TRACEABILITY FOR DAIRY, DELI, & BAKERY

U.S. IMPLEMENTATION GUIDE

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Dairy·Deli·Bakery
ASSOCIATION

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International Dairy Foods Association
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DAIRY, DELI, & BAKERY TRACEABILITY IMPLEMENTATION GUIDE

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1. Introduction

The Dairy, Deli, and Bakery industry continues to evolve to optimize business processes and 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 about product traceability, raises the need to identify and adopt business practices and standards that will aid the dairy, deli, and bakery distribution channel participant's ability to track and trace product throughout the supply chain.

This guide serves as a strategic effort between IDDBA, IDFA, GS1 US, and individual companies who choose to join on a voluntary basis to streamline their company's adoption and implementation of GS1 Standards. The GS1 system has been in use since 1973 and is designed to overcome the limitations of using company, organization, or sector specific coding systems, and to make trading much more efficient and responsive to customers in today's global marketplace. The idea is that with proper processes, checks and testing, a desired outcome can be delivered more effectively with fewer problems and unforeseen complications. While GS1 standards are user-driven, royalty-free, and globally applicable, the use of these standards is voluntary, not mandatory. Consent between trading partners may replace specific recommendations.

1.1. Purpose and Scope of this Document

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 products when potentially harmful products 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 Traceability Implementation Guide for Dairy, Deli, and Bakery has been developed to aid in the adoption of consistent business practices to effectively manage traceability for the dairy, deli, and bakery industry. This guide references information previously published in the document *Industry Roadmap: Building the Fresh Foods Supply Chain of the Future* (http://www.gs1us.org/industries/fresh-foods/tools-and-resources) but also provides additional details for traceability implementation specifically for the dairy, deli, and bakery industry segments.

The Bioterrorism Act of 2002 requires the establishment and maintenance of records to identify contact information and product data for immediate previous sources and immediate subsequent recipients (one step forward, one step back) of food, including its packaging. The Food Safety Modernization Act of 2011 affirms the Bioterrorism Act and is expected to require additional recordkeeping for high-risk foods. As of this printing, additional information has not been published detailing the identification of high risk foods or additional traceability requirements.

This guide recommends an additional voluntary approach to implementing best practices for identifying and tracking of dairy, deli, & bakery items from processor/manufacturer to point of sale or service.

The scope of this guideline establishes minimum requirements and best practices to share information between distribution channel participants. This guide:

- Addresses traceability practices from the processing facility to the point of consumer sale or service to support Critical Tracking Events (CTEs) such as:
    - Product Creation
    - Product Transformation
    - Product Shipping
    - Product Receipt
    - Product Unit Depletion (Consumer Sale / Consumption / Disposal)

- Applies to all dairy, deli, and bakery products for human consumption;

- Applies to all levels of the product hierarchy, which may include shipping logistics unit information, lots, pallets, cases, consumer items, and ingredients with data elements, etc.

- Includes all U.S. distribution channel participants including manufacturers, processors, suppliers, importers, exporters, wholesalers, distributors, food retailers, foodservice operators, and 3rd party providers.

Visibility enables distribution channel participants to enhance business processes in the supply chain, including traceability. The visibility of products throughout the distribution channel can be used for additional business purposes, including:

- Product Recalls/Market Withdrawals

- Regulatory Compliance

- Public Health Trace Backs

- Safety and Quality Assurance

- Sustainability

- Order Management/Inventory Accuracy

- Operations Improvements

This document is intended to provide members of the dairy, deli, and bakery industry with guidance to develop and adopt business processes which provide tracing to products within the entire distribution channel, regardless of company size or technological sophistication.

The recommended guidance is based on GS1 global standards for supply chain management and product identification. These standards were developed by industry participants to optimize business practices across supply chains worldwide over 40 years ago.

1.2. How do I Use the Document?

Step 1: If traceability or GS1 Global Standards are new to your company, read the section titled "Key Traceability Standards" in **Section 2** which provides an overview of the GS1 Standards, product hierarchy, and bar code use.

Step 2: Read **Section** 3 to gain an understanding of traceability principles, Critical Tracking Events (CTEs) and Key Data Elements (KDEs).

Step 3: Read **Section 4.1** to determine your company's role(s) in the supply chain.

Step 4: Review the entire guideline for all roles to best understand the traceability process for the dairy, deli, & bakery industry distribution channel.

Step 5: Begin implementing, using the reference documents and appendices for assistance. Users should ensure they understand specific government, industry, and trading partner requirements for the markets they serve.

1.3. Who can use this Document?

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 traceability practices for dairy, deli, and bakery manufacturers, exporters, wholesalers, suppliers, distributors, retailers, foodservice operators, and 3rd party service providers. However, these traceability practices also define, to a degree, interactions with foodservice distributors, foodservice operators, exporters, and importers. This guide may be useful to these companies as well.

2. Key Traceability Standards

2.1. GS1 Traceability Standard

GS1 Standards are the "common language of business" and provide the framework required to support the traceability business process. These industry best practice implementation guidelines are based on the GS1 Global Traceability Standard (GTS). Developed by industry, the standard defines the globally-accepted method for uniquely identifying:

- Trading partners (your suppliers, your own company, your customers, 3rd party providers)

- Trading locations (can be any physical location such as a manufacturer, distributor, warehouse, packing line, storage facility, receiving dock, or a store/restaurant)

- The products your company uses or creates

- The logistics units your company receives or ships

- Inbound and outbound shipments

The GS1 Global Traceability Standard also defines the essential information that must be collected, recorded and shared to ensure "one step up, one step down" traceability. The standard is applicable to companies of all sizes and geography.

While the GS1 Global Traceability Standard may be implemented independently from any specific technology, best business practices require the adoption of bar coding on packaging hierarchies that may include shipping logistics units, pallets, cases, and consumer units. Businesses are further encouraged to voluntarily adopt electronic messaging to exchange essential business information. These technologies will be explored in the sections that follow.

GS1 US supports the adoption and implementation of GS1 global standards to provide organizations with real-time, accurate information of internal assets and products in the supply chain. Together with the International Dairy-Deli-Bakery Association and the International Dairy Foods Association, GS1 US provides important resources to help your company understand the most effective way to implement traceability with your supply chain partners. GS1 US may also help your company connect with technology providers that serve the dairy, deli, and bakery industry.

To obtain a copy of the Global Traceability Standard, please visit http://www.gs1.org/traceability.

2.2. Global Trade Item Number® (GTIN®)

What is a Global Trade Item Number?

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

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

When product is sold under a brand name, the brand owner is responsible for securing a GS1 Company Prefix from a local GS1 Member Organization and assigning the GTIN. A brand owner typically owns the label for the product that is sold. This may also include non-branded packaging (i.e., private label).

If you manufacture product and your company *is not* the brand owner, then you must contact the brand owner and use their GTIN. If your company *is* the brand owner, and you need to create a GTIN, the first step is to contact your local GS1 Member Organization and apply for a GS1 Company Prefix. The GS1 Company Prefix uniquely identifies your organization globally and serves as the basis for each individual product number assigned. Your company then assigns a GTIN, using the GS1 Company Prefix, to each one of your products and every packaging configuration.

GTIN - 14 = 14 total Digits													
Indicator Digit	GS1 Company Prefix & Item Reference												Check Digit
N_1	N_2	N_3	N_4	N_5	N_6	N_7	N_8	N_9	N_{10}	N_{11}	N_{12}	N_{13}	N_{14}

Figure 1 - GTIN -14 Structure

If your company receives product and commingles items or ingredients to sell under your company's name, you have become the brand owner for those items, and must assign a GTIN using a GS1 Company Prefix assigned to your organization. This also applies to "further finished" products where attributes of an item are changed such that it becomes another item. See **Section 5.4** for additional details or the glossary for definitions of "Further Finished" product.

To learn more about GTIN assignment visit: http://www.gs1us.org/resources/standards

2.3. Product Hierarchy and Bar Code Use

There are a number of symbologies or data carriers used today in the dairy, deli, and bakery industry that support the identification of products as they move through the supply chain. The level of information encoded into the data carrier differs based on the bar code symbology used. All bar code formats with the exception of the U.P.C. Number System 2 bar code, which is used on variable-measure consumer level products, contain a Global Trade Item Number (GTIN). The U.P.C. Number System 2 bar code contains a retailer specific item reference and is not globally unique. For purposes of this document, the U.S. dairy, deli, and bakery distribution channels suggests the use of the following bar codes at each level of the product hierarchy:

Product Type	Recommended Bar Code	Sample Bar Code Image
Pallet **(Shipping Logistics Unit)** Fixed-measure and Variable-measure	GS1-128 Bar Code with Application Identifier, AI (00) Encoding SSCC (Serial Shipping Container Code)	 (00) 0 0614141 0032416553
Case: **Option 1** **(Totes, Bins)** Fixed-measure and Variable-measure	GS1-128 Bar Code Encoding GTIN-14 Allows extended data such as Expiration Date, Net Weight, Count, and Batch/Lot Number	 (01) 9 0614141 004365 (17) 100629 (3201) 000374 (30) 02 (10) 57432
Case: **Option 2** **(Cardboard cartons)** Fixed-Weight	ITF-14 Bar Code Encoding GTIN-14	 2 06 14141 51695 1
Consumer Item Fixed-Weight	UPC-A Bar Code Encoding GTIN-12	 6 14141 54321 2
Consumer Item **(Store Item Number)** Variable-measure	UPC-A Bar Code Encoding U.P.C. Number System 2	 2 41314 51225 8
Consumer Item Fixed and Variable-measure	GS1 DataBar Expanded Stacked Bar Code Encoding GTIN-14 Allows extended data such as Net Weight, Best Before Date, and Batch/Lot Number	 (01) 0 0614141 51695 7 (3202) 002423 (15) 111231 (10) 00235496

Figure 2 - GS1 Bar Code Product Hierarchy

2.4. General GTIN Allocation Rules

GS1 publishes general guidance on the assignment and allocation of GTINs. The dairy, deli, and bakery distribution channels have product characteristics that are different from shelf-stable grocery items, so additional GTIN allocation guidance is necessary. In addition to the general allocation guidelines, manufacturers, processors, and brand owners should allocate GTINs in accordance with these rules:

- Assign separate GTINs for each different packaging type such as Fixed or Variable measure, and store-processed product.

