United Fresh
New Zealand Incorporated

The Case For Traceability

Produce Industry Traceability Guidelines

Sustainable Farming Fund Project 405482
Effective Fresh Produce Traceability Systems

May 2021

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We would like to thank Michael Ahern, CEO of Strawberry Growers New Zealand Inc., and the late John Seymour, then General Manager of Vegetables New Zealand Inc., as well as the growers, packhouses, wholesalers, and retailers, who willingly participated in the trial Traceability studies that have led to the learnings incorporated into these Guidelines.

We would also like to thank Sustainable Food & Fibre Futures who have made this project possible.

IMPORTANT NOTES

The overriding purpose of these Guidelines is to improve interoperability of supply chain Traceability systems. This can only be achieved by having all parties in the supply chain operating to a common standard. The most plausible standards for the fresh produce industry are the GS1 Standards.

This document is not a comprehensive guide to the role of the standard organisation GS1, either nationally or globally, but specifically deals with GS1 Standards based label generation for produce consumer units, produce crates/trays/cartons, as well as pallet labels.

If there is a need to engage with GS1 beyond the generation of labels, please direct your requests to GS1 New Zealand https://www.gs1nz.org/.

INTRODUCTION

It is with pleasure and in anticipation that we present the Produce Industry Traceability Guidelines.

With pleasure, because the project of developing the Guidelines has been a very rewarding one for the industry team members who have contributed. We believe that these Guidelines provide the New Zealand fruit and vegetable industry with a constructive, robust, and realistic mechanism to improve Traceability within our supply chains, which is increasingly no longer an 'optional extra' but a base line requirement.

In anticipation, because Guidelines are not enforcement documents, but as the definitions suggests, a set of recommendations or a piece of advice. As such, the extent to which these Guidelines will evolve into the Traceability norm in our industry will entirely depend on the ability of the project team to convincingly communicate the necessity and urgency to embrace an all-of-industry system, as well as Industry's to uptake and implement such a system.

Let me be entirely clear. The system documented in this Guideline is based on GS1 Standards. GS1 is a standards organisation and not a technical system anyone needs to purchase.

At its most basic, GS1 Standards based systems can be managed with pen and paper. At issue is not the type or brand of IT system a produce supply chain participant is using to generate barcodes for their inner or outer packaging.

What does matter though is that a barcode applied to outer packaging as fruit and vegetables are leaving a packhouse, ought to be scannable at the point of departure as well as at the point of next arrival (e.g., wholesale facility, market, retail distribution centre), without the need to apply a second layer of labels.

What also matters is that the use of a common standard will enable us to extend both internal and external Traceability beyond our current limitations, whilst at the same time improving data capture accuracy and capacity and reducing error rates and labour costs.

We were heartened by the encouragement we received from industry during the project's planning, delivery, and documentation phase.

As an industry, we are ready to start generating the benefits from the implementation of common standard Traceability systems.

Dr Hans Maurer

Chair, Technical Advisory Group
United Fresh

1 The Case For Improving Traceability

1.1 A Snapshot of the New Zealand Produce Industry

In 2017, Horticulture New Zealand (HortNZ) commissioned KPMG to write the "growing story" of New Zealand's domestic vegetable production.[1] The following is a quote from the Story's Executive Summary:

"New Zealand horticulture is big business and growing fast. With an industry value of $5.6 billion (excluding wine), we export 60 percent of what we grow, that is, $3.4 billion in value to 124 countries. Exports increased by 40 percent from June 2014 to 2016. The 5,500 commercial fruit and vegetable growers employ about 60,000 people and the demand for workers across the skill spectrum is outstripping supply."[2]

Given trends over the last few decades, the number of growers may well have reduced since, but the data relating to turnover, breadth of trade, and the numbers employed are likely to have grown from a 2020 perspective. Export values certainly have. New Zealand's horticultural exports amounted to $3.7 billion in 2018,[3] compared to the 3.4 billion in 2017.

The horticulture industry covers more than 120,000 hectares of plantings from Cape Reinga to Bluff,[4] and consists of a variety of businesses from growers, packhouses, wholesalers, retailers, logistics providers and exporters.

Our domestic fresh produce retail industry is estimated to be worth $3 billion dollars, based on the New Zealand Harmonised Trade Data for 2018.[5] The retail component of imports translates into approximately $800 million of this.[6]

1.2 Legislative Background and Regulations

Food Safety, and Traceability requirements, have increasingly become a concern for the relevant regulatory agencies across New Zealand.

The industry is regulated under the Food Act 2014, and its associated Regulations, which expect produce industry participants to be able to document and trace products grown, products purchased, and products sold.[7] Under the Food Act 2014, the administration of the Act is delegated to the Ministry for Primary Industries (MPI).[8] The MPI Business Unit with the responsibility for managing the Act is called '*New Zealand Food Safety*'.[9]

Businesses which process food or food products such as fresh produce must register with MPI, and establish and implement a Food Control Plan (FCP) if deemed high-risk, or a National Programme (NP) if the risk is deemed to be at a lower level.[10] Within the NP category, there are 3 different risk levels that could apply, designated NP1, NP2, and NP3.

The majority of produce businesses are considered to be operating with low risk and are therefore currently required to manage their businesses within the NP1 category.

1. KPMG (2017). New Zealand domestic vegetable production: the growing story. Horticulture New Zealand. Accessible via: http://archive.hortnz.co.nz/assets/Media-Release-Photos/HortNZ-Report-Final-A4-Single-Pages.pdf
2. Ibid, page 5.
3. This figure is based on the Fresh Facts 2018 publication - Aitken, A. G. & Warrington, I. J (2018). Fresh Facts 2018. The New Zealand Institute for Plant & Food Research. Wine has explicitly been deducted from the value given in Fresh Facts, in order to provide a clearer picture of produce exports in both commodity and added value categories.
4. Aitken, A. G. & Warrington, I. J (2018). Fresh Facts 2018. The New Zealand Institute for Plant & Food Research.
5. Department of Statistics New Zealand. InfoShare. Accessible via http://archive.stats.govt.nz/infoshare
6. Department of Statistics New Zealand. InfoShare. Accessible via http://archive.stats.govt.nz/infoshare
7. New Zealand Parliament (2014). The Food Act 2014.
8. New Zealand Parliament (2014). The Food Act 2014.
9. https://www.mpi.govt.nz/about-us/our-structure/. Accessed 19/02/2020
10. https://www.mpi.govt.nz/food-safety/food-act-2014/overview/. Accessed 19/02/2020.

1.3 The Need for Traceability

Ineffective or absent Traceability Systems can present severe problems for consumers and industry. The 2013 dairy industry whey protein scare relating to Botulism, and the subsequent challenges related to Traceability, highlighted the need for effective industry systems,[11] not only in the New Zealand dairy industry, but in other Fast-Moving Consumer Goods categories (FMCG) including Fresh Produce. The incidence rate of foodborne illnesses attributed to fresh produce is steadily rising worldwide,[12,13] increasing the need for an effective and workable Traceability System that helps prevent and reduce such incidents. A failure in fresh produce Traceability risks an impact as severe as the dairy industry botulism incident, or potentially even greater.

Transparency of the Traceability process is becoming increasingly an urgent requirement for supply chains from a consumer perspective. Consumers have no trust in a system's outputs if they have no confidence in the system itself.[14] Therefore, any Traceability System must also be transparent to consumers, to enable consumers to accept the accuracy of such a system's outputs. A lack of transparency in a Traceability System will impede trust in the entire supply chain, impacting uptake and effectiveness. Transparency helps maintain customer and consumer confidence in the upstream supply chain, underpinning their reasonable expectation that all food reaching them is safe.

Traceability is also growing in importance as a mechanism linking domestic and international food supply chains.[15] Currently, Traceability in the New Zealand domestic fresh produce supply chain is not working to a common standard.[16,17] Every produce supply chain in New Zealand varies in its management of Internal Traceability and External Traceability, with External Traceability working well in some cases, or not at all in extreme situations.[18]

1.4 Internal Traceability

When referring to Internal Traceability, we are using this definition: "*The methods, procedures and elements needed for tracking and recording data within a company's processes.*"[19] To comply with the definition, a business needs to have the ability to track incoming and outgoing product and link inputs to outputs in an Internal Traceability System.

1.5 External Traceability

When referring to External Traceability, we are using this definition: "*The methods, elements and procedures necessary to obtain traceable data between the companies that make up the supply chain.*"[20] To comply with the definition, a business can track any product, either received or produced, along its supply chain(s) via an External Traceability System that typically relies upon cooperation between supply partners.

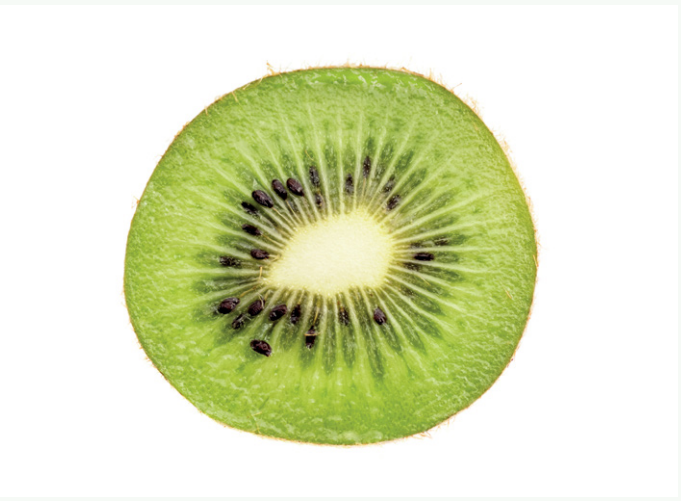
1.6 Interoperability

Internal and External Traceability describe a desirable state that the produce industry needs to achieve, to create and maintain a sustainable and robust Traceability system. The enabler for such a system is Interoperability, the ability of a system to work with, or use the parts or equipment of, another system.[21]

The United Fresh SFF Project has already confirmed that:

- *Growers collect a substantial amount of data to support their business operations.*
- *Growers have demonstrated that significant Traceability information is available from the work arising during the on-farm production and post—harvest processes.*

