



The Australasian Hardware Industry

Industry
Guidelines for the
Numbering and
Bar Coding of
Trade Items

Version 1.2

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These guidelines should be read in conjunction with the ***user manuals issued by GS1 Australia and GS1 New Zealand respectively, hereafter referred to as 'the technical literature'***.

Disclaimer

Every possible effort has been made to ensure that the information and specifications in this document are correct, however GS1 Australia, GS1 New Zealand, BizEvolution, The Hardware Industry Working Group (HIWG) and members of all associated sector groups, expressly disclaim liability for any errors. In addition, no warranty or representation is made that this document will not require modification due to developments in technology or changes or additions to the GS1 System.

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This Numbering and Bar Coding Guideline for the Australasian Hardware Industry was originally developed by GS1 Australia as part of the Hardware Industry B2B E-Commerce Project facilitated in 2001/2002 by Tradegate ECA. In April 2007 GS1 Australia kindly authorised GS1 New Zealand to modify the document for use in New Zealand and it was redeveloped as an Australasian Hardware Industry Guide.

Previous versions of this document have been modified with the input of members of the Hardware Industry Working Group (HIWG). Current members are listed on the HIWG web site, www.hiwg.org.au.



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1 Executive Summary

As the Hardware Industry in Australasia seeks to adopt the key principles of Efficient Consumer Response (ECR) there is increased demand for improved data capture at all points of the supply chain. This should be a key objective for all trading partners if they are to effectively meet their company needs and exceed customers' expectations.

The efficient servicing of customers is the process of supplying the right products, right quantity, right price, right quality, right time and place with a minimum of effort. The benefits are the avoidance of wasted effort, measured in terms of low cost and high levels of customer service.

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 Electronic Data Interchange (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.

These recommendations for best practice encompass the main requirements of the Australasian Hardware Industry, including the Timber, Greenlife, Plumbing and Electrical sectors. Adoption of these recommendations should bring improved business efficiency and effectiveness for all companies within the supply chain.

These guidelines are a recommendation only. Before implementation please consult your trading partners for specific requirements above and beyond this document.



2 Introduction and Overview

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 bar codes 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, 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 bar code trade items using the GS1 standards for the Hardware Industry.

The versatility of the GS1 System provides users with various numbering and bar coding 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.

2.1 Who are GS1 Australia and GS1 New Zealand?

GS1 Australia and New Zealand are part of the not-for-profit GS1 global organisation that locally administers the GS1 System in Australia and New Zealand.

Created to help business enterprises to become more efficient, our fundamental role is to allocate GS1 Identification Numbers, maintaining internationally accepted trading standards. This in turn allows organisations to adopt world's best practice supply chain management techniques.

Today, over 1 million member companies, serviced by offices in 108 countries, use the GS1 standards as part of their daily business communications, representing over five billion scanning transactions a day.

2.2 Who is the Hardware GS1 Action Group?

Pooling the knowledge and experiences of the Australian and New Zealand Hardware industry participants, and following the lead of other global hardware initiatives, the Hardware GS1 Action Group has been set up to help develop, promote and deliver user guidelines, training courses and implementation programmes relating to the global GS1 standards.

The Hardware GS1 Action Group is overseen by a representative leadership group made up of key retailers and suppliers across Australia and New Zealand.

To address the needs of the Hardware industry, the following work groups have been set up:

- Numbering & bar coding – to oversee issues related to retail, non-retail and logistic unit identification and tracking;



- Data Synchronisation – to lead the trialling and implementation of data synchronisation via GS1net; and
- eMessaging – to continue the maintenance of GS1 EANCOM guidelines, and oversee industry adoption of GS1 XML messaging.

Future workgroups are expected to oversee industry adoption of RFID, Global Location Numbering and development of industry specific case studies.

2.3 Who is the HIWG?

The Hardware Industry Working Group (HIWG) is a community of organisations committed to the development and implementation of industry agreed B2B (business-to-business) eCommerce guidelines and recommendations. It is a self-managed and self-funded consortium and includes members from a range of organisations across Australia and New Zealand including retailers, distributors, wholesalers and suppliers from the broad hardware industry - including the electrical, greenlife, plumbing, timber and home building sectors.

Members of the HIWG collaborate to develop industry agreed B2B eCommerce guidelines and recommendations, based on global standards wherever possible, in order to maximise value from e-trading. The work of the HIWG is focused on the application of eCommerce to enable supply chain improvements, including the opportunity to streamline business processes. In addition, pilot to production implementation projects are co-ordinated and general industry education and awareness is delivered.

Members of the HIWG recognise that this work is never complete and that they are on a path of learning and understanding, positioning their organisations, and the hardware industry as a whole, for the future. All outcomes of the work done by the HIWG are made available to others in the industry from the HIWG website at <http://www.hiwg.org.au>



3 The GS1 System

The GS1 System permits organisations of any size to order, track, trace, deliver and pay for goods across the supply chain, anywhere in the world.

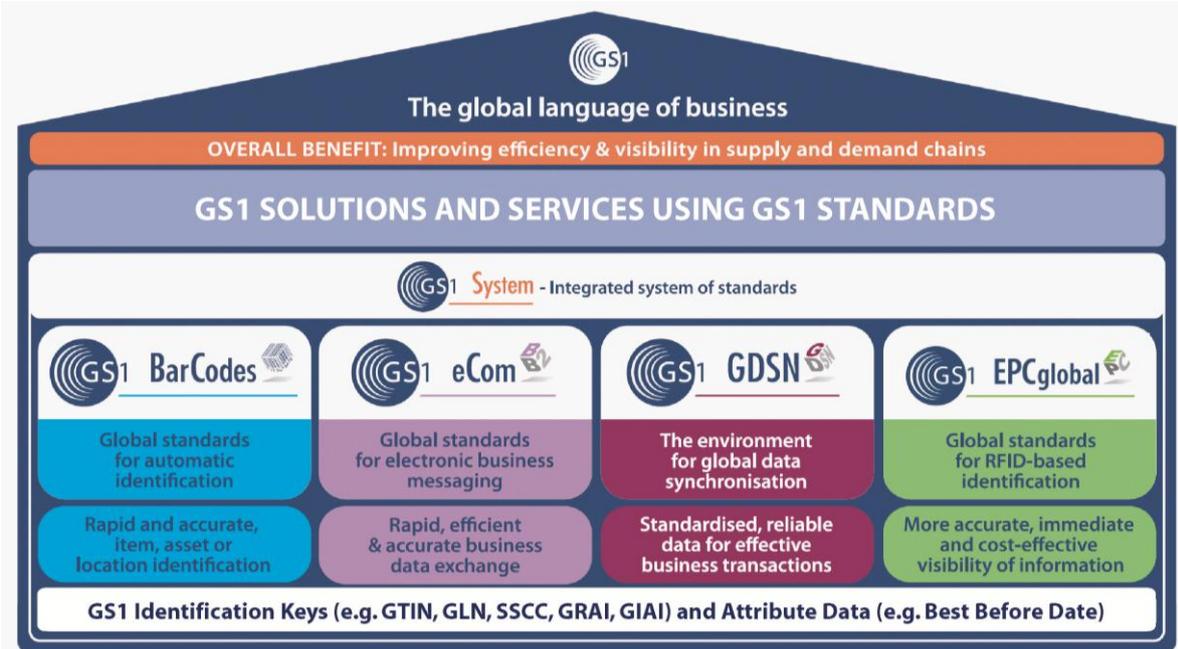
As illustrated in the Figure 1 on page 7, GS1 Solutions and Services using the GS1 System include:

GS1 Identification Keys: GS1 Identification Keys are the keys to accessing information about a product (or any physical or non physical item) on a computer file. The numbers are unique, non significant and global. They can be allocated to trade items, logistic units, locations, assets, shipments, consignments, documents and service relationships. The main elements of the numbering system are GTIN, SSCC, GLN and the Attribute Data. Please contact GS1 Australia for a full list of all GS1 Identification Keys.

Bar Codes: Within the GS1 System, data carriers (most commonly bar codes) are used to encode the GS1 Identification Keys to facilitate communication, data collection and exchange of information and smooth the flow of information between trading partners.

eMessaging: This is based on the principle of the transfer of structured data, using agreed messaging standards from one computer application to another by electronic means and with a minimum of human intervention. The structure and data content are exchanged by agreed means by trading partners. GS1 EANCOM and GS1 XML are the two messaging standards in the GS1 System used for eMessaging implementations. The electronic exchange of data or eMessaging provides trading partners with an efficient trading tool for the transmission of data.

Figure 1: the GS1 System



GS1 GDSN: The GS1 Global Data Synchronisation Network (GDSN) is a concept developed by various industry groups, including Global Commerce Initiative (GCI) and GS1 to assist industries streamline their supply chain transactions with the aim of reducing supply chain costs. The GS1 GDSN is an internet based interconnected network of interoperable data posted to a global registry that enables companies around the globe to exchange and synchronise supply chain master data with their trading partners. GS1net is the GDSN Data Pool run by GS1 Australia.

EPCglobal: The EPC (Electronic Product Code) Network is an open standards-based system that will make organisations more effective through real and timely visibility of information about items in the supply chain. This new, open global standard combines Radio Frequency Identification technology (RFID), existing communications network infrastructure and the EPC (a number for uniquely identifying an item) to create cost-efficient, real-time, accurate information about the location of items, the history of items, and the number of items in the supply chain. It is based on research conducted through the Auto-ID Centre with the support of more than 100 leading companies.

The EPC Network is comprised of five fundamental elements:

- Electronic Product Code (EPC)
- EPC Tags and Readers
- Object Name Service (ONS)
- Middleware (Application Level Event Software)
- EPC Information Service (EPCIS)



4 Benefits of Implementation

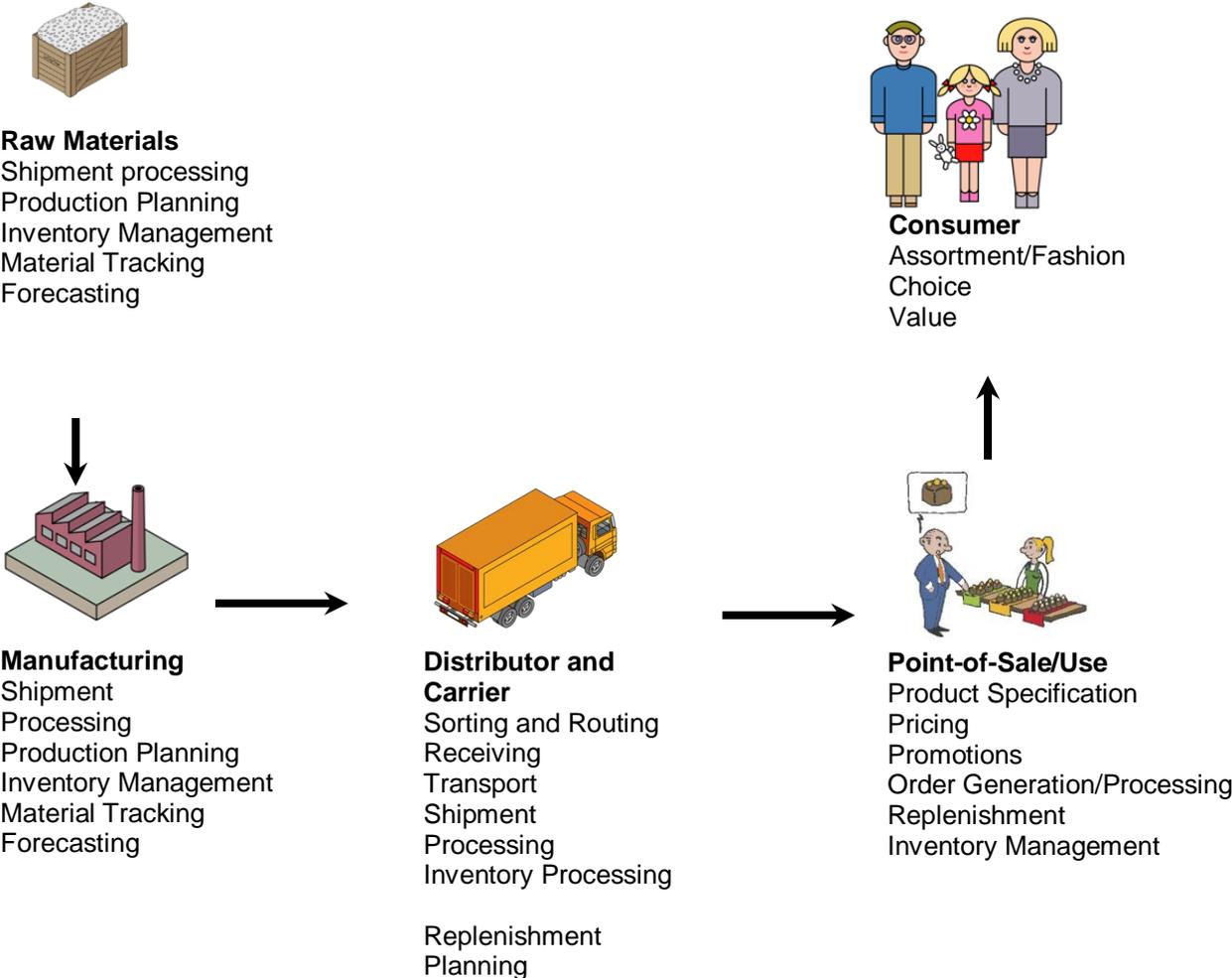
Using a standard common approach to the numbering and bar coding of trade items, logistic units, locations, assets, and documents, amongst others, will deliver the benefits of speed, accuracy and labour savings in the handling and distribution of goods throughout the entire supply chain. Companies should 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. The benefits listed below are defined generically for users throughout the entire supply chain and not just the end user.

Some of the specific identified benefits are:

- More accurate information
- Real-time information
- Reduced manual entry
- Improved traceability (including for product recalls/withdrawals)
- Common identification across Industry
- Improved stock handling
- Improved stocktaking
- Reduced picking errors
- Reduce customer order errors

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

Figure 2: Numbering and Bar Coding Benefits along the Supply Chain



5 How to Number and Bar Code Trade Items

5.1 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 also includes services, all of them having pre-defined characteristics.

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, a film-wrapped tray, a crate with bottles, 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

A separate GTIN must be assigned to every different variation of a product. Size, style, grade, colour, etc. are all considered separate variations and thus require separate GTINs.

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 “GTIN Allocation Rules” for guidance on when a change of GTIN is required, or 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.

Note: A GTIN allocated to a trade item that has become obsolete must not be re-used for another trade item until at least 48 months (4 years) has elapsed after:

- The expiration date of the last original trade items produced with that GTIN, or
- The last original trade items produced with that GTIN have been supplied to the customer

Companies may choose to extend the period of time before a GTIN is re-used beyond the minimum of four years; this is perfectly acceptable.

Consideration should be given to items which may exist in the marketplace for a longer period. For example, steel beams may be stored for many years before entering the supply chain, and processes should be put in place to ensure that the GTIN is not reallocated for a significant period of time.

In addition, when contemplating the re-use of a GTIN, consideration should be given to the use of data associated with the original GTIN by trading partners for statistical analysis or service records, which may continue long after the original trade item was last supplied.

5.2 Attributes of Trade Items

Attribute information of trade items is any data over and above the item identifier, ie. the GTIN. Examples of this type of information include batch numbers, serial numbers 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.

Suppliers, at their discretion, can apply to trade items, any of the AIs available to them under the GS1 standards. For a complete list of AIs refer to the **GS1 Australia User Manual-Numbering and Bar Coding** which can be found at www.gs1au.org.

Figure 3: Attribute Information used for traceability



Note: Bar code size is not to scale. The GTIN-13 is encoded in an EAN-13 Bar Code, the attribute information, such as expiry date, batch/lot number or serial number are encoded in a GS1-128 Bar Code. Only the EAN-13 Bar Code will be scanned at POS.

Important Notes REGARDING TRADE ITEM ATTRIBUTE INFORMATION:

- Attribute information cannot stand-alone; it must always be accompanied by a GTIN
- Attribute information can be encoded with the GTIN in a GS1-128 or GS1 DataBar¹ Bar Code. It can also be added as an additional bar code to an existing EAN-13, UPC-A, ITF-14 or a GS1-128 Bar Code, 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
- Attribute information cannot currently be scanned at the retail Point-of-Sale¹

For further information regarding the use of Application Identifiers please refer to the **GS1 Australia User Manual-Numbering and Bar Coding**.

5.3 Difference between Numbering and Bar Coding

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

¹ GS1 DataBar has been approved for bilateral use between trading partners from 2010 and, in 2014 GS1 DataBar becomes an open Symbology and all scanning environments must be able to read these symbols.



5.3.1 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. There are nine GS1 Identification Keys that support the identification of trade items, logistic units, shipments, consignments, locations, documents, service recipients, individual assets, and returnable assets. Each of the GS1 Identification Keys provides a link between the items and information pertaining to them.

5.3.2 Bar Coding

All of the GS1 Identification Keys ('numbers') used in the GS1 System can be represented in data carriers and of these, bar codes are the most commonly used. Bar codes 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.

Bar codes 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.

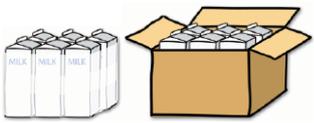
For more information, please refer to the GS1 Australia User Manual – Numbering and Bar Coding.

Figure 4: GTIN-13 vs. EAN-13



5.4 Numbering, Bar Coding and packaging levels

Table 1: Guide to choosing the numbering and bar coding options for a particular application

Application Areas	Encoded GTIN and/ or attribute information	Symbol
Retail Point-of-Sale only 	GTIN-13 GTIN-12 may be required for North America/Canada GTIN-12 or GTIN-13 + attribute data ²	EAN-13 (or GS1 DataBar ³) UPC-A (or GS1 DataBar ³) GS1 DataBar ³
Retail Point-of-Sale only - small items 	GTIN-8 a zero-suppressed GTIN-12 (Note that these numbers are for North America only and have not been issued for some time therefore only companies that already have them can use them.) GTIN-8 + attribute data ²	EAN-8 (or GS1 DataBar ³) UPC-E GS1 DataBar ³
Retail Point-of-Sale and Non-Retail (General Distribution) 	GTIN-13 GTIN-12 may be required for North America/Canada	EAN-13 UPC-A
Non-Retail (General Distribution), ideal for printing on corrugate 	GTIN-13 GTIN-12 GTIN-14	ITF-14 ITF-14 ITF-14
Non-Retail (General Distribution), can encode attribute data, ideal for printing on labels 	GTIN-12, GTIN-13 or GTIN-14 GTIN-12, GTIN-13 or GTIN-14 + attribute data	GS1-128 GS1-128

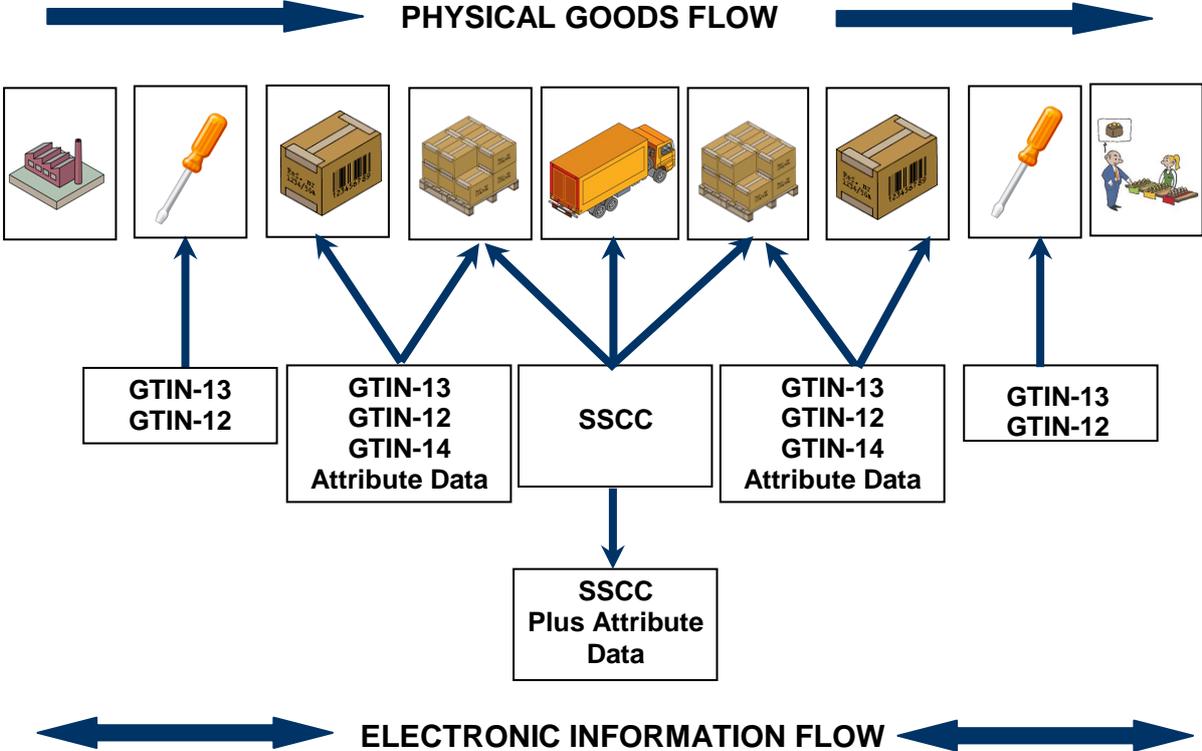
² Attribute data will not be captured at the Retail Point of Sale, unless encoded in a GS1DataBar. Please refer to footnote 1 on page 11 for further information.

³ See footnote 1 on page 11



Note: Depending on the Sector, there might be Industry specific requirements that need to be fulfilled (e.g. GS1 DataMatrix in the Healthcare sector).

Figure 5: an example illustrating Identification across the Supply Chain



5.5 Fixed Measure Trade Items Sold at Retail Point-of-Sale (POS)

Any trade item which is intended to be sold to the final consumer through retail Point-of-Sale (POS) is more commonly known as a RETAIL ITEM or CONSUMER UNIT.

Trade items, scanned at retail POS can be identified with a GTIN-13, GTIN-12 or GTIN-8 as described in the following sections. To be scanned at the Point-of-Sale, these GS1 Identification Keys must be encoded in EAN-13, EAN-8, UPC-A, UPC-E or GS1 DataBar⁴ Bar Code Symbology.

5.5.1 GTIN-13

Trade items that are sold at POS are generally allocated a GTIN-13.

The format of the GTIN-13 is:

GS1 Company Prefix:

The GS1 Company Prefix is allocated by GS1 Member Organisations. GS1 Australia allocates nine- or seven-digit GS1 Company Prefixes.

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.

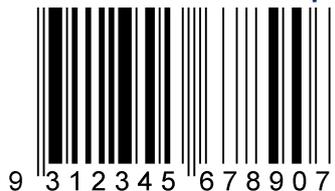
Check Digit:

Validates the accuracy of the entire number by mathematical formula.

A GTIN-13 can be represented in an EAN-13 or GS1 DataBar⁴ Bar Code.

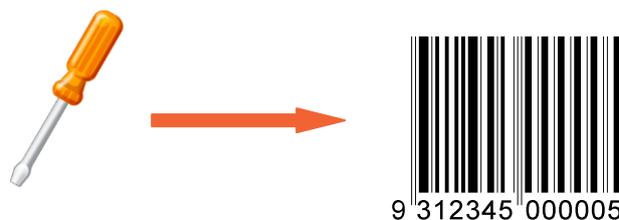
For details regarding the EAN-13 Bar Code, including dimensions, please refer to EAN-13 Bar Code specifications in the ***GS1 Australia User Manual-Numbering and Bar Coding***.

Figure 6: Example of an EAN-13 Bar Code representing the GTIN-13



Note: Bar code size is not to scale.

Figure 7: Example of a trade item carrying a GTIN-13 represented in an EAN-13 Bar Code



Note: Bar code size is not to scale.

⁴ see footnote 1 on page 11



5.5.2 GTIN-8

The allocation of a GTIN-8 is restricted to trade items that genuinely cannot accommodate a larger EAN-13 Bar Code. These can only be obtained directly from GS1 Australia and are allocated as a complete eight digit number. A GTIN-8 can be represented in an EAN-8 or GS1 DataBar⁵ Bar Code.