- Assign separate GTINs for each primary refrigeration state in which a product is marketed (e.g., if product is normally marketed in more than one state (i.e., shelf stable, chilled) assign different GTINs to each refrigeration state).

- Assign separate GTINs to product lots that have different marketing claims or production methods when such characteristics are important marketing features to buyers (i.e., further-finished, bulk, organic, etc.).

- Assign separate GTINs for each different product configuration.

To learn more about GTIN allocation rules visit: www.gs1.org/1/gtinrules

2.5. Use of the Indicator Digit

The first position of the GTIN-14 is called the Indicator Digit and is used to indicate the packaging hierarchy level. The indicator may be any value between 1 and 8. In **Figure 2** the Case: Option 2 shows a GTIN-14 with an indicator digit of 2. The packaging indicator for a variable-measure case must always be 9.

The indicator digit is used to ensure uniqueness among the various forms of packaging of the same item. An example would be where an item can be sold as an individual unit, an inner box of 6 units, or a case of 4 inner boxes (24 units). All 3 forms will have the same GS1 Company Prefix, the same item reference, but the indicator and check digits will be different.

2.6. Use of Batch/Lot Numbers and Case Serial Numbers

All manufacturers should assign Batch/Lot Numbers (the terms batch and lot as defined here are interchangeable) or Serial Numbers to products they create. The content, syntax, and format of the batch or lot number itself typically varies from one company to another, depending on company practice and the precision desired. For example, a lot can represent all product produced in a day at one facility, or the product produced in one hour from an individual processing/packing line, or it could represent a unique recipe run. Industry best practices limit lot codes to no more than one day's production. Additionally, care should be exercised to ensure that other regulatory lot coding requirements, such as those for thermally-processed canned foods regulated by the FDA, are met. In addition to the Batch/Lot Number, some suppliers also assign a unique Serial Number to each case and record the beginning and ending case Serial Numbers for each batch or lot.

It is important to remember that the range of product assigned to a single Batch/Lot Number also defines the minimum amount of product that may need to be removed from the supply chain in the event of a recall. This needs to be considered when defining your company's standard practice for setting the scope of each Batch/Lot Number for each type of product that it produces.

Case Serial Numbers can be assigned to each case at the time of packing by the supplier. Serial Numbers should be generated without any intelligence (e.g., a simple sequential number without any production facility or production date and time reference). However, it is important to link the range of serial numbers assigned to a Batch/Lot Number, production facility, production date and time, etc., for reference with regard to queries about the case.

2.7. How Does my Company Uniquely Identify Products in the Supply Chain?

Many companies use a Stock Keeping Unit (SKU) to identify a product within their distribution network. While the SKU may uniquely identify an item within a company, it is not globally unique, so it is not recommended for product identification for traceability.

The best practice is to assign a GS1 Global Trade Item Number (GTIN) for each trade item and to generate, at the very least, a unique batch or lot number for each production run of a given product. A serial number would, of course, give the ultimate value of unique identification of any trade item. A GTIN may be assigned at any level of the packaging hierarchy from a pallet, a case, or consumer item, in order to make that level of packaging globally unique.

2.8. Use of Global Location Numbers

A GS1 Global Location Number (GLN) is a globally-unique location identification number for a physical or legal entity assigned by the owner of the physical or legal entity using its GS1 Company Prefix.

The GLN can be used at a very high level to represent an entire corporation, but can also be used at a granular level to represent a specific facility, or a location within a processing plant, etc. It is recommended that participants in the dairy, deli, and bakery industry, at a minimum, assign GLNs to all of their physical locations to provide globally-unique location identification for their traceability processes. **Figure 3** displays the GLN format:

Format of the Element String													
Application Identifier	GS1 Company Prefix -------------------------------->						Location Reference <--------------------------------						Check Digit
4 1 4	N_1	N_2	N_3	N_4	N_5	N_6	N_7	N_8	N_9	N_{10}	N_{11}	N_{12}	N_{13}

Identification of a Physical Location - Global Location Number: AI (414) GLN length is 13 numeric characters.

Figure 3 - Global Location Number (GLN)

For participants who choose not to assign GLNs, or are not required to do so due to market or regulatory requirements, the location identification for the production of the lot must be encoded in the batch/lot number. This will allow participants to maintain confidentiality, while ensuring that the identity of production locations is available in human readable format on individual packages, and in both human readable and machine readable format on cases, pallets and shipping documents. **Figure 4** displays the Batch/Lot format:

Format of the Element String	
Application Identifier	Batch or Lot Number
1 0	X_1 ------- variable length ------> X_{20}

Figure 4 - Batch/Lot Number format

The formatted length of the Batch or Lot Number element is 20 alphanumeric characters. This can be made up of internal codes that identify facility locations, dates, etc., that are used to associate an item with information relevant for traceability of the trade item. Note: Application Identifiers (AI) precedes both of the element strings. Application Identifiers are discussed in **Section 6.1**

To learn more about GLN assignment visit**:** http://www.gs1us.org/resources/standards

3. Traceability Principles

Implementing a traceability process within a supply chain requires all parties involved to link the physical flow of products with the flow of information about them. Adopting industry standards for traceability processes ensures agreement about identification of the traceable items. This supports the visibility and continuity of information across the supply chain.

Supply chain traceability is the net result of two complementary business processes, referred to as external and internal traceability. External traceability involves the communication of product identification and transport information between trading partners, while internal traceability involves the association of input products with output products when an industry participant creates a new product, i.e., further-finished product or commingling.

External Traceability - All traceable items must be uniquely identified and this information must be shared between all affected distribution channel participants. External traceability for the dairy, deli, and bakery industry is primarily based on the case and consumer item level of the packaging hierarchy. At a minimum, the identification of products for the purpose of traceability requires:

- The assignment of a unique GS1 Global Trade Item Number (GTIN); and

- The assignment of a Batch/Lot Number (which includes location information if GLNs are not used).

To maintain external traceability, traceable product identification numbers must be communicated to distribution channel participants on product labels and related paper or electronic business documents. This links the physical products with the information requirements necessary for traceability.

Internal Traceability - Processes that companies maintain within their organization to link the batch identity of raw materials to the batches of the finished goods are those that enable internal traceability.

When a product is combined with others, processed, reconfigured, or re-packed, the new product must have its own unique product identifier (i.e., GTIN). The linkage (auditable function) must be maintained between this new product and its original inputs such as flavouring, toppings, fillings, ingredients, other value-added items that change the ingredient list, packaging materials, and many others to maintain traceability. The label showing the lot identification of the traceable input item should remain on the packaging until that entire traceable item is consumed. This principle applies even when the traceable item is part of a larger packaging hierarchy.

Internal and External Traceability - End-to-end or whole-chain traceability requires that the processes of internal and external traceability be effectively conducted. Each trading partner should be able to identify the direct source and direct recipient of traceable items. This is the "one step up, one step down" principle which requires distribution channel participants to collect, record, store, and share minimum pieces of information for traceability that are described in the sections that follow. To have an effective traceability process across the supply chain:

Any item that needs to be traced forward or traced backward should be globally and uniquely identified;

AND

All distribution channel participants should implement both internal and external traceability practices.

Implementation of internal traceability should ensure that the necessary linkages between inputs and outputs are maintained.

End-to-end, or whole-chain traceability can be accomplished by identifying various Critical Tracking Events (CTEs) and capturing the corresponding Key Data Elements (KDEs) resulting from the events. Critical Tracking Events are events that identify core business processes where traceability data capture is vital to a successful traceability process. They usually occur at a product's origin (manufacture, re-pack, further finishing, etc.), or a

transfer of ownership. Key Data Elements are the data pieces captured during a Critical Tracking Event that describe the What, When, Where, and Why of the Critical Tracking Event.

The chart below identifies some of the common Critical Tracking Events and their corresponding Key Data Elements:

Critical Tracking Event (CTE)	Key Data Elements (KDE)	Examples
Product Creation / Repacking	All Key Data Elements should answer 4 basic questions: **WHAT** Unique Product Identification - GTIN **AND** Batch / Lot **OR** - Serial Shipping Container Code (SSCC)	Origination (Create a unique identifier - Product enters Supply Chain) Aggregation (Put discrete items together) Disaggregation (Unpack / Breakdown) Convert (Re-pack, Re-label, or Further Finish) Co-mingle (Bundle items together, Blending fluid milk)
Product Receipt	**WHEN** Date & Time of the CTE	Order unloading and put away activities: - Segregate for quarantine or recoup - Placement into storage location
Product Shipping	**WHERE** Location Identification - GLN	Order preparation activities: - Picking - Staging - Loading
Product Depletion (Consumption, Sale, and/or Disposal)	**WHY** Description of the CTE (What was happening)	Retail Sale Foodservice Consumption

Figure 5 - Critical Tracking Events

The following example identifies the Critical Tracking Events and the Key Data Elements in a series of transactions from the viewpoint of a simulated company – Pilot Processing:

ABC Company is a cheese manufacturer that produces various cheeses in 640 pound blocks. They sell their cheese blocks to Pilot Processing where they are processed to smaller formats and sold to various retail, foodservice, and wholesale accounts.

Pilot Processing receives a delivery *(WHY)* of 50 cases of GTIN 30814141234566, Batch / Lot Code 08312012 *(WHAT)* from ABC Company through door number 5 of their Anytown, WI, processing plant internally defined as GLN 0614141000107 *(WHERE)* on February 29th, 2012 at 1:00 PM *(WHEN)*.

