The Numbering and Barcoding Guidelines for Suppliers to the Food Manufacturing Industry

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Disclaimer

Every possible effort has been made to ensure that the information and specifications in this manual are correct; however, GS1 Australia and the Australian Food Manufacturing Industry expressly disclaim liability for any errors. In addition, no warranty or representation is made that this manual will not require modification due to developments in technology or changes or additions to the GS1 System.

This document is not exhaustive and does not replace the *GS1 General Specifications*, which remains the standard reference document.

GS1 General Specifications: http://www.gs1.org/barcodes-epcrfid-id-keys/gs1-general-specifications

Acknowledgements

This Numbering and Barcoding Guideline for the Australian Food Manufacturing Industry was developed by GS1 Australia as part of the Supplier Supply Chain Improvement project.

The Supplier Supply Chain Improvement Project members include the following organisations:

• Nestle	• Lion Dairy & Drinks
• Ingham's	• Newly Weds Foods
• SPC	• Label Makers Group
• Chr Hansen	• FPC Food Plastics
• Matthews Australasia	

The GS1 Supply Chain Improvement Project

The GS1 Supply Chain Improvement Initiative serves as a strategic effort in which Australian food manufacturers and suppliers of both raw ingredients and packaging may choose to join on a voluntary basis to assist with their company's adoption and implementation of GS1 Standards.

A group of Australian food manufacturers, raw ingredient and packaging suppliers decided to define a common way to provide tighter integration of their supply chains. Their objectives were to avoid costly and time-consuming IT integration projects with every manufacturer or supplier.

The main aim of the Initiative is to increase the visibility of the food ingredient and raw material supply chain to deliver efficiencies, cost savings and improve food safety in Australia. This will be achieved through the use of GS1 standards for identification, automatic data capture and data sharing as a foundation to automate key ingredient sourcing, utilisation and traceability processes between food manufacturers and their ingredient suppliers.

Progress with the Supply Chain Improvement Project

GS1 Australia has lead an active working group comprising of key food manufacturers and their packaging and raw ingredients suppliers. The aim of this work has been to review current processes in the order to cash cycle and determine the scope and implementation approach in Australia to automate them. This is achieved using the GS1 standards of Identification, capture and share.

This initiative is the result of this work and forms the basis for Upstream Supply Chain Integration in the Australian Food Manufacturing Industry.

Industry Recommendation

Following the endorsement of the Supply Chain Improvement Project initiatives as the standard for Upstream Integration, the Australian Food Manufacturing sector encourages GS1 adoption and implementation. To find out how you can get started please visit the Food and Beverage Section of the Industry pages at www.gs1au.org

About this Guide

The objective of the numbering and barcoding guidelines for suppliers to the food manufacturing industry is to provide an introductory "user-friendly" and simple document describing the GS1 system with particular focus on numbering, barcoding and labelling of raw ingredients and packaging materials.

This guideline provides the recommended approach for raw ingredients and packaging supplies using GS1-128 barcodes and associated Application Identifiers (AIs) for their manufacturing trading partners that choose to migrate to the GS1-128 barcode as a means to enable certain supply chain practices that trading partners have agreed to implement.

This document is not exhaustive and does not replace the *GS1 General Specifications*, which remains the standard reference document.

GS1 General Specifications: http://www.gs1.org/barcodes-epcrfid-id-keys/gs1-general-specifications

Note: Please note that the barcode symbols used in this manual are only examples, are not to scale and not intended to be scanned or used as references.

This guide is divided into 8 sections;

Section 1:	Introduction and the GS1 System
Section 2:	GS1 Identification
Section 3:	How to Allocate a GTIN
Section 4:	GS1 Barcodes
Section 5:	The GS1 Logistics Label
Section 6:	eMessaging
Section 7:	Traceability
Section 8:	The GS1 Services
Appendix A:	Glossary of Terminology
Appendix B:	Barcode Quality Check List
Appendix C:	Table of Application Identifiers

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Executive Summary

The market has changed: there are more products available for consumers but also often in smaller quantities. The time between design and delivery to final customer is expected to be shorter. This puts pressure on the upstream section of the supply chain and explains the need for integration, more reliability of the information flow and visibility of the physical flow.

The Supply Chain Improvement project has created solutions to address the challenges in the integration of the supply chain between manufacturers and their suppliers.

Upstream integration is about improving visibility of demand, demand changes and inventory. This will increase responsiveness to the manufacturing requirements and ultimately to the final customers.

Achieving efficiency in the management of the supply chain relies on having fast, accurate and timely information about production, distribution and consumption. The need for a highly responsive supply chain is driving forward the development of communication techniques. Bar codes and EDI are the technologies for this communication. Any company serious about exploiting the concepts and practices of supply chain management must be bar code and EDI competent. Nothing is more central to the effectiveness of a supply chain than the ability to transmit accurate, relevant, understandable and timely information among its participants.

Australian manufacturers are realizing the benefits of case and pallet-level barcoding and beginning to make the necessary investment in labeling and scanning technology. As a result, companies are grasping the importance of electronically capturing additional product information beyond the item number. The GS1 Supply Chain Improvement Project has realized these benefits and as a result will be asking for supplemental information to be printed through the use of GS1-128 barcodes.

GS1-128 barcodes are used to encode trade item data for logistics units such as cases, bins and pallets. The use of this barcode supports fast and accurate data capture and inventory tracking, adding visibility to your supply chain.

Specific information can be encoded in GS1-128 barcodes through the use of Application Identifiers (AIs). GTIN, Batch/Lot Number, and Production Date are examples of the supplemental information that can be included. These identifiers, which are used in advanced barcoding, are increasingly viewed as important by many operators and distributors.

With the development of automated scanning processes throughout the manufacturing supply chain, it is increasingly important that suppliers ensure 100% scannability of all codes, which will bring mutual benefits to all trading partners. Printing a good quality bar code which is scannable at all points through the supply chain, costs no more than printing a bar code that is unscannable.

Bar codes are used throughout the supply chain for a variety of functions. Failure to scan at any point of this chain will disrupt an efficient process, ultimately impacting on the consumer.

These recommendations for best practice encompass the main requirements of the Australian Food Manufacturing. These recommendations do not aim to encompass all aspects of GS1 numbering and bar coding, nor are they a substitute for the more detailed User Manuals available from GS1 Australia. This guideline should be read in conjunction with the GS1 General Specifications for packaging and bar coding and the respective eMessaging Message Implementation Guidelines.

Clearly, it is essential to continue to discuss any problems in meeting these recommendations with trading partners. Adoption of these recommendations should bring improved business efficiency and your effectiveness for all companies within the supply chain.

Section 1: Introduction

The GS1 System originated in the United States and was established in 1973 by the Uniform Code Council (UCC), now known as GS1 US. The UCC adopted a 12-digit identification number, and the first identification numbers and barcodes in open trade were being scanned in 1974.

Following the success of the UCC System, the European Article Numbering Association (now known as GS1), was established in 1977 to develop a compatible system for use outside North America.

Today, full global compatibility is achieved through the use of the Global Trade Item Number (GTIN), an 8, 12, 13, or 14-digit number that is unique worldwide. The GS1 System is designed for use in any industry or trade sector, at all levels of manufacturing and distribution. In Australia, major system adopters include the grocery, health, steel, hardware, consumer electronics, and furniture, meat and telecommunications industries. The GS1 System is even used for fire brigades and electricity generators.

The following information contains guidelines on how to number and barcode trade items using the GS1 standards for the Australian Food Manufacturing Industry

The versatility of the GS1 System provides users with various numbering and barcoding options. It is left to the discretion of manufacturers and suppliers to decide which option is suitable to their business needs and those of their trading partners.

About GS1

GS1 is a neutral, not-for-profit organisation that develops and maintains the most widely used global standards for efficient business communication. We are best known for the barcode, named by the BBC as one of "the 50 things that made the world economy".

GS1 standards improve the efficiency, safety and visibility of supply chains across physical and digital channels in 25 sectors.

Our scale and reach – local Member Organisations in 112 countries, 1.5 million user companies and 6 billion transactions every day – help ensure that GS1 standards create a common language that supports systems and processes across the globe.

The today's GS1 Australia organisation was formed in 1978 as *the Australian Product Numbering Association* (APNA), which was named *EAN Australia* from 1993 to 2005.

Find out more: https://www.gs1au.org/

The GS1 System

The GS1 standards are built on three main elements:

• Identify   • Capture   • Share

Businesses use standards to identify real world objects such as products, services, assets and more, so that they may be the subject of electronic information that is stored and/or communicated by stakeholders in the supply chain. To identify these entities, businesses use GS1 Identification (ID) Keys.

This data is carried directly on physical objects, bridging the world of physical and electronic information. Capture standards include barcodes and Radio Frequency Identification (RFID).

The sharing of the information that is contained and then captured is made available through numerous standards that provide the foundation for electronic business transactions and the visibility of the physical world and other information applications.

Why businesses use standards

Standards are agreements that structure any activity or any industry. They may be rules or guidelines that everyone applies in the same way. They may be an agreed-upon and uniform way of measuring, describing or classifying products or services.

Well-designed supply chain standards play a critical role in day-to-day business operations because they:

• Reduce complexity between and within organisations.

• Make it easier to make the right decisions about purchasing hardware, software and equipment.

• Reduce the costs of implementation, integration and maintenance

• Make it easier to make the right decisions about purchasing hardware, software and equipment.

• Facilitate collaboration between trading partners in the supply chain to make it quicker and easier to identify items, share information, order and receive parts or ingredients from suppliers, or ship goods to customers.

• Help improve patient safety and reduce medication errors.

• Enable global traceability and authentication.

Well-designed standards are the foundation for clear, understandable exchanges that keep costs down for everyone by reducing complexity.

Why businesses choose GS1 standards

Some companies develop their own proprietary identification, classification and data capture systems. Others use standards that are only functional within a single industry sector, or a single country.

The GS1 system of standards is:

• **Global** – No matter where in the world your business, suppliers or customers are based, GS1 standards are universal.

• **Robust** – GS1 standards have been purpose-built by industry to be extremely robust.

• **Multi-sector** – GS1 standards work within any organisation or business. They have been widely adopted by many industry sectors around the world.

• **User-generated** – All GS1 standards are built and maintained through the GS1 Global Standards Management Process (GSMP), a worldwide collaborative forum. The GSMP is a community-based forum for businesses facing similar problems to work together and develop standards-based solutions

to address them. These are standards created by industry, for industry.

• **Scalable** – GS1 standards can be used by small, large or multinational companies. Originally created by manufacturers and retailers to improve the efficiency of the distribution of food and consumer goods to supermarkets, GS1 standards are used today by more than one million companies across many industry sectors.

IDENTIFY

CAPTURE

SHARE

GS1 Standards for Identification	GS1 Standards for Barcodes & EPC/RFID	GS1 Standards for Data Exchange
COMPANY & LOCATION Global Location Number (GLN)	**GS1 BARCODES**	**MASTER DATA** Global Data Synchronisation Network (GDSN)
PRODUCT Global Trade Item Number (GTIN) Serialised Global Trade Item Number (SGTIN)	EAN/UPC GS1-128	**TRANSACTIONAL DATA** eCom (EDI): EANCOM, GS1 XML
LOGISTICS & SHIPPING Serial Shipping Container Code (SSCC) Global Shipment Identification Number (GSIN) Global Identification Number for Consignment (GINC)	ITF-14 GS1 DataBar	**EVENT DATA** EPC Information Services (EPCIS)
ASSETS Global Individual Asset Identifier (GIAI) Global Returnable Asset Identifier (GRAI)	GS1 DataMatrix GS1 QR Code GS1 Composite Barcode	
SERVICES & MORE Global Service Relation Number (GSRN) Global Document Type Identifier (GDTI) Global Coupon Number (GCN)	**GS1 EPC/RFID** Electronic Product Code (EPC) RFID EPC HF Gen 2 EPC UHF Gen 2	

Figure 1: The GS1 System of Identify, Capture and Share

Benefits of Implementation upstream

Using a standard common approach to the numbering and barcoding of trade items, logistic units, locations, assets, and documents, amongst others, will deliver the benefits of speed, accuracy and labour savings in the handling and distribution of goods throughout the entire supply chain. Companies should consider that the implementation of the GS1 standards is applicable not only to meet customer or trading partner demands but also to improve internal supply chain management.

Some of the specific identified benefits are:

Supplier	**Manufacturer**	**Retailer**	**Consumer**
✓ Increased visibility	✓ Optimised inventory levels	✓ Increased on-shelf availability	✓ Increased on-shelf availability
✓ Supply chain efficiencies	✓ Supply chain efficiencies	✓ Reduced time to market	✓ Faster recalls and withdrawals
✓ Optimised inventory levels	✓ Reduced obsolescence	✓ Facilitate better recalls	✓ Greater access to better product information
✓ Better customer service levels	✓ Increased retailer responsiveness	✓ Greater transparency to customers	✓ Better product visibility
✓ Lower integration costs	✓ Optimised processes	✓ More product information available to consumers	✓ A trusted and safer food chain
✓ Optimised processes	✓ Maximised production capacity		
✓ Faster order-to-cash cycle			

Figure 2: Benefits of upstream integration to the supply chain

The numbering and barcoding of trade items supports the following supply chain functions:

Raw Materials
Shipment processing
Production Planning
Inventory Management
Material Tracking
Forecasting

Consumer
Assortment
Traceability
Choice
Value

Manufacturing
Shipment
Processing
Production Planning
Inventory Management
Material Tracking
Forecasting

Distributor and Carrier
Sorting and Routing
Receiving
Transport
Shipment
Processing
Inventory Processing
Replenishment
Planning

Point-of-Sale/Use
Product Specification
Pricing
Promotions
Order Generation/Processing
Replenishment
Inventory Management

Figure 3: Numbering and Barcoding Benefits along the Supply Chain

The adoption of the GS1 standards for Upstream integration allows companies to translate their internal processes and approaches into a common language that all other parties can use. The overall benefits rise as more companies adopt GS1 standards

The GS1 standards enables Companies to uniquely identify, capture and share data around items, shipments and locations including:

- Ingredients, raw materials and packaging supplies, including fixed and variable measure ingredients
- Locations, including supplier and manufacturer identification, ship to locations, etc.
- Shipments or logistic units such as a pallet of ingredients, or bulk delivery.

Section 2: GS1 Identification

2.1   GS1 identification keys

IDENTIFY

GS1 IDENTIFICATION NUMBERS

GS1 identification keys give companies efficient ways to access information about items and entities in their value chains, and share this information with trading partners. The keys enable organisations to assign standard identifiers to products, documents, physical locations, and more. Because GS1 ID keys are globally unique, they can be shared between organisations, increasing supply chain visibility for trading partners.
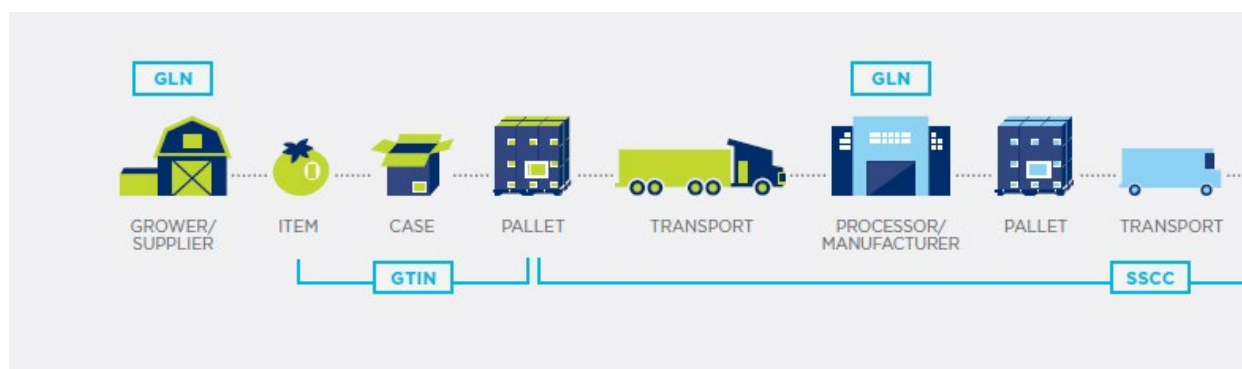
Figure 4: Identification Keys in the upstream supply chain

The GS1 identification keys are:

- Global Trade Item Number (GTIN)
- Global Location Number (GLN)
- Serial Shipping Container Code (SSCC)
- Global Coupon Number (GCN)
- Global Returnable Asset Identifier (GRAI)
- Global Individual Asset Identifier (GIAI)
- Global Service Relation Number (GSRN)
- Global Document Type Identifier (GDTI)
- Global Shipment Identification Number (GSIN)
- Global Identification Number for Consignment (GINC)
- Component/Part Identifier (CPID)

The three most widely used GS1 identification keys and the ones to be used for upstream integration are explained in detail in this manual namely: Global Trade Item Number (GTIN), Serial Shipping Container Code (SSCC) and Global Location Number (GLN).

