



The Global Language of Business

Fresh Fruit and Vegetable Traceability Guideline

Implementing traceability in fresh fruit & vegetable supply chains using the GS1 standards for identification, data capture, data sharing & the GS1 Global Traceability Standard.

Release 2.0, Ratified, Feb 2021



Document Summary

Document Item	Current Value
Document Name	Fresh Fruit and Vegetable Traceability Guideline
Document Date	Feb 2021
Document Version	2.0
Document Issue	
Document Status	Ratified
Document Description	Implementing traceability in fresh fruit & vegetable supply chains using the GS1 standards for identification, data capture, data sharing & the GS1 Global Traceability Standard.

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Log of Changes

Release	Date of Change	Changed By	Summary of Change
1.0	Jul-2009	Mike Sadiwnyk	Initial issue
1.0.1	Jan-2010	Core Author Team	Editorial changes to ensure consistency across the guide and harmonisation of Glossary with GS1 Global Data Dictionary
1.1	Sep-2015	Alex Johnson	Re-Branding
1.2	Sep 2016	D. Buckley	Layout fixes
2.0	Feb 2021	D.Clark, T.Marsh, E.Tomanovich, J. Ryu	WR 20-046 GTS2 alignment and business requirements from global experts and advisors

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Table of Contents

1	Introduction	10
1.1	Purpose	10
1.2	Scope	10
1.3	Audience.....	11
1.4	About GS1	11
2	Supply chain context	12
2.1	Supply chain overview	12
2.2	Supply chain needs	13
2.3	Supply chain roles and responsibilities	13
3	Traceable objects.....	15
3.1	Overview of traceable objects	15
3.2	How to identify the traceable objects?	17
3.2.1	Traceability principles.....	17
3.2.2	Recall preparedness	21
3.3	How to mark the traceable objects?.....	22
3.3.1	Supported data carriers	22
3.4	Which barcode can I use at Point of Sale?	26
3.4.1	Business Process Change for Variable Measure Products	27
3.4.2	Fixed Measure Products	28
3.4.3	Loose Produce Trade Items	29
3.5	Which barcode can I use in General Distribution?	30
3.5.1	Marking of cases.....	30
3.5.2	Marking of logistic units.....	30
3.6	How to automatically capture data about traceable objects.....	31
4	Traceability data	32
4.1	Implementation guideline for Growers	32
4.2	Overview of traceability data	32
4.3	What are the Key Data Elements?	32
4.3.1	Capturing production inputs	33
4.3.2	How does my company uniquely identify logistics units and grower information?	33
4.3.3	How is my company identified uniquely?.....	33
4.4	What are the Key Data Elements for Growers?.....	34
4.4.1	What traceability information does my company need to record and share?	34
4.4.2	Data Requirements for Growers – Growers who are the FIRST participants in the supply chain (NO previous trading partners)	35
4.4.3	Other traceability Best Practices for growers	35
4.5	Business scenario for growers.....	36
4.5.1	Grower receives items for growing season	36
4.5.2	Grower applies items during growing season.....	36
4.5.3	Grower delivers bulk to pack house or cooperative.....	37
4.6	Implementation Guideline for Packers/Repackers	37
4.6.1	Capturing Production inputs	37
4.6.2	How is my company identified uniquely?.....	38
4.6.3	How does my company identify products in the supply chain?	38

- 4.6.4 How does my company identify products that must be traced? 38
- 4.6.5 How does my company uniquely identify logistics units? 39
- 4.6.6 Best practice for case and logistic unit labels..... 39
- 4.7 What are the Key Data Elements for Packers/Repackers?..... 40
 - 4.7.1 What traceability information does my company need to collect, record and share? 40
 - 4.7.2 Data Requirements for Packers..... 43
 - 4.7.3 Data Requirements for Repackers 43
- 4.8 Business scenarios for packers/repackers..... 45
 - 4.8.1 Packer scenario: Field packed product 45
 - 4.8.2 Packer scenario 2: Shed (Packinghouse) packed product 47
 - 4.8.3 Repacker scenario 1: Repack of previously packed product 49
- 4.9 Implementation Guideline for Distributors/Traders 50
 - 4.9.1 Capturing traceability inputs 50
 - 4.9.2 How is my company identified uniquely?..... 50
 - 4.9.3 How does my company identify Products in the Supply Chain? 50
 - 4.9.4 How does my company identify product that must be traced? 51
 - 4.9.5 How does my company identify production batches/lots? 51
 - 4.9.6 How does my company uniquely identify logistics units? 51
 - 4.9.7 Best Practices for Case and Logistic Unit Labels 51
- 4.10 What are the Key Data Elements for Distributors/Traders?..... 53
 - 4.10.1 What traceability Information does my company need to collect, record and share 53
 - 4.10.2 Data Requirements for Distributors and Traders 54
 - 4.10.3 Other traceability best practices for Distributor/Trader 54
- 4.11 Business scenarios for distributors/traders 55
 - 4.11.1 Distributor scenario: Distributor receives imported product from a grower/exporter 55
 - 4.11.2 Distributor scenario: Distributor receives and re-distributes produce from packers /other distributors/ traders (including cooperatives, brokers, auctions) 56
- 4.12 Implementation Guideline for Foodservice Operators/Retail Stores 58
 - 4.12.1 Capturing traceability data 58
 - 4.12.2 How is my company identified uniquely?..... 58
 - 4.12.3 How does my company identify products in the supply chain? 59
 - 4.12.4 How does my company identify produce that must be traced?..... 59
 - 4.12.5 How do my trading partners uniquely identify logistics units? 59
 - 4.12.6 Best practices for case and logistic unit labels 59
- 4.13 What are the Key Data Elements for Foodservice Operators/Retail Stores?..... 61
 - 4.13.1 What traceability Information does my company need to collect and record 61
 - 4.13.2 Data Requirements for Foodservice Operators and Retailers..... 61
 - 4.13.3 Other traceability Best Practices for Foodservice Operators and Retail Stores 62
- 4.14 Business scenarios for foodservice operator /retail stores..... 63
 - 4.14.1 Foodservice Scenario: Foodservice operator receives product direct-to-store..... 63
 - 4.14.2 Foodservice Scenario: Foodservice Operator receives product into a central distribution centre 64

5 What are the Critical Tracking Events? 66

- 5.1 Beginning of life event 67
- 5.2 Transformation-type event 67
- 5.3 Transportation-type events 67
 - 5.3.1 Shipping event: 67
 - 5.3.2 Receiving event: 68



- 5.4 Depletion-type events..... 68
 - 5.4.1 Consumption event: 68
 - 5.4.2 Disposal event: 68
- 6 Critical Tracking Events (CTEs) for the Produce Industry 68**
 - 6.1 Harvest (picking) 68
 - 6.2 Harvest (packing materials)..... 69
 - 6.3 Transformation (case pack) 71
 - 6.4 Transport (packed to repacker)..... 72
 - 6.5 Transport (tomatoes received at repacker) 73
 - 6.6 Create Finished Goods..... 74
 - 6.7 Ship Finished Goods..... 75
 - 6.8 Receive Finished Goods..... 76
 - 6.9 Finished Goods Sold at Point of Sale or Consumption 77
 - 6.10 Destroy Unsaleable Finished Goods 78
- 7 What are the Key Data Elements (KDEs) for the Produce Industry? 79**
 - 7.1 Key data elements (KDE) 79
 - 7.2 GLN master data and GTIN master data..... 79
 - 7.3 Traceability data collection in business process steps..... 79
- 8 Additional internal data to support traceability 82**
 - 8.1 Seed..... 82
 - 8.1.1 How can this be acquired/shared?..... 82
 - 8.1.2 Seed/seedling Purchase..... 83
 - 8.1.3 Seed/seedling reception 83
 - 8.1.4 Seed/seedling storage 83
 - 8.1.5 Seed/seedling Planting 83
 - 8.2 Fertilizer 83
 - 8.2.1 How can this be acquired/shared?..... 83
 - 8.2.2 Fertilizer Purchase 84
 - 8.2.3 Fertilizer reception 84
 - 8.2.4 Fertilizer storage..... 84
 - 8.2.5 Fertilizer Application..... 85
 - 8.3 Crop protection & Phytosanitary..... 85
 - 8.3.1 How can this be acquired/shared?..... 85
 - 8.3.2 Crop protection & Phytosanitary Purchase..... 86
 - 8.3.3 Crop protection & Phytosanitary reception 86
 - 8.3.4 Crop protection & Phytosanitary storage 86
 - 8.3.5 Crop protection & Phytosanitary Application 86
 - 8.4 Irrigation method..... 86
 - 8.4.1 How can this be acquired/shared?..... 87
 - 8.4.2 Irrigation method..... 87
 - 8.5 Harvesting 87
 - 8.5.1 How can this be acquired/shared?..... 87
 - 8.5.2 Harvesting Location 87
 - 8.5.3 Harvesting Materials..... 88
 - 8.6 Post-harvest treatment 88
 - 8.6.1 How can this be acquired/shared?..... 88



- 8.6.2 Post-Harvest Treatment..... 88
- 8.7 Packing..... 88
 - 8.7.1 How can this be acquired/shared?..... 88
 - 8.7.2 Packaging Purchase 89
 - 8.7.3 Packaging reception 89
 - 8.7.4 Packaging Storage 90
 - 8.7.5 Packaging 90
- 8.8 Shipping 90
 - 8.8.1 How can this be acquired/shared?..... 90
 - 8.8.2 Sale 90
 - 8.8.3 Transport..... 91
- 8.9 Receiving 91
 - 8.9.1 How can this be acquired/shared?..... 91
 - 8.9.2 Reception 91
 - 8.9.3 Storage 91
- 8.10 Quality check..... 92
 - 8.10.1 How can this be acquired/shared?..... 92
 - 8.10.2 Quality Check 92
- 8.11 Processing..... 92
 - 8.11.1 How can this be acquired/shared?..... 92
 - 8.11.2 Processing 93
- 8.12 Packing..... 93
 - 8.12.1 How can this be acquired/shared?..... 93
 - 8.12.2 Packaging Purchase 94
 - 8.12.3 Packaging reception 94
 - 8.12.4 Packaging Storage 94
 - 8.12.5 Packaging 94
- 8.13 Shipping 94
 - 8.13.1 How can this be acquired/shared?..... 95
 - 8.13.2 Sale 95
 - 8.13.3 Transport..... 95
- 8.14 Customs entry 95
 - 8.14.1 How can this be acquired/shared?..... 95
 - 8.14.2 Reception 96
 - 8.14.3 Storage 96
- 8.15 Customs checking 96
 - 8.15.1 How can this be acquired/shared?..... 96
 - 8.15.2 Customs Check..... 97
- 8.16 Customs freight release 97
 - 8.16.1 How can this be acquired/shared?..... 97
 - 8.16.2 Freight release 97
- 8.17 Receiving 97
 - 8.17.1 How can this be acquired/shared?..... 98
 - 8.17.2 Reception 98
 - 8.17.3 Storage 98
- 8.18 Shipping 98
 - 8.18.1 How can this be acquired/shared?..... 98
 - 8.18.2 Sale 99
 - 8.18.3 Transport..... 99



A	Glossary.....	100
B	Regulatory background.....	105
C	Additional implementation resources and examples.....	106
D	References.....	107

1 Introduction

The produce industry continues to evolve to meet consumers' needs. Consumers today are much more knowledgeable and demanding about the foods they purchase. The increased focus on food safety and consumer awareness raises the need to identify and adopt business practices and standards that will aid the produce sector's ability to track and trace product throughout the supply chain. It is important to note that different regions may have different requirements. Users are reminded to be aware of the requirements in target markets (both business and regulatory).

1.1 Purpose

Consumers expect safe and nutritious foods. They also expect all participants in the supply chain to have effective practices in place that allow for the rapid identification, location, and withdrawal of food lots when problems are suspected or confirmed. Ensuring that effective practices are in place across a complex and global supply chain is an on-going challenge. For this reason, the GS1 Fresh Fruit and Vegetable Traceability Guideline has been developed to aid in the adoption of consistent business practices to effectively manage traceability for the produce industry.

Traceability is a business process that enables trading partners to follow products as they move from field through to retail stores, online or in-store, to foodservice operators and also to the end consumer. Each Traceability Partner must be able to identify the direct source (supplier) and direct recipient (customer) of product.

The first priority of traceability is to protect the consumer through faster and more precise identification of implicated product. This is critical if the product must be withdrawn or recalled from the supply chain.

This document serves as a best practice guide to implementing traceability in the Fresh Fruit and Vegetable (Produce) Industry. The best practices recommended are based on GS1 global standards for supply chain management, data sharing and product identification. These standards were developed by industry to optimise business practices across supply chains world-wide.

1.2 Scope

This implementation guideline is built on the basis of GS1 Global Traceability Standard 2, which defines the minimum traceability requirements across all sectors. The guideline focuses on the additional traceability requirements that are specific for fresh fruit and vegetable traceability. The scope of this guideline establishes minimum requirements and best practices to share information between distribution channel participants.

This guideline:

- Addresses traceability practices from pre-grower to retail store or foodservice operator (i.e. external traceability) to the point of consumer sale to support Critical Tracking Events (CTEs) such as product creation/(re)packaging, shipping, receiving, processing, and selling;
- Considers traceability practices upstream from the grower, including guidance for seed or crop protection or treatments;
- Applies to all fresh fruit and vegetable products for human consumption;
- Applies to all levels which are uniquely identified including the base product or traded item (e.g. case/carton, consumer item), Logistic Unit (e.g. bin, container);
- Includes all supply chain participants: growers/primary producers, packers/repackers, suppliers/distributors/traders/exporters or importers, wholesalers, retailers, and foodservice operators.

Traceability has become a strategic priority for organisations around the world. In addition to enabling increased supply chain quality, efficiency and transparency, the sharing and use of traceability data enables the development of solutions that enhance supply chain security and safety.

1.3 Audience

This is a practical guide that is intended for those responsible for implementing traceability in their company's operations and supply chain. The document provides a guide for fresh produce growers/primary producers, packers/repackers, suppliers/distributors/traders/exporters or importers/wholesalers, retailers and foodservice operators (all organisations which impact the fresh produce supply chain). Individual organisations may perform any combination of these roles.

How do I Use the Document?

Step 1: If traceability or GS1 standards are new to your company, read the sections 1 & 2.

Step 2: Read Section 4 to determine your company's role(s) in the supply chain.

Step 3: Read Section 5 to understand key traceability definitions and principles.

Step 4: Review guidelines specific for your role(s) as outlined in 6 through 8.

Step 5: Begin implementation using the reference documents/appendices as assistance. Users should ensure they understand specific government and/or industry requirements, or trading practices within the target markets they serve (e.g. document retention, origin/provenance, identification, e-commerce requirements).

1.4 About GS1

GS1 believes in the power of standards to transform the way we work and live.

- We create a common foundation for business by uniquely identifying, accurately capturing and automatically sharing vital information about products, locations and assets.
- We enable visibility through the exchange of authentic data.
- We empower business to grow and to improve efficiency, safety, security and sustainability.

GS1 standards are the common language of business and provide the framework required to support the traceability (business) process. This industry best practice implementation guideline is based on the GS1 Global Traceability Standard (GTS) Version 2. Developed by industry, the standard defines the globally accepted method for uniquely identifying:

- Trading parties (your suppliers, your own company, your customers, 3rd party carriers or services)
- Trading locations (can be any physical location such as a farm, warehouse, packing line, storage facility, receiving dock or store)
- The products your company uses or creates
- The logistics units your company receives or ships
- Inbound and outbound shipments

The GS1 Global Traceability Standard Version 2 also defines the essential pieces of information that have to be collected, recorded and shared to ensure one step up, one step down traceability. The standard is applicable to companies of all sizes and geographical locations.

While the GS1 Global Traceability Standard Version 2 may be implemented independently from any specific technology, best business practices require adoption of bar coding on every level of packaging. Businesses are further encouraged to adopt electronic messaging to exchange essential business information and use EPCIS for visibility data. These technologies will be explored in the sections that follow.

GS1 standards are the global common language for traceability solutions. GS1 standards are used globally by more than one million companies.

GS1 provides the global framework and local implementation services in 115 countries to ensure that traceability systems are interoperable and scalable, where trading partners can easily collaborate and share information across the entire chain.

GS1 is a not-for-profit standards organisation with member affiliates in 115 countries around the world. Together with local/national produce trade associations they are important resources that are able to help your company understand the most effective way to implement traceability with your

trading partners. They can also help your company to connect with technology providers that serve the produce industry.

A copy of the Global Traceability Standard Version 2 appears in Appendix D.

2 Supply chain context

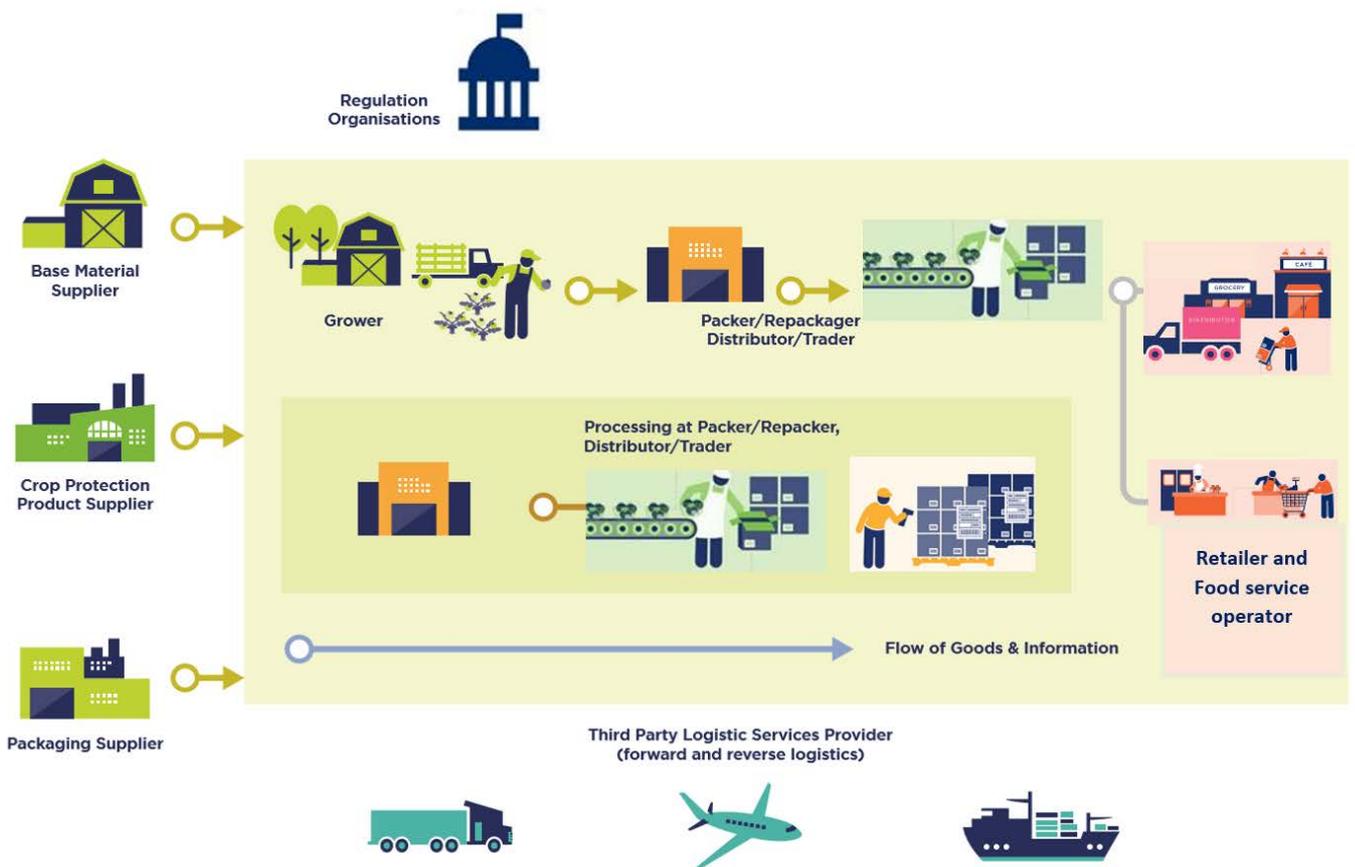
2.1 Supply chain overview

The document provides a guide for fresh produce growers/primary producers, packers/repackers, suppliers/ distributors/traders/exporters or importers, wholesalers, retailers and foodservice operators.

Figure 2-1 Overview of the Produce Supply Chain



Figure 2-2 Overview of the Produce Supply Chain



Note: “The purpose of this graphic is to provide a high level, simplified overview of the fruit and vegetable supply chain including key stakeholders and activities across stakeholders. Internal operations and movement of product (or information) within a

stakeholder's business (e.g. movement of product from a retailer's distribute centre to store locations) are not included but does not exclude them from traceability.

 **Note:** Configuration of trade units (e.g. cases) or logistics units (e.g. pallets) may change as product is shipped to the next actor in the supply chain.

2.2 Supply chain needs

The two main drivers for fresh fruit and vegetable traceability are regulatory requirements and the need for greater transparency.

Compliance with regulatory requirements

Product traceability is already a requirement in many different countries all of whom have adopted the 'one up one down' approach for prescribed supplier and consumer information. Hence there is already traceability at all stages of growing, packaging (repackaging), processing and distribution from harvesting to retail.

In other jurisdictions there may be different data requirements, and also a different emphasis on traceability requirements. But generally, whilst it is expected that the one up, one down requirement will often be sufficient, there may be additional requirements applicable to other geographical or regulatory constraints.

 **Note:** It is the participant's responsibility to be aware of target market requirements.

How can the traceability data be used?

Providing compliance evidence to regulators and trading partners

The regulatory requirements lead to stricter reporting requirements. Retailers demand precise data from their suppliers and authorities are demanding detailed data on fresh food both imported and domestic.

Providing data to the consumer

Consumers are more and more interested to know the origin of the product they buy and how it was produced. Based on the traceability data suppliers and retailers can provide detailed and verifiable information on the package as well as online via website or mobile app.

Supplier management

Based on traceability data companies can tighten their supply chain partnerships. Upstream suppliers are able to provide accurate, real-time data and therefore establish trustworthy information exchange and strong relationships. Downstream the data can be used in order to communicate at the point-of-sale where goods are coming from and who processed them in what manner. This can support consumer trust. Furthermore, companies in the supply chain can evaluate the traceability data and its quality from their preliminary stage.

This enables setting data quality goals as part of an integrated supplier management.

Supporting product recalls

Traceability data are an essential prerequisite for the management of product recalls. It allows the analysis of the cause of an issue by tracing the origin of the product upstream, and quickly locate product lot/batches that were already distributed downstream.

2.3 Supply chain roles and responsibilities

Table 2-1 Produce industry supply chain roles and responsibilities

Section	Role	Activities	Alias
4.1	Grower/ Primary producer	Grow, Harvest, Store, Sell, Ship	
4.6	Packer/Repacker	Aggregate, Pack, Sell, Ship	Agricultural Cooperative / Pack House
4.6	Ripener/ Processor	Ripen, cut, wash, freeze, pack, sell, ship	Ripening facility / Processing Plant
4.9	Supplier/ Distributor/Trader/ Wholesaler	Store, Sell, Ship	Retail, online or Foodservice Distribution Centre / Import and Export Warehouses / Wholesale / Terminal Markets / Auction / Broker
4.12	Retailer	Store, Sell to Consumer	
4.12	Foodservice Operator	Store, Prepare, Sell to Consumer	
Industry best practice includes recording information from:			
8.8; 8.13; 8.18	Third Party Logistics Service Provider	Transport	Truck / Rail / Ship / Air
8.7; 8.12	Supplier of Packing Material	Sell	Suppliers of packing material (crates, bags, boxes, labels, bins, clamshells, etc.)
8.2; 8.3;	Supplier of grower inputs	Sell	Suppliers of crop protection means, artificial manure, energy, etc.
8.1	Supplier of seed / plants	Sell	Suppliers of seeds and plants
8.15	Regulatory Organisations	Inspect	Customs, Inspection Agencies, etc.



Note: Traceability data are spread among many stakeholders along the chain. All these stakeholders have different traceability systems. In order to have an effective end-to-end traceability, these tools must be able to communicate with each other through a common language (or to be “interoperable”). Solution providers of traceability systems play an important role in the traceability ecosystem.

3 Traceable objects

3.1 Overview of traceable objects

A traceable object is an object whose supply chain path can, and needs to, be determined. Traceable objects can include both loose and packaged produce; cartons, re-useable containers used in transport; transport vehicles; etc.