11. Dairy Traceability Working Group (2014). Dairy Traceability Working Group Report A – Proposed Regulatory Requirements for Traceability. Dairy Traceability Working Group.
12. Sivapalasingam, S., et al. (2004). Fresh Produce: A Growing Cause of Outbreaks of Foodborne Illness in the United States, 1973 Through 1997. Journal of Food Protection, V.67(10), p2342-2353.
13. Commission of the European Communities. (2011). Lessons Learned from the 2011 Outbreak of Shiga Toxin-Producing Escherichia Coli (STEC) O104:H4 in Sprouted Seeds. Commission of the European Communities.
14. Hobbs, J. E. (2003). Consumer Demand for Traceability. International Trade Research Consortium. Working Paper 03-1. ISSN 1098-9218.
15. Bosona, T., & Gebresenbet, G. (2013). Food Traceability as an Integral Part of Logistics Management in Food and Agricultural Supply Chain. Food Control, V.33(1), p32-48.
16. Maurer, H., Dolan, M., & Arts, A-M. (2015). The New Zealand Produce Industry Food Safety & Traceability Framework Position Paper. United Fresh.
17. Arts, A-M. & Maurer, H. (2016). Strategic Assessment of Food Safety & Traceability in the New Zealand Domestic Fresh Produce Industry. United Fresh Food Safety & Traceability Committee.
18. MPI (2014). Outbreak Source Investigation - Yersinia pseudotuberculosis 2014. MPI.
19. https://www.dipolerfid.com/en/internal-tracking.
20. https://www.dipolerfid.com/en/external-traceability.
21. https://www.merriam-webster.com/dictionary/interoperability. Accessed 12/02/2020.



In other words, the challenges we experience as an industry when it comes to Traceability along the supply chain are not based on the lack of data, but on the incompatibility that typically exists between the information management systems in use along the supply chain. This means that it is far more difficult in many cases to move information relating to produce that has been sold between supply chain participants, than it is to move the produce itself.

The key learning for the United Fresh SFF Project Team related to the improvements needed to strengthen Traceability is expressed in the following statement:

"Effective and efficient **Traceability** can only be based on a high degree of **Interoperability** between supply chain partners, which is fast becoming a baseline necessity to achieve the **Rapid Reactivity** increasingly expected by regulatory authorities."

(Dr Hans Maurer, Chair, United Fresh Technical Advisory Group).

It is that need for Interoperability which has guided the Project Team in developing the Traceability Guidelines documented in the pages that follow.

1.7 Internal and External Traceability Combined

The use of Internal Traceability Systems by individual supply chain participants, coupled with an External Traceability System along the entire supply chain, is what enables Product Traceability.

Should Internal Traceability be missing at any point in a supply chain, External Traceability, and therefore overall Product Traceability, is compromised.

1.8 Traceability and Technology

A robust Traceability System does not necessarily require significant investments into technology. Traceability needs to be systems based, and a system is any process that involves regular keeping of records, that allows identification of where a product has come from, and where a product has gone. **At the most basic level, such a system can be paper based**.

Regardless of whether a system is paper based or operates at the other end of the continuum through providing semi-automatically generated Blockchain entries, "one-up, one-down" External Traceability works at its best when all parties are adhering to a common standard.

1.8.1. The Traceability Principle: "One-up, One-down"

The focus of these guidelines is to provide New Zealand Fresh Produce supply chain participants with the opportunity to implement a "one-up, one-down" Traceability structure in their businesses that works.

The "one-up, one-down" Traceability structure is illustrated in Figure 1.

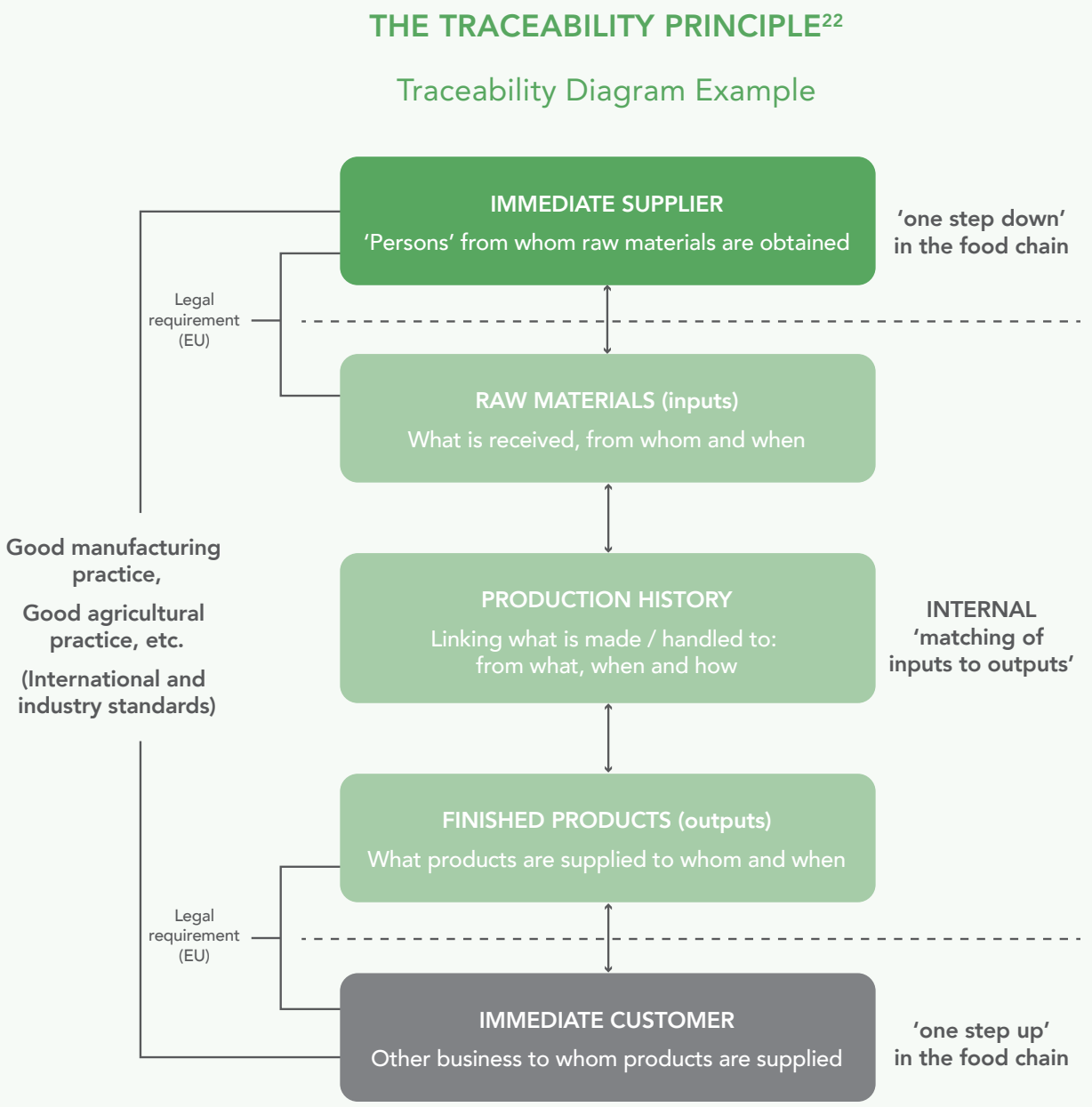


Figure 1

22. Staff (2009). Guideline 60 - Traceability in the Food and Feed Chain: Requirements for System Design and Implementation. Campden BRI, United Kingdom.

Regardless of the size of a produce operation, the principles as outlined in Figure 1 apply to any produce business that needs to manage Traceability.

Traceability does not work without an underpinning standard that enables participants in a supply chain to recognise and move electronic data related to physical product, parallel to moving the product itself. In today's complex global trading environments, such standards cannot be determined and developed by participants in a single supply chain, regardless of how significant that supply chain is.

Nor can such standards be determined and developed on a national basis only. These standards must be able to function globally.

The last point for consideration is that such standards will also fail if they are determined and developed by one specific global industry sector alone. Growers, producers, and manufacturers typically use aggregators such as wholesalers, distributors, supermarkets, and other traditional retail entities, as well as a broad spectrum of virtual sales platforms to get their product to consumers. All these supply chain participants trade across ranges of FMCG products and are unable to cope with more than one standard.

As it so happens, a global standard provider, active within the FMCG categories and beyond, already exists, namely GS1. This Guideline is therefore based on definitions, documents and applications generated by GS1, in many cases with the active cooperation of the international fresh produce trade, and already used by New Zealand produce exporters in the kiwifruit, pipfruit and avocado industries.

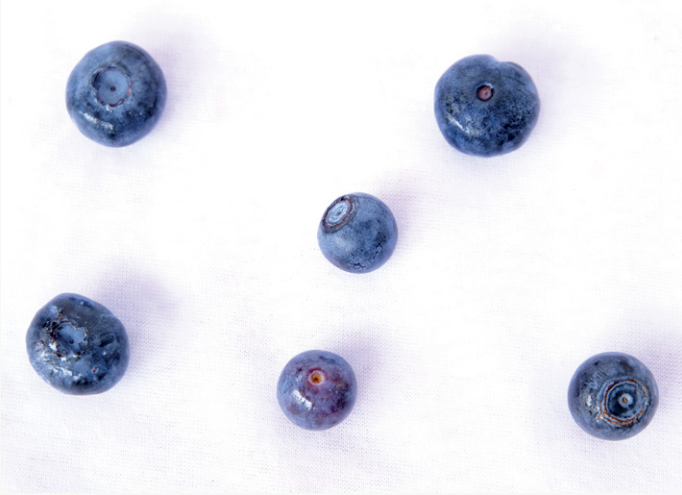
2 Guidelines

2.1 Introduction

Based on the learnings generated by the SFF Project entitled "Effective Fresh Produce Traceability Systems", these Guidelines assume the New Zealand Produce Industry will adopt the following position statements:

- The Produce Industry in New Zealand adopts the GS1 standards as the single industry standard for data management.
- The New Zealand Produce Industry aims to achieve a degree of effectiveness within 36 months of these Guidelines being adopted, that will see grower/packer generated GS1 standards-based barcode labels, readable at all stages within the Fresh Produce supply chain, thus avoiding the need for downstream supply chain participants relabelling product as it moves through their facilities.
- Each Fresh Produce supply chain participant and/or each specialist produce supply chain determines to which extent the need to introduce technology into managing data transmission based on GS1 standards is necessary.
- Individual supply chain participants retain their ability to employ technology of their choice but are encouraged to select a technology solution that can operate to GS1 standards.
- The Fresh Produce Industry in New Zealand accepts that Internal and External Traceability can only be achieved through creating a level of Interoperability that can act as an enabler for Rapid Reactivity, as required by Regulators.
- These Guidelines are **voluntary**. It is up to individual supply chains to determine if, when and how these Guidelines are used to improve industry Traceability.