GS1 identification keys webpage: http://www.gs1.org/id-keys

COMPANY	LOCATION
Global GS1 Company Prefix	**GLN**
	Global Location Number
GLN	
Global Location Number	

PRODUCT	LOGISTICS
GTIN*	**SSCC**
Global Trade Item Number®	Serial Shipping Container Code
EPC*/SGTIN	**GSIN**
Serialized Global Trade Item Number	Global Shipment Identification Number

ASSETS
GIAI
Global Individual Asset Identifier
GRAI
Global Returnable Asset Identifier

Figure 5: The Identification Keys and their applications

2.2 The Global Trade Item Number (GTIN)

2.2.1 Definition of Trade Item

A trade item is any item (product or service) upon which there is a need to retrieve pre-defined information and that may be priced or ordered or invoiced at any point in any supply chain. This definition covers raw materials through to the end user products and includes services, all of them having pre-defined characteristics.

The GTIN identifies trade items at any stage of the supply chain up to the end consumer. In order to use the GTIN along the entire supply chain, it should be allocated as early as possible. In the fresh foods sector or raw ingredients environment it is the party who brings the product into the supply chain. I.e. the grower or brand owner.

A trade item may be a single, non-breakable unit; it may also be a standard and stable grouping of a series of single items. Such a unit may be presented in a wide variety of physical forms: a fibreboard carton, a covered or banded pallet, an intermediate bulk container, roll of plastic wrap, a crate with bottles, or a tanker of glucose syrup etc. Trade items consisting of single units are identified with a unique Global Trade Item Number (GTIN); standard groupings of identical or different units are identified with separate unique GTINs.

The GTIN can be represented in one of four ways:
- GTIN-8
- GTIN-12
- GTIN-13
- GTIN-14

The GTIN-8 is represented by an EAN-8 barcode and is used for small, hard to mark items only. For this reason, the GTIN-8 is not used by the Australian Food Manufacturing Industry.

If your trade item is imported from and / or is to be sold within North America a GTIN-12 may be used. The GTIN-12 can be encoded in an ITF-14, GS1-128 or GS1 DataBar barcode symbology, provided that a filler zero is added in front of the GTIN-12.

The GTIN-13 can be encoded in an ITF-14, GS1-128 or GS1 DataBar barcode symbology, provided that a filler zero is added in front of the GTIN-13.

To be scanned in a general distribution scanning environment, these GS1 Identification Keys must be encoded in EAN-13, UPC-A, ITF-14 or the GS1-128 Barcode symbologies.

A separate GTIN must be assigned to every different variation of a product. Size, style, grade, colour, quantity etc are all considered separate variations and thus require separate GTINs. Each level of packaging should be numbered (and barcoded) separately to all other levels.

Note: The Australian Food Manufacturing Industry recommends that a GTIN-14 or GTIN-13 with a filler zero (Or GTIN-12 with filler zeros) be used. This will enable attribute data such as production date, batch numbers etc to be represented into a GS1-128 barcode.

Note: In the Australian Food Manufacturing Industry, the scanning environment that we refer to is known as General Distribution

For more information on the GS1 Global Trade Item Number and GS1 Data Carriers please refer to the GS1 General Specifications: : http://www.gs1.org/barcodes-epcrfid-id-keys/gs1-general-specifications

2.3   The GTIN Management Standard

Any change to trade items, such as weight, description, etc may require the allocation of another GTIN. In this event consult www.gs1.org and follow the links to the GTIN Management Standard for the guiding principles that should be considered by any brand owner on when a change of GTIN is required. Please contact GS1 Australia for further information.

When allocating GTINs in any of the formats described in the following sections, GS1 Australia recommends that no significance is created within the GTIN itself. Data is linked via a database to the GTIN, thus no level of understanding is required within the number itself.

Please note, that once a GTIN has been allocated to a trade item, and it has been introduced to the market, under no circumstances, must it be transferred or reused for any other trade item.

2.4   Difference between Numbering and Barcoding

The GS1 System makes a clear distinction between numbering and barcoding. Even though they often go together, it is very important to be clear about the difference.

Numbering

The GS1 System provides Identification Keys (the 'Numbers') for different applications. The application will determine how the number is to be used. The data structure of the GS1 Identification Keys guarantees worldwide uniqueness within the relevant area of application. Each of the GS1 Identification Keys provides a link between the items and information pertaining to them.

Barcoding

All of the GS1 Identification Keys ('numbers') used in the GS1 System can be represented in data carriers and of these, barcodes are the most commonly used. Barcodes are a means of representing data in machine readable form, and allow automatic data capture at each point where an item leaves or enters premises.

With improvements in the technology and new application requirements, data carriers such as GS1 DataBar, GS1 DataMatrix, and EPC/RFID have been introduced. These data carriers are not documented in these guidelines.

i **For more information on other GS1 Data Carriers please refer to the GS1 General Specifications:** http://www.gs1.org/barcodes-epcrfid-id-keys/gs1-general-specifications

Figure 6: GTIN-13 vs. EAN-13

2.5   Product Packaging Hierarchy Overview

The Supply Chain Improvement Project has defined a trading partner's product packaging hierarchy using the following terms. This includes raw ingredients, packaging and other materials used in the Australian Food Manufacturing environment:

The lowest level of ordering is considered the base unit and could be a tub, carton, pallet, tanker or tote and any other form of transit unit etc

- **Primary Package (Base Unit)** – the lowest level of packaging for a product
- **Secondary Package (Inner)** – the Intermediate packaging level (also referred to a Pack or Inner Pack) contained inside a Case. An inner can only exist if an outer packaging is used.
- **Outer Package (Case)** – the highest level of packaging for a product (also referred to as Tertiary, Carton or Shipper)
- **Logistics Unit** – a grouping of products sent as one logistics unit (also referred to as Pallet Unit or Handling Unit or LCL (loose carton load)). This level of packaging contains one (1)

or more Cases and may include a pallet as its base. This could also be a IBC (Intermediate Bulk Container) or a Tote etc

- **Shipment** – a grouping of one or more pallets, handling units or logistics units

If a trade item does not have a packaging hierarchy and is delivered and ordered as a bulk item, then this is considered the primary package (base unit) and identified accordingly as described in section 3.1.1

GS1 Identification and Barcoding specifications are applicable to each of the following product categories:

- Raw ingredients
- Packaging Supplies
- Consumables (Trade Items)
- Assets (Capital equipment)

Note: Each level of packaging should be numbered (and barcoded) separately to all other levels.
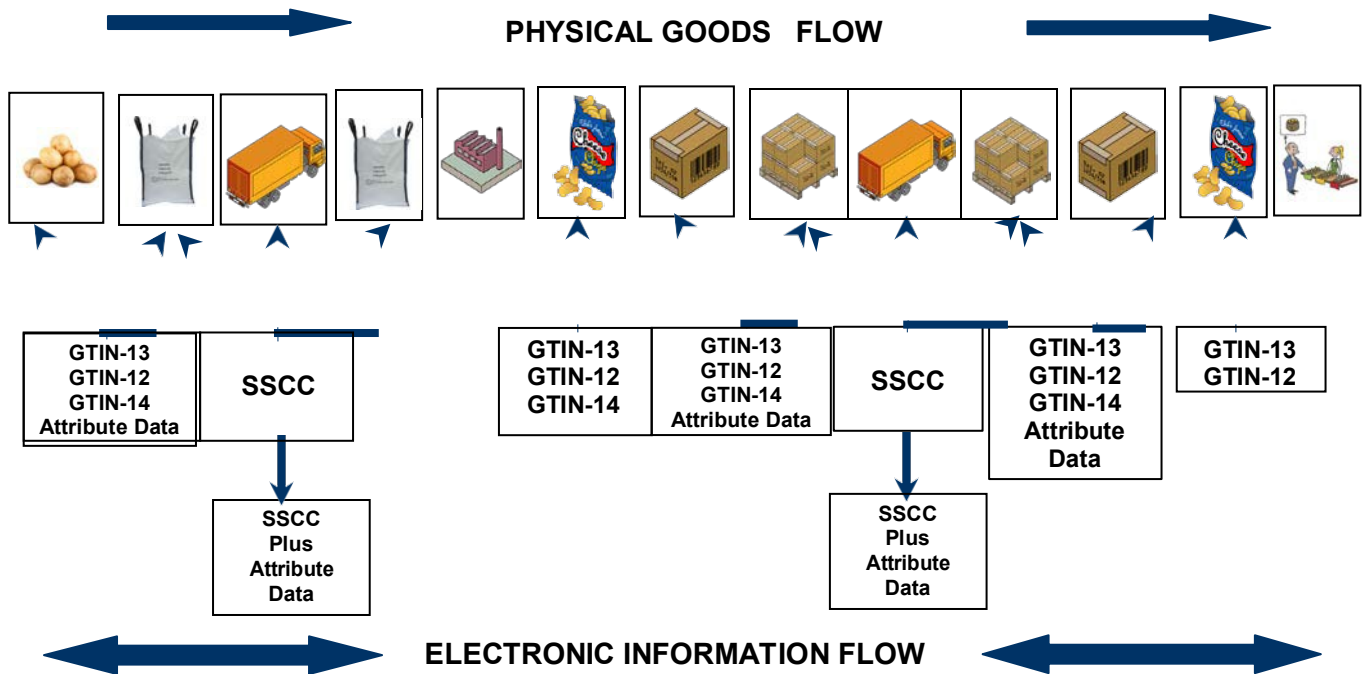
Figure 7: GTIN use throughout the packaging hierarchy

Table 1: Guide to choosing the numbering and barcoding options for an application

Application Areas	Encoded GTIN and/ or attribute information	Symbol
Base Unit	GTIN-13 with filler zero	ITF-14
	GTIN-13 with filler zero + attribute data	GS1-128
Intermediate packaging	GTIN-14	ITF-14
	GTIN-14 + attribute data	GS1-128
Outer packaging ideal for printing on corrugate To encode attribute data, ideal for printing on labels	GTIN-14 GTIN-14 + attribute data	ITF-14 GS1-128
Logistics units and can encode attribute data, ideal for printing on labels	GTIN-14 + attribute data	GS1-128

2.6 Attributes of Trade Items

Attribute information of trade items is any data over and above the item identifier, i.e. the GTIN. Examples of this type of information include batch numbers, production, use by and best before dates and variable measure information such as length, weight etc.

Attribute information is represented by GS1 Application Identifiers (AIs) and these ensure that the attribute information can be interpreted unambiguously by trading partners throughout the entire supply chain. In order to enable cost-effective adoption by food manufacturers, the Australian Food Manufacturing Industry recommends the use of attribute data to provide traceability of product from the supplier into the manufacturing plant, providing visibility and faster and more efficient recalls and food safety. Suppliers, at their discretion, can also apply to trade items, any of the AIs available to them under the GS1 specifications.

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 [Global Trade Item Number (GTIN)]

2. Date (Production, Packaging, Expiration or Best Before)

3. Production Information (Batch/Lot Number or Serial Number)

Recommended AIs for the Australian Food Manufacturing Industry are listed below in Table 2:

> ⓘ **For more information regarding the use of AIs, please refer to the GS1 General Specifications**: http://www.gs1.org/barcodes-epcrfid-id-keys/gs1-general-specifications

> ⓘ **For a complete list of the GS1 AI's refer to Appendix C or the GS1 General Specifications:** http://www.gs1.org/barcodes-epcrfid-id-keys/gs1-general-specifications

> ✔ **Note**: Regarding Trade Item Attribute information:
>
> - Attribute information cannot stand-alone; it must always be accompanied by a GTIN
>
> - Attribute information must be encoded in a GS1-128 barcode. It can also be added as an additional barcode to an existing EAN-13, UPC-A, ITF-14 or a GS1-128 Barcode, which is representing a GTIN
>
> - If an AI appears on the same item more than once (e.g. if two labels are applied to the same item) the AI must be followed by the same information on each label

> ✔ **Note**: For Barcode examples of attribute data please see section 4.4.1

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Table 2: Recommended AIs for suppliers to the Food Manufacturing Industry

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 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 manufacturer 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 number of items contained within a variable measure trade unit. It is variable length and may have up 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 associate this with AI (02). This information refers to the count of trade items contained in a logistics unit. 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.**

2.7 How Numbers are entered into Trading Partners Systems

Accurate, timely and complete product information is important to businesses. All information associated with the GS1 identification keys need to be shared between trading partners. This includes information about trade items, locations and services and suppliers need to update any information that changes, either for existing or new products.

1. Trading Partners will require a minimum set of product information for all products sold;

2. Information for each level of a product's packaging (e.g. base unit, inner, carton and logistics units) need to be supplied;

3. Pricing information to be provided against the nominated packaging level (usually the level at which the material is invoiced at).

The following five steps give a broad outline to synchronising product data with that of all trading partners in the supply chain.

- Step 1: Brand Owner assigns a number to the product
- Step 2: Enter the product number / description / attribute into your product database
- Step 3: Forward this information to trading partners via hardcopy, softcopy or via a suitable e-catalogue such as GS1 Australia's The National Product Catalogue
- Step 4: Trading partner will enter this information into their own database
- Step 5: Product is scanned and system looks up item records in the manufacturer's database.

2.8 Global Location Numbers

2.8.1   Introduction

On a daily basis information related to parties and locations is generated and communicated throughout the business world in vast quantities. Names and addresses are put on envelopes for the mail, the point to which a delivery is to be made is put on transport documentation, EDI network addresses are provided in an electronic message, etc. These are just a few examples of the many applications in existence today, which identify parties or locations in trade or other communications.

With the advent of electronic communication, the need for the identification of parties and locations has become more acute. The use of numeric identification instead of full alphanumeric names and addresses is the key to the successful implementation of an eMessaging project.

Global Location Numbers (GLNs) offer an internationally recognised standard solution to the identification of parties and locations.

Once assigned at source, i.e. in general by the party owning the location, the GLN becomes a unique and universal reference, which can be used by all.

2.8.2   Definition of the Global Location Number (GLN)

The GLN is a thirteen-digit non-significant reference number used to identify:
* Legal entities, e.g. registered companies
* Physical entities, e.g. a door of a warehouse, a room in a building

Global Location Numbers (GLNs) can be used to identify anything which is, or can be, addressed. Some examples of this would include companies, departments, rooms, factories, shelves, delivery points, network addresses, etc.

Details associated with a GLN, e.g. name and address, location type, contact persons, communications numbers, banking information, delivery requirements or restrictions, etc., are stored in the computer files of the system for later retrieval.

Although a GLN is strictly a reference key and does not carry any information on the location it identifies, it has a standard format and is structured to allow each GLN to be unambiguous and unique worldwide.

The format of a GLN is a thirteen-digit, fixed length numeric field, structured in the same way as a GTIN-13.

GLNs are mainly used in eMessaging to identify the sender and recipient of an electronic transmission and any party relevant to the transaction, e.g. buyer, seller, carrier etc.

GLNs can also be used in a barcode format to identify a physical location or to encode the identification of relevant parties in logistic applications, e.g. "Ship-to" location number. The GS1-128 Barcode is used to encode a GLN but a filler zero must be added to the front of the GLN to create a 14-digit number. In addition, the appropriate Application Identifier should be used according to the rules specified in the *GS1 General Specifications.*

GS1 Australia member companies that have been allocated a GS1 Company Prefix for item identification can use the same GS1 Company Prefix for assigning GLNs.

Companies that are not members of GS1 Australia can still use GLNs. These companies should contact GS1 Australia for further information.

* All companies should be identified by a GLN in all electronic messages.

- All locations (warehouse, stores, manufacturing plants, etc.) in electronic messages should be identified by GLNs.

During a migration period, both GLNs and current internal numbers can be used at the discretion of the trading partners for identifying locations.

2.9 Asset Numbering

The GS1 System provides a method for the identification of assets. The object of asset identification is to identify a physical entity as an inventory item.

Asset Identifiers may be used for simple applications, such as the location and use of a given fixed asset (e.g. a personal computer), or for complex applications such as recording the characteristics of a returnable asset (e.g. a reusable beer keg), its movements, its life-cycle history and any relevant data for accounting purposes.

GS1 System asset identifiers can be used to identify any fixed assets of a Company. It is left to the discretion of the issuer to determine whether the Global Returnable Asset Identifier (GRAI), AI (8003), or Global Individual Asset Identifier (GIAI), AI (8004), is more suitable for the application concerned.