****

The next day, *(WHEN)* Pilot Processing moves the same product, GTIN 30814141234566, Batch / Lot No. 08312012 Quantity 50 cases *(WHAT)* to a quarantine location GLN 0614141000114 *(WHERE)* within their warehouse and submits samples for a quality check *(WHY)*.

On March 10th *(WHEN)* it is moved to the processing area GLN 0614141000128 *(WHERE)* to be converted into smaller cheese blocks *(WHY)* of GTIN 50614141345675 Batch / Lot No. SC20120910 Quantity 25 cases *(WHAT)*.

The following day *(WHEN)*, in the processing area *(WHERE)*, 15 of the processed cases are re-packed *(WHY)* into wine baskets GTIN 30614141673897, Batch / Lot No. WB20120911 *(WHAT)*.

****

On March 25th *(WHEN)*, 12 of the wine baskets GTIN 30614141673897 Batch / Lot No. WB20120911 *(WHAT)* are moved to the staging area, GLN 0614141000135 *(WHERE)* and shipped to Retailer XYZ *(WHY)*.

On the same day *(WHEN)*, 2 cases of the block cheese GTIN 50614141345675 Batch / Lot No. SC20120910 *(WHAT)*, are returned to quarantine GLN 0614141000114 *(WHERE)*, to be destroyed *(WHY)* due to defects incurred during processing.

****

ABC COMPANY MANUFACTURER

PILOT PROCESSING

50

RECEIPT
GTIN 30814141234566
Batch/Lot Number 8/31/2012
Quantity 50 cases
Date 2/29/12
Time 1:00 PM
GLN 0614141000107

QUALITY CHECK
GTIN 30814141234566
Batch/Lot Number 8/31/2012
Quantity 50 cases
Date 3/1/12
Time 8:30 AM
GLN 0614141000114

50

PRODUCT CONVERSION
GTIN 50614141345675
Batch/Lot Number SC20120910
Quantity 25 cases
Date 3/10/12
Time 10:00 AM
GLN 0614141000128

25

REPACKING
GTIN 30614141673897
Batch/Lot Number WB20120911
Quantity 15 cases
Date 3/11/12
Time 2:00 PM
GLN 0614141000128

15

12

SHIPPING
GTIN 30614141673897
Batch/Lot Number WB20120911
Quantity 12 cases
Date 3/25/12
Time 11:30 AM
GLN 0614141000135

RETAILER XYZ DISTRIBUTION CENTER

2

DISPOSAL
GTIN 50614141345675
Batch/Lot Number SC20120910
Quantity 2 cases
Date 3/25/12
Time 3:00 PM
GLN 0614141000114

Figure 6 summarizes the Critical Tracking Events (CTEs) and the Key Data Elements (KDEs) captured during the activity above.

Supply Chain Partner	Critical Tracking Events (CTEs)	Key Data Elements (KDEs)			
		What	When	Where	Why
Pilot Processing	Receipt of product from Manufacturer ABC Company	**GTIN** 30814141234566 **Batch/Lot No.** 8/31/2012 **Quantity** 50 cases	**Date** 2012.02.29 **Time** 13.00.00	**GLN** 0614141000107	Receive product from manufacturer
	Quality Check	**GTIN** 30814141234566 **Batch/Lot No.** 8/31/2012 **Quantity** 50 cases	**Date** 2012.02.29 **Time** 08.30.00	**GLN** 0614141000114	Quality Review
	Product Conversion	**GTIN** 50614141345675 **Batch/Lot No.** SC20120910 **Quantity** 25 cases	**Date** 2012.02.29 **Time** 10.00.00	**GLN** 0614141000128	Consumed 25 cases during production run
	Repacking	**GTIN** 30614141673897 **Batch/Lot No.** WB20120911 **Quantity** 15 cases	**Date** 2012.02.29 **Time** 14.00.00	**GLN** 0614141000128	Re-packed 15 cases into a new configuration
	Shipping	**GTIN** 30614141673897 **Batch/Lot No.** WB20120911 **Quantity** 12 cases	**Date** 2012.02.29 **Time** 11.30.00	**GLN** 0614141000135	Ship 12 of the 15 repacked cases to a distributer
	Disposal	**GTIN** 50614141345675 **Batch/Lot No.** SC20120910 **Quantity** 2 cases	**Date** 2012.02.29 **Time** 15.00.00	**GLN** 0614141000114	Dispose of 2 cases of the original item

Figure 6 - Pilot Processing CTE Summary

3.1. Implementing Traceability Processes

In order to support best practices for maintaining a traceability process, there are five basic business processes that should be put in place among supply chain participants. They include:

1) Plan and organize how to assign, collect, share, and maintain traceability information.

2) Determine how to align master data required for all products and distribution channel participants and other physical locations.

3) Record traceability information as products are created, shipped, and modified in form (Critical Tracking Events or CTEs).

4) Request a trace using at least one of the five information sources listed:

   a. GTIN or some form of the product/item identification;

   b. GLN or some form of the traceability partners' name or attribute;

   c. GLN of the physical location for the targeted product;

   d. Dates or time periods for targeted product.

   e. Batch/Lot Number

5) Use the information provided to take the appropriate action as required.

3.2. Traceability Data Retention

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

1) The 2002 Bioterrorism Act requires that records must be maintained for up to two years based on the type of product. For more details go to*:
   http://www.fda.gov/RegulatoryInformation/Legislation/ucm155733.htm

2) Length of time product may exist in the distribution channel beyond two years. This is based on the type of product (chilled, frozen, fresh, or shelf stable).

3) The need to promptly retrieve data in the event of an epidemiological event which may, or may not implicate your product.

4) Industry agreements or trading partner/customer requirements.

4. The Dairy, Deli, & Bakery Industry Distribution Channel

Supply chain partners play different roles throughout the overall supply chain. Each role has its own Critical Tracking Events based upon its activities. The next two figures provide an overview of a generic supply chain for dairy, deli, and bakery and additional details on the critical tracking events.

Figure 7 shows an overview of the Dairy-Deli-Bakery distribution channel(s) and the key roles played by various distribution participants.
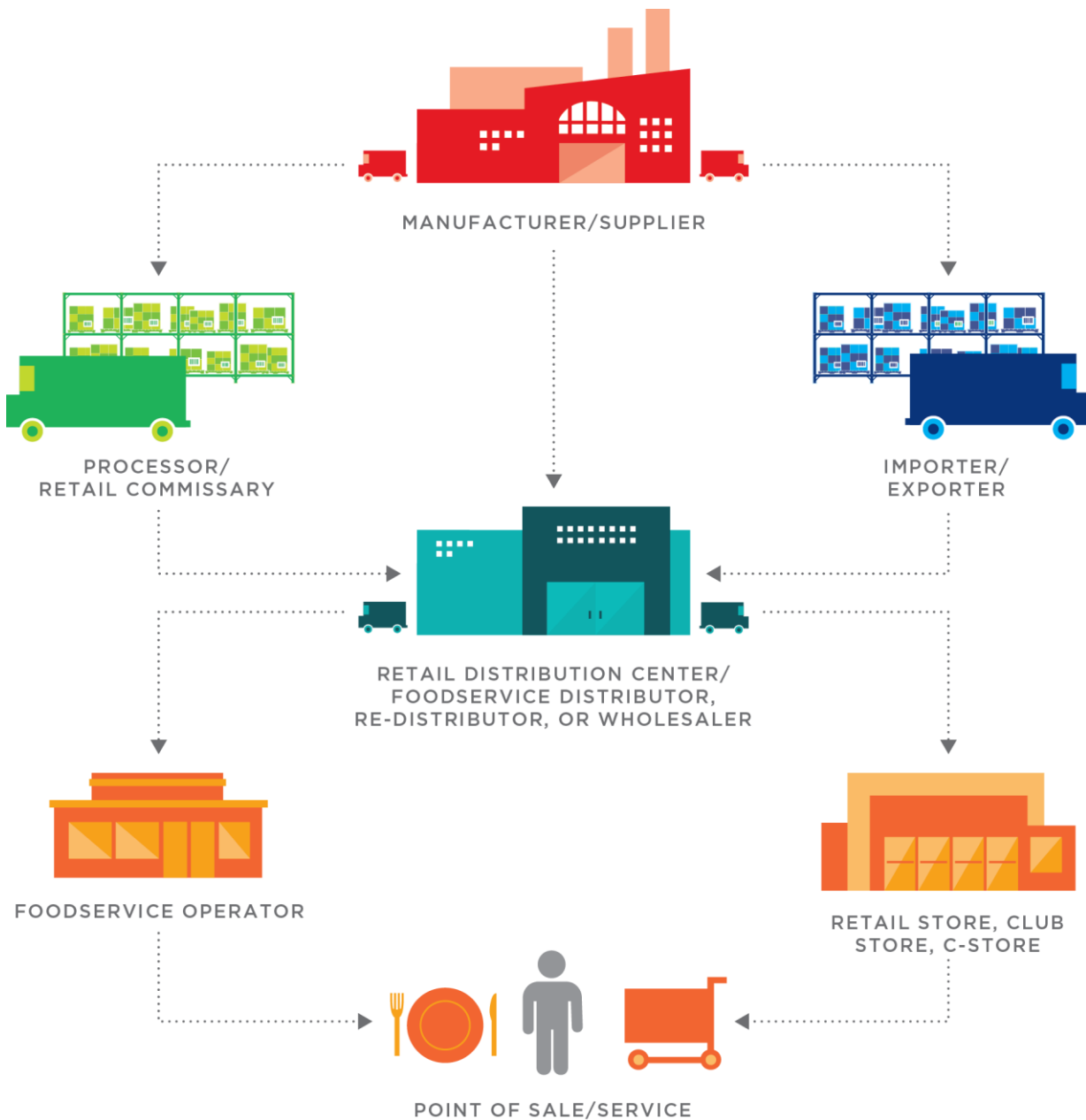

Figure 7 - Dairy, Deli, & Bakery Supply Chain

4.1. Roles in the Supply Chain

Figure 8 provides a list of the primary and support roles found in the dairy, deli, and bakery supply chain, their critical tracking events and, the GS1 application of the standards for each role.