A company must determine what needs to be traced. This is commonly referred to as the “traceable item.” A traceable item can be:

- a product or traded item (e.g. case/carton, consumer item)
- a logistic unit (e.g. pallet, transport container)
- a shipment or movement of a product or trade item
- an asset (e.g. re-usable tote, crate, bin)

There must be agreement between trading partners on what the traceable item is. This ensures that both partners are tracking the same thing; otherwise the chain will be broken. Each Trading Partner must define at least one level of traceable item for each shipment.

The table below lists the GS1 keys that are available for the identification of traceable objects, for the purposes of fresh produce the three main identification keys leveraged are the GTIN, GLN and SSCC, with GIAI & GRAI which can be leveraged for re-usable containers.

A full list of relevant GS1 Identification keys is available in the GS1 General Specifications.

Table 3-1

Key	Full name	Type of objects being identified
GTIN	Global Trade Item Number	Types of products at any packaging level, e.g., consumer unit, inner pack, case, pallet.
GLN	Global Location Number	Physical Locations (Farms; fields; warehouses; delivery addressed; etc...)
SSCC	Serial Shipping Container Code	Logistic units, combination of trade items packaged together for storage and/or transport purposes; for example a case, pallet or parcel.
GIAI	Global Individual Asset Identifier	Identifies a particular physical entity as an asset. (e.g. Container/transport used as an asset)
GRAI	Global Returnable Asset Identifier	Identifies a physical entity as a returnable asset. (e.g. Container/transport used as an asset between trade partners)

Trade item identification

The GS1 system provides globally unambiguous identification keys to provide a common language for the communication of product information from company to company. The GS1 identification key for products is the GS1 Global Trade Item Number (GTIN). For decades, this GS1 identification key has facilitated the sharing and communication of product information among supply chain partners and has also provided the foundation for innovative improvements in supply chain management for many industries.

GS1 standards provide a choice regarding the granularity of trade item identification, leading to varying degrees of precision, as it pertains to traceability, that can be achieved as summarised in the following table.

Table 3-2

Granularity	GS1 identification key or other identifier	Comments
Type of Trade item – (Includes Cases & retail item levels)	PLU / Association assigned identifier (e.g. 033383 Prefix)	<p>All products of a given type (e.g., 10 lb bag of potatoes) are marked identically.</p> <p>It is possible for an information system to tell one product from another (e.g., a 10 lb bag of Russet potatoes from a 10 lb bag of Yukon Gold potatoes), but not to distinguish two of the same product type (two separate 10 lb bags of Russet potatoes)</p> <p>Historically, this type of marking could be incorporated into package artwork that was printed in bulk for multiple brand owners/resellers/retailers.</p> <p> Note This type of identification does not support traceability of source.</p>
Grower specific Trade item level – (Includes Cases & retail item levels)	GTIN	<p>All products of a given type (e.g., 10 lb bag of potatoes) from a particular brand are marked identically.</p> <p>It is possible for an information system to tell one product from another (e.g., a 10 lb bag of Russet potatoes from a 10 lb bag of Yukon Gold potatoes), and to distinguish two of the same product type (two separate 10 lb bags of Russet potatoes) from different producers.</p> <p>This type of marking can be incorporated into package artwork that is printed in bulk for a single brand owner/reseller/retailer.</p>
Batch/Lot level	GTIN + batch/lot number	<p>All product of a given type (e.g., case of red peppers) within a given batch/lot are marked identically.</p> <p>It is possible for an information system to tell one product from another (e.g., a case of red peppers from a case of green peppers), and to distinguish two products of the same type from different lots/batches (a case of red peppers from Lot #20100201 and a case of red peppers from Lot #20100204), but not to distinguish two products of the same type within the same batch/lot.</p>
Instance Level	GTIN + Serial number	<p>A specific product of a given type (e.g., case of red peppers).</p> <p>It is possible for an information system to tell one product from another (e.g., a case of red peppers from a case of green peppers), and to distinguish two products of the same type from each other.</p>

Reading from top to bottom, each choice gives increased ability to trace products in the supply chain, though at the cost of data management and cost of product marking.

Product type level identification (PLU/Association assigned identifier) provides the ability to see where different products are used in the supply chain, and to gather data based on counting products but not their source. This includes many inventory applications, sales analysis, etc. However, at this level, all instances of a given product are indistinguishable, which prevents real traceability.

Product-level identification (GTIN) this level of identification provides the ability to identify different types of product and their source. This can be used for inventory applications, sales analysis, etc. However, with this marking level, traceability can identify the grower/producer (or brand owner).

Batch/lot-level identification (GTIN + batch/lot ID) provides the ability to distinguish products in one batch/lot from another batch/lot. This is especially useful in business processes that deal with quality or food safety issues that tend to occur on a batch-by-batch basis, such as a product recall of a contaminated batch/lot. Batch/lot-level traceability lets you identify all the places in the supply chain where a given batch/lot has reached and confirm the quantity of items present from that batch/lot.

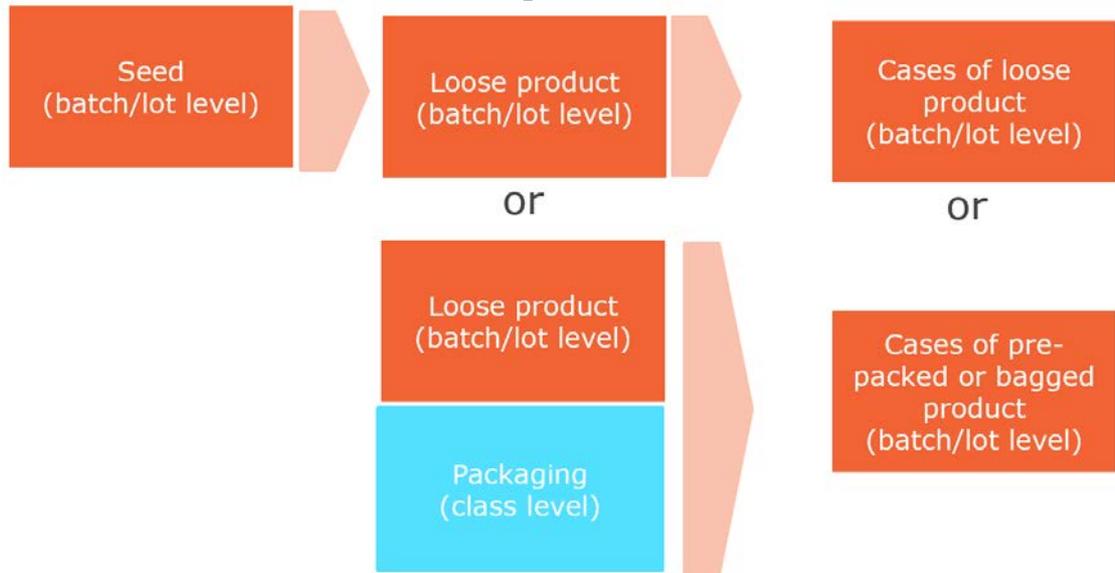
Instance level identification (GTIN + serial number) provides the ability to distinguish products from one another. This is especially useful in business processes that deal with quality or food safety

issues for high value items. Serialization traceability lets you identify all the places in the supply chain where a given item was handled and confirm the quantity of items present. (This level is not identified in the images below)

Figure 3-1



Figure 3-2



3.2 How to identify the traceable objects?

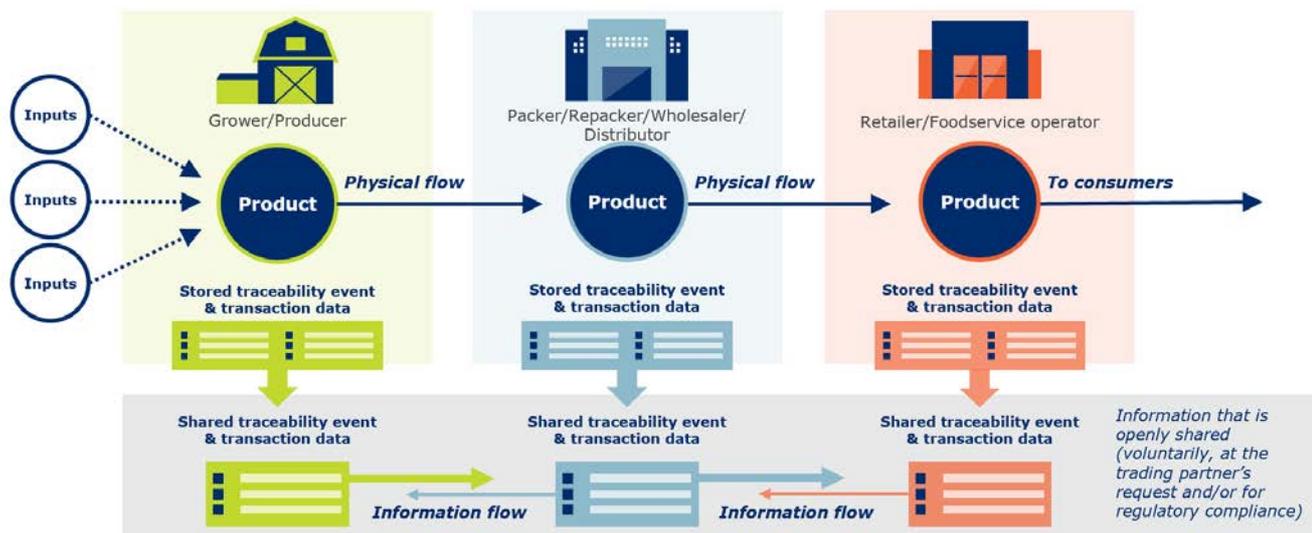
3.2.1 Traceability principles

- All traceable items must be identified and this information is shared between all affected supply chain partners.
- At a minimum, the identification of products for the purpose of traceability requires:
 - The assignment of a unique GS1 Global Trade Item Number (GTIN) See GS1 Fruit & Vegetable GTIN Assignment Guideline.
 - The assignment of a batch / lot (or serial number).

- When a product is reconfigured and/or repacked, the new product must be assigned a new unique product identification (i.e. GTIN + Lot/Batch where required (e.g. co-mingling)). A linkage must be maintained between the new product and its original inputs.
- When a Logistic Unit is reconfigured, the new Logistic Unit must be assigned a new unique identification (i.e. SSCC). A linkage must be maintained between the new Logistic Unit and its original input.
- All supply chain parties must systematically link the physical flow of products with the flow of information about them. Traceable item identification numbers must be communicated on related business documents.

✓ Note: A Global Trade Item Number (GTIN) is a standardised and globally unique way to identify items traded in the supply chain. Where there is a requirement to accurately order, invoice, price or receive your product, the GTIN is the basic enabler. The GTIN provides a common language to support multiple business practices, including traceability.

Figure 3-3 Fruit & Vegetable product and data flows for end-to-end traceability



✓ Note: An important aspect to consider is the potential sensitivity of the traceability data that an organisation may choose to share with other parties. Generally, a distinction can be made between internal data —data not suitable for sharing with other parties, for example due to commercial or privacy reasons— and external data —data suitable for sharing with other parties if certain pre-defined conditions are met—. See below for examples of data that may be treated as internal vs external by an organisation.

Table 3-3

Sensitivity of data	Master data		Transactional data	Visibility event data
External data	<i>Static data:</i> Locations Catalogue items Assets ...	<i>Relation data:</i> Suppliers Customers 3 rd party service providers ...	Purchase orders Despatch notifications / Advance Ship Notice Transport instructions ...	Producing Picking Packing Shipping Receiving ...

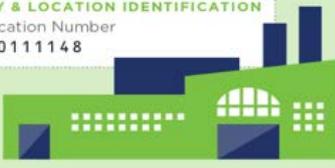
Sensitivity of data	Master data		Transactional data	Visibility event data
Internal data	Product design Production Process Personnel ...	Contracts ...	Quality inspection data Lab analysis results	Inspecting Collecting Holding ...

Figure 3-4 GS1 standards enabling traceability in the fruit and vegetable supply chain



Packer/Repacker/Shipper

COMPANY & LOCATION IDENTIFICATION
Global Location Number
9506000111148



TRADE ITEM IDENTIFICATION
(final product)
Global Trade Item Number
and traceability data
Date + batch/lot
9506000111155



CASE-LEVEL IDENTIFICATION
(carton boxes)
Global Trade Item Number
and traceability data
Date + batch/lot
9506000111179



Packer/Repacker

GTIN + lot (final product)	SSCC
Date + time	Date + time
GLN of plant	GLN of shipping data
Produced	Packed

- Internal traceability is maintained in the key processes: receiving, transformation of raw materials to semi-finished goods, storage, and distribution.
- GTINs and production data (batch/lot & expiry date) are printed on products to be despatched.
- Links between goods received and dispatch of final product are always maintained through the GTINs and Batch/lot numbers.

Warehouse/Distribution centre

COMPANY & LOCATION IDENTIFICATION
Global Location Number
9506000111247



PALLET-LEVEL IDENTIFICATION
Global Serial Shipping Container Code
(received from manufacturer)
095060001111000017



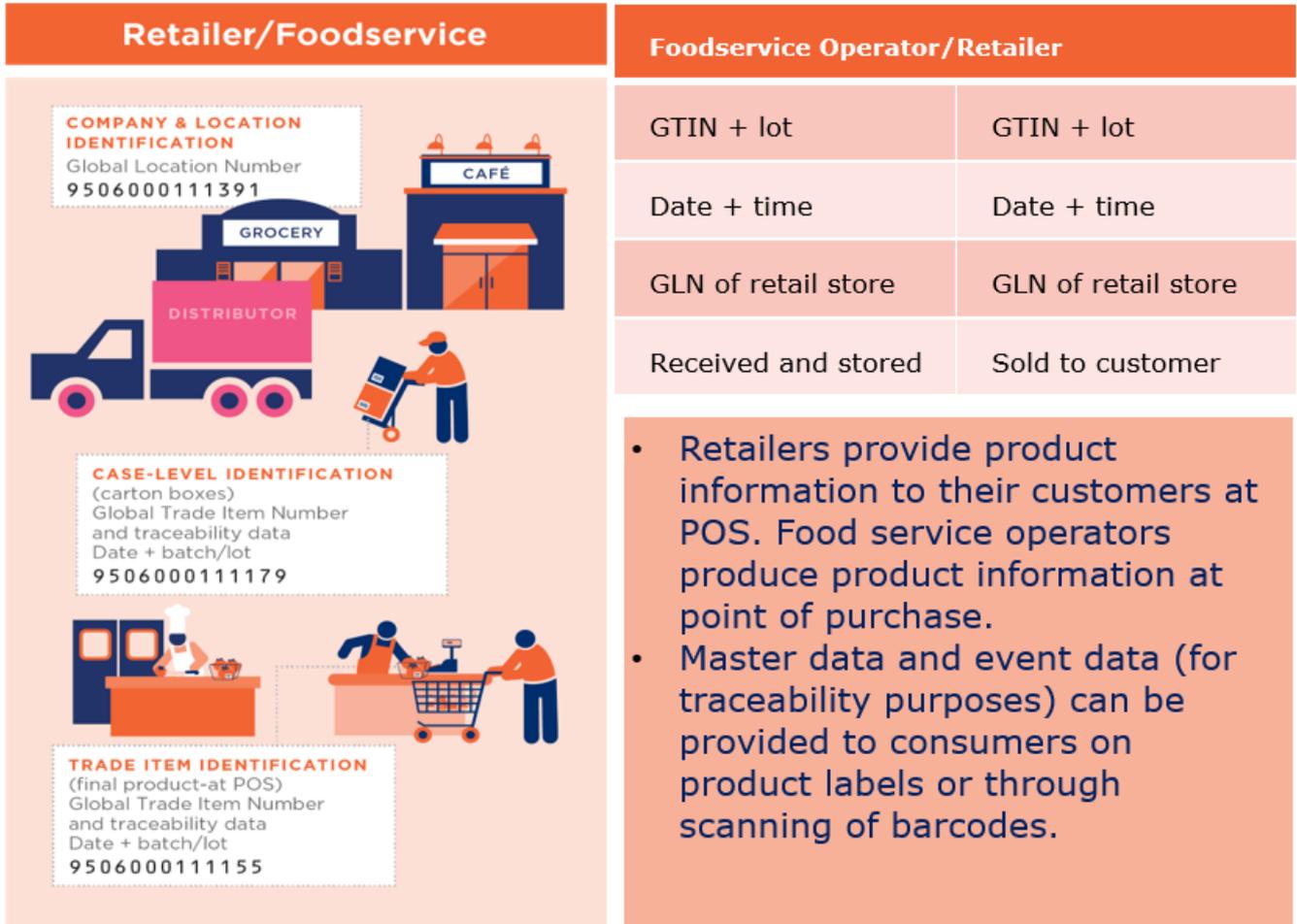
PALLET-LEVEL IDENTIFICATION
Global Serial Shipping Container Code
(after aggregation/disaggregation)
095060001112000016



Distributor/Trader

SSCC	SSCC
Date + time	Date + time
GLN of warehouse/DC	GLN of warehouse/DC
Delivered	Shipped

- Internal traceability is maintained in the key processes; receiving, cross docking, storage, and distribution.
- GTIN + batch/lot or expiry date is used to ensure accuracy of picked products when aggregated and disaggregated. These cases are linked and tracked with pallet using the SSCC.
- Despatch advice containing GTINs, SSCCs and GLNs is sent to customers.



Note: A traceability partner can be a grower, packer/repacker, distributor/trader, wholesaler, broker, retail store or foodservice operator.

- Each Traceability Partner (company) must be able to identify the direct source (supplier) and direct recipient (customer) of traceable items. This is the "one step up, one step down" principle. This requires that supply chain partners collect, record/store and share minimum pieces of information for traceability which are described in the sections which follow.
- All supply chain parties require both internal and external traceability. (Implementation of internal traceability must ensure that the necessary linkages between inputs and outputs are maintained.)
- Any asset (e.g. returnable pallet) which needs to be traced forward or traced back must be uniquely identified.
- Labels showing the traceable item identification number must remain on the packaging until the traceable item is consumed or destroyed (by the next trading partner). This principle applies even when the traceable item is part of a larger packaging hierarchy.

3.2.2 Recall preparedness

- Any trading party may initiate a trace or recall request. Efficient trace or recall requests require that the suspect items are identified using their unique identification numbers.

- To ensure preparedness in the event of an incident, every company should have a traceability team in place and practice/simulate recalls to test the traceability system in place.

3.3 How to mark the traceable objects?

- Automatic identification is a prerequisite for the fast and precise tracking of traceable objects. At a minimum, the identification key (i.e. GTIN or SSCC), batch/lot ID need to be marked on the traceable object. Encoding other frequently needed data elements, such as the harvest or pack date will often be valuable as well. This can be achieved through barcodes and RFID tags. The following subsections discuss the application of barcodes, for information on RFID please refer to the link in Annex D.1.

3.3.1 Supported data carriers

The decision to use EAN/UPC, or GS1 DataBar on variable measure products is left to the brand owner or bi-lateral use between trading partners. GS1 QR Code or GS1 DataMatrix on variable measure products can be used with a bi-lateral agreement between trading partners. It is important to note that different regions may have different requirements.

Check with your trading partner for data carrier requirements. Note that reading GS1 DataMatrix or GS1 QR Code symbols requires image- based scanning capabilities.

Scanners must be compliant and enabled for GS1 DataBar Expanded and GS1 DataBar Expanded Stacked, GS1 DataBar Omnidirectional, GS1 DataBar Stacked Omnidirectional, GS1 DataMatrix, or GS1 QR Code Symbols.

For the choice of the right barcode please see the respective section 4.2.1 or 4.1.1 depending on the decision to be processed as fixed or variable measure product in the GS1 AIDC Fresh Foods Sold at Point-of-Sale Implementation Guideline.

Table 3-4 Supported data carriers

GS1 barcode	Point of Sale		General Distribution	
	GTIN	GTIN+attributes	GTIN	GTIN+attributes
EAN/UPC	X		X1	
GS1 DataBar Omnidirectional	X		X1	
GS1 DataBar Stacked Omnidirectional	X		X1	
GS1 DataBar Expanded		X		X1
GS1 DataBar Expanded Stacked		X		X1
GS1 QR Code		X		
GS1 DataMatrix		X		
Interleaved Two-of-Five (ITF)			X	
GS1-128				X

1 – Proper x dimensions must be adhered to.



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



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

3.3.1.1 EAN/UPC (GTIN only)

EAN/UPC symbols can carry the GTIN and are widely used at retail POS. These symbols do not support other GS1 keys, and also do not allow for inclusion of additional attributes.

Example
The UPC-A symbol below encodes the GTIN.



3.3.1.2 GS1 DataBar

A family of symbols that can be scanned at retail point-of-sale (POS). GS1 DataBar symbols can carry the GTIN and, in certain encodings, GTIN key extensions (batch/lot number and serial number), as well as additional attributes such as a best before date or expiration date. In this way, GS1 DataBar can improve the in-store management processes for fresh produce.

- ✔ **Note:** Please verify with your trade partner as to the symbols accepted for use at POS (point of sale).

3.3.1.2.1 GS1 DataBar Omnidirectional (GTIN only)

The GS1 DataBar Omnidirectional barcode is designed to be read by an omnidirectional scanner, such as a retail slot scanner.



3.3.1.2.2 GS1 DataBar Stacked Omnidirectional (GTIN only)

The GS1 DataBar Stacked Omnidirectional barcode is a full height, two-row variation of the GS1 DataBar Omnidirectional barcode that is designed to be read by an omnidirectional scanner, such as a retail slot scanner.



3.3.1.2.3 GS1 DataBar Expanded (GTIN + Attributes)

The GS1 DataBar Expanded barcode is designed to be read by an omnidirectional scanner such as a retail slot scanner and support Application Identifiers (GTIN key extensions; such as batch/lot or serial number number), which enhances the ability to track and trace products moving through the supply chain.



3.3.1.2.4 GS1 DataBar Expanded Stacked (GTIN + Attributes)

The GS1 DataBar Expanded Stacked barcode is designed to be read by an omnidirectional scanner such as a retail slot scanner and support Application Identifiers (GTIN key extensions; such as batch/lot or serial number number), which enhances the ability to track and trace products moving through the supply chain.



3.3.1.2.5 Two dimensional barcodes - GS1 QR Code symbology (GTIN + Attributes)

GS1 QR Code can encode GS1 system data structures and offers other technical advantages. Its compact design and the existence of various production methods that accommodate placing the symbology onto various substrates offer certain advantages over other symbologies currently in the GS1 system.

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



3.3.1.2.6 Two dimensional barcodes - GS1 DataMatrix symbology (GTIN + Attributes)

GS1 DataMatrix can encode GS1 system data structures and offers other technical advantages. Its compact design and the existence of various production methods that accommodate placing the symbology onto various substrates offer certain advantages over other symbologies currently in the GS1 system.

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 applications that will involve imaging scanners throughout the supply chain.



3.3.1.3 Interleaved Two-of-Five (ITF or I25) (GTIN only)

Interleaved Two-of-Five symbols can carry the GTIN and are widely used for fixed measure general distribution items. These symbols do not support other GS1 keys, and also do not allow for inclusion of additional attributes.



3.3.1.4 GS1-128 (GTIN + Attributes)

GS1-128 barcodes can carry all GS1 identification keys (including the GTIN and SSCC) and support Application Identifiers (GTIN key extensions; such as batch/lot or serial number), which enhances the ability to track and trace products moving through the supply chain.

Besides the GTIN and batch/lot, additional attributes such as pack date or use by date can be encoded.



3.4 Which barcode can I use at Point of Sale?

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

Table 3-5 POS Data Carrier Considerations

GS1 barcode	Fixed Measure		Loose Produce		Variable Measure	
	GTIN	GTIN+attributes	GTIN	GTIN+attributes	GTIN	GTIN+attributes
EAN/UPC	✓					
GS1 DataBar Omnidirectional	✓		✓		✓	
GS1 DataBar Stacked Omnidirectional	✓		✓		✓	
GS1 DataBar Expanded		✓		✓		✓
GS1 DataBar Expanded Stacked		✓		✓		✓
GS1 QR Code (2D)				✓		✓
GS1 DataMatrix (2D)				✓		✓

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

Please be aware that different regions have different requirements. Check with your trading partner for data carrier requirements.

 **Note:** 2D barcodes require imaging-based scanning capabilities.

For an overview of all data carriers see sample barcodes in section 3.3.

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

3.4.1 Business Process Change for Variable Measure Products

How you identify and label your products today at Point-of-Sale is changing.

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

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

To find the right attributes please see figure 3-3 which provides an overview of the commonly used data elements/application identifiers in this business environment.