Asset identifiers must not be used for any other purpose and must remain unique for a period well beyond the lifetime of the relevant records.

If a company assigns asset identifiers to trade items supplied to its customers, the company must ensure that the asset identifiers are never re-used.

2.9.1　Global Returnable Asset Identifier (GRAI) – AI (8003)

A Returnable asset is a reusable package or transport equipment of a certain value, such as a beer keg, a gas cylinder, a plastic pallet, or a crate. The GS1 System identification of a returnable asset, the Global Returnable Asset Identifier (GRAI), enables tracking as well as recording of all relevant data.

A typical application using a GRAI is in tracking returnable beer kegs. The owner of the beer keg applies a barcode carrying a GRAI to the keg using a permanent marking technique. This barcode is scanned whenever the keg is supplied full to a customer and scanned again when it is returned. This scanning operation allows the beer keg owner to automatically capture the life-cycle history of a given keg and to operate a deposit system, if desired.

Note: A GRAI identifies a physical entity as a returnable asset. When such a physical entity is used to transport or to contain a trade item, the element string AI (8003) must never be used to identify the transported or contained trade item.

2.9.1.1　Allocating a Global Returnable Asset Identifier (GRAI)

The structure of the data for a GRAI can include two parts: the mandatory GRAI and an optional serial number. The GRAI is composed of the GS1 Company Prefix of the company assigning the asset identifier, and the asset type. The latter is assigned to uniquely identify, together with the GS1 Company Prefix, a kind of asset. The GRAI remains the same for all identical returnable assets. Although consecutive numbering is recommended, the structure is left to the discretion of the assigning company.

The owner of the asset assigns the optional serial number. It denotes an Individual Asset within a given asset type. The field is alphanumeric and is used to distinguish individual assets with the same asset types.

The format of the GIAI:

GS1 Company Prefix: The GS1 Company Prefix is allocated by GS1 Member Organisations. This is preceded by a filler zero

Asset Type: This is a number assigned by the owner of the asset to uniquely identify each type of asset

Check Digit: Validates the accuracy of the entire number by mathematical formula

Note: The AI (8003) is not part of the Check Digit Calculation

The Serial Number (Optional):   This is assigned by the owner of the asset. It identifies an individual asset within a given asset type. The field is alphanumeric and variable in length up to 16 characters

(8003)093123450012480001
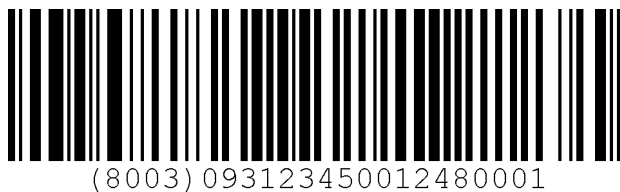
Figure 8: Global Returnable Asset Identifier, AI (8003), represented in a GS1-128 Barcode

2.9.2   Global Individual Asset Identifiers (GIAI) – AI (8004)

In the GS1 System, an individual asset is considered a physical entity made up of any characteristics.

The Global Individual Asset Identifier (GIAI) identifies a physical entity as an asset. It must not be used for other purposes and must be unique for a period well beyond the lifetime of the relevant asset records. Whether the assigned GIAI may remain with the physical item when changing hands depends on the business application. If it remains with the physical item, then it must never be re-used.

This element string might, for example, be used to record the life-cycle history of a wine vat or barrel. By symbol marking the GIAI, using AI (8004), on a given vat, or barrel, wine manufacturers are able to automatically update their inventory database and track assets from acquisition until retirement.

2.9.2.1   Allocating a Global Individual Asset Identifier (GIAI)

The GS1 Company Prefix is the one allocated to the company assigning the individual asset reference.

The format of the GIAI:

GS1 Company Prefix: The GS1 Company Prefix is allocated by GS1 Member Organisations.

The Individual Asset Reference :   This is allocated and structured at the discretion of the holder of the GS1 Company Prefix. The data can be alphanumeric, and is of variable length, ensuring that the entire GIAI is not longer than 30 characters.

Check Digit: Validates the accuracy of the entire number by mathematical formula

Note: The AI (8004) is not part of the Check Digit Calculation.

The exact method used to allocate the GIAI is left to the discretion of the issuing Organisation. However, each GIAI must be unique for each individual asset being identified and, for ease of administration, the GS1 System recommends that GIAIs be allocated sequentially and not contain classifying elements.

(8004)9312345000000001

Figure 9: Global Individual Asset Identifier, AI (8004), represented in a GS1-128 Barcode

Section 3: How to allocate a GTIN

3.1 Fixed Measure Trade Items

3.1.1   Base Unit

The Base Unit is the Primary Package, or the lowest level of packaging for a product.   For the Australian Food Manufacturing Industry, it is recommended that the base unit of a trade item can be identified with a GTIN-13 with a filler zero or a GTIN-12 with filler zeros as described in the following sections

The GTIN-13 and GTIN-12 can be encoded in an ITF-14 or GS1-128 symbology, provided that a filler zero/s is added in front of the GTIN.

✅ **Note**: If any attribute data such as production date, batch number or other date codes are required to be scanned then the GS1-128 barcode must be used.

3.1.1.1 GTIN-13

The format of the GTIN-13 is:

GS1 Company Prefix:	The GS1 Company Prefix is allocated by GS1 Member Organisations.
Item Reference:	A unique non-significant number for each individual trade item. Generally issued sequentially, 000, 001, 002 etc for each different variant of a product.
Check Digit:	Validates the accuracy of the entire number by mathematical formula.

Outside of the Australian Food Manufacturing Industry, predominately at a Point-Of-Sale environment, a GTIN-13 can be represented in an EAN-13 or GS1 DataBar Barcode.

ⓘ **For more information regarding the EAN-13 and GS1 DataBar Barcodes please refer to the GS1 General Specifications:** http://www.gs1.org/barcodes-epcrfid-id-keys/gs1-general-specifications

Figure 10: Example of an EAN-13 Barcode representing the GTIN-13

9 312345 678907

3.1.1.2 GTIN-13 with a Filler Zero

To enable the GTIN-13 to be represented into an ITF-14 or GS1-128 barcode symbology a filler zero precedes a GTIN-13 allocated to the trade item.

Figure 11: Example of an ITF-14 Barcode representing a GTIN-13 with a filler zero

09312345678907

Figure 12: Example of a GS1-128 Barcode representing a GTIN-13 with a filler zero

(01)09312345678907

3.1.1.3 GTIN-12

If your trade item is imported from and / or is to be sold within the North America a GTIN-12 may be required.

Outside of the Australian Food Manufacturing Industry a GTIN-12 can be represented in an UPC-A or GS1 DataBar Barcode.

ⓘ **For more information regarding the UPC-A and GS1 DataBar Barcodes please refer to the GS1 General Specifications:** http://www.gs1.org/barcodes-epcrfid-id-keys/gs1-general-specifications

Figure 13: Example of a UPC-A Barcode representing the GTIN-12

3.1.1.4 GTIN-12 with Filler Zeros

To enable the GTIN-12 to be represented into an ITF-14 or GS1-128 barcode symbology two filler zero precedes a GTIN-12 allocated to the trade item.
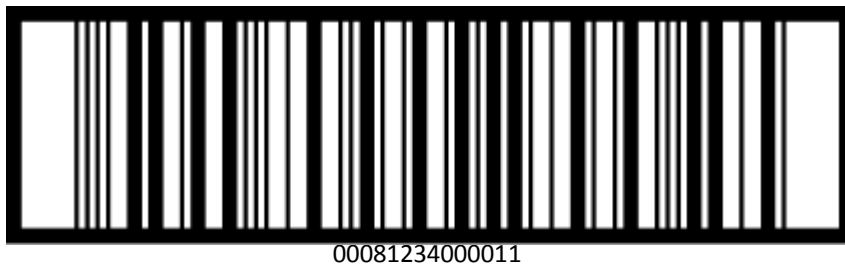
Figure 14: Example of an ITF-14 Barcode representing a GTIN-12 with two filler zeros

Figure 15: Example of a GS1-128 Barcode representing a GTIN-12 with two filler zeros

3.1.2 Inner and Outer Packaging (Trade Items)

It is recognised that beyond the base unit, there can be many different levels of packaging of trade items. The next level of packaging, is often referred to as an **INNER OR INTERMEDIATE** pack. The last level of packaging (the outer most) is the highest level; this is up to but not including the pallet. However, this does not preclude suppliers from issuing GTINs to pallets or a bulk trade item if they wish to identify this level of packaging itself as a trade item.

✅ **Note**: Each individual level of trade item must be uniquely identified with a different GTIN

Options for Trade Items

A Trade Item can be numbered and barcoded with:

- GTIN-14 represented in either the ITF-14 or GS1-128 Barcode
- GTIN-13 with a filler zero represented in either the ITF-14 or GS1-128 Barcode
- GTIN-12 with two filler zeros represented in either the ITF-14 or GS1-128 Barcode

✅ **Note**: If any attribute data such as production date, batch number or other date codes are required to be scanned then the GS1-128 barcode must be used.

3.1.2.1 GTIN-14

The GTIN-14 is created based on the GTIN of the base unit. This solution is only available for homogeneous groupings of trade items, where all units contained in the group are identical.

This number is formed by taking the number allocated to the base unit, and preceding the number by an indicator, which can take the value 1 to 8.

The indicator digit has no explicit meaning – they simply generate different numbers with different check digits that will identify the different levels of packaging for the same item. The indicators 1 to 8 may be used in any order, and some may not be used at all. A scenario based on GTINs is shown below as an example.

GTIN-13 9312345670000   GTIN-14 193123456700007   GTIN-14 293123456700004
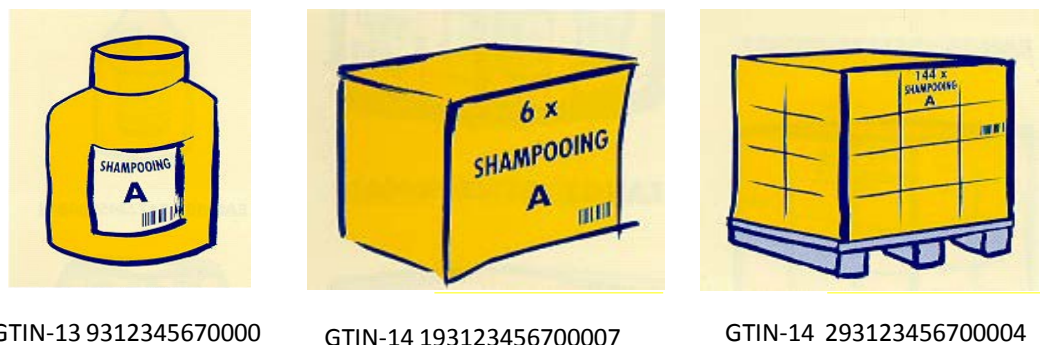
Figure 16: Trade item groupings identified with GTIN-14 based on GTIN of the base unit

✅ **Note**: GTIN-14s beginning with 9 are created in a similar manner, and are used to identify outer cases with varying content (see section 3.2 Variable Measure Trade Items).

How to form a GTIN-14 if a base unit trade Item carries a GTIN-13 with filler zero

Choose the GTIN-13 with the filler zero on the base unit that is the lowest level of packaging within the non-retail trade item. To form the GTIN-14, put an Indicator in front of the first twelve digits of this GTIN-13 then recalculate the Check Digit. A Check Digit Calculator Program is available on our website www.gs1au.org.

Figure 27: structure of GTIN-14 based on GTIN-13 with filler zero

Table 3: example of GTIN-14 using the indicator method

Item		GTIN	Barcode
Base unit		**0** 9312345000005	GS1-128 / ITF-14
Intermediate level of packaging		**1** 9312345000002	GS1-128 / ITF-14
Outer level of packaging		**2** 9312345000009	GS1-128 / ITF-14
Logistics Unit		**3** 9312345000006	GS1-128 / ITF-14

Note: Only allowed with identical products contained in the trade item.

3.1.2.2 GTIN-13 with a Filler Zero

If there is only one level of packaging I.e.: 20Kg Flavour then this is identified with a GTIN-13 and a filler zero as described in Section 3.1.1.2 GTIN-13 with a Filler Zero and as below.

To enable the GTIN-13 to be represented into an ITF-14 or GS1-128 barcode symbology a filler zero precedes a GTIN-13 allocated to the trade item.

Figure 18: structure of GTIN-13 with a filler zero

✅ **Note**: If any attribute data such as production date, batch number or other date codes are required to be scanned then the GS1-128 barcode should be used.

(01)09312345000012(17)100205(10)246813

Figure 19: example of a GTIN-13 with a filler Zero for a bulk trade item. This is the base unit.

3.1.2.3 GTIN-12 with two filler zeros

If your trade item is imported from and / or is to be sold within the North America a GTIN-12 with two filler zeros may be required.

To enable the GTIN-12 to be represented into an ITF-14 or GS1-128 barcode symbology two filler zeros precedes a GTIN-12 allocated to the trade item

✅ **Note**: If any attribute data such as production date, batch number or other date codes are required to be scanned then the GS1-128 barcode should be used.

ℹ️ **For more information regarding the GTIN-12 please refer to the GS1 General Specifications:** http://www.gs1.org/barcodes-epcrfid-id-keys/gs1-general-specifications

3.2 Variable Measure Trade Items

Trade items may be of variable measure either because the production process does not guarantee consistency in weight, size or length (Bins of fruit, lengths of packaging material etc) or because the items are created to meet a special order which states a quantity (e.g. plastic film ordered by the meter, glass ordered by the square metre).

Only trade items that are sold, ordered or produced in quantities, which can vary continuously, are covered by the rules outlined below. Trade items, which are sold in discrete and pre-defined units (e.g. as a nominal weight), are treated as fixed measure trade items.

A trade item must be variable measure if one of its parameters is variable and the variation is of significance to trading partner(s). For example, a supplier may sell and invoice plastic wrap in standardised bundles of a total of 1000 metres, but the number of rolls of plastic wrap may vary. The customer, a food manufacturer, in this example, may need to know the exact number of rolls of wrap contained in each bundle. In this example, the supplier should mark the trade item by using a variable measure GTIN and a variable count Application Identifier (AI).

The GTIN-14 formed with the Indicator **"9"** is used to identify a Variable Measure Trade Item. The presence of variable measure information is mandatory for the complete identification of a Variable Measure Trade Item. The digit **"9"** in the first position is an integral part of the fourteen-digit Variable Measure GTIN.