Role	Activities	Alias / Examples	Critical Tracking Event (CTE)	GS1 Application
Primary Roles				
Manufacturer / Supplier	Create, Process, Package, Label, Store, Sell, Ship product	Manufacturers of spices, flavorings, pasta, fillings Suppliers of Dairy, Deli, & Bakery retail / foodservice ingredients and products.	Produce / Create product Process / Pack / Re-pack product Ship product	Build Master Data Assign GTIN® Assign Lot identification Bar Code & Label Application Store Transaction Data Share Event Data
Broker	Manages relationship between supplier and customer, but does *NOT* take possession of product	Agent	Buyer of Record - Purchase product Sells product	Store Transaction Data Share Event Data
Importer / Exporter	Manages relationship between supplier and customer, and *DOES* take possession of product	Import / Export broker, warehouse	Receive product Ship product	Build Master Data Assign GTIN Assign Lot identification Bar Code & Label Application Store Transaction Data Share Event Data
Processor / Retail Commissary	Receive, Process, Repack, Package, Label, Store, Sell, Ship	Bakery packer, supplier, centralized kitchen	Receipt of raw materials Creation or Repacking of finished product Ship Product	Assign GTIN Assign Lot identification Bar Code & Label Application Store Transaction Data Share Event Data
Retail Distribution Center / Foodservice Distributor / Re-distributor / Wholesaler	Receive, Store, Further Finish product, Sell, Ship	Retail distribution center, Foodservice Distribution Center	Receive product Further Finish product Re-pack product Ship product	For Further Finished & Re-packed Product: - Build Master Data - Assign GTIN - Assign Lot identification - Bar Code & Label Application Store Transaction Data
Retail Store, Club Store, C-Store	Create, Receive, Store, Process, Further Finish product, Package/Label, and Display; Sell to Consumer	Grocery Store, Supermarket, Grocery Chains, Open Market, Military Commisary	Receive product Further Finish Product Re-pack product Sell product	For Further Finished & Re-packed Product: - Build Master Data - Assign GTIN - Assign Lot identification - Bar Code & Label Application Store Transaction Data Share Event Data
Foodservice Operator	Storage, Prepare, Cook, Bake, Sell to Consumer	Restaurants, Entertainment Venues, Institutions, and In-store Retail Franchises.	Receive product Further Finish product Prepare / process product Sell to consumer	For Further Finished & Prepared/Processed Product: - Build Master Data - Assign GTIN - Assign Lot identification - Bar Code & Label Application Store Transaction Data Share Event Data
Support Roles				
Packaging / Shipping Material Supplier	Produce and ship	Suppliers of packing material (crates, bags, boxes, labels, bins, clamshells, etc.) that come in contact with food products.	Produce product Ship product	Build Master Data Assign GTIN Assign Lot identification Bar Code & Label Application Store Transaction Data Share Event Data
Third Party Logistics Service Provider	Transport, Store	Truck / Rail / Ship / Air / Warehousing services	Receive product Ship product	Store Transaction Data Share Event Data
Regulatory Organizations	Compliance oversight	Customs, Inspection, Grading agencies, Food Code regulators		Review data as required

Figure 8 - Table of Supply Chain Roles

4.2. Product and Packaging Scenarios

Within the dairy, deli and bakery distribution channel, products are segmented between Fixed-measure, Random Weight, Variable-measure, and Store-Processed products. Generally, products are delivered by suppliers to retailers, distributors, wholesalers, or foodservice operators in one of the following package types:

Dairy and Refrigerated Case Products			
Case Packaging Type	Definition	Product Examples	
		Case	Unit
Fixed measure Units	Foodservice or Consumer level items ready for sale. Product is processed, packaged, and labeled for sale by supplier.	12 ct tray of yogurt 12 ct case of butter	1 - 6 oz cup of yogurt 1 - 1 lb box of butter
Random Weight Units	Foodservice or Consumer level items ready for sale. Product is processed, packaged, and labeled for sale by supplier.	6 ct case pre-packed prepared salad	1 tub pre-packaged prepared salad
Deli Products			
Case Packaging Type	Definition	Product Examples	
		Cases	Units
Fixed measure Units	Foodservice or Consumer level items ready for sale. Product is processed, packaged, and labeled for sale by supplier.	16 ct case of Sea Salt Bagel Crisps 24 ct case of Smokey Bacon sandwich sauce	1 - bag of Sea Salt Bagel Crisps 1 - bottle Smokey Bacon sandwich sauce
Random Weight Units	Foodservice or Consumer level items ready for sale. Product is processed, packaged, and labeled for sale by supplier.	4 ct case of deli ham 2 ct tub of potato salad	1 lb of sliced to order ham 2 lbs of potato salad
Variable Measure Units	Processed, packaged, and partially labeled for consumer sale by supplier. Final labeling for consumer sale is done by the retailer.	N/A as these are usually processed by the deli departments and sold in the self-service deli case	1 cup pre-portioned chicken & rice soup 1 turkey and swiss cheese sandwich
Store Processed / Retail Commissary	Bulk packed from supplier and retailer is doing further processing, labeling, and packaging.	10 ct case of chicken	1 - Rotisserie Chicken
Bakery Products			
Case Packaging Type	Definition	Product Examples	
		Cases	Units
Fixed measure Units	Foodservice or Consumer level items ready for sale. Product is processed, packaged, and labeled for sale by supplier.	12 - 8 ct tray of hot dog rolls 12 - 6 ct tray of pre-packaged bagels	1 - 8 ct pack of hot dog rolls 1 - 6 ct bag of bagels
Random Weight Units	Foodservice or Consumer level items ready for sale. Product is processed, packaged, and labeled for sale by supplier.	24 ct case of chocolate chip cookies 16 ct case of cheese danish	1 chocolate chip cookie 1 cheese danish
Variable Measure Units	Processed, packaged, and partially labeled for consumer sale by supplier. Final labeling for consumer sale is done by the retailer.	4 ct Sourdough bread 4 ct cheesecake	1 loaf of Sourdough bread 1 - slice of cheesecake
Store Processed / Retail Commissary	Bulk packed from supplier and retailer is doing further processing, labeling, and packaging.	1 - 6ct case Dutch apple pie 2 ct pre-iced white cakes	1 slice of Dutch apple pie 1 custom decorated cake

Figure 9 - Dairy, Deli, & Bakery Package Types

Product Packaging Definitions:

Fixed Measure Products
As previously defined, a fixed-measure item is always produced and sold in the same weight. A fixed-measure product is typically priced per selling unit, rather than per weight. Fixed-measure products sold at retail use a UPC-A bar code.

Variable-Measure and Random-Weight Products
A variable-measure product is typically product priced by the unit, either sold as a package or by the each (examples include cupcake, donut, loaf of bread, etc.). Random-weight products are typically deli and cheese products that are priced by the weight of the item (such as one pound of sliced ham, a half pound of cheese, or ten ounces of pasta salad).

Variable-measure and random-weight consumer items commonly use the U.P.C. Number System 2 bar code format, which is usually encoded at the retail facility. For products sold at retail, best practice is to use a GS1 DataBar Expanded bar code which allows for additional item attributes to be included in the scanning of the product. See **Section 6.1** for additional details on best practices and GS1 DataBar bar code.

Case or Shelf-Ready Products
Case or Shelf Ready product requires no further handling by the retailer or operator. Product information communicated by the supplier to the retailer that can be used by the retailer through their supply system to the point of sale or service.

Private-Label Products
Private-Label products can come in any of the above formats. When retailers, distributors, or operators have suppliers provide them with "Private Label" branded product, the retailer, distributor, or operator is the brand owner and is therefore responsible for identifying that product in the supply chain. The best practice is to identify these private-label items by using a unique GS1 Global Trade Item Number (GTIN) as specified in **Section 2.2**. In these instances, the retailers, distributors, or operators will provide the supplier with the correct GTIN for use on the product's packaging.

Further-Finished or Processed Products
Companies that perform further-finishing or processing activities, and package a product in the supply chain, (i.e., store-processed product), become the brand owners and are responsible for assigning a GTIN or item reference and traceability attributes.

Generally, any time a company modifies the basic characteristics of a trade item, a new GTIN or item reference is required. Retailers, distributors, and operators should be familiar with, and use the same GTIN allocation rules that suppliers use if a GTIN is created. These rules can be found in Section 2.4 of this document.

A common business process within the Deli & Bakery industry is the use of a U.P.C. Number System 2 bar code on variable-measure and random-weight products. This bar code *does not* contain a globally-unique item number (GTIN). It contains a proprietary vendor or supplier reference number, an industry item reference, the extended price, and a price verifier digit. Because this data structure is specific to the retailer, it is not normally used in traceability processes initiated by the manufacturer.

U.P.C. Number System 2 Bar Code										
U.P.C. Prefix	Item Reference Number					Price Verifier Digit	Item Price				Code Check Digit
2	N	N	N	N	N	C	N	N	N	N	C

Figure 10 - U.P.C. Number System 2 Bar Code Format

When using the U.P.C. Number System 2 bar code, there are a variety of options for a retailer to identify store-processed product, such as the industry item reference for the product (http://iddba.org/resources.aspx, e.g., PLU, URMIS, NAMPS, NCC) assigned by the retailer or the retailer product category name. It is up to the retailer to decide which code to use and is dependent upon the retailer's requirements for granularity. However, it is the retailer's obligation to always correlate the supplier's GTIN and Batch/Lot Number of the raw material to

the product identity assigned by the retailer to the store-processed consumer item created from the supplier's raw material.

4.3.   Impact of Batch/Lot and Serial Numbers on Traceability

Each partner in the supply chain shall provide and/or capture certain product information to enable forward and backward (one up/one down) traceability. It is imperative that the supplier establish a case-level product marking protocol that can be used for traceability by supplier, distributor, retailer, and foodservice operator in normal business operations so that they can locate specific product in the event of a product traceback/recall.

