTIN**
- **(17) Expiration Date**

“This product is expired. Please exchange it with a fresher one.”



Chicken Drumsticks



(01)09520012300239
 (15)211114
 (3103)000954
 (3922)429

BEST BEFORE
 11.14.21

NET WT kg
 0.954

PRICE/kg
 \$ 4.50

TOTAL PRICE
 \$ 4.29

GTIN	(01)
Best Before Date	(15)
Weight	(3103)
Price	(3922)

7.4.2 Automatic markdown

GTIN + Expiration Date enables the POS to determine if the product is close to the expiration date, enabling the POS software to provide an Automatic Markdown at the POS (*Subject to local regulations). A pop-up message could appear on the register screen. See examples below:



(01)08801114111116
(17)101220

- **(01) GTIN**
- **(17) Expiration Date**



7.4.3 Product recall and traceability at point-of-sale

Encoding GTIN + Lot Number or GTIN + Batch Number enables the POS to determine if the product is being recalled. A pop-up message could appear on the register screen. See examples below:



With GTIN + Lot Number or GTIN + Batch Number encoded in the GS1 DataBar Expanded or Expanded Stacked barcode, the POS software can process and store both pieces of data enabling traceability to the consumer (based on loyalty card usage). It is also possible to print the batch number and other additional information on the customer receipt. See example below:




FEILE FOODS
 Unit 5A, Clonminam Bus Pk
 Portlaoise
 Co. Laois
 Ireland
 Tel: 057 8681955
 Fax: 057 8681956
 Vat No: 6361564R


Date: Tue, 02-Feb-2010 Time: 10:18
 No.: 00153300

Description	Qty	Wt	Value
Breakfast Pack	1		9.99
Peppered Steak x 4	1	0.859	9.99
Batch: 50020201/0005			
Expiry Date: 12-02-2010			
Weekend Bundle	1		29.99
Total:			49.97
Cash:			49.97

Thank You For Shopping At
 Feile Foods



Sausage



BEST BEFORE
01.15.21

NET WT kg
1.24

PRICE/kg
\$ 4.99

TOTAL PRICE
\$ 6.19

LOT: DEF789

GTIN (01)

Weight (3102)

Price (3922)

Batch/Lot (10)

Best Before Date (15)

GTIN (01)

Best Before Date (15)

Weight (3102)

Batch/Lot (10)



✓ Note: These examples are representative of options, local requirements may vary

7.4.4 Product replenishment



GTIN + Expiry Date or GTIN + Sell-by-Date can enhance the knowledge of how much close coded product is left in the display / selling case of the store

Example using GS1 DataBar Stacked Omnidirectional on Fruit & Vegetables

The GS1 DataBar Stacked Omnidirectional encodes GTIN only. The GTIN provides brand identification.

Improved Front-end Productivity and Shrink Reduction



With the GS1 DataBar Stacked Omnidirectional, the cashier or customer (if self-scanning available) can scan the barcode versus key entry of a code number, providing accurate data, just like any other consumer product good. Having accurate data will reduce shrinkage, improve inventory management, and enable Category Management in the fruit & vegetable department.

Example using GS1 DataMatrix on pre-packed/pre-labelled Fruit & Vegetable



7.5 GS1 barcode samples

This section displays examples of barcodes that might be used to support fresh food. If printed at the size provided on a well maintained printer, these symbols could be used to confirm whether scanners can read these GS1 barcodes. The data interpreted and transmitted by the scanner is dependent on the manufacturer’s device settings. Human readable interpretation (HRI) is shown in the table as a guide for what is encoded in the symbols.

Colour Coding Key	
Red	Function Code 1 (FNC1), to be encoded according to the specifications of the symbology used.
green	GS1 Application Identifier (AI)
blue	ISO/IEC 15424 symbology identifier
purple	If the FNC1 is used as a separator character for GS1 AIs the FNC1 is interpreted as a group separator <GS1>



Symbol 1 – EAN-13

Human Interpretable Form (HRI): 9501101420014
 data to be encoded in the symbol: 9501101420014
 data interpreted and transmitted by the scanner: **1E0**9501101420014