The format of a variable measure GTIN-14 is:

Application Identifier (01)	Used to identify that the data following is a fourteen-digit GTIN when encoded in a GS1-128 Barcode
Indicator "9"	Indicates that the trade item is of variable measure
GS1 Company Prefix:	The GS1 Company Prefix is allocated by GS1 Member Organisations.
Item Reference:	Item Reference allocated by the company to each different item.
Check Digit:	Calculated using a mathematical formula

Figure 20: structure of a Variable Measure GTIN-14

Table 4: Example of a Variable Measure Trade Item, net weight in kilos, represented in a GS1-128 Barcode

AI	Example Data & Format	Attribute Information
(01)	**99312345678900** n14- 14 digits numeric (fixed length)	**Global Trade Item Number** Item Identification. (Primary identification of the product carton) 9 indicates that it is a variable measure (weight) product 9312345 - GS1 Company Prefix. (7, or 9 digits in length depending on the GS1 prefix allocated) 67890 – Item Reference 0 – Check digit
(310n)	**2600** n6 - 6 digits numeric (fixed length)	**Net Weight - Kilograms** In this example as n = 2, start at the very right of the measurement data field and count to the left 2nd place. The net weight is 26.00kg. (n indicates that the position of the decimal point is n places to the left of the end of the number e.g. (3102) NB: Measure information is mandatory if the item is a variable measure trade item.
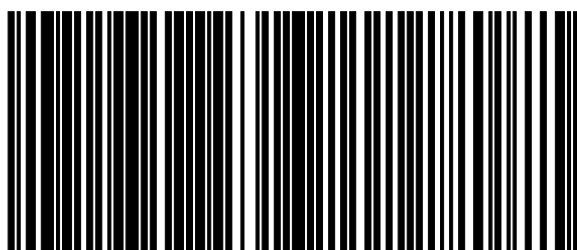
(01)99312345678900(3102)000325

Figure 21: GS1-128 Symbol representing a Variable Measure Trade Item with a weight of 3.25kg

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Table 5: Example of a Variable Measure Trade Item, length or first dimension in metres, represented in a GS1-128 Barcode

AI	Example Data & Format	Attribute Information
(01)	**99312345678900** n14- 14 digits numeric (fixed length)	**Global Trade Item Number** Item Identification. (Primary identification of the product carton) 9 indicates that it is a variable measure (weight) product 9312345 - GS1 Company Prefix. (7, or 9 digits in length depending on the GS1 prefix allocated) 67890 – Item Reference 0 – Check digit
(311n)	**2600** n6 - 6 digits numeric (fixed length)	**Length, or first dimension** In this example as n = 4, start at the very right of the measurement data field and count to the left 4th place. The total length is 2 600 metres (n indicates that the position of the decimal point is n places to the left of the end of the number e.g. (3114) NB: Measure information is mandatory if the item is a variable measure trade item.
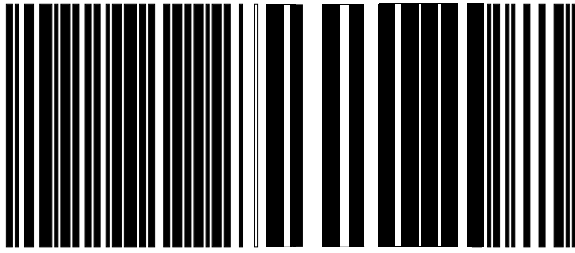
(01)99312345678900(3114)002600

Figure 22: GS1-128 Symbol representing a Variable Measure Trade Item with a length of 2600 metres

Table 6: Example of a Variable Measure Trade Item, net volume - Litres, represented in a GS1-128 Barcode

AI	Example Data & Format	Attribute Information
(01)	**99312345678900** n14- 14 digits numeric (fixed length)	**Global Trade Item Number** Item Identification. (Primary identification of the product carton) 9 indicates that it is a variable measure (weight) product 9312345 - GS1 Company Prefix. (7, or 9 digits in length depending on the GS1 prefix allocated) 67890 – Item Reference 0 – Check digit
(315n)	**15 675** n6 - 6 digits numeric (fixed length)	**Net Volume, Litres** In this example as n = 5, start at the very right of the measurement data field and count to the left 4th place. The total volume is 15 675 Litres (n indicates that the position of the decimal point is n places to the left of the end of the number e.g. (3155) NB: Measure information is mandatory if the item is a variable measure trade item.
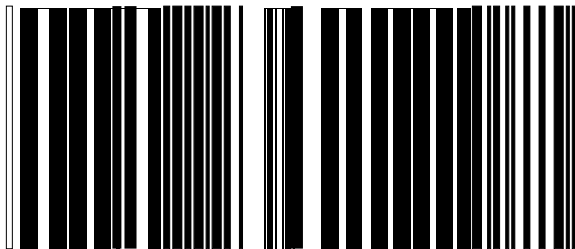
(01)99312345678900(3155)015675

Figure 23: GS1-128 Symbol representing a Variable Measure Trade Item with a volume of 15 675 litres

ⓘ **For more information on the Application Identifiers (AIs) please refer to Section 2.6 Attributes of Trade Items and the GS1 General Specifications**:
http://www.gs1.org/barcodes-epcrfid-id-keys/gs1-general-specifications

Any of the variable measure Application Identifiers available in Table 6 below can be used.

Table 6: Variable Measure Application Identifiers

A₁	A₂	A₃	Trade measure	Unit of measure
3	1	0	Net weight	Kilograms
3	1	1	Length or first dimension	Metres
3	1	2	Width, diameter, or second dimension	Metres
3	1	3	Depth, thickness, height, or third dimension	Metres
3	1	4	Area	Square metres
3	1	5	Net volume	Litres
3	1	6	Net volume	Cubic metres
3	2	0	Net weight	Pounds
3	2	1	Length or first dimension	Inches
3	2	2	Length or first dimension	Feet
3	2	3	Length or first dimension	Yards
3	2	4	Width, diameter, or second dimension	Inches
3	2	5	Width, diameter, or second dimension	Feet
3	2	6	Width, diameter, or second dimension	Yards
3	2	7	Depth, thickness, height, or third dimension	Inches
3	2	8	Depth, thickness, height, or third dimension	Feet
3	2	9	Depth, thickness, height, or third dimension	Yards
3	5	0	Area	Square inches
3	5	1	Area	Square feet
3	5	2	Area	Square yards
3	5	6	Net weight	Troy ounces
3	5	7	Net weight (or volume)	Ounces
3	6	0	Net volume	Quarts
3	6	1	Net volume	Gallons (U.S.)

Section 4: BARCODES

CAPTURE – GS1 DATA CARRIERS

GS1 Data Carriers are capable of holding varying amounts of data to accommodate different needs such as Batch/Lot information and expiration dates

EAN/U.P.C. barcode are examples of barcodes scanned at retail point of sale. ITF-14 and GS1-128 barcodes are used to uniquely identify units of product at the case and pallet level to help access product information and track movement of product in the supply chain. GS1 DataBar* barcodes can carry the same, and in some cases, more, information in less space that U.P.C. barcodes. They were created to identify small and hard-to-mark products, like fresh produce.

The data encoded in the GS1 Data Carriers not only uniquely identifies products (and units of products), but also allows trading partners to share extended data, such as Batch / Lot numbers, production date, packaging information, and more.

Figure 26: The GS1 1 Dimensional barcode family

Barcodes are usually included in the production process, at the producer site. They may be pre-printed with other information present on the packaging, a label can be affixed to the item at the production line, or they can be printed directly on to the packaging online.

ℹ️ **For more information on the GS1 Barcodes please refer to the GS1 General Specifications**: http://www.gs1.org/barcodes-epcrfid-id-keys/gs1-general-specifications

4.1 EAN-13

This encodes a GTIN-13, and is used to identify the vast majority of trade items in the retail supply chain. Examples of use: retail items that cross Point-of-Sale applications.

4.2 UPC-A

This encodes a GTIN-12, and is used to identify some products being exported to North America.

Examples of use: retail items that cross Point-of-Sale applications

✅ **Note**: The Australian Food Manufacturing Industry recommends that a GS1-128 Barcode be used. This will enable attribute data such as production date, batch numbers etc to be encoded.

ℹ️ **For more information on the EAN/UPC Barcodes please refer to the GS1 General Specifications**: http://www.gs1.org/barcodes-epcrfid-id-keys/gs1-general-specifications

Figure 27: EAN-13 Barcode

Figure 28: UPC-A Barcode

4.3 ITF-14 Barcode

ITF-14 barcodes only encode a GTIN and are not intended for scanning in a General Distribution Scanning environment.

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.

The ITF-14 barcode is typically used on product groupings such as a case of washing detergent or a carton of tissue boxes. Its simple design makes it easy to print on the type of packaging used for cartons.

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.

09312345678907
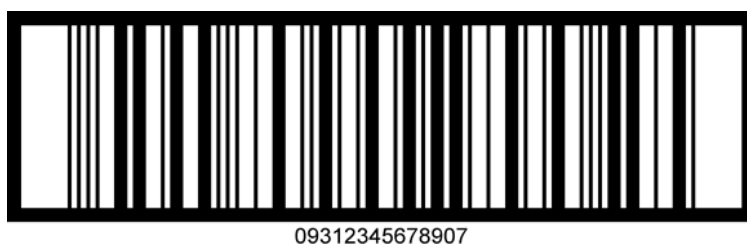
Figure 29: ITF-14 Barcode

4.4 GS1-128 Barcodes

GS1-128 barcodes are used to represent GS1 ID Keys and other data, and are commonly found on cases, pallets and other logistics units in the supply chain. These barcodes can include additional information about your trade items to improve supply chain efficiency.

The GS1-128 barcode was added to the GS1 System to enable companies to capture more information in a single barcode. Initially used in the food and grocery industries, it is now widely used in logistics and other application such as the identification of assets.

The barcode uses a series of GS1 Application Identifiers to include a range of additional data such as:

- Best Before Date

- Batch Number

- Quantity

- Weight

The GS1-128 also encodes the SSCC, used for the identification of logistics units.

This barcode is not scannable at point-of-sale.
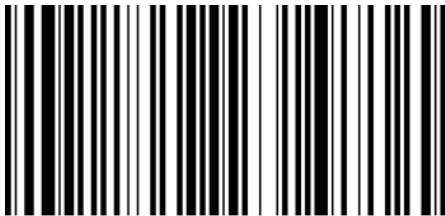
(01)09312345678907

Figure 30: GS1-128 Barcode

4.4.1 Examples of attribute data represented in the GS1-128 Barcode

Figure 31: Encoding GTIN, Production Date and Batch/Lot number
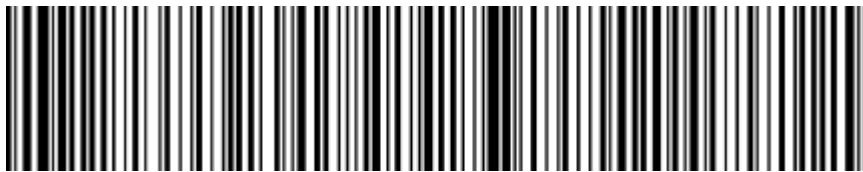
(01)09312345678907 (11)160815 (10)ABC123DEF

- AI (01) 09312345678907 denotes the GTIN
- AI (11) 160815 signifies a production date of August 15, 2016
- AI (10) ABC123DEF denotes the batch/lot number.

Figure 32: Encoding GTIN, Best Before Date, NET Weight & Serial Number
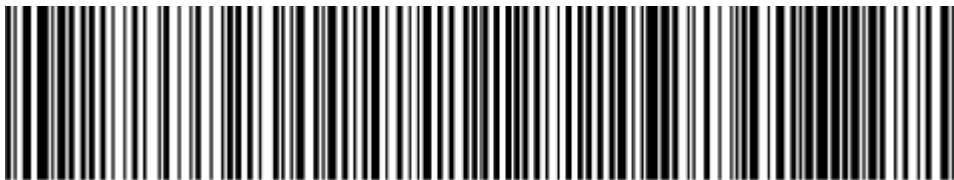
(01)99312345678900(45) 200715 (3102) 000500 (210) HIJ12345

- AI (01) 09312345678907 denotes the GTIN
- AI (15) 200715 signifies a best before date of July 15, 2020
- AI (3102) 000500 denotes a net weight of 5.00 Kilograms
- AI (21) HIJ12345 denotes the serial number

4.5 Bulk Deliveries

In some cases, it may be difficult or impossible to physically bar code a shipment especially in the case of bulk deliveries. Bulk deliveries may consist of a shipping container, a tanker of liquid or a truck load of ingredient.

If full use of eMessaging is in place it is recommended that the supplier sends all relevant information in the electronica message, and that the SSCC – Serial Shipping Container Code is either documented or bar coded in the delivery paperwork.

4.6 Barcode Technical Specifications

ℹ️ **For more information on the EAN/UPC Barcodes please refer to the GS1 General Specifications**: http://www.gs1.org/barcodes-epcrfid-id-keys/gs1-general-specifications

4.6.1   Magnification Factor (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%).

Generally, bigger barcodes scan more reliably. All GS1 barcodes have a minimum and maximum size requirement. Your printer should be able to advise on the suitable size for your packaging, printing method and design.

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.

GS1-128 Barcodes are not recommended for printing directly onto corrugated fibreboard.

✅ **Note:** If packaging or printing constraints do not allow for the minimum magnification and height to be obtained, please discuss with your Trading Partner.

Figure 33: Example of a ITF-14 barcode at an X-Dimension of 1.02mm

Figure 34: Example of a GS1-128 barcode at an X-Dimension of 1.02mm

Table 7: Barcode Symbol Dimensions for ITF-14 and GS1-128 Barcodes

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

✅ **Note:** The width for the GS1-128 barcode dimensions listed above refers only that encode a GTIN-14 only with no other attribute data encoded. To work out the width of a concatenated GS1-128 Barcode please contact GS1 Australia

4.6.2   Height of Bars

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

Elongated barcodes where possible are useful for increasing scannability. These are suitable for very large cartons, plastic wrapped bundles, odd shaped boxes.

4.6.3   Quiet Zones

Quiet zones are the clear areas before the first bar and after the last bar on a barcode.

The quiet zone is very important – it tells the scanner where the beginning and end of the barcode is. If it is reduced or eliminated, the barcode may not be able to be scanned. 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.

4.6.4   Barcode colours

Scanners read barcodes using infrared light sources that identify the contrast between the two colours – so it is important to use dark bars on a solid, light background.

The most reliable colour combination is black bars on a white background, although other combinations are possible as shown below.

SCANNABLE BARCODES   NON-SCANNABLE BARCODES

Note: Consult your printer or GS1 Australia if you are uncertain about your options

4.6.5   Human Readable Interpretation (HRI)

The HRI should be placed below the barcode, must show all the 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.

4.6.6   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.

Note: If a lot of data is being encoded, it is recommended that the concatenated GS1-128 barcodes are stacked into 2 or more barcodes as shown in the below example.
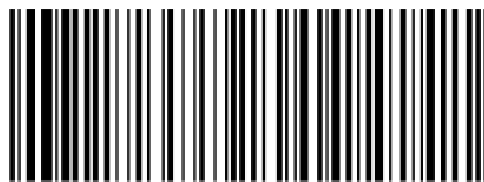
(01) 9 9312345678900 (15) 170815
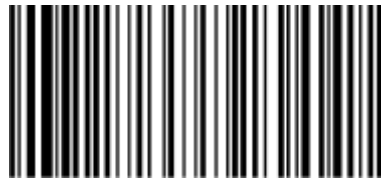
(3102) 000500 (21) HIJ1234

Figure 35: Encoding GTIN, Best Before Date, Net Weight and Serial Number in a stacked barcode

4.6.7 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.

4.6.8 Things to consider when printing barcodes

4.6.8.1 Substrate

It is important to choose a suitable substrate; that is, the material the barcode is printed on. Different substrates affect the quality of the barcode and thus its ability to scan.

You should:

▪ Avoid high gloss (reflective) substrates

▪ Avoid transparent or semi-transparent backgrounds

▪ Avoid placing transparent wrappers over the printed barcode

4.6.8.2 Printing methods

Common ways to apply barcodes to trade items include:

▪ **Pre-printed labels** – a printer or label service can print barcodes onto labels, or you can print them on-site using specialised printing equipment

▪ **On-site direct printing on packaging** – you can print the barcode directly onto packaging using specialised printing equipment

▪ **Printing on packaging at source** – you can incorporate barcodes into packaging artwork

Please note that direct part marking is an option for some applications, such as laser etching. GS1 has standards to support this method of print for certain applications. Please contact us for further assistance.

4.6.8.3 Barcode quality check

You should regularly check your printing standards to ensure acceptable print quality and ink spread; and to ensure that the barcodes meet all the requirements listed above.

GS1 provides a Barcode Testing Service called Barcode Check for quality assurance you're your barcode scans first time, every time.

> *i* **For more information on the Barcode Check service please refer to the GS1 Australia website:** http://www.gs1au.org

4.7 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 on the trade items should be upright (i.e. in picket fence orientation) and placed on the sides of the unit. Each item shall have at least one barcode, with two or more highly recommended. The barcodes should be kept away from any vertical edges so that they are less likely to be accidentally damaged in transit.

- Printing direction – some printing processes get better results in an orientation
- Curved surfaces - certain combinations of size and diameter need to be considered. Contact GS1 for more information
- Avoid obscuring obstacles – anything that obscures or damages the barcode should be avoided

ALL ATTEMPTS SHOULD BE MADE TO MAINTAIN 100% SCANNABILITY AT ALL TIMES.