3.4.1.1 Which Barcode Do I Use for variable measure items?

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

Table 3-6

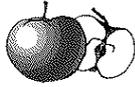
Barcode	Encoding Capacity	Reader requirements
GS1 DataBar Expanded	GTIN plus attributes	Laser or image based scanner
GS1 DataBar Expanded Stacked	GTIN plus attributes	Laser or image based scanner
GS1 DataMatrix	GTIN plus attributes	Image based scanner
GS1 QR Code	GTIN plus attributes	Image based scanner

Example labels are shown in Figure below.

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

New Label with GS1 DataBar Expanded Stacked barcode with additional data

Best - Mart



Braeburn Apples

20-05-10		
£/kg	kg	£
1.59	0.160	0.25



2 001010 000255 >

Best - Mart



Braeburn Apples

20-05-10		
£/kg	kg	£
1.59	0.160	0.25



(01) 0 9524567 89258 4
(3103) 000160
(3922) 000025
(15) 100520

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

Best - Mart



Braeburn Apples

20-05-10		
£/kg	kg	£
1.59	0.160	0.25



(01) 0 9524567 89258 4
(3103) 000160
(3922) 000025
(15) 100520

Best - Mart



Braeburn Apples

20-05-10		
£/kg	kg	£
1.59	0.160	0.25



(01) 0 9524567 89258 4
(3103) 000160
(3922) 000025
(15) 100520



Note: The samples above are not actual size and are for example only. Reference Section 5.12.3 - Table 1 in the GS1 General Specifications for symbol specifications

3.4.2 Fixed Measure Products

3.4.2.1 Which Barcode Do I Use for fixed measure items?

If the supplier chooses to provide additional information about a fixed measure product sold at POS, such as its expiry date or batch number, GS1 DataBar Expanded or GS1 DataBar Expanded Stacked Symbols are used by industry. This process will require some form of on-demand or in-line printing.

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

Table 3-7

Barcode	Encoding Capacity	Reader requirements	Remark
GS1 DataBar	GTIN only	Laser or imaged based scanner	For small and round produce
GS1 DataBar Stacked	GTIN only	Laser or imaged based Scanner	For small and round produce
GS1 DataBar Expanded	GTIN plus attributes	Laser or image based scanner	
GS1 DataBar Expanded Stacked	GTIN plus attributes	Laser or image based scanner	

3.4.3 Loose Produce Trade Items

Loose produce (trade items sold by weight or by piece) are presented to the consumer in a display such as boxes or cases, to be picked by the consumer and weighed or counted at the POS. Depending on the size and nature of the item they may carry a label.

Loose Produce trade items are trade items which are identified with a GTIN or a GTIN and attributes. For more information regarding which barcode to use see the table in section 3.4. At the retailer’s discretion, these fresh foods items can be processed as fixed or variable measure products.

 **Note:** Products identified as fixed measure - reference Fixed measure fresh food items scanned at retail POS of the GS1 General Specifications, Section 2.

 **Note:** Products identified as variable measure, reference Variable measure fresh good trade items scanned at POS using GTIN of the GS1 General Specifications, Section 2.

For the choice of the right barcode please see the table in section 3.4, decision to be based on processing as fixed (count based) or variable measure product (individual weight based).



3.4.3.1 Store-processed products

- For store-processed items, it is recommended to apply GTINs (assigned by the retailer or wholesaler) and follow the same method as for shelf-ready items, using EAN/UPC or GS1 DataBar.
- For the packaging and labelling of store-prepared/packaged items, the supplier’s case GTIN and batch/lot number or case serial number will need to be associated with the GTIN and other relevant data (e.g sell-by date) that is applied to the package by the retailer or wholesaler.
- Maintaining this association makes store-prepared/packaged item traceability a greater challenge than shelf-ready consumer items where product is processed only by the original supplier.

 **Note:** The use of retailer / wholesaler assigned in-store codes has serious traceability limitations, and is therefore not recommended.

3.5 Which barcode can I use in General Distribution?

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

Table 3-8

GS1 barcode	General Distribution	
	GTIN	GTIN+attributes
EAN/UPC	✓ ₁	
GS1 DataBar Omnidirectional	✓ ₁	
GS1 DataBar Stacked Omnidirectional	✓ ₁	
GS1 DataBar Expanded		✓ ₁
GS1 DataBar Expanded Stacked		✓ ₁
Interleaved Two-of-Five (ITF)	✓	
GS1-128		✓

1 – Can be used for General Distribution with the proper x-dimension

3.5.1 Marking of cases

Both variable-weight and fixed-weight product cases must be clearly labelled with the same traceability information in text format. Such text should be clearly labelled data elements such as the text “batch/lot Number” followed by the batch/lot number value. In addition to the text, barcodes can be utilised for efficient exchange of traceability data. The GS1-128 linear and GS1 DataBar Expanded and Expanded Stacked barcodes allow for the use of GS1 Application Identifiers (AI) to define different data elements in a barcode on each case.

The supplier must establish product identification at case level, using the GTIN and batch/lot number, to enable effective traceability or product recall. Using a serial number for each case, rather than a batch/lot number, is also acceptable; a batch/lot number or a serial number must be provided in addition to a GTIN.

Table 3-9 Summary of scannable and human readable traceability data elements

	Shelf-ready		Tray-ready / Store-processed	
	Human Readable	Scan	Human Readable	Scan
Brand Owner/Company Name	X		X	
Consumer item product description	X		X	
Lot number as defined	X	X	X	X
Global Trade Item Number (GTIN)	X	X	X	X
Pack Best before date or Sell-by date Or Use-by date or Production date	X	X	X	X

3.5.2 Marking of logistic units

To ensure traceability of logistic units such as pallets and bulk bins, and smaller units such as cases that are shipped independently, a label needs to be applied. The GS1 Logistics Label is a standard format that explains how text and barcodes must be positioned and formatted. The Serial Shipping Container Code (SSCC) is the only mandatory element on the label. Additional data elements that

provide information on transport, destination and contents of the logistic unit may be included. See the GS1 Logistics Label Guideline [LOGLAB] for more information.

3.6 How to automatically capture data about traceable objects

Best practices for maintaining traceability for suppliers, retailers, processors, wholesalers, distributors, and foodservice operators is to capture all applicable traceability information and store it within their systems by scanning the information directly from the case and/or consumer item barcodes.

Scanning enables data to be captured, stored, and retrieved without the need to visually review the human readable information and manually key that information into systems. This typically involves the use of a scanning device, usually a barcode scanner.

Product can be scanned for Critical Tracking Events e.g. as it enters a distribution centre; as it is shipped out of the distribution centre; as it is received at a retailer store or foodservice operator; or as it is opened for processing or consumer display. The Institute of Food Technologists (IFT), in its 2009 *Traceability (Product Tracing) in Food Systems Technical Report*, defined Critical Tracking Events (CTEs) as “those events that must be recorded in order to allow for effective traceability of products in the supply chain;” these are “those instances where product is moved between premises, is transformed, or is otherwise determined to be a point where data capture is necessary to trace a product. “As a best practice retailers, foodservice operators, processors, distributors and wholesalers should put processes in place to collect and store at least the minimum product information required to support traceability.

Traceability is not only the marking of products but leveraging encoded data and combining it with other key data elements (such as location, time, movement, incident, etc...) in a concise data framework.

4 Traceability data

4.1 Implementation guideline for Growers

This section is intended for Growers who are **NOT** packing product (i.e. their only role is that of a primary producer). Growers who pack product should also refer to Section 4.6. If you only perform the grower role, the traceable item is always the Logistic Unit.

4.2 Overview of traceability data

Produce traceability data is needed to provide parties downstream with information on what happened upstream. These data need to be recorded by each individual party and are defined in this guideline as Key Data Elements (section 7) and Critical Tracking Events (section 5). Traceability data can be pushed from one party to the next party or provided on request. Two main data sharing standards are supported in this guideline, EDI and EPCIS. The guideline also supports sharing of data in barcoded form, as explained in section 3. Traceability data can be used for various business purposes. The most important uses are described in this guideline (see section 3.3).

4.3 What are the Key Data Elements?

Key Data Elements (KDE) ensure that captured and recorded data can be interpreted by all supply chain partners. Key Data Elements define Who, What, When, Where and Why. Since a lot of the KDEs are expressed as identification keys, also master data (MD) related to these keys will be required. For a trade item class, for example, master data might include the trade item's dimensions, descriptive text, nutritional information (in the case of a food product), and so on. Although master data is static, it can change over time. It is important to refer to the master data that were in effect at the time of the Critical Tracking Event.

able 4-1 Key Data Elements

Key Data Elements	
WHO	
GLN of party	Used to identify the grower or farming company that did the first sale (see <i>sales note</i>). Also used to identify buyers and sellers further downstream.
WHAT	
<u>GTIN</u> +	Global Trade Item Number that identifies the type of trade item.
<u>Batch/lot number</u>	The batch/lot number associates a trade item with information the manufacturer considers relevant for traceability of the trade item. The data may refer to the trade item itself or to items contained in it. In combination with the GTIN the batch/lot number identifies a group of trade item instances.
<u>Serial number</u>	A code, numeric or alphanumeric, assigned to an individual instance of an entity for its lifetime. In combination with the GTIN the serial number identifies exactly one trade item instance.
Quantity	The quantity of the respective trade item.
Net weight	Used to identify the net weight of the trade item. Net weight excludes any packaging materials. Has to be associated with a valid unit of measurement.
<u>SSCC</u>	Serial Shipping Container Code that identifies an individual logistic unit.
WHERE	
GLN of physical location	Used for location identification (Farm, Field, portion of field, etc...). Used to identify production and inventory locations.
Name and address	Name and address of the party/location.
Additional IDs	Identifiers used in addition to the GLN to identify the party/location.
Tax number	VAT number, company tax number or equivalent ID of the party.

FBO approval number	Number used to identify a food business operator (FBO) in an official registry related to food standards and safety.
WHEN	
Date and time of Critical Tracking Event (CTE)	E.g. production, shipping, receiving
WHY	
Business process of Critical Tracking Event (CTE)	Used to record the process context of the critical tracking event. Example: Shipping.
Disposition	Status of the traceable object subsequent to the CTE. Example: Available for sale, quarantined.
Transaction reference	E.g. sales note, PO reference, ...

4.3.1 Capturing production inputs

To enable traceability, growers must maintain records of essential information related to the production of the product (e.g. crop protection materials including date of application and batch/lot information, seed information, fertilizers, packaging material, harvesting crew, and water source). This information is critical to your company's body of internal traceability information.

4.3.2 How does my company uniquely identify logistics units and grower information?

Each Logistic Unit destined for a packing facility must be uniquely identified. Examples of logistics units include bins, totes, containers, trailers.

To uniquely identify logistics units or to participate in electronic commerce, the best practice is to use the GS1 Serialised Shipping Container Code number (SSCC). This number is based on your GS1 Company Prefix number (supplied to you through your local GS1 Member Organisation), thus ensuring global uniqueness.

Over time, your company will exhaust its pool of available GS1 SSCC numbers. It is important that you manage the re-use of SSCC numbers so as not to conflict with the logistics units already in the supply chain. SSCC number must not be reallocated within one year of the shipment date from the SSCC assignor to a trading partner. However, prevailing regulatory or industry organisation specific requirements may extend this period.

Additional information about GS1 SSCC assignment appears in the GS1 General Specifications.

What additional grower/harvest information is required?

To assist packers in assigning batch / lot at the pack house, growers should include on their Logistic Unit tag/label, in human-readable format, all relevant grower/harvest information. The information included should enable the creation of a meaningful batch/lot number and could include the harvest crew, field or plot of harvest, date of harvest, etc.

What information must appear on the Logistic Unit label?

Each logistics label should provide the following data in human-readable format:

- Unique Logistic Unit identification (e.g. SSCC)
- Commodity name and, where applicable, variety name
- Your company's unique identification
- Additional grower/harvest information

4.3.3 How is my company identified uniquely?

The best practice is to use the GS1 Global Location Number (GLN). GLN is a standard that can be used to uniquely identify your company and its premises. GLN's can be allocated either by a GS1 Member Organisation or by your company using your GS1 Company Prefix.

Table 4-2

Which types of data play a role?	Explain the concepts of master data, dynamic data, transaction data, ILMID.
What are the supply chain sources of the data?	use the supply chain overview diagram, and include the main data streams
What are the main systems used to manage the traceability data?	ERP, WMS, dedicated traceability service, ...

4.4 What are the Key Data Elements for Growers?

4.4.1 What traceability information does my company need to record and share?

To ensure that the link between trading partners for traceability is maintained, the following data must be recorded and shared. This represents the minimum data set required to ensure traceability between you and your trading partners.

Logistic Unit identification (SSCC)

Commodity name and, where applicable, variety name, growing method, GTIN if applicable

Receiver Identification (GLN)

Ship from location identification (i.e. GLN of shipping location)

Ship to location identification (i.e. GLN of receiving location/trading partner)

Ship Date

Grower records details related to growing/production (e.g. field, seeds, details of production inputs)

Additional grower information (e.g. harvest crew, date of harvest) to enable batch / lot assignment by the trading partner (packer)

Sender Identification (GLN)

The accompanying chart, Data Requirements for Growers, further illustrates the minimum data required to maintain traceability.

4.4.2 Data Requirements for Growers – Growers who are the FIRST participants in the supply chain (NO previous trading partners)

Figure 4-1

Grower/Producer	Data to Record	Data to Share with Next Trading Partner
	<ul style="list-style-type: none"> Logistics unit ID (SSCC) Additional grower information (e.g. batch/lot) Commodity/variety (GTIN) Receiver ID (GLN) Ship date Ship from location (GLN) Ship to location (GLN) Details of production inputs (e.g. seed, fertilizer, crop protection) 	<ul style="list-style-type: none"> Logistics unit ID (SSCC) Additional grower information (e.g. batch/lot) Commodity/variety (GTIN) Ship date Ship from location (GLN) Sender ID (GLN)

Figure 4-2

Grower/Packer	Data to Record	Data to Share with Next Trading Partner
	<ul style="list-style-type: none"> Logistics unit ID (SSCC) Additional grower information (e.g. batch/lot)* Commodity/variety (GTIN)* Ship date Ship from location (GLN) Ship to location (GLN) Details of production inputs (e.g. seed, fertilizer, crop protection) Output batch/lot number Output trade item identification (GTIN) Trade item description Trade item quantity & unit of measure <p>* not required for field pack items</p>	<ul style="list-style-type: none"> Logistics unit identification (SSCC) Output batch/lot number Trade item identification (GTIN) Trade item description Trade item quantity & unit of measure Sender identification (packer/repacker identification) (GLN) Ship from location (GLN) Shipment identification Ship date

4.4.3 Other traceability Best Practices for growers

Assign SSCC number to Logistic Unit

- Affix labels bearing the SSCC number to corresponding Logistic Unit
- The SSCC numbers are shown in barcode format using GS1-128 symbology

If transmitting product information electronically, use standard EDI EANCOM®/GS1 XML* messages to convey shipment details. Send EDI Dispatch Advice/Advanced Ship Notice to receiver:

- a. Link Logistic Unit (SSCC) to packing reference information (this may be the purchase order, shipment, packing run number or harvest work order)
- b. Link packing reference to shipment



Note: For more information about SSCC creation please reference the GS1 General Specifications or your local GS1 Member Organisation.

*Other electronic messaging standards exist (e.g. X12)

4.2.2.1 Data retention

All companies are expected to maintain records that will facilitate timely and accurate traceability and support any product recalls. It is recommended that your company establish your internal data retention policy based on the following considerations:

1. Government or market requirements
2. How long your product may exist (somewhere) in the supply chain
3. The need to retrieve data in the event of an epidemiological trace-back which may, or may not, implicate your product

4.5 Business scenario for growers

4.5.1 Grower receives items for growing season

Who are the trading parties?

All Farm Products supplies ABC Farms with seed/seedlings, fertilizer and pesticides.

What needs to be traced?

ABC Farms is responsible for recording and maintaining information that will enable batch / lot assignment of all inbound items.

How do they accomplish this?

ABC Farms records the inbound shipments (waybill; product identifier, lot/batch or serial number; time and day; shipping company used etc...).

Why is this important?

If there is ever a recall, having the information recorded can minimise the loss impact to the grower. Also detailed location and date identification can be used to identify if/when a plot of land can be deemed 'organic'.

4.5.2 Grower applies items during growing season

Who are the trading parties?

All Farm Products supplies ABC Farms with seed/seedlings, fertilizer and pesticides, etc...

What needs to be traced?

ABC Farms is responsible for recording and maintaining information that will enable batch / lot assignment of when and where those items are used.

How do they accomplish this?

ABC Farms is responsible for recording when those items are used and where.

Why is this important?

If there is ever a recall, having the information recorded can minimise the loss impact to the grower. Also detailed location and date identification can be used to identify if/when a plot of land can be deemed 'organic'.

4.5.3 Grower delivers bulk to pack house or cooperative

Who are the trading parties?

ABC Farms grows, harvests, and transports raw product to other companies (pack houses and/or cooperatives) which, in turn, receive, sort, grade and pack raw product received in bulk from ABC Farms into "finished product" configurations.

What needs to be traced?

ABC Farms is responsible for recording and maintaining information that will enable batch / lot assignment during the packing process. ABC Farms are also responsible for providing this information to its trading partners as product is delivered.

How do they accomplish this?

ABC Farms harvests their product and transports the raw product in bins or field boxes to their trading partners. As product is harvested, ABC records information related to each day's activity based on commodity, harvest date, field being harvested (i.e. Ranch/Plot, Unit/Block) and harvesting crew. A human-readable "field tag" is generally applied to the bin or field boxes as they are filled. The "field tag" generally includes information as outlined above. To enable greater granularity during the batch / lot assignment, additional information could include specifics on the actual truck load of raw product being transported to their trading partner.

ABC Farms is responsible for conveying the day's activity/harvest information, (as stipulated in section 2.2) along with the number of units (bins or field boxes), to the trading partner that will be receiving the product. Although this information is contained on "field tags" affixed to each bin or field box, it should also be conveyed via a "receiving" or "trip" ticket containing all the information and that is given to the driver of the vehicle transporting the raw product to ABC's trading partner.

4.6 Implementation Guideline for Packers/Repackers

4.6.1 Capturing Production inputs

Logistics units coming from growers:

Growers deliver product in bulk using various containers or logistics units for transport. Common examples of logistics units include totes, bins and trailers. Each Logistic Unit must be individually traceable. For this reason, each Logistic Unit carries a tag or label that shows a unique identification number. This is a GS1 Serial Shipping Container Code (SSCC) number and is assigned by the Grower. Use of the SSCC number ensures not only distinct identification from any of the Grower's other shipping containers but also guarantees uniqueness across all growing companies providing product. The tag or label provides other important information including:

- Commodity name and, where applicable, variety name
- Additional grower/harvest information
- The grower's unique company identification (GLN)

Product coming from packers:

Product sourced from other packers is identified using the GS1 Global Trade Item Number (GTIN). The assignment of GTINs for each product traded (i.e. all product configurations) is the responsibility of the brand owner and must be recorded in the repacker's internal systems prior to being repacked and traded. Use of the GS1 GTIN ensures unique product identification across all of the supplier's product configurations. If the item/s are a commodity (Non-Branded) then the other packer will apply the GTIN

Traceability is accomplished by associating each GTIN with its batch / lot. GTIN and batch / lot information is shown on individual case labels.

Other sources of supply:

To enable traceability, packers/repackers must also maintain records of other product inputs (e.g. packaging material, packing line information, etc.). This information is equally critical to your company's body of internal traceability information.

4.6.2 How is my company identified uniquely?

The best business practice is to assign a GS1 Global Location Number (GLN) to your company and then share that number with suppliers and customers. GLNs are allocated by the GS1 Member Organisations in some countries and in others companies are permitted to make up their own using their GS1 Company Prefix. Contact your GS1 Member Organisation for guidance on the practice in your country.

Individual GLN's can be assigned to represent your company as well as any individual trading subsidiaries. GLN's can also be used to identify important production, storage, shipping or receiving locations in your company.

4.6.3 How does my company identify products in the supply chain?

The best practice is to assign a GS1 Global Trade Item Number (GTIN) for each traded item.

What is a Global Trade Item Number?

A Global Trade Item Number (GTIN) is a standardised and globally unique way to identify items traded in the supply chain. Where there is a requirement to accurately order, invoice, price or receive your product, the GTIN is the basic enabler. The GTIN provides a common language to support multiple business practices, including traceability.

How is a GTIN assigned to the traded items my company produces?

Where product is sold under a brand name, the brand owner is responsible for assigning the GTIN. If the company is the brand owner, the first step is to approach your local GS1 Member Organisation and apply for a GS1 Company Prefix. A brand owner typically owns the label for the product that is sold; this may also include non-branded packaging. The GS1 Company Prefix will be globally unique for each organisation and it will be used to create the GTINs assigned to the organisation's trade items. Your company then assigns a GTIN to each of your products and each product and packaging configuration.

If your company is not the brand owner, you must use the brand owner's GTIN.

4.6.4 How does my company identify products that must be traced?

The best practice is to identify traceable products (packages/cases) by their GTIN and the associated production batch / lot. Where a package contains pre-packaged inner packages, each inner should be assigned and marked with a unique GTIN and the associated production batch/lot.

How does my company identify production batches/lots?

All packers/repackers must assign a batch / lot to products they create. The batch / lot itself can vary from one company to another, depending on the precision desired. For example, a batch / lot can represent a day's production or the product produced from an individual packing line. Packer/repacker batch / lot may be different but must maintain records which internally link to the original grower/harvest batch/lot.

It is important to remember that your batch / lot relates to the scope of products that may be implicated in a recall and needs to be considered during assignment.

4.6.5 How does my company uniquely identify logistics units?

For packers and repackers, outbound logistics units are typically pallets or containers. When your company's traceable item is one or more logistics units, the best business practice is to assign a GS1 Serial Shipping Container Code (SSCC) to each Logistic Unit. Each SSCC number that is assigned is unique to the individual Logistic Unit and is based on your company's GS1 Company Prefix number. This ensures uniqueness world-wide.

Over time your company will exhaust its pool of available SSCC numbers. For this reason, it is important that your company manage the re-use of SSCC numbers so as not to conflict with logistics units already in the supply chain. SSCC number must not be reallocated within one year of the shipment date from the SSCC assignor to a trading partner. However, prevailing regulatory or industry organisation specific requirements may extend this period.

4.6.6 Best practice for case and logistic unit labels

Guidelines for case labels

Case labels provide a means to identify product to other trading partners. The label shows the product identification (i.e. the GTIN) and associated batch / lot in an easy-to-read human-readable form and should also, as a best practice, provide case information using GS1-compliant barcodes. This ensures cases can be identified quickly and accurately at any subsequent point in the supply chain, anywhere in the world. Your local GS1 Member Organisation can help your company understand how to produce barcodes and provide guidance on label placement.

You should note that where your company's case product is sold to consumers in the case (i.e. the case is sold at retail point-of-sale), a second barcode symbology must be used to enable front end / point-of-sale scanning. Your local GS1 Member Organisation can also provide assistance on using a barcode that can be scanned at point-of-sale. In this example you need to ensure that both barcodes carry the same GTIN.

When the traceable item is the Logistic Unit (i.e. each Logistic Unit needs to be uniquely identified and tracked), refer to the guidelines above for Logistic Unit labels.

The figure below shows examples of GS1-128 case labels uniquely identifying a traded product.

Figure 4-3 Examples of GS1-128 case labels



(01) 10614141000415 where (01) = AI 01 (GTIN)

(10) 02228ABC where (10) = Batch / Lot

Where can I learn more about creating GS1-compliant barcodes?

See the GS1 General Specifications.

Guidelines for Logistic Unit labels:

When the traceable item is the Logistic Unit, labels provide a means to identify that shipping container (or pallet) to other trading partners. The label shows the Logistic Unit identification (i.e. the SSCC number) in an easy to read human-readable form. Additional information may be shown on the pallet label.

Your local GS1 Member Organisation can help your company to understand global standards for logistics labels.

The best practice is to provide pallet information using GS1-compliant barcodes. This ensures pallets can be identified quickly and accurately at any subsequent point in the supply chain, anywhere in the world. Pallet barcodes (i.e. symbols) conform to a symbology called GS1-128. Your local GS1 Member Organisation can help your company understand how to produce GS1-128 barcodes and provide guidance on label placement.

The figure below shows an example of a GS1-128 pallet label uniquely identifying a Logistic Unit.

Figure 4-4 Example of a GS1-128 pallet label



(00) 034531200000002527 where (00) = AI 00 (SSCC)

Where can I learn more about creating GS1-compliant barcodes?

See the GS1 General Specifications.