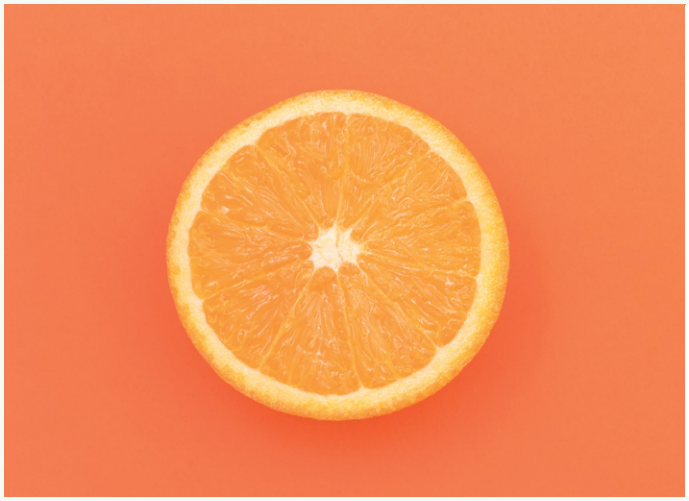
Regardless of organisational size, the basic steps to achieving the necessary level of robustness within the envisaged Traceability System apply across the board and are shown in Table 1.



INTEROPERABILITY STEPS – ALL PRODUCE BUSINESSES

	STEPS	OUTCOMES
1	Visit – http://www.nzbn.govt.nz/	Apply for your NZBN number if you do not already have one to identify your business with your unique NZBN
2	Become a GS1 member	Generating the ability to identify and label products according to the GS1 standards Note: If you only require GLNs, GS1 membership may not be necessary
3	Obtain GTINs and GLNs as required	Achieving visibility for the organisation as well as for the products the organisation markets Note: Instructions on obtaining GTINs and GLNs are in Work Instructions (p 22)
4	Start recording Internal Traceability data in formats usable within the GS1 System	Generating robust and reliable data for both Internal Traceability and External Traceability purposes
5	Retain in formats usable within the GS1 System Traceability data provided by suppliers to the business	Achieving the first step on the road to Interoperability
6	Provide in formats usable within the GS1 System Traceability data generated by the business to customers	Closing the loop of the required "one-up, one-down" Traceability System

Table 1



The produce industry is made up of a multitude of businesses, and it is acknowledged that methodologies employed within those businesses may need to vary in terms of their deployment of technology, based on the nature and scale of the business. What is critical however, is that all businesses within the Fresh Produce supply chain adhere to the same overall GS1 standards.

The following sections, 2.2 to 2.5, introduce Best Practice to achieve effective Traceability of pallets, crates, cartons and consumer units of fruits and vegetables. These practices are all based on the same three principles:

A. The label(s) attached at the point of origin of a consignment, for example a packhouse, will carry all information needed to ensure a smooth journey of the product from the source to its destination at retail or food service endpoints.

B. There is no longer the need to have pallets relabelled at different points in the supply chain, to be recognised in various supply participants' IT systems.

C. To achieve principles A and B, operating to Best Traceability Practice means supply chains need to operate to a common data standard. The only common global data standard for our industry is GS1.

The GS1 System is based on three pillars: Identify, Capture and Share, as shown in Table 2.

THE GS1 PILLARS

IDENTIFY

Unique unambiguous identification of each product and item (tray, crate, bin, pallet etc).

This is achieved with global trade item numbers (GTINs) (often known – wrongly - as 'barcodes' or 'barcode numbers') and Serial Shipping Container Codes (SSCCs).

Each type of number has its own name.

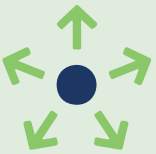
CAPTURE

The identification and any associated data e.g. date or batch must be captured by some means. Usually this is barcode scanning, but it could be manual, or RFID.

Manual is least preferred; slow and error-prone.

Each type of barcode has its own name.

SHARE



The supply chain participants dealing with the products share data about the products using the standard identifiers and data formats. This could be by any means but is best done by EDI.

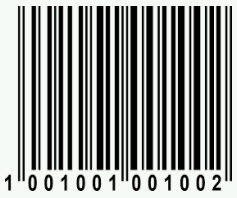
Table 2

The guidelines that follow are based on a standard scenario in which attaching labels at all levels is achievable. In fresh produce some items cannot be labelled e.g. individual berries, naked lettuce. In such cases the identification must begin at the first level on which labelling is possible e.g. punnet or crate. Potentially the same product may be labelled or not, depending on customer requirements, e.g. wrapped for one and unwrapped for another.

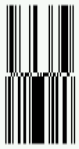
A **Benefits** Pillar has been added to the GS1 Pillars by the Project Team, to articulate the rationale for adopting the GS1 system. The Benefits Pillar is represented by the "$" symbol.

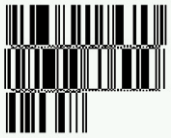
2.1.1. Numbers and Barcodes: The Difference Matters[23]

Thinking and speaking of numbers and barcodes separately is an important discipline. They are different things. The same number can be put into more than one barcode. "Changing the barcode" is not the same as "changing the number." The same number could be encoded in multiple barcode types e.g. a punnet's identifier will be thirteen digits long and will usually be encoded in a barcode like this…



But it could be put into one of these…





or possibly in the (not-too-distant) future one of these…

It could have a zero in front to make it fourteen digits long on a crate or tray in a barcode like this…

or, if there was a need to add more data e.g. a use-by date and batch number, it would be encoded in a barcode like this…

23. Note: Barcodes shown in this document are for illustration purposes only.

2.1.2. Getting the Language Right[24]

Numbers should be refered to as **GTINs**, meaning **Global Trade Item Numbers**. They are defined by the number of digits they contain. The usual number used to identify what the consumer will buy e.g. a wrapped lettuce or a punnet of blueberries will contain thirteen digits. This number is called a GTIN-13.

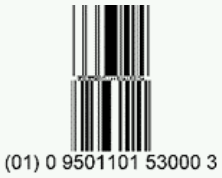
Crates, trays and cartons are usually identified by fourteen digit numbers called GTIN-14s. There are other GTINs in the market but growers in New Zealand are unlikely to be using them.

Barcodes should be referred to by their names. The following are the most common GS1 barcodes and the ones most likely to be used in the fresh produce industry but there are more.

At the checkout the **EAN-13** barcode is almost universal:

BARCODE TYPE	USAGE EXAMPLE	BARCODE EXAMPLE
EAN-13	Prepacked fruit & vegetable; e.g., 1kg Kūmara bags and nets	

Suppliers of summer fruit may be asked to use **GS1 DataBar** barcode:[25]

BARCODE TYPE	USAGE EXAMPLE	BARCODE EXAMPLE
GS1 Databar	Loose apples or stone fruit	

In the foreseeable future some suppliers of wrapped fresh produce may be asked to use **GS1 DataBar Expanded** barcode (which may have several layers depending on how much data is encoded):

BARCODE TYPE	USAGE EXAMPLE	BARCODE EXAMPLE
GS1 Databar Expanded	Bagged salads	

24. Note: Barcodes shown in this document are for illustration purposes only.
25. When used on PLU labels the numbers beneath are not printed if space does not allow.

On cartons, crates and trays growers who only want to encode the GTIN-14 number will use the **ITF-14** barcode:[26]

BARCODE TYPE	USED ON	BARCODE EXAMPLE
ITF-14	Outer packaging units of all produce	 19501101530000

Growers who need to encode more data, for example a use-by date and batch number, would use a **GS1-128** barcode. This example contains the GTIN-14 number that identifies the crate, the use-by date of the product in the crate, and a batch number.

BARCODE TYPE	USED ON	BARCODE EXAMPLE
GS1-128	Outer packaging units of selected produce where more sets of data are requested	 (01) 1 9501101 53000 0 (17) 180430 (10) AB-123

Logistics units – usually pallets - are identified with an eighteen-digit number called a **Serial Shipping Container Code (SSCC)**. It differs from GTINs in that every identical item or tray will have the same GTIN as the others, but every pallet will have a different SSCC even if it has the same contents as other pallets. SSCCs remove the need for the trays or crates on a pallet to be counted.

Locations and businesses can be identified with GS1 numbers as well. Called **Global Location Numbers (GLN)** the numbers that are used for this purpose have the same structure as GTIN-13s, but they are issued complete by GS1 and they are used to identify businesses and locations.

2.1.3. Obtaining the Numbers (GTINs and GLNs)

The grocery industry in New Zealand & Australia require suppliers to have their barcodes verified by GS1.

GS1 cannot verify and vouch for the uniqueness of numbers that have not been sourced from GS1.[27] They are termed 'unauthorised numbers' by GS1, and are considered to be outside of the GS1 system. Major retailers, both internationally and in New Zealand, require GS1 compliance by suppliers, because they rely on the GS1 standards and GS1 identifiers to support some business processes.

The GS1 verification step involves examining the barcode for technical correctness and likely scanning performance, and checking that the GTIN is unique and correctly licensed to the user. This ensures that the number and barcode developed for a product is unique and meets the formatting standards for reliable scanning and use while physically with the product.

26. The thick black border (bearer bars) may be printed only on the top and bottom when printing with thermal printers.
27. Recognised exceptions are numbers previously obtained from GS1 by a company that the current user now owns.

Any barcode that fails verification cannot be relied upon to provide accurate Traceability data, either because it may not scan reliably, or the number it contains cannot be guaranteed to identify only that product.

Using non-GS1 numbers is not compliant. Please contact your trading partner if you have a concern.