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 (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

19mm
Minimum

32mm
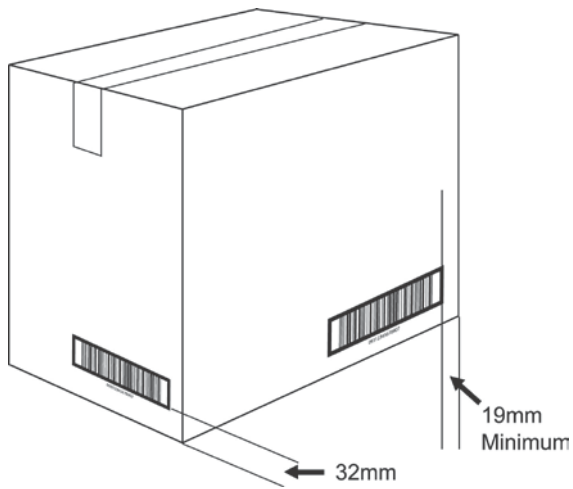
Figure 36: Location of barcode symbol on a Trade Item

Front

0 12345 67890 5

RAW
GOODS

RAW
GOODS

0 12345 67890 5

Symbol on back
and symbol on front
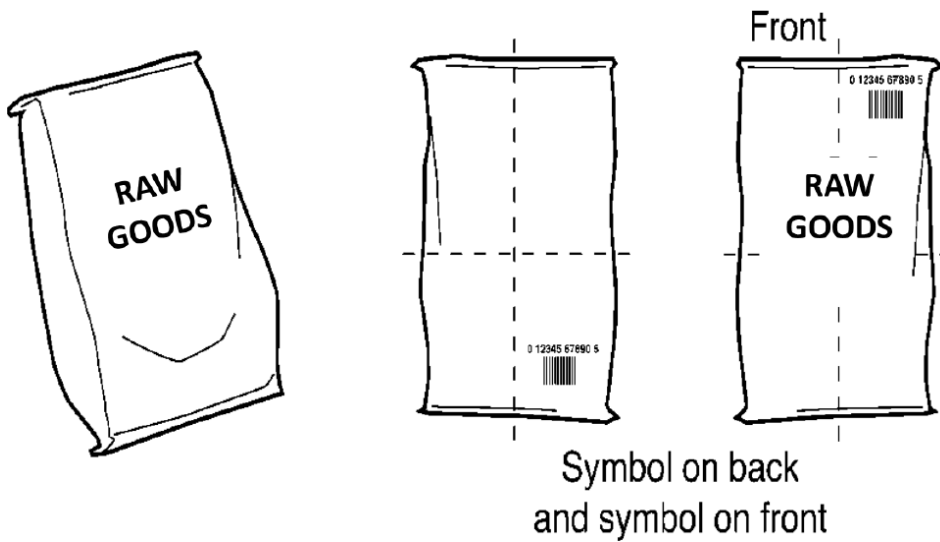
Figure 37: Symbol Placement on large, heavy or bulky bags
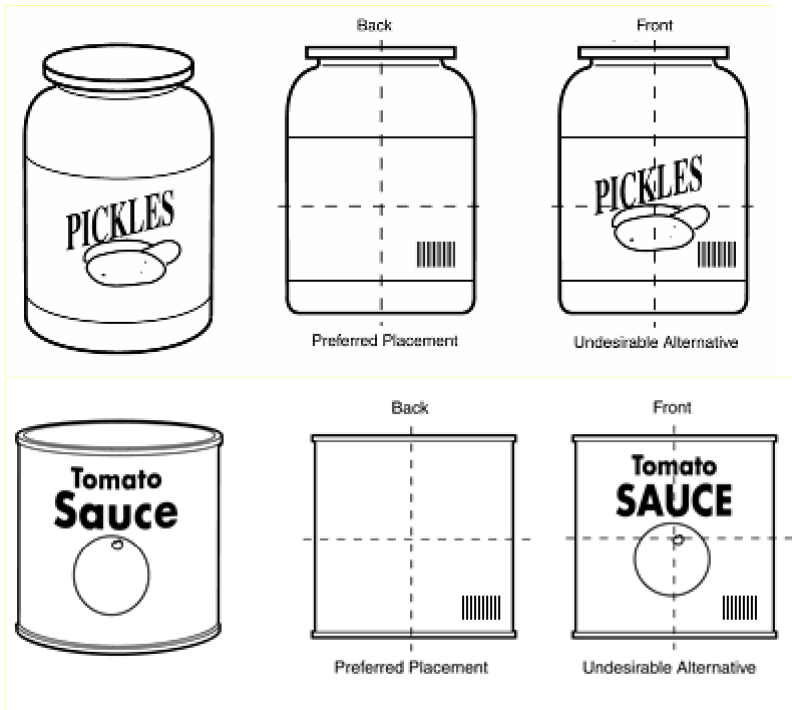
Figure 38: Symbol Placement on large, heavy or bulky jars, cans, jugs or tubs

Figure 39: Location on Bin/ Tote / Crate

Shallow Trays

If the height of the non-retail unit is less than 50mm, making it impossible to print a full height barcode with the Human Readable Interpretation below the bars, or if the construction of the unit is such that the full height barcode cannot be accommodated, the following options should be considered (in order of preference):

- Place the Human Readable Interpretation to the left of the barcode, outside the Quiet Zones as shown in Figure 38
- When the height of the unit is less than 32 mm, the barcode may be placed on the top of the package, with the bars perpendicular to the shortest side, no closer than 19mm from any edge

Figure 40: Symbol Placement on Shallow Trays

ⓘ **For more examples of symbol placement on other packaging types please refer to the GS1 General Specifications**: http://www.gs1.org/barcodes-epcrfid-id-keys/gs1-general-specifications

Section 5: How to Number and Barcode Logistic Units

5.1 Serial Shipping Container Code (SSCC)

A logistic unit is an item of any composition established for transport and/or storage, which needs to be managed through the supply chain.

There are also instances within the Australian Food Manufacturing Industry where the allocation of a GTIN is not feasible because the resulting permutations and combination of product is limitless and is generally governed by the customer's order.

Mixed orders fall into this category; with customers, able to pick and choose what is required and hence the allocation of a GTIN for each combination is unrealistic. With the use of scan packing, the solution for the marking of such a logistic unit is with the Serial Shipping Container Code.

The Serial Shipping Container Code (SSCC) is a reference number or license plate used to uniquely identify logistics units. The SSCC acts as a "reference key" which can be stored in a computer system to which information can be added and shared amongst trading partners as the logistics unit moves throughout the supply chain. This unique "license plate" provides the opportunity to track and trace logistic units in the supply chain.

Scanning the SSCC marked on each logistic unit allows the physical movement of units to be individually tracked and traced by providing an information flow. It also opens the opportunity to implement a wide range of applications such as cross docking, shipment routing, automated receiving etc.

The SSCC is used to uniquely identify goods on the way from sender to final recipient, and can be used by all participants in the transport and distribution chain. Each shipping container or logistic unit, at the time of its creation, is uniquely identified by the sender with an SSCC. A label encoding the SSCC is applied to the logistic unit using the appropriate AI and the GS1-128 Barcode.

The SSCC uniquely identifies the entity (typically the shipping container or logistic unit to which the SSCC is applied) for the lifetime of that unit.

Supplier	**Transporter**	**Manufacturer**	**Transporter**	
Applies original SSCC	Uses SSCC for internal controls And tracing	Receives SSCC Uses SSCC for internal controls and tracing	Uses SSCC for internal controls and tracing	Receives SSCC. Uses SSCC for internal controls and for outbound shipments
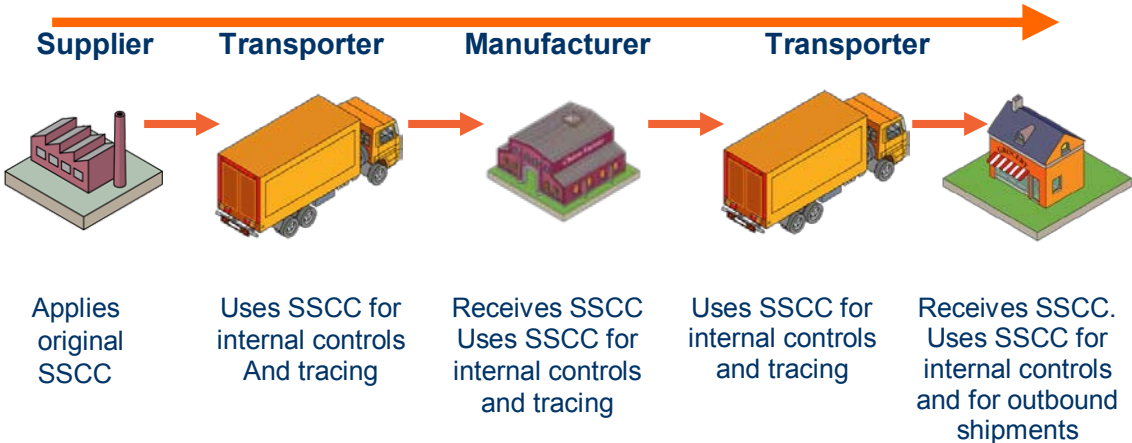
Figure 41: The Use of the SSCC throughout the supply chain

It is essential that the recipient, transport company, manufacturer or distributor of the transport unit

with the SSCC attached, receives prior advice about the details of the transport unit and the SSCC. This advice is usually communicated via eMessaging, which is the computer-to-computer exchange of business messages in a standard format.

There may be instances where all parties relevant to a shipment are not fully capable of eMessaging and where only some electronic messages are being exchanged. In this situation, there may be a requirement to add additional information to the logistics label to facilitate the process of the logistic units through the supply chain. Alternatively, the whole supply chain may be fully capable of eMessaging and the whole suites of shipping messages are being exchanged.

Identification of the objects throughout the chain is vital for efficient tracking and tracing as well as for efficient operations. The more parties involved the more standardisation is necessary. Common accepted logistics labels may be applied to avoid double entry, manual entry and thus avoiding work and time delays, and equipment for producing new labels not creating additional value. Common standards give the opportunity for efficient tracking and tracing, thus providing higher transparency throughout the supply chain and support performance measuring as well as the clearance of liability disputes.

5.2 How to Allocate the Serial Shipping Container Code (SSCC)

The SSCC should be handled as an *eighteen-digit non-significant number* uniquely identifying the unit to which it is attached. To ensure worldwide uniqueness, the following general code structure has been defined by GS1 Global Office:

The company responsible for the marking of the logistic unit is responsible for issuing the SSCC.

The format of the Serial Shipping Container Code is:
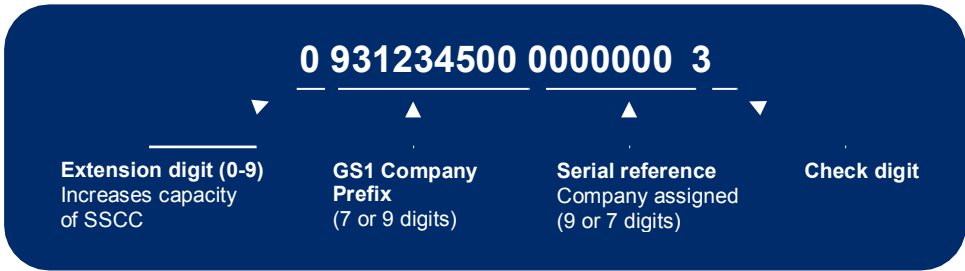
Figure 42: structure of the SSCC

Application Identifier (00)	Used in the GS1-128 Barcode to identify that the data following is an eighteen-digit Serial Shipping Container Code (SSCC)
Extension Digit	A digit (0-9) used to increase the capacity of the Serial Reference within the SSCC. The company that constructs the SSCC assigns the extension digit to the logistic unit.
GS1 Company Prefix:	The GS1 Company Prefix is allocated by GS1 Member Organisations. It makes the SSCC unique worldwide but does not identify the country of origin of the unit.
Serial Reference:	A Serial Reference usually comprises seven digits (nine digits if the GS1 Company Prefix is seven digits) and uniquely identifies each transport package or logistic unit. The method used to allocate a Serial Reference is at the discretion of the company coding the package.
Check Digit:	Calculated using a mathematical formula.
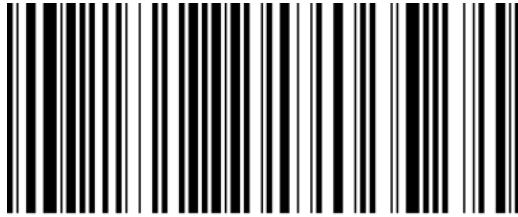
(00)393123451234567891

Figure 43: Serial Shipping Container Code (SSCC)

5.3   The Logistics Label

The various trading partners involved in a distribution channel have different information needs. The information flow, which accompanies the physical flow of goods, is communicated between trading partners by various means. Electronic Commerce, or eMessaging, is the way to transmit information along the supply chain.

In practice, however, fully automated communication channels, which make it possible to rely exclusively on electronic files for retrieving information on the movements of goods, are not always available.

For this reason, there is a need to indicate relevant information on the goods themselves, in addition to their identification. The various fields of information need to be organised in a standard way to facilitate their interpretation and processing by all trading partners in the supply chain.

The purpose of the GS1 Logistics Label is to provide information about the unit to which it is fixed, clearly and concisely. The core information on the label should be represented both in machine (barcode) and human readable form. There may be other information, which is represented in human readable form only.

This GS1 Logistics Label can be applied to a single item, or a grouping of several items made up to facilitate the operation of handling, storing and shipping. This can be:
- A carton
- A pallet
- A group of shrink wrapped units
- A tray
- A container
- Or any other similar type of packaging created for handling, storing or shipping.

The following information is a reference for the design of logistics labels. Application Identifiers (AIs) and the GS1-128 Symbology are important components of logistics labels and apply to all the specifications relating to these labels.

The structure and layout for logistics labels is explained, however, emphasis is given to the basic requirements for practical application in an open trade environment. The major areas include:
- the unambiguous identification of logistic units
- the efficient presentation of text and machine-readable data (barcodes)
- the information requirements of key partners in the supply chain– suppliers, customers and carriers
- technical parameters to ensure systematic and stable interpretation of the labels

This information is applicable to any type of logistic unit marked with a Serial Shipping Container Code (SSCC), which is used in logistic and transport applications where there is a need to track and trace individual units or a grouping of units being a part of the same transport transaction.

5.3.1 Components of the GS1 Logistics Label

Information represented on GS1 Logistics Labels has two basic forms:
- Information required to be utilised by people–usually comprising text and graphics, e.g. to and from addresses
- Barcodes (machine readable form) – a secure and efficient method of conveying structured data

The human readable text allows general access to basic information at any point in the supply chain. However, both methods of information representation provide value to the GS1 Logistics Label and often co-exist on the same label.

The mandatory field for all logistics labels is the Serial Shipping Container Code (SSCC) represented by the Application Identifier (00). The SSCC is a unique identification number assigned to each specific logistic unit. In principle, the SSCC is sufficient for all logistic applications.

In an environment where eMessaging is used to transmit the detailed information pertaining to each logistic unit, or where the information is already within a database, the SSCC acts as the reference point to information.

However, when eMessaging is not available at each point in the supply chain, or when redundancy is desired, certain additional elements of information are desirable. Each of these is also represented through the use of Application Identifiers (AIs).

▪ Label Design

The design of the logistics label accounts for the supply chain process by grouping information into three logical sections. A section is a logical grouping of information that is generally known at a time.

Supplier section:

This section of the label contains information that is generally known at the time of packaging by the supplier. The SSCC is applied here as the unit identifier, along with the GTIN if used.
Other information that may be of interest to the supplier but might also be useful for customers and carriers can be applied. This includes product-related information such as product variant; dates such as production, packaging, expiration, and best-before dates; and batch/lot and serial numbers.

- **Customer section**
  The customer section of the label contains information that is generally known at the time of the order and order processing by the supplier. Typical information includes the ship to location, purchase order number, and customer-specific routing and handling information.

- **Carrier section**
  The carrier section of the label contains information that is generally known at the time of shipment and is typically related to transport. Typical information includes AI (420) - Ship-to Postal Codes, AI (401) - Global Identification Number for Consignment.

Each label section may be applied at a different point in time, as the relevant information becomes known. However, should all relevant information be known at the time, the label is to be produced, it can be combined into one label, please refer to examples in GS1 Logistics Label Formats for the Australian Food Manufacturing Industry Section 5.4.

Within each section barcoded information is separated from text information to facilitate separate processing by automatic data capture and people. Barcodes are represented in the lower part of each section, while human readable information is shown in the upper part of the section. This facilitates access to each component as required.

The organisation responsible for the printing and application of the label, determines the content format and dimensions of the label.

Further information regarding the type of data included in these sections can be obtained from the **GS1 General Specifications.**
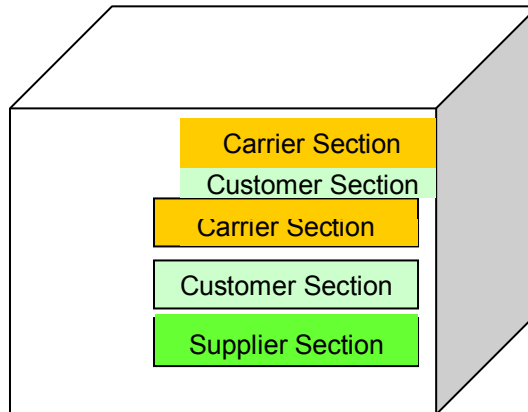
Figure 44: Label sections represented separately on a logistic unit

▪ Label Dimensions

The physical dimensions of the label are determined by the company applying the label to the logistic unit. However, the size of the label should be consistent with the information required in all sections of the label.