For details regarding the EAN-8 Bar Code, including dimensions, please refer to EAN-8 Bar Code specifications in the **GS1 Australia User Manual-Numbering and Bar Coding**.

Figure 8: Example of an EAN-8 Bar Code representing the GTIN-8



Note: Bar code size is not to scale.

5.5.3 GTIN-12

If your trade item is to be sold within the United States and/or Canada, a GTIN-12 may be required. A GTIN-12 can be represented in a UPC-A or GS1 DataBar⁵ Bar Code.

For more information on the GTIN-12 and for details of the UPC-A Bar Code, including dimensions, please refer to the **GS1 Australia User Manual – Numbering and Bar Coding**.

Figure 9: Example of a UPC-A Bar Code representing the GTIN-12



Note: Bar code size is not to scale.

5.6 Variable Measure Trade Items Sold at Retail Point-of-Sale (POS)

These Variable Measure Trade Items are those sold in random quantity against a fixed price per unit quantity and intended to cross a Point-of-Sale (e.g. apples sold at a fixed price per kilogram); the items are either marked in the store by the retailer or are marked at the source by the supplier.

There is currently no global solution for Variable Measure Trade Items sold at POS but work is underway to develop global standards for these items, particularly in the area of Fresh Foods.

There is, however, a **national** solution for Variable Measure Trade Items sold at POS; manufacturers who wish to label and apply bar codes to Variable Measure Trade Items must apply to GS1 Australia for standard variable measure company items numbers. The latter are used to construct a 13-digit number known as a VMN-13 (Variable Measure Number). For details on VMN-13s and the EAN-13 Bar Code in which they are encoded, please refer to the **GS1 Australia User Manual – Numbering and Bar Coding**.

⁵ see footnote 1 on page 11



5.7 Fixed Measure Trade Items Non-Retail (General Distribution)

5.7.1 Definition

Trade items not sold at POS are any standard grouping of items made up to facilitate the operations of handling, storing, order preparation, shipments etc and may often be referred to as **NON-RETAIL TRADE ITEMS**.

For an overview on what GS1 Identification Keys and what GS1 Bar Code symbology are used for non-Retail Trade Items, please refer to section 5.4 or go to the ***GS1 Australia User Manual – Numbering and Bar Coding***.

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

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

5.7.2 Options for Trade Items NOT sold at Retail Point-of-Sale (POS)

A trade item **not** sold at retail POS can be numbered and bar coded with:

- GTIN-14 represented in either the ITF-14 or GS1-128 Bar Code
- GTIN-13 represented in an EAN-13, ITF-14 or GS1-128 Bar Code

For items sold in North America, refer to the GS1 Australia User Manual-Numbering and Bar Coding.

GTIN-14

This option is only available for homogenous groupings of standard trade items, where all units contained in the group are identical. It involves using an Indicator with the GTIN and recalculating the Check Digit.

An Indicator can be any number from one to eight. Indicators are used to create up to eight unique GTIN-14s to distinguish between different packaging levels or pack quantities of the same trade item. They are chosen at the discretion of the company allocating the number.

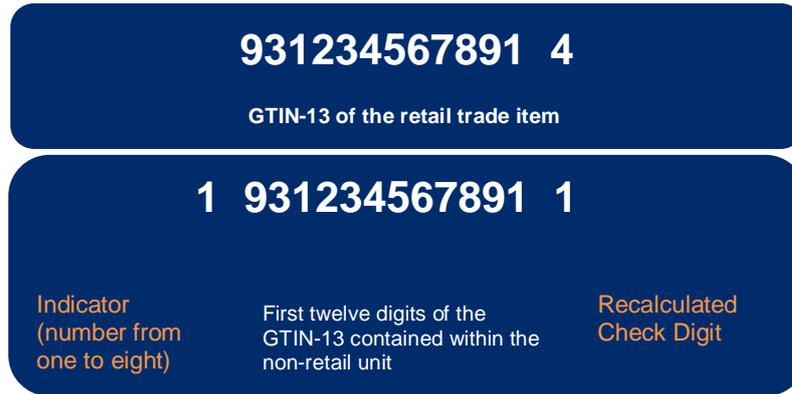
Note: The Indicator 9 is reserved for variable measure trade items (see Section 4.5)

How to form a GTIN-14 if a Trade Item Sold at Retail Point-of-Sale (Retail Trade Item) Carries a GTIN-13

Choose the GTIN-13 on the retail 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 10: structure of GTIN-14 based on GTIN-13



How to form a GTIN-14 if a Retail Trade Item Carries a GTIN-8

Choose the GTIN-8 on the retail unit that is the lowest level of packaging within the non-retail trade item. To form the GTIN-14, put an Indicator followed by five filler zeros in front of the first seven digits of the GTIN-8 then recalculate the Check Digit. A Check Digit Calculator Program is available on our website www.gs1au.org

Figure 11: structure of GTIN-14 based on GTIN-8



Note: The GTIN-14 can be represented in either an ITF-14 or a GS1-128 Bar Code but the ITF-14 Symbology is better suited for printing onto corrugated fibreboard.

Table 2: example of GTIN-14 created out of GTIN-13 or GTIN-8

Item		GTIN	Bar Code
Consumer unit/retail item		931234500000 5	EAN-13
		9312345 7	EAN-8
Box of 20 identical retail items		1 931234500000 2 1 000009312345 4	GS1-128 / ITF-14
Box of 50 identical retail items		2 931234500000 9 2 000009312345 1	GS1-128 / ITF-14

Note: Only allowed with identical products in the non-retail item.



Figure 12: ITF-14 Bar Code

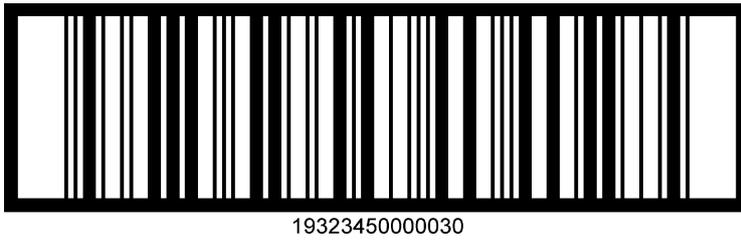


Figure 13: GS1-128 Bar Code



Note: Bar code size is not to scale.

GTIN-13

If desired, a GTIN-13 can be allocated to a non-retail trade item. The method used to allocate this number is the same as for allocating a number to a retail trade item; refer to the **GS1 Australia User Manual - Numbering and Bar Coding**, located on our website - www.gs1au.org.

If there is any possibility of the non-retail trade item being sold at retail level, it *must* carry a GTIN-13 represented in an EAN-13 Bar Code. Ensure that a non-retail trade item is not allocated the same GTIN as a retail trade item.

If the non-retail trade item is NOT crossing retail Point-of-Sale, it can be encoded in an ITF-14 or GS1-128 Bar Code, provided that a filler zero is added in front of the GTIN-13.

The ITF-14 Symbology is better suited for printing onto corrugated fibreboard.

Figure 14: EAN-13 Bar Code

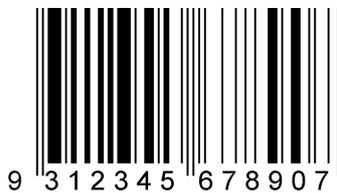


Figure 15: ITF-14 Bar Code

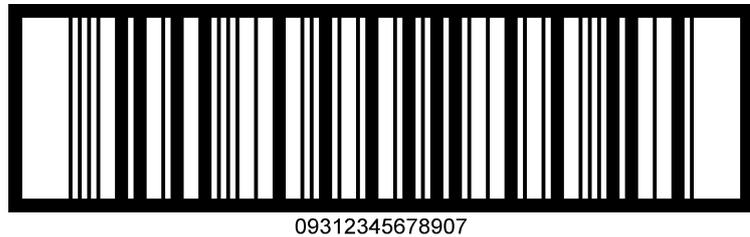
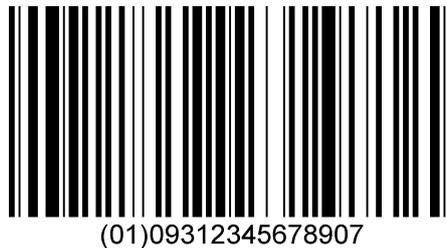


Figure 16: GS1-128 Bar Code



Note: Bar code size is not to scale.



5.8 Variable Measure Trade Items NOT Sold at Retail Point-of-Sale (POS)

Trade items may be of variable measure either because the production process does not guarantee consistency in weight, size or length (carcasses of meat, lengths of timber etc) or because the items are created to meet a special order which states a quantity (e.g. textiles 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 considered to 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 timber in standardised bundles of a total of 10 metres, but the number of pieces of timber may vary. The customer, a retailer in this example, may need to know the exact number of pieces of timber contained in each bundle. In this example, the supplier should mark the trade item by using a variable measure GTIN and a variable count 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 particular Variable Measure Trade Item. The digit “9” in the first position is an integral part of the fourteen digit Variable Measure GTIN.

Note: Variable measure information represented in the following manner **cannot** be scanned at the retail Point-of-Sale (POS).

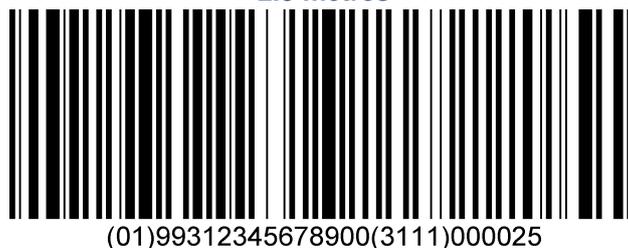
The format of one example of a variable measure GTIN-14 is:

Application Identifier (01)	Used to identify that the data following is a fourteen-digit GTIN when encoded in a GS1-128 Bar Code
Indicator “9”	Indicates that the trade item is of variable measure
GS1 Company Prefix:	The GS1 Company Prefix is allocated by GS1 Member Organisations. GS1 Australia allocates nine- or seven-digit GS1 Company Prefixes.
Item Reference:	Item Reference allocated by the company to each different item.
Check Digit:	Calculated using a mathematical formula
Application Identifier (311n)⁶	Used in a GS1-128 Bar Code to identify that the information following is the length or first dimension in metres. The last digit, n, of the AI indicates the decimal point position.
Format	Six fixed numeric characters used to represent the length in metres

⁶ The Application Identifier (3111) has been used as an example. Any of the measure AIs available can be used.



Figure 17: GS1-128 Symbol representing a Variable Measure Trade Item with a length of 2.5 metres



Note: Bar code size is not to scale.

Note: For further information on Application Identifiers see Section 5.2 and consult the *GS1 Australia User Manual - Numbering and Bar Coding*.

5.9 Location of the Bar Code on Trade Items

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

5.9.1 Trade Items Sold at Retail Point-of-Sale (POS)

Where the trade item sold at retail POS is to be bar coded, the **general** location for bar codes on trade items is the lower right quadrant of the back respecting the Quiet Zones around the bar code and the edge rule.

The **edge rule** stipulates that the bar code must not be closer than 8mm or further than 100mm from any edge of the package/container.

In the event that trade items are of an irregular or unusual shape, a common sense approach should be taken; the bar code should be located as close as possible to the recommended guidelines thereby ensuring that its location does not affect its ability to be scanned.

More detailed guidelines for specific types of retail trade items can be found in *GS1 Australia User Manual - Numbering and Bar Coding*.

5.9.2 Trade Items NOT Sold at Retail Point-of-Sale (POS)

The bar codes on units not intended for retail POS should be upright (i.e. in picket fence orientation) and placed on the sides of the unit. Each item shall have at least one bar code, with two or more highly recommended. The bar codes should be kept away from any vertical edges so that they are less likely to be accidentally damaged in transit.

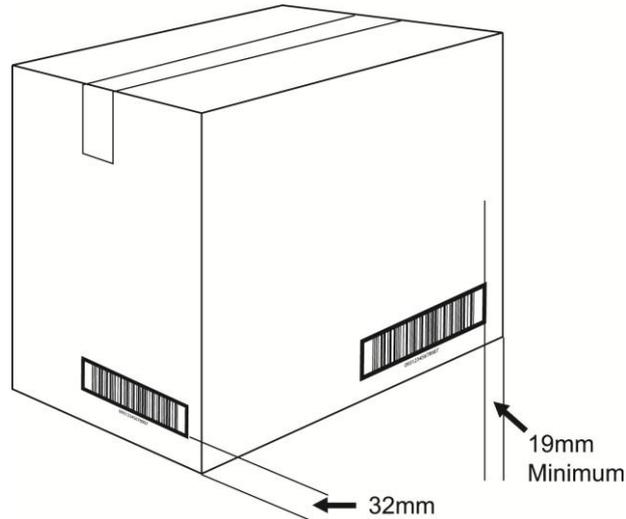
All attempts should be made to maintain 100% scannability at all times.

The bar codes 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 Bar Code) are exactly 32mm from the lower edge of the base of the carton
- No part of the bar code (including the Bearer Bars on an ITF-14 Bar Code, and Quiet Zones) is closer than 19mm to any vertical edge.



Figure 18: Location of an ITF-14 Bar Code on a Trade Item

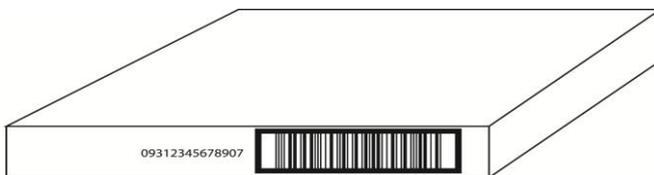


Shallow Trays

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

- Place the Human Readable Interpretation to the left of the bar code, outside the Quiet Zones as shown in Figure 19
- When the height of the unit is less than 32 mm, the bar code 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 19: Symbol Placement on Shallow Trays



6 How to Number and Bar Code Logistic Units

6.1 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.

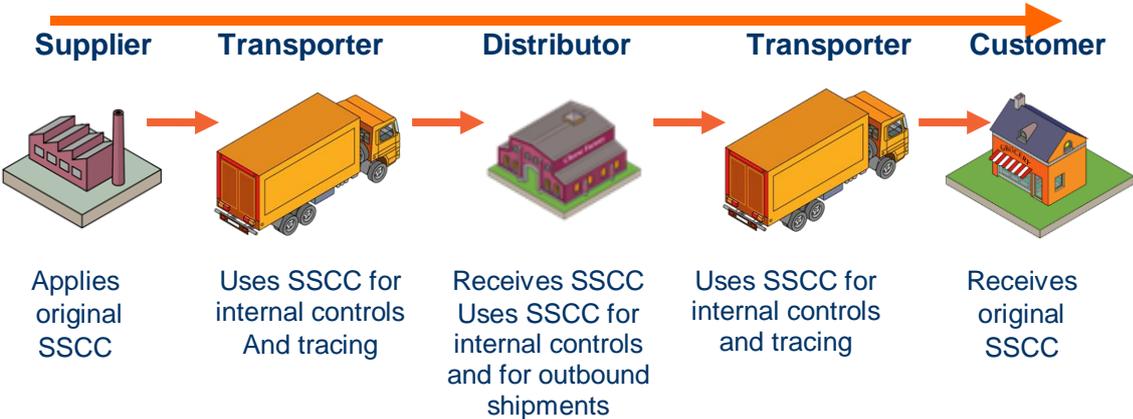
The Serial Shipping Container Code (SSCC) is a reference number or license plate used to uniquely identify logistics units. The SSCC acts as a “reference key” which can be stored in a computer system to which information can be added and shared amongst trading partners as the logistics unit moves throughout 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 up 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 Bar Code.

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.

Figure 20: The Use of the SSCC throughout the supply chain



It is essential that the recipient, transport company, distributor or customer 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 particular 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.

6.2 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 21: structure of the SSCC



Table 3: structure of the SSCC

Application Identifier (00)	Used in the GS1-128 Bar Code 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. GS1 Australia allocates nine- or seven-digit GS1 Company Prefixes. 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.

Figure 22: Serial Shipping Container Code (SSCC)



Note: Bar code size is not to scale.

6.3 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 in order 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 (bar code) 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 the purpose of 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 of 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 (bar codes)
- 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.

6.3.1 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
- Bar codes (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).

6.3.2 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 particular 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.

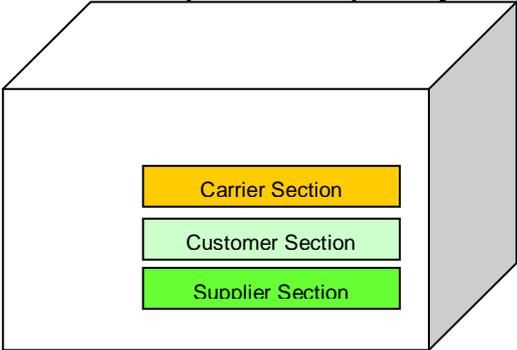
Each label section may be applied at a different point in time, as the relevant information becomes known. However should all relevant information be known at the time, the label is to be produced, it can be combined into one label, please refer to examples in Section 6.4.

Within each section bar coded information is separated from text information to facilitate separate processing by automatic data capture and people. Bar codes 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 Australia User Manual - Numbering and Bar Coding**.

Figure 23: Label sections represented separately on a logistic unit



6.3.3 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)

6.3.4 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 Australia User Manual - Numbering and Bar Coding** or contact GS1 Australia for further information.

Bar Codes

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

The number of GS1-128 Bar Codes 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 bar codes. The sequence of the bar coded 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.

Bar Code Orientation and Placement

Bar codes 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.

Text

There are three types of text information, which can appear on a logistics label:

- Plain text - text that is not encoded in the bar code but often required on a label e.g. name and address of the sender and receiver
- Human Readable Interpretation - the information encoded in the bar code 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.

Further details can be found in the **GS1 Australia User Manual - Numbering and Bar Coding**.



6.4 GS1 Logistics Label Formats for the Australasian Hardware Industry

As described in Section 6.1 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.

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

- **Logistic unit containing the same trade items** (see Figure 24)
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 nails.
- **Mixed trade items on the logistic unit from the same Purchase Order** (see Figure25)
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.
- **Mixed trade items on the logistic unit from various Purchase Orders** (see Figure26)
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.
- **Where full eMessaging is applicable** (See Figure26)
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.

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.

Note: The bar codes in Figure 24 to Figure 26 are not to scale.



Figure 24: Example of the GS1 Logistics Label Format standard pallets

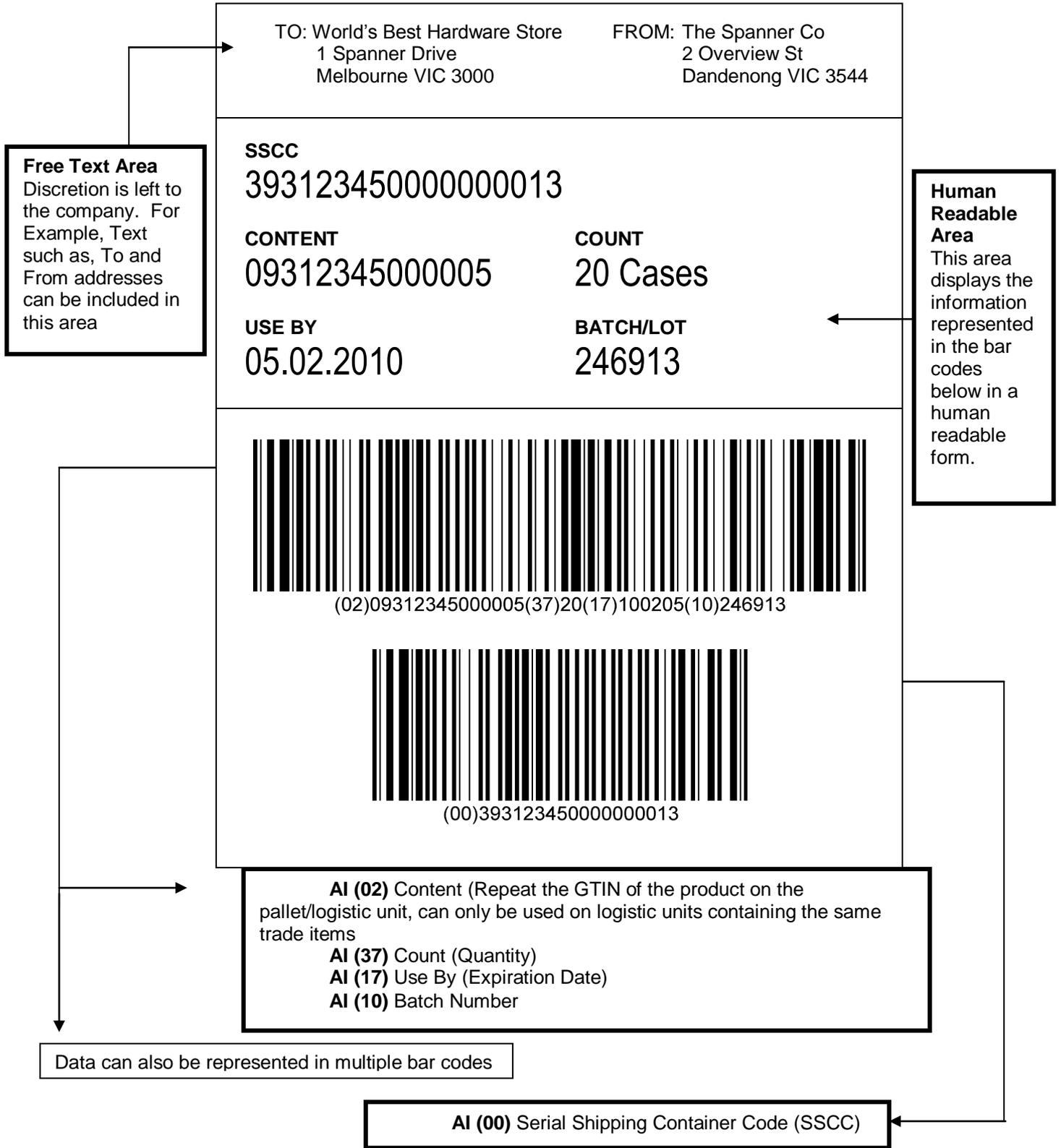


Figure 25: Example of a GS1 Logistics Label Format mixed orders same Customer Purchase Order