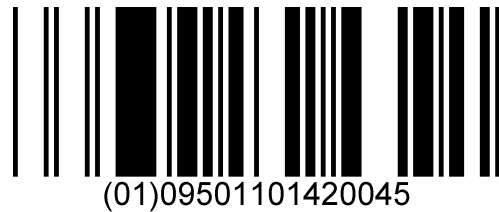
Symbol 2 – GS1 DataBar Omnidirectional

Human Interpretable Form (HRI): (01)09501101420021
 data to be encoded in the symbol: **FNC101**09501101420021
 data interpreted and transmitted by the scanner: **1e001**09501101420021



Symbol 3 – GS1 DataBar Stacked Omnidirectional

Human Interpretable Form (HRI): (01)09501101420038
 data to be encoded in the symbol: **FNC101**09501101420038
 data interpreted and transmitted by the scanner: **!e001**09501101420038



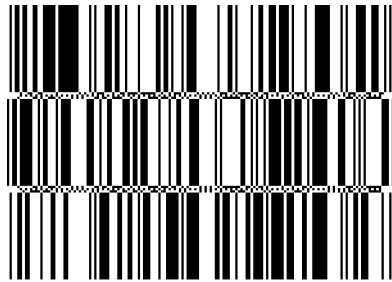
Symbol 4 – (POS and General Distribution) GS1 DataBar Omnidirectional

Human Interpretable Form (HRI): (01)09501101420045
 data to be encoded in the symbol: **FNC101**09501101420045
 data interpreted and transmitted by the scanner: **!e001**09501101420045



Symbol 5 – GS1 DataBar Expanded

Human Interpretable Form (HRI): (01)09501101420052(21)12345678
 data to be encoded in the symbol: **FNC101**09501101420052**21**12345678
 data interpreted and transmitted by the scanner : **!e001**09501101420052**21**12345678



(01)09501101420069
 (3922)995
 (3202)000100
 (17)210615
 (422)123
 (21)12345678



(01)09501101420069
 (3922)995
 (3202)000100
 (17)210615
 (422)123
 (21)12345678

Symbol 6 – GS1 Databar Expanded Stacked

Human Interpretable Form (HRI):

(01)09501101420069(3922)995(3202)000100(17)210615(422)123(21)12345678

data to be encoded in the symbol:

FNC101095011014200693922995FNC1320200010017210615422123FNC12112345678

data interpreted and transmitted by the scanner:

!e001095011014200693922995<GS>320200010017210615422123<GS>2112345678

Symbol 7 – GS1 QR Code

HRI: (01)09501101420069(3922)995(3202)000100(17)210615(422)123(21)12345678

data to be encoded in the symbol:

FNC101095011014200693922995FNC1320200010017210615422123FNC12112345678

data interpreted and transmitted by the scanner :

!Q301095011014200693922995<GS>320200010017210615422123<GS>2112345678



(01)09501101420069
 (3922)995
 (3202)000100
 (17)210615
 (422)123
 (21)12345678

Symbol 8 – GS1 DataMatrix

HRI: (01)09501101420069(3922)995(3202)000100(17)210615(422)123(21)12345678

data to be encoded in the symbol:

FNC101095011014200693922995FNC1320200010017210615422123FNC12112345678

data interpreted and transmitted by the scanner:

Id201095011014200693922995<GS>320200010017210615422123<GS>2112345678

8 Glossary

The following glossary was updated for this publication of this document. Please refer to the [GS1 Glossary](#) for the latest version.

Term	Definition
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.
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.
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 Application Identifier (AI)	The field of two or more digits at the beginning of an element string that uniquely defines its format and meaning.
GS1 DataBar Omnidirectional barcode	A barcode that encodes a GTIN. It is designed to be read by omnidirectional scanners.
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 Expanded Bar code	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 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 DataMatrix	A subset of Data Matrix which uses the function that allows the encoding of element strings.
GS1 QR Code	A subset of QR Code which uses the function that allows the encoding of element strings.
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 the encoded data. Start, stop, shift and function characters, as well as the symbol check character, are not shown in the human readable interpretation.
Image based scanner	Scanners able to scan 1D symbols as well as 2D symbols.
Loose Produce Trade Items	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.
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.
Restricted Circulation Number (RCN)	Signifies a 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).
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.
variable measure trade item	A trade item which may be traded without a predefined measure, such as its weight or length.