4.7 What are the Key Data Elements for Packers/Repackers?

4.7.1 What traceability information does my company need to collect, record and share?

To ensure that the traceability link is maintained, the following data must be collected, recorded and shared. The following represents the minimum data required to ensure traceability between your suppliers (i.e. growers) and your customers.

- When your company is a packer:
- When the grower’s inbound Logistic Unit is the inbound traceable item
 - Logistic Unit identification (SSCC)

- Commodity name and, where applicable, variety name
- Ship from location identification (i.e. GLN of shipping location)
- Receipt date
- Grower/harvest information
- Ship date
- Sender Identification (GLN)
- When your company's (outbound) product (package/case) is the traceable item
 - Trade item identification (GTIN)
 - Trade item description
 - Batch / Lot
 - Trade item quantity and unit of measure
 - Ship from location identification (i.e. GLN of the shipping location)
 - Ship to location identification (i.e. GLN of the receiving location/trading partner)
 - Ship date
 - Sender Identification (GLN)
 - Receiver Identification (GLN)
- When your company's (outbound) Logistic Unit is the traceable item
 - Logistic Unit identification (SSCC)
 - Ship from location identification (i.e. GLN of shipping location)
 - Ship to location identification (i.e. GLN of receiving location/trading partner)
 - Ship Date
 - Sender Identification (GLN)
 - Receiver Identification (GLN)
- When your company's (outbound) shipment is the traceable item
 - Unique shipment identification (e.g. may be the bill of lading number)
 - Ship from location identification (i.e. GLN of shipping location)
 - Ship to location identification (i.e. GLN of receiving location/trading partner)
 - Ship date
 - Sender Identification (GLN)
 - Receiver Identification (GLN)
- When your company is a repacker:
- When the packer's (inbound) product (package/case) is the traceable item
 - Trade item identification (GTIN)
 - Trade item description
 - Batch / Lot
 - Trade item quantity and unit of measure
 - Ship from location identification (i.e. GLN of the shipping location)
 - Ship date
 - Sender Identification (GLN)
 - Receipt date

- When the packer's (inbound) Logistic Unit is the traceable item
 - Logistic Unit identification (SSCC)
 - Ship from location identification (i.e. GLN of shipping location)
 - Receipt date
 - Ship date
 - Sender Identification (GLN)
- When the packer's (inbound) shipment is the traceable item
 - Unique shipment identification (e.g. may be the bill of lading number)
 - Ship from location identification (i.e. GLN of shipping location)
 - Ship to location identification (i.e. GLN of receiving location/trading partner)
 - Ship date
 - Sender Identification (GLN)
 - Receiver Identification (GLN)
 - Receipt date
- When your company's (outbound) product (package/case) is the traceable item
 - Trade item identification (GTIN)
 - Trade item description
 - Batch / Lot
 - Trade item quantity and unit of measure
 - Ship from location identification (i.e. GLN of the shipping location)
 - Ship to location identification (i.e. GLN of the receiving location/trading partner)
 - Ship date
 - Receiver Identification (GLN)
 - Sender Identification (GLN)
- When your company's (outbound) logistics item is the traceable item
 - Logistic Unit identification (SSCC)
 - Ship from location identification (i.e. GLN of shipping location)
 - Ship to location identification (i.e. GLN of receiving location/trading partner)
 - Ship date
 - Sender Identification (GLN)
 - Receiver Identification (GLN)
- When your company's (outbound) shipment is the traceable item
 - Unique shipment identification (e.g. may be the bill of lading number)
 - Ship from location identification (i.e. GLN of shipping location)
 - Ship to location identification (i.e. GLN of receiving location/trading partner)
 - Ship date
 - Sender Identification (GLN)
 - Receiver Identification (GLN)

Data attribute definitions are provided in the Glossary (Appendix A.1).

The accompanying charts, Data Requirements for Packers and Data Requirements for Repackers, further illustrate the minimum data required to maintain traceability.

4.7.2 Data Requirements for Packers

Figure 4-5

Packer	Data to Collect	Data to Share
	<ul style="list-style-type: none"> Receipt date Ship date <p>FROM PREVIOUS TRADING PARTNER</p> <ul style="list-style-type: none"> Logistics unit identification (SSCC) Additional growing information (e.g. batch/lot) Commodity/variety (GTIN) Sender identification (GLN) Sender's ship from location (GLN) 	<p>WITH PREVIOUS TRADING PARTNER</p> <ul style="list-style-type: none"> Receiver identifier (GLN) Ship to location (GLN) <p>WITH NEXT TRADING PARTNER</p> <ul style="list-style-type: none"> Logistics unit identification (SSCC) Output batch/lot number Trade item identification (GTIN) Trade item description Trade item quantity & unit of measure Sender identification (packer/repacker identification) (GLN) Ship from location (GLN) Shipment identification Ship date
	<p>Data to Record</p> <ul style="list-style-type: none"> Output batch/lot number Trade item description Output trade item identification (GTIN) Trade item quantity & unit of measure Receipt date Receiver identification Sender identification Ship date Ship from location (GLN) Ship to location (GLN) Shipment identification 	

4.7.3 Data Requirements for Repackers

Figure 4-6

Repacker	Data to Collect	Data to Share
	<ul style="list-style-type: none"> Receipt date Ship date <p>FROM PREVIOUS TRADING PARTNER</p> <ul style="list-style-type: none"> Logistics unit identification (SSCC) Input batch/lot number Trade item identification (GTIN) Trade item description 	<p>WITH PREVIOUS TRADING PARTNER</p> <ul style="list-style-type: none"> Receiver identifier (GLN) Ship to location (GLN) <p>WITH NEXT TRADING PARTNER</p> <ul style="list-style-type: none"> Logistics unit identification (SSCC) Output batch/lot number Trade item description Trade item identification (GTIN) Trade item quantity & unit of measure Sender identifier (packer/repacker identifier) (GLN) Ship from location (GLN) Shipment identifier Ship date
	<p>Data to Record</p> <ul style="list-style-type: none"> Input & output logistics unit identification (SSCC) Input & output batch/lot number Input & output trade item description Input & output trade item quantity & unit of measure Input & output trade item identification (GTIN) Receipt date Receiver identification Sender identification Ship date Ship from location (GLN) Ship to location (GLN) Shipment identification 	

Other traceability Best Practices for packers/repackers

- Where the brand of the product belongs to your company or the product is not branded at all:
 - Assign GTINs for prepackaged consumer units or loose produce
 - Assign GTINs for all case configurations
 - Label product using the appropriate GS1 Data Carrier
- Where the brand of the product belongs to another trading partner (e.g. private label of a retailer):
 - Use brand owner's GTINs for prepackaged consumer units or loose produce
 - Label product using the appropriate GS1 Data Carrier
 - Use brand owner's GTINs for all case configurations
 - Link to GRAI or GIAI for re-usable containers
- For cases initially being packed and configured, also store:

- Purchase order number for product received
 - Transporter of inbound product
 - For cases being repacked and/or reconfigured:
 - Scan SSCC number from each inbound Logistic Unit (e.g. pallet) for automated receipt
 - Store GTIN and corresponding batch / lot in system
 - Link original GTIN and corresponding batch / lot (for each original product inputted to the newly created item) with GTIN from newly created case and corresponding batch / lot and store this link in your computer systems
 - Assign GTINs for all new case configurations
 - Link to GRAI or GIAI for re-usable containers
 - Encode both the newly created GTIN and corresponding batch / lot in a GS1 data carrier, e.g. a GS1-128 barcode
 - Assign a SSCC number to each Logistic Unit
 - Link case GTINs and corresponding batch / lot residing in that Logistic Unit to the SSCC number
 - Affix pallet tags bearing the SSCC numbers that are unique to each Logistic Unit. Also store:
 - Purchase Order Number associated with an outbound product
 - Transporter of outbound product
 - Send (EANCOM® / GS1 XML) Despatch Advice/Advanced Ship Notice* to receiver
 - Link item to case GTIN and case batch / lot
 - Link case GTIN and corresponding batch / lot to Logistic Unit SSCC
 - Link Logistic Unit SSCC to Purchase Order
 - Link purchase order, if necessary, to shipment
 - Link Asset Identifier if required
- *Other electronic messaging standards exist e.g. X12
- Link SSCC number with corresponding GTIN and batch information as well as purchase order information to shipment details. This should include:
 - Ship to Location Identification (GLN) and Address
 - Purchase Order number
 - Transporter
 - Ship from location Identification (GLN) and Address
 - Trade Item Quantity and Unit of Measure
 - Ship Date
 - Expected Delivery Date *by buyer*
 - Asset identification

Data retention:

All companies are expected to maintain records that will facilitate timely and accurate traceability and support any product recalls.

It is recommended that your company establish your internal data retention policy based on the following considerations:

- Government or market requirements
- How long your product may exist (somewhere) in the supply chain

- The need to retrieve data in the event of an epidemiological trace-back which may, or may not, implicate your product.



Note: There are additional traceable elements which can be leveraged to increase full visibility. For more details see section 8.

4.8 Business scenarios for packers/repackers

Below are examples of common business scenarios that may be relevant for your company.

4.8.1 Packer scenario: Field packed product

Who are the trading parties?

ABC Farms grows product for XYZ Packing Company who is responsible for performing the following activities with the product:

- Harvesting
- Sorting/grading
- Field packing
- Transporting
- Cooling
- Storing

XYZ Packing Company packs all of ABC Farms product in cases with XYZ's brand.

What needs to be traced?

Since ABC is only growing and field packing the product, XYZ Packing Company is responsible for recording and maintaining GTIN and related batch / lot information about raw product used to create cases of product in XYZ's brand.

How do they accomplish this?

XYZ Packing Company harvests, sorts/grades and packs product in a field. They assign a unique batch / lot to each day's activity based on commodity, harvest/pack date, field being harvested (i.e. Ranch/Plot, Unit/Block) and harvesting crew. Finer batch / lot granularity could be obtained by assigning a unique batch / lot based, not only on the above attributes, but also on a truck load of packed product being transported to the cooling/storage facility.

As product is packed, a case label containing XYZ's GTIN and the batch / lot in barcode and human-readable format is applied to each case before being palletized. XYZ also affixes an internal pallet tag to each completed pallet for internal inventory control purposes.

Each load of product being transported from the field should also have batch / lot information conveyed via a "receiving" or "trip" ticket that is given to the driver of the vehicle transporting the packed product to XYZ's facility.

Once product arrives at the cooling/storage facility the "receiving" or "trip" ticket should be verified against actual product received and each case or pallet of product should be recorded in XYZ's Warehouse Management System (WMS).

During all phases of product movement within the cooling/storage facility (pre-cooling, put away, staging, shipment, etc.), internal records are maintained by GTIN and batch / lot at the case or pallet level. This process assures that XYZ Packing can accurately track product by batch / lot from field to shipment in the event of a recall incident.

Example 1 – Field Pack Romaine

Romaine lettuce directly packed in the field into a case with a GS1-128 Case Label including GTIN and Lot. Cases are packed onto pallets with an SSCC and shipped to a retailer with an Advanced

Ship Notice (Despatch Advice). Case label shows human readable commodity, variety, country of origin, grower, pack date and Voice Pick Code hash of GTIN, Lot (see producetraceability.org for details).

Figure 4-7



Table 4-3

	Pack (Field)	Receive (Pack house)	Pallet Pack (Pack House)	Ship Pallet (pack House)
Who	Grower	Packer	Packer	Packer
What	GTIN, Lot, Quantity, Units = Cases	GTIN, Lot, Quantity, Units = Cases	Parent: Pallet SSCC Children: GTIN/Lot/Qty	Pallet SSCC
Where	Field ID (GLN)	Packing Shed ID (GLN)	Packing Shed ID (GLN)	Packing Shed ID (GLN)
When	Date, Time, Zone	Date, Time, Zone	Date, Time, Zone	Date, Time, Zone
Other Fields	GPC Brick Code Commodity & Variety Size & Grade Brand Name Trade Item Description Packaging Type Code Case Dimensions Gross & Net Weights Pallet Ti/Hi Grower Contact Info Field Geofence Growing Method Organic Cert Info	Packer Contact Info Packing Shed Location		Customer Contact Info Ship To Address

Note: The Parent and Child designation identifies the relationship between the two hierarchy levels.

Note: Please connect with your local trading authority for a full list of commodity and variety codes.

4.8.2 Packer scenario 2: Shed (Packinghouse) packed product

Who are the trading parties?

Ideal packers is a produce packing company that operates a packinghouse where product is received from various growers, including ABC Farms, who deliver raw product to Ideal's facilities where the following activities are performed on the product:

- Sorting/grading
- Packing (under Ideal Packers' Brand)
- Cooling
- Storing
- Selling
- Shipping

What needs to be traced?

All raw product supplied by growers to Ideal Packers must be properly identified according to the guidelines outlined in section 4.1 "Implementation Guidelines for Growers". Ideal Packers must maintain records pertaining to all inbound raw product. Ideal Packers must also maintain information pertaining to packed (finished) product with linkage to raw product information (commodity, variety and additional growing information) supplied by growers.

How do they accomplish this?

Product is harvested in the field and placed in bins which are brought by truck to Ideal Packers' packing shed. These logistics units serve as the traceable unit between ABC Farms and Ideal Packers. A human-readable "field tag" is applied to the bin or pallets of field boxes. The "field tag" generally includes the commodity name, variety name, name or number of the field, date, and possibly the harvest crew.

When the truck arrives at the pack shed, the product is moved to a holding area until it is to be packed (generally fairly quickly, but could be held in a cold room overnight, or for months like apples in a controlled atmosphere storage). A receiving ticket is generated noting the SSCC number, commodity and variety received, grower/harvest information, quantity, date, time, and truck.

The holding area can also be identified with a GLN and all data associated with the product is captured in the WMS at the time of put away

When it is time to pack the produce, the raw product is retrieved from the holding area and brought to a packing area where the product is placed onto the packing line. Before packing begins, Ideal Farms assigns a batch / lot to the production run. When different product (commodity/variety) or product from a new field is brought to the packing line, there is a pause to let the product from the previous production run finish being packed and a new batch / lot is assigned to the next production run. After the product is graded and packed into cartons, a label is applied to the carton containing human-readable information about the product. The label also contains a GS1-128 barcode that includes Ideal Packers' GTIN for the item and the batch / lot.

Once the pallet is ready to ship to a customer, Ideal Packers must make sure that a pallet tag with an SSCC has been created and affixed to each pallet being shipped. The SSCC pallet tag number will be linked to internal pallet information within Ideal Packers' systems.

Ideal Packers sends an EDI (EANCOM® or GS1 XML) Despatch Advice/Advanced Ship Notice* to the customer identifying the pallets (SSCC) on the shipment and the product (including GTIN and batch / lot) on each pallet.

*Other electronic messaging standards exist e.g. X12

Example 2 – Shed Pack Tomato

Tomatoes harvested from fields in field bins, then sorted by size and grade then packed into cases which are labelled with a GS1-128 Barcode including GTIN and Lot. Cases are packed onto pallets

and labelled with a GS1-128 Barcode including the SSCC. An EDI Advanced Ship Notice is sent to retailer using this data.

Figure 4-8



Table 4-4

	Harvest (Field A; Field B)	Receive (Pack House)	Fill Cases (Pack House)	Pack Pallet (Pack House)	Ship Pallet (Pack House)
Who	Grower	Packer	Packer	Packer	Packer
What	Container ID (GRAI/GIAI) Quantity Units = KGS or LBS	Container ID (GRAI/GIAI) Quantity Units = Cases	Input: Container ID (GRAI/GIAI), Quantity, Units Output: GTIN/Lot/Qty, Units = Cases	Parent: Pallet SSCC Children: GTIN/Lot/Qty	Pallet SSCC
Where	Field IDs (GLN)	Packing Shed ID (GLN)	Packing Shed ID (GLN)	Packing Shed ID (GLN)	Packing Shed ID (GLN)
When	Date, Time, Zone	Date, Time, Zone	Date, Time, Zone	Date, Time, Zone	Date, Time, Zone
Other Fields	GPC Brick Code Commodity & Variety	Packer Contact Info Packing Shed Location	GPC Brick Code Commodity & Variety Size & Grade Brand Name Trade Item Description Packaging Type Code Case Dimensions Gross & Net Weights Pallet Ti/Hi Grower Contact Info Field Geofence Growing Method Organic Cert Info		Customer Contact Info Ship To Address



Note: The Parent and Child designation identifies the relationship between the two hierarchy levels.

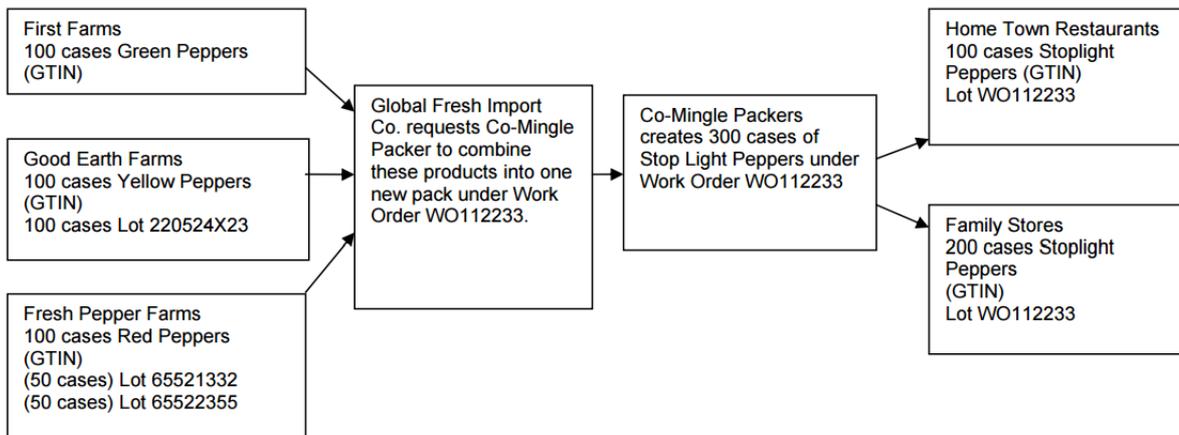
 **Note:** Please connect with your local trading authority for a full list of commodity and variety codes.

4.8.3 Repacker scenario 1: Repack of previously packed product

Who are the trading parties?

Co-Mingle Packers is a produce packing company that operates a repack facility where product is received from grower suppliers, through the services of Global Fresh Import Company, an importer who delivers packed product to Co-Mingle Packers’ facilities. The product Co-Mingle Packer receives will be from multiple growers and contain multiple batch / lot which will be commingled into the same package to be delivered to Co-Mingle Packers’ customers.

Figure 4-9 Diagram of the repacking process



What needs to be traced?

Co-Mingle Packers will combine product with multiple GTINs and batch / lot into a new package where a new GTIN and batch / lot will be assigned. Each batch of product repacked will need to have a unique reference number assigned to track the input product to the output product. Co-Mingle Packers must record all the GTINs, batch / lot and quantities of the source product to this reference number. The reference number will be assigned as the batch / lot to the output product created from the re- pack.

How do they accomplish this?

Global Fresh Import Company sources product from many growers and sells this product to customers, the product received from growers is already packed into standard packaging ready for delivery to the customer. When Global Fresh Import Co. is requested to pack product into specialty packs for the customer, a work order is created for Co-Mingle Packers. Global Fresh Import Co. will deliver product to Co-Mingle Packers prior to the repack service being required.

When it is time to pack the produce, Co-Mingle Packers will scan the Work Order Number, pallet SSCC number and each GS1 case label to record the GTIN and batch / lot information for each case of product used as source product. As each case is created in the new pack, a GS1 case label is printed with the new GTIN and batch / lot. The GTIN will be the brand owner’s GTIN and the batch / lot will be the Work Order Number. The Work Order Number is the control number for traceability to reference the GTIN and batch / lot combinations that were commingled. In the event of a recall, if any of the source products were identified as implicated then all the output product would now need to be considered implicated as well.

The labelled cartons are stacked on pallets for storage prior to being shipped. Once a pallet is complete, a new SSCC pallet tag is attached to the pallet. All the GS1 case labels are scanned and recorded against the new SSCC pallet tag. Co-Mingle Packers sends an electronic EDI (EANCOM® or GS1 XML) Despatch Advice/Advanced Ship Notice* message to their customers identifying the pallets (SSCC) on the shipment and the product (including GTIN and batch / lot) on each pallet.

*Other electronic messaging standards exist (e.g. X12)

4.9 Implementation Guideline for Distributors/Traders

4.9.1 Capturing traceability inputs

Distributors/traders must capture product information from their supplier companies. These products are identified using a GS1 Global Trade Item Number (GTIN). The assignment of GTINs for each product traded (i.e. all product configurations) is the responsibility of the brand owner and must be recorded in the distributor/trader's internal systems prior to product being traded. Use of the GS1 GTIN ensures unique product identification across all of a supplier's product configurations and uniqueness across all sources of supply.

Traceability is accomplished by associating each GTIN with its batch / lot. GTIN and batch/lot information is displayed on individual case labels. This information will need to be captured, stored, and communicated to the food service operator/retailer.

Distributors/traders may also need to capture information about inbound logistics units, these are typically pallets. Pallets are identified at the time that they are created by the packer and are individually identified using a GS1 Serial Shipping Container Code (SSCC). This number is assigned by the packer/shipper and appears on individual Logistic Unit labels. The pallet label provides other important information that must be collected and recorded. To enable traceability, distributor/traders must also maintain records of other product inputs (e.g. packaging material) for their own use. This information is equally critical to a company's body of internal traceability information.

4.9.2 How is my company identified uniquely?

The best business practice is to assign a GS1 Global Location Number (GLN) to your company and then share that number with suppliers and customers. GLNs are allocated by the GS1 Member Organisations in some countries and in others, companies are permitted to determine their own using their GS1 Company Prefix. Contact your GS1 Member Organisation for guidance on the practice in your country.

Individual GLN's can be assigned to represent your company as well as any individual trading subsidiaries. GLN's can also be used to identify important production, storage, shipping or receiving locations in your company.

Additional information about GLN assignment appears in Appendix A.

4.9.3 How does my company identify Products in the Supply Chain?

Where distributors/traders simply re-sell product from their packer/repacker suppliers (i.e. products are not re-configured into other traded units), they must use the GS1 GTINs assigned by the packer/repacker suppliers to inbound products.

Where distributors re-configure product from suppliers, the best practice is to assign a new GS1 GTIN for each new product. Please refer to Section 3 (for packers/repackers)

What is a Global Trade Item Number?

A Global Trade Item Number (GTIN) is a standardised and globally unique way to identify items traded in the supply chain. Where there is a requirement to accurately order, invoice, price or receive your product, the GTIN is the basic enabler. The GTIN provides a common language to support multiple business practices, including traceability.

How is a GTIN assigned to the traded items my company produces?

Where product is sold under a brand name, the brand owner is responsible for assigning the GTIN. If your company is the brand owner, the first step is to approach your local GS1 Member Organisation and apply for a GS1 Company Prefix. The GS1 Company Prefix will be globally unique for each organisation and it will be used to create the GTINs assigned to the organisation's trade

items. Your company then assigns a GTIN to each one of your products and every packaging configuration.

If your company is not the brand owner, then you must use the brand owner's GTIN.

4.9.4 How does my company identify product that must be traced?

The best practice is to identify individual products by their GTIN and the associated production batch / lot.

4.9.5 How does my company identify production batches/lots?

All distributors/traders must assign a batch / lot to products they create. The batch / lot itself can vary from one company to another, depending on the precision desired. For example, a batch / lot can represent a day's production or the product produced from an individual packing line.

It is important to remember that your batch / lot relates to the scope of products that may be implicated in a recall and needs to be considered during assignment.

4.9.6 How does my company uniquely identify logistics units?

For distributors/traders, outbound logistics units are typically pallets or containers. When your company's traceable item is one or more logistics units, the best business practice is to assign a GS1 Serial Shipping Container Code (SSCC) to each Logistic Unit. Each SSCC number that is assigned is unique to the individual Logistic Unit and is based on your company's GS1 Company Prefix number. This ensures global uniqueness.

Over time your company will exhaust its pool of available SSCC numbers. For this reason, it is important that your company manage the re-use of SSCC numbers so as not to conflict with logistics units already in the supply chain. The best practice is to restrict the re-issue of SSCC numbers for a period of no less than one year.

4.9.7 Best Practices for Case and Logistic Unit Labels

Guidelines for Case Labels

When the traceable item is the product, case labels provide a means to identify that product to other trading partners. The label shows the product identification (i.e. the GTIN) and associated batch / lot in an easy-to-read human-readable form and, as best practice, should also be provided using GS1-compliant barcodes. This ensures cases can be identified quickly and accurately at any subsequent point in the supply chain, anywhere in the world. Case barcodes (i.e. symbols) conform to a symbology called GS1-128. Your local GS1 Member Organisation can help your company understand how to produce GS1-128 barcodes and provide guidance on label placement.