Should a product traceability or recall situation occur, it is of critical importance that the supplier be able to convey to their trading partner(s) the required information to enable a precise search for the recalled product. It is incumbent upon the supplier to identify to their trading partners the type of data that will normally be provided for product traceability (i.e., Batch/Lot or Serial Number). At a minimum, a supplier must assign a Batch/Lot Number for case-level traceability.

An exception has been identified within the Dairy Industry. Several categories of products such as fluid milk, cottage cheese, sour cream, creamers, and similar items are currently distributed directly to point of sale or service (retail, foodservice) in milk crates and/or bossy carts, which generally do not bear any labels. The individual items will bear some form of labeling and batch/lot coding for traceability, and the Bioterrorism Act rules.

Figure 11 - Milk Crate and Bossy Cart used in the Dairy Industry

5. Maintaining Traceability at All Levels of the Product Hierarchy

The best practice for traceability throughout the supply chain is to identify and capture products with their GTIN and the associated production Batch/Lot or Serial Number information in a scannable format. Electronic capture via scanning improves accuracy by reducing, or eliminating, transcription errors, thus improving efficiency. However, understanding that the majority of supply chain participants are currently capturing information manually, requires this information to be minimally available in a human readable format.

> NOTE: The emphasis for a successful traceability program should be placed on identifying the proper critical tracking events and capturing the key data elements supporting those events, not on electronic vs. manual processes.

To maintain traceability among supply chain partners, products should have standard identification at all levels of the product hierarchy (item, case, pallet, and shipment). **Figure 12** identifies information that should be used

to identify each level. Linking the standard product identification with human readable, and potentially scannable, attributes for each level of the product hierarchy ensures traceability.

Product Hierarchy	Identification
Consumer Item	GTIN **AND** Product description **AND** Brand owner **AND** Unique lot identifier such as a sell-by date, best buy date, production date or date/lot code
Case	GTIN **AND** Batch/Lot number **OR** serial number
Pallet or Shipment	Serial Shipping Container Code (SSCC) **AND** Purchase order number(s) **OR** Global Shipment Identification Nimber (GSIN)*

Figure 12 - Current Identification Requirements

*GSIN details at: http://www.gs1.org/barcodes/technical/idkeys/gsin

5.1. Item Level Traceability

Consumer item traceability must allow all supply chain participants to quickly identify suspect product, so human readable information is essential. Therefore, consumer item traceability requires the use of human readable information on fixed-measure, variable-measure, and random-weight consumer items.

Fixed-measure consumer items have a scannable UPC-A bar code that includes a GTIN, but no additional scannable traceability attributes. Variable-measure and random-weight consumer items have a scannable U.P.C. Number System 2 bar code that includes an item reference. While the item references provide the high-level information about the type of product sold, they fail to provide effective traceability with point of sale scanning. Due to this limitation, retailers as well as consumers are largely dependent on human readable information for consumer item traceability for all items that have a UPC-A or a U.P.C. Number System 2 bar code.

The party responsible for packaging labeling, bar coding, and setting the shelf life date of the consumer items varies with the packaging type. **Figure 13** highlights whether the supplier or the retailer has human readable labeling responsibility for each packaging type:

Packaging Type	Packaging		Label Placement		U.P.C. Number System 2 Item Reference		Shelf Life Dating	
	Supplier	Retailer	Supplier	Retailer	Supplier	Retailer	Supplier	Retailer
Fixed measure Units	●		●		N/A	N/A	●	
Variable Measure / Random Weight Units	●		●*	●*		●		●
Store Processed / Retail Commissary		●		●		●		●

* Pre-priced variable-measure product is labeled by the supplier; Non pre-priced variable-measure product is labeled by the retailer

Figure 13 - Responsible Party for Consumer Item Traceability Data

Fixed-measure consumer items are packaged and labeled by suppliers and the traceability information for this packaging type is always the responsibility of the supplier. Variable-measure or random-weight items may be packaged by either a supplier or a retailer depending upon the product (i.e., fresh rolls, bagels, bread). Store-processed or retail commissary items are packaged and labeled by the retailer. **Figure 14** shows those traceability elements required on consumer-item products that have U.P.C. bar codes:

Data Elements	Scan Length	Fixed/Variable/ Random Measure		Store-Processed	
		Human Readable	Scan	Human Readable	Scan
Brand Owner/Company Name	N/A	●		●	
Consumer Item Product Description	N/A	●		●	
Batch / Lot Number as defined	2+20	●		●*	
Global Trade Item Number (GTIN) **OR**	12	●	●	●	●*
(Store) Item Identification Number (such as U.P.C. Number System 2)	12	●	●^	●	●^
Best-Before-Date, **OR** Sell-By-Date, **OR** Use-By-Date, **OR** Production Date All above is commonly known as a Date Code or Lot Control Date	N/A	●		●	

Human Readable - label text
*Only on fixed-measure items with a UPC-A bar code

Scan = Bar coded using the UPC-A;
^Only on variable-measure items with a U.P.C. Number System 2 bar code

Figure 14 - Traceability Data Elements for a Consumer Item with a UPC-A Bar Code

Note that the Batch/Lot number and Date Code/Lot Control Date are listed as separate data elements. Using the two terms interchangeably is a common practice today, but does not provide the complete information needed to prevent excess identification and withdrawal of product during a recall. For example, a manufacturer produces 800 (100 cs/hr x 8 hours) cases of product during a shift which will all have the same Sell-By-Date since they were made on the same day. Every hour during manufacturing, a different tank of a pre-blended mix was added to the production line. During a recall, recording each addition of the pre-blend as a separate Batch/Lot allows the manufacturer to identify multiples of 100 cases that were impacted as opposed to 800 cases for the whole day's production.

Figure 15 is a product containing all of the human readable and scannable traceability elements.

Use by Date with a separate Batch / Lot number

UPC-A encoding GTIN

Consumer item product description

Scannable Data
Human Readable Data
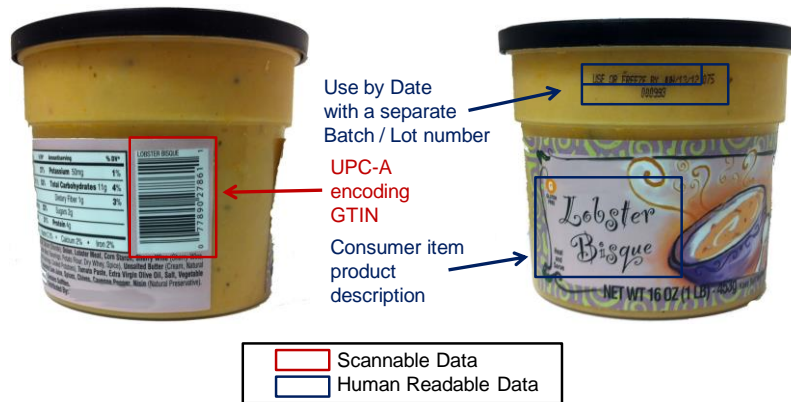
Figure 15 - Complete Traceability Elements

Fixed-measure items utilize the UPC-A bar code containing the GTIN, which by itself does not establish unique traceability because the batch/lot number is not part of the UPC-A bar code. Therefore, to enable product traceability, human readable data must be used in combination with scannable data. **Figure 16** shows two fixed measure units with the human readable and scannable information highlighted.

Figure 16 - Fixed-Weight, Consumer Item Labels

Similarly, variable-measure packages which utilize the U.P.C. Number System 2 bar code do not contain the product GTIN or any other essential traceability information. For these packages, traceability is achieved entirely through human-readable label information as noted in **Figure 17**.
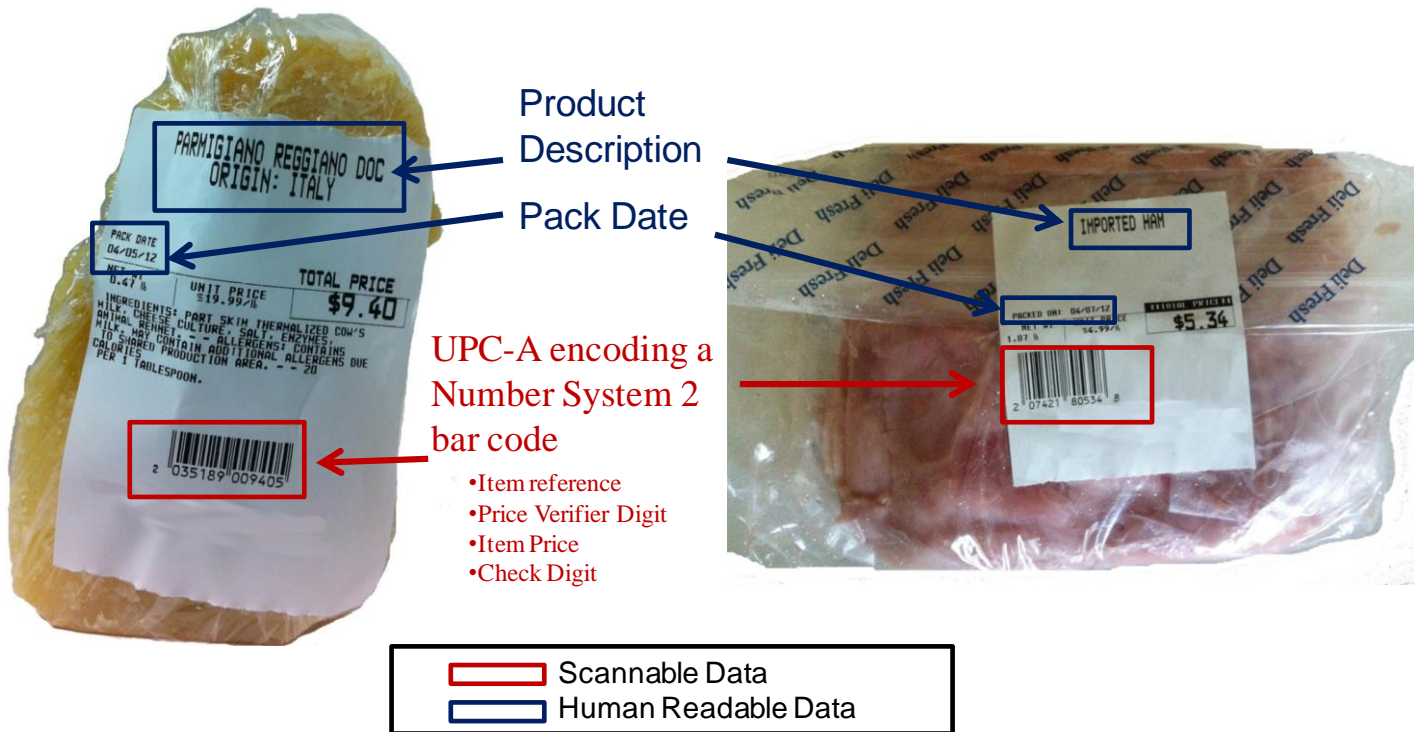
Figure 17 - Current Variable-Measure Consumer Item Label