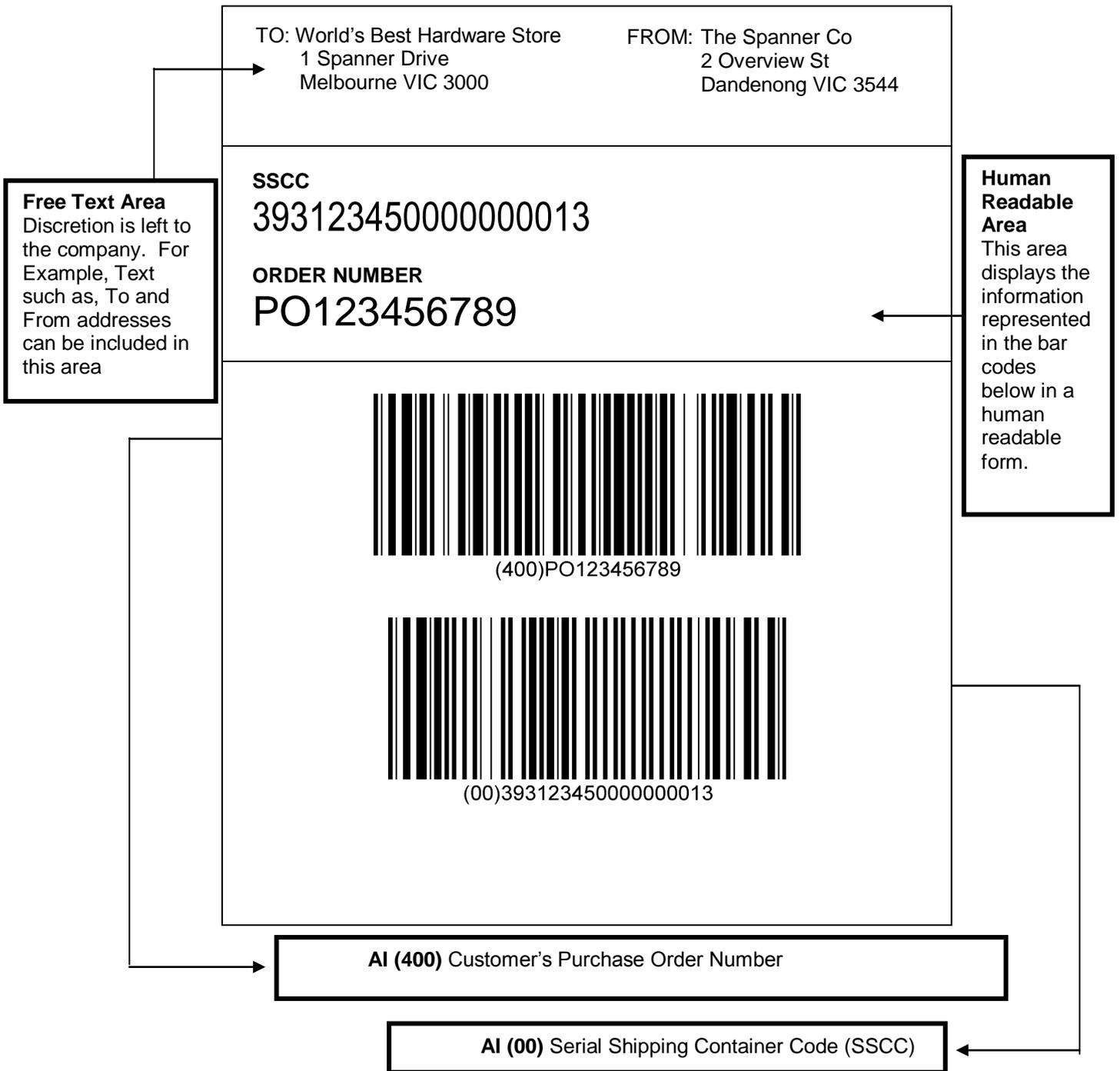
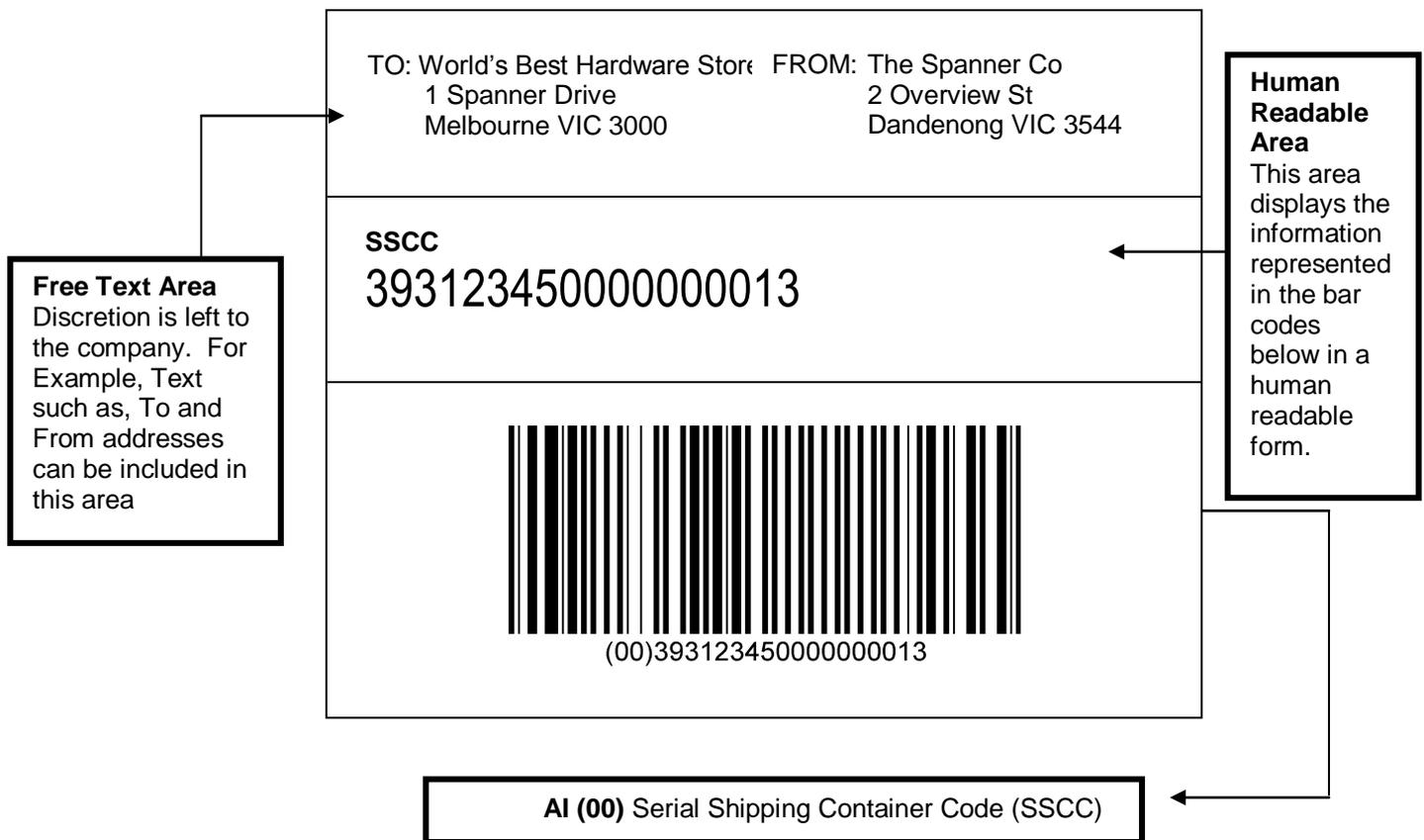


Figure 26: Example of a GS1 Logistics Label Format mixed trade items with different Customer Purchase Order Numbers



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.



6.5 Location of Logistic Unit Label

The bar codes on units intended for General Distribution should be upright (i.e. in picket fence orientation) and placed on the sides of the unit. Each item shall have at least one bar code, and two are recommended.

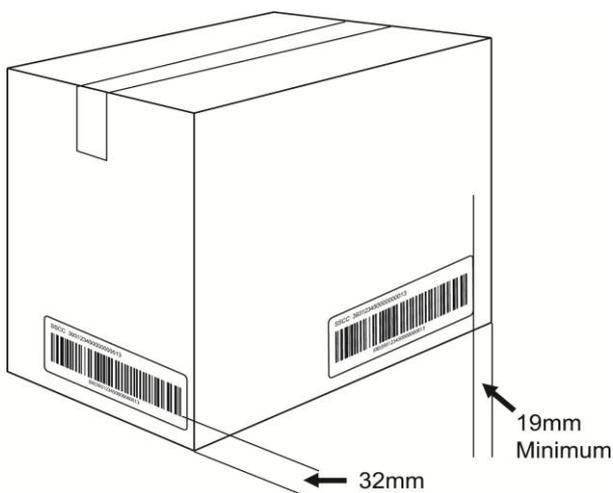
In the event that the product is not a standard carton or pallet of uniform shape all efforts should be made to meet the recommendations. For shipments with an irregular or unconventional shape common sense should direct the location of any logistics labels to ensure that the label is visible at all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

Consult the **GS1 Australia User Manual - Numbering and Bar Coding** or contact GS1 Australia for further information on logistic label location.

6.5.1 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 Bar Code containing the SSCC is 32mm from the base of the unit. Ensure that no part of the bar code (Including Quiet Zones) is closer than 19mm from any vertical edge.



If the unit is already marked with an EAN-13, UPC-A, ITF-14 or GS1-128 Bar Code for trade item identification purposes, the label should be placed so as not to obscure the pre-existing bar code. The preferred location of the label in this case is to the side of the pre-existing bar code, so that a consistent horizontal location is maintained.

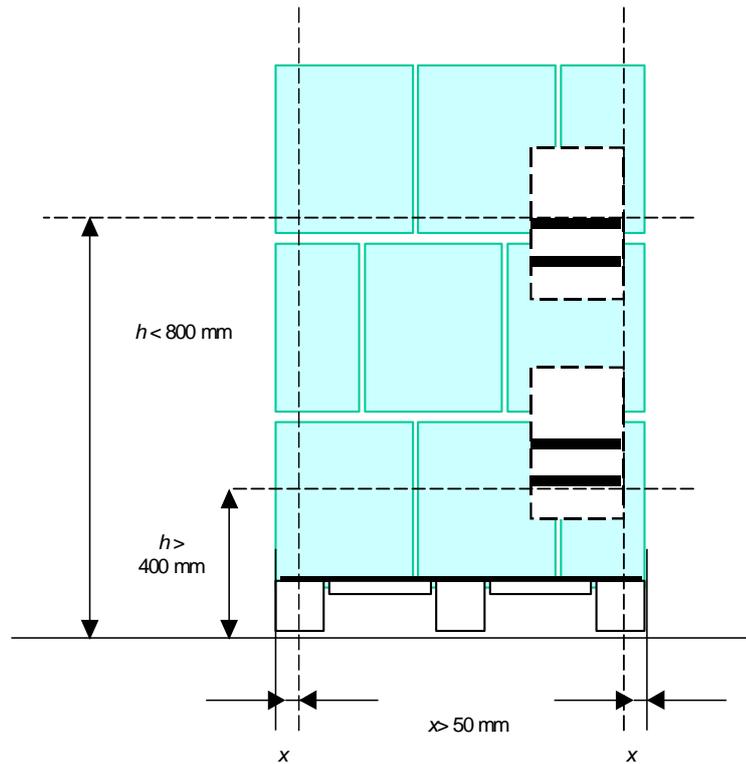


6.5.2 Pallets

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

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

Figure 27: Location of the GS1 Logistics Label on pallets



7 Global Location Numbers

7.1 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.

7.2 Definition of the Global Location Number (GLN)

The GLN is a thirteen-digit non-significant reference number used to identify:

- Parties, e.g. legal entities or organisations, business functions, groups
- Physical entities, e.g. a door of a warehouse, a particular 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 bar code 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 Bar Code 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 Australia User Manual – Numbering and Bar Coding**.

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.

7.3 Implementation Timing

- 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.



8 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.

Within this guideline, Asset Numbering has not been covered in any more detail. If you require further information please consult the ***GS1 Australia User Manual-Numbering and Bar Coding*** or contact GS1 Australia.



9 Australasian Hardware Industry Requirements

This is a practical guideline for companies who are intending to implement the numbering and bar coding of trade items. The recommended times listed below for implementation are provided as a guide for all parties throughout the supply chain and it is recognised that some companies may require more or less time according to their current level of implementation and trading partner agreements.

Table 4: Implementation Timetable

Time Frame	GTIN required for POS items ⁷	GTIN required for trade items not sold at POS	Attribute data identified at Industry Level	SSCC ⁸	Global Location Number
Refer to trading partner requirements and whole of industry call to action documents.	Required on Individual trade items				
		Required on trade items not sold at the Point-of-Sale where appropriate			
				Will be required by most retailers for scan receipting	
			Additional information may be required based on trading partner relationships		
					Will be required once messaging standards implemented

⁷ See Section 5.5 for further information about Point-of-Sale items.

⁸ When combined with EDI the SSCC improves efficiency throughout the supply chain. In the event where EDI has not yet been fully implemented solutions exist to enable the use of the SSCC during any transitional period. Refer to Section 7 for relevant solutions





10 Industry Sector Scenarios

10.1 Introduction

The basis of the GS1 System ensures that no matter what industry adopts the standards, the same methodology of allocation of numbers, choice of data carrier (bar code), etc, is kept generic and thus allows for a seamless flow through the supply chain from industry to industry, trading partner to trading partner.

The Hardware Industry covers a diverse number of industry sectors all of which will follow the same standards stipulated by the GS1 System, however to assist certain sections of the Hardware Industry to clearly apply the system the following sections have been developed to provide examples of trade item and trading scenarios that are applicable within each industry sector.

To date the Hardware Industry sectors that have produced sections for this guideline are:

- Greenlife
- Timber
- Plumbing
- Electrical

Care should be taken when reading these sections to ensure that they are used in conjunction with the main body of the Hardware Guidelines. These sections only provide examples of trade item types and scenarios and **not** the methodology for how to allocate Global Trade Item Numbers (GTINs), use appropriate data carriers (bar code), etc.

These sections should preferably not be distributed as standalone documents, but should this be required, to avoid any confusion, reference should be made to the entire Hardware Industry Guidelines.

It should be noted that no other industry sector is precluded from the process of developing a section in this guideline.

Please contact GS1 Australia or GS New Zealand for further information.



10.2 Greenlife Industry Scenarios

10.2.1 Introduction

The GS1 System prides itself on having a complete set of recommendations and requirements to ensure that all parties throughout the supply chain are aided and not hindered by the implementation of its system.

The Hardware guidelines have been written to provide a snapshot view of the GS1 System. Used in conjunction with the technical literature supplied by GS1 and assistance from GS1 they have been designed to identify the key components of the GS1 System and enable suppliers within the industry to begin implementation throughout their business.

The following section of the Hardware guidelines focuses on providing examples of trade items that exist within the Greenlife Industry and the methods of allocating Global Trade Item Numbers (GTINs). This is the key foundation to implementation of other aspects of the GS1 System and the content covered in this chapter assumes some prior knowledge of GTINs and bar coding. Therefore, it is important readers of this section of the document refer to earlier chapters for reference material.

It is not feasible to include every possible variation of trade item available in such a document. It is up to suppliers to identify their own products and the associated method by which to allocate a GTIN and the respective bar code applicable.

In 2002, input into this section of the Hardware Industry Guidelines was provided by the members of the Greenlife Sector group of the Hardware Industry Working Group (HIWG). Since then, any updated versions of this document have also been reviewed by the group. For more information refer to www.hiwg.org.au.



10.3 GTIN Options for Hardware Industry Trade Items

Regardless of the manner in which the trade item is sold, whether it is a packet of seeds with a standard count, or a standard weight or the selling of plants at the various sizes each variation must be assigned its own unique GTIN. For example, if daisies are sold in seed packets of 50 and 100, each variation must be assigned its own unique GTIN. If these trade items are then packed into cartons of 100 and 50 respectively, these two variations also would be assigned a separate and unique GTIN.

Note: Past applications of the GS1 standards within the Greenlife Industry have led to the application of separate GTINs for different price points rather than for each variation of trade item. GS1's recommendations are always to identify a trade item at the lowest level of variation. These guidelines will only provide examples using this methodology.

The decision of which GTIN structure and what data carrier is generally left to the discretion of each individual company and is ultimately governed by factors such as requirements within the company for the marking of additional information, the path of the trade item through the supply chain and whether the trade item will be sold in a retail Point-of-Sale environment.

10.3.1 Trade Items Sold at Retail Point-of-Sale (POS)

Trade items that are sold to a retailer for sale in the Point-of-Sale environment must be numbered and bar coded as described below. In summary the recommendations stipulate that the trade item **must** be assigned a unique GTIN using the GTIN-13 structure and represented in an EAN-13 Bar Code.

Note: All variations (different pack size, plant size, colour, plant variety etc) require a unique GTIN.

Note: Unless products are to be sold in the North American and Canadian markets companies will generally use the EAN-13 Bar Code. Please consult GS1 if your trade item is to be sold within North America and Canada.

Figure 28: Example of a packet of daisy seeds allocated a GTIN-13 represented in an EAN-13 Bar Code



The following list depicts additional examples of different trade items that would be assigned a separate and unique GTIN for use within the Point-of-Sale environment.

- Daisy Seeds 25g
- Daisy Seeds 50g
- Beefeater Tomato Seeds 50 per Packet
- Black Russian Tomato Seeds 50 per Packet
- Premium Potting Mix 25 Litres
- Premium Potting Mix 10 Litres
- Blood and Bone 5kg
- Blood and Bone 10kg
- Loose Potting Mix 1m³
- Bulk Bin Potting Mix 1m³
- Bag 1m³
- etc...

Note: Listed examples in no way depict every different type of trade item available; they serve only to provide an example of product types requiring a separate and unique GTIN.

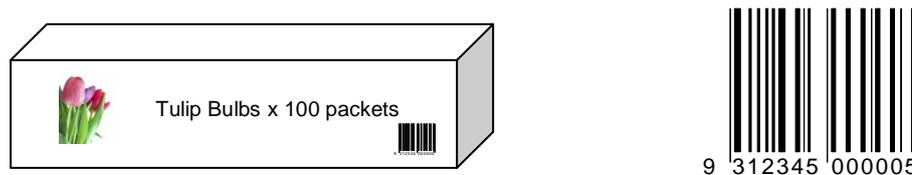
Figure 29: Example of a potted 125mm Variety X Plant allocated a GTIN-13 represented in an EAN-13 Bar Code



The following list depicts additional examples of different trade items that would be assigned a separate and unique GTIN for use within the Point-of-Sale environment.

- Punnet of 6 Blue Pansies
- Punnet of 6 Yellow Pansies
- 125mm Date Palm
- 200mm Maiden Hair Hanging Basket
- 125mm Maiden Hair Standard Pot
- Double Delight Bare rooted Rose
- Double Delight 125mm Pot
- etc...

Figure 30: Example of a carton of 100 packets of tulip bulbs allocated a GTIN-13 represented in an EAN-13 Bar Code



10.3.2 Trade Items NOT Sold at Retail Point-of-Sale (POS)

Where a trade item is sold at the retail Point-of-Sale (i.e. the packet of seeds), then the applicable option described in Section 9.3.1 is applicable. However if the trade item is then bundled into a stable grouping (i.e. a box of seeds) but this unit itself is **not** sold in the Point-of-Sale environment, any of the options for the numbering and bar coding described in Section 5 are applicable.

Note: Every variation (different pack size, plant size, colour, plant variety etc) requires a separate and unique GTIN. If the variations vary for every different order a Variable Measure GTIN should be assigned, see Section 5.8 and 10.3.3 for further information.

Figure 31: Example of a carton of bulbs allocated a GTIN-13 represented together with a leading zero in a GS1-128 Bar Code

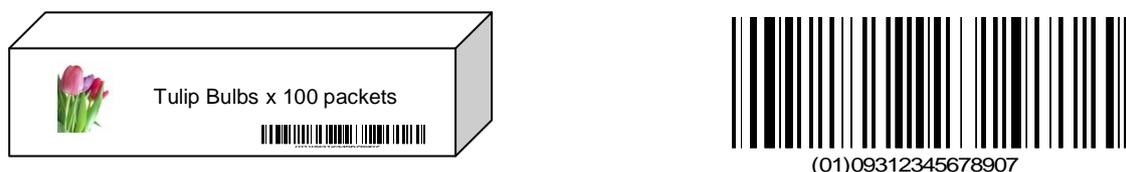


Figure 32: Example of a carton of bulbs allocated a GTIN-13 represented together with a leading zero in an ITF-14 Bar Code



Note: In the examples presented in Figure 31 and Figure 32 the GTIN assigned must be unique and hence **must not** be the same as the GTIN assigned to the individual piece.

ALTERNATIVE OPTION

Alternatively the GTIN-14 option could have been used, see example below.

Figure 33: Example of a carton of bulbs allocated a GTIN-14 represented in a GS1-128 Bar Code



OR

Figure 34: Example of a carton of bulbs allocated a GTIN-14 represented in an ITF-14 Bar Code



The following list depicts additional examples of different



trade items (not sold at retail POS) that should be assigned a separate GTIN.

- Tray of 512 Punnets of Blue Pansies
- Tray of 512 Punnets of Yellow Pansies
- Carton containing 100 Sleeves of Daisy Seeds
- Carton containing 200 Sleeves of Daisy Seeds
- etc....

10.3.3 Variable Measure Trade Items NOT Sold at Retail Point-of-Sale (POS)

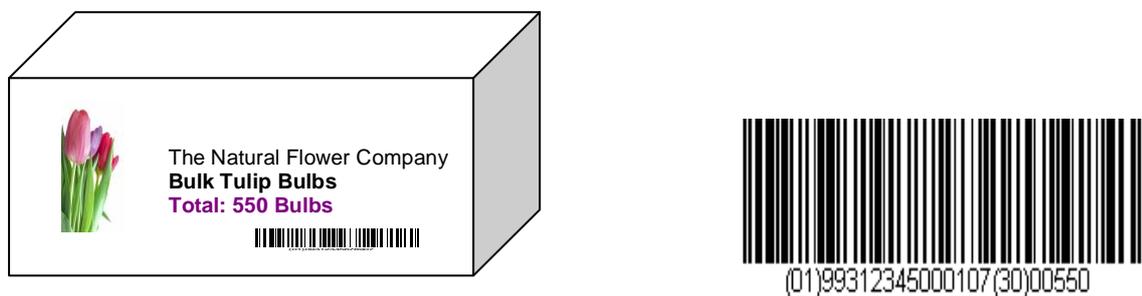
As described in Section 5.8 trade items may be variable measure either because the production process does not guarantee consistency in weight, size or length etc., or because the items are created to meet a special order which states a quantity (e.g. seeds sold by count).

The use of a variable measure GTIN enables the identification of the variable piece of data to be included within the bar code.

Within the Greenlife Industry certain trade items fall within the above mentioned definition. These include seeds sold by count, seeds sold by weight, etc.

Note: This solution will not be available for trade items that are sold through a traditional retail Point-of-Sale environment as POS scanners are not set up to scan the GS1-128 Bar Code required for this application.

Figure 35: Bulk Bulbs sold by count



In this example the number of seeds ordered was 550.

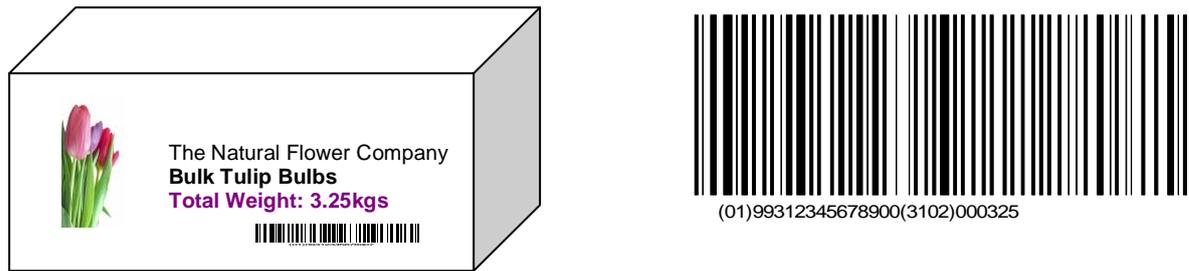
The example provided above highlights the need for a variable measure trade item based on the number or count of seeds. It is assumed that Bulk Daisy Seeds are never sold in a standard count/quantity. In the event that the seed will always be sold in a standard quantity a standard GTIN must be assigned to every different standard quantity available, be it 500, 1,000 and so on.

If a trade item can be sold in different units of measure, for example variable count or sold by weight, each variation should be assigned a separate GTIN.



Example

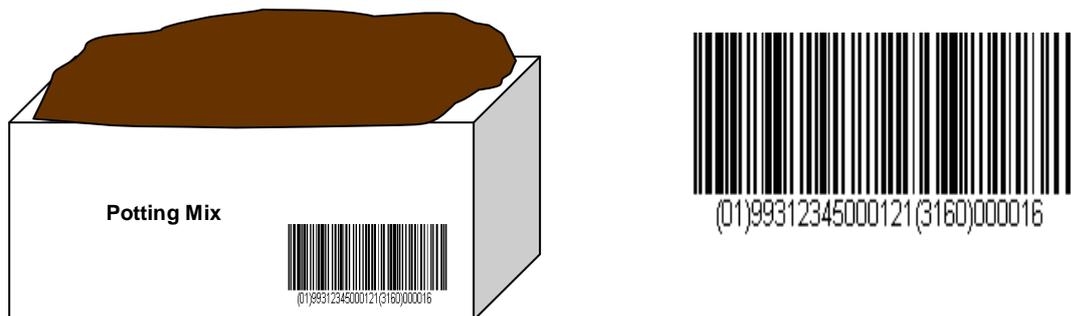
Figure 36: Bulk Bulbs Sold by the weight, total weight for this example 3.25kg



Note: A separate variable measure GTIN has been assigned to identify Bulk Seeds sold by the weight and Bulk Seeds sold by the count.

Other trade items may be sold in variable quantities determined by the trading partner. Such products may include, bulk potting mix, sand, pebbles, gravel etc. The following example depicts the identification of Bulk Potting Mix Grade A as a variable measure trade item.