GS1 is the only source of verified numbers that will work in the GS1 system. See Appendix 4 - Obtaining numbers & putting them in barcodes.

GTINs, GLNs and NZBNs

GTINs and GLNs are explained above. GLNs are an ISO (International Organization for Standardization) standard, and are part of a credible international system used widely in international trade, supply chain logistics and electronic messaging systems.

The New Zealand Business Number (NZBN) Act[28] came into effect in 2016, enabling all businesses to be allocated or register for an NZBN. That includes government agencies, who are working to implement the NZBN into their systems and processes. The flow-on effect will be that agencies can get core business information from the NZBN Register, eliminating the need for businesses to provide and update it.[29]

Each NZBN is a Global Location Number (GLN), supplied by GS1 New Zealand and administered by the New Zealand Government under licence for the purpose of identifying businesses. All New Zealand registered businesses should have an NZBN.

Companies needing only GLNs need not become GS1 members and can obtain two free GLNs from the NZBN website https://www.nzbn.govt.nz/ More may be purchased as required. Note that GLNs are called Organisation Part Numbers on the NZBN website.

Companies that will need to use GTINs must become GS1 members. See Work Instructions p 22. On doing so they will be eligible to receive five GLNs at no charge and they can purchase more if required.

Your NZBN can be found in your company details on the New Zealand Companies Register, accessible here: https://www.nzbn.govt.nz/mynzbn/search/.

Note: If you do not have an NZBN, you do not have an assigned GLN. To gain your NZBN and the associated GLN, register your business at https://www.nzbn.govt.nz/get-an-nzbn/.

28. https://www.legislation.govt.nz/act/public/2016/0016/20.0/DLM6431505.html , accessed 11th February 2021.
29. https://www.nzbn.govt.nz/whats-an-nzbn/about/ , accessed 11th February 2021.

2.2 Consumer units

Consumer units are pre-packaged units which a consumer buys at a store of the same size/weight/volume (e.g., a pre-packed bag of lettuce). The required barcode and number must represent a single unit of the product.

2.2.1. Where Only Product Identification is Required[30]

Identify

Identify the unit with a GTIN-13 number. Each variety of each product needs a separate GTIN and the owner of the brand on the product is responsible for allocating the GTINs.[31]

Capture

Capture the data required by using an EAN-13 barcode unless specifically requested otherwise by the customer.

Share

Share your data about the product with customers by paper, email or (preferably) EDI (Electronic Data Interchange). Your customer will tell you what information they want. GTIN number and description will be the minimum.

Benefits

- Cost minimisation: supply chain partners need not customise their systems; one identifier works for everyone; leading to reduced labour and label costs.
- Uniqueness: a correctly assigned GTIN-13 number can never appear on any other product.
- Simplicity: application at source removes the need for assignment of other identification later.
- Traceability: the link between the GTIN and the producer is registered globally.[32]
- Accuracy: one ID from source to sale avoids delay and error in changing ID.
- Better sales data: GTIN numbers identify product and brand/source; PLUs only identify variety.
- Enhanced grower reputation: sales data will show which grower's produce sells better than others.

The EAN-13 barcode on the label will look like this.[33] The overall design and appearance of the surrounding label is for the grower to decide unless the customer has given specific instructions.

30. Note: Barcodes shown in this document are for illustration purposes only.
31. Growers supplying unbranded bulk product where the customer has not provided a GTIN to use, must allocate their own. Growers must be GS1 members to allocate GTINs.
32. See https://gepir.gs1.org/index.php/search-by-gtin.
33. For an illustration of GS1 DataBar see page 13.

2.2.2. Where Product Identification & Supplementary Data (e.g., Date/Batch) is Required[34, 35]

Identify

Identify with a GTIN-13 number expanded to fourteen digits (GTIN-14) by putting a zero in front i.e. 9412345670007 becomes 09412345670007. (Appendix 4 - Obtaining numbers & putting them in barcodes). All varieties of every product need separate GTIN numbers. The owner of the product brand is responsible for GTIN number allocation.

Decide what additional sets of data are required in the barcode. The customer will indicate what information they want. GTIN and description and a batch/lot number will be the minimum. Set out the number string in the manner shown in the GS1 New Zealand User Guide April 2021 at https://support.gs1nz.org/hc/en-us/articles/204924800.

Capture

Capture by use of GS1 DataBar Expanded barcode. Users of GS1 DataBar Expanded barcodes will own their own printer and label applicator. The equipment supplier will have instructed the user in the operation of the equipment. Ensure when buying label printing equipment that the supplier sets all sizes to meet GS1 specifications.[36] If a supplier is printing the labels, they should be given instructions to comply fully with GS1 specifications concerning size.

Share

Share data about the product with customers by paper, email or (preferably) EDI. The customer will indicate what information they want. GTIN, description, batch and/or date will be the minimum.

Benefits

- Cost minimisation: supply chain partners need not customise their systems; one identifier works for everyone; leading to reduced labour and label costs.
- Uniqueness: a correctly assigned GTIN-14 number can never appear on any other product.
- Simplicity: application at source removes the need for identification later.
- Traceability: the link between the GTIN and the producer is registered globally, and the precise batch or lot of product can be identified.
- Accuracy: one ID from source to sale avoids delay and error in changing ID.
- Superior recall/withdrawal capability: because the precise batch or lot of product can be identified only affected product need be recalled/withdrawn, leaving the rest in the market.
- Better sales data: GTIN numbers identify product and brand/source; PLUs only identify variety.
- Enhanced grower reputation: sales data will show which grower's produce sells better than others.
- Superior category management: product can be placed for sale in the order in which it arrived and avoiding missed stock aging "out the back".

The GS1 DataBar Expanded barcode on the label will look like this. Its size and the number of layers may vary according to how much data is encoded. The overall design and appearance of the surrounding label is for the grower to decide unless the customer has given specific instructions.

34. At the time of writing this is not required in the New Zealand market although some pilots are in progress and this guidance will be useful to some suppliers in the foreseeable future. Readers who have not been asked for supplementary data in consumer item barcodes should skip this paragraph.
35. Note: Barcodes shown in this document are for illustration purposes only.
36. Equipment suppliers should be familiar with the specifications.

2.3 Crates/Trays/Cartons

Crates, trays, and cartons represent shipping units that carry multiple items of one product, or a large and fixed volume/weight of a product sold by weight (e.g., loose potatoes), and are not typically sold to consumers. These require a barcode and number that represent the product contained in the larger shipping unit, as well as the volume of product, whether by number of units or weight (e.g., 15kg).

2.3.1. Where Only Product Identification is Required[37]

Identify

Identify with GTIN-14 (shown in the GS1 New Zealand User Guide April 2021 at https://support.gs1nz.org/hc/en-us/articles/204924800. Each variety of each product needs a separate GTIN and the owner of the brand on the product is responsible for allocating the GTINs.[38]

Capture

Capture by use of an ITF-14 barcode.

Share

Share data about the product with customers by paper, email or (preferably) EDI. Your customer will tell you what information they want. GTIN and description will be the minimum.

Benefits

- Cost minimisation: supply chain partners need not customise their systems; one identifier works for everyone; leading to reduced labour and label costs.
- Uniqueness: a correctly assigned GTIN-14 number can never appear on any other product.
- Simplicity: application at source removes the need for assignment of other identification later.
- Traceability: the link between the GTIN and the producer is registered globally.
- Accuracy: one ID from source to sale avoids delay and error in changing ID.
- Better sales data: GTIN numbers identify product and brand/source.
- Superior recall/withdrawal capability: because the brand or source of the produce is known through the GTIN-14 number only the affected supplier's produce need be removed, leaving other suppliers' produce in the market.
- Enhanced grower reputation: wholesalers' and distributors' records will show which grower's produce is ordered more frequently.
- Superior category management: product can be placed for sale in the order in which it arrived ensuring freshness and avoiding missed stock aging "out the back".

The label may look similar to these. The exact format is for suppliers and customers to agree.

37. Note: Barcodes shown in this document are for illustration purposes only

38. Growers supplying unbranded bulk product where the customer has not provided a GTIN to use, must allocate their own. Growers must be GS1 members to allocate GTINs.

2.3.2. Where Product Identification & Supplementary Data (e.g., Date/Batch) is Required[39]

Identify

Identify with GTIN-14. (shown in the GS1 New Zealand User Guide April 2021 at https://support.gs1nz.org/hc/en-us/articles/204924800. Each variety of each product needs a separate GTIN and the owner of the brand on the product is responsible for allocating the GTINs.[40]

Decide what additional sets of data are required by the barcode. The customer will indicate what information they want. GTIN and description and a batch/lot number will be the minimum. The number string should be set out in the manner shown in the GS1 New Zealand User Guide April 2021 at https://support.gs1nz.org/hc/en-us/articles/204924800.

Capture

Capture by use of GS1-128 barcode. Users of GS1-128 barcodes will probably own their own printer and label applicator. The equipment supplier will have instructed the user in the operation of the equipment. Ensure when it is set up that the supplier sets all sizes to meet GS1 specifications.[41] If a supplier is printing the labels, they should be given instructions to comply fully with GS1 specifications concerning size.

Share

Share data about the product with customers by paper, email or (preferably) EDI. The customer will indicate what information they want. GTIN, description, batch and/or date will be the minimum.

Benefits

- Cost minimisation: supply chain partners need not customise their systems; one identifier works for everyone; leading to reduced labour and label costs.
- Uniqueness: a correctly assigned GTIN-14 number can never appear on any other product.
- Simplicity: application at source removes the need for assignment of other identification later.
- Traceability: the link between the GTIN and the producer is registered globally, and individual batches of product can be identified.
- Accuracy: one ID from source to sale avoids delay and error in changing ID.
- Superior recall/withdrawal capability: because the precise batch or lot of product can be identified only affected product need be recalled/withdrawn, leaving the rest in the market.
- Better sales data: GTIN numbers identify product and brand/source; SKUs identify only variety.
- Enhanced grower reputation: wholesalers' and distributors' records will show which grower's produce is ordered more frequently.
- Superior category management: product can be placed for sale in the order in which it arrived ensuring freshness and avoiding missed stock aging "out the back".

The label may look similar to these. The exact format is for suppliers and customers to agree.