GS1 DataBar Expanded/ Expanded Stacked may be an acceptable alternative in certain markets. (for additional information refer to the GS1 General Specifications section 5.5.2.3)

You should note that where your company's case product is sold to consumers in the case (i.e. the case is sold at retail point-of-sale), then a second barcode symbology will have to be used to enable front end and point-of-sale scanning. Please note that if the GTIN is represented in different barcodes then it must remain the same number. Your local GS1 Member Organisation can also provide assistance on using a barcode that can be scanned at point-of-sale. When the traceable item is the Logistic Unit (i.e. each Logistic Unit needs to be uniquely identified and tracked), refer to the guidelines below for Logistic Unit labels.

Figure 4-10 Examples of GS1-128 case labels



(01) 10614141000415 where (01) = AI 01 (GTIN)
 (10) 02228ABC where (10) = Batch / lot

Where can I learn more about creating GS1-compliant barcodes?

See the GS1 General Specifications.

Guidelines for Logistic Unit labels:

When the traceable item is the Logistic Unit, labels provide a means to identify that shipping container to other trading partners. The label shows the Logistic Unit identification (i.e. the SSCC number) in an easy to read (human-readable) form. Additional information may be shown on the pallet label. This is usually determined by customer-specific relationships.

The best practice is to provide pallet information using GS1-compliant barcodes. This ensures pallets can be identified quickly and accurately at any subsequent point in the supply chain, anywhere in the world. Pallet barcodes (i.e. symbols) conform to a symbology called GS1-128. Your local GS1 Member Organisation can help your company understand how to produce GS1-128 barcodes and provide guidance on label placement.

Figure below shows an example of a GS1-128 pallet label uniquely identifying a Logistic Unit.

Figure 4-11 Example of a GS1-128 pallet label



(00) 034531200000002527 where (00) = AI 00 (SSCC)

Where can I learn more about creating GS1-compliant barcodes?

See the GS1 General Specifications.

4.10 What are the Key Data Elements for Distributors/Traders?

4.10.1 What traceability Information does my company need to collect, record and share

To ensure that the traceability link is maintained, the following data must be collected, recorded and shared. The following represents the minimum data required to ensure traceability between your suppliers (i.e. packers/repackers) and your customers.

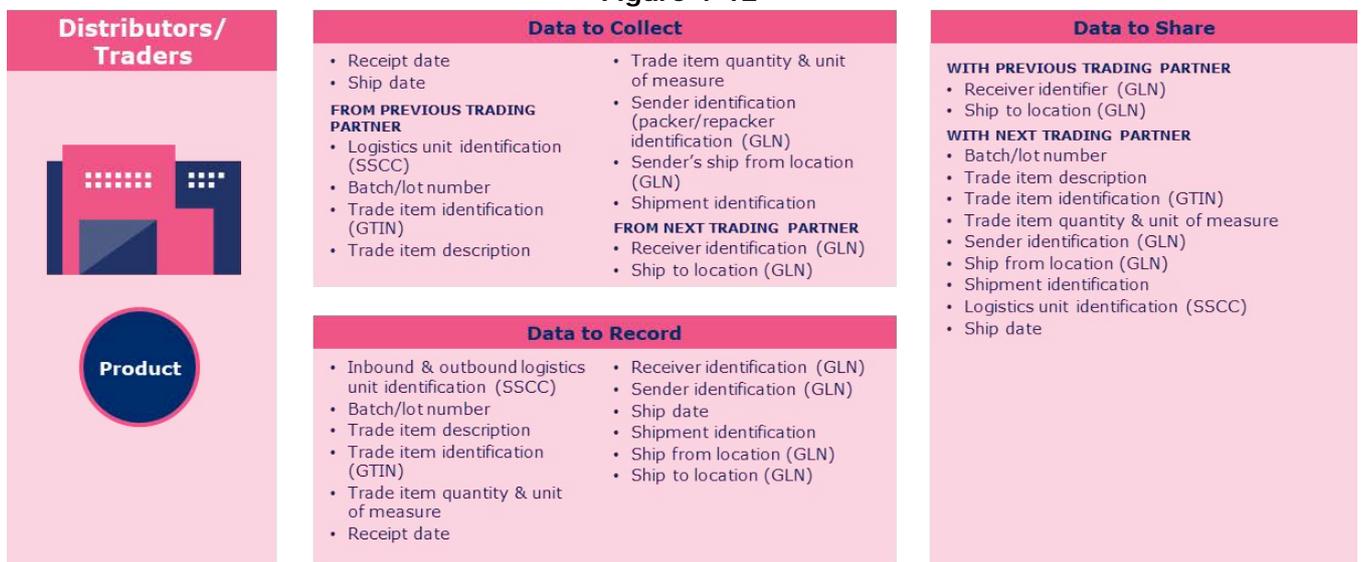
- When the packers/repacker's (inbound) product (package/case) is the traceable item
 - Trade item identification (GTIN)
 - Trade item description
 - Batch / lot
 - Trade item quantity and unit of measure
 - Ship from location identifier (i.e. shipping location)
 - Ship date
 - Sender Identification (GLN)
 - Receipt date
- When the packer/repacker's (inbound) Logistic Unit is the traceable item
 - Logistic Unit identification (SSCC)
 - Ship from location identification (i.e. GLN of shipping location)
 - Receipt date
 - Sender Identification (GLN)
 - Ship date
- When the packer/repackers (inbound) shipment is the traceable item
 - Unique shipment identification (e.g. may be the bill of lading number)
 - Ship from location identification (i.e. GLN of shipping location)
 - Ship to location identification (i.e. GLN of receiving location/trading partner)
 - Ship date
 - Sender Identification (GLN)
 - Receiver Identification (GLN)
 - Receipt date
- When your company's (outbound) product (package/case) is the traceable item
 - Trade item identification (GTIN)
 - Trade item description
 - Batch / lot
 - Trade item quantity and unit of measure
 - Ship from location identification (i.e. GLN of shipping location)
 - Ship to location identification (i.e. GLN of receiving location/trading partner)

- Ship date
- Sender Identification (GLN)
- Receiver Identification (GLN)
- When your company's (outbound) Logistic Unit is the traceable item
 - Logistic Unit identification (SSCC)
 - Ship from location identification (i.e. GLN of a shipping location)
 - Ship to location identification (i.e. GLN of receiving location/trading partner)
 - Ship date
 - Sender Identification (GLN)
 - Receiver Identification (GLN)
- When your company's (outbound) shipment is the traceable item
 - Unique shipment identification (e.g. may be the bill of lading number)
 - Ship from location identification (i.e. GLN of shipping location)
 - Ship to location identification (i.e. GLN of receiving location/trading partner)
 - Ship date
 - Sender Identification (GLN)
 - Receiver Identification (GLN)

The accompanying chart, Data Requirements for Distributors and Traders, further illustrates the minimum data required to maintain traceability.

4.10.2 Data Requirements for Distributors and Traders

Figure 4-12



4.10.3 Other traceability best practices for Distributor/Trader

- Where the brand of the product belongs to another trading partner (e.g. private label of a retailer):
 - Use brand owner's GTIN's for pre-packaged consumer units or loose produce
 - Label product using a GS1 label and symbology that can be used at point-of-sale
 - Ask for GTINs for all case configurations

- Where the brand of the product belongs to your company please refer to the packing section in 3.0
- Link SSCC number with corresponding GTIN, batch / lot and purchase order information to the outbound shipment details. This should include:
 - Ship to Identification (GLN) and location
 - Purchase Order number
 - Ship-From (GLN) Name
 - Ship-From (GLN) Address
 - Quantity
 - Ship Date
 - Expected Delivery Date by Buyer

Data Retention:

All companies are expected to maintain records that will facilitate timely and accurate traceability and support any product recalls.

It is recommended that your company establish your internal data retention policy based on the following considerations:

- Government or market requirements
- How long your product may exist (somewhere) in the supply chain
- The need to retrieve data in the event of an epidemiological trace-back which may, or may not, implicate your product.

4.11 Business scenarios for distributors/traders

4.11.1 Distributor scenario: Distributor receives imported product from a grower/exporter

Who are the trading parties?

The Best Distribution Company is a re-seller of produce that is sourced from growers/exporters.

What needs to be traced?

The Best Distribution Company traces product from suppliers at the Logistic Unit (pallet) level. Best Distribution also traces logistics units on outbound distribution.

When the product arrives at Best Distribution, it is unloaded and verified against the information previously received. The grower/exporter is expected to place a pallet tag with a SSCC on each pallet which is scanned and verified by Best Distribution.

If the grower/exporter does not place pallet tags on the shipment, Best Distribution does so, using a SSCC it assigns. Likewise, if the grower/exporter does not identify a batch / lot for each case, a unique number such as the shipment identification from the grower/shipper documentation is assigned as a batch / lot.

The product is stored pending sale and shipment to a customer. The storage location at the Best Distribution Company can be identified with a GLN and used for put-away and details stored in the WMS.

Once the pallet is ready to ship to a customer, Best Distribution scans and records the outbound pallet SSCC for each pallet on a shipment/order so they can identify exactly what is on the shipment and the product begins its journey to the next stage in the supply chain.

Best Distribution sends an EDI (EANCOM® or GS1 XML) Despatch Advice/Advanced Ship Notice* message to the customer identifying the pallets on the shipment (using SSCC) and the product on each pallet (using GTIN and batch / lot).

*Other electronic messaging standards exist (e.g. X12)

Table 4-5

	Ship Pallet (Exporter)	Receive (Distributor/Trader)	Deplete / Dispose (Distributor/Trader)
Who	Exporter	Distributor/Trader	Distributor/Trader
What	Pallet SSCC	Container ID	Input: GTIN/Lot/Qty, Units = Cases
		Quantity	Output: GTIN/Lot/Qty, Units = Eaches; Inner Trade Item Grouping; Cases
		Units = Cases	
Where	Retailer ID	Retailer ID	Retailer ID
When	Date, Time, Zone	Date, Time, Zone	Date, Time, Zone
Other Fields	Customer Contact Info	Retailer Contact Info	GTIN
	Ship To Address	Retailer Storage Location	GPC Brick Code
			Commodity & Variety
			Size & Grade
			Brand Name
			Trade Item Description
			Packaging Type Code
			Case Dimensions
			Gross & Net Weights

4.11.2 Distributor scenario: Distributor receives and re-distributes produce from packers /other distributors/ traders (including cooperatives, brokers, auctions)

Who are the trading parties?

Always Fresh Produce is a large distributor of fresh fruit and vegetables that markets products under the brand names of major packers and under their own “Always Fresh” brand. Always Fresh performs multiple roles within the supply-chain process and has accountability for the receipt and shipment of products that will include traceability data.

The roles that Always Fresh can play in the supply-chain include:

- The receiver of product from the source of goods which can include a field, packing house, or production facility. Consequently, Always Fresh may perform the role of packer, repacker or distributor/trader.
- The receiver of product from another distributor in the supply-chain. Always Fresh performs the role of distributor/trader.
- A supplier of product to an end customer such as a retail store, restaurant, or other points of consumption.
- A supplier of product to a distribution point that ships the product to a retail store, restaurant, or other points of consumption.

- Receiver of product that is returned or rejected from a supplied entity.

What needs to be traced?

Always Fresh is responsible for the capture, retention and communication of traceability data for the product that is managed. Always Fresh and its trading partners are tracking at the product level.

How do they accomplish this?

The tasks involved with receipt of products include the following:

- At the point of receipt, Always Fresh is responsible for receiving each item ordered with the associated GTIN, batch/lot, quantity received, and date. This information reflects the initial point of control. This data must be captured and stored within a data management system. Always Fresh will expect that the batch / lot information provided by growers can be linked back to the field, packing house, or production of the product.
- If the item received from the source of goods includes multiple batch/lots for the same GTIN, each GTIN and associated batch / lot must be captured and recorded along with the quantity received.
- If the product is received due to a rejection or return, the information for the GTIN, batch/lot, quantity, and receipt date must be captured and recorded. If the product from this scenario is received and destroyed, the information is still captured and recorded.

The tasks involved with the management of product within Always Fresh's facility:

- Following the receipt of products into the facility, Always Fresh will be responsible for the retention of data associated to each GTIN and batch / lot within their facility.
- At the point of picking, it is recommended that Always Fresh captures each GTIN and batch / lot information for the products staged to ship.

The tasks involved with the shipment and transfer of goods from Always Fresh to the receiving entity include:

- At the point of product shipment Always Fresh provides the receiving entity with the GTIN, original batch / lot from source, and quantity for each item shipped.
- This information should be provided in an electronic format EDI (EANCOM® or GS1 XML) Despatch Advice/Advanced Ship Notice* message to support the receiving entities receipt.

*Other electronic messaging standards exist (e.g. X12)

Table 4-6

	Ship Pallet (Grower/Packer/Distributor)	Receive (Distributor)	Deplete / Dispose (Distributor)
Who	Grower/Packer/Distributor	Distributor	Distributor
What	Pallet SSCC	Container ID	Input: GTIN/Lot/Qty, Units = Cases
		Quantity	Output: GTIN/Lot/Qty, Units = Eaches; Inner Trade Item Grouping; Cases
		Units = Cases	
Where	Retailer ID	Retailer ID	Retailer ID
When	Date, Time, Zone	Date, Time, Zone	Date, Time, Zone
Other Fields	Customer Contact Info	Retailer Contact Info	GTIN
	Ship To Address	Retailer Storage Location	GPC Brick Code
			Commodity & Variety

	Ship Pallet (Grower/Packer/Distributor)	Receive (Distributor)	Deplete / Dispose (Distributor)
			Size & Grade
			Brand Name
			Trade Item Description
			Packaging Type Code
			Case Dimensions
			Gross & Net Weights

4.12 Implementation Guideline for Foodservice Operators/Retail Stores

4.12.1 Capturing traceability data

Foodservice operators and retail stores must capture product information from their supplier companies. These products are identified using a GS1 Global Trade Item Number (GTIN). The assignment of GTINs for each product traded (i.e. all product configurations) is the responsibility of the brand owner and must be recorded in the foodservice operator/retailer’s internal systems prior to product being traded. Use of the GS1 GTIN ensures unique product identification across all of a supplier’s product configurations and uniqueness across all sources of supply.

When the trading relationship requires that the inbound product is traceable, this is accomplished by associating each GTIN with its batch / lot. GTIN and batch / lot information is displayed on individual case labels.

Foodservice operators and retail stores may also need to capture information about inbound logistics units, these are typically pallets. Pallets are identified at the time that they are created by the supplier and are individually identified using a GS1 Serial Shipping Container Code (SSCC). This number is assigned by the supplier/shipper and appears on individual Logistic Unit labels. The pallet label provides other important information that must be collected and recorded.

Foodservice operators and retail stores may also need to capture information about outbound shipments to stores, these are typically cases. Cases are identified at the time that they are created by the supplier and are individually identified using GTIN and batch / lot. This number is assigned by the supplier/shipper or the retailer/foodservice operator and appears on individual case labels. The case label provides a reference that can be traced to the original source. Each order that is shipped to a store should have the linkage between the order, GTIN, batch / lot, and quantity shipped. The retailer/foodservice operator may also create new logistics units and this information must be captured as well.

To enable traceability, foodservice operators/retail stores must also maintain records of other product inputs (e.g. packaging material) for their own use. This information is equally critical to your company’s body of internal traceability information.

4.12.2 How is my company identified uniquely?

The best business practice is to assign a GS1 Global Location Number (GLN) to your company and then share that number with the source of supply. Like the GTIN, a GLN ensures global uniqueness. GLN’s can be allocated either by a GS1 Member Organisation or by your company using your GS1 Company Prefix.

Individual GLN’s can be assigned to represent your company as well as any individual trading subsidiaries. GLN’s can also be used to identify important storage, shipping or receiving locations in your company.

Additional information about GLN assignment appears in Appendix A.

4.12.3 How does my company identify products in the supply chain?

The best practice is to use the GS1 Global Trade Item Number (GTIN) to identify each traded item.

What is a Global Trade Item Number?

A Global Trade Item Number (GTIN) is a standardised and globally unique way to identify items traded in the supply chain. Where there is a requirement to accurately order, invoice, price or receive your product then the GTIN is the basic enabler. The GTIN provides a common language to support multiple business practices, including traceability.

How is a GTIN assigned to the traded items my company produces?

Where product is sold under a brand name, the brand owner is responsible for assigning the GTIN. If your company is the brand owner, the first step is to approach your local GS1 Member Organisation and apply for a GS1 Company Prefix. The GS1 Company Prefix will be globally unique for each organisation and it will be used to create the GTINs assigned to the organisation's trade items. Your company then assigns a GTIN to each one of your products and every packaging configuration. Your company is responsible for communicating GTIN's to your packers.

If your company is not the brand owner, then you must use the brand owner's GTIN.

Where brand is owned by your supplier, the supplier is responsible for assigning GTINs to each configuration of the traded item.

4.12.4 How does my company identify produce that must be traced?

The best practice is to identify individual products by their GTIN and associated production batch / lot. The batch / lot is determined by the trading party that created the individual trade item.

4.12.5 How do my trading partners uniquely identify logistics units?

For foodservice operators and retail stores, inbound logistics units are typically pallets or containers. Where there is a need to trace at the Logistic Unit level, the best business practice is to use the GS1 Serial Shipping Container Code (SSCC) that your source of supply assigned to each Logistic Unit. Each SSCC number is unique to the individual Logistic Unit and is based on your supplier's GS1 Prefix number. This ensures global uniqueness.

4.12.6 Best practices for case and logistic unit labels

Guidelines for Case Labels:

When the traceable item is the inbound product, case labels provide a means to identify that product. The label shows the product identification (i.e. the GTIN) and associated batch / lot in an easy to read (human-readable) form and, as a best practice, should also be provided using GS1-compliant barcodes. This ensures cases can be identified quickly and accurately throughout the supply chain, anywhere in the world. Case barcodes (i.e. symbols) conform to a symbology called GS1-128. Your local GS1 Member Organisation can help your company understand how to scan GS1-128 barcodes.

Where the product is both a general distribution and retail unit, please ensure a POS capable barcode is used. Your local GS1 Member Organisation can also provide assistance on scanning a barcode that can be scanned at point-of-sale.

When the inbound traceable item is the Logistic Unit (i.e. each Logistic Unit needs to be uniquely identified and tracked), refer to the guidelines below for Logistic Unit labels.

Figure 4-13 Examples of GS1-128 case labels



(01) 10614141000415 where (01) = AI 01 (GTIN)
 (10) 02228ABC where (10) = Batch / lot

Where can I learn more about creating GS1-compliant barcodes?

See the GS1 General Specifications.

Guidelines for Logistic Unit labels:

When the inbound traceable item is the Logistic Unit, labels provide a means to identify that shipping container. The label shows the Logistic Unit identification (i.e. the SSCC number) in an easy to read (human-readable) form. Additional information may be shown on the pallet label. This is usually determined through your company’s relationship with your suppliers.

The best practice is to provide pallet information using GS1-compliant barcodes. This ensures pallets can be identified quickly and accurately throughout the supply chain, anywhere in the world. Pallet barcodes (i.e. symbols) conform to a symbology called GS1-128. Your local GS1 Member Organisation can help your company understand how to scan GS1-128 barcodes.

Figure below shows an example of a GS1-128 pallet label uniquely identifying a Logistic Unit.

Figure 4-14 Examples of GS1-128 case labels



(00) 03453120000002527 where (00) = AI 00 (SSCC)

Where can I learn more about creating GS1-compliant barcodes?

See the GS1 General Specifications.

4.13 What are the Key Data Elements for Foodservice Operators/Retail Stores?

4.13.1 What traceability Information does my company need to collect and record

To ensure that the traceability link is maintained, the following data must be collected and recorded. The following represents the minimum data required to ensure traceability with your source of supply.

- When the supplier's product (package/case) is the traceable item:
 - Trade item identification (GTIN)
 - Trade item description
 - Batch / lot
 - Trade item quantity and unit of measure
 - Ship from location identification (i.e. GLN of shipping location)
 - Ship date
 - Receipt date
 - Sender Identification (GLN)
- When the supplier's Logistic Unit is the traceable item
 - Logistic Unit identification (SSCC)
 - Ship from location identification (i.e. GLN of shipping location)
 - Ship date
 - Receipt date
- Sender Identification (GLN) When the supplier's shipment is the traceable item
 - Unique shipment identification (e.g. may be the bill of lading number)
 - Ship from location identification (i.e. GLN of shipping location)
 - Ship date
 - Sender Identification (GLN)
 - Receipt date

The accompanying chart, Data Requirements for Foodservice Operators and Retailers, further illustrates the minimum data required to maintain traceability.

4.13.2 Data Requirements for Foodservice Operators and Retailers

Figure 4-15

Foodservice Operators/ Retailers	Data to Collect	Data to Record
	<ul style="list-style-type: none"> • Receipt date FROM PREVIOUS TRADING PARTNER • Batch/lot number • Trade item identification (GTIN) • Trade item description • Trade item quantity & unit of measure • Sender identification (GLN) • Sender's ship from location (GLN) • Shipment identification • Ship date • Logistic units identification (SSCC) 	<ul style="list-style-type: none"> • Logistics units identification (SSCC) • Batch/lot number • Trade item description • Trade item identification (GTIN) • Trade item quantity & unit of measure • Receipt date • Sender identification (GLN) • Ship from location (GLN) • Shipment identification

4.13.3 Other traceability Best Practices for Foodservice Operators and Retail Stores

1. Scan case barcode for each case received
2. Store GTIN and corresponding batch / lot
3. Receive EDI (EANCOM® or GS1 XML) Despatch Advice/Advanced Ship Notice* in order to understand the supplier's shipment in advance of reception. Supplier will:
 - a. Identify each case product using the Product Identification (GTIN) and batch / lot
 - b. Relate each individual case to a Logistic Unit
 - c. Identify each Logistic Unit with a (serialised) SSCC number
 - d. Identify the shipment, including:
 - i. Unique shipment identification (e.g. bill of lading number)
 - ii. Supplier's ship from location
 - iii. Buyer's receiving location

*Other electronic messaging standards exist (e.g. X12)

Data Retention:

All companies are expected to maintain records that will facilitate timely and accurate traceability and support any product recalls.

It is recommended that your company establish your internal data retention policy based on the following considerations:

- Government or market requirements
- How long your product may exist (somewhere) in the supply chain
- The need to retrieve data in the event of an epidemiological trace-back which may, or may not, implicate your product.

4.14 Business scenarios for foodservice operator /retail stores

4.14.1 Foodservice Scenario: Foodservice operator receives product direct-to-store

Who are the trading parties?

Home Town Restaurants is a small regional restaurant operator. Home Town does not operate a central receiving facility and requires that all suppliers deliver direct to each of Home Town's restaurant locations.

Always Fresh Produce is a large distributor of fresh fruit and vegetables that markets produce under the brand names of major packers and under their own "Always Fresh" brand.

What needs to be traced?

Home Town Restaurants issues a purchase order to Always Fresh on a weekly basis who, in turn deliver to each restaurant location within 24-48 hours.

Always Fresh traces the outbound movement of product and the logistics units used to ship them.

How do they accomplish this?

- Home Town communicates an electronic purchase order message (i.e. using EANCOM® or GS1 XML) ORDERS/Purchase Order* to identify the product (GTIN) and quantity required as well as the restaurant distribution.

*Other electronic messaging standards exist (e.g. X12)

- Always Fresh processes the order and builds a single shipment with multiple delivery (drop) locations. Product is aggregated and palletized by delivery location.
- Where product is sold under a packer's own brand, Always Fresh records the outbound movement of the packer's GTIN. Each product case displays the GTIN and batch / lot in barcoded form.
- At the time of picking, each product (case) GTIN is scanned (i.e. both the GTIN and batch / lot) and later associated with a specific customer delivery location.
- A pallet will be built for each Home Town delivery location. Each pallet is designated a unique GS1 SSCC number.
- A pallet label is attached to each outbound pallet showing the SSCC number as well as:
 - Shipper information (Company identification, ship from location, GLN of sender)
 - Consignee information (Company identification, ship to location, GLN of receiver)
- All pallet information is linked to a master shipment record, using the bill of lading number as the master shipment identification.
- Always Fresh transmits an electronic packing slip transaction (i.e. using the EANCOM or GS1 XML Despatch Advice/Advanced Ship Notice message*). This document defines the contents of the shipment destined for each of Home Town's restaurant locations. This enables Home Town to reconcile the inbound shipment to outstanding purchase orders and to record all inbound GTINs and their batch / lot.