When wholesalers, distributors, retailers, or operators package and label store-processed / retail commissary consumer items, they must be able to associate the supplier's case GTIN and Batch/Lot Number (or case Serial Number) with the consumer item product name, item reference, and Sell-By Date that they apply to the consumer package. Although a challenge, maintaining this association makes store-processed product traceability a greater possibility than case-ready consumer items where product is processed only by the original supplier.

Labeling traceability markings on store-processed variable-measure consumer items is always the responsibility of the retailer. The retailer must determine the Sell-By Date and associate it with the supplier's Batch/Lot Number (or case Serial Number) as shown in **Figure 18**.

Product Description

Sell By Date

UPC-A encoding GTIN

☐ Scannable Data (red outline)
☐ Human Readable Data (blue outline)

Figure 18 - Store-Processed Consumer Item Label

5.2. Case Level Traceability

The minimum requirements for case level traceability rely upon a combination of the GTIN and Batch/Lot or Serial Number.
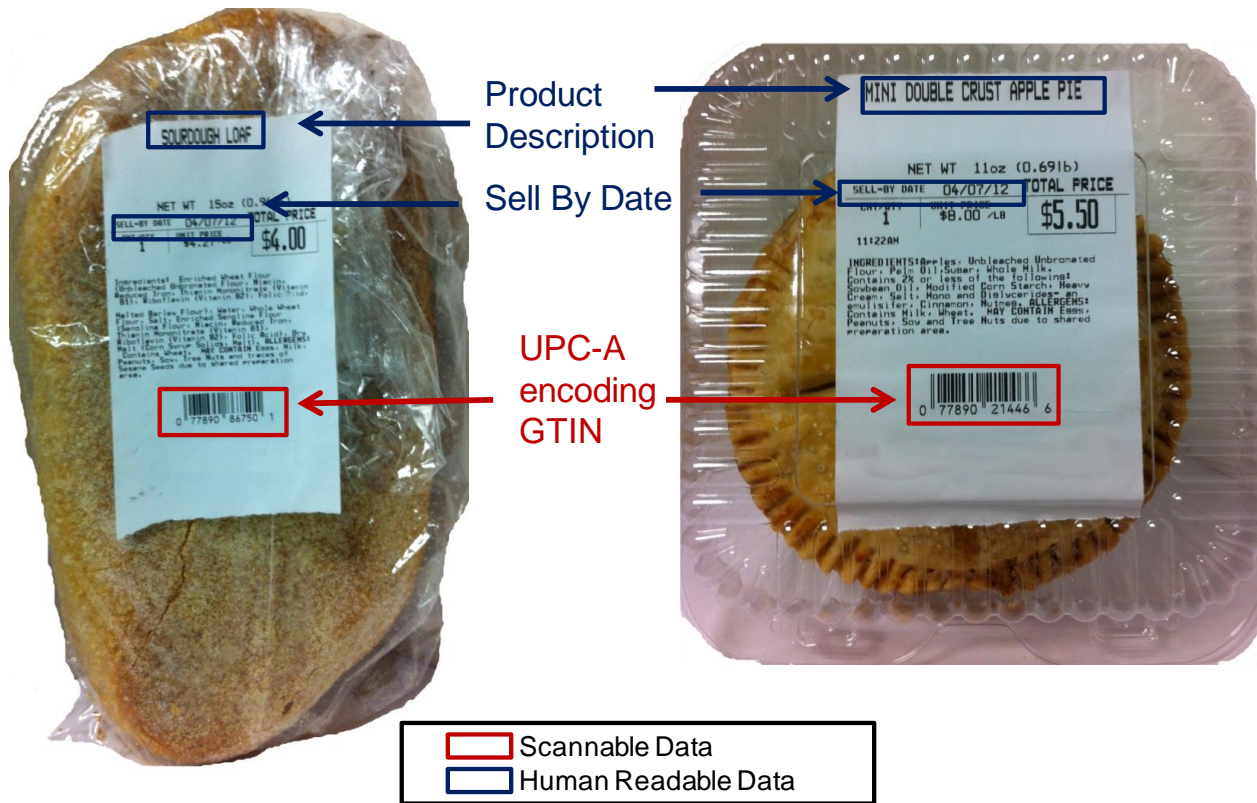
5.2.1. Minimum Required Data

Because of differences in production practices and bar code size constraints, traceability labeling practices vary depending on the type of dairy, deli, and bakery product produced. The primary difference is between fixed / variable-measure products and store-processed / further-finished products. These differences are summarized in **Figure 19** below:

	Scan Length	Fixed / Variable Weight		Store Processed / Further Finished	
		Human Readable	Scan	Human Readable	Scan
Brand Owner/Company Name	N/A	●		●	
Consumer Item Product Description	N/A	●		●	
Batch/Lot Number as defined	2+ Maximum of 20	●	●	●*	
Global Trade Item Number (GTIN)	2+14	●	●	●	●*
Open Date Label (Best-Before-Date, Sell-By-Date, Use-By-Date etc.)	N/A	●		●	

Human Readable = label text; Scan = Bar coded;
* = Use Serial Number when present on case and use Batch/Lot Number if no Serial Number present on case.

Figure 19 - Case-Level Data Requirements for Traceability

Both variable-measure and fixed-measure product cases must be clearly labeled with the same human-readable core traceability information. Human-readable numbers should be clearly labeled as data elements such as the text "Batch Number" followed by the batch number value. Human-readable numbers located below each GS1 bar code are not considered to meet the human readable requirement because they are not clearly labeled data elements.

5.2.2. Bar Code Recommendations

Note that the ITF-14 bar code used today by many manufacturers includes only the GTIN and not the Batch/Lot or Serial Number in a scannable form. The GS1-128 bar code format is the preferred format to be used at the case level to communicate both of these critical traceability data elements. It should be adopted, if not currently in use, to best facilitate information sharing for traceability processes. Additional details on GS1-128 bar codes can be found in **Section 6.2**.

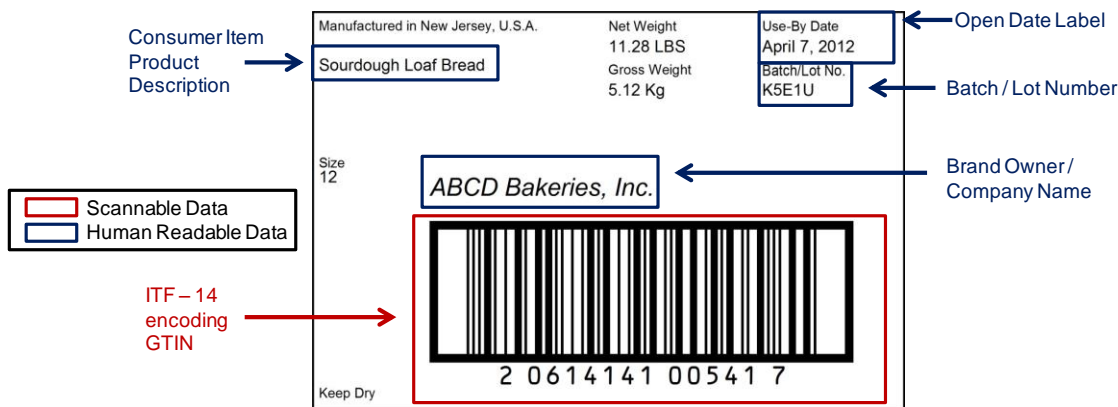**Figure 20** is an example of a fixed-measure case label that contains all of the required traceability information:

Figure 20 - Fixed-measure Case Label

5.2.3. Date Use Recommendations

The use of dates is required by distributors and retailers to know how much shelf life the product has remaining. The type of product date used depends upon the business segment being served by the product. Most products destined for retail shelves use a Sell-By Date. Foodservice customers generally are interested in the age of the product, so product destined for foodservice may use a production date. Others may prefer other formats and any of four dates (Sell-By, Use-By, Best Before, and Pack) could be used.

5.3. Requirements for Shipment Traceability

Bills of Lading (BOL) and Manifests are paper-based documents created by a supplier or shipper and sent with a shipment or order to the product recipient. The Bill of Lading is the legal document summarizing information about the goods being transported. The Manifest document describes individual order details such as product GTINs, individual case weights, etc. Advance Ship Notices (ASNs) are electronic messages created by the shipper and sent to the recipient using Electronic Data Interchange (EDI) and are used to communicate similar shipment information as the Bill of Lading and Manifest.