Figure 37: 16m³ of Bulk Potting Mix Grade A identified with a Variable Measure GTIN



In this example it is assumed that the number of cubic metres provided varies from load to load and hence the use of the variable measure GTIN is applicable. In the event that the Bulk Potting Mix can be purchased in a standard amount, for example 15 cubic metres, then the allocation of a separate standard GTIN applies.

Note: Current trading practices do not trade loose material such as Bulk Potting Mix, Sand, and Pebbles etc. in variable quantities. However the example provided above serves to demonstrate the most suitable method of dealing with such product should there be a requirement to manage variable quantities in the future.



10.4 Attribute Information Options for the Greenlife Industry

In “principle” the Australasian Hardware Industry supports the use of additional attribute data in the long term. Individual companies need to make their own assessment on the implementation and use of additional attribute data in their business.

Suppliers may wish to enhance the traceability of their own products by introducing additional information over and above the allocation of a GTIN to each trade item.

When attribute information is applied to a trade item that is sold at POS then it can be added along side the EAN-13 Bar Code, (see below) or encoded in a GS1 DataBar Bar Code⁹ if the systems that will record the scanning of the item and the resulting GTIN are suitably enabled.

Where the trade item will not be sold at the retail POS attribute information can be concatenated (linked together) with the GTIN, in one single GS1-128 Bar Code as shown in Figure 39: Concatenated GS1-128 Bar Code or in a GS1 DataBar Bar Code⁹.

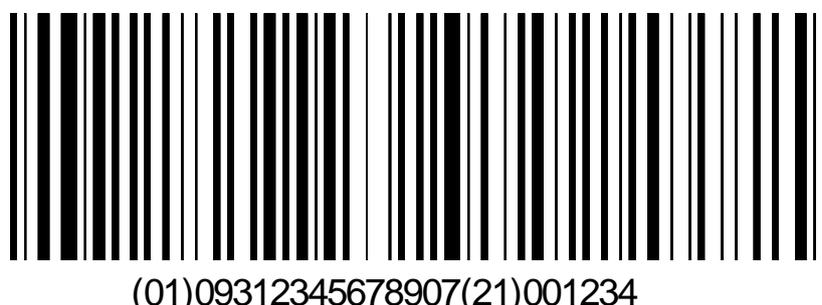
For further information regarding Attribute Information please refer to Section 5.2.

Figure 38: GTIN and serial number represented in separate bar codes



Note: The attribute information, in this example serial number, represented in the above figure will NOT scan at the Point-of-Sale. Only the EAN-13 will scan.

Figure 39: Concatenated GS1-128 Bar Code



Note: The bar code represented in the above figure will not scan at the Point-of-Sale

⁹ see footnote 1 on page 11



Note: The following section describes some of the Application Identifiers that the Greenlife Industry sees as providing useful additional information. This does not preclude suppliers from accessing the entire list of AIs available for use.

10.4.1 Batch Numbers

The Application Identifier (10) is used to define a batch number.

Up to twenty alphabetic and/or numeric characters can be assigned not including the AI. Examples of information that can be included with the AI (10) are:

- production line numbers
- shift numbers
- Date and Time of production

A company other than the one creating the number need not use any internal structures encoded into a batch number. Other companies must use the complete number to identify the batch unambiguously. This is particularly important in situations such as product recall.

Note: The AI (10) must be associated with a GTIN or with the combined AIs 02 and 37

Figure 40: Batch Number AI (10) represented in a GS1-128 Bar Code

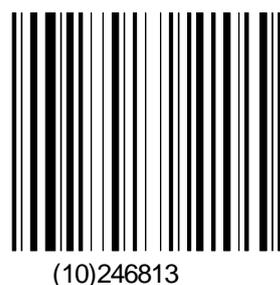
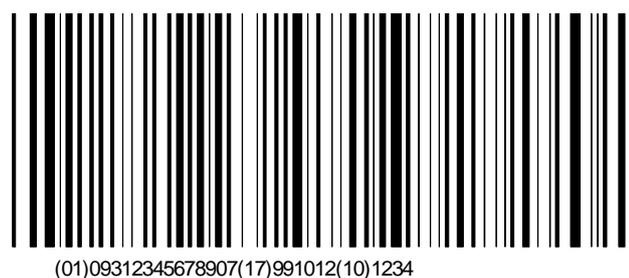


Figure 41: Customised Potting Mix marked with a GTIN, expiration date and batch number.



Batch numbers can be applied to trade items such as bulk potting mix, plants, fertilizer etc.

Note: If the bag illustrated above was intended for retail sale the information shown could be encoded in a GS1 DataBar Bar Code¹⁰, provided the scanners at the POS were suitably enabled.

¹⁰ see footnote 1 on page 11



10.5 Logistic Unit Marking for the Greenlife Industry

The identification of standard and variable measure trade items is achieved by the allocation of unique GTINs. The natural progression from the identification of a trade item is to the identification of a logistic unit.

As described in Section 6 a logistic unit is an item of any composition established for transport and/or storage, which needs to be managed through the supply chain.

The use of the SSCC can enable the unique identification of every logistic unit. Within the Greenlife sector this includes the identification of truckloads of sand, bulk loads of potting mix, pallets of cartons of seed, etc.

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

Seedlings fall into this category. With customers able to pick and choose what is required within their order 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 (SSCC) as described in Section 6.

Example:

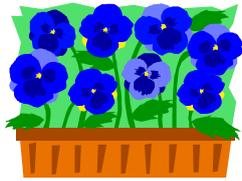
The following example depicts the identification of a trolley of plants ordered by a customer. The trolley is made up of 10 trays of pansies with each tray made up of 8 punnets. In this example each tray consists of the same variety of pansy but there is a mix of trays in the trolley. Overall the trolley consists of:

- 2 Trays of Blue Pansies
- 3 Trays of Red Pansies
- 4 Trays of Purple Pansies
- 1 Tray of Yellow Pansies

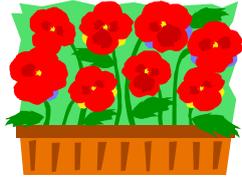
Note: Each of the variations of trays and punnets has its own unique GTIN.



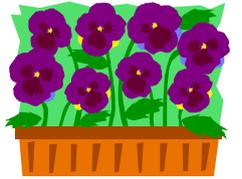
Figure 42: GTINs assigned to individual punnets of Pansies



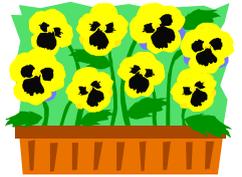
1 Punnet of Blue Pansies = 9312345001002



1 Punnet of Red Pansies = 9312345001019



1 Punnet of Purple Pansies = 9312345001026



1 Punnet of Yellow Pansies = 9312345001033



Figure 43: GTINs assigned to trays of Punnets of Pansies



1 Tray of Blue Pansies = 9312345001040



1 Tray of Red Pansies = 9312345001057



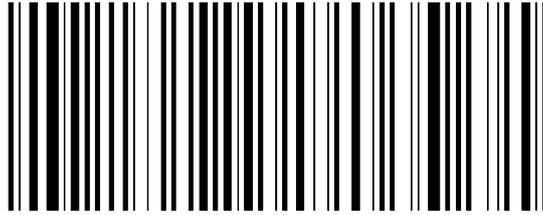
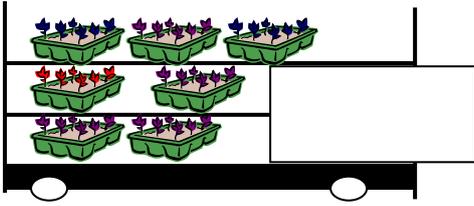
1 Tray of Purple Pansies = 9312345001064



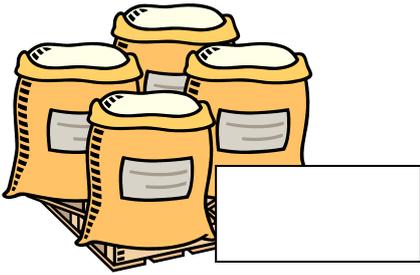
1 Tray of Yellow Pansies = 9312345001071



Figure 44: Logistic Unit (Trolley) of Pansies or a pallet of Potting Mix



(00)393123451234567891



Note: The SSCC would be represented on a label with a format depicted in Section 6.4.



10.6 Greenlife Industry Implementation Issues

The implementation process often identifies anomalies that exist with certain product types where the standard application of the GS1 System is either not feasible or not practical. This in no way indicates that the system is not used; it merely indicates that standard methodologies currently available do not fit within the scope of that particular product.

For instance the application of GTINs to bulk potting mix is practical and feasible; however the physical application of the GTIN represented by the relevant bar code to the actual unit itself may not be realistic or practical.

This section has been developed to assist the industry identify these trade items and methods of dealing with these trade items through the supply chain, including final retail Point-of-Sale.

10.6.1 Bulk Potting Mix and Loose Materials

Loose materials such as Bulk Potting Mix are generally delivered in any of the following ways:

- Truck Loads
- Containers, e.g. Wooden Bins
- Bulk Bags

The physical application of the bar code to such trade items may present a problem since the load is generally not secured with any physical packaging the application of a physical label to the trade item is not likely to be feasible. In this instance trading partners may agree to supply the label on documentation provided with the delivery.

Alternatives to this solution include providing a secure plastic pocket attached to the container that is protected from the elements. Within this pocket the label can be secured.

For further information regarding placement of labels on bulk trade items please consult GS1.

10.6.2 Variable Measure Trade Items Sold at Retail Point-of-Sale (POS)

It has been identified within the Greenlife Industry that some trade items sold to trading partners begin as standard items allocated a standard GTIN. For example, bulk potting mix, sand, gravel, pebbles etc.

These trade items can then be sold to the consumer in any number of variations of volume generally dictated by the consumer at the point of purchase. The following possible solutions are available to trading partners to enable the automation of the trade item, (generally required at the retail Point-of-Sale).

1. The supplier allocates (but does not mark the trade item) with a standard GTIN that identifies the trade item as “**Sandpit Sand variable measure**”. The cost for each cubic metre of the trade item would be entered into the database; much like the cost of a standard trade item is linked to the GTIN of a product. This assigned GTIN is represented by an EAN-13 Bar Code and printed in what is commonly called a shadow book⁹ with an appropriate description along side.

⁹ A Shadow book is a book that contains the printed bar codes encoding GTINs assigned but not printed on the actual trade item, generally because it is not physically possible to do so. The shadow book provides the operator the ability to quickly



At the point of purchase the operator would scan the appropriate EAN-13 Bar Code and the system would need to be programmed to prompt the operator for the total volume in cubic metres purchased. From here the system calculates the price accordingly and registers the sale.

2. The alternative to the above solution is that the seller (normally a retailer) of the trade item assigns Restricted Circulation Number instead of the supplier assigning a GTIN and follows the same procedure as described above. Please consult the technical literature supplied by GS1 or contact GS1 for further information on Restricted Circulation Numbers.

10.6.3 Customised Potting Mix

Customers have the option of ordering potting mix customised to their liking, i.e. the 'recipe' within the mix varies from customer to customer and often from order to order. Where there is never a consistent 'recipe' of potting mix the only method to identify such an order is with the use of the SSCC, refer to Section 6 for further information.

Alternatively where there is always a standard "recipe" that can be purchased each variation can be assigned a unique GTIN. In the event a new recipe is devised then companies may choose to assign a new GTIN should this recipe become a regularly orderable trade item.

10.6.4 Grouped Items NOT Sold as a Trade Item

In some instances trade items are bundled together for transportation purposes but are not traded in this form. Bare rooted plants are such an example. These trade items are only sold as individual units, however to increase stability during the transportation process they are bundled together in groups. Currently there are no requirements for the numbering and bar coding of these types of grouped items.

Note: Should companies wish to number and bar code these items this is perfectly acceptable.

10.6.5 Mixed Trays of Seedlings

In some instances companies may wish to trade trays of seedlings that contain a variation in colour of the same plant. There are a number of ways to assign a GTIN to this configuration of product dependent on the requirements between trading partners.

- **Where the combination of seedlings is always the same**

In the instances where a supplier provides a standard combination of different coloured seedlings. For example a tray that consists always of 6 Blue Pansies, 6 Yellow Pansies, 6 Purple Pansies and 6 White Pansies, then a GTIN can be assigned to this standard combination. Refer to Section 10.3 for GTIN options.

Any order of this GTIN will result in the stated combination being provided. For any other standard combination a separate unique GTIN will be required.

- **Where the combination of seedlings varies from tray to tray and this information does not need to be conveyed**

Where there is never a set combination of plants within a tray and the trading partner does not require the knowledge of the final combination of trade items one GTIN can be assigned to identify that the trade item is a mixed tray of Pansies configuration unknown. Refer to Section 10.3 for GTIN options.

reference trade items sold and scans the appropriate bar code. It provides an automated solution for the trade items not easily bar coded or that have a variable component dictated by the customer.



In this instance trading partners will not be able to track the specific combinations of colours that may be included within the tray.

Where the combination of seedlings varies from tray to tray and this information does need to be conveyed

Where there is never a set combination of plants within a tray and the combination is required to be advised then the SSCC should be used. This would result in information pertaining to each plant being linked to the SSCC and transmitted via Electronic Data Interchange (EDI) prior to the despatch of the order. Refer to Section 6 and 10.5.



11 Timber Industry Scenarios

11.1 Introduction

The GS1 System prides itself on having a complete set of recommendations and requirements to ensure that all parties throughout the supply chain are aided and not hindered by the implementation of its system.

The Hardware guidelines have been written to provide a snapshot view of the GS1 standards. Used in conjunction with the technical literature supplied by GS1 and with assistance from GS1 Australia they have been designed to identify the key components of the system and enable suppliers within the industry to begin implementation throughout their business.

The following section of the Hardware guidelines focuses on providing examples of trade items that exist within the Timber Industry and the methods of allocating GTINs for trade item identification. This is the key foundation to implementation of other aspects of the GS1 System and the content covered in this chapter assumes some prior knowledge of GTINs and bar coding. Therefore, it is important readers of this section of the document refer to earlier chapters for reference material.

It should also be noted that it is not feasible to include every possible variation of trade item available in such a document. It is up to suppliers to identify their own products and the associated method by which to allocate a GTIN and the respective bar code type to use.

In 2002, input into this section of the Hardware Industry Guidelines was provided by the members of the Timber Sector group of the Hardware Industry Working Group (HIWG).

The range of trade items covered by the Timber Sector group includes structural timber, timber boards and lining, treated timber, roundwood, timber mouldings, engineered timber, plywood, MDF and particleboard panels, and MDF mouldings. In this document, representative timber and panel products have been chosen for the purposes of illustrating the principles involved.

The main focus of the Timber Sector group is on the business transactions supporting the sale of timber by the manufacturer. Most of the goods are sold in a packaging unit referred to as a 'pack'. The customer either on-sells the product in the same packaging unit, or breaks open the pack and sells individual pieces (which may be repackaged). Assignment of GTINs to the individual pieces is also important, as retailers require this for POS purposes.



11.2 Terminology and Definitions for Timber Trade Items

To ensure consistency and an understanding of the Timber Industry terminology the following section seeks to clearly describe the terminologies intended for use throughout this section of the Hardware Guidelines relating to Timber trade items.

In this section the term **timber** is used when referring to timber products that exist physically as lengths of timber.

11.2.1 Timber Terminology

- **Packaging Level**

Packaging level is defined as the level at which the trade item is packaged for sale i.e. whether it is sold as pieces, packs or bulk, and if sold as packs, the size of the packs.

- **Pack Configuration**

The pack configuration is defined as whether the trade items are sold as a set length pack, random length pack or a cut to length pack. These commonly used terms are defined in section 11.2.2.

- **Pack Type**

Whether a trade item is a full pack, half pack etc. For timber, it is normally the end section that determines how many pieces will be in a given pack at a given mill, how many pieces across the base of the pack and how many pieces high. The normal sized pack produced by a timber mill may be referred to as having a pack type of full pack. The same mill might also produce the same product in other pack types such as half pack and jumbo pack. Each of these pack types represents a different packaging level

- **Pack Tally**

The pack tally is a record of the number of pieces in a pack of timber and their dimensions.

- **Pack Size**

The pack size is the number of pieces in a pack.

- **Piece Length**

The length of an individual piece of timber, alternatively described as a length of timber. When the trade item is a pack of timber this attribute refers to the length of each individual piece in the pack. (This is only relevant if all pieces in the pack have the same piece length).



11.2.2 Timber Configurations

Various timber configurations relating to the way in which timber is packaged and defined for sale are reviewed in this document and these are defined below:

- **Standard Set Length Pack**

A standard set length pack is a pack of timber containing a selection of pieces of timber, all having the same end section and length. Length is normally a 'nominal length' in 300 mm increments from 300 mm to 7200 mm.

For standard set length pack trade items, both piece length and pack size (number of pieces in a pack) are pre-defined and thus allow for the allocation of a fixed measure GTIN. This can require the allocation of a separate GTIN for each mill where the standard pack size varies from mill to mill within a business.

- **Variable Set Length Pack**

Variable set length pack trade items are set length pack items where the pack size varies from pack to pack. These should only be used for the situation where some packs are produced slightly under or over the standard number of pieces in a pack due to end-of-run processes in some mills. These trade items will not be orderable.

- **Variable Cut to Length (CTL) Pack**

This pack type is the same as a set length pack except that piece length is not pre-defined but is specified at the time of ordering. This is only used for uncommon lengths that have not had a GTIN assigned for the specific length.

Normally the number of pieces in a variable CTL pack will correspond to the number in a set length pack of the same end section from the same mill. However, the same variable GTIN can be used to span multiple pack size, because the volume of CTL products sold is very small.

- **Random Length Pack**

A random length pack is a pack of timber containing a selection of pieces of timber all of the same end section, but varying in length, with the mix of lengths varying from pack to pack. These are assigned a variable measure GTIN.

Random length packs can be classified as 'Long', 'Medium' or 'Short', determined by the piece length range in a pack. Where this is significant for trading purposes, a separate GTIN should be issued for each of these.

- **Standard Mixed Length Pack**

Standard mixed length pack refers to a pack similar to a random pack with a selection of timber all of the same end section and varying in length, with the difference that the mix of lengths is standard from pack to pack.

- **Bulk**

It may be appropriate to regard some timber trade items as bulk product where packaging is irrelevant. These items require a variable measure GTIN. This approach might be used for certain lower grade product and bulk export of timber.

- **Standard Length Piece**



The manufacturer sells most timber in packs. However, the individual pieces of timber in the packs also require identification, for retail sale purposes. Standard length piece trade items have predefined length.

- **Variable Length Piece**

Timber pieces may be 'cut to length' for sale, a variable measure GTIN is required to identify these items.

11.3 GTIN Options for Timber Trade Items

In Section 5 the methods for allocating and representing GTINs is described in detail and should be referred to when reviewing the following scenarios.

Specifying a particular GTIN for a trade item such as structural timber should normally identify the item in terms of the following attributes or characteristics:

- Species
- Condition/Dryness
- Finish
- End-Section
- Pack Configuration
- Piece Length
- Origin
- Grade
- Treatment
- Profile
- Packaging Level
- Pack Type
- Brand
- Value-Added

Timber is produced in many different pack sizes and lengths. Because of the significant variation in these two attributes, there has been a tendency to define timber trade items at a level that does not define these attributes closely enough to allow for fixed measure trade items.

However, the overriding principle adopted in the following examples is that the attributes of packaging level and piece length should be predefined– thus enabling the assignment of a fixed measure GTIN and removing the need for individual pack tallies where possible. Only if there is significant variation in one or the other of these attributes, making it impractical to assign a GTIN for each variant, is a variable measure GTIN that spans multiple variations allowed.

The decision of which GTIN structure and what data carrier is generally left to the discretion of each individual company and is ultimately governed by factors such as requirements within the company for the marking of additional information, the path of the trade item through the supply chain and whether the trade item will be sold in the retail Point-of-Sale environment.

11.3.1 Trade Items Sold at Retail Point-of-Sale (POS)

Trade items that are sold to a retailer for sale in the Point-of-Sale environment must be numbered and bar coded as described below. In summary the recommendations stipulate that the trade item **must** be assigned a unique GTIN using the GTIN-13 structure and usually represented in an EAN-13 Bar Code, although GTIN-14 encoded in GS1-DataBar Bar Code is an option, where the scanners and computer systems at the POS are suitably enabled.

Note: All variations require a separate GTIN.

Note: Unless products are to be sold in North America and Canada, companies will generally use the EAN-13 Bar Code. Please consult GS1 if your trade item is to be sold within North America or Canada. When dealing with any country you should only consider using GS1 DataBar when you know that any retail system that will scan the item is enabled for GS1 DataBar.



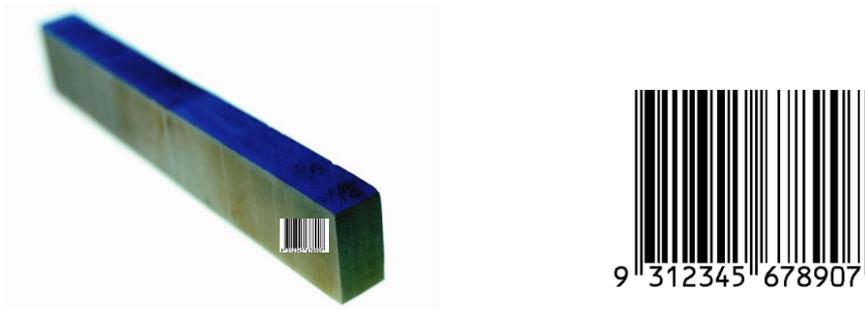
Within the Timber Industry the following configurations may fall within the category of a trade item sold at retail Point-of-Sale (POS) and thus must be numbered and bar coded according to the methods described in this section:

- Standard Set Length Pack see Section 11.2 for full definition
- Standard Mixed Length Pack see Section 11.2 for full definition
- Standard Length Piece see Section 11.2 for full definition

In Section 11.4 the Timber Sector group has defined specific recommendations pertaining to the allocation and use of GTINs. The recommendations applicable for Timber Trade Items sold at retail Point-of-Sale are 1, 2, 3, 4, 5, 6A and 7A.

Example:

Figure 45: Example of a piece of timber allocated a GTIN-13 represented in an EAN-13 Bar Code



Example:

Figure 46: Example of a standard set length pack of timber allocated a GTIN-13 represented in an EAN-13 Bar Code



Note: For standard set length pack trade items, both piece length and pack size (number of pieces in a pack) are pre-defined and thus allows for a fixed measure GTIN to be assigned



11.3.2 Fixed Measure Trade Items NOT Sold at Retail Point-of-Sale (POS)

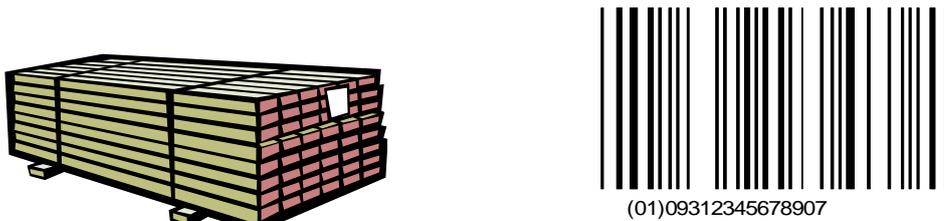
Where a trade item is sold at the retail Point-of-Sale (i.e. pack or piece of timber), then the applicable option described in Section 11.3.1 is applicable. However if the trade item is **not** sold in the Point-of-Sale environment, any of the options for the numbering and bar coding described in Section 5.7 are applicable.

Within the Timber Industry the following configurations may fall within the category of a trade item not sold at retail Point-of-Sale (POS) and thus must be numbered and bar coded according to the methods described in this section:

- Standard Set Length Pack see Section 11.2 for full definition
- Standard Mixed Length Pack see Section 11.2 for full definition
- Standard Length Piece see Section 11.2 for full definition

In Section 11.4 the Timber Sector group has defined specific recommendations pertaining to the allocation and use of GTINs. The recommendations applicable for Timber Trade Items **not** sold at retail Point-of-Sale are 1, 2, 3, 4, 6A, 7A and 9.

Figure 47: Example of a standard set length pack of timber allocated a GTIN-13 and together with a leading zero represented in a GS1-128 Bar Code



Alternatively a standard set length pack of timber may be allocated a GTIN-13 and together with a leading zero, have this represented in an ITF-14 Bar Code. Due to the industry practice of identifying timber packs with a serial number as well as a GTIN, this however would not typically be used.