*Other electronic messaging standards exist (e.g. X12)

- As each pallet is delivered to its Home Town store location, the pallet SSCC number is scanned. This enables Home Town to automatically confirm delivery and to update store inventory records.
- In the event of a product recall, Home Town's automated records are able to verify which product batches were delivered to any of their restaurant locations.
- For depletion (and disposing) it is important to automatically capture (scan) the GTIN and batch/lot information in order to accurately track and trace both movement and recall scenarios.

Table 4-7

	Ship Pallet (Grower/Packer/Distributor)	Receive (Retailer/Foodservice)	Deplete / Dispose (Retailer/Foodservice)
Who	Grower/Packer/Distributor	Retailer/Foodservice	Retailer/Foodservice
What	Pallet SCCC	Container ID	Input: GTIN/Lot/Qty, Units = Cases
		Quantity	Output: GTIN/Lot/Qty, Units = Eaches; Inner Trade Item Grouping; Cases
		Units = Cases	
Where	Retailer ID	Retailer ID	Retailer ID
When	Date, Time, Zone	Date, Time, Zone	Date, Time, Zone
Other Fields	Customer Contact Info	Retailer Contact Info	GTIN
	Ship To Address	Retailer Storage Location	GPC Brick Code
			Commodity & Variety
			Size & Grade
			Brand Name
			Trade Item Description
			Packaging Type Code
			Case Dimensions
			Gross & Net Weights

4.14.2 Foodservice Scenario: Foodservice Operator receives product into a central distribution centre

Who are the trading parties?

The Best Produce Company is a regional vegetable supplier serving a large number of customers from a central warehouse. Best Produce’s brands have a reputation for product freshness and the Best Produce Company is recognised for operational efficiency. This efficiency has come in part through investment in automated systems and the ability to exchange electronic (EDI) messages with key customers.

Fine Foods is a mid-sized grocery retailer operating a chain of 25 full-line stores. All fruits and vegetables are received centrally through Fine Food’s single Distribution Centre.

What needs to be traced?

To ensure traceability between Best Produce and Fine Foods, both companies record the movement of products (GTIN and batch/lot) and logistics units. The efficiency of the order-to-cash process used by both trading partners greatly simplifies the task of traceability.

How do they accomplish this?

Each week, Fine Foods sends an electronic purchase order (EANCOM® or GS1 XML)* to Best Produce specifying its product requirements for the next 7 day period. Each product is identified using Best Produce’s GTINs. Fresh produce shipped to Fine Food’s distribution centre is received, inspected and put away for later re-distribution to their stores. Put-away locations can be identified with GLNs and stored in the WMS.

Upon receiving an order from Fine Foods, it is recorded in Best Produce’s sales system and a shipping order is relayed to the warehouse. As each case of fresh product is picked and staged for shipping, Best Produce updates their shipping records with product information, including GTIN being shipped, the associated batch / lot(s) and quantity. Each case bears a shipping label showing the GTIN and Batch / lot in both barcoded and human-readable formats. This enables each case to be scanned as it is loaded to an outbound pallet. Once the pallet is complete, it is assigned a unique identification number (SSCC) which is printed on a GS1-compliant logistics (pallet) label together with ship-from and ship-to details. The pallet label is then scanned and an electronic record is created linking the product information with the unique logistics units (SSCC) number.

The information captured by Best Produce’s shipping system enables the creation of electronic manifest (EDI EANCOM® or GS1 XML Despatch Advice/Advance Ship Notice*) which can be sent to Fine Foods as soon as the truck is loaded. The Despatch Advice groups shipping data by each (retailer) purchase order number and shows all GTINs being shipped and associated batch / lot shipping quantity and the pallet SSCC number(s) containing that product.

At Fine Foods, the EDI (EANCOM® or GS1 XML)* Despatch Advice/Advance Ship Notice is used for multiple purposes. It assists the scheduling of distribution centre resources, validating ordered merchandise and adjusting in-transit quantities. The Despatch Advice also contains the logistics and product information needed for traceability.

As logistics units are received into fine Food’s distribution centre, each pallet label is scanned to confirm receipt. The pallet identification number (SSCC) is cross-referenced to the in-transit information taken from Best Produce’s Despatch Advice. This provides Fine Foods with an immediate record of GTINs on the pallet and their associated batch / lot. In the event of a product recall, both Best Produce and Fine Foods have records showing all products exchanged (GTIN and batch / lot) and the movement of each impacted Logistic Unit.

*Other electronic messaging standards exist (e.g. X12)

Table 4-8

	Ship Pallet (Grower/Packer/Distributor)	Receive (Retailer/Foodservice)	Deplete / Dispose (Retailer/Foodservice)
Who	Grower/Packer/Distributor	Retailer/Foodservice	Retailer/Foodservice
What	Pallet SSCC	Container ID	Input: GTIN/Lot/Qty, Units = Cases
		Quantity	Output: GTIN/Lot/Qty, Units = Eaches; Inner Trade Item Grouping; Cases
		Units = Cases	
Where	Retailer ID	Retailer ID	Retailer ID
When	Date, Time, Zone	Date, Time, Zone	Date, Time, Zone
Other Fields	Customer Contact Info	Retailer Contact Info	GTIN
	Ship To Address	Retailer Storage Location	GPC Brick Code
			Commodity & Variety
			Size & Grade
			Brand Name
			Trade Item Description
			Packaging Type Code
		Case Dimensions	

	Ship Pallet (Grower/Packer/Distributor)	Receive (Retailer/Foodservice)	Deplete / Dispose (Retailer/Foodservice)
			Gross & Net Weights

5 What are the Critical Tracking Events?

Since the strategic concept of Critical Tracking Events (CTEs) was first offered in 2009, there has been growing consensus of its utility in documenting the path of a product through the supply chain. CTEs are activities in the supply chain that should be documented by the capture of key information for each event in order to accurately trace product movement up or down the supply chain. The Institute of Food Technologists (IFT) report defined CTEs as “those instances where-in product is moved between premises, is transformed, or is determined to be a point where data capture is necessary for effective tracing.” Typically, these events involve a product’s transformation, transportation, or depletion.

To ensure that the chain of traceability is not broken, each trading partner responsible for one of these events should record key information about each event and be prepared to share it with their trading partners or government authorities upon request. The key information to be captured and shared is known as Key Data Elements (KDEs).

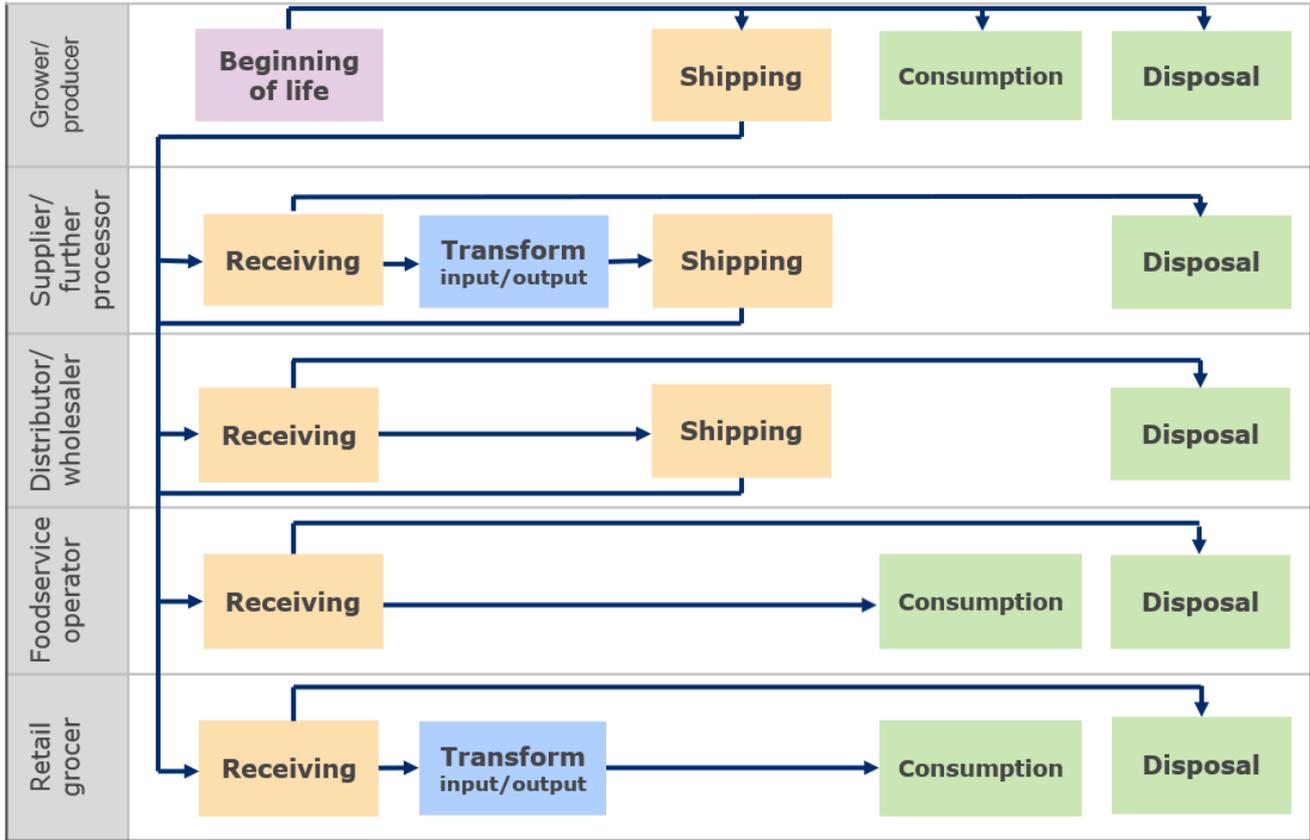
There are six CTEs for parties in the fresh produce supply chain and these events are organised into four event types as follows:

Figure 5-1

CRITICAL TRACKING EVENT DEFINITIONS		
Beginning of life – type event <i>events that typically support the introduction of an item in the supply chain</i>	Beginning of life (B)	An event where a new item is introduced into the supply chain. (e.g. Harvesting a specific batch/lot of apples).
Transformation – type event <i>Events that typically support internal traceability within the four walls of a supply chain company</i>	Transformation (T) Input/Output	An event where one or more materials are used to produce a traceable product that enters the supply chain. Note: materials used to produce products for immediate consumption by consumers are reported as consumption events
Transportation – type event <i>Events that typically support external traceability between supply chain companies</i>	Shipping (S) event	An event where traceable product is dispatched from a defined location to another defined location
	Receiving (R) event	An event where traceable product is received at a defined location from another defined location
Depletion – type event <i>Events that capture how traceable product is removed from the supply chain</i>	Consumption (C) event	An event where a traceable product becomes available to consumers (point of sale or prepared)
	Disposal (D) event	An event where a traceable product is destroyed or discarded or otherwise handled in a manner that the product could no longer be used as a food ingredient or become available to consumers.

The CTEs most commonly managed by a supply chain segment are summarised below. However, when supply chain companies vary from typical roles, such as a supplier that also sells direct to consumers, those companies will need to identify and capture KDEs for these events even though they are non-typical for that segment role.

Figure 5-2



5.1 Beginning of life event

Beginning of life events occur whenever a product is first introduced into the supply chain. This is the first moment where an identifier is associated to an object allowing data to be collected and/or shared.

5.2 Transformation-type event

Transformation events occur whenever a traceable product is transformed either by: 1) changing the nature of the product itself by mixing different sources of product, adding ingredients, cutting, or cooking; and/or 2) by changing the nature of the product packaging, such as when a company places bulk product in consumer-sized bags for consumer self-service.

5.3 Transportation-type events

Transportation events occur whenever a traceable product is physically transferred from one trading partner to another. This product may be used as an ingredient in a later transformation event by the receiving company, or it could be traceable product that is shipped by the receiving company to another trading partner without transformation. In some cases the transportation of a traceable product between two processing or storage facilities of the same company may be documented as a transportation event. Typically, transportation events occur as a Shipping Event followed by a Receiving Event.

5.3.1 Shipping event:

The event where traceable product is dispatched from a defined location to another defined location. Shipping CTEs are typically followed by a subsequent Receiving event. In some cases, a company could determine that shipping and receiving events should be recorded within their own company, such as when a product batch in an interim state is transferred to another production facility to

complete the production process. More typically, this event occurs when a traceable product is sent by truck, rail, or ship from one supply chain company to another supply chain company.

5.3.2 Receiving event:

The event where traceable product is received at a defined location from another defined location. Receiving CTEs typically occur in response an earlier Shipping event. Typically, this event occurs when a traceable product is received at a location after being transported by truck, rail, or ship between any two supply chain companies but could also include receipt at one physical location after shipment from another physical location under the same ownership.

5.4 Depletion-type events

Depletion events occur when the product leaves the supply chain either by consumption events that make the product available to the ultimate consumer or by disposal events that remove the product from the supply chain in a manner that it can no longer be offered to or used by consumers.

5.4.1 Consumption event:

The event where a traceable product becomes available to consumers. Examples of a consumption event are when a case of delicatessen luncheon meat loafs is opened and one or more loafs are placed in a full-service-display service case at a retail grocery store; a consumer-level tray-package of steak is sold to a consumer at a retail grocery store point-of-sale register; or a case of bulk chicken breast product is opened for use in preparing menu items at a foodservice restaurant.

5.4.2 Disposal event:

The event where a traceable product is destroyed or discarded or otherwise handled in a manner that the product can no longer be used as a food ingredient or become available to consumers. An example of a disposal event is when a case of unopened fresh meat product or other traceable product at a foodservice restaurant or grocery retail store reaches its expiration date and is properly discarded.



Note: The financial transfer of ownership over traceable product is not a CTE. It may be the cause of a later CTE such as a shipping event or occur simultaneously with a consumption CTE, but the sale or purchase of traceable product by itself is not a critical traceability event. Even in the case of a Consumption event at a retail point of sale, it is the physical transfer and assumed consumption of the product by the consumer that causes the event to be captured and not the financial transfer of ownership to the consumer.

6 Critical Tracking Events (CTEs) for the Produce Industry

Traceability processes are only as good as the weakest link. Therefore, it is important for growers, suppliers, packers, repackers, wholesalers, distributors, retailers and foodservice operators to understand the value of collecting and maintaining product information that supports, at the very least, “one up/one down” traceability. Critical Tracking Events (CTEs) are records of the completion of a step in the business process in a supply chain, that is critical to record and share, in order to ensure end-to-end traceability. Critical Tracking Events provide a precise and granular view of the physical events, including the final sale to the end consumer. It goes beyond the recording of commercial transactions between trading partners.

The figures below illustrate examples of the Critical Tracking Events that have been defined for the produce supply chain.

6.1 Harvest (picking)

Tomatoes (input) are harvested in the field into bushels, then loaded into “packaging materials” (input). Packed tomatoes are the output. These tomatoes are loose in the bushels; they are not

packed in the field in the form of a finished good. Sometimes they are packed into sacks or bins instead of bushels.

Figure 6-1



Table 6-1

	Key Data Element Name	EPCIS Translation	Example Value
Type	-	EPCIS Event Type	Object
When	Date/Time	Event Time	2017-05-22T13:15:00+06:00
		Record Time	2017-05-22T16:15:00+06:00
What	GTIN		9504000219109*
	Batch/Lot	GTIN + Lot (LGTIN)	B20171202-1
	Serial #	GTIN + Serial # (SGTIN)	-
	Quantity	QTY	200
	Unit of Measure	UOM	Bushel
Where	-	Read Point	9504000219901.PL-A023
	-	Biz Location	9504000219000
Why	-	Biz Step	Commissioning
	-	Disposition	Active
	Business Transaction	Biz Transaction Type	ProdOrder
	Activity ID	Biz Transaction ID	WO234
	-	ILMD (mda:)	harvestdate 2017-05-22

*This GTIN is the individual tomato

6.2 Harvest (packing materials)

Packaging materials have been previously created for use. This input step identifies the packaging materials to be used in this transformation step.

Figure 6-2



Table 6-2

	Key Data Element Name	EPCIS Translation	Example Value
Type	-	EPCIS Event Type	Object
When	Date/Time	Event Time	2017-07-14T23:20:00+01:00
		Record Time	2017-07-15T08:20:00+01:00
What	GTIN		9501101530003
	Batch/Lot	GTIN + Lot (LGTIN)	AB-123
	Serial #	GTIN + Serial # (SGTIN)	-
	Quantity	QTY	500
	Unit of Measure	UOM	cases
Where	-	Read Point	9504000219901.PL-A023
	-	Biz Location	9504000219000
Why	-	Biz Step	Commissioning
	-	Disposition	Active
	Business Transaction	Biz Transaction Type	ProdOrder
	Activity ID	Biz Transaction ID	WO234

6.3 Transformation (case pack)

The harvested tomatoes (input) are put into the packaging materials (input) to create the cases of packed tomatoes (output) for shipment to the shed.

Figure 6-3



Table 6-3

	Key Data Element Name	EPCIS Translation	Example Value
Type	-	EPCIS Event Type	Object
When	Date/Time	Event Time	2017-07-14T23:20:00+01:00
		Record Time	2017-07-15T08:20:00+01:00
What Input	GTIN		9504000219109
	Batch/Lot	GTIN + Lot (LGTIN)	C20171202-1
	Serial #	GTIN + Serial # (SGTIN)	-
	Quantity	QTY	500
	Unit of Measure	UOM	cases
What Input	GTIN		9504000219109
	Batch/Lot	GTIN + Lot (LGTIN)	B20171202-1
	Serial #	GTIN + Serial # (SGTIN)	-
	Quantity	QTY	500
	Unit of Measure	UOM	cases
What Output	GTIN		9501101530003
	Batch/Lot	GTIN + Lot (LGTIN)	AB-123
	Serial #	GTIN + Serial # (SGTIN)	-
	Quantity	QTY	500
	Unit of Measure	UOM	cases
Where	-	Read Point	9501101530911
	-	Biz Location	9501101530911
Why	-	Biz Step	Commissioning
	-	Disposition	Active
	Business Transaction	Biz Transaction Type	ProdOrder
	Activity ID	Biz Transaction ID	WO234
	-	ILMD(mda:)	productiondate 2017-07-15

6.4 Transport (packed to repacker)

Packed tomatoes are shipped to the re-packers.

Figure 6-4



Table 6-4

	Key Data Element Name	EPCIS Translation	Example Value
Type	-	EPCIS Event Type	Object
When	Date/Time	Event Time	2017-05-22T13:15:00+06:00
		Record Time	2017-05-22T13:15:00+09:00
What	SSCC	SSCC	395011015300022000
	GTIN		9504000219109
	Batch/Lot	GTIN + Lot (LGTIN)	AB-123
	Serial #	GTIN + Serial # (SGTIN)	-
	Quantity	QTY	20
	Unit of Measure	UOM	CASES
Where	-	Read Point	9501101530928.PL-A023
	-	Biz Location	9501101530928
Why	-	Biz Step	Shipping
	-	Disposition	In Transit
	Business Transaction	Biz Transaction Type	DesAdv
	Activity ID	Biz Transaction ID	ASN123
	-	Sources	9501101530911
	-	Destination	9501101530928

6.5 Transport (tomatoes received at repacker)

Packed tomatoes received at Repacker.

Figure 6-5



Table 6-5

	Key Data Element Name	EPCIS Translation	Example Value
Type	-	EPCIS Event Type	Object
When	Date/Time	Event Time	2017-05-22T13:15:00+06:00
		Record Time	2017-05-22T13:15:00+09:00
What	SSCC	SSCC	395011015300022000
	GTIN		9504000219109
	Batch/Lot	GTIN + Lot (LGTIN)	AB-123
	Serial #	GTIN + Serial # (SGTIN)	-
	Quantity	QTY	20
	Unit of Measure	UOM	CASES
Where	-	Read Point	9501101530928.ST5
	-	Biz Location	9501101530928
Why	-	Biz Step	Shipping
	-	Disposition	In Transit
	Business Transaction	Biz Transaction Type	RecAdv
	Activity ID	Biz Transaction ID	RA123
	-	Sources	9501101530911
	-	Destination	9501101530928

6.6 Create Finished Goods

Finished goods are created (flat of tomatoes) for transport to final point of sale.

Figure 6-6



Table 6-6

	Key Data Element Name	EPCIS Translation	Example Value
Type	-	EPCIS Event Type	Object
When	Date/Time	Event Time	2017-07-14T23:20:00+01:00
		Record Time	2017-07-15T08:20:00+01:00
What Input	GTIN		9504000219109
	Batch/Lot	GTIN + Lot (LGTIN)	C20171202-1
	Serial #	GTIN + Serial # (SGTIN)	-
	Quantity	QTY	20
	Unit of Measure	UOM	
What Output	GTIN		9501101530003
	Batch/Lot	GTIN + Lot (LGTIN)	AB-123
	Serial #	GTIN + Serial # (SGTIN)	-
	Quantity	QTY	15
	Unit of Measure	UOM	Tray
Where	-	Read Point	9504000357001
	-	Biz Location	9504000357001
Why	-	Biz Step	Commissioning
	-	Disposition	Active
	Business Transaction	Biz Transaction Type	ProdOrder
	Activity ID	Biz Transaction ID	WO234

6.7 Ship Finished Goods

Finished goods are shipped to final point of sale.

Figure 6-7



Table 6-7

	Key Data Element Name	EPCIS Translation	Example Value
Type	-	EPCIS Event Type	Object
When	Date/Time	Event Time	2017-05-22T13:15:00+06:00
		Record Time	2017-05-22T13:15:00+09:00
What	SSCC	SSCC	095040001234567000
	GTIN		9504000219109
	Batch/Lot	GTIN + Lot (LGTIN)	AB-123
	Serial #	GTIN + Serial # (SGTIN)	-
	Quantity	QTY	20
	Unit of Measure	UOM	CASES
Where	-	Read Point	9501101530928.PL-A023
	-	Biz Location	9501101530928
Why	-	Biz Step	Shipping
	-	Disposition	In Transit
	Business Transaction	Biz Transaction Type	DesAdv
	Activity ID	Biz Transaction ID	ASN789
	-	Sources	9501101530911
	-	Destination	9504000357001

6.8 Receive Finished Goods

Finished goods are received at final point of sale.

Figure 6-8



Table 6-8

Key Data Element			
	Name	EPCIS Translation	Example Value
Type	-	EPCIS Event Type	Object
When	Date/Time	Event Time	2017-05-22T13:15:00+06:00
		Record Time	2017-05-22T13:15:00+09:00
What	SSCC	SSCC	395011015300022000
	GTIN		9504000219109
	Batch/Lot	GTIN + Lot (LGTIN)	AB-123
	Serial #	GTIN + Serial # (SGTIN)	-
	Quantity	QTY	10
	Unit of Measure	UOM	CASES
Where	-	Read Point	9504000357001
	-	Biz Location	9504000357001
Why	-	Biz Step	Shipping
	-	Disposition	In Transit
	Business Transaction	Biz Transaction Type	RecAdv
	Activity ID	Biz Transaction ID	RA789
	-	Sources	9501101530911
	-	Destination	9501101530928

6.9 Finished Goods Sold at Point of Sale or Consumption

Finished goods (flat of tomatoes) are sold at point of sale.

Figure 6-9



Table 6-9

	Key Data Element Name	EPCIS Translation	Example Value
Type	-	EPCIS Event Type	Object
When	Date/Time	Event Time	2017-05-22T13:15:00+06:00
		Record Time	2017-05-22T13:15:00+09:00
What	GTIN		9504000357662
	Batch/Lot	GTIN + Lot (LGTIN)	2018040G11440
	Serial #	GTIN + Serial # (SGTIN)	-
	Quantity	QTY	8
	Unit of Measure	UOM	
Where	-	Read Point	9504000357001
	-	Biz Location	9504000357001
Why	-	Biz Step	Retail Selling
	-	Disposition	Retail Sold
	Business Transaction	Biz Transaction Type	Receipt Transaction
	Activity ID	Biz Transaction ID	POS 123

6.10 Destroy Unsaleable Finished Goods

Unsaleable finished goods are destroyed.

Figure 6-10



Table 6-10

	Key Data Element Name	EPCIS Translation	Example Value
Type	-	EPCIS Event Type	Object
When	Date/Time	Event Time	2017-05-22T13:15:00+06:00
		Record Time	2017-05-22T13:15:00+09:00
What	GTIN		9504000357662
	Batch/Lot	GTIN + Lot (LGTIN)	2018040G11440
	Serial #	GTIN + Serial # (SGTIN)	-
	Quantity	QTY	2
	Unit of Measure	UOM	
Where	-	Read Point	9504000357001
	-	Biz Location	9504000357001
Why	-	Biz Step	Destroying
	-	Disposition	Destroyed
	Business Transaction	Biz Transaction Type	Work Order
	Activity ID	Biz Transaction ID	WO456

7 What are the Key Data Elements (KDEs) for the Produce Industry?

The following subsections provide more details about the Key Data Elements (KDEs) that will need to be recorded for each Critical Tracking Event (CTE).