39. Note: Barcodes shown in this document are for illustration purposes only

40. Growers supplying unbranded bulk product where the customer has not provided a GTIN to use, must allocate their own. Growers must be GS1 members to allocate GTINs.

41. Equipment suppliers should be familiar with the specifications.

2.4 Pallet Labels (SSCC)

A pallet contains up to several dozen shipping units that could contain the same or different products. Pallets therefore need a barcode and number to represent the pallet as a single unit.

Identify

Identify each pallet with a different Serial Shipping Container Code. (See the GS1 New Zealand User Guide April 2021 at https://support.gs1nz.org/hc/en-us/articles/204924800. Businesses with a single GTIN cannot make up SSCCs and should contact GS1 to discuss options.

Capture

Capture by use of GS1-128 barcode. Users of GS1-128 barcodes will probably own their own printer and label applicator. The equipment supplier will have instructed the user in the operation of the equipment. Ensure when it is set up, that the supplier sets all sizes to meet GS1 specifications.[42] If a supplier is printing the labels, they should be given instructions to comply fully with GS1 specifications concerning size.

Share

Share data about the product with customers by paper, email or (preferably) EDI. The customer will indicate what information they want. GTIN, description, batch and/or date will be the minimum. Note that the customer may want more information than will be shown on the label. Sometimes only the SSCC is enough on the label and the customer will associate the other data with the products on the pallet when it arrives.

Benefits

- Uniqueness: a correctly assigned SSCC number can never appear on any other pallet.
- Speed of handling: Scanning the SSCC removes the need to physically count the crates or trays on the pallet.
- Accuracy: Potential human error in manual counting is removed.
- Enhanced supply chain management: individualised identification of otherwise identical pallets enables them to be precisely directed and individually tracked.
- Versatility (1): users have options between putting just the GTIN-14 on the label and sending all the product data separately for association when the pallet arrives or putting all the product information on the label in GS1-128 barcode.
- Versatility (2): where all product data in the barcodes is shown on the pallet label, parties handling the product can set their scanning software to only take from the label the data required at their point in the supply chain.
- Simplicity: application at source removes the need for assignment of other identification later.
- Traceability (1): the pallet is unique so it can be recalled or withdrawn on its own without the need to remove greater quantities of product from the market.
- Traceability (2): Tracing is faster because the pallet has had the same ID as it passed though different supply chain partners so no translations between different identifiers is necessary.
- Accuracy: one ID from source to sale avoids delay and error in changing ID.
- Enhanced grower reputation: wholesalers' and distributors' records will show which grower's produce is ordered more frequently.
- Superior category management: product can be picked and despatched in the order in which it arrived ensuring freshness and avoiding missed stock aging "out the back".

The SSCC label is illustrated in the GS1 New Zealand User Guide April 2021 at https://support.gs1nz.org/hc/en-us/articles/204924800. The design may be varied to meet users' requirements, but the general format should be preserved.

42. Equipment suppliers should be familiar with the specifications.

2.5 Locations and Businesses

Businesses producing product at multiple locations need to be able to distinguish between product made at each site. Each site therefore requires a number that uniquely represents it.

Identify

Identify each business or location with one of your acquired & unique GLNs.[43]

Capture

Capture by whatever means is appropriate. If the GLN is being used in the manner of a supplier number, users will write it or provide it by phone or email as for a supplier number. If it is to be used with barcodes it will be incorporated in a GS1-128 number string and encoded in a GS1-128 or another barcode.

Share

Share data about the product with customers by paper, email or (preferably) EDI.

Benefits

- Cost minimisation: supply chain partners need not customise their systems; one identifier works for everyone; leading to reduced labour and label costs.
- Uniqueness: a correctly assigned GLN can never appear as the identifier of any other business or place.
- Meets regulatory requirements: GLN is a recognised identifier for meeting the location identification requirements of government regulators such as MPI and Customs in New Zealand and the equivalent authorities in all significant trading partner nations offshore.
- Removes the need for using a different supplier number when dealing with different customers.
- Versatility: A GLN permanently indicates to any trading partner the location or business to which it is assigned.
  - GLNs can indicate location to the degree of accuracy chosen by the user e.g., to indicate the whole farm or distribution centre, individual buildings, single packing lines, individual workstations, fields, rows etc.
  - In strings of GS1 numbers GLNs identify addresses for any business or logistics purpose – obtained from, packed at, harvested at, ship to, send invoice to, etc.
  - Can be used in any form of communication instead of text.
  - Usable in barcodes.
  - Users can put location data in barcodes to be scanned on the route or sent by other means to be associated with the product when it reaches the customer.
- Enhanced supply chain management: locations at any point along the supply chain can be identified and the identification captured in electronic communications and/or by scanning barcodes containing the GLN.

There is no GLN label as such. When a GLN is used on a label it will be incorporated in the other text and barcodes on it according to the requirements of the label's user.

43. Called Organisation Part Numbers on the NZBN web site https://www.nzbn.govt.nz/

3 Work Instructions

This section outlines below the information and steps necessary to acquire and implement the GS1 based systems of Global Location Numbers (GLNs),[44] Global Trade Item Numbers (GTINS) and the associated electronically scannable barcode labels.

3.1 Obtain Global Location/ Organisation Part Numbers for the Business

The GLN is the GS1 identifier for a business or location. The location may be a legal, functional, digital, or physical location. Locations can be as specific as identifying individual shelves on a storage unit in a room within a warehouse, or as general as a single business address, depending on what is required for Traceability.

If your business packages, processes, or collates produce at multiple sites (e.g., packhouses), your system should involve a GLN for each of these packaging/processing sites. This should be considered the minimum required, as it enables Traceability back to a unique point within the supply chain.

Additional Traceability can be achieved through a business acquiring additional GLNs as necessary, each identifying more specific locations as required. For example, a packhouse could, if required, acquire, and assign GLNs to individual processing lines if required for Traceability purposes.

Step 1 – The GLN

Every business with a New Zealand Business Number (NZBN) has a minimum of one GLN already provided to them, as your NZBN is a GLN. Your NZBN can be found in your company details on the New Zealand Companies Register, accessible here: https://www.nzbn.govt.nz/mynzbn/search/.

Note: If you do not have a NZBN, you do not have an assigned GLN. To gain your NZBN and the associated GLN, register your business at https://www.nzbn.govt.nz/get-an-nzbn/.

Step 2 – Additional GLNS for Two or More Sites

The NZBN system allows for two or more GLNs to be assigned to a business through "Organisation Parts".

Organisation Parts are an extension of the NZBN system, to allow for multiple globally unique location codes and can be assigned to businesses, which can be used by the business.

Companies that need to use GTINs as well as GLNs must become GS1 members. By doing so they will gain the ability to use GTINs and an automatic entitlement to five free GLNs with the ability to purchase more as required.

Note: This can be achieved by joining GS1 at https://signup.gs1nz.org/businesses/new.

44. Called Organisation Part Numbers on the NZBN web site https://www.nzbn.govt.nz/

Using a NZBN as a GLN

The NZBN is normally a "party identifier". It identifies, for example, "Sunny Growers Ltd" as a business entity and should be used for that purpose in business communications. However, the use of the NZBN may not be suitable for use in Traceability, because the business may be run from an office in a city, with the land on which the company's products are grown being seventy kilometres away. If using an NZBN for Traceability purposes, care should be taken to ensure that the physical location to which the NZBN is assigned matches the location of the event you want to record for Traceability purposes, for example, packing, despatch, receipt etc.[45]

Step 3

Record in your system the details of each location, and the related GLN that is associated with this site. This will enable adequate Traceability of future processes and outputs.

Step 4 – Managing multiple GLNs

Whether numbers have been sourced through NZBN or GS1, best practice is to log them in the NZBN Register at https://www.nzbn.govt.nz/mynzbn/login. This links the individual numbers to the user company's NZBN and assists supply chain visibility, by enabling easy and accurate number association with the user company.

45. Such events are called "Critical Tracking Events (CTE) in the GS1 Traceability Standard.

3.2 Consumer Units

A consumer unit is the smallest unit that the consumer can buy, either as single units, or by weight/volume (for example, Loose potatoes by the kg, or individual banana bunches). These are identified in information systems for the purposes of Traceability and inventory management, by using a Global Trade Identification Number (GTIN).

Note: Each product sold needs a unique GTIN to be Traceable. This GTIN will be different to any other GTINs used on similar product, e.g., a 250g and 500g packet of carrots require different GTIN, and loose apples need a unique GTIN for each variety or grade.

Step 1

Determine what printed barcode types and internal information management systems are required to effectively manage your inventory of GTIN labelled products. This could be a pen and notebook, or an inventory management database, depending on your requirements, but must enable you to effectively manage all your product in a manner that enables accurate Traceability.

Step 2

Collect a detailed list of all loose produce/ packaged produce items that you will be assigning GTINs to, as well as supplementary information.

Note: This list needs to have separate identifiers for each type of loose and packaged product, in line with how they are managed in the inventory for sales.

Example: a carrot seller may need multiple GTINs, to identify their loose large carrots, loose small carrots, 250g bagged large carrots, 500g bagged large carrots, 1kg bagged large carrots, and 500g bagged baby carrots.

Step 3

Acquire the required number of GTINs from GS1 New Zealand to identify each of your items.

Note: This ensures your items will be Traceable by all GS1 members, meaning each GTIN is unique, and does not risk your Traceability.

Create your GTIN number for each product by logging on to your dedicated page on the GS1 New Zealand website https://www.gs1nz.org/ and following the instructions in Appendix 1 of the GS1 New Zealand User Guide April 2021 at https://support.gs1nz.org/hc/en-us/articles/204924800.[46]

Step 4

Some products may also need supplementary data appended to the GTIN. This data can include pack date, best before dates, or other Traceability information.