The business requirements for most users of GS1 Logistic Labels are met by using one of the following:
- A6 format (105mm x 148mm) which is particularly suitable when only the SSCC, or the SSCC and limited additional data is encoded.
- A5 (148 mm x 210 mm)

5.3.2 Technical Specifications

The following sections identify specific aspects of the format of the logistics label to assist in the initial processes of development. Not all technical aspects have been provided within this document and companies should ensure that they consult the **GS1 General Specifications** or contact GS1 Australia for further information.

5.3.2.1 Barcodes

The GS1-128 Barcode shall be used for all information on the GS1 Logistics Label.

The number of GS1-128 Barcodes may be minimised by using concatenation (stringing data elements together) wherever possible. When not possible due to constraint of label size, data can be represented in multiple barcodes. The sequence of the barcoded data elements is irrelevant in terms of interpretation.

Note: The exception is the SSCC, which is the identifier for the logistic unit and the most fundamental element of the label. Due to the larger magnification recommended for the SSCC, concatenation is not feasible on a standard width label.

5.3.2.2 Barcode Orientation and Placement

Barcodes shall be in picket fence orientation on logistic units, i.e. the bars and spaces shall be perpendicular to the base on which the logistic unit stands. In all cases, the SSCC shall be placed in the lowest portion of the label.

5.3.2.3 Text

There are three types of text information, which can appear on a logistics label:
- Plain text - text that is not encoded in the barcode but often required on a label e.g. name and address of the sender and receiver
- Human Readable Interpretation - the information encoded in the barcode that is required to support manual operations and to facilitate key entry.

- Data titles - the standard abbreviated descriptions of data fields used to denote the Human Readable Interpretation of data fields e.g. SERIAL is the data title of serial number.

For more information please refer to the GS1 General Specifications: http://www.gs1.org/barcodes-epcrfid-id-keys/gs1-general-specifications

5.4 GS1 Logistics Label Formats for the Australian Food Manufacturing Industry

As described in Section 0 there is the ability to identify logistic units with the use of the Serial Shipping Container Code (SSCC). Where companies and/or industry sectors are not fully capable of eMessaging there is often a need to identify additional data represented on the GS1 Logistics Label to assist processing of shipments through the supply chain.

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 [Global Trade Item Number (GTIN)]

2. Date (Production, Packaging, Expiration or Best Before)

3. Production Information (Batch/Lot Number or Serial Number)

The following section describes the minimum data set required on a GS1 Logistics Label for the Australian Food Manufacturing Industry for use on logistic units of the following configuration:

1. **Logistic unit containing the same trade items** (see Figure 45)
   This label format would be used in the instance where the trade items carry the same GTINs within the logistic unit. Data on this label is only applicable where the GTINs are all the same on the individual trade items, for example a pallet of 20 cartons of raw ingredients.

6   **Logistic unit containing the same configuration of trade items (**see Figure 46)
   In the event that the logistic unit itself has been assigned a unique GTIN this label example can be used. This label format should be used when the trade item is a standard, stable and orderable trade item; for example, the orderable trade item is always one pallet of 2 x bags of raw ingredient. The logistic unit could consist of either a standard grouping of identical trade items or a standard mix of trade items.

7   **Mixed trade items on the logistic unit from the same Purchase Order** (see Figure 47)
   When an order is picked and packed and is a mix of various trade items from one Customer Purchase Order this label format can be used.

8   **Mixed trade items on the logistic unit from various Purchase Orders** (see Figure 48)
   In the event that a back order/s is filled thus consisting of various Customer Purchase Orders this example logistics label is required. Note full use of eMessaging is required to advise the customer of the information linked to the SSCC.

Figure 46 also applies to: -

9   **Where full eMessaging is applicable** (See Figure 48)
In this example full use of eMessaging is applicable between trading partners. Here all the information is linked to the SSCC and this acts as the key to access all information about the logistic unit. This label format can be used on all types of logistic units from, standard groupings to mixed trade items. The only requirement is that eMessaging is fully operational between all trading partners throughout the supply chain.

10   Logistic unit containing the same product of variable weight (See Figure 49**)**
In the event that the logistic unit itself has been assigned a unique GTIN this label example can be used. This label format should be used when the trade item is a standard orderable trade item that may vary in weight. For example, a supplier sells sugar by the kilo in bulk.

11   **Homogenous logistic unit containing variable weight product. All items on the logistic unit must be the same (**See Figure 50)
This label format would be used in the instance where the trade items carry the same GTIN within the logistic unit. Data on this label is only applicable where the GTINs are all the same on the individual trade items, for example a pallet of 40 cartons of Beef topside

Note: Information contained on the GS1 Logistics Label is negotiable between suppliers, customers and transporters/consolidators. These guidelines in no way limit any other information, which may be required by each party in the supply chain.

Figure 45: Example of the GS1 Logistics Label Format standard pallets
Logistic unit containing the same trade items

Free Text Area
Discretion is left to the company. For Example, Text such as, To and From addresses can be included in this area

TO: World's Food Manufacturer
1 Spanner drive
Melbourne VIC 3000

FROM: The Raw Ingredients Co
2 Overview St
Dandenong VIC 3544

SSCC
393123450000000013

CONTENT
09312345000005

COUNT
20 Cases

USE BY
05.02.2010

BATCH/LOT
246913

(02)09312345000005(37)20(17)100205(10)246913

(00)393123450000000013

Human Readable Area
This area displays the information represented in the barcodes below in a human readable form.

AI (02) Content (Repeat the GTIN of the product on the pallet/logistic unit, can only be used on logistic units containing the same trade items
AI (37) Count (Quantity)
AI (17) Use By (Expiration date)
AI (10) Batch Number

Data can also be represented in multiple barcodes

AI (00) Serial Shipping Container Code (SSCC)

Figure 46: Example of the GS1 Logistics Label Format standard pallets
Logistic unit containing the same configuration of trade items

TO: World's Best Food
Manufacturer
1 Spanner drive
Melbourne VIC 3000

FROM: The Raw Ingredients
Co
2 Overview St

Free Text Area
Discretion is left to the company. For Example, Text such as, To and From addresses can be included in this area

SSCC
393123450000000013

GTIN
09312345000012

USE BY
05.02.2010

BATCH/LOT
246813

Human Readable Area
This area displays the information represented in the barcodes below in a human readable form.

(01)09312345000012(17)100205(10)246813

(00)393123450000000013

- **AI (01)** GTIN (A unique GTIN for the pallet. For standard pallets only.)
- **AI (17)** Use By (Expiration date)
- **AI (10)** Batch/Lot (Batch number)

Data can also be represented in multiple barcodes

- **AI (00)** Serial Shipping Container Code (SSCC)

Figure 47: Example of a GS1 Logistics Label Format mixed orders same Customer Purchase Order

Free Text Area
Discretion is left to the company. For Example, Text such as, To and From addresses can be included in this area

TO: World's Best Food Manufacturer
1 Spanner drive
Melbourne VIC 3000

FROM: The Raw Ingredients Co
2 Overview St

SSCC
393123450000000013

ORDER NUMBER
PO123456789

(400)PO123456789

(00)393123450000000013

Human Readable Area
This area displays the information represented in the barcodes below in a human readable form.

AI (400) Customer's Purchase Order Number

AI (00) Serial Shipping Container Code (SSCC)

Figure 48: Example of a GS1 Logistics Label Format mixed trade items with different Customer Purchase Order Numbers and where full EDI is applicable

TO: World's Best Food Manufac
1 Spanner drive
Melbourne VIC 3000

FROM: The Raw Ingredients Co
2 Overview St

Human Readable Area
This area displays the information represented in the barcodes below in a human readable form.

SSCC
39312345000000013

Free Text Area
Discretion is left to the company. For Example, Text such as, To and From addresses can be included in this area

(00)39312345000000013

AI (00) Serial Shipping Container Code (SSCC)

Note: Full use of eMessaging is required when using the above label format to advise the trading partner of the information linked to the SSCC.

Figure 49: Example of a GS1 Logistics Label Format variable weight logistics unit containing the same product

FREE INFORMATION

Example: Sugar Bulk 400kg, Sugar Co, etc.

SSCC 093123450000000012 **WEIGHT** 400kg

GTIN 99311791001157

(01)99311791001157(3102)040000

(00)093123450000000012

AI	Title on Label	Example & AI Data Format	Attribute Information
(01)	GTIN	99311791001157 n14 – numeric fixed 14 digits	**Identification of Trade Item** Assign (01) to identify the trade item (GTIN).
(310n)	Weight	400kgs n6 – numeric fixed 6 digits	**Net Weight Kilograms – Trade** Assign AI 3102 to identify the net weight in kilograms of the trade item. Use this weight in trading transactions as the basis for calculating the invoice amount. The fourth digit in the AI represents the decimal point indicator, which shows where the decimal point belongs in the actual encoded value. Eg (3102) 060000 = 600kg

Figure 50: Examples of a GS1 Logistics Label Format Homogenous logistic unit containing variable weight product. All items on the logistic unit must be the same

FREE INFORMATION

Example: Beef topside 600kg, details of company

SSCC 093123450000000012 **Prod Date** 30/12/2008

CONTENT 99311791001157 **COUNT** 40 boxes **WEIGHT** 600kg

(02)99311791001157(3102)060000(37)40(13)081230

(00)093123450000000012

AI	Title on Label	Example & AI Data Format	Attribute Information
(10)	Batch / Lot Number	an...20 – alpha numeric up to 20 characters (variable length)	Batch or Lot Number
(21)	Serial	an...20 – alpha numeric up to 20 characters (variable length)	Serial Number
(11) Or	Prod Date	30/12/2008 n6 - 6 digits numeric (fixed length)	Production Date (YYMMDD)
(13) Or	Pack Date	n6 – numeric fixed 6 digits	Packaging Date (YYMMDD) For use when product is to be wrapped at a later stage and packed into cartons.
(15)	Best Before or Sell By	n6 – numeric fixed 6 digits	Minimum Durability Date (YYMMDD)

11.2 Location of Logistic Unit Label

11.2.1   Pallets and logistics Units

The barcodes on units intended for General Distribution should be upright (i.e. in picket fence orientation) and placed on the forklift entry sides of the unit Two identical pallets labels per pallet are recommended. Each item shall have at least one barcode.

In the event that the product is not a standard carton or pallet of uniform shape all efforts should be made to meet the recommendations. For shipments with an irregular or unconventional shape common sense should direct the location of any logistics labels to ensure that the label is visible at all times.

Note: If only one label is applied, the side chosen needs to take into consideration the way the pallet will be picked. In this instance, the label should be applied to the "pick side" of the pallet. Before taking this option, consultation with all trading partners is advised.

For all types of pallets, including full pallets containing individual trade items and singular trade items (such as an IBC, barcodes should be placed at a height between 400mm and 800mm from the base of the unit. Including Quiet Zones, the barcodes should be no closer than 50mm from any vertical edge to avoid possible damage.

For pallets less than 400mm in height, the barcodes should be placed as high as possible whilst protecting the logistics label.

Figure 51: Location of the GS1 Logistics Label on pallets
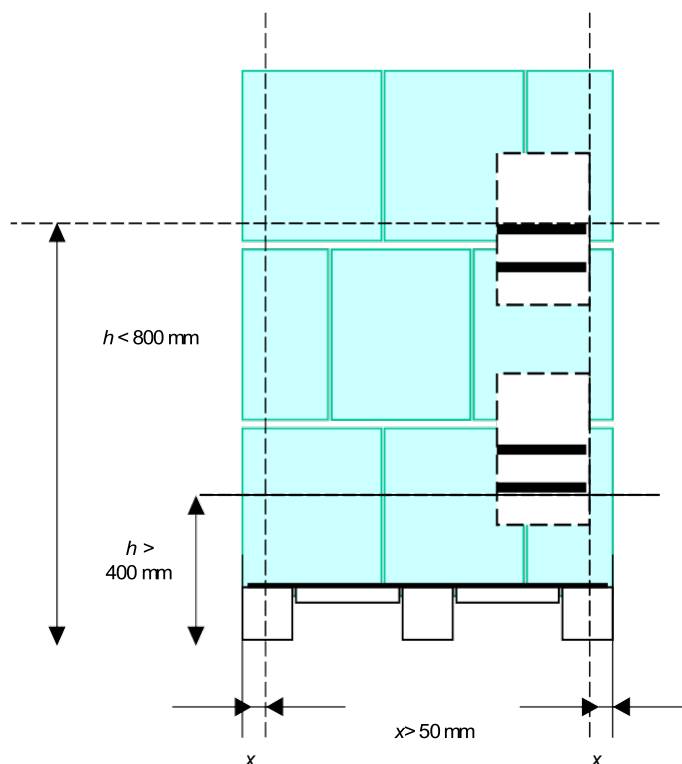
Figure 52: Location of the GS1 Logistics Label on large bulk containers

11.2.2   Cartons and Outer Cases

For cartons and outer cases, logistic labels should be placed so that the lowest edge of the vertical bars of the GS1-128 Barcode containing the SSCC is 32mm from the base of the unit. Ensure that no part of the barcode (Including Quiet Zones) is closer than 19mm from any vertical edge.
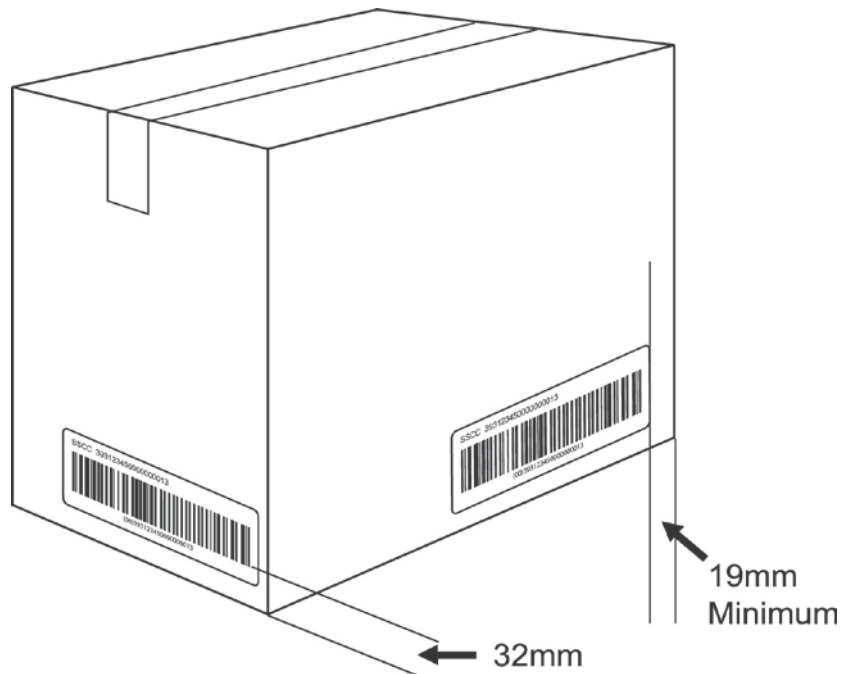
Figure 53: Location of the GS1 Logistics Label on a carton or unit less than 1 metre in height

If the unit is already marked with an ITF-14 or GS1-128 Barcode for trade item identification purposes, the label should be placed so as not to obscure the pre-existing barcode. The preferred location of the label in this case is to the side of the pre-existing barcode, so that a consistent horizontal location is maintained.

Section 6: Electronic Messaging

6.1   EDI

Electronic Data Interchange (EDI) standards are used in electronic business messaging to improve the speed and accuracy of information sent between trading partner using a standardized format. The GS1 system supports two EDI standards, GS1 EANCOM and GS1 XML.
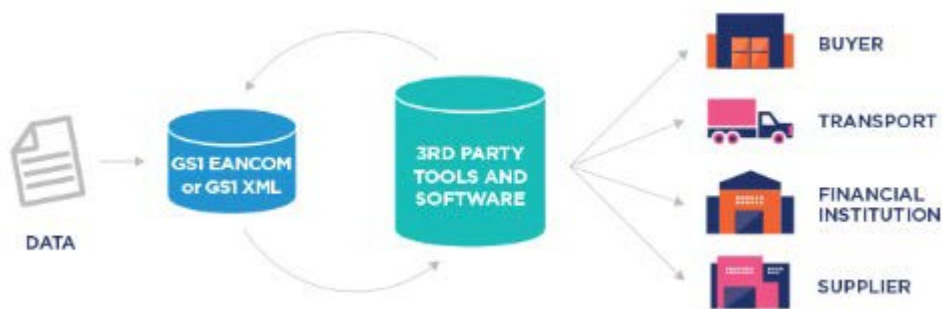
Figure 54: The automated flow of information along the supply chain

With automated exchange of key business transactions, such as electronic Purchase Order, Advanced Ship Notices (ASN) and eInvoice, key ingredient sourcing, utilisation and traceability processes between you and your customer will no longer be manual.