The traceability data elements required for ASNs are the same for all dairy, deli, and bakery products including fixed-measure and variable-measure items as well as refrigerated and shelf-stable products. Best practices require the following data elements to be included in the paper-based Manifest and/or the electronic ASN:

- Global Trade Item Number

- Batch/Lot or Serial Numbers

- Quantity shipped

- Shipping and Receiving Dates

- Ship From and Destination Locations

In addition, the following information may be included as appropriate for your records:

- Stock Keeping Unit (SKU) or other supplier product identification reference

- Production Date - **IF** Product is for retail store-processing or foodservice use

- Sell-By Date **OR** Best-By Date - **IF** applicable

The shipment information includes the capability to define relationships between the shipment, purchase orders, pallets, and cases present in the order and the traceability and logistical management data for each. These relationships should be clearly defined at the shipment level in each electronic message. See **Section 6.5** for additional information about ASNs.

5.4. Maintaining Traceability for Logistics Units from Dairy, Deli, Bakery Providers

Dairy, deli, and bakery supply chain partners deliver product in various logistic units. A logistics unit is an item of any composition established for transport and/or storage that needs to be managed through the supply chain. Examples can include cases, trays, crates, carts, pallets etc. Each logistics unit should be individually traceable. Information used to insure traceability includes:

- Provider Identity
- Origin information
- Purchase Order Number or Live Receiving Ticket of received product
- Date of Shipment and Receipt
- Carrier Name and Trailer Number
- Item identification and piece count for each GTIN
- Batch / Lot code for each case

Any treatment used in the production process that changes the original core product must be traceable. This is accomplished by associating each product lot identification number with the GTIN and Batch/Lot Number of the output product it is used to produce. Treatments can include combining or blending ingredients, curing, smoking, baking, seasoning, partially or fully cooking, etc. Further-finishing activities such as filling, decorating, topping, repacking, portioning, etc. also need to be traceable as they can add ingredients or change the product into a new item.

Products that are modified with additional ingredients or further finishing must be packaged under the brand identity of the company performing the modification (i.e., the retail store). The last entity changing the product becomes the "brand owner" and must assign their company's unique GTIN.

Product sourced from other suppliers should be identified by the GS1 Global Trade Item Number (GTIN) and Batch/Lot Numbers provided by the supplier. 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 supplier's internal systems prior to being processed or traded.

GTIN and Batch/Lot or Serial Number information should be shown on individual case labels. The GTIN and Batch/Lot or Serial Number of each input product must be associated with the GTIN and Batch/Lot Number of the output product to maintain traceability. Refer back to the example in **Section 3** to see how the Batch/Lot number is indentified as the item is transformed to its new form.

5.5. Maintaining Traceability in Sustainability Assurance

This guide has been designed for the purposes of complying with traceability requirements for food safety. The processes and information that are collected and maintained under a food-safety traceability program can also be utilized to provide sustainability information to stakeholders who have a need for sustainability. This implementation guide will enable tracing of product, both in machine and human readable form, from its source to the end user, covering all levels of the supply chain needed for dairy, deli, and bakery product tracing for sustainability. In light of this, and in order to avoid unnecessary duplication or conflicting requirements that would add substantial costs to dairy, deli, and bakery traceability, a system created by these guidelines will be sufficient to satisfy stakeholders sustainability needs.

The dairy, deli, and bakery industry best practices for organizing sustainability-related information associates that information with the input lot at the point of first receipt, where it can be tracked through the supply chain. This information by input lot then is associated with the GTIN and Batch/Lot Number of the output product for which it is used and can be retrieved upon request.

The sustainability data that needs to be collected and made available up the supply chain will vary depending upon the type of product, the manner in which it is produced and processed, the market, and legal or customer requirements. In the dairy, deli, and bakery facilities/operations that have achieved certification as sustainable or compliant with established best practices may obviate the need for detailed information related to the production of dairy, deli, and bakery products produced by that operation to be included in a detailed trace. Simply put, the best practices established for lot traceability will be capable of including sustainability information. The guide will assist each segment of the supply chain as it works with their suppliers and customers to develop the specific list of needed information, the method of documenting the information within their internal systems, and the method for sharing the information with their trading partners.

5.6. Industry Practice for Product Dating

Although the product date is not used at the case level for traceability, it is related to the product Batch/Lot number and because the product date is critical for inventory management, it typically appears on the case and consumer item label. Select the appropriate date type for your company based on the best practice recommendations below:

Product Type:

- o **Minimally-Processed, Refrigerated, (or Frozen) Items** – Use the Production Date.

- o **Further-Processed Foods** – If the process alters the life of the product such as cooking or freezing a refrigerated product, the appropriate date is the Packaging Date.

- o **Cutup and Repacked Items** – Neither of these changes the useful life of the product.   The original Production Date should be on the case label as described above. The process step of cutup or repack, however, should be traceable by the Batch/Lot Number.

- o **Otherwise Blended or Further-Finished** items – These blended or further-finished items, intended for use in other processes or consumption should be identified by a Use-By date. By using a Use-By date, the items can be produced to satisfy volume needs without regard for final use. The Use-By date should be calculated based on the characteristics of the item(s) used to produce the product.

Date Type:

- o **Production Dating** – To represent the actual production date, use the Production Date. For uses that require knowing the age of refrigerated items, this is an appropriate method.

- o **Packaging Dating** – This type of dating should be used if the process alters the life of the product such as cooking or freezing a refrigerated product. With this type of situation the appropriate date is the Packaging Date.

- o **Sell-By Dating** – This date should be used on product destined for, and that will be viewed by, end customers.   Examples of this would be fresh tray pack items.

- Use-By Dating / Best-By Dating – This type of date should be used where product is going to be used in another process. Its advantage is that it shows the user the last date a product can be used.

Additional information regarding product dating can be found in **Section 9.5**.

6. Best Practices for Maintaining and Advancing Traceability

Traceability processes are only as good as the weakest link. Therefore it is important for all participants in the supply chain to understand the value of collecting and maintaining product information that supports a product recall, but at the very least, be able to provide "one up/one down" traceability. Further detail on specific logistics information required can be found in **Section 7.6**.

Best practices for maintaining traceability throughout the supply chain is for all members to review their procedures for handling product and identify the Critical Tracking Events from the time product is created/received until the time it leaves their facility. The Key Data Elements that support the Critical Tracking Events should be captured and stored. Refer back to **Section 3** for additional information on Critical Tracking Events and Key Data Elements.

Supply chain partners should discuss and agree upon which Critical Tracking Events to identify, the corresponding Key Data Elements to be captured, and the format required to share between each partner. When agreeing upon Events to track, be sure to keep in mind the reporting requirements of any government body such as the FDA and, that different partners may have different needs based upon their processes.

The best practice for capturing information throughout the supply chain is to capture all previously agreed to traceable information and store it within your system by scanning the information directly from the case and/or consumer item bar codes. 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. As such, it can improve data accuracy by reducing or eliminating errors. The accuracy and efficiency gained by scanning data make it a preferred method to manual entry.

While the process of scanning consumer items at retail point of sale is fairly commonplace, scanning cases from distribution centers to a store or operator is an exception today. However, more and more manufacturers, processors, distributors, wholesalers, and retailers are putting these processes in place to collect and store at least the minimum product information required to support traceability. It is recommended that product be scanned as it enters a distribution center, as it is shipped out of the distribution center, as it is opened for processing or consumer display, or as it is received at a retailer store or foodservice operator to meet traceability requirements.

It is also recommended that all supply chain partners mimic the product information data provided by their supplier to provide a holistic view of the supply chain. In other words, product and information flows from shipper to receiver, so receivers should minimally provide the same information provided by the shipper when it comes time for them to ship product from their warehouse. Keep in mind, the more visibility you have about products moving along the supply chain, the more accurate information you can act upon in your traceability program.

The best practices discussed in the following sections for labeling consumer units and cases are not meant to imply immediate investment and/or implementation for traceability effectiveness. Rather, they are meant to provide a view toward future opportunities for planning purposes. Other fresh food industries are beginning to transition into using the GS1 DataBar bar codes in their businesses as a more efficient means of identifying, capturing, and storing information. As such, it is highly encouraged to discuss these recommendations with your supply chain partners so the functionality can be included as plans are made for future system upgrades.

6.1.   Best Practices for Labeling Consumer Items for Traceability

Historically, many of the fresh food categories have used the UPC-A Bar Code or U.P.C. Number System 2 bar codes to identify fixed and variable-measure items at the consumer item level (See **Section 2.3**). While effective for point of sale or service activities, they are limited in the amount of information that can be captured and shared for traceability purposes. Due to this limitation, most traceability plans today rely on human readable, or a combination of scannable and human readable elements. In order to accommodate all of the traceability needs in the most efficient manner, the GS1 DataBar Expanded and GS1 DataBar Expanded Stacked bar codes were developed to combine this information, and their use is considered best practice for capturing traceability data at this product level.

The GS1 DataBar® symbology standard allows for up to 74 numeric characters or 41 alpha/numeric characters of information to be included on a consumer item bar code. The two versions are designed to encode primary (item identification) and extended data (open dating information) on items for point of sale or service and several other applications. Different formats of the GS1 DataBar (GS1 DataBar Omnidirectional and GS1 DataBar Stacked Omnidirectional) can be found today in other food categories (such as produce), but these formats only include item identification information (GTIN). The expanded formats provide the necessary information for traceability purposes. Once this symbology is adopted, all product information required for traceability can be encoded into the bar code. The need to combine human readable information with the scannable information will no longer be necessary as the required information for traceability can be included on each unit. Perishables, pharmaceuticals, and coupons are implementing GS1 DataBars first as work has been underway for a few years to develop their requirements.

The GS1 DataBar Expanded symbology will also enable the dairy, deli, and bakery industry to move away from the retailer specific U.P.C. Number System 2 bar code which does not support the encoding of a GTIN. The DataBar Expanded bar code can be used on variable-measure, variable-price, and store-processed items and will greatly aid in the ability to capture traceability information electronically as product flows from a retailer to the consumer.