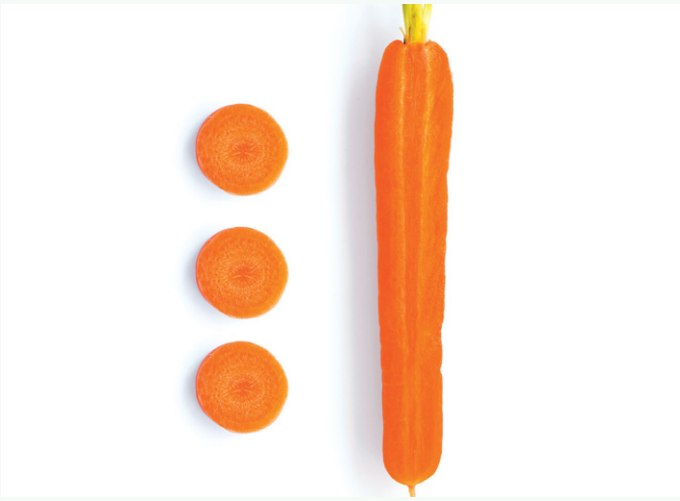
To generate your supplementary data:

a. Take the assigned GTIN. It may be thirteen digits long if it is already in use.[47]

b. If it is thirteen digits long append a 0 digit to the start of the GTIN to make a total of fourteen human-readable digits.

c. Append the required supplementary data, using the required Application Identifier (AI) data and format specified in the GS1 New Zealand User Guide April 2021 at https://support.gs1nz.org/hc/en-us/articles/204924800.

46. The page is created, and login details are provided on joining GS1.
47. The GS1 website will generate GTINS that will all be fourteen digits long, starting 094…. If they are to be used in retail the leading zero should be disregarded and the thirteen-digit form used. In other cases the leading zero should be retained and the fourteen-digit form used.



Step 5

If you do not have on-demand printing equipment, you may want to obtain a graphic of the barcode containing each GTIN. Print and packaging suppliers may prefer to create their own graphics using the data you provide.

GS1 members who joined up to and including December 2020 will find a 'barcode generator' button in their dedicated page on the GS1 website https://www.gs1nz.org/ and may obtain a graphic by following the instructions there.

Note: The generator does not provide barcodes that can contain supplementary data. Your printing equipment should be able to produce them,[48] and commercial print and packaging providers can provide them.

GS1 members who joined after 1 January 2021 should contact GS1 New Zealand (phone 0800 10 23 56 Option 1) and verbally order their graphics.[49]

Step 6

Alter any packaging or documents carrying product information to include the new GTIN and barcode, if necessary, including the supplementary data where applicable.

Note: Contact GS1 New Zealand (https://www.gs1nz.org/ or phone 0800 10 23 56 Option 1) if you are unsure as to what barcode type is required.

Step 7

Provide your customers with the GTIN information of your products, including all supplementary information.

48. When buying on-demand printing equipment specify full GS1 compliance including the ability to encode supplementary data with GTINs.
49. At the date of writing GS1 is working on providing a link from the member's dedicated page.

3.3 Crates/Trays/Cartons

Bulk shipping units such as crates, trays, or cartons, that carry multiple consumer units can also utilise GS1 GTINS and barcodes for Traceability. These are sometimes referred to as Order Multiples (OMs).

Step 1

Determine what printed barcode types and internal information management systems are required to effectively manage your inventory of GTIN labelled products. This could be a pen and notebook, or an inventory management database, depending on your requirements, but must enable you to effectively manage all your product in a manner that enables accurate Traceability.

Step 2

Collect a detailed list of all crates/tray/cartons packing options for Consumer Units that you will be assigning GTINs to, as well as supplementary information.

Note: This list needs to have separate identifiers for each type of crate/tray/carton and every potential number/volume of product it will carry, in line with how they are managed in the inventory for sales.

Example: A packhouse that packs two types of potatoes (1kg and 2.5kg bags) may pack into three crate types (e.g., small/medium/large). This requires a unique GTIN for each combination of Consumer Unit potato bag and the number in each crate (e.g., 4/6/10/12 units per crate).

Step 3

Acquire the required number of GTINs from GS1 New Zealand to identify each of your crates/trays/OMs.

Note: This ensures your crates/trays/cartons will be Traceable by all GS1 members, meaning each GTIN is unique, and does not risk your Traceability.

Step 4

Generate your GTIN:

a. Create your GTIN number for each unit by logging on to your dedicated page on the GS1 New Zealand website https://www.gs1nz.org/ and following the instructions in Appendix 1 of the GS1 New Zealand User Guide April 2021 at https://support.gs1nz.org/hc/en-us/articles/204924800.[50]

b. Repeat this process for all crates/trays/cartons that require a GTIN.

50. The page is created, and login details are provided on joining GS1.

Step 5

Some crates/tray/cartons may also need supplementary data appended to the GTIN. This data can include pack date, best before dates, or other Traceability information.

To generate your supplementary data:

a. Take the assigned GTIN.[51]

b. Use it with the 0 digit at the start of the GTIN so there is a total of fourteen human-readable digits.[52]

c. Append the required supplementary data, using the required Application Identifier (AI) data and format specified in the GS1 New Zealand User Guide April 2021 at https://support.gs1nz.org/hc/en-us/articles/204924800.

Step 6

If you do not have on-demand printing equipment, you may want to obtain a graphic of the barcode containing each GTIN. Print and packaging suppliers may prefer to create their own graphics using the data you provide.

GS1 members who joined up to and including December 2020 will find a 'barcode generator' button in their dedicated page on the GS1 website https://www.gs1nz.org/ and may obtain a graphic by following the instructions there.

Note: The generator does not provide barcodes that can contain supplementary data. Your printing equipment should be able to produce them,[53] and commercial print and packaging providers can provide them.

GS1 members who joined after 1 January 2021 should contact GS1 New Zealand (phone 0800 10 23 56 Option 1) and verbally order their graphics.[54]

Step 7

Alter any packaging or documents carrying product information to include the new GTIN, and barcode if necessary, including the supplementary data where applicable.

Note: Contact GS1 New Zealand (https://www.gs1nz.org/) if you are unsure as to what barcode type is required.

Step 8

Provide your customers with the GTIN information of your products, including all supplementary information.

51. The GS1 website will generate GTINS that will all be fourteen digits long, starting 094…. If they are to be used in retail the leading zero should be disregarded and the thirteen-digit form used. In other cases the leading zero should be retained and the fourteen-digit form used.
52. If the GTIN is already in use on the product and was created some years ago it may have been made up by a method that GS1 no longer supports that allowed digits 0 to 8 to be used at the start of the number. GTINs made up in this manner may still be used. In these cases disregard the references to leading zeros in this document.
53. When buying on-demand printing equipment specify full GS1 compliance including the ability to encode supplementary data with GTINs.
54. At the date of writing GS1 is working on providing a link from the member's dedicated page.

3.4 Pallet Labels (SSCC)

When shipping multiple crates/trays/cartons or individual consumer units as one bulk pallet or other large bulk shipping items of a similar nature, and where such items may have multiple GTINs and quantities, a Serial Shipping Container Code (SSCC) is used to identify the products contained within the larger shipping unit.

Step 1

Determine what printed barcode types and internal information management systems are required to effectively manage your inventory of SSCC labelled pallets/bulk shipping units. This could be a pen and notebook, or an inventory management database, depending on your requirements, but must enable you to effectively manage all your product in a manner that enables accurate Traceability.

Step 2

Find your Global Company Prefix (GCP) in "MyGS1", accessible on your dedicated page on the GS1 New Zealand website at https://my.gs1nz.org/mygs1/.

Note: This number will be the bold part of the numbers in the GTIN range shown on your landing page, for example, with **9412345**000002 – **9412345**999993, your GCP is 9412345.

Step 3

Create the SSCC:

This step is **not** necessary if you are using on-demand printing equipment. Your equipment supplier will only need to know your GCP to programme your printer to create SSCCs as required.

If you are creating your own SSCCs.[55]

a. Append a 3 in front of the GCP.

b. Assign a unique number for each pallet/large serial shipping unit, appended to the modified GCP to form a 17-digit long identifier.

Note: It is up to you how you create your product reference numbers, but it is suggested that you do not use a pattern to create them. Patterns may make it harder to manage your GTIN inventory through assigning a number twice, or not using a number that you have acquired. Best practice is to assign them in sequence, to avoid duplication or missing GTINs.

c. Calculate the check digit. The Check Digit is a calculated one-digit number used to validate data integrity. The check digit can be calculated here: https://www.gs1.org/services/check-digit-calculator.

d. Record this SSCC with the corresponding contained crate/tray/carton data in your system.

e. Repeat this process for all large shipping units that require a SSCC.

Step 4

Alter any packaging or documents carrying product information to include the new SSCC, and barcode if necessary, including the supplementary data where applicable.

Also include any GTINs for crates/trays/cartons or individual Consumer Units on altered packaging or invoices, as required.

Step 5

Print and apply your labels by one of the following means as appropriate:

a. Using your on-demand equipment in the manner shown by the equipment provider.

b. GS1 members joined prior to January 2021 use the 'SSCC printer' button in your dedicated page on the GS1 website, follow the instructions and apply the printed labels to your units.

c. GS1 members joined after December 2020 contact GS1 (phone 0800 10 23 56 to arrange access to the SSCC tool then follow the instructions on the screen).[56]

Step 6

Provide your customers with the SSCC information of your shipping units, including all supplementary information.

55. When buying on-demand printing equipment specify full GS1 compliance including the ability to encode supplementary data with GTINs.
56. At the date of writing GS1 is working on providing a link from the member's dedicated page.

3.5 Linking Consumer Units, Trays, and Pallets

It is possible to link individual units or crates/trays/cartons to specific orders or shipping units, provided sufficient supplementary data such as batch/lot number has been identified and captured in your Traceability system.

If your system does capture this information, then you are able to link Consumer Unit GTINs to crate/tray/carton GTINS, and these GTINS to the SSCC of the larger shipping unit.

Step 1

Ensure your system is identifying and capturing Batch/lot number/production date or other similar supplementary information that will enable accurate Traceability of the product between GTINs and SSCCs, and that this is being identified with the appropriate GTIN Identifiers (see the GS1 New Zealand User Guide April 2021 at https://support.gs1nz.org/hc/en-us/articles/204924800 for further details if required).

Note: This should include the Consumer Units and trays/crates/cartons having physical barcodes and supplementary information presented on the packaging as required.

Step 2

Ensure your system is identifying and capturing the appropriate supplementary information of crates/trays/cartons of multiple Consumer Units, and that this is being identified with the appropriate GTIN Identifiers (see the GS1 New Zealand User Guide April 2021 at https://support.gs1nz.org/hc/en-us/articles/204924800 for further details if required).