7.1 Key data elements (KDE)

This guideline supports three main methods for sharing of key data elements: 1. Case labels, 2. EDI, 3. EPCIS. The methods do not exclude each other, and different methods may be used in combination.

Further downstream it is expected that EDI or EPCIS will be used, and that the information on the label will serve as back-up information. However, once sold to the final customer, the label again becomes the main source of information.

EDI is especially suitable for the one-to-one exchange of transaction data between trading partners, such as order, despatch advice (Advanced Ship Notice) and invoice (order-2-cash). Traceability data can be included in such messages but will need to be carried over between parties (from upstream to downstream).

EPCIS has been designed to records and share records of observed physical events between authorised parties. EPCIS enables direct access across parties to traceability data via a query interface, and so eliminates the need to "carry over" data from party to party. Different choreographies (distributed, centralised) and discovery and access control mechanisms can be applied. See [GTS2] *Section 4.3.3 Data discovery, trust and access control*.

7.2 GLN master data and GTIN master data

When it comes to GLN and GTIN master data this guideline supports the following data exchange methods:

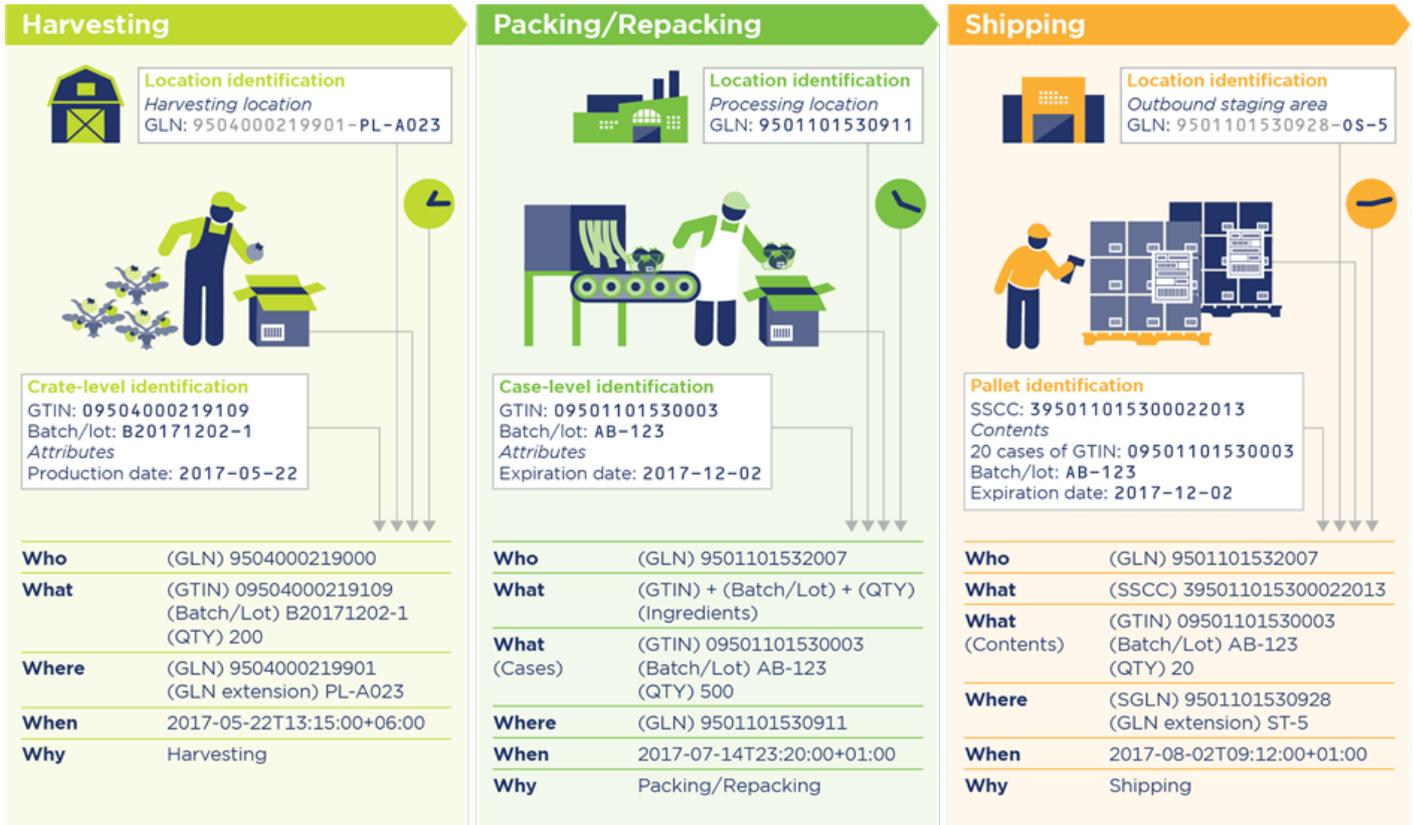
- GDSN (for GTIN master data)
- GLN Service (for GLN master data)
- EDI (for GTIN and GLN master data)
- EPCIS (for GTIN and GLN master data)
- AIDC (for some critical GTIN master data elements that need to be exchanged upstream).

7.3 Traceability data collection in business process steps

Figures 7-1 and figure 7-2 illustrate some of the business process steps that will occur at various points in the supply chain. Each step will lead to one or more critical tracking event (CTEs) for which key data elements (KDEs) need to be recorded.

Figure 7-1 Traceability data collection in business process steps (1)

Figure 7-1



Harvesting: The producer harvests the crop and packs the products into in cases. Each of the cases gets a label with GTIN + batch/lot ID, and the related data are recorded.

Packing/Repacking: The packer/repacker transforms ungraded commodities into products. After that, the packer/repacker packs the products into cases.

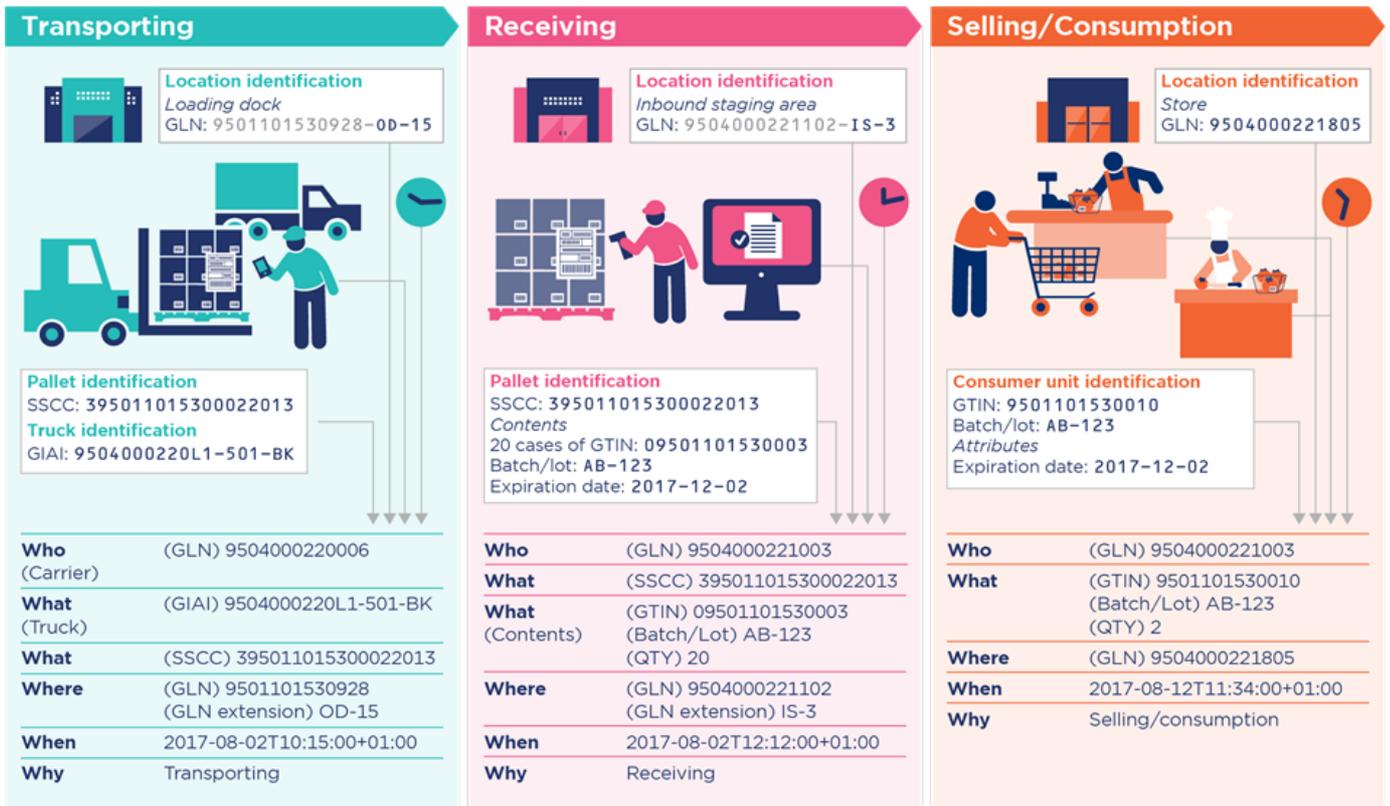
To maintain traceability the inputs and outputs of the process are recorded on batch/lot level.

Shipping: The packer/repacker palletizes the cases of product. To maintain traceability the warehouse records the links between product IDs (GTIN + batch/lot ID) and pallet IDs (SSCC).

Subsequently, the pallets are moved to the outbound staging area to be collected by the carrier.

Figure 7-2 Traceability data collection in business process steps (2)

Figure 7-2



Transporting: The carrier arrives and loads the pallets onto the truck. The driver uses his mobile device to identify each of the pallets. The link between the pallets and the truck is recorded. Now, by tracking the truck also the pallets and goods can be tracked.

Receiving: The pallets arrive in the retailer or foodservice operator’s distribution centre.

The incoming goods department inspects the received goods by scanning the SSCCs on the pallet label and comparing the data against the pre-registered information in the system.

When all checks are ok, the goods will be marked as available in the inventory management system.

Selling or Consumption: The products have arrived at the retail store and have been placed on the shelves.

A consumer has decided to buy two products. At the checkout, the clerk scans the barcode on the products. The system automatically checks the expiry date.

The sales are recorded, in addition to the GTIN also the batch/lot ID is registered.

In foodservice, orders are placed by and shipped to Foodservice operators, the incoming goods department inspects the received goods by scanning the SSCCs on the pallet label or the GTINs on the individual cases and comparing the data against the waybill/invoice.

When all checks are ok, the goods will be marked as available in the inventory management system. Then it can be used (i.e. depleted).

8 Additional internal data to support traceability

This section does not identify what data must be shared but rather what data could be collected to assist in traceability.

8.1 Seed

Below are some of the events where data collection should be performed which impact seed and seedlings.



Note: The collection of this information is recommended but not required to enable traceability.

8.1.1 How can this be acquired/shared?

Seed/Seedlings				
	Business rationale	KDE	EDI	Data Source
Purchase	Documentation of orders placed for possible recall issues	Supplier (GLN)	Purchase Order	
		PO #		
		Invoice #		
		GTIN		GDSN
		Quantity		
		Date		
Reception	First contact with GTIN + supplemental information (Batch/lot) as well as a record of the transport company used in case or recall from source of recall from transport contamination	Transporter (GLN)	Despatch Advice	
		Invoice #		
		PO #		
		Reception Date		
		Receiver (GLN)		
		SSCC		
		GTIN		GDSN
		Quantity		
		Batch/Lot (or Serial #)		GS1-128
Storage	Accurate inventory control (in & out)	GTIN		GDSN
		Quantity		
		Batch/Lot (or Serial #)		GS1-128
		Location (GLN)		
		Date		
Planting	documentation of where items were planted/applied.	GTIN		GDSN
		Quantity		
		Batch/Lot (or Serial #)		GS1-128
		Location (GLN)		
		Date		

8.1.2 Seed/seedling Purchase

Purchase	
what	GTIN + batch/lot ID + quantity <u>OR</u> GTIN + serial ID
when	order date and time
where	GLN of grower
why	Initial traceability pre reception

8.1.3 Seed/seedling reception

Reception	
what	GTIN + batch/lot ID + quantity <u>OR</u> GTIN + serial ID
when	reception date and time
where	GLN of grower
why	Initial traceability reception into inventory

8.1.4 Seed/seedling storage

Storage	
what	GTIN + batch/lot ID + quantity <u>OR</u> GTIN + serial ID
when	storage date and time
where	GLN of seed sub-location
why	efficient stock rotation

8.1.5 Seed/seedling Planting

Planting	
what	GTIN + batch/lot ID + quantity <u>OR</u> GTIN + serial ID
when	application date and time
where	GLN of field/location of use
why	Crop traceability

8.2 Fertilizer

Below are some of the processes where data collection should be performed which impact fertilizer.



Note: The collection of this information is recommended but not required to enable traceability.

8.2.1 How can this be acquired/shared?

Fertilizer				
	Business rational	KDE	EDI	Data Source
Purchase	Documentation of orders placed for possible recall issues	Supplier (GLN)	Purchase Order	
		PO #		
		Invoice #		
		GTIN		GDSN

Fertilizer				
		Quantity		
		Date		
Reception	First contact with GTIN + supplemental information (Batch/lot) as well as a record of the transport company used in case or recall from source of recall from transport contamination	Transporter (GLN)	Despatch Advice	
		Invoice #		
		PO #		
		Reception Date		
		Receiver (GLN)		
		SSCC		
		GTIN		GDSN
		Quantity		
		Lot/Batch		GS1-128
Storage	Accurate inventory control (in & out)	GTIN		GDSN
		Quantity		
		Lot/Batch		GS1-128
		Location (GLN)		
		Date		
Application	documentation of where items were applied.	GTIN		GDSN
		Quantity		
		Lot/Batch		GS1-128
		Location (GLN)		
		Date		

8.2.2 Fertilizer Purchase

Purchase	
what	GTIN + batch/lot ID + quantity <u>OR</u> GTIN + serial ID
when	order date and time
where	GLN of grower
why	Initial traceability pre reception

8.2.3 Fertilizer reception

Reception	
what	GTIN + batch/lot ID + quantity <u>OR</u> GTIN + serial ID
when	reception date and time
where	GLN of grower
why	Initial traceability reception into inventory

8.2.4 Fertilizer storage

Storage	
what	GTIN + batch/lot ID + quantity <u>OR</u> GTIN + serial ID
when	storage date and time

Storage	
where	GLN of fertilizer sub-location
why	efficient stock rotation

8.2.5 Fertilizer Application

Application	
what	GTIN + batch/lot ID + quantity <u>OR</u> GTIN + serial ID
when	application date and time
where	GLN of field/location of use
why	Traceability

8.3 Crop protection & Phytosanitary

Below are some of the events where data collection should be performed which impact crop protection and phytosanitary treatments.



Note: The collection of this information is recommended but not required to enable traceability.

8.3.1 How can this be acquired/shared?

Crop Protection & Phytosanitary				
	Business rationale	KDE	EDI	Data Source
Purchase	Documentation of orders placed for possible recall issues	Supplier (GLN)	Purchase Order	
		PO #		
		Invoice #		
		GTIN		GDSN
		Quantity		
		Date		
Reception	First contact with GTIN + supplemental information (Batch/lot) as well as a record of the transport company used in case or recall from source of recall from transport contamination	Transporter (GLN)	Despatch Advice	
		Invoice #		
		PO #		
		Reception Date		
		Receiver (GLN)		
		SSCC		
		GTIN		GDSN
		Quantity		
		Lot/Batch		GS1-128
Storage	Accurate inventory control (in & out)	GTIN		GDSN
		Quantity		
		Lot/Batch		GS1-128
		Location (GLN)		

Crop Protection & Phytosanitary				
		Date		
Application	documentation of where items were applied.	GTIN		GDSN
		Quantity		
		Lot/Batch		GS1-128
		Location (GLN)		
		Date		

8.3.2 Crop protection & Phytosanitary Purchase

Purchase	
what	GTIN + batch/lot ID + quantity <u>OR</u> GTIN + serial ID
when	order date and time
where	GLN of grower
why	Initial traceability pre reception

8.3.3 Crop protection & Phytosanitary reception

Reception	
what	GTIN + batch/lot ID + quantity <u>OR</u> GTIN + serial ID
when	reception date and time
where	GLN of grower
why	Initial traceability reception into inventory

8.3.4 Crop protection & Phytosanitary storage

Storage	
what	GTIN + batch/lot ID + quantity <u>OR</u> GTIN + serial ID
when	storage date and time
where	GLN of product sub-location
why	efficient stock rotation

8.3.5 Crop protection & Phytosanitary Application

Application	
what	GTIN + batch/lot ID + quantity <u>OR</u> GTIN + serial ID
when	application date and time
where	GLN of field/location of use
why	Traceability

8.4 Irrigation method

Below are some of the events where data collection should be performed which impact irrigation.



Note: The collection of this information is recommended but not required to enable traceability.

8.4.1 How can this be acquired/shared?

Irrigation method				
	Business rational	KDE	EDI	Data Source
Irrigation	Documentation of irrigation method which impacts the growing season	Date		
		irrigation type		
		field location (GLN)		

8.4.2 Irrigation method

Method	
what	Type of irrigation
when	date and time
where	GLN of field/location of use
why	Traceability

8.5 Harvesting

Below are some of the events where data collection should be performed which impact harvesting.

8.5.1 How can this be acquired/shared?

Harvesting				
	Business rational	KDE	EDI	Data Source
Location	documentation of where items were harvested.	GTIN		GDSN
		Quantity		
		Lot/Batch		GS1-128
		Location (GLN)		
		Date		
Materials	First contact with GTIN + supplemental information (Batch/lot) as well as a record of the transport company used in case or recall from source of recall from transport contamination	Invoice #	Purchase Order & Despatch Advice	
		PO #		
		Reception Date		
		Receiver (GLN)		
		SSCC		
		GTIN (or GIAI/GRAI)		GDSN
		Quantity		
		Lot/Batch		GS1-128

8.5.2 Harvesting Location

Location	
what	Harvesting Location
when	date and time

Location	
where	GLN of field/location of use
why	Traceability

8.5.3 Harvesting Materials

 **Note:** Packing materials may be identified with a GTIN for single use, or with a GIAI or GRAI for re-usable packaging

Materials	
what	Harvesting Materials
when	date and time
where	GLN of field/location of use
why	Traceability

8.6 Post-harvest treatment

Below are some of the events where data collection should be performed which impact post harvest treatment.

8.6.1 How can this be acquired/shared?

Post Harvest Treatment				
	Business rational	KDE	EDI	Data Source
Treatment	documentation of where items were applied.	GTIN		GDSN
		Quantity		
		Lot/Batch		GS1-128
		Location (GLN)		
		Date		

8.6.2 Post-Harvest Treatment

Post-Harvest Treatment	
what	Post-Harvest Treatment
when	date and time
where	GLN of field/location of use
why	Traceability

8.7 Packing

Below are some of the events where data collection should be performed which impact packing.

8.7.1 How can this be acquired/shared?

Packing				
	Business rational	KDE	EDI	Data Source
Purchase		Supplier (GLN)	Purchase Order	

Packing				
	Documentation of orders placed for possible recall issues	PO #		
		Invoice #		
		GTIN		GDSN
		Quantity		
		Date		
Reception	First contact with GTIN + supplemental information (Batch/lot) as well as a record of the transport company used in case of recall from source or recall from transport contamination	Transporter (GLN)	Despatch Advice	
		Invoice #		
		PO #		
		Reception Date		
		Receiver (GLN)		
		SSCC		
		GTIN		GDSN
		Quantity		
		Lot/Batch		GS1-128
Storage	Accurate inventory control (in & out)	GTIN		GDSN
		Quantity		
		Lot/Batch		GS1-128
		Location (GLN)		
		Date		
Packaging	documentation of where items were used/applied.	GTIN		GDSN
		Quantity		
		Lot/Batch		GS1-128
		Location (GLN)		
		Date		

8.7.2 Packaging Purchase

Purchase	
what	GTIN + batch/lot ID + quantity <u>OR</u> GTIN + serial ID
when	order date and time
where	GLN of grower
why	Initial traceability pre reception

8.7.3 Packaging reception

Reception	
what	GTIN + batch/lot ID + quantity <u>OR</u> GTIN + serial ID
when	reception date and time
where	GLN of grower
why	Initial traceability reception into inventory

8.7.4 Packaging Storage

Storage	
what	GTIN + batch/lot ID + quantity <u>OR</u> GTIN + serial ID
when	storage date and time
where	GLN of product sub-location
why	efficient stock rotation

8.7.5 Packaging

Packaging	
what	GTIN + batch/lot ID + quantity <u>OR</u> GTIN + serial ID
when	application date and time
where	GLN of field/location of use
why	Traceability

8.8 Shipping

Below are some of the events where data collection should be performed which impact shipping.

8.8.1 How can this be acquired/shared?

Shipping				
	Business rational	KDE	EDI	Data Source
Sale	Documentation of orders received for possible recall issues	Supplier (GLN)	PO Acknowledgement	
		PO #		
		Invoice #		
		GTIN		GDSN
		Quantity		
		Date		
Transport	First contact with GTIN + supplemental information (Batch/lot) as well as a record of the transport company used in case of recall from source or recall from transport contamination	Transporter (GLN)	Shipment & Billing Notice	
		Invoice #		
		PO #		
		Reception Date		
		Shipper (GLN)		
		SSCC		
		GTIN		GDSN
		Quantity		
Lot/Batch	GS1-128			

8.8.2 Sale

Sale	
what	GTIN + batch/lot ID + quantity <u>OR</u> GTIN + serial ID
when	order date and time
where	GLN of seller

Sale	
why	Initial traceability pre reception

8.8.3 Transport

Transport	
what	GTIN + batch/lot ID + quantity <u>OR</u> GTIN + serial ID
when	Transport date and time
where	GLN of seller
why	Initial traceability reception into inventory

8.9 Receiving

Below are some of the events where data collection should be performed which impact receiving.

8.9.1 How can this be acquired/shared?

Receiving				
	Business rationale	KDE	EDI	Data Source
Reception	First contact with GTIN + supplemental information (Batch/lot) as well as a record of the transport company used in case of recall from source or recall from transport contamination	Transporter (GLN)	Despatch Advice	
		Invoice #		
		PO #		
		Reception Date		
		Receiver (GLN)		
		SSCC		
		GTIN		GDSN
		Quantity		
		Lot/Batch		GS1-128
Storage	Accurate inventory control (in & out)	GTIN		GDSN
		Quantity		
		Lot/Batch		GS1-128
		Location (GLN)		
		Date		

8.9.2 Reception

Reception	
what	GTIN + batch/lot ID + quantity <u>OR</u> GTIN + serial ID
when	reception date and time
where	GLN of buyer
why	Initial traceability reception into inventory

8.9.3 Storage

Storage	
what	GTIN + batch/lot ID + quantity <u>OR</u> GTIN + serial ID

Storage	
when	storage date and time
where	GLN of product sub-location
why	efficient stock rotation

8.10 Quality check

Below are some of the events where data collection should be performed which impact quality checking.

8.10.1 How can this be acquired/shared?

Quality Check				
	Business rational	KDE	EDI	Data Source
Quality Check	Sorting touch point which impacts pre and post GTIN & Lot/batch	Seller/grower (GLN)		
		date of reception		
		GTIN		GDSN
		Lot Batch		GS1-128
		Quantity		
		SSCC		
		Location (pre) (GLN)		
		QC date		
		Grade		
		Location (post) (GLN)		

8.10.2 Quality Check

Quality Check	
what	GTIN + batch/lot ID + quantity <u>OR</u> GTIN + serial ID
when	Quality check date and time
where	GLN of repacker/processor sub-location
why	Change of GTIN/lot-batch tracking

8.11 Processing

Below are some of the events where data collection should be performed which impact processing.

8.11.1 How can this be acquired/shared?

Processing				
	Business rational	KDE	EDI	Data Source
Processing	Processing point which impacts pre and post GTIN & Lot/batch	Source GTIN		GDSN
		Source Lot/Batch		GS1-128
		Source Quantity		
		Storage Location (GLN)		
		Date		

Processing				
		Output GTIN		GDSN
		Output Lot/Batch		GS1-128
		Output Quantity		
		Process Location (GLN)		
		Processing Materials GTIN		GDSN
		Final Storage Location (GLN)		

8.11.2 Processing

Processing	
what	GTIN + batch/lot ID + quantity <u>OR</u> GTIN + serial ID
when	Processing date and time
where	GLN of repacker/processor sub-location
why	Change of GTIN/lot-batch tracking

8.12 Packing

Below are some of the events where data collection should be performed which impact packing.