6.2   Why use GS1 EDI

GS1 EDI allows computer applications to exchange business data without the need for human intervention.

The key benefits for your supply chain are:
- Speed
- Lower administration and processing cost
- Accuracy
- Reduced lead time and inventory
- Reduced out-of-stock situations
- Increased customer satisfaction
- Automatic reconciliation of business documents

6.3 EDI Messages for the Australian Food Manufacturing Industry

The Supply Chain Improvement Project has created a select number of electronic documents as part of its Industry rollout. These electronic documents are based on the GS1 XML 3.3 Standard and aligned to the GS1 Australian Food Manufacturing Industry Message Implementation Guidelines.

These documents define the business rules and data content of a suite of business transactions to be conducted electronically between manufacturers/customers and their suppliers in the Australian food manufacturing Industry. The transactions in the order to cash cycle is depicted in the diagram below, with details showing which EDI messages have been created by the Supply Chain Improvement project.
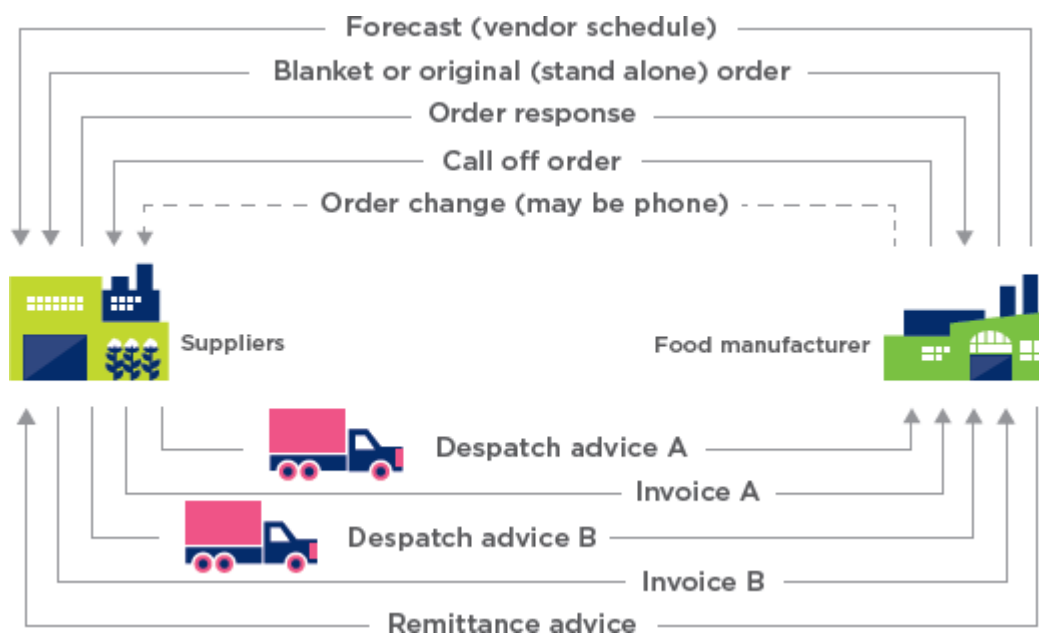
Figure 55: The Order to Cash Cycle

The following EDI messages will be implemented:

Consumption Forecast

Purchase Order

Purchase Order Response

Despatch Advice

Invoice

Remittance Advice

For suppliers who are EDI ready (currently receiving and sending EDI messages with other trading partners), please contact the Food and Beverage Team at GS1 Australia to begin the process of setting up and implementing EDI messaging with your customers.

For suppliers who are not EDI ready at the moment, but wish to move to EDI, please contact your customer to discuss timelines and expectations.

i **For the EDI Message Implementation Guidelines (MIGs) for the above messages please refer to the Supply Chain Improvement webpage**: https://www.gs1au.org/for-your-industry/food-and-beverage/supply-chain-improvement-project/

Section 7: Traceability

The GS1 Traceability standard gives all parties within your supply chain a common business language so that you can design and implement a traceability system that works for all.

Using a range of GS1 standards (such as barcodes, EPC and EDI standards), GS1 Traceability exists to:

- Define the traceability process
- Define minimum traceability requirements for all sectors and all types of products
- Identify existing GS1 standards

It includes:

Identification of parties, items and events

Labelling and/or marking and/or tagging of products

The nature and type of data to be captured and collected

Record keeping including archiving/data storage

Communication and sharing of information (at the physical level using packaging labels and printed barcodes or at a data management level using EDI)

Links identification and management

Retrieval and search of information (the ability to track and trace a traceable item from creation to the point of sale, use or destruction depending on the industry, e.g. using a standards-based EPCIS)

All types of trade items – products, cartons, pallets and more – can be traced using the GS1 Traceability standard.

For more than a decade, the GS1 Global Traceability Standard has been at the forefront of guiding the implementation of traceability solutions, from upstream suppliers to consumers and patients. The new GS1 Global Traceability Standard, version 2.0, provides the needed framework to ensure that traceability systems are interoperable and scalable, where trading partners can easily collaborate and share information for visibility across the entire chain.

This standard allows an end-to-end traceability system, linking the flow of information to physical products. In an event of a food outbreak, the sharing of traceability information between trading partners in the supply chain is critical to ensure a targeted and effective recall.

The GS1 Global Traceability Standard is the basis of the GS1 Global Traceability Compliance Criteria for Food, a document used to evaluate critical points within a traceability system. Companies can verify the quality and integrity of their existing traceability system using this Checklist with the help of our traceability experts.

i **For more information on the GS1 Global Traceability Standard please refer to the GS1 website at the following link or contact GS1 Australia**
https://www.gs1.org/traceability-retail

Section 8: GS1 Services

For over 30 years, GS1 Australia has developed and delivered services that support its members to implement the GS1 system. This support ensures the full benefits and supply chain efficiencies are realised.

Numbering and Barcoding
We provide unique numbers to identify products, locations, documents and more

Build capability and implement

Build knowledge and capability to implement system and process changes with GS1 standards.

Education and training
Learn how to make your supply chain more efficient

Consult
We solve your supply chain problems

Quality assurance

Ensure the accurate implementation of GS1 standards (barcodes and EDI systems).

Barcode Check
Be confident that your barcodes will scan

EDI Certify
Validate eMessages before deploying your eCommerce strategy with your trading partners

Item master data and digital content

Create, manage and syndicate accurate product information.

National Product Catalogue
A secure way to share your product data from a single source

Smart Media
Manage and share images, digital assets and data with your trading partners

Product Photography
We deliver product shots for planograms, advertising and online shopping

Product Launch
Enables suppliers to provide retailers with all the information needed to range new products

Trusted Data
Easily access a database with retail and healthcare product data

Consumer safety and traceability

Recall and withdraw products from distribution and physical locations.

Recall
Minimise the impact and cost of a product recall or withdrawal

Locatenet
The fast and accurate way to pinpoint locations across your supply chain

For more information on the GS1 Services please contact GS1 Australia at www.gs1au.org **or 1300 BARCODE (1300 227 263)**

Appendixes

Appendix A: Glossary of Terminology

Term	Definition
2-dimensional symbology	Optically readable symbols that must be examined both vertically and horizontally to read the entire message. Two-dimensional symbols may be one of two types: matrix symbols and multi-row symbols. Two-dimensional symbols have error detection and may include error correction features.
add-on symbol	A barcode used to encode information supplementary to that in the main barcode.
alphanumeric (an)	Describes a character set that contains alphabetic characters (letters), numeric digits (numbers), and other characters, such as punctuation marks.
Attribute	An element string that provides additional information about an entity identified with a GS1 identification key, such as batch number associated with a Global Trade Item Number (GTIN).
bearer bars	Bar abutting the tops and bottoms of the bars in a barcode or a frame surrounding the entire symbol, intended to equalise the pressure exerted by the printing plate over the entire surface of the symbol and/or to prevent a short scan by the barcode reader.
brand owner	The party that is responsible for allocating GS1 identification keys. The administrator of a GS1 Company Prefix.
carrier (logistics)	The party that provides freight transportation services or a physical or electronic mechanism that carries business information.
check digit	A final digit calculated from the other digits of some GS1 identification keys. This digit is used to check that the data has been correctly composed. (See GS1 check digit calculation.)
concatenation	The representation of several element strings in one barcode.
Coupon	A voucher that can be redeemed at the point-of-sale for a cash value or free item.
Customer	The party that receives, buys, or consumes an item or service.
data character	A letter, digit, or other symbol represented in the data field(s) of an element string.
data 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 discount or for loyalty points when making a purchase.
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).
EAN/UPC symbology	A family of barcodes including EAN-8, EAN-13, UPC-A, and UPC-E barcodes. Although UPC-E barcodes do not have a separate symbology identifier, they act like a separate symbology through the scanning application software. See also EAN-8 barcode, EAN-13 barcode, UPC-A barcode, and UPC-E barcode.
EAN-13 barcode	A barcode of the EAN/UPC symbology that encodes GTIN-13, Coupon-13, RCN-13, and VMN-13.
EAN-8 barcode	A barcode of the EAN/UPC symbology that encodes GTIN-8 or RCN-8.
electronic commerce	The conduct of business communications and management through electronic methods, such as electronic data interchange (EDI) and automated data collection systems.
electronic message	A composition of element strings from scanned data and transaction information assembled for data validation and unambiguous processing in a user application.
Electronic Product Code (EPC)	An identification scheme for universally identifying physical objects (e.g. trade items, assets, and locations) via RFID tags and other means. The standardised EPC data consists of an EPC (or EPC Identifier) that uniquely identifies an individual object, as well as an optional filter value when judged to be necessary to enable effective and efficient reading of the EPC tags.
element string	The combination of a GS1 Application Identifier and GS1 Application Identifier data field.
extension digit	The first digit within the SSCC (Serial Shipping Container Code) which is allocated by the user and is designed to increase the capacity of the SSCC.

Term	Definition
fixed length	Term used to describe a data field in an element string with an established number of characters.
fixed measure trade item	An item always produced in the same pre-defined version (e.g., type, size, weight, contents, design) that may be sold at any point in the supply chain.
Function 1 Symbol Character (FNC1)	A symbology character used in some GS1 data carriers for specific purposes.
general distribution scanning	Scanning environments that include barcoded trade items packaged for transport, logistic units, assets, and location tags.
Global Coupon Number (GCN)	A GS1 identification key that provides a globally unique identification for a coupon, with an optional serial number
Global Location Number (GLN)	The GS1 identification key used to identify physical locations or parties. The key comprises a GS1 Company Prefix, location reference, and check digit.
Global Returnable Asset Identifier (GRAI)	The GS1 identification key used to identify returnable assets. The key comprises a GS1 Company Prefix, asset type, check digit, and optional serial number.
Global Service Relation Number (GSRN)	The Global Service Relation Number is the GS1 identification key used to identify the relationship between an organisation offering services and the recipient or provider of services. The key comprises a GS1 Company Prefix, service reference and check digit.
Global 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	The field of two or more digits at the beginning of an element string that uniquely defines its format and meaning.
GS1 Application Identifier data field	The data used in a business application defined by one application identifier.
GS1 check digit calculation	An algorithm used by the GS1 system for the calculation of a check digit to verify accuracy of data. (e.g., modulo 10 check digit, price check digit).
GS1 Company Prefix	A unique string of four to twelve digits used to issue GS1 identification keys. The first digits are a valid GS1 Prefix and the length must be at least one longer than the length of the GS1 Prefix. The GS1 Company Prefix is issued by a GS1 Member Organisation. As the GS1 Company Prefix varies in length, the issuance of a GS1 Company Prefix excludes all longer strings that start with the same digits from being issued as GS1 Company Prefixes. See also U.P.C Company Prefix.
GS1 DataBar®	A family of barcodes, including GS1 DataBar Omnidirectional; GS1 DataBar Stacked Omnidirectional; GS1 DataBar Expanded; GS1 DataBar Expanded Stacked GS1 DataBar Truncated, GS1 DataBar Limited, and GS1 DataBar Stacked symbols.
GS1 DataMatrix	GS1 implementation specification for use of Data Matrix
GS1 EANCOM®	The GS1 standard for Electronic Data Interchange (EDI) that is a detailed implementation guideline of the UN/EDIFACT standard messages using the GS1 identification keys.
GS1 Global Standards Management Process	GS1 created the Global Standards Management Process (GSMP) to support standards development activity for the GS1 system. The GSMP uses a global consensus process to develop supply chain standards that are based on business needs and user-input
GS1 identification key	A unique identifier for a class of objects (e.g. a trade item) or an instance of an object (e.g. a logistic unit).
GS1 Member Organisation	A member of GS1 that is responsible for administering the GS1 system in its country (or assigned area). This task includes, but is not restricted to, ensuring brand owners 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 symbologies using GS1 Application Identifiers	All GS1 endorsed barcode symbologies that can encode more than a GTIN namely GS1-128, GS1 DataMatrix, GS1 DataBar and Composite.
GS1 system	The specifications, standards, and guidelines administered by GS1.
GS1 XML	The GS1 standard for extensible markup language (XML) schemas providing users with a global business messaging language of e-business to conduct efficient internet-based electronic commerce.

Term	Definition
GS1®	Based in Brussels, Belgium, and Princeton, USA, it is the organisation that manages the GS1 system. Its members are GS1 Member Organisations.
GS1-128 symbology	A subset of Code 128 that is utilised exclusively for GS1 system data structures.
GS1-8 Prefix	A unique string of three digits issued by GS1 Global Office and allocated to GS1 Member Organisations to issue GTIN-8s or allocated to issue RCN-8s (see RCN-8).
GSIN	See Global Shipment Identification Number.
GTIN application format	A format for a GTIN-8, GTIN-12, or GTIN-13 used when a GTIN application uses a fixed field length, for example, when a GTIN-13 is encoded in symbology using Application Identifier (01).
GTIN-12	The 12-digit GS1 identification key composed of a U.P.C. Company Prefix, item reference, and check digit used to identify trade items.
GTIN-13	The 13-digit GS1 identification key composed of a GS1 Company Prefix, item reference, and check digit used to identify trade items.
GTIN-14	The 14-digit GS1 identification key composed of an indicator digit (1-9), GS1 Company Prefix, item reference, and check digit used to identify trade items.
GTIN-8	The 8-digit GS1 identification key composed of a GS1-8 Prefix, item reference, and check digit used to identify trade items.
Indicator	A digit from 1 to 9 in the leftmost position of the GTIN-14.
Interleaved 2-of-5 symbology	Barcode symbology used for the ITF-14 barcode.
item reference	A component of the Global Trade Item Number (GTIN) assigned by the brand owner to create a unique GTIN.
ITF symbology	See Interleaved 2-of-5 symbology.
ITF-14 barcode	ITF-14 (a subset of Interleaved 2-of-5) barcodes carry GTINs only on trade items that are not expected to pass through the point-of-sale.
Kit	A collection of different regulated healthcare items assembled for use in a single therapy.
local assigned code (LAC)	A use of the UPC-E barcode for restricted distribution.
location reference	A component of a Global Location Number (GLN) assigned by the brand owner to create a unique GLN.
logistic measures	Measures indicating the outside dimensions, total weight, or volume inclusive of packing material of a logistic unit. Also known as gross measures.
logistic unit	An item of any composition established for transport and/or storage that needs to be managed through the supply chain. It is identified with an SSCC.
magnification	Different sizes of barcodes based on a nominal size and a fixed aspect ratio; stated as a percentage or decimal equivalent of a nominal size.
modulo 10	The name of the algorithm – a simple checksum formula in the public domain – used to create a check digit for those GS1 identification keys that require one.
point-of-sale (POS)	Refers to the retail checkout where omnidirectional barcodes must be used to enable very rapid scanning or low volume checkout where linear or 2D matrix barcodes are used with image-based scanners.
Quiet Zone	A clear space which precedes the start character of a barcode and follows the stop character. Formerly referred to as "clear area" or "light margin".
radio frequency	Any frequency within the electromagnetic spectrum associated with radio wave propagation. When a radio frequency current is supplied to an antenna, an electromagnetic field is created that then is able to propagate through space. Many wireless technologies are based on radio frequency field propagation.
radio frequency identification (RFID)	A data carrier technology that transmits information via signals in the radio frequency portion of the electromagnetic spectrum. A radio frequency identification system consists of an antenna and a transceiver, which read the radio frequency and transfer the information to a processing device, and a transponder, or tag, which is an integrated circuit containing the radio frequency circuitry and information to be transmitted.
RCN-12	A 12-digit Restricted Circulation Number (see Restricted Circulation Number).