Note: This should include the crates/trays/cartons having the printed barcodes and supplementary information as required.

Step 3

Ensure your system is identifying and capturing the appropriate supplementary information of crates/trays/cartons of multiple Consumer Units attached to the SSCC, and that this is being identified with the appropriate GTIN Identifiers (see the GS1 New Zealand User Guide April 2021 at https://support.gs1nz.org/hc/en-us/articles/204924800 for further details if required).

Note: This should include the SSCC having the printed supplementary barcodes and supplementary information as required.

Step 4

Ensure your system is identifying and capturing the appropriate supplementary information between the Consumer Units, crates/trays/cartons, and the SSCC, so that appropriate Traceability is maintained.

Step 5

Communicate all required supplementary information captured with the GTINs and SSCC to your customers.

GLOSSARY

TERM	MEANING
AI	Application Identifier
BRC	British Retail Consortium
Codex	Codex Alimentarius
CPMA	Canadian Produce Marketing Association
DataBar /GS1 Databar	A GS1 barcode standard
DataMatrix	A GS1 two-dimensional (2D) barcode
DC	Distribution Centre
EAN	European Article Number (Association), now GS1
EAN-13	EAN barcode containing a GTIN-13
EDI	Electronic Data Interchange
FAO	United Nations Food and Agriculture Organisation
FCP	Food Control Plan
FMCG	Fast Moving Consumer Goods
FSANZ	Food Standards Australia New Zealand
FPSC	Fresh Produce Safety Centre
FSSRC	New Zealand Food Safety and Science Research Centre
GAP	Good Agricultural Practice
GLN	Global Location Number
GS1	The GS1 organisation
GS1-128	A GS1 barcode and number system
GTIN	Global Trade Item Number
HEA	Horticultural Export Authority
IFPS	International Federation for Produce Standards
ITF-14	Interleaved two of five (ITF) barcode
MPI	Ministry for Primary Industries
NP1, NP2, NP3	National Programme level 1, 2 or 3
NZBN	New Zealand Business Number
PMA	US Produce Marketing Association
PMA A-NZ	PMA Australia-New Zealand
PMAC	Plant Market Access Council

TERM	MEANING
POS	Point of Sale
PTI	Produce Traceability Initiative
QR Code	A GS1 two-dimensional (2D) barcode
SFF	Sustainable Food & Fibre Futures Fund
SSCC	Serial Shipping Container Code
TAG	United Fresh Technical Advisory Group
UF USA	United Fresh USA
UN	United Nations
UPC	Uniform Product Code
WQA	Woolworths Quality Assurance
NZGAP	New Zealand Good Agricultural Practice organisation
GlobalGAP	Global Good Agricultural Practice organisation
New Zealand Business Number (NZBN)	Identification number issued to businesses by the NZ Government
Organisation Part Number	The name applied to a GLN on the NZBN website

GS1 SPECIFIC TERMS & THEIR MEANINGS

TERM	MEANING
Application Identifier	Digits printed inside brackets and placed within strings of GS1 numbers to identify each component of the number string, i.e., GTIN, date, batch, weight.
Critical Tracking Event (CTE)	An event that must be recorded in order to allow for effective tracking of products in the supply chain e.g. harvest, packing, consignment, receipt etc.
DataBar/GS1 Databar	A barcode usable in retail that can contain additional data not carried by more traditional barcodes e.g. batch number, date.
DataMatrix	A two-dimensional (2D) barcode. When used to encode GTINs and related data it is called GS1 DataMatrix and contains some special structural features.
EAN	European Article Number (Association), now GS1.
EAN-13	An EAN barcode containing a GTIN-13; the most common retail barcode. (The group of barcodes that can be used in retail are collectively known as EAN/UPC barcodes).
EDI	Electronic Data Interchange. (The exchanging of supply chain data by automated computer-to-computer communication).
GLN	Global Location Number.
GS1	The GS1 organisation.
GS1-128 (barcode)	A type of barcode used to encode SSCC, GTIN-14 and related data.
GS1-128 (number format)	A means of combining SSCC and/or GTIN-14 with associated data, e.g., date, batch number.
GTIN	Global Trade Item Number. GTINs are distinguished by the number of numeric characters they contain, as there are several types.
ITF-14	An "interleaved two of five" (ITF) barcode being used to encode a GTIN-14.
MyGS1	The GS1 online members section in the NZ GS1 website.
QR Code	A two-dimensional (2D) barcode. (Distinguishable by large dark squares in three corners).
SSCC	Serial Shipping Container Code.
UPC	Uniform Product Code. (The American term for the US equivalent of the EAN-13 but often (wrongly) used to refer to a GTIN.) The group of barcodes that can be used in retail are collectively known as EAN/UPC barcodes.

Appendices

APPENDIX 1 – THE ROLE OF GS1

GS1 is a global standards organisation active in over 100 countries. GS1 is dedicated to the design and implementation of global standards for use in the supply chain. These standards provide a framework that allows products, services, and information about them to move efficiently and securely for the benefit of businesses and the improvement of people's lives, every day, everywhere.[57] GS1 is a not-for-profit body owned by its members, who are companies that use the GS1 system.

GS1 standards bring together participants representing all parts of the supply chain – manufacturers, growers, distributors, retailers, hospitals, transporters, customs organizations, software developers, local and international regulatory authorities and more. GS1 standards are used by huge multinational chains and by small corner shops, by world famous brands and by individual craftsmen. GS1 standards make Traceability Systems possible on a global scale – no matter how many companies are involved or how many borders are crossed as food and food ingredients travel from one end of the supply chain all the way to the consumer.[58]

The GS1 standards combine a single label system with unique barcodes and numbers that encode the data related to the product and generates this in numerical and barcode formats. This data system is based on the Global Location Number (GLN) and the Global Trade Item Number (GTIN) concepts.

The GTIN provides a global supply chain solution by identifying any trade item that may be priced, or ordered, or invoiced at any point in the supply chain upon which there is a need to retrieve pre-defined information.

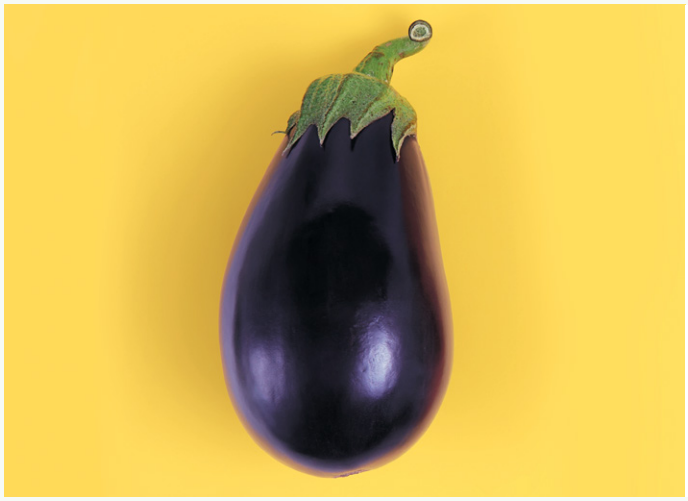
Unique identification of trade items is critical to maintaining operational efficiencies that business partners rely on to exchange information about products in consistent ways, as well as ensuring the smooth operations of global supply chains. Additionally, the unique identification of trade items is crucial when complying with various regulations across the globe.[59]

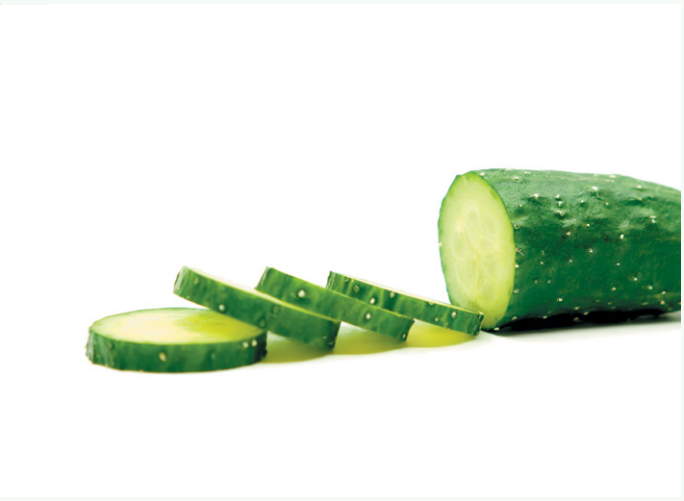
The GLN provides a unique and unambiguous identification of; physical locations, digital locations, legal entities, or functions within a legal entity, and therefore enables the unique and unambiguous identification of any type of location used in business processes. Identification in this manner is a prerequisite for efficient communication between trading partners. A GLN acts as a database key which references location specific information that is repeatedly applied. Its function is to reduce input errors and increase efficiency.[60]

These systems of identifying the location of production (GLN) and the product number for any product that follows the GS1 standard (GTIN), work and are already in use in the global produce export sector, with GS1 compliant labelling covering loose produce, packaged produce, cartons, or crates that hold multiple loose produce items or multiple pre-packed produce items, and larger packing and shipping units such as pallets, cages, and one-way cardboard bins.

GS1 therefore has a number of Implementation Guidelines specifically for assisting the Produce Industry to effectively and efficiently work with GS1 standards. The GS1 Guidelines are listed in the general specifications, found at https://www.gs1.org/docs/barcodes/GS1_General_Specifications.pdf.

57. www.GS1.org. Accessed 05/02/2020.
58. www.GS1.org. Accessed 05/02/2020.
59. https://www.gs1.org/sites/default/files/docs/barcodes/GS1_GTIN_Management_Standard.pdf. Access 11/02/2020.
60. https://www.gs1.org/sites/default/files/docs/barcodes/GS1_General_Specifications.pdf. Accessed 11/02/2020.