Note: In the examples presented the GTIN assigned must be unique and hence **must not** be the same as the GTIN assigned to the individual piece.

ALTERNATIVE OPTION

Alternatively the GTIN-14 option could have been used, see example below.

Figure 48: Example of a standard set length pack of timber allocated a GTIN-14 represented in a GS1-128 Bar Code



Alternatively a standard set length pack of timber may be allocated a GTIN-14 using the indicator method, and have this represented in an ITF-14 Bar Code. Due to the industry practice of identifying timber packs with a serial number as well as a GTIN, this however would not typically be used.



11.3.3 Variable Measure Trade Items NOT Sold at Retail Point-of-Sale (POS)

As described in Section 5.8 trade items may be variable measure either because the production process does not guarantee consistency in weight, size or length etc. or because the items are created to meet a special order which states a quantity or measure (e.g. timber ordered in a certain piece length). The HIWG recommendations document 'Bar Coding of Timber Packs v1.1' provides further information about identification and bar coding of variable measure trade items not sold at retail POS.

The use of a variable measure GTIN enables the identification of the variable piece of data to be included within the bar code.

Note: This solution will not generally be available for trade items that are sold through a traditional retail Point-of-Sale environment as POS scanners are not set up to scan the GS1-128 Bar Code required for this application. However, where a retailer has enabled scanners and systems at the POS to scan GS1 DataBar Bar Codes, these bar codes may be used in preference to GS1-128 Bar Codes.

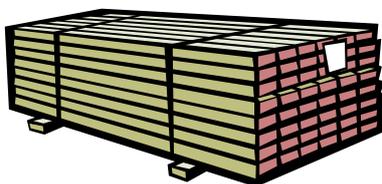
Within the Timber Industry the following configurations fall within the category of a variable measure trade item **not** sold at retail Point-of-Sale (POS) and thus must be numbered and bar coded according to the methods described in this section:

- Variable Set Length Pack see Section 11.2 for full definition
- Random Length Pack see Section 11.2 for full definition
- Variable Cut to Length Pack see Section 11.2 for full definition
- Variable Length Piece see Section 11.2 for full definition
- Bulk see Section 11.2 for full definition

Note: Discussion between trading partners should determine if there is a physical requirement to label each variable length piece with its respective GTIN and bar code.

In Section 11.4 the Timber Sector group has defined specific recommendations pertaining to the allocation and use of GTINs. The recommendations applicable for Variable Measure Timber Trade Items not sold at retail Point-of-Sale are 6B, 7B and 8.

Figure 49: Example of a variable measure pack of timber represented by a Variable Measure GTIN with the associated length measurement represented in a GS1-128 Bar Code



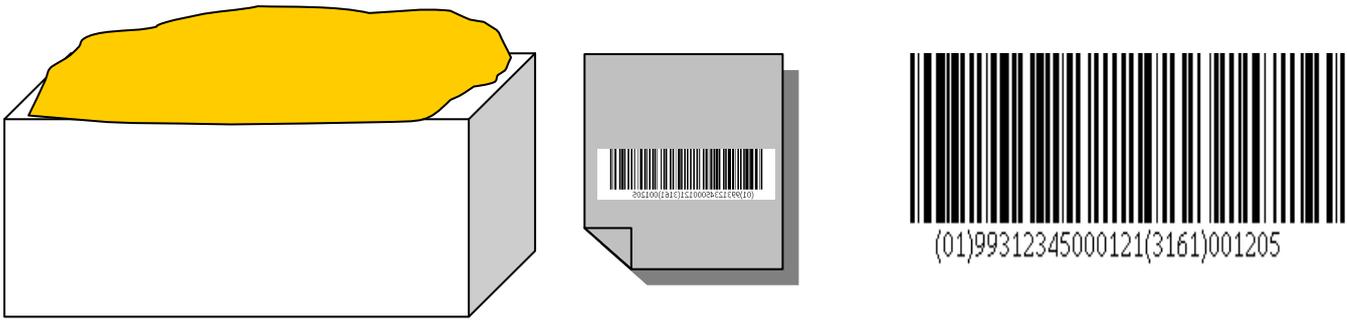
In this example the total length of timber contained within the pack is 1288.2 metres.

Note: The solution illustrated does **not** permit the marking of this type of timber pack for sale at the retail Point-of-Sale if systems are not enabled to scan the GS1-128 Bar Code. If required for use at the retail Point-of-Sale a GS1 DataBar Bar Code could be used provided the scanning and computer systems involved are enabled.

Variable Measure GTINs can also be used for the identification of trade items sold in bulk such as wood chips



Figure 50: Delivery docket or invoice for 120.5m³ of Pine Wood Chips identified with a Variable Measure GTIN. The docket or invoice can be used at the time of receiving.



The example provided above defines that the Pine Wood Chips are never sold as a fixed measure trade item. It is assumed that the number of cubic metres provided varies from load to load and hence the use of the variable measure GTIN is applicable. In the event that the Pine Wood Chips can be purchased in a standard amount then the allocation of a separate standard GTIN applies.



11.4 Timber Trade Item Recommendations

The following summarises the recommendations suggested for the implementation of the GS1 standards for timber trade items. The recommendations focus mainly on the allocation of GTINs to trade items and the suggested allocations at both piece and pack level, fixed and variable measure trade items. Refer to Section 11.3 for examples of some of the following recommendations.

Table 5: Timber Trade Item recommendations

Recommendation Number ¹⁰	Recommendation Statement
1	A GTIN is assigned to each packaging level.
2	For pack trade items, the GTIN should be allocated to a predefined pack size – unless this is impractical due to the multiplicity of pack sizes possible.
3	For timber trade items with a single definable piece length, the GTIN should be allocated to the predefined piece length – unless this is impractical due to the multiplicity of piece lengths possible.
4	When ordering timber, customers should order using the GTIN that most fully defines the item, rather than using other less specific variable measure GTINs that might span multiple lengths or pack sizes.
5	For timber piece trade items, a unique fixed measure GTIN, in a bar code scannable at POS, should be assigned for each piece length.
6A	Set length packs should be assigned a unique fixed measure GTIN for each piece length/pack size combination. This may require a separate fixed measure GTIN per production mill where the standard pack size varies by mill within a business.
6B	A separate variable measure (length specific) GTIN can be assigned to any occasional set length packs that may be produced that are under or over the standard pack size for the production mill.
7A	Cut to length packs should be assigned a unique fixed measure GTIN for each piece length/pack size combination that is commonly produced and sold. Normally this will require a separate fixed measure GTIN per production mill as standard pack size varies by mill.
7B	A separate variable measure GTIN can be used for one-off lengths in any pack size.
8	Items sold in random lengths packs (with inherent variability in pack size) should be assigned a variable measure GTIN.
9	The choice of which type of GTIN to use for fixed measure non-retail trade items (GTIN-13 or GTIN-14 with indicator between 1 and 8) is at the discretion of the supplier. However, a GTIN-13 encoded in an EAN-13 Bar Code is normally required for retail Point-of-Sale.

¹⁰ The recommendation numbers listed can be referenced in the "Identification of Timber with the GS1 Numbering Standard-Product Variability Considerations Version 1.0", which can be downloaded from www.hiwig.org.au.



11.5 Terminology and Definitions for Panel Trade Items

To ensure consistency and an understanding of the Timber Industry terminology the following section seeks to clearly describe the terminologies intended for use throughout this section of the Hardware Guidelines relating to Panel trade items.

The term **panel** is used for products that exist as sheets, such as particleboard, MDF panel, or ply wood.

11.5.1 Panel Terminology

- **Piece Size**

The width and length of an individual piece or sheet of a panel trade item. When the trade item is a pack of panels this attribute refers to the width and length of each individual piece in the pack

- **Panel Configurations**

The main configurations in which panels are sold are as follows:

- **Standard Pack**

A standard pack is a pack of panels containing a selection of panels all having the same width and length and a consistent number of pieces within a pack.

- **Variable Cut to Size Pack**

A variable cut to size pack is a pack of panels containing a selection of panels all having the same width and length where the customer defines the size of the panels on the order for uncommon 'cut to size' requests. Again the number of pieces in a pack remains consistent.

- **Standard Piece**

A standard piece trade item is a panel trade item of a predefined piece size.

- **Bulk**

It may be appropriate to regard some panel trade items as bulk product where packaging is irrelevant. These items require a variable measure GTIN. This approach might be used for certain lower grade product, bulk export of timber and for uncommon 'cut to size' requests.



11.6 GTIN Options for Panel Trade Items

In Section 5 the methods for allocating and representing GTINs is described in detail and should be referred to when reviewing the following scenarios.

The definition of timber and panel trade items has many similarities. The main differences between panels and timber include:

- Panels are sold as sheets rather than lengths
- Panels within a pack are all of the same size
- Panels tend to be sold in packs of fixed pack size by supplier (within the domestic market)

The allocation of a GTIN to panels should identify the trade item in terms of the following characteristics:

- Substrate
- Finish
- Packaging Level
- Value-Added
- Piece Size (Width by Length)
- Colour
- Treatment
- Profile
- Piece Thickness
- Pack Type
- Brand

The attributes of particular interest within the area of panels are packaging level and piece size as panels can be produced in many different packaging levels and sizes, though panels have less variation than timber.

The decision of which GTIN structure and what data carrier is generally left to the discretion of each individual company and is ultimately governed by factors such as requirements within the company for the marking of additional information, the path of the trade item through the supply chain and whether the trade item will be sold in the retail Point-of-Sale environment.

11.6.1 Trade Items Sold at Retail Point-of-Sale (POS)

Trade items that are sold to a retailer for sale in the Point-of-Sale environment must be numbered and bar coded as described below. In summary the recommendations stipulate that the trade item **must** be assigned unique GTIN using the GTIN-13 structure and represented in an EAN-13 Bar Code.

Note: All variations require a separate GTIN.

Note: Unless products are to be sold in North America and Canada, companies will generally use the EAN-13 Bar Code. Please consult GS1 if your trade item is to be sold within North America and Canada.

Within the Timber Industry the following panel configurations may fall within the category of a trade item sold at retail Point-of-Sale (POS) and thus must be numbered and bar coded according to the methods described in this section:

- Standard Pack see Section 11.5.1 for full definition
- Standard Piece see Section 11.5.1 for full definition

In Section 11.7 the Timber Sector group has defined specific recommendations pertaining to the allocation and use of GTIN's. The recommendations applicable for Panel Trade Items Sold at retail Point-of-Sale are P1, P2, P3, P4, P5 and P6.



Figure 51: Example of a panel allocated a GTIN-13 represented in an EAN-13 Bar Code

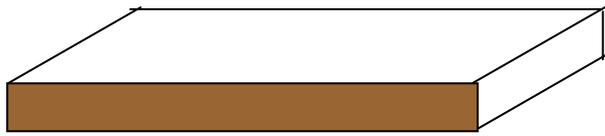
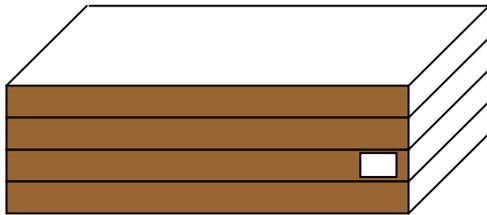


Figure 52: Example of a pack of panels allocated a GTIN-13 represented in an EAN-13 Bar Code



11.6.2 Fixed Measure Trade Items NOT Sold at Retail Point-of-Sale (POS)

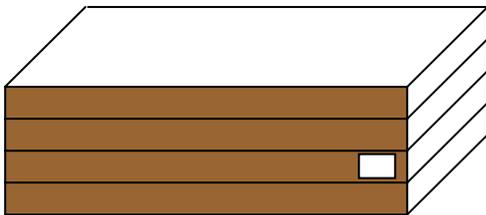
Where a trade item is sold at the retail Point-of-Sale (i.e. pack or piece of panel), then the applicable option described in Section 11.6.1 is applicable. However if the trade item is **not** sold in the Point-of-Sale environment, any of the options for the numbering and bar coding described in Section 5.7 are applicable.

Within the Timber Industry the following panel configurations may fall with the category of a trade item not sold at retail Point-of-Sale (POS) and thus must be numbered and bar coded according to the methods described in this section:

- Standard Pack see Section 11.5.1 for full definition

In Section 11.7 the Timber Sector group has defined specific recommendations pertaining to the allocation and use of GTINs. The recommendations applicable for panel trade items **not** sold at retail Point-of-Sale are P1, P2, P3, P4, P5, P6 and P9.

Figure 53: Example of a pack of panels allocated a GTIN-13 represented together with a leading zero in a GS1-128 Bar Code



Alternatively a pack of panels may be allocated a GTIN-13 and together with a leading zero have this represented in an ITF-14 Bar Code.

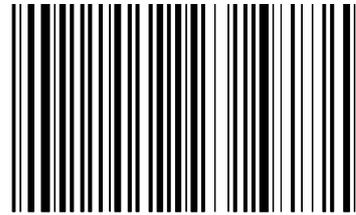
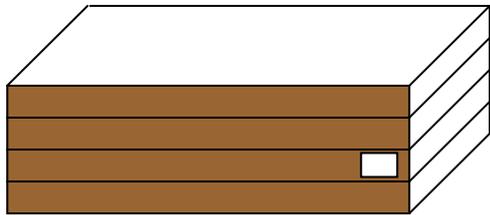
Note: In the example presented Figure 53 the GTIN assigned must be unique and hence **must not** be the same as the GTIN assigned to the individual piece.



ALTERNATIVE OPTION

Alternatively the GTIN-14 option could have been used, see example below.

Figure 54: Example of a standard pack of panels allocated a GTIN-14 represented in a GS1-128 Bar Code



(01)19312345678904

Alternatively a standard set pack of panels could be allocated a GTIN-14 which is represented in an ITF-14 Bar Code

11.6.3 Variable Measure Trade Items NOT Sold at Retail Point-of-Sale (POS)

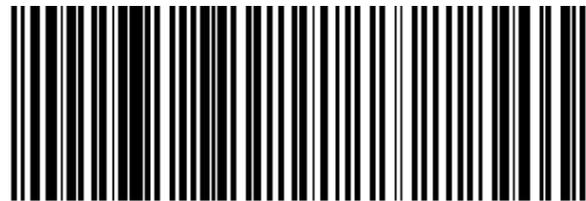
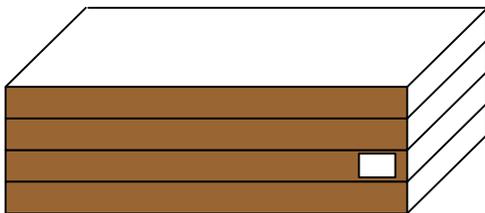
As described in Section 5.6 trade items may be variable measure either because the production process does not guarantee consistency in weight, size or length etc. or because the items are created to meet a special order which states a quantity or measure (e.g. panels ordered in a certain size). The use of a variable measure GTIN enables the identification of the variable piece of data to be included within the bar code.

Note: This solution will not be available for trade items that are sold through a traditional retail Point-of-Sale environment as POS scanners are not set up to scan the GS1-128 Bar Code required for this application.

Within the Timber Industry panels that are cut to size and bulk fall within the category of a variable measure trade item **not** sold at retail Point-of-Sale (POS) and thus must be numbered and bar coded according to the methods described in this section:

Note: Discussion between trading partners should determine if there is a physical requirement to label each variable length size with its respective GTIN and bar code.

Figure 55: Example of a variable measure pack of panels represented by a GTIN with the Indicator nine with the associated area measurement represented in a GS1-128 Bar Code



(01)99312345000107(3140)000144

In this example the total area of panels contained within the pack is 144 square metres.

Note: The solution illustrated does **not** permit the marking of this type of panel pack for sale at the retail Point-of-Sale. This could be achieved by encoding the data in a GS1 DataBar Bar Code provided the retail POS system that will capture and store the data is suitably enabled.



11.7 Panel Trade Item Recommendations

The following summarises the recommendations suggested for the implementation of the GS1 standards for panel trade items. The recommendations focus mainly on the allocation of GTINs to trade items and the suggested allocations at both piece and pack level, fixed and variable trade items. Refer to Section 11.6 for examples of some of the following recommendations.

Table 6: Panel Trade Item Recommendations

Recommendation Number ¹¹	Recommendation Statement
P1	A GTIN is assigned to each packaging level
P2	For pack trade items, the GTIN should be allocated to a predefined pack size – unless this is impractical due to the multiplicity of pack sizes possible.
P3	For panel trade items with a single definable piece size, the GTIN should be allocated to the predefined the piece size – unless this is impractical due to the multiplicity of piece sizes possible.
P4	When ordering panels, customers should order using the GTIN that most fully defines the item, rather than using other less specific variable measure GTINs that might span multiple piece sizes or pack sizes.
P5	For panel piece trade items, a unique fixed measure GTIN, scannable at POS should be assigned for each piece length.
P6	Panels pack trade items should be assigned a unique fixed measure GTIN for each piece/pack size combination.
P9	The choice of which type of GTIN to use for fixed measure non-retail trade items (GTIN-13, or GTIN-14 with indicator between 1 and 8) is at the discretion of the supplier. However, a GTIN-13 is required for retail Point-of-Sale.

¹¹ The recommendation numbers listed can be referenced in the “Identification of Timber with the EAN/UCC Numbering Standard-Product Variability Considerations Version 1.0”, which can be downloaded from www.hiwig.org.au



11.8 Attribute Information Options for the Timber Industry

In “principle” the Australasian Hardware Industry supports the use of variable data in the long term. Individual companies need to make their own assessment on the implementation and use of variable data in their business.

Suppliers may wish to enhance the traceability of their own products by introducing additional information over and above the allocation of a GTIN to each trade item.

When attribute information is applied to a trade item that is sold at POS then it can be added alongside the EAN-13 Bar Code, (see below) or encoded in a GS1 DataBar Bar Code if the systems that will record the scanning of the item and the resulting GTIN are suitably enabled.

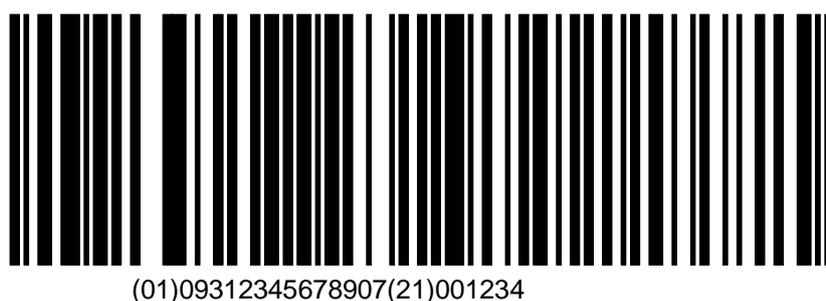
Where the trade item will not be sold at the retail POS attribute information can be concatenated (linked together) with the GTIN, in one single GS1-128 Bar Code as shown in Figure 57: Concatenated GS1-128 or a GS1 DataBar Bar Code.

Figure 56: GTIN and serial number represented in separate bar codes



Note: The attribute information, in this example serial number, represented in the above figure will NOT scan at the Point-of-Sale. Where POS scanning is required GS1 DataBar may be considered.

Figure 57: Concatenated GS1-128 Bar Code



Note: The bar code represented in the above figure will not scan at all Point-of-Sale systems

Note: The following section describes some of the Application identifiers that the Timber Industry sees as providing useful additional information. This does not preclude suppliers from accessing the entire list of AIs available for use.

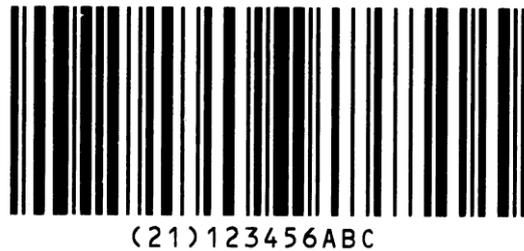


11.8.1 Serial Number – Pack Number

Within the Timber Industry, the serial number assigned to a pack of timber may be referred to as a pack number. This is the serial number allocated to the pack of timber.

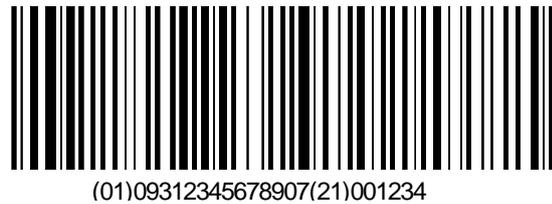
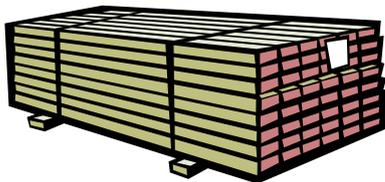
A serial number is a unique alpha or alphanumeric number assigned by a company to an entity for its lifetime. Combined with a GTIN the serial number uniquely identifies each individual trade item. Use any structure to generate the serial number. However, it must be possible for any company to use the combination GTIN and serial number for identifying a specific trade item, regardless of the actual structure of the number.

Figure 58: Serial Number AI (21) represented in a GS1-128 Bar Code



Note: The AI (21) must be associated with a GTIN

Figure 59: Pack of Timber representing fixed measure GTIN and serial number in a GS1-128 Bar Code



11.9 Timber Industry Implementation Issues

The implementation process often identifies anomalies that exist with certain product types where the standard application of the GS1 System is either not feasible or not practical. This in no way indicates that the system is not used, merely identifies that standard methodologies currently available do not fit within the scope of that particular product.

This section has been developed to assist the industry identify these trade items and methods of dealing with these trade items through the supply chain, including final retail Point-of-Sale.

11.9.1 Variable Measure Trade Items Sold at Retail Point-of-Sale (POS)

Within the Timber Industry packs and pieces of timber are routinely traded between trading partners varying from wholesale through to the retail consumer market.

When suppliers allocate and apply GTINs to trade items the assumption is that the trade item will remain complete with no changes occurring to it during the supply chain process.

However, with the timber retail Point-of-Sale area there are times when the trade item is sold to the consumer with an ability for the consumer to specifically ask for altered lengths of timber, i.e. the retailer further cuts the timber to suit the consumer's requirements.

The following are some solutions available to trading partners to enable the automation of the trade item for sale at the retail Point-of-Sale:

1. The supplier allocates the trade item a standard GTIN-13 that identifies the trade item as **"Timber Piece Type X End section Y"** (but does not mark the trade item). The cost per metre of the trade item would be entered into the database; much like the cost of a standard trade item is linked to the GTIN of a product. This assigned GTIN is represented by an EAN-13 Bar Code and printed in what is commonly called a shadow book¹² with an appropriate description along side.

At the point of purchase the operator would scan the appropriate EAN-13 Bar Code and the system would need to be programmed to prompt the operator for the total length purchased. From here the system calculates the price accordingly and registers the sale.

2. An alternative to the above solutions is that the seller (normally a retailer) of the trade item assigns a Restricted Circulation Number instead of the supplier assigning a GTIN and follows the same procedure as described in subparagraph 1 above. Please consult the technical literature supplied by GS1 or contact GS1 for further information on Restricted Circulation Numbers.

11.9.2 Order Quantity Unit of Measure

Within the Timber Industry current order quantity units of measure (UOM) range from metres, metres cubed, pieces and packs. However a standardised approach to ordering of trade items in the unit of measure of the GTIN is the ultimate goal and all parties in the supply chain should endeavour to work towards this.

¹² A Shadow book is a book that contains the printed form of any GTINs assigned but not printed on the actual trade item, generally because it is not physically possible to do so. The shadow book provides the operator the ability to quickly reference trade items sold and scan the appropriate bar code. It provides an automated solution for trade items that are not easily bar coded or that have a variable component dictated by the customer.



11.9.3 Damaged Packs

Through general transport and movement packs of timber and panels may be damaged. These packs may be identified uniquely with either the use of the combined use of the serial number issued at the point of packaging or alternatively with the use of the Serial Shipping Container Code (SSCC). For further information refer to Section 6.





12 Plumbing Industry Scenarios

12.1 Introduction

The GS1 System prides itself on having a complete set of recommendations and requirements to ensure that all parties throughout the supply chain are aided and not hindered by the implementation of its system.

The Hardware guidelines have been written to provide a snapshot view of the GS1 System. Used in conjunction with the technical literature supplied by GS1 and assistance from GS1 they have been designed to identify the key components of the system and enable suppliers within the industry to begin implementation throughout their business.