The GS1 DataBar bar codes use one or more Application Identifier (AI) to explain the nature of the data that immediately follows. Application Identifiers precede an element string to identify its format and meaning. AIs are identified by parenthesis only in the human readable format. The parenthesis is not a character in the scannable format. The chart below identifies common AIs, their format, and meaning:

Application	Application Identifier	Format of the Element String					
Batch or Lot Number	**1 0**	X_1 ------- variable length ------> X_{20}					
		Year		**Month**		**Day**	
Production Date	**11**	N_1	N_2	N_3	N_4	N_5	N_6
Packaging Date	**13**	N_1	N_2	N_3	N_4	N_5	N_6
Best Before Date	**15**	N_1	N_2	N_3	N_4	N_5	N_6
Expiration Date	**17**	N_1	N_2	N_3	N_4	N_5	N_6

Note: Year * - the tens and units of the year (e.g. 2003 = 03), which is mandatory
The determination of the correct century is explained in section 7.13 of the GS1 General Specifications
Month - the number of the month (e.g. January = 01), which is mandatory
Day - the number of the day of the relevnt month (e.g. the second day = 02), if if is not necessary to specify the day, the field must be filled with zeroes

Figure 21 - Common Application Identifiers, Definition and Format

Referring back to the list in **Section 5.6** regarding product dating and using the chart above, the corresponding Application Identifiers can be applied to each as described below:
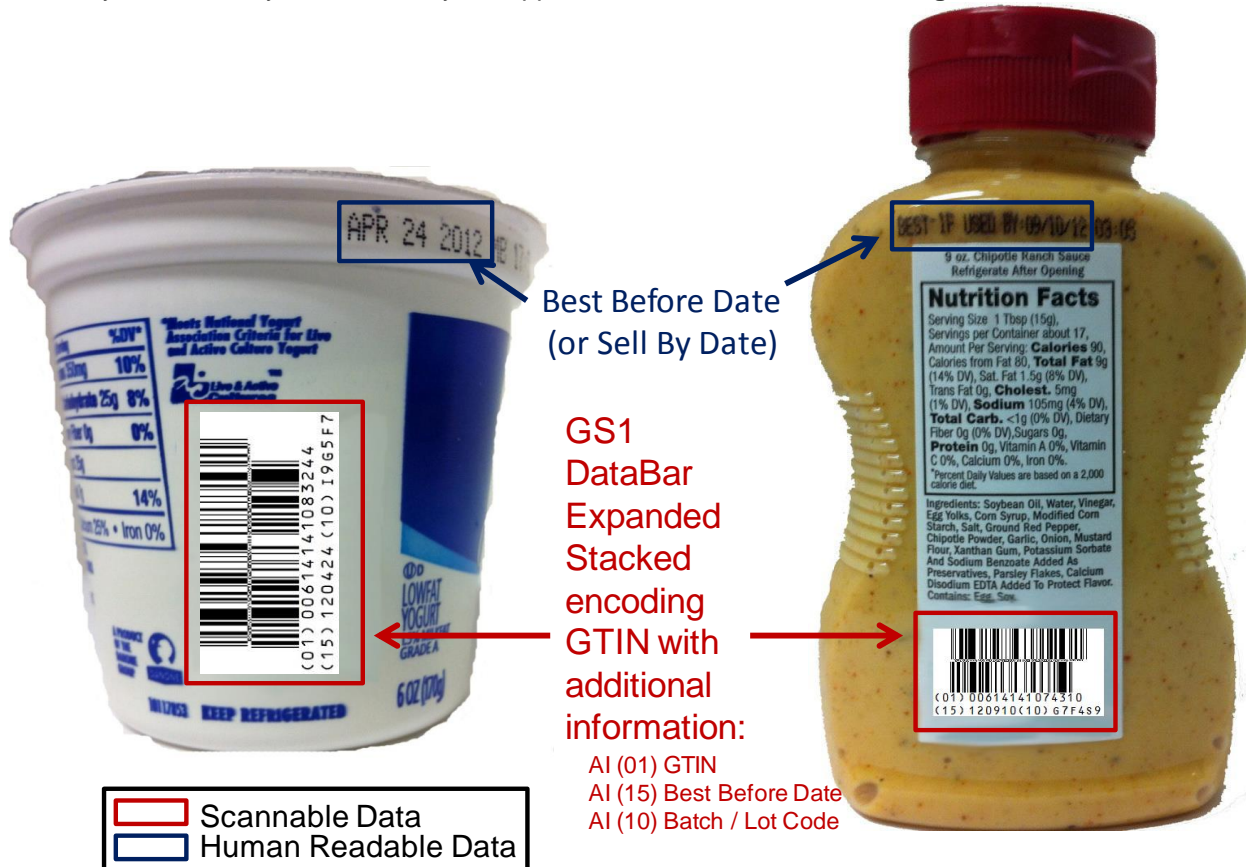
Product Type:

- o **Minimally-Processed, Refrigerated, (or Frozen) Items** – Use the Production Date, AI "11".

- o **Further-Processed Foods** – Use the Packaging Date, AI "13".

- o **Cutup and Repacked Items** – Use the Batch/Lot Number, AI "10".

- o **Otherwise Blended or Further-Finished** items – Use the Use-By date, AI "17".

Date Type:

- o **Production Dating** – Use the Production Date, AI "11".

- o **Packaging Dating** – Use the Packaging Date, AI "13".

- o **Sell-By Dating** – Use the Best-Before Date AI "15".

- o **Use-By Dating / Best-By Dating** – Use the Expiration Date AI "17".

Even though logistics supply chain professionals may be able to interpret application identifier code numbers (such as "10" = Batch/Lot number), the application identifier is not a substitute for a clearly-labeled data element. The Human Readable Interpretation of data in a bar code should be shown below the symbol. The characters should be clearly legible and must be obviously associated with the symbol. See the example below for clarification.

Figure 22 shows the same consumer units in **Section 5.1** with a GS1 DataBar Expanded Stacked bar code that enhances traceability by allowing the product GTIN (AI "01") and other extended information as noted to be scanned at the point of sale. Note the format, which has the Application Identifiers separated by parenthesis, followed by the data. The GTIN is always first, followed by the other identified elements. The other elements can be in any order as they are defined by the application identifier as defined in **Figure 21**.
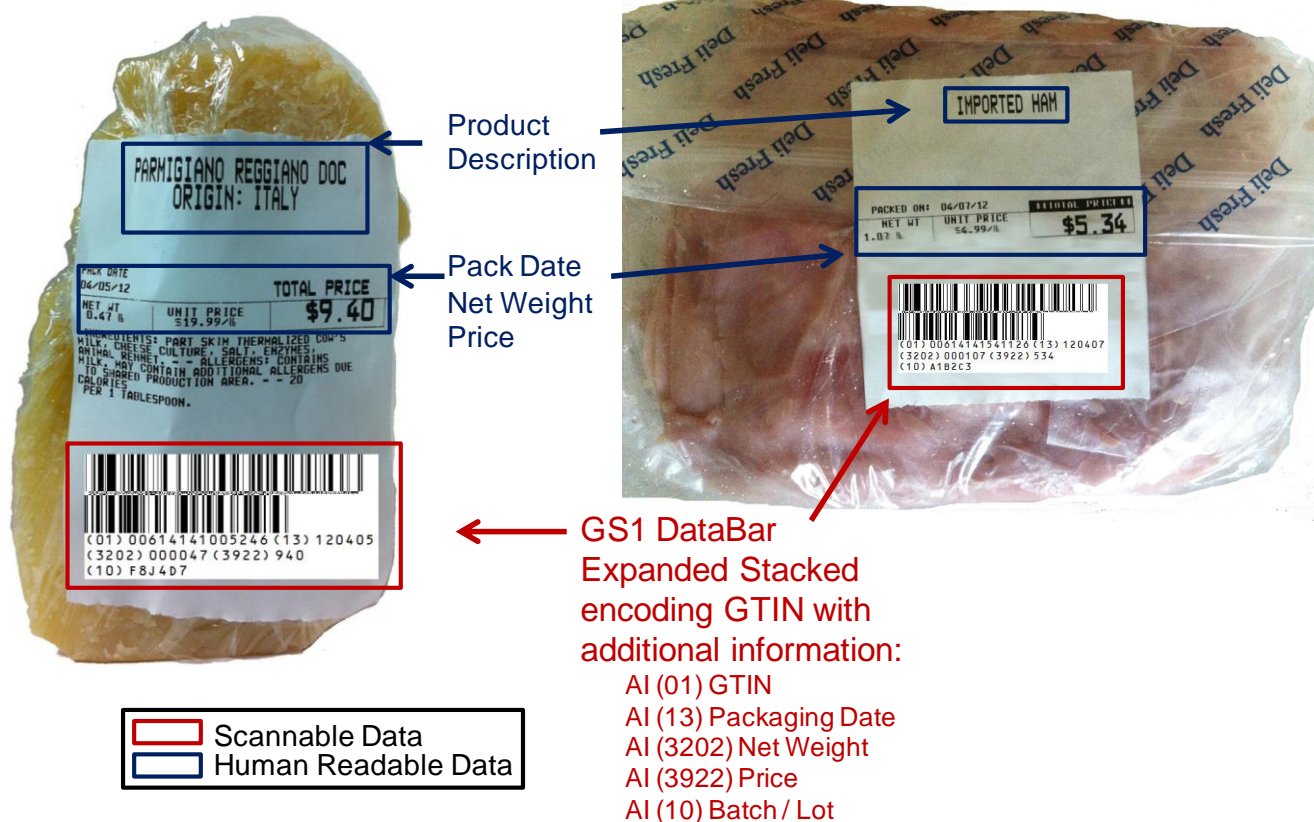

Best Before Date (or Sell By Date)

GS1 DataBar Expanded Stacked encoding GTIN with additional information:
AI (01) GTIN
AI (15) Best Before Date
AI (10) Batch / Lot Code

Scannable Data
Human Readable Data

Figure 22 - Fixed and Variable-Measure Consumer Item Labels with GS1 DataBar bar code

For implementation information about the GS1 DataBar, go to http://www.gs1us.org/resources/standards/gs1-databar

6.2. Best Practices for Labeling Cases