The "Traceability Guidelines for the New Zealand Produce Industry" are based on the learnings from the Milestones completed within the SFF Effective Produce Traceability Systems Project and the industry expertise contributed by the Project Team. Our Milestone 3 Report included the recommendation that the industry needs to explore standardising the type of data and format it is held in, to enable fast and reliable sharing of data required in a recall.[61]

We are in the fortuitous position of not having to start from scratch, as United Fresh connections with the international produce trade through the International Federation for Produce Standards (IFPS) allows for a meaningful exchange of information and cooperation between member organisations.[62] This has given United Fresh New Zealand Incorporated access to the learnings of the North American Produce Traceability Initiative (PTI).[63]

Learnings from the work of PTI that reaches back to 2007 have been incorporated into our thinking as we prepared these Guidelines. The PTI Project Teams prepared a range of Best Practice documents for the North American Produce Industry, as they worked on improving the Traceability capability of the industry. These documents and their electronic location are listed in Appendix 3 – Industry & GS1 Co-published Documents.

Of note is that the success of the North American Produce Traceability Initiative is based on the collaborative effort of the Canadian Produce Marketing Association (CPMA), the US Produce Marketing Association (PMA), United Fresh Produce Association (UF USA) and GS1 USA.[64]

61. https://www.unitedfresh.co.nz/technical-advisory-group/sff. Accessed 12/02/2020.
62. https://www.ifpsglobal.com/. Accessed 19/02/2020.
63. https://www.producetraceability.org/. Accessed 19 /02/2020.
64. https://www.producetraceability.org/. Accessed 19 /02/2020.

APPENDIX 2 – GS1 GUIDELINES FOR THE PRODUCE INDUSTRY

TITLE	VERSION	PUBLISHED BY	WEB LOCATION
FRESH PRODUCE SPECIFIC GUIDELINES			
Traceability for Fresh Fruits and Vegetables - Implementation Guide	1.1	GS1 Global	https://www.gs1.org/sites/default/files/docs/traceability/Global_Traceability_Implementation_Fresh_Fruit_Veg.pdf
Fruit & Vegetable Master Data Attribute Implementation Guide	1.3	GS1 Global	https://www.gs1.org/docs/freshfood/Fruit_Vegetable__Master_Data_Attribute-ImpGuide.pdf
GS1 Fruit & Vegetable GTIN Assignment Implementation Guideline	2.0.1	GS1 Global	https://www.gs1.org/docs/freshfood/Fruit_and_Vegetable_GTIN%20Assignment_Guideline.pdf
GS1 Fresh Fruit & Vegetable Labelling Consumer Units Guideline	1.0.1	GS1 Global	https://www.gs1.org/docs/freshfood/GS1_Fresh_Fruit_Vegetable_Labelling_Guideline.pdf
Transforming the Produce Industry	1.0	GS1 Australia	https://www.gs1au.org/download/GS1au-flyer-databar-for-loose-fresh-produce.pdf/file
GS1 DataBar. Are you ready for GS1 DataBar?	1.0	GS1 Australia	https://www.gs1au.org/download/GS1au-flyer-databar-recall.pdf/file
GS1 DataBar for loose produce. Solutions for a smarter, fresher and safer supply chain.	1.0	GS1 Australia	https://www.gs1au.org/download/GS1au-flyer-databar-recall.pdf/file
FMCG GUIDELINES WITH RELEVANCE FOR FRESH PRODUCE			
GS1 New Zealand User Guide April 2021	1.9.1	GS1 New Zealand	https://support.gs1nz.org/hc/en-us/articles/204924800
GS1 AIDC Fresh Foods Sold at Point-of Sale Implementation Guide	1.1	GS1 Global	https://www.gs1.org/docs/freshfood/Fresh_Food_Implementation_Guide.pdf
GDSN 3.1 Trade Item Implementation Guide	32	GS1 Global	https://www.gs1.org/docs/gdsn/tiig/3_1/GDSN_Trade_Item_Implementation_Guide.pdf
GS1 Logistic Label Guideline	1.3	GS1 Global	https://www.gs1.org/docs/tl/GS1_Logistic_Label_Guideline.pdf
GS1 Logistics Interoperability Model Application Standard	1.1.1	GS1 Global	https://www.gs1.org/docs/EDI/GS1_Logistics_Interoperability_Model_Application_Standard.pdf

APPENDIX 3 – INDUSTRY & GS1 CO-PUBLISHED DOCUMENTS

Worldwide, Produce Industry bodies have been increasingly working with GS1 to implement national Traceability Guidelines in a coordinated manner that are Interoperable and enable Rapid Reactivity.

In North America, the Canadian Produce Marketing Association, GS1 United States, The Produce Marketing Association, and the United Fresh Produce Association of America have established the Produce Traceability Initiative, which has developed and co-published a range of Traceability guidelines for the North American Produce Industry. Some relevant documents are listed below.

TITLE	VERSION	FOCUS	WEB LOCATION
Produce Traceability Initiative Best Practices for Formatting Case Labels	1.4	Labelling	https://www.producetraceability.org/documents/Produce_Traceability_Initiative_Best_Practices_for_Formatting_Case_Labels_Revision_1.4_FINAL.pdf
Produce Traceability Initiative Best Practice for Use of Hybrid Pallet Labels by Receivers	1.1	Labelling	https://www.producetraceability.org/documents/Best_Practice_for_Use_of_Hybrid_Pallet_Labels_by_Receivers_Rev_1.1_101314.pdf
Produce Traceability Initiative Best Practices for Formatting Hybrid Pallet Labels	2.6	Labelling	https://www.producetraceability.org/documents/Best_Practices_for_Formatting_Hybrid_Pallet_Labels_Rev_2.6_101314.pdf
Produce Traceability Initiative Best Practices for Private Label/Brand	1.2	Processes	https://www.producetraceability.org/documents/PTI_Best_Practices_for_Private_Label_Sept_2016.pdf
Produce Traceability Initiative Best Practices for Repacking and Commingling	1.1	Labelling	https://www.producetraceability.org/documents/PTI_Best_Practices_for_Private_Label_Sept_2016.pdf
Produce Traceability Initiative Best Practices for Produce Brokers	1.0	Processes	https://www.producetraceability.org/documents/Produce_Broker_Best_Practice_Guide_v1_0_03272012_FINAL.pdf
Produce Traceability Initiative Best Practices for Direct Print	1.0	Labelling	https://www.producetraceability.org/documents/Direct_Print_Best_Practices_Guideline_Jan_2012.pdf
Produce Traceability Initiative Best Practices for Preparing to Assign GTINs	1.2	Processes	https://www.producetraceability.org/documents/best_practices_gtin_assignment_strategy_010312_final.pdf
Produce Traceability Initiative Best Practices for Product Substitutions	1.1	Processes	https://www.producetraceability.org/documents/PTI_Item_Substitutions_Best_Practice_Document_2011_v10.pdf
Produce Traceability Initiative Best Practices for Cross-Docking and Load Only Services	1.1	Processes	https://www.producetraceability.org/documents/Cross_Docking_Best_Practice_Guide_JA_11_30_11__4__KV_AF.pdf

In Europe, the Dutch Produce Industry Body, FrugiCom, have developed and co-published a range of Traceability Guidelines for the European Produce Industry, with contributions from individual country GS1 organisations, European national produce organisations, and GS1 Global. Some relevant documents are listed below.

TITLE	VERSION	PUBLISHED BY	WEB LOCATION
Labelling of Consumer Units. Supply Chain Management for Fresh Fruit and Vegetables	1.0	GS1 in Europe	https://www.gs1.eu/publications?SharingZone[id]=175
Labelling of Trade Units. Supply Chain Management for Fresh Fruit and Vegetables	1.0	GS1 in Europe	https://www.gs1.eu/publications?SharingZone[id]=175
Labelling of Logistic Units. Supply Chain Management for Fresh Fruit and Vegetables	1.0	GS1 in Europe	https://www.gs1.eu/publications?SharingZone[id]=175

APPENDIX 4 – OBTAINING NUMBERS & PUTTING THEM IN BARCODES

Obtaining the numbers (GTINs)

The only source of verifiable numbers for use in the GS1 System is GS1. Businesses wishing to use numbers must join through the website https://www.gs1nz.org/. Select 'Services' then 'Barcodes'.

There are two membership options:

1. (Only available to businesses with annual turnovers <$1m) Buy one number at a time
2. Licence membership: buy blocks of 100 – 100,000 numbers. Licence members obtain numbers one at a time from their blocks.

Single numbers cost $59 + GST.[65] This is a one-off cost. Licence membership requires payment of an annual membership fee based on total company turnover. In the first year of membership there is also an initial one-off charge to buy a block of numbers. This charge is based on the number of numbers in the block.

The minimum number is one hundred. Current fees will be found at https://www.gs1nz.org/.

Adding additional data such as dates and batch numbers is explained in the GS1 New Zealand User Guide April 2021, found at https://support.gs1nz.org/hc/en-us/articles/204924800.

What about numbers from sources other than GS1?

GS1 cannot vouch for the uniqueness of numbers that have not been sourced from GS1 by the party currently using them.[66] They are termed 'unauthorised numbers' by GS1 in the absence of a current GS1 authorisation for their use and are considered to be outside of the GS1 system. The terms of trade of most major grocery retailers in Australasia require GS1 compliance by suppliers because they rely on the GS1 standards and GS1 identifiers to support some business processes.

The use of non-GS1 numbers is not compliant. Please speak with your trading partner if you have a concern about this.

Obtaining the numbers (GLNs)

Licence members will be automatically allocated a GLN to identify their business location when they join GS1 as a licence member and will be entitled to up to four more at no charge so they can identify more units or sub-units of their business if they wish.[67] Thereafter a charge of $59 + GST applies for each GLN.[68] Single-number members do not receive free GLNs but may purchase them.

GLNs are rarely used in barcodes. They are more often used in documents and electronic communications to indicate locations, although they may be in barcodes on SSCC or (sometimes) crate labels.

65. At the time of writing (April 2021).
66. Recognised exceptions are numbers previously obtained from GS1 by a company that the current user now owns.
67. Depending on when each company joined GS1 their New Zealand Business Number may also be their GLN. This will be indicated on MyGS1. Note that the NZBN identifies the business not necessarily its physical location e.g. a grower's business may be run from one location, but the orchard may be a kilometre away. In such cases the orchard should be allocated a GLN as deliveries and pickups may be based on the GLN.
68. At the time of writing (April 2021).

NOTES

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New Zealand Incorporated

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