In developing the numbering and bar coding guidelines for the Hardware Industry, the finer detail depends largely on the way in which material is routinely traded. When the identification of a trade item is practised as part of a business solution, there is firstly a mandatory requirement for information at item level. Beyond this there may be the requirement to incorporate additional information such as batch number, serial numbers or even production dates. These guidelines serve to identify any such requirements that the industry has chosen and highlight them in a practical example.

The following section of the Hardware guidelines focuses on providing examples of trade items that exist within the Plumbing Industry and the methods of allocating GTINs. This is key foundation to implementation of other aspect of the GS1 System and the content covered in this chapter assumes some prior knowledge of GTINs and bar coding. Therefore, it is important readers of this section of the document refer to earlier chapters for reference material.

It is not feasible to include every possible variation of trade item available in such a document. It is up to suppliers to identify their own products and the associated method by which to allocate a GTIN and the respective bar code type to use.



12.2 GTIN Options for Plumbing Trade Items

In Section 5 the methods for allocating and representing GTINs is described in detail and should be referred to when reviewing the following scenarios

12.2.1 Trade Items Sold at Retail Point-of-Sale (POS)

Trade items that are sold to a trading partner for sale ultimately at a retail Point-of-Sale environment must be numbered and bar coded as described in Section 5.5.

In summary the recommendations stipulate that the POS trade item **must** be assigned a unique GTIN using the GTIN-13 structure and represented in an EAN-13 Bar Code and for every different variation of a product a separate GTIN must be assigned. GS1 DataBar may be an option in situations where the retail POS systems that will process sales of the item are suitably enabled.

Note: Unless products are to be sold in North America and Canada, companies will generally use the EAN-13 Bar Code. Please consult with GS1 if your trade item is to be sold within North America and Canada.

Figure 60: Example of a tap allocated a GTIN-13 represented in an EAN-13 Bar Code



The following list depicts additional examples of different trade items that would be assigned a separate GTIN for use within the Point-of-Sale environment.

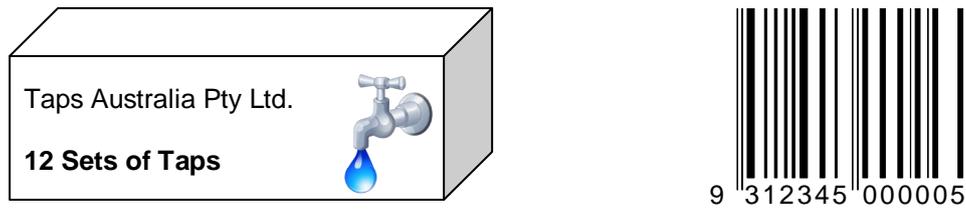
- Deluxe Toilet Seat - White
- Deluxe Toilet Seat - Mist Grey
- Classic II Rainmaker Shower Rose - Chrome
- Classic II Rainmaker Shower Rose - White
- Elite Mark II Basin Set - White/Gold
- Elite Mark II Top Assembly - Basin - White/Gold
- Elite Mark II Shower Set - White/Gold
- Flickmixer Jupiter Basin Mixer - Chrome
- Flickmixer Venus Basin Mixer - Chrome
- Roll of Copper Coil 18m x 6 x 0.9
- Roll of Copper Coil 30m x 6 x 0.9
- 1 x 100mm Heavy Duty Revolutionary Underground Conduit - 4m/length - Orange
- 1 x 125mm Heavy Duty Revolutionary Underground Conduit - 4m/length – Orange
- etc.....

Note: Listed examples in no way depict every different type of trade item available; they serve only to provide an example of different product types requiring a separate GTIN.

If a trade item is bundled into a stable grouping (e.g. a carton of taps) which itself can be sold at Point-of-Sale then a separate GTIN must be assigned.



Figure 61: Example of a carton of taps allocated a GTIN-13 represented in an EAN-13 Bar Code



The following list depicts additional examples of different trade items that would be assigned a separate GTIN for use within the Point-of-Sale environment.

- Pack of 3 - Elite Mark II Wall Dress Rings – Chrome
- Pack of 6 – Chrome 10cm Door Handle
- etc....

Note: Each packaging level, if sold at retail POS, must have a separate GTIN represented by a GTIN-13 and EAN-13 Bar Code.

12.2.2 Trade Items NOT Sold at Retail Point-of-Sale (POS)

Where a trade item is sold at the retail Point-of-Sale (i.e. the tap), then the option described in Section 12.2.1 is applicable. However if the trade item, is then bundled into a stable grouping (e.g. a carton of taps) but this unit itself is **not** sold in the Point-of-Sale environment, any of the options for the numbering and bar coding described in Section 5.7 are applicable.

Note: Every variation in the quantity of trade items is assigned a separate GTIN. If the variations differ for every different order a Variable Measure GTIN should be assigned, see Section 5.8 and 12.2.4 for further information.

It is generally left to the discretion of the company marking the goods as to which option to use to mark the product. Types of trade items within the Plumbing Industry that would be considered in this section include cartons of retail units (e.g. taps), crates of pipe, boxed quantities of copper tubing etc.

Figure 62: Example of a carton of taps allocated a GTIN-13 represented in a GS1-128 Bar Code

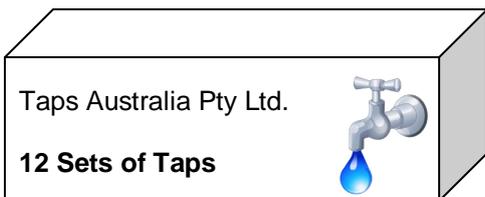


Figure 63: Example of a carton of taps allocated a GTIN-13 represented in an ITF-14 Bar Code



Note: In the examples presented in Figure 62 and Figure 63 the GTIN assigned must be unique and hence **must not** be the same as the GTIN assigned to the individual piece.



ALTERNATIVE OPTION

Alternatively the GTIN-14 option could have been used, see example below.

Figure 64: Example of a carton of taps allocated a GTIN-14 represented in a GS1-128 Bar Code



Figure 65: Example of a carton of taps allocated a GTIN-14 represented in an ITF-14 Bar Code



The following list depicts additional examples of different trade items (not sold at retail POS) that should be assigned a separate GTIN.

- 1 Pack (54) x 100mm Heavy Duty Underground Conduit - 4m/length - Orange
- 1 Pack (38) x 125mm Heavy Duty Underground Conduit - 4m/length - Orange
- Box of 6 x 18m Roll of Copper Coil
- etc....

12.2.3 Trade Items Sold as Kits

Within the Plumbing Industry there are some trade items that can be sold in a kit form, e.g. toilet suites.

Where a trade item is sold as a kit comprising of a number of different components the following points are applicable:

- If the components that make up the kit can be sold individually each component must be allocated a unique GTIN. Suppliers must ensure that any bar codes identifying the individual components are obscured if placed together as one unit.
- Each kit must be assigned a unique GTIN. In the event that a kit is sold but distributed in its component parts, at separate times, care must be taken to ensure that only the GTIN associated with the kit is clearly displayed on each component and any GTINs identifying the individual components is obscured. Please refer to Section 12.5 for further implementation issues.
- Any combinations of individual components that make up a kit must be uniquely identified with a separate GTIN.



Figure 66: Toilet Suite comprising three components all marked with the GTIN-13 represented in the EAN-13 Bar Code

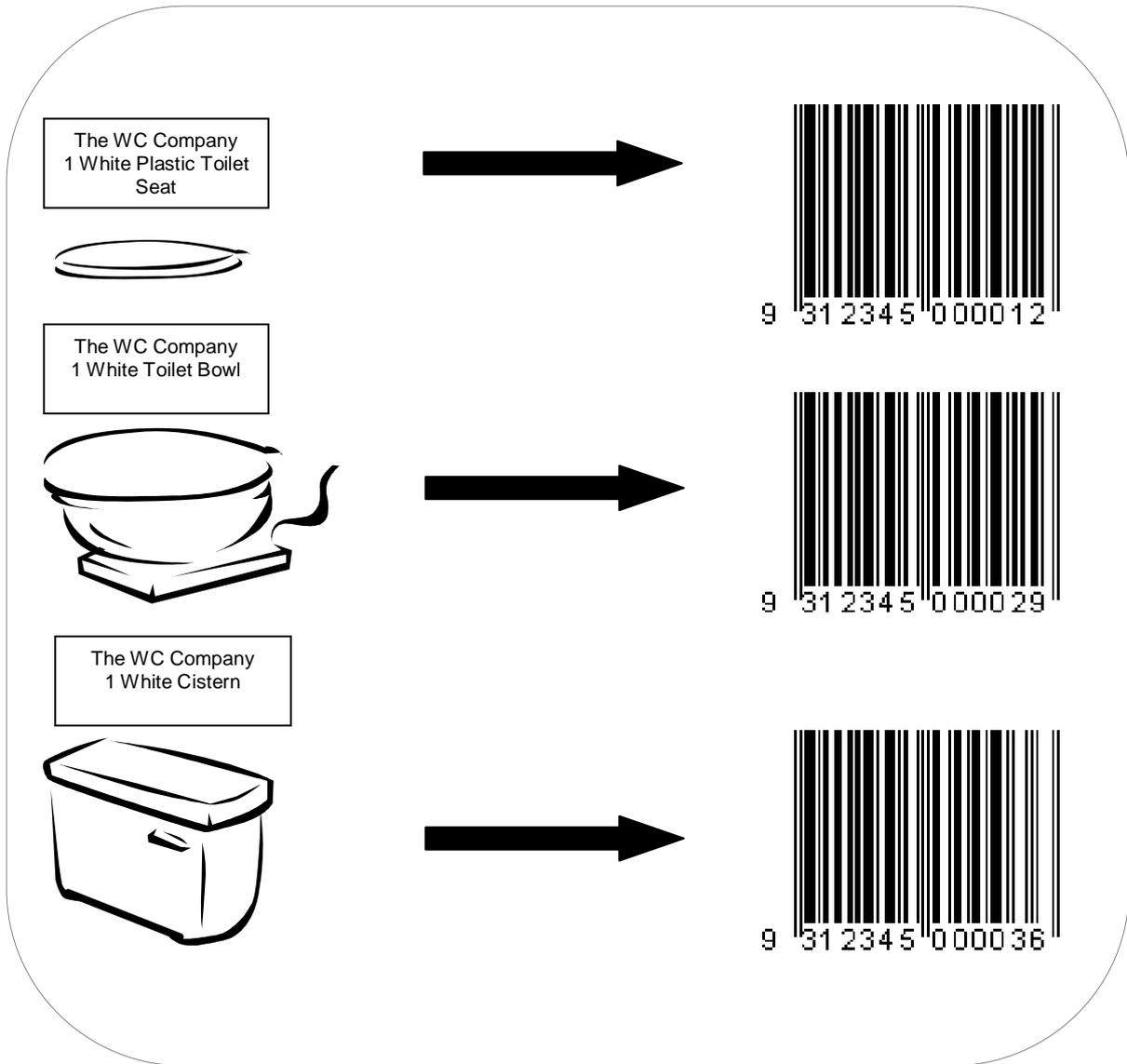
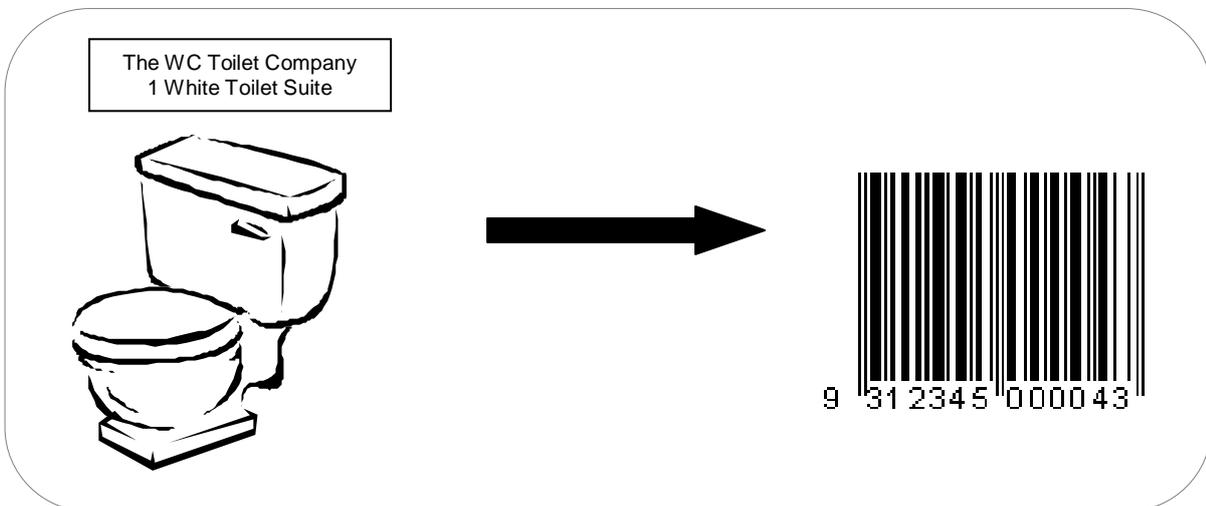


Figure 67: Toilet Suite bundled together marked with its own unique GTIN in the GTIN-13 format



The following description depicts another example of trade items sold as both individual components and a kit. As described above each component would be assigned a unique GTIN, with the kit assigned its own unique GTIN.

- G Series Exposed Breech Wall Set - Brass
4 Components each with own GTIN:
 - G Series Exposed Breech Wall
 - G Series Exposed Sets Outlet
 - G Series Lever Handle Sub Assembly
 - G Series Spout Adapteretc...

Note: This example in no way depicts every different type of trade item available; it serves only to provide a real life example.

12.2.4 Variable Measure Trade Items NOT Sold at Retail Point-of-Sale (POS)

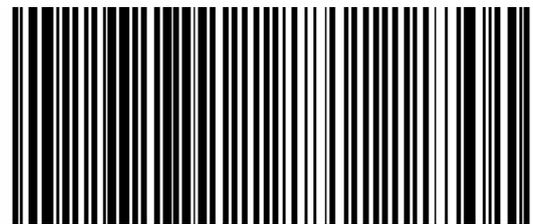
As described in Section 5.8 trade items may be variable measure either because the production process does not guarantee consistency in weight, size or length etc, or because the items are created to meet a special order which states a quantity (e.g. roofing ordered by the square metre).

The use of a variable measure GTIN enables the identification of the variable piece of data to be included within the bar code.

Note: This solution will not be available for trade items that are sold through a traditional retail Point-of-Sale environment as POS scanners are not set up to scan the GS1-128 Bar Code required for this application. Where sale through a retail POS is intended the options provided in paragraph 13.3 below may be considered.

The following example depicts the assigned GTIN and GS1-128 Bar Code represented on a pack of 35 square metres of roofing requested from a customer.

Figure 68: Colorbond Stainless Steel Roofing Sheets 35 square metres



(01)99312345000107(3340)000035



12.3 Attribute Information Options for the Plumbing Industry

In “principle” the Australasian Hardware Industry supports the use of variable data in the long term. Individual companies need to make their own assessment on the implementation and use of variable data in their business.

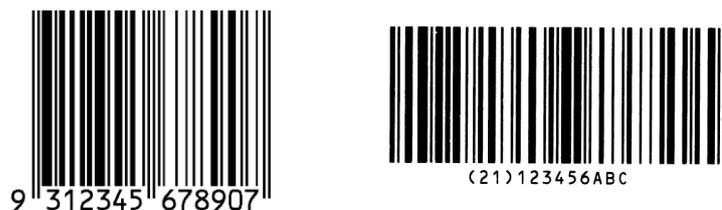
Suppliers may wish to enhance the traceability of their own products by introducing additional information over and above the allocation of a GTIN to each trade item.

When attribute information is applied to a trade item that is sold at POS then it can be added along side the EAN-13 Bar Code, (see below) or encoded in a GS1 DataBar if the systems that will record the scanning of the item and the resulting GTIN are suitably enabled.

Where the trade item will not be sold at the retail POS attribute information can be concatenated (linked together) with the GTIN, in one single GS1-128 Bar Code as shown in Figure 70: Concatenated GS1-128 Bar Code, or in a GS1 DataBar Bar Code .

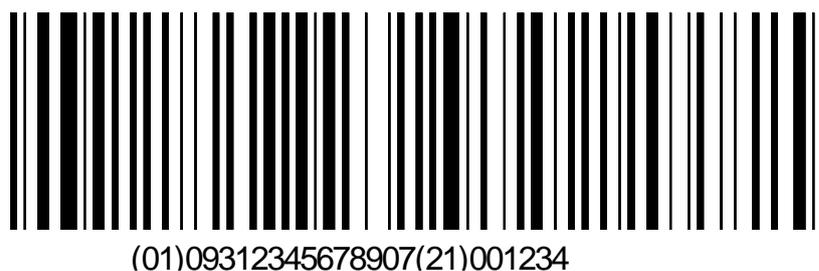
For further information regarding Attribute Information please refer to Section 5.2.

Figure 69: GTIN and serial number represented in separate bar codes



Note: The attribute information, in this example serial number, represented in the above figure will NOT scan at the Point-of-Sale.

Figure 70: Concatenated GS1-128 Bar Code



Note: The bar code represented in the above figure will not scan at the Point-of-Sale



12.3.1 Application Identifiers Used in the Plumbing Industry

The table represented below identifies some of the AIs that may be considered by companies within the Plumbing Industry.

It is recommended that suppliers/manufacturers/distributors consult with GS1 on the use of these or any other Application Identifiers to ensure that compliance to the standards is adhered to at all times.

Note: Whilst the table listed below lists specific AIs that may be relevant for use within the Plumbing Industry it does not preclude suppliers from accessing the entire list of AIs available for use. Refer to GS1 Australia's website www.gs1au.org under the download section for a complete list of list of AIs available.

AI	Notes	Content	Format	
			AI	Data
00		Serial Shipping Container Code	n2	n18
01		Global Trade Item Number (GTIN)	n2	n14
02		GTIN of items contained in a logistic unit	n2	n14
10		Batch or Lot Number	n2	an..20
11	a	Production Date (YYMMDD)	n2	n6
13	a	Packaging Date (YYMMDD)	n2	n6
15	a	Best Before Date (YYMMDD)	n2	n6
17	a	Expiration Date (YYMMDD)	n2	n6
20		Product Variant	n2	n2
21		Serial Number	n2	an..20
240		Additional product identification assigned by the manufacturer	n3	an..30
30		Variable Count	n2	n..8
37		Count of trade items contained in a logistic unit	n2	n..8
311	c	Length or first dimension, metres trade	n4	n6

12.3.2 Serial Number

The Application Identifier (21) is used to define a serial number.

A serial number is a unique alpha or alphanumeric number assigned by a company to an entity for its lifetime. Combined with a GTIN the serial number uniquely identifies each individual trade item. Use any structure to generate the serial number. However, it must be possible for any company to use the combination GTIN and serial number for identifying a specific trade item, regardless of the actual structure of the number.

In Plumbing Industry, the traceability of hot water services could be automated by applying the combination of the GTIN and the serial number to uniquely identify each and every hot water service., thus allowing for better tracking of service history and warranty follow up.

Note: The AI (21) must be associated with a GTIN



Figure 71: Serial Number AI (21) represented in a GS1-128 Bar Code

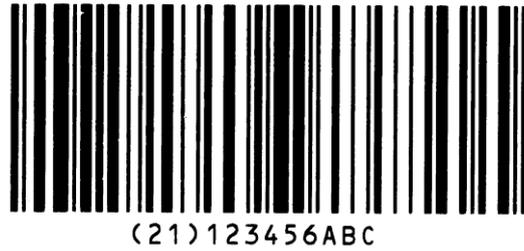


Figure 72: Hot water service marked with a GTIN and serial number.



(01) 09312345678914(21)123456ABC

Note: When sold at a retail Point-of-Sale system the label affixed on the carton should contain the EAN-13 Bar Code encoding the GTIN assigned with the serial number alongside as represented in Figure 69. (The GTIN assigned is the same just represented in a different bar code type.) Alternatively the use of GS1 DataBar may be considered if the retail POS system that will process the sale of the item is suitably enabled.



12.4 Logistic Unit Marking for the Plumbing Industry

The identification of standard and variable measure trade items is achieved by the allocation of unique GTINs. The natural progression from the identification of a trade item is to the identification of a logistic unit.

A logistic unit is an item of any composition established for transport and/or storage, which needs to be managed through the supply chain. The identification of a logistic unit can be achieved using an SSCC (Serial Container Shipping Code). See Section 6 for information about the usage of the SSCC.

Figure 73: Use of the SSCC on a logistics unit



Note: The SSCC would be represented on a label with a format depicted in Section 6.4.

12.5 Plumbing Industry Implementation Issues

In some circumstances the option to physically apply a bar code to a trade item is neither possible nor practical, for example, tiny screws and nuts sold individually. In other cases the trade item sold between trading partners is then broken down further into variable sizes the size of which is dictated by the consumer. These trade items may require additional thought as to the final processes required to either on-sell, mark or in fact identify them using GS1 standards.

This section has been developed to assist the industry identify trade items that may not necessarily have an obvious GS1 solution that is presented in this guideline and provide methods of handling these trade items through the entire supply chain.

12.5.1 Variable Measure Trade Items Sold at Retail Point-of-Sale (POS)

It has been identified within the Plumbing Industry that some trade items sold to trading partners begin as standard items allocated a standard GTIN. For example, coils of conduit. These trade items are traded as coils of standard lengths, for example 50m, 100m, and 150m etc, all of which receive their own unique GTIN as described in Section 5.6.

This trade item can then be sold to the consumer in any number of variations of lengths generally dictated by the consumer at the point of purchase. The following possible solutions are available to trading partners to enable the automation of the trade item, (generally required at the retail Point-of-Sale).

1. The supplier allocates the trade item a standard GTIN-13 that identifies the trade item as **“Conduit Type X Variable Measure”** (but does not mark the trade item). The cost per metre of the trade item would be entered into the database; much like the cost of a standard trade item is linked to the GTIN of a product. This assigned GTIN is represented by an EAN-13 Bar Code and printed in what is commonly called a shadow book¹³ with an appropriate description along side.

At the point of purchase the operator would scan the appropriate GTIN and the system would need to be programmed to prompt the operator for the total length purchased. From here the system calculates the price accordingly and registers the sale.

2. An alternative to the above solutions is that the seller (normally a retailer) of the trade item assigns a Restricted Circulation Number instead of the supplier and follows the same procedure as described in subparagraph 1 above. Please consult the technical literature supplied by GS1 or contact GS1 for further information on. Restricted Circulation Numbers
3. If the trade item will only be sold in set lengths from the coil, e.g., always in 1m sections, then each metre could be marked with its own unique GTIN allocated by the supplier. This then allows the operator at the POS to scan each bar code identifying one single metre unit. This solution may require specific printing techniques and equipment and is only applicable if the length is set standard length blocks.

12.5.2 Trade Items Sold as Kits

¹³ A Shadow book is a book that contains the printed form of any GTINs assigned but not printed on the actual trade item, generally because it is not physically possible to do so. The shadow book provides the operator the ability to quickly reference trade items sold and scans the appropriate bar code. It provides an automated solution for the trade items not easily bar coded or that have a variable component dictated by the customer.



In Section 12.2.3 the solution for the marking and distribution of trade items sold both as kits and individual components is provided. It is identified that in some instances the trade item, the kit, is sold as a complete unit but transported in its components not necessarily all at the same time. In this instance trading partners will need to confirm between them the best method of tracking all component parts to ensure that the complete set is ultimately delivered.

One method of doing this would be to identify via the GTINs allocated that the combination of all component GTINs is equivalent to the GTIN assigned to the entire kit. In this case upon receipt of the goods, the customer can scan the individual components and flag that only two of the three parts has been received. Once all components, in this example the third, are received the system updates the receipt of a complete kit.

For example:

The combination of a White Toilet Suite could be represented as:

$$9312345000043 = 9312345000012 + 9312345000029 + 9312345000036$$

Where:	White Toilet Suite =	9312345000043
	White Plastic Seat =	9312345000012
	White Bowl =	9312345000029
	White Cistern =	9312345000036

Upon scanning the GTIN comprising of the suite, the system may request that the operator scan for each of the individual components to complete the receipt of the goods. Should one or more components be missing then this is flagged accordingly as an incomplete order.