Term	Definition
RCN-13	A 13-digit Restricted Circulation Number (see Restricted Circulation Number).
RCN-8	An 8-digit Restricted Circulation Number (see Restricted Circulation Number) beginning with GS1-8 Prefix 0 or 2.
refund receipt	A voucher produced by equipment handling empty containers (bottles and crates).
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.
Restricted Circulation Number (RCN)	Signifies a GS1 identification number used for special applications in restricted environments, defined by the local GS1 Member Organisation (e.g., restricted within a country, company, 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 product identification, couponing).
Scanner	An electronic device to read barcode and convert them into electrical signals understandable by a computer device.
Serial Shipping Container Code (SSCC)	The GS1 identification key used to identify logistics units. The key comprises an extension digit, GS1 Company Prefix, serial reference, and check digit.
service relation instance number (SRIN)	An attribute to the GSRN which allows to distinguish different encounters during the same episode, or the reuse of the same GSRN in different episodes.
Substrate	The material on which a barcode is printed.
Supplier	The party that produces, provides, or furnishes an item or service.
Symbol	The combination of symbol characters and features required by a particular symbology, including Quiet Zone, start and stop characters, data characters, and other auxiliary patterns, which together form a complete scannable entity; an instance of a symbology and a data structure.
symbol character	A group of bars and spaces in a symbol that is decoded as a single unit. It may represent an individual digit, letter, punctuation mark, control indicator, or multiple data characters.
symbol contrast	An *ISO/IEC 15416* parameter that measures the difference between the largest and smallest reflectance values in a Scan Reflectance Profile (SRP).
Symbology	A defined method of representing numeric or alphabetic characters in a barcode; a type of barcode.
trade item	Any item (product or service) upon which there is a need to retrieve pre-defined information and that may be priced, or ordered, or invoiced at any point in any supply chain.
trade item grouping	A predefined composition of trade item(s) that is not intended for point-of-sale scanning. It is identified with a GTIN-14, GTIN-13, or GTIN-12.
trade measures	Net measures of variable measure trade items as used for invoicing (billing) the trade item.
Truncation	Printing a symbol shorter than the symbology specification's minimum height recommendations. Truncation can make the symbol difficult for an operator to scan.
U.P.C. Company Prefix	A GS1 Company Prefix starting with a zero ('0') becomes a U.P.C. Company Prefix by removing the leading zero. A U.P.C. Company Prefix is used to issue GTIN-12.
U.P.C. Prefix	A GS1 Prefix starting with a zero ('0') becomes a U.P.C. Prefix by removing the leading zero. A U.P.C. Prefix is used to issue U.P.C. Company Prefixes or allocated to other specific areas.
unrestricted distribution	Signifies that such system data may be applied on goods to be processed anywhere in the world without restraint as to such things as country, company, and industry.
UPC-A barcode	A barcode of the EAN/UPC symbology that encodes GTIN-12, Coupon-12, RCN-12, and VMN-12.
UPC-E barcode	A barcode of the EAN/UPC symbology representing a GTIN-12 in six explicitly encoded digits using zero-suppression techniques.
variable measure number (VMN)	A Restricted Circulation Number used to identify variable measure products for scanning at point-of-sale. It is defined per GS1 Member Organisation rules in their country (see VMN-12 and VMN-13).
variable measure trade item	A trade item which may be traded without a pre-defined measure, such as its weight or length.

Term	Definition
VMN-12	The 12-digit Restricted Circulation Number encoded in UPC-A symbols to allow scanning of variable measure products at point-of-sale. It is defined per target market specific rules that are associated with U.P.C. Prefix 2.
VMN-13	The 13-digit Restricted Circulation Number encoded in EAN-13 symbols to allow scanning of variable measure products at point-of-sale. It is defined per target market specific rules that are associated with GS1 Prefixes 20 through 29.
wide-to-narrow ratio	The ratio between the wide elements and the narrow elements in a barcode symbology such as ITF-14 that has two different element widths.
X-dimension	The specified width of the narrowest element of a barcode.

Appendix B: Barcode Quality Check List

There are a number of aspects to printing the barcode to ensure that 100% readability is achieved and maintained. The checklist below itemises the things to check during the barcode generation and printing processes.

7   Ensure that the correct barcode is used for the relevant product, application, and scanning environment
8   Check that the barcode will remain readable in the environment in which the product will be stored, handled, and distributed
9   Ensure that the Check Digit is correct
10 Check the size of the barcode, both the magnification and the bar height
11 Ensure that there are adequate Quiet Zones, and that any optional Quiet Zone Indicators are correctly placed
12 Check that the contrast between the bars and the background is adequate, and that the colours chosen will scan
13 Make sure that the colour of the contents of the packaging will not unduly affect the contrast between the bars and spaces
14 Check the position of the barcode on the final, formed product
15 Ensure that no shrink-wrap, tape, or other printing will obscure the barcode on the finished product
16 Ensure that no other barcodes will be visible or show through from the inside of the pack
17 Carry out routine verification at all levels of packaging to ensure that the barcode complies with the required quality standard, and to identify any potential problems
18 Check the print quality regularly throughout the print run by verifying the barcode quality
19 Notify trading partners of the GTINs and the products they identify in good time
20 Consider having GS1 Australia prepare a Barcode Verification Report on the artwork for you prior to the final print to help detect any errors or areas for improvement

Some in-house printing methods, particularly on-line ink jet printing, require attention to the total print process and on-going maintenance.

The GS1 specifications for printing barcodes are explicit in that if the specified procedures are followed, with routine quality control, you can produce barcodes that scan consistently.

Note: It is recommended that the quality of the barcodes be assessed. This can be achieved through the use of the GS1 Barcode Check Service.

Appendix C: GS1 Application Identifiers in numerical order

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

AI	Data Content	Format (*)	FNC1 required (****)	Data title
321 (***)	Length or first dimension, inches (variable measure trade item)	N4+N6		LENGTH (i)
322 (***)	Length or first dimension, feet (variable measure trade item)	N4+N6		LENGTH (f)
323 (***)	Length or first dimension, yards (variable measure trade item)	N4+N6		LENGTH (y)
324 (***)	Width, diameter, or second dimension, inches (variable measure trade item)	N4+N6		WIDTH (i)
325 (***)	Width, diameter, or second dimension, feet (variable measure trade item)	N4+N6		WIDTH (f)
326 (***)	Width, diameter, or second dimension, yards (variable measure trade item)	N4+N6		WIDTH (y)
327 (***)	Depth, thickness, height, or third dimension, inches (variable measure trade item)	N4+N6		HEIGHT (i)
328 (***)	Depth, thickness, height, or third dimension, feet (variable measure trade item)	N4+N6		HEIGHT (f)
329 (***)	Depth, thickness, height, or third dimension, yards (variable measure trade item)	N4+N6		HEIGHT (y)
330 (***)	Logistic weight, kilograms	N4+N6		GROSS WEIGHT (kg)
331 (***)	Length or first dimension, metres	N4+N6		LENGTH (m), log
332 (***)	Width, diameter, or second dimension, metres	N4+N6		WIDTH (m), log
333 (***)	Depth, thickness, height, or third dimension, metres	N4+N6		HEIGHT (m), log
334 (***)	Area, square metres	N4+N6		AREA (m^2), log
335 (***)	Logistic volume, litres	N4+N6		VOLUME (l), log
336 (***)	Logistic volume, cubic metres	N4+N6		VOLUME (m^3), log
337 (***)	Kilograms per square metre	N4+N6		KG PER m²
340 (***)	Logistic weight, pounds	N4+N6		GROSS WEIGHT (lb)
341 (***)	Length or first dimension, inches	N4+N6		LENGTH (i), log
342 (***)	Length or first dimension, feet	N4+N6		LENGTH (f), log
343 (***)	Length or first dimension, yards	N4+N6		LENGTH (y), log
344 (***)	Width, diameter, or second dimension, inches	N4+N6		WIDTH (i), log
345 (***)	Width, diameter, or second dimension, feet	N4+N6		WIDTH (f), log
346 (***)	Width, diameter, or second dimension, yard	N4+N6		WIDTH (y), log
347 (***)	Depth, thickness, height, or third dimension, inches	N4+N6		HEIGHT (i), log
348 (***)	Depth, thickness, height, or third dimension, feet	N4+N6		HEIGHT (f), log

AI	Data Content	Format (*)	FNC1 required (****)	Data title
349 (***)	Depth, thickness, height, or third dimension, yards	N4+N6		HEIGHT (y), log
350 (***)	Area, square inches (variable measure trade item)	N4+N6		AREA (i^2)
351 (***)	Area, square feet (variable measure trade item)	N4+N6		AREA (f^2)
352 (***)	Area, square yards (variable measure trade item)	N4+N6		AREA (y^2)
353 (***)	Area, square inches	N4+N6		AREA (i^2), log
354 (***)	Area, square feet	N4+N6		AREA (f^2), log
355 (***)	Area, square yards	N4+N6		AREA (y^2), log
356 (***)	Net weight, troy ounces (variable measure trade item)	N4+N6		NET WEIGHT (t)
357 (***)	Net weight (or volume), ounces (variable measure trade item)	N4+N6		NET VOLUME (oz)
360 (***)	Net volume, quarts (variable measure trade item)	N4+N6		NET VOLUME (q)
361 (***)	Net volume, gallons U.S. (variable measure trade item)	N4+N6		NET VOLUME (g)
362 (***)	Logistic volume, quarts	N4+N6		VOLUME (q), log
363 (***)	Logistic volume, gallons U.S.	N4+N6		VOLUME (g), log
364 (***)	Net volume, cubic inches (variable measure trade item)	N4+N6		VOLUME (i^3)
365 (***)	Net volume, cubic feet (variable measure trade item)	N4+N6		VOLUME (f^3)
366 (***)	Net volume, cubic yards (variable measure trade item)	N4+N6		VOLUME (y^3)
367 (***)	Logistic volume, cubic inches	N4+N6		VOLUME (i^3), log
368 (***)	Logistic volume, cubic feet	N4+N6		VOLUME (f^3), log
369 (***)	Logistic volume, cubic yards	N4+N6		VOLUME (y^3), log
37	Count of trade items	N2+N..8	(FNC1)	COUNT
390 (***)	Applicable amount payable or Coupon value, local currency	N4+N..15	(FNC1)	AMOUNT
391 (***)	Applicable amount payable with ISO currency code	N4+N3+N..15	(FNC1)	AMOUNT
392 (***)	Applicable amount payable, single monetary area (variable measure trade item)	N4+N..15	(FNC1)	PRICE
393 (***)	Applicable amount payable with ISO currency code (variable measure trade item)	N4+N3+N..15	(FNC1)	PRICE
394n (***)	Percentage discount of a coupon	N4+N4	(FNC1)	PRCNT OFF
400	Customer's purchase order number	N3+X..30	(FNC1)	ORDER NUMBER
401	Global Identification Number for Consignment (GINC)	N3+X..30	(FNC1)	GINC

AI	Data Content	Format (*)	FNC1 required (****)	Data title
402	Global Shipment Identification Number (GSIN)	N3+N17	(FNC1)	GSIN
403	Routing code	N3+X..30	(FNC1)	ROUTE
410	Ship to - Deliver to Global Location Number	N3+N13		SHIP TO LOC
411	Bill to - Invoice to Global Location Number	N3+N13		BILL TO
412	Purchased from Global Location Number	N3+N13		PURCHASE FROM
413	Ship for - Deliver for - Forward to Global Location Number	N3+N13		SHIP FOR LOC
414	Identification of a physical location - Global Location Number	N3+N13		LOC No
415	Global Location Number of the invoicing party	N3+N13		PAY TO
420	Ship to - Deliver to postal code within a single postal authority	N3+X..20	(FNC1)	SHIP TO POST
421	Ship to - Deliver to postal code with ISO country code	N3+N3+X..9	(FNC1)	SHIP TO POST
422	Country of origin of a trade item	N3+N3	(FNC1)	ORIGIN
423	Country of initial processing	N3+N3+N..12	(FNC1)	COUNTRY - INITIAL PROCESS.
424	Country of processing	N3+N3	(FNC1)	COUNTRY - PROCESS.
425	Country of disassembly	N3+N3	(FNC1)	COUNTRY - DISASSEMBLY
426	Country covering full process chain	N3+N3	(FNC1)	COUNTRY – FULL PROCESS
427	Country subdivision Of origin	N3+X..3	(FNC1)	ORIGIN SUBDIVISION
7001	NATO Stock Number (NSN)	N4+N13	(FNC1)	NSN
7002	UN/ECE meat carcasses and cuts classification	N4+X..30	(FNC1)	MEAT CUT
7003	Expiration date and time	N4+N10	(FNC1)	EXPIRY TIME
7004	Active potency	N4+N..4	(FNC1)	ACTIVE POTENCY
7005	Catch area	N4+X..12	(FNC1)	CATCH AREA
7006	First freeze date	N4+N6	(FNC1)	FIRST FREEZE DATE
7007	Harvest date	N4+N6..12	(FNC1)	HARVEST DATE
7008	Species for fishery purposes	N4+X..3	(FNC1)	AQUATIC SPECIES
7009	Fishing gear type	N4+X..10	(FNC1)	FISHING GEAR TYPE
7010	Production method	N4+X..2	(FNC1)	PROD METHOD
703s	Number of processor with ISO Country Code	N4+N3+X..27	(FNC1)	PROCESSOR # s
710	National Healthcare Reimbursement Number (NHRN) – Germany PZN	N3+X..20	(FNC1)	NHRN PZN
711	National Healthcare Reimbursement Number (NHRN) – France CIP	N3+X..20	(FNC1)	NHRN CIP
712	National Healthcare Reimbursement Number (NHRN) – Spain CN	N3+X..20	(FNC1)	NHRN CN
713	National Healthcare Reimbursement Number (NHRN) – Brasil DRN	N3+X..20	(FNC1)	NHRN DRN

AI	Data Content	Format (*)	FNC1 required (****)	Data title
nnn (*****)	National Healthcare Reimbursement Number (NHRN) – Country "A" NHRN	N3+X..20	(FNC1)	NHRN xxx
8001	Roll products (width, length, core diameter, direction, splices)	N4+N14	(FNC1)	DIMENSIONS
8002	Cellular mobile telephone identifier	N4+X..20	(FNC1)	CMT No
8003	Global Returnable Asset Identifier (GRAI)	N4+N14+X..16	(FNC1)	GRAI
8004	Global Individual Asset Identifier (GIAI)	N4+X..30	(FNC1)	GIAI
8005	Price per unit of measure	N4+N6	(FNC1)	PRICE PER UNIT
8006	Identification of the components of a trade item	N4+N14+N2+N2	(FNC1)	GCTIN
8007	International Bank Account Number (IBAN)	N4+X..34	(FNC1)	IBAN
8008	Date and time of production	N4+N8+N..4	(FNC1)	PROD TIME
8010	Component / Part Identifier (CPID)	N4 + X..30	(FNC1)	CPID
8011	Component / Part Identifier serial number (CPID SERIAL)	N4 + N..12	(FNC1)	CPID SERIAL
8012	Software version	N4 + X..20	(FNC1)	VERSION
8017	Global Service Relation Number to identify the relationship between an organisation offering services and the provider of services	N4+N18	(FNC1)	GSRN - PROVIDER
8018	Global Service Relation Number to identify the relationship between an organisation offering services and the recipient of services	N4+N18	(FNC1)	GSRN - RECIPIENT
8019	Service Relation Instance Number (SRIN)	N4+N..10	(FNC1)	SRIN
8020	Payment slip reference number	N4+X..25	(FNC1)	REF No
8110	Coupon code identification for use in North America	N4+X..70	(FNC1)	-
8111	Loyalty points of a coupon	N4+N4	(FNC1)	POINTS
8200	Extended Packaging URL	N4+X..70	(FNC1)	PRODUCT URL
90	Information mutually agreed between trading partners	N2+X..30	(FNC1)	INTERNAL
91 to 99	Company internal information	N2+X..30	(FNC1)	INTERNAL

NOTES:

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

- N   numeric digit
- X   alphanumeric character
- N3   3 numeric digits, fixed length
- N..3 up to 3 numeric digits
- X..3 up to 3 characters in **Error! Reference source not found.**

(**): 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:

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

(****): All GS1 Application Identifiers indicated with (FNC1) are defined as of variable length and SHALL be delimited unless this element string is the last one to be encoded in the symbol. The delimiter SHALL be a Function 1 Symbol Character in GS1-128 symbology, GS1 DataBar Expanded Versions and GS1 Composite symbology and SHOULD be a Function 1 Symbol Character in GS1 DataMatrix and GS1 QR Code symbology.

(*****) An example to illustrate future additional NHRNs. If additional NHRN AIs are required, a request for a new NHRN AI SHALL be made through the GS1 GSMP.

The Global Language of Business

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