8.12.1 How can this be acquired/shared?

Packing				
	Business rationale	KDE	EDI	Data Source
Purchase	Documentation of orders placed for possible recall issues	Supplier (GLN)	Purchase Order	
		PO #		
		Invoice #		
		GTIN		GDSN
		Quantity		
		Date		
Reception	First contact with GTIN + supplemental information (Batch/lot) as well as a record of the transport company used in case of recall from source or recall from transport contamination	Transporter (GLN)	Despatch Advice	
		Invoice #		
		PO #		
		Reception Date		
		Receiver (GLN)		
		SSCC		
		GTIN		GDSN
		Quantity		
		Lot/Batch		GS1-128
Storage	Accurate inventory control (in & out)	GTIN		GDSN
		Quantity		
		Lot/Batch		GS1-128
		Location (GLN)		
		Date		

Packing				
Packaging	documentation of where items were used/applied.	GTIN (or GIAI/GRAI)		GDSN
		Quantity		
		Lot/Batch		GS1-128
		Location (GLN)		
		Date		

8.12.2 Packaging Purchase

Purchase	
what	GTIN + batch/lot ID + quantity <u>OR</u> GTIN + serial ID
when	order date and time
where	GLN of grower
why	Initial traceability pre reception

8.12.3 Packaging reception

Reception	
what	GTIN + batch/lot ID + quantity <u>OR</u> GTIN + serial ID
when	reception date and time
where	GLN of grower
why	Initial traceability reception into inventory

8.12.4 Packaging Storage

Storage	
what	GTIN + batch/lot ID + quantity <u>OR</u> GTIN + serial ID
when	storage date and time
where	GLN of fertilizer sub-location
why	efficient stock rotation

8.12.5 Packaging

Packaging	
what	GTIN + batch/lot ID + quantity <u>OR</u> GTIN + serial ID OR GIAI/GRAI
when	application date and time
where	GLN of field/location of use
why	Traceability

8.13 Shipping

Below are some of the events where data collection should be performed which impact shipping.

8.13.1 How can this be acquired/shared?

Shipping				
	Business rationale	KDE	EDI	Data Source
Sale	Documentation of orders received for possible recall issues	Supplier (GLN)	PO acknowledgement	
		PO #		
		Invoice #		
		GTIN		GDSN
		Quantity		
		Date		
Transport	First contact with GTIN + supplemental information (Batch/lot) as well as a record of the transport company used in case of recall from source or recall from transport contamination	Transporter (GLN)	Shipment & Billing Notice	
		Invoice #		
		PO #		
		Reception Date		
		Shipper (GLN)		
		SSCC		
		GTIN		GDSN
		Quantity		
		Lot/Batch		GS1-128

8.13.2 Sale

Sale	
what	GTIN + batch/lot ID + quantity <u>OR</u> GTIN + serial ID
when	order date and time
where	GLN of seller
why	Initial traceability pre reception

8.13.3 Transport

Transport	
what	GTIN + batch/lot ID + quantity <u>OR</u> GTIN + serial ID
when	Transport date and time
where	GLN of seller
why	Initial traceability reception into inventory

8.14 Customs entry

Below are some of the events where data collection should be performed which impact customs receiving.

8.14.1 How can this be acquired/shared?

Customs entry				
	Business rationale	KDE	EDI	Data Source

Customs entry				
Reception	First contact with GTIN + supplemental information (Batch/lot) as well as a record of the transport company used in case of recall from source or recall from transport contamination	Transporter (GLN)	Despatch Advice	
		Invoice #		
		PO #		
		Reception Date		
		Receiver (GLN)		
		SSCC		
		GTIN		GDSN
		Quantity		
		Lot/Batch		GS1-128
Storage	Accurate inventory control (in & out)	GTIN		GDSN
		Quantity		
		Lot/Batch		GS1-128
		Location (GLN)		
		Date		

8.14.2 Reception

Reception	
what	GTIN + batch/lot ID + quantity <u>OR</u> GTIN + serial ID
when	reception date and time
where	GLN of buyer
why	Initial traceability reception into inventory

8.14.3 Storage

Storage	
what	GTIN + batch/lot ID + quantity <u>OR</u> GTIN + serial ID
when	storage date and time
where	GLN of Customs facility
why	Regulation

8.15 Customs checking

Below are some of the events where data collection should be performed which impact customs validation.

8.15.1 How can this be acquired/shared?

Customs Check				
	Business rational	KDE	EDI	Data Source
Customs Check	Verification touch point to ensure physical products match the waybill/documentation	Seller/grower (GLN)		
		date of reception		
		GTIN		GDSN
		Lot Batch		GS1-128

		Quantity		
		SSCC		
		Location (pre) (GLN)		
		QC date		
		Grade		
		Location (post) (GLN)		

8.15.2 Customs Check

Customs Check	
what	GTIN + batch/lot ID + quantity <u>OR</u> GTIN + serial ID
when	Quality check date and time
where	GLN of Customs facility
why	Regulation

8.16 Customs freight release

Below are some of the events where data collection should be performed which impact customs release.

8.16.1 How can this be acquired/shared?

Freight Release				
	Business rational	KDE	EDI	Data Source
Transport	GTIN + supplemental information (Batch/lot) as well as a record of the transport company used in case of recall from source or recall from transport contamination	Transporter (GLN)	Shipment & Billing Notice	
		Invoice #		
		PO #		
		Reception Date		
		Receiver (GLN)		
		SSCC		
		GTIN		GDSN
		Quantity		
		Lot/Batch		GS1-128

8.16.2 Freight release

Freight release	
what	GTIN + batch/lot ID + quantity <u>OR</u> GTIN + serial ID
when	Quality check date and time
where	GLN of buyer
why	Regulation

8.17 Receiving

Below are some of the events where data collection should be performed which impact receiving.

8.17.1 How can this be acquired/shared?

Receiving				
	Business rationale	KDE	EDI	Data Source
Reception	GTIN + supplemental information (Batch/lot) as well as a record of the transport company used in case of recall from source or recall from transport contamination	Transporter (GLN)	Despatch Advice	
		Invoice #		
		PO #		
		Reception Date		
		Receiver (GLN)		
		SSCC		
		GTIN		GDSN
		Quantity		
		Lot/Batch		GS1-128
Storage	Accurate inventory control (in & out)	GTIN		GDSN
		Quantity		
		Lot/Batch		GS1-128
		Location (GLN)		
		Date		

8.17.2 Reception

Reception	
what	GTIN + batch/lot ID + quantity <u>OR</u> GTIN + serial ID
when	reception date and time
where	GLN of buyer
why	Initial traceability reception into inventory

8.17.3 Storage

Storage	
what	GTIN + batch/lot ID + quantity <u>OR</u> GTIN + serial ID
when	storage date and time
where	GLN of product sub-location
why	efficient stock rotation

8.18 Shipping

Below are some of the events where data collection should be performed which impact shipping.

8.18.1 How can this be acquired/shared?

Shipping				
	Business rationale	KDE	EDI	Data Source
Sale	Documentation of orders received for possible recall issues	Supplier (GLN)	PO Acknowledgement	
		PO #		
		Invoice #		

Shipping				
		GTIN		GDSN
		Quantity		
		Date		
Transport	First contact with GTIN + supplemental information (Batch/lot) as well as a record of the transport company used in case of recall from source or recall from transport contamination	Transporter (GLN)	Shipment & Billing Notice	
		Invoice #		
		PO #		
		Reception Date		
		Shipper (GLN)		
		SSCC		
		GTIN		GDSN
		Quantity		
		Lot/Batch		GDSN

8.18.2 Sale

Sale	
what	GTIN + batch/lot ID + quantity <u>OR</u> GTIN + serial ID
when	order date and time
where	GLN of seller
why	Initial traceability pre reception

8.18.3 Transport

Transport	
what	GTIN + batch/lot ID + quantity <u>OR</u> GTIN + serial ID
when	Transport date and time
where	GLN of seller
why	Initial traceability reception into inventory

A Glossary

For the purposes of this document the following terms and definitions apply. Please refer to the [GS1 Glossary](#) for the full version.

A.1 Glossary of terms

Term	Definition
Actor	An actor is a role that a user plays with respect to a system.
GS1 Application Identifier	The field of two or more digits at the beginning of an Element String that uniquely defines its format and meaning.
Batch / Lot	The batch or lot number associates an item with information the manufacturer considers relevant for traceability of the trade item. The data may refer to the trade item itself or to items contained in it.
Consumer Unit	The package size of a product or products agreed by trading partners as the size sold at the retail point of sale.
Data Carrier	A means to represent data in a machine readable form; used to enable automatic reading of the Element Strings.
Event	An Event has four dimensions: What: what physical objects were involved (GTIN) When: when the Event took place (timestamp) Where: where the Event took place (Location identifier (GLN)) Why: what business step was being carried out
External Traceability	External Traceability takes place when instances of a Traceable Item are physically handed over from one Traceability partner (Traceable Item source) to another Traceability partner (Traceable Item recipient).
Fresh Food Trade Items	Trade items in the following product categories: fruits, vegetables, meats, seafood, bakery and ready to serve food such as cheese, cold cooked or cured meats, and salad, etc. Fresh foods is defined as food that is not preserved by canning, dehydration, freezing or smoking.
GIAI (Global Individual Asset Identifier)	The GS1 identification key used to identify an individual asset. The key comprises a GS1 Company Prefix and individual asset reference.
GLN (Global Location Number)	The GS1 Identification Key used to identify physical locations or legal entities. The key comprises a GS1 Company Prefix, Location Reference, and Check Digit.
GTIN (Global Trade Item Number)	The GS1 Identification Key used to identify trade items. The key comprises a GS1 Company Prefix, an Item Reference and Check Digit.
Global Returnable Asset Identifier (GRAI)	The GS1 Identification Key used to identify an Individual Asset. The key comprises a GS1 Company Prefix and Individual Asset Reference.
GS1 DataBar Expanded Bar Code	A barcode that encodes any GS1 identification key plus attribute data, such as weight and "best before" date, in a linear symbol that can be scanned omnidirectionally by suitably programmed point-of-sale scanners.
GS1 DataBar Expanded Stacked Bar Code	A barcode that is a variation of the GS1 DataBar expanded barcode that is stacked in multiple rows and is used when the normal symbol would be too wide for the application.
GS1 DataBar Omnidirectional Bar Code	A barcode that encodes a GTIN. It is designed to be read by omnidirectional scanners.
GS1 DataBar Stacked Omnidirectional Bar Code	A barcode that is a variation of the GS1 DataBar symbology that is stacked in two rows and is used when the GS1 DataBar Omnidirectional symbol would be too wide for the application. It is designed to be read by omnidirectional checkout scanners.
GS1 System	The specifications, standards, and guidelines administered by GS1.
Human Readable Interpretation (HRI)	Characters, such as letters and numbers, which can be read by persons and are encoded in GS1 AIDC data carriers confined to a GS1 standard structure and format. The human readable interpretation is a one-to-one illustration of the encoded data. However start, stop, shift and function characters, as well as the symbol check character, are not shown in the human readable interpretation.

Term	Definition
Identification	Refer to GLN and GTIN
Identification Carrier	Mark / tag / label / accompanying document sometimes called "passport" or "identity card" or "Pedigree" in some industry sectors
Internal Process	A series of actions, changes or function(s) within an organisation or an organisation that brings about a result.
Internal Traceability	Internal Traceability takes place when a Traceability partner receives one or several instances of traceable items as inputs that are subjected to internal processes, before one or several instances of traceable items are output.
Link	Recording the information necessary to establish the relationship to other relevant information.
Location	A place where a traceable item is or could be located [ISO/CD 22519]. A place of production, handling, storage and/or sale.
Logistic Unit	An item of any composition established for transport and/or storage that needs to be managed through the supply chain. It is identified with an SSCC.
Loose Produce Trade Items	Fruits and vegetables which are delivered to the store loose, in boxes or cases, and then put into a bag or selected individually by the customer for purchase.
Master Data	Within the context of Data Synchronisation, any data that is applicable across multiple business transactions. Master Data describes each Item or Party involved in Supply Chain Processes. A Global Trade Item Number (GTIN) or a Global Location Number (GLN) uniquely identifies each data set. Master Data can be divided into neutral and relationship dependent data
Party	A Party (or) Location is any legal or physical entity involved at any point in any supply chain and upon which there is a need to retrieve pre-defined information. A Party is uniquely identified by a Global Location Number (GLN).
Point-of-Sale (POS)	Refers to the retail checkout where omnidirectional barcodes must be used to enable very rapid scanning or low volume checkout where linear or 2D matrix barcodes are used with image-based scanners.
Produce Lookup Code (PLU)	PLU codes are used in retail locations to facilitate the checkout process. PLUs identify bulk and random or variable weight fruits and vegetables (and related items such as nuts and herbs). PLU numbers are printed on a small label that is attached directly to individual fruits and vegetables. They consist of a four or five digit number. Four-digit PLUs identify conventionally grown fruits and vegetables while a 9 is added at the beginning of the PLU to identify the item as organic.
Process	In a GS1 context this refers to a business process. This is a series of actions, or functions that transform an input into an output to assist in meeting an organisation's objectives. Inputs and outputs may be data, physical entities or a mixture of both, examples being order to cash, collaborative planning, warehouse management and cross-docking.
Product Description	GS1 Global definition: A piece of information reflecting a characteristic related to an identification number [e.g., an expiration date or a product description related to a GTIN®].
Quantity	A precise number of articles, pieces or units. Used in conjunction with Unit of Measure.
Receipt Date	GS1 Global definition: Date/time upon which the goods were received by a given party.
Record	Act of creating a permanent piece of information constituting an account of something that has occurred.
Restricted Circulation Number (RCN)	Signifies a GS1 identification number used for special applications in restricted environments, either defined by local GS1 Member Organisations (for regional applications such as variable measure product identification and couponing) or by a company (for internal applications).
Serial Shipping Container Code (SSCC)	The GS1 Identification Key used to identify logistics units. The key comprises an Extension digit, GS1 Company Prefix, Serial Reference, and Check Digit.
SGTIN (Serialised Global Trade Identification Number)	SGTIN is a method of identifying items at the unit or retail level as well as at the case and carton levels. It is composed of a GS1 assigned Company Prefix & Item Reference (GTIN), combined with a Serial Number. Where GS1 barcodes have traditionally been used, the SGTIN specification combined with an EPC tag can give visibility beyond the Item Reference right down to the exact serial number of the item.

Term	Definition
Share	Act of exchanging information about an entity or traceable item with another Trading Partner.
Ship Date	Date on which goods should be shipped or despatched by the Supplier.
Ship from Location	Identification of the party from where goods will be or have been shipped.
Ship to Location	Identification of the party to where goods will be or have been shipped.
Shipment	A grouping of logistics and transport units assembled and identified by the seller (sender) of the goods travelling under one despatch advice and/or Bill of Lading to one customer (recipient).
Shipment Reference Number	The reference number assigned to a shipment.
Traceability	[ISO 9001: 2000] Traceability is the ability to trace the history, application or location of that which is under consideration.
Traceability Data	Any information about the history, application or location of a traceable item, either Master Data or Transactional Data.
Traceable Item	A physical object that may or may not be a trade item, where there may be a need to retrieve information about its history, application, or location. The level at which the traceable item is defined is dependent on the industry and degree of control required (for example within a product packaging or logistical hierarchy). It could be tracked, traced, recalled or withdrawn. It could exist in multiple locations at the same time (for example, if identified at the trade item and batch level). A traceable item may be related to another traceable item. It is the choice of the Traceability Partner which identification level (e.g. GTIN or Lot/Batch or serial level) to use for the traceable item. See also definition for process
Trace Request	A formal inquiry about the history, application, or location of a traceable item. A request can trigger subsequent trace requests up or down the supply chain in order to fulfil the original request
Tracing (Tracing Back)	The ability to identify the origin, attributes, or history of a particular traceable item located within the supply chain by reference to records held. "Tracking back" and "tracking forward" are the preferred terms used in this document.
Tracking (Tracking Forward)	The ability to follow the path of a traceable item through the supply chain as it moves between parties.
Trade Item	Any item (product or service) upon which there is a need to retrieve pre-defined information and that may be priced, or ordered, or invoiced at any point in any supply chain.
Trading Partner	Any Supply Chain Partner that has a direct impact on the flow of goods through the supply chain. Examples include Third Party Logistics Provider, Manufacturer, Retailer, and Grower.
Transformation	A change to the nature of a traceable item that changes the identity and/or the characteristics of the traceable item. The act of changing the item such as combining ingredients to make a finished product or case picking to create a new pallet. Transformation can be production, aggregation, grouping, splitting, mixing, compounding, packing and repacking traceable items.
Transporter	The Traceability Partner that receives, carries, and delivers one or more traceable items from one point to another without transforming the traceable item(s). Typically only has possession, custody, or control of a traceable item, but may have ownership.
Unit of Measure	The unit of measure relating to a specific quantity. Reference to a unit of measure code that optionally applies to the quantities value. Example of units of measure include pound, metre, kilo.
Variable Measure Trade Item	Variable Measure Trade Item is an item which is priced, ordered or invoiced in quantities which can vary, such as fruit and vegetables, meat, cheese, rope, chain, fabric, carpets on a roll, etc. The complete identification of a Variable Measure Trade Item consists of both its identification number and its variable data. For Retail Variable Measure Trade Items either the price or the quantity of the given unit must be included in the barcode to be read at the checkout.

A.2 Global Traceability Standard Version 2 Terms

Chain of custody

A time-ordered sequence of parties who take physical custody of an object or collection of objects as it moves through a supply chain network.

Chain of ownership

A time-ordered sequence of parties who take legal possession of an object or collection of objects as it moves through a supply chain network.

Critical Tracking Event (CTE)

A record of completion of a step in the business process in a supply chain, that is critical to record and share, in order to ensure end-to-end traceability.

Key Data Element (KDE)

Those data required to be present in a CTE to accurately represent what occurred in the step of a business process, in order to ensure traceability.

Party

An organisation or individual acting as an entity in a supply chain. Parties may play multiple different roles in the supply chain.

Supply chain

A supply chain is a system of organisations and business processes that are involved in the manufacture, distribution and maintenance of a product or asset.

Supply chain visibility

The awareness of, and control over, specific information related to product orders and physical shipments, including transport and logistics activities and the statuses of events and milestones that occur prior to and in-transit. [Aberdeen Group]

Traceability

Traceability is the ability to trace the history, application or location of an object [ISO 9005:2015]. When considering a product or a service traceability can relate to:

- the origin of materials and parts;
- the processing history;
- the distribution and location of the product or service after delivery.

For practical reasons, “trace” or “track and trace” may be used as equivalent terms to designate the action of ensuring the traceability.

Traceability system

The system used by an individual party to manage traceability in its supply chain(s). A traceability system includes mechanisms for the identification of objects and for the capture of information about observations of those objects over time as they move between locations or participate in various business processes.

Traceability party

A party that has been selected to be in scope of a traceability system. Parties in scope of traceability systems may include those that take custody of traceable objects, those that take ownership of traceable objects, those that inspect traceable objects, those that insure traceable objects, etc. End-customers (including consumers and patients) will often not be treated as traceability parties, since they do not necessarily carry a traceability responsibility and very often remain unknown to the other traceability parties.

Traceability location

A traceability location is a designated physical area that has been selected to be in scope of a traceability system.

Traceable object

A traceable object is a physical or digital object whose supply chain path can and needs to be determined.

Tracing

Tracing is the capability to identify the origin and characteristics or history of a particular traceable object upstream (through earlier observations) based on data recorded at defined points of the supply chain. Trace or Tracing backward or ascending traceability

Tracking

Tracking is the capability to locate or follow the path of a particular traceable object downstream (through later observations) based on data recorded at defined points of the supply chain. Track forward or descending traceability

Transparency

Transparency refers to the need to ensure visibility and access to accurate information across supply chains (inclusive of consumers), including the provision of relevant traceability data to trading partners and consumers in a spirit of openness.

Visibility

Visibility is the ability to know exactly where things are at any point in time, or where they have been, and why.

Visibility event data

Visibility event data are records of the completion of business process steps in which physical or digital entities are handled. [ARCH]

Each visibility event captures what objects participated in the process, when the process took place, where the objects were and will be afterwards, and why (that is, what was the business context in which the process took place).

A.3 GS1 Terms and acronyms

Also see the GS1 Glossary: www.gs1.org/glossary and the [GS1 Global Traceability Standard \[GTS2\]](#).

Abbreviation	Full term
AI	GS1 Application Identifier
AIDC	Automatic Identification and Data Capture
CBV	Core Business Vocabulary
CTE	Critical Tracking Event
EDI	Electronic Data Interchange
EPC	Electronic Product Code
EPCIS	EPC Information Services
GDSN	Global Data Synchronisation Network
GLN	Global Location Number
GTIN	Global Trade Item Number
GTS2	Global Traceability Standard Version 2
HRI	Human Readable Interpretation
KDE	Key Data Element
POS	Point-Of-Sale
RFID	Radio Frequency identification
SSCC	Serial Shipping Container Code
TDS	Tag Data Standard
UTC	Coordinated Universal Time

B Regulatory background

With GS1 traceability, all stakeholders, including consumers and regulators, benefit from the transparency that comes with access to accurate and dynamic information about their food products—where they come from, where they have been, how they have been handled along with answers to a host of other relevant questions.

Trading partners should understand relevant requirements for their markets.

Traceability with GS1 standards helps trading partners more easily comply with relevant regulatory requirements in their market.



Note: The following locations and examples are not an exhaustive list.

Market	Agency	Name of Regulation	Notes
Australia/New Zealand	Food Standards Australia and New Zealand	Food Standards Code	https://www.foodstandards.gov.au/Pages/default.aspx
Canada	Canadian Food Inspection Agency (CFIA)	Safe Food for Canadians Act (SFCA)	
Europe	European Food Safety Authority	EU General Food Law EU GMO Labelling	
U.S.	Food & Drug Administration (FDA)	Food Safety Modernization Act (FSMA)	

C Additional implementation resources and examples

The purpose of this section is to provide supporting information on topics relevant for implementation that were identified during Guideline development but are outside of the scope of this Guideline.

C.1 The Produce Traceability Initiative

This common case label was developed by industry for use throughout the U.S. and Canadian supply chains regardless of vendor or buyer.

Additional information (PTI Guideline): <https://www.producetraceability.org/resources/>



D References

D.1 Normative references

Abbreviation	Document	Author / Year
AIDC for fresh foods at POS	GS1 AIDC Fresh Foods Sold at Point-of-Sale Implementation Guideline	GS1, 2020
CBV	Core Business Vocabulary Standard, http://www.gs1.org/epcis	Latest version
EDI	GS1 has currently three sets of complementary EDI standards: GS1 EANCOM® GS1 XML GS1 UN/CEFACT XML See https://www.gs1.org/edi for more information	GS1
EPCIS	EPC Information Services Standard version, http://www.gs1.org/epcis	Latest version
	Fruit & Vegetable GDSN Trade Item Implementation Guideline	GS1
	Fruit and Vegetable GTIN Assignment Implementation Guideline	GS1, 2014
	GS1 Human Readable Interpretation (HRI) Guideline	GS1, 2011 updated 2018
	GS1 Fresh Fruit & Vegetable Labelling Consumer Units Guideline	GS1, 2015
	Fruit and Vegetable Master Data Attribute Implementation Guide	GS1, 2013, updated 2017
GENSPECS	GS1 General Specifications, http://www.gs1.org/genspecs	Latest version
GTIN-MAN	GTIN Management Rules, http://www.gs1.org/1/gtinrules/en/	Latest version
GTS2	GS1 Global Traceability Standard, version 2 https://www.gs1.org/standards/gs1-global-traceability-standard	GS1, 2017
RECALL	Product Recall Business Message Standard, version 3.4, http://www.gs1.org/edi-xml-recall/xml-product-recall/3-4	GS1, 2020
RFID	GDS1 RFID/Barcode Interoperability Guideline https://www.gs1.org/docs/barcodes/RFID_Barcode_Interoperability_Guidelines.pdf	GS1, 2016
TDS	GS1 Tag Data Standard (TDS), version 1.10, http://www.gs1.org/epc-rfid	GS1, 2017

D.2 Non-normative references

Organisation	Document
GS1 in Europe Fruit & Vegetable Implementation Group	GS1 in Europe Legal Requirements for Labels - Guidelines for Consumer Units
International Federation of Produce Standards (IFPS)	