This solution will require programming from within the IT department of each company. In addition information such as purchase order numbers and logistic unit marking may be required to ensure that there is unique identification of the original order and that in the event that only components are priced and invoiced that this is not associated with the receipt of a kit.

Please consult with GS1 for further assistance on this matter





13 Electrical Industry Scenarios

13.1 Introduction

The GS1 System prides itself on having a complete set of recommendations and requirements to ensure that all parties throughout the supply chain are aided and not hindered by the implementation of its system.

The Hardware Industry guidelines have been written to provide a snapshot view of the GS1 standards. Used in conjunction with the technical literature supplied by GS1 and assistance from GS1 they have been designed to identify the key components of the system and enable suppliers within the industry to begin implementation throughout their business.

In developing the numbering and bar coding guidelines for the Hardware Industry, the finer detail depends largely on the way in which material is routinely traded. When the identification of traded items is practised as part of a business solution, there is firstly a mandatory requirement for information at item level. Beyond this, there may be the requirement to incorporate additional information such as batch number, serial numbers or even production dates. These guidelines serve to identify any such requirements that the industry has chosen and highlight them in a practical example.

The following section of the Hardware guidelines focuses on providing examples of trade items that exist within the industry and the methods of allocating Global Trade Item Numbers (GTINs). This is key foundation to implementation of other aspect of the GS1 System and the content covered in this chapter assumes some prior knowledge of GTINs and bar coding. Therefore, it is important readers of this section of the document refer to earlier chapters for reference material.

It is not feasible to include every possible variation of trade item available in such a document. It is up to suppliers to identify their own products and the associated method by which to allocate a GTIN and the respective bar code type applicable.



13.2 GTIN Options for Electrical Trade Items

In Section 5 the methods for allocating and representing GTINs are described in detail and should be referred to when reviewing the following scenarios.

Regardless of the manner in which the trade item is sold, whether it is a carton of white light switches with a standard count or individual light switches of different colours each product variant must be assigned its own unique GTIN. For example if light globes are sold in inner packs of 5 and 10, each inner pack size must be assigned its own unique GTIN. If these trade items are then packed into cartons of 100 and 50 respectively, these two variations also would be assigned separate GTINs.

The decision about which GTIN structure and data carrier are used is generally left to the discretion of each individual company and is ultimately governed by factors such as requirements within the company for the marking of additional information, the path of the trade item through the supply chain and whether the trade item will be sold in a retail Point-of-Sale environment.

13.2.1 Trade Items Sold at Retail Point-of-Sale (POS)

Trade items that are sold to a retailer for sale in the Point-of-Sale environment must be numbered and bar coded as described below. In summary the recommendations stipulate that the trade item should normally be assigned a unique GTIN using the GTIN-13 structure and the GTIN-13 represented in an EAN-13 Bar Code.

Note: All variations of a product require a separate GTIN.

Note: Unless products are to be sold in the North American and Canadian retail market, companies will generally use the EAN-13 Bar Code. Please consult with GS1 if your trade item is to be sold within North America and Canada.

Figure 74: Example of a power switch power allocated a GTIN-13 represented in an EAN-13 Bar Code



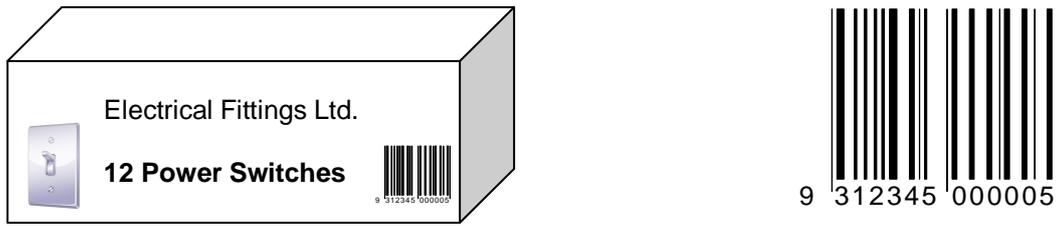
The following list depicts additional examples of different trade items that would be assigned a separate GTIN for use within the Point-of-Sale environment.

- Batten Lamp Holder – White
- Batten Lamp Holder – Beige
- Remote Control Door Chime – Model DC490
- Remote Control Door Chime – Model DC580
- Individually Switched 4 Outlet Power Board
- Individually Switched 6 Outlet Power Board
- Domestic Power Lead 240V 10amp – 2 metre
- Domestic Power Lead 240V 10amp – 3 metre
- Domestic Power Lead 240V 10amp – 5 metre
- Etc.....

Note: The examples listed above in no way depict every different type of trade item available they serve only to provide an example of different product types requiring a separate GTIN.



Figure 75: Example of a carton of double power outlets allocated a GTIN-13 represented in an EAN-13 Bar Code



The following list depicts additional examples of different trade items that would be assigned a separate GTIN for use within the Point-of-Sale environment.

- Pack of 24 - Double Architrave Switches – White
- Pack of 12 - Batten Lamp Holders – Beige
- Etc.....

Note: Each packaging level, if sold at retail POS, must have a separate GTIN usually a GTIN-13; a GTIN-13 is represented in an EAN-13 Bar Code.

The EAN-13 Bar Code encoding a GTIN-13 option **must** be used when a carton of stock most commonly found in a warehouse environment is also sold at the retail Point-of-Sale. In the event that the carton will never be sold at Point-of-Sale the above and following options are available.

13.2.2 Trade Items NOT Sold at Retail Point-of-Sale (POS)

Where a trade item is sold at the retail Point-of-Sale (e.g., a double power point), the option described in Section 10.3.1 is applicable. However if the trade item is bundled into a stable grouping (i.e. a carton of 12 double power points) and this unit itself is **not** sold in the Point-of-Sale environment, any of the options for the numbering and bar coding described in Section 5.7 are applicable.

Note: Every variation (different pack size, colour, etc) requires a separate GTIN. When variation in the product measure occurs between each different instance an item is ordered a Variable Measure GTIN should be assigned, see Section 5.8 and 10.3.3 for further information.

It is generally left to the discretion of the company marking the goods as to which option to use to mark the product.

Figure 76: Example of a carton of double power outlets allocated a GTIN-13 and together with a filler zero represented in a GS1-128 Bar Code

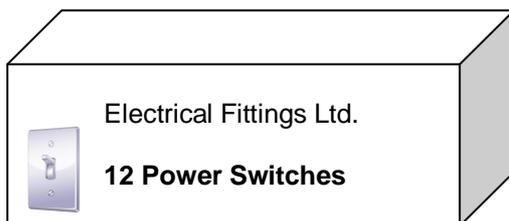
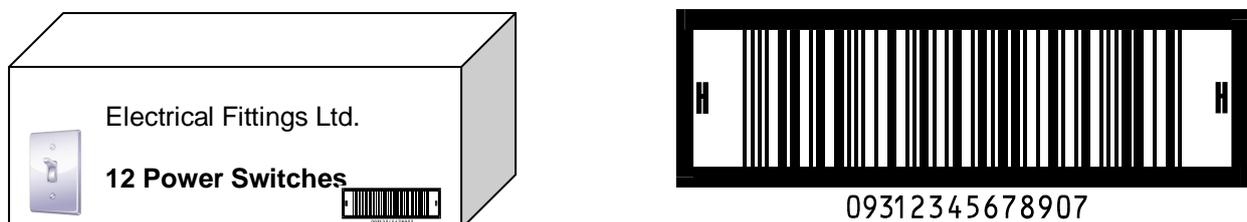


Figure 77: Example of a carton of double power outlets allocated a GTIN-13 and together with a filler zero represented in an ITF-14 Bar Code



Note: In the examples presented in Figure 76: Example of a carton of double power outlets allocated a GTIN-13 and together with a filler zero represented in a GS1-128 and

Figure 77: Example of a carton of double power outlets allocated a GTIN-13 and together with a filler zero represented in an ITF-14 the GTIN assigned must be unique and hence **must not** be the same as the GTIN assigned to the individual piece.

ALTERNATIVE OPTION

Alternatively the Indicator option could have been used, see example below.

Figure 78: Example of a carton of double power outlets allocated a GTIN-14 using the Indicator method, represented in a GS1-128 Bar Code

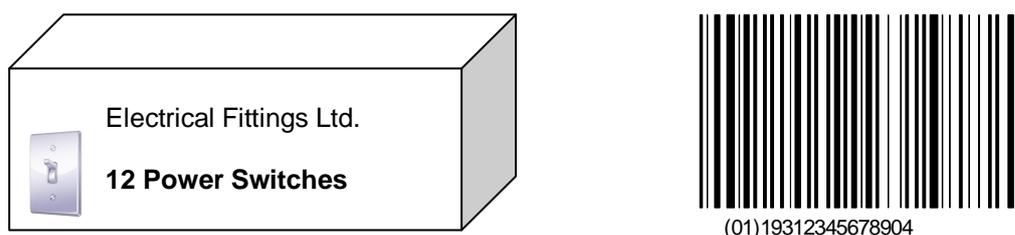
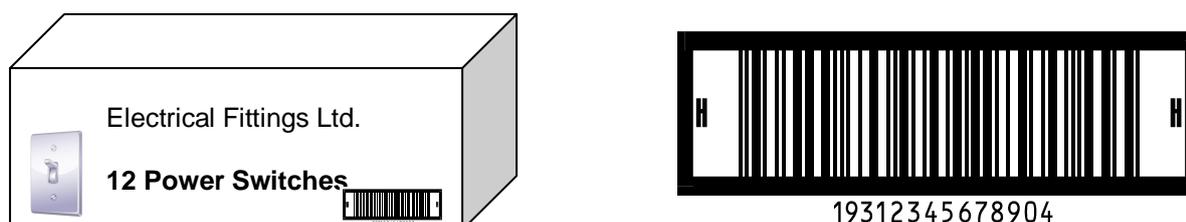


Figure 79: Example of a carton of double power outlets allocated a GTIN-14 using the Indicator method, represented in an ITF-14 Bar Code



The following list depicts additional examples of different trade items found in the Electrical Industry (not sold at retail POS) that should be assigned a separate GTIN.

- Carton of 54 – Batten Lamp Holders – White
- Carton of 100 – Standard Junction Boxes – White
- Carton of 60 – Raised Mounting Blocks – White
- Etc.....

13.2.3 Trade Items Sold as Kits

Within the Electrical Industry there are some trade items that can be sold in a kit form, e.g. Garden Lighting Kits.

Where a trade item is sold as a kit comprising of a number of different components the following points are applicable:

- If the components that make up the kit can be sold individually each component must be allocated a unique GTIN. Suppliers must ensure that any bar codes identifying the individual components are obscured if placed together as one unit.
- Each kit must be assigned a unique GTIN. In the event that a kit is sold but distributed in its component parts at separate times, care must be taken to ensure that only the GTIN associated



with the kit is clearly displayed on each component and any GTINs identifying individual components are obscured.

- Any combinations of individual components that make up a kit must be uniquely identified with a separate GTIN.

Figure 80: Exit Lighting Kit comprising four components all marked with a GTIN-13 represented in an EAN-13 Bar Code

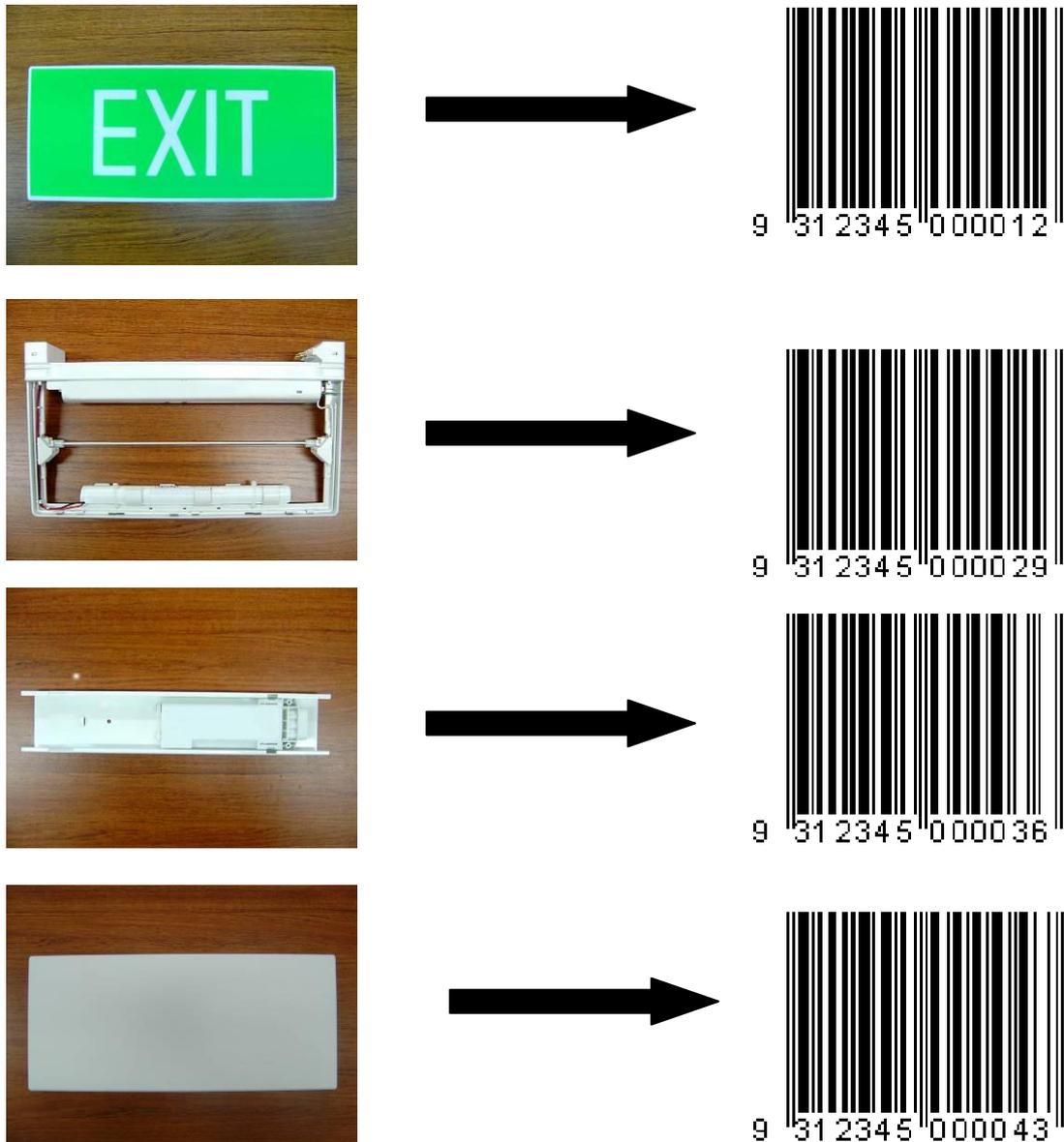
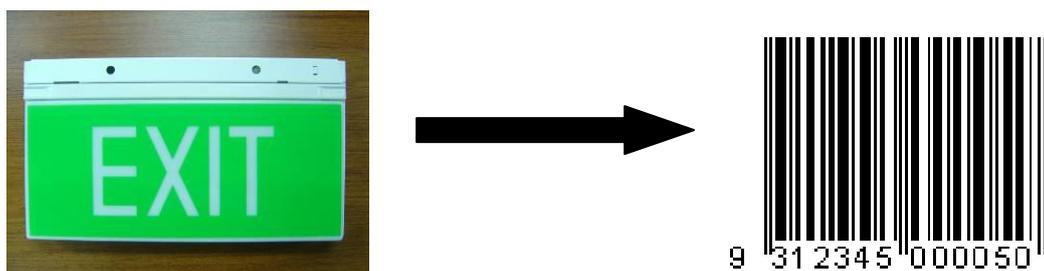


Figure 81: Exit Lighting Kit bundled together marked with its own unique GTIN in the EAN-13 format



Following is another example of a trade item sold as individual components as well as a kit. As described above, each component would be assigned a unique GTIN with the kit assigned its own unique GTIN.

- Combination Outdoor Antenna Kit
 - 4 Components each with own GTIN:
 - VHF to UHF Antenna
 - Antenna Transformer Balun
 - 50 metres Coaxial Cable
 - Antenna Mounting U-Bolts & V-Bocks

Note: The above examples in no way depict every different type of trade item available; they serve only to provide real life examples.

Note: Please refer to Section 13.5.2 Trade Items Sold as Kits for discussion regarding the implementation issues surrounding the sale of kits in the Electrical Industry.



13.2.4 Variable Measure Trade Items NOT Sold at Retail Point-of-Sale (POS)

As described in Section 5.8 trade items may be variable measure either because the production process does not guarantee consistency in weight, size or length, etc, or because the items are created to meet a special order which states a quantity (e.g., cable sold by length).

The Electrical Industry recommends a variable measure GTIN be allocated to each variable measure non-retail item, as this enables the inclusion of an additional piece of data within the bar code describing the variable characteristic of the item.

Within the Electrical Industry certain trade items fall within the above mentioned category. These include rolls of speaker wire, garden lighting cable, and electrical cable sold by length.

Note: This solution will not be available for trade items that are sold through a traditional retail Point-of-Sale environment as POS scanners are not set up to scan the GS1-128 Bar Code required for this application. Where retail sale is intended the options provided in paragraph 14.5.1 may be considered.

Figure 82: 217 metre reel of electrical cable (length in metres)



13.2.5 Variable Measure Trade Items Sold at Retail Point-of-Sale (POS)

Within the Electrical Industry some trade items are sold at Point-of-Sale in variable quantities for example, electrical cable sold by the metre. Special consideration needs to be taken when identifying these products at Point-of-Sale and ensuring the amount sold is recorded correctly. Please refer to Section 13.5.1 for further details.



13.3 Attribute Information Options for Trade Items for the Electrical Industry

In “principle” the Australasian Hardware Industry supports the use of attribute data in the long term. Individual companies need to make their own assessment on the implementation and use of attribute data in their business.

Suppliers may wish to enhance the traceability of their own products by introducing additional information over and above the allocation of a GTIN to each trade item.

When attribute information is applied to a trade item that is sold at POS then it can be added alongside the EAN-13 Bar Code, (see below) or encoded in a GS1 DataBar Bar Code if the systems that will record the scanning of the item and the resulting GTIN are suitably enabled.

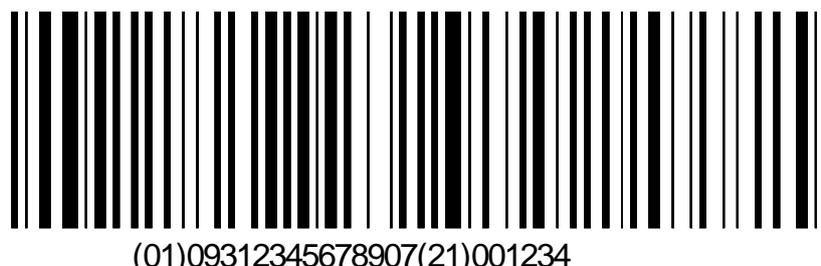
Where the trade item will not be sold at the retail POS attribute information can be concatenated (linked together) with the GTIN, in one single GS1-128 Bar Code as shown in Figure 84: Concatenated GS1-128 Bar Code, or in a GS1 DataBar.

Figure 83: GTIN and serial number represented in separate bar codes



Note: The attribute information, in this example the serial number, represented in the above figure will NOT scan at the Point-of-Sale.

Figure 84: Concatenated GS1-128 Bar Code



Note: The bar code represented in the above figure will not scan at the Point-of-Sale.



13.3.1 Application Identifiers Used in the Electrical Industry

The table below identifies some of the AIs that may be used by companies within the Electrical Industry.

It is recommended that suppliers/manufacturer/distributors consult GS1 regarding the use of these or any other Application Identifiers to ensure compliance to the standards at all times.

Note: Whilst the table listed below lists specific AIs that **may** be relevant for use within the Electrical Industry it does not preclude suppliers from accessing the entire list of AIs available for use. Refer to GS1 Australia's website (www.gs1au.org) under the download section for a complete list of list of AIs available.

AI	Notes	Content	Format	
			AI	Data
00		Serial Shipping Container Code (SSCC)	n2	n18
01		Global Trade Item Number (GTIN)	n2	n14
02		GTIN of items contained in a logistic unit	n2	n14
10		Batch or Lot Number	n2	an..20
11	a	Production Date (YYMMDD)	n2	n6
13	a	Packaging Date (YYMMDD)	n2	n6
15	a	Best Before Date (YYMMDD)	n2	n6
17	a	Expiration Date (YYMMDD)	n2	n6
20		Product Variant	n2	n2
21		Serial Number	n2	an..20
240		Additional product identification assigned by the manufacturer	n3	an..30
30		Variable Count	n2	n..8
37		Count of trade items contained in a logistic unit	n2	n..8
311	c	Length or first dimension, metres trade	n4	n6

a: when indicating only a year and month, fill DD with 00

c: indicates plus one digit for decimal point indication

n: indicates the field is of numeric format only, e.g., n2 indicates a numeric field of 2 characters

an: indicates the field is of alpha numeric format, e.g., an..2 indicates an alpha numeric field of up to 2 characters

13.3.2 Serial Number

The Application Identifier (21) is used to define a serial number.

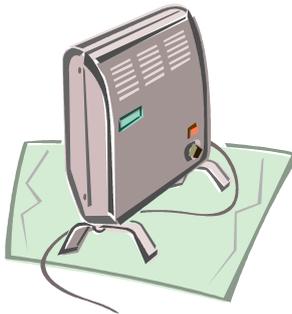
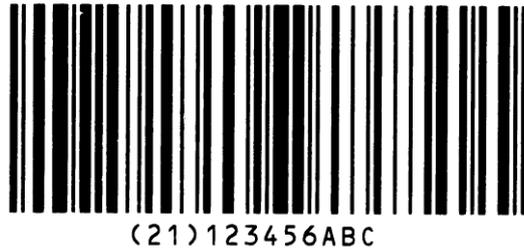
A serial number is a unique alpha or alphanumeric number up to 20 characters in length assigned by a company to an entity for its lifetime. Combined with a GTIN the serial number uniquely identifies each individual trade item. Use any structure to generate the serial number. However, it must be possible for any company to use the combination GTIN and serial number for identifying a specific trade item, regardless of the actual structure of the number.

In the Electrical Industry, the traceability of high price products could be automated by applying the combination of the GTIN and the serial number to uniquely identify each and every unit.

Note: When used, the AI (21) must be associated with a GTIN



Figure 85: Serial Number AI (21) represented in a GS1-128 Bar Code



(01) 09312345678914(21)123456ABC

Note: When sold at retail Point-of-Sale the label affixed on the carton should contain the EAN-13 Bar Code encoding the GTIN assigned with the serial number along side. (The GTIN assigned is the same just represented in a different bar code type.) Alternatively GS1 DataBar Bar Code may be used provided the retail POS system that will process the sale of the item is suitably enabled.



13.4 Logistic Unit Marking for the Electrical Industry

The identification of standard and variable measure trade items is achieved by the allocation of unique GTINs. The natural progression from the identification of a trade item is to the identification of a logistic unit.

As described in Section 6, a logistic unit is an item of any composition established for transport and/or storage, which need to be managed through the supply chain.

The use of the SSCC can enable the unique identification of every logistic unit. Within the Electrical sector logistic units could include reels of electrical cable, cartons of light fittings and switches, or pallets of air conditioning and heating units.

Figure 86: Use of the SSCC on a logistics unit



Note: The SSCC would be represented on a label with a format depicted in Section 5.3.

There are also instances within the Electrical 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. In this case, an SSCC can be used.



13.5 Electrical Industry Implementation Issues

The implementation process often identifies anomalies that exist with certain product types where the standard application of the GS1 System is either not feasible or not practical. This in no way indicates that the system should not be used, but merely identifies that standard methodologies currently available do not fit within the scope of that particular product.

This section has been developed to assist the industry identify these trade items and methods of dealing with these trade items through the supply chain, including final retail Point-of-Sale.

13.5.1 Variable Measure Trade Items Sold at Retail Point-of-Sale (POS)

Within the Electrical Industry some trade items sold begin as standard items allocated a standard GTIN. For example, coils of wire. These items are traded as standard packs, for example 100m, 500m, and 5000m etc, all of which receive their own unique GTIN as described in Section 13.2.

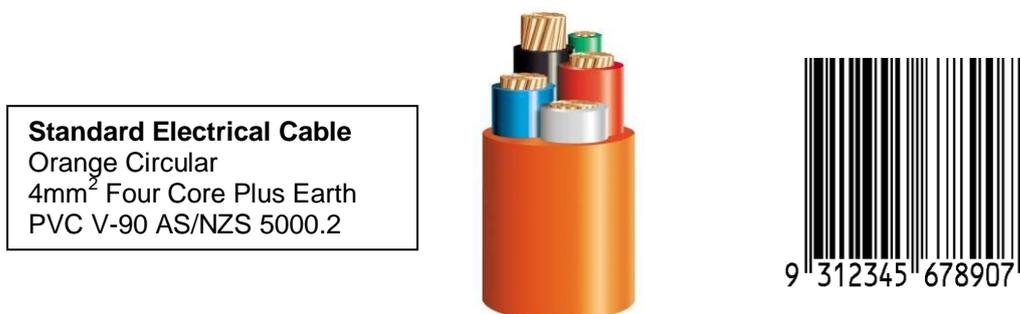
This trade item can then be sold to the consumer in any number of variations of lengths generally as requested by the consumer at the point of purchase. It is important to note that once the fixed measure trade item has had a quantity removed the GTIN allocated to it at the point of manufacture no longer applies as the characteristic of the product has changed. As such the bar code should be removed or defaced to avoid misrepresentation of the product.

The following possible solutions are available to trading partners to enable automatic capture of the trade item, (generally required at the retail Point-of-Sale).

The supplier allocates (but does not mark the trade item) with a standard GTIN that identifies the trade item as “**cable type X variable measure**”. The cost per metre of the trade item would be entered into the database; much like the cost of a standard trade item is linked to the GTIN of a product. This assigned GTIN is represented by an EAN-13 Bar Code and printed in what is commonly called a shadow book¹⁴ with an appropriate description alongside. To aid identification, a picture or diagram of the item could also be included in the shadow book.

At the point of purchase the operator would scan the appropriate GTIN and the system would need to be programmed to prompt the operator for the total length purchased. From here the system calculates the price accordingly and registers the sale.

Figure 87: Example "Shadow Book" entry for electrical cable sold by length



¹⁴ A Shadow book is a book that contains the printed form of any GTIN's assigned but not printed on the actual trade item, generally because it is not physically possible to do so. The shadow book provides the operator the ability to quickly reference trade items sold and scans the appropriate bar code. It provides an automated solution for the trade items not easily bar coded or that have a variable component dictated by the customer.



1. The alternative to the above solution is that the seller (normally a retailer) of the trade item assigns a Restricted Circulation Number instead of the supplier and follows the same procedure as described above. Please consult the technical literature supplied by GS1 or contact GS1 Australia for further information about Restricted Circulation Numbers.
2. If the trade item will only be sold in set lengths from the coil, e.g., always in 1m sections, then each metre could be marked with its own unique GTIN allocated by the supplier. This then allows the operator at the POS to scan each bar code identifying one single metre unit. This solution may require specific printing techniques and equipment and is only applicable if the length is set standard length blocks.

13.5.2 Trade Items Sold as Kits

In Section 13.2.3 the solution for the marking and distribution of trade items sold both as kits and individual components is provided. It is identified that in some instances the trade item, i.e., the kit, is sold as a complete unit but transported in its components, not necessarily all at the same time. In this situation, trading partners will need to confirm between them the best method of tracking all component parts to ensure that the complete set is ultimately delivered.

One method of doing this would be to identify via the GTINs allocated that the combination of all component GTINs is equivalent to the GTIN assigned to the entire kit. That is, a relationship would need to be created in the user's internal database linking the component GTINs to the overall kit GTIN. In this case upon receipt of the goods, the customer can scan the individual components and flag that only two of the three parts has been received. Once all components, in this example the third, are received the system updates the receipt of a complete kit.

For example:

The combination of all the components to form a double switch could be represented as:

9312345000012 + 9312345000029 + 9312345000036 + 9312345000043 + 9312345000050 = KIT
GTIN



Upon scanning the GTIN for the kit the system may request that the operator scan for each of the individual components to complete the receipt of the goods. Should one or more components be missing then this is flagged accordingly as an incomplete order.



This solution will require programming from within the IT department of each company. In addition information such as purchase order numbers and logistic unit marking may be required to ensure that there is unique identification of the original order and that in the event that only components are ordered and invoiced that this is not associated with the receipt of a kit.

Please consult with GS1 Australia for further assistance on this matter.

13.5.3 Retail Packs Opened for Individual Component Sale

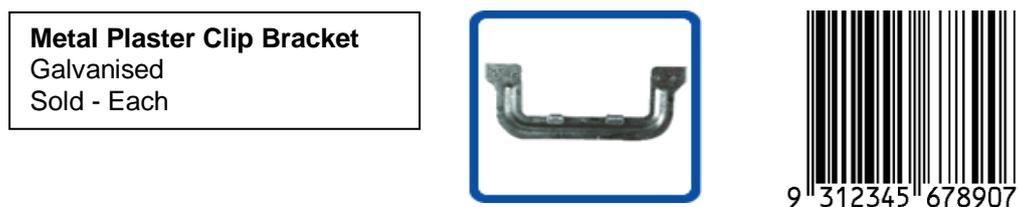
Sometimes in retail outlets unit packs may be opened and the individual contents sold on a “per each basis”. An example would be a bag of 100 plaster clip brackets that is opened so one or more individual clips can be sold. In this example the pack itself would be identified and bar coded with a unique GTIN, but the individual clips would not be identified or bar coded. The following possible solutions are available to trading partners to enable automatic capture of the trade item, (generally required at the retail Point-of-Sale).

1. The supplier allocates the trade item grouping a standard GTIN-13 that identifies the trade items as “**Metal Plaster Clip Bracket; Variable Count**” (but does not mark the trade items). The cost per unit of the trade items would be entered into the database; much like the cost of a standard trade item is linked to the GTIN of a product. This assigned GTIN is represented by an EAN-13 Bar Code and printed in what is commonly called a shadow book¹⁵ with an appropriate description alongside.

At the point of purchase the operator would scan the appropriate GTIN and the system would need to be programmed to prompt the operator for the total count purchased. From here the system calculates the price accordingly and registers the sale.

Below is an example of a shadow book entry for the purposes described above.

Figure 88: Example “Shadow Book” entry for individual unit sale



- An alternative to the above solution is that the retailer of the trade item assigns a Restricted Circulation Number and follows the same procedure described above. Please consult the technical literature supplied by GS1 or contact GS1 for further information about Restricted Circulation Numbers.
- The supplier may choose to allocate a unique GTIN to the individual units within the pack and physically bar code these where appropriate. This then allows the operator at Point-of-Sale to scan each bar code to identify the units sold. If this option is selected, it is recommended the user refer to the technical literature supplied by GS1 or contacts GS1 for further information about the GS1 technical standards for bar code production.

¹⁵ A Shadow book is a book that contains the printed form of any GTIN's assigned but not printed on the actual trade item, generally because it is not physically possible to do so. The shadow book provides the operator the ability to quickly reference trade items sold and scans the appropriate bar code. It provides an automated solution for the trade items not easily bar coded or that have a variable component dictated by the customer.



13.5.4 Customised Products

Customised Products, also called configurable products, are products manufactured to customer specifications that are not part of regular product offerings. Such products are often produced and sold by the Electrical Industry. For example, a manufacturer may offer double power points in the standard colours white, cream and beige. If a customer requires 200 double power points in blue, the manufacturer will produce and supply these.

The Electrical Industry requires the ability to trace these configurable products in a similar manner to standard products and as such is working with GS1 to define an industry standard for such traceability. This will be based on the existing capabilities of the GS1 System. Once the solution is finalised, these Guidelines will be updated.

13.5.5 Re-Use of Existing Product Packaging

Within the Electrical Industry there are instances where a customer may order a quantity of retail items that does not coincide with the total quantity of items packed within the standard non-retail unit. For example a customer may order 7 of a particular item, but the full quantity of the non-retail unit is 10. Currently, in this situation the supplier would remove 3 items and ship the remaining 7 in the existing packaging, leaving the existing bar code. This would then introduce inaccuracies into the transaction as the customer, upon scan receiving the stock, would record the carton as containing 10 items, not the 7 still remaining.

In a situation as described above, the Electrical Industry in line with GS1 Standards recommends the following:

- As soon as items are removed from non-retail unit, the bar code on the packaging becomes invalid. This bar code should be removed or defaced so as not to cause confusion for the customer scan receiving the stock.
- The non-retail unit should then be bar coded with a variable measure GTIN combined with a count of the total number of retail items within the non-retail unit. This will then reflect the true contents of the non-retail unit. The bar code placed on the non-retail unit will appear similar to that shown below.

Figure 89: Variable measure GTIN combined with a count of the number of items contained within the non-retail traded unit.



13.5.6 Imported Products

Sometimes non-retail units imported into Australia or New Zealand by the Electrical Industry do not carry GS1 Bar Codes. These products may carry non-GS1 Bar Codes or simply not carry a bar code at all. The company receiving this stock does not usually break open the non-retail units and currently sends these to their customers with no modification to the packaging

Irrespective of whether the product does not carry a bar code or carries a non-GS1 Bar Code, the Electrical Industry recommends the following should occur:



- The importer of the product should advise the brand owner of the Hardware Industry Guidelines and the requirement for non-retail trade items to be bar coded. The importer should also advise the brand owner that the GS1 standards state GTINs allocated to non-retail trade items should be assigned by the brand owner, from their range of GTINs.
- The importer should then request that the brand owner begins to allocate GTINs to their non-retail products and bar codes these as per the Hardware Industry Guidelines.
- If the brand owner does not wish to bar code the products, the importer should ask this company to consider at least allocating GTINs to these products and advising the importer of these GTINs. It can then be the responsibility of the importer to bar code the product.
- If the brand owner does not wish to allocate GTINs to their products, the importer can allocate a GTIN to the traded unit from their own range. However, if in the future the brand owner does allocate GTINs to their products, the importer must then change their GTIN allocations to be in line with that of the brand owner.

Note: Using the method described in option 4, it is possible for multiple importers of a given product; operating within the one country, to all allocate GTINs to that product. This would create a situation where the trading partners operating in the industry would have to keep track of the multiple GTINs.

In addition, the Electrical Industry recommends that where a non-retail trade item carries a non-GS1 Bar Code, this be either defaced or removed before the subsequent GS1 Bar Code is placed on the packaging. Alternatively, the GS1 Bar Code could be placed over the existing bar code providing this is in line with bar code location standards and does not impede the scanning efficiency of the uppermost bar code.

For further information about marking imported products with GTINs, please contact GS1, who can also provide contact details for GS1 in other countries for the information and convenience of overseas suppliers.

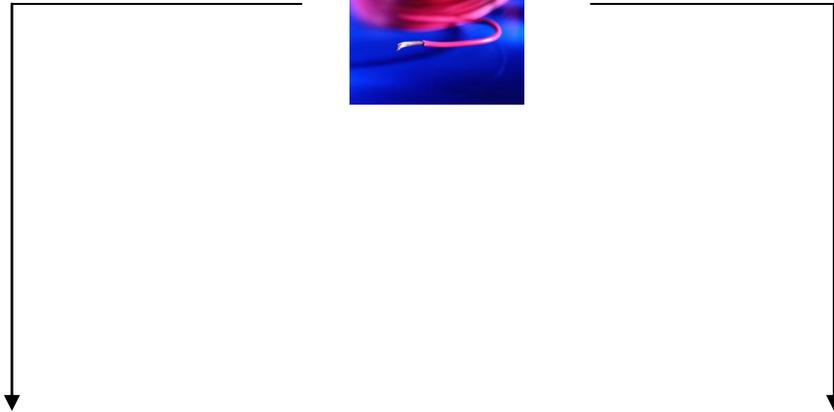
13.5.7 Fixed Length Cable from which a Variable Length is cut

The majority of cable produced within the Electrical Industry is stored in fixed length reels, e.g., 5000m or 1000m that are not sold at Point-of-Sale. However, at the request of a trading partner, a specified quantity, e.g. 89m, may be cut off a fixed length reel and sold, again not at Point-of-Sale. As such, the bar code on the fixed length reel then becomes invalid, as the reel is no longer the length to which the allocated GTIN originally applied. In this situation, the supplier will need to consider how they should then mark the reel with its remaining cable as well as the length of cable cut from the reel. Section 5.7 describes how to form GTINs for both fixed units and the resulting variable length pieces of cable; however Diagram 68 illustrates the format of both the numbers and bar codes to be used in the specific example described above.

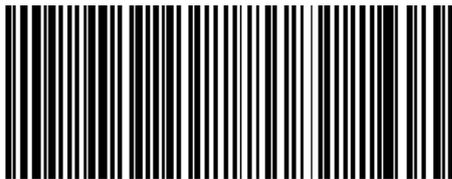


Figure 90: Bar coding fixed and variable length cable

5000m reel of cable (fixed length product)

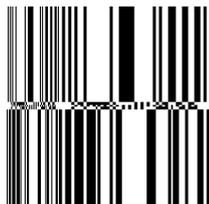


Length of 89m is removed from 5000m reel (variable length product)



(01)99312345000206(3110)000089

OR.....



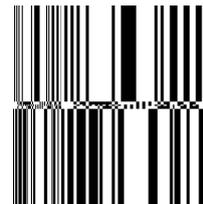
(01)09312345000203(3110)000089

4911m of cable remains on original reel (variable length product)



(01)99312345000213(3110)004911

OR.....



(01)09312345000203(3110)004911



14 Appendix

14.1 Bar Code Quality Check List

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

- Ensure that the correct bar code is used for the relevant product, application, and scanning environment
- Check that the bar code will remain readable in the environment in which the product will be stored, handled, and distributed
- Ensure that the Check Digit is correct
- Check the size of the bar code, both the magnification and the bar height
- Ensure that there are adequate Quiet Zones, and that any optional Quiet Zone Indicators are correctly placed
- Check that the contrast between the bars and the background is adequate, and that the colours chosen will scan
- Make sure that the colour of the contents of the packaging will not unduly affect the contrast between the bars and spaces
- Check the position of the bar code on the final, formed product
- Ensure that no shrink-wrap, tape, or other printing will obscure the bar code on the finished product
- Ensure that no other bar codes will be visible or show through from the inside of the pack
- Carry out routine verification at all levels of packaging to ensure that the bar code complies with the required quality standard, and to identify any potential problems
- Check the print quality regularly throughout the print run by verifying the bar code quality
- Notify trading partners of the GTINs and the products they identify in good time
- Consider having GS1 Australia prepare a Bar Code 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 bar codes are explicit in that if the specified procedures are followed, with routine quality control, you can produce bar codes that scan consistently.

Note: It is recommended that the quality of the bar codes be assessed. This can be achieved through the use of the GS1 Bar Code Verification Service. Please refer to section 14.3 for further information or contact GS1 Australia.



14.2 Emerging Technologies

14.2.1 EPC Network & Radio Frequency Identification (RFID)

Global trade involves moving goods and tracking them around the world. GS1 has developed standards for the EPC network, which combines low cost RFID technology, existing communications network infrastructure and the Electronic Product Code (EPC). The EPC Network will make organisations more effective through real and timely visibility of information about items in the supply chain.

The EPC network incorporates global standardisation of tags and readers, a standard for encoding most GS1 Identification keys into EPC tags, a method for filtering RFID data and Standards for storing and later retrieving event based information in an EPC Information Service (EPCIS), an Object Naming Service (ONS) registry for locating the source of specific item information, and a Discovery Service for locating EPCIS repositories that may also have information specific to that item. Global standards have been developed with direct input from the GS1 community and end users.

The use of RFID technology has some advantages over linear bar codes in that;

- It does not require line of sight
- Multiple items can be read
- Some tags have read/write ability and have larger data storage capacity
- Some tags have additional functionality such as temperature monitoring

14.2.2 GS1 DataMatrix

GS1 DataMatrix is a standalone two-dimensional matrix symbology that is made up of square modules arranged within a perimeter finder pattern. Data Matrix has been used in the public domain since 1994.

Some of the production processes that can be used to produce GS1 DataMatrix Symbols are as follows:

- Direct part marking, such as is done by dot peening on items, such as automotive, aircraft metal parts, medical instruments, and surgical implants
- Laser or chemically etched parts with low contrast or light marked elements on a dark background (e.g., circuit boards and electronic components, medical instruments, and surgical implants)
- High-speed ink jet printed parts and components where the marked dots cannot form a scannable linear symbol
- Very small items that require a symbology with a square aspect ratio and/or cannot be marked with the allocated packaging space by existing GS1 DataBar and Composite Symbols (see footnote 1 on page 11)

GS1 DataMatrix Symbols are read by two-dimensional imaging scanners or vision systems. Most other scanners that are not two-dimensional imagers cannot read GS1 DataMatrix. GS1 DataMatrix Symbols are restricted for use with new niche applications that will involve imaging scanners throughout the supply chain.



14.3 Services Offered by GS1 Australia

14.3.1 Introduction

A new era demands new solutions and new solutions demand new services. Consequently GS1 Australia has invested heavily in a series of initiatives geared toward helping members successfully implement eCommerce based supply chain management strategies.

Through our specialised member assistance divisions: Industry Management, Accreditation, GS1net and Professional Services, we are positioned to respond more efficiently to member needs. By utilising these services as appropriate, you can gain greater control over your business and prepare for the future.

14.3.2 The Services

Industry Management

The Industry Management Team provides assistance to GS1 Australia's Members, enabling them to equip themselves with the knowledge needed to adopt the GS1 Standards successfully.

Membership of GS1 Australia allows the use of the GS1 System for supply chain management and eCommerce processes.

It also provides you, the member, with a wide range of assist services, which include; assistance on how to apply numbers and bar codes, helpdesk support on GS1 System queries, onsite visits, advice on GS1 System implementation, industry guidelines and education & training.

As a member, you can call on the Industry Management Team as an invaluable resource for achieving greater control over day-to-day supply chain processes and business transactions.

As part of GS1 Australia's commitment to industry, Industry Management team is also responsible for the delivery of the 'Industry Engagement Program' that assists the industry wide adoption and education of the GS1 System. Currently GS1 works with eighteen industry sectors in Australia to improve supply chain efficiency between trading partners by utilising eCommerce and GS1 Global Standards.

Testing Services - Bar Code Verification Reporting

GS1 Australia offers a bar code verification report service to all members. Bar codes are tested for print quality against ISO standards to ensure they will be able to be scanned successfully through the supply chain. We also test the validity of the number encoded and ensure it is unique to this product and within the brand owner's available allocation.

A full Bar Code Verification Report is issued for each test that confirms compliance and makes educational suggestions for improvement where applicable.

GS1net –Global Data Synchronisation Service

Because integrity of data is crucial to eCommerce, GS1net has been developed as a secure on-line data synchronisation service, holding records of significant volumes of bar-coded items, including grocery, liquor, healthcare, hardware, auto aftermarket, general merchandise, office products and much more. Each record contains a broad range of fields that include product identifiers, images, description, dimensions, bar code testing status, customer specific pricing and trading terms.

The GS1net catalogue has been created to meet the following needs:



- Allow all trading partners to electronically synchronise data and remove errors associated with paper-based processes.
- Provide retailers, wholesalers, Healthcare jurisdictions and other industry stakeholders with an inexpensive means of accessing information on available products and their master data attributes.
- Provide a single point of entry and retrieval data repository, to enable data integrity that is essential to minimising errors in eCommerce transactions.

Notably, GS1net has already been endorsed by major trading partners in the Australasian Healthcare, Grocery, Liquor and Hardware industries.

Professional Services

GS1 Australia members requiring additional onsite implementation support can benefit from GS1 Australia's Professional Services' expert and independent assistance. GS1 Professional Services provide dedicated consulting services covering all elements of the GS1 System for unique item identification, bar coding and RFID, electronic messaging and data synchronisation..

GS1 Professional Services' advisors offer a cost-effective and relevant means to come to terms with GS1 System processes and benefits. Professional Services can help you with all aspects of your implementation project, including:

- Project Planning, Management and Facilitation
- Business process analysis and design
- Selection of required hardware and software
- Development of functional specifications for systems integration
- Training and change management programs
- Compliance audits of internal processes, systems and applications to meet specific industry or trading partner requirements

GS1 Professional Services also offers a range of tailored programs designed to implement the GS1 System for internal operational improvements.

GS1 Professional Services' advisors not only have a deep technical understand of the GS1 System, but also have a wealth of implementation expertise across a number of industry sectors, including wholesale / retail, manufacturing, foodservices, automotive aftermarket, hardware, healthcare, liquor, building and agriculture. As a result, we can help to deliver complete end-to-end solutions by providing members with unbiased advice on hardware and software, facilitating implementation and training staff and management.

For more information on any of the above services, please contact GS1 Australia.

GS1 Locatenet

GS1 Locatenet is a central directory of GS1 Global Location Numbers (GLNs) which identify physical, operational and legal locations. GLNs may be assigned to pricing locations, ship-from locations, ship-to destinations, eMessaging addresses and more.

GS1 Locatenet delivers the ability for trading partners to communicate location master data using GS1 global standards. GS1Locatenet facilitates the dissemination of quality location data from a central, validated, electronic source, supported and administered by GS1 Australia. Whilst developed initially for the Healthcare sector to support the National Product Catalogue (NPC), GS1 Locatenet is available to all users of GLNs, across all industries.

For further information on GS1 Locatenet, please visit <http://www.gs1au.org/services/locatenet/>



GS1 Recallnet

GS1 Recallnet is GS1 Australia's Recall & Withdrawal Notification Service. GS1 Recallnet is a standardised, industry-driven communication tool enabling manufacturers to share real-time product recall and withdrawal notifications information with their trading partners in a secure and efficient manner.

This user-driven online tool is being developed through an industry consultation and collaboration process and is based on local and global best practices.

GS1 Recallnet enhances existing recall and withdrawal notification processes and leverages GS1 standards and GS1 Identification Keys, including Global Trade Item Number (GTIN), Global Location Number (GLN), Global Service Relation Number (GSRN), and the Global Document Type Identifier (GDTI).

For further information on GS1 Recallnet, please contact GS1 Australia on 1300 366 033.

Training Services

Four different training modes make GS1 learning convenient even for the busiest of schedules. An array of education options and training sessions allows members to get the supply chain management education they need, regardless of where they live or when they are available.

Members can select from:

- **Classroom Sessions**

Classroom training sessions offer the opportunity to learn from expert instructors. Classes designed around important learning outcomes, allow new and existing members to gain better insight and understanding of the GS1 System. GS1 Australia supports training in Numbering and Bar Coding and in implementation of GS1net/NPC(Healthcare) Data Synchronisation in three levels: **Learn** (introductory), **Knowledge** (intermediate) and **Masterclass** (specific to business applications of the GS1 standards such as bar code quality and data quality).

- **Online Courses**

For members who find it difficult to travel to a classroom, GS1 Australia training is as close as the internet. An online training tool, GS1 ONLINE LEARN allows members to take a series of courses on essential supply chain concepts, anywhere and at their own pace, 24 hours per day, seven days a week.

- **Web Interactive Training**

New members can take advantage of GS1's web-interactive training, or "webinars" for an introduction to the GS1 System and all the information and tools needed to print bar codes on their products. The introductory multimedia presentation connects participants with a GS1 expert live via a telephone conference call, while following the presentation on the web. GS1 Australia supports webinars in Numbering and Bar Coding as well as in GS1net/NPC(Healthcare) Data Synchronisation.

- **GS1works - Interactive training in the GS1 Australia Supply Chain Knowledge Centre**

Nothing can quite compare to the impact of our interactive training at GS1 Australia's Supply Chain Knowledge Centre, which delivers GS1works, a business challenge based program specifically developed for the application of the GS1 System of standards across the supply chain of all enterprises: small, medium and large. GS1works in the Supply Chain Knowledge Centre takes participants on an educational journey through the supply chain end to end and is relevant to every sector of industry. It demonstrates, in a clear and easily understandable manner, how sound supply chain management techniques can benefit your business and provide the foundation for effective numbering and bar coding, eCommerce strategies as well as ways to integrate master data synchronisation and EPC/RFID technologies.. The Supply Chain Knowledge Centre is a very effective



way to introduce staff to the fundamentals of supply chain management - from raw material, through to manufacture, distribution and on to the retail Point-of-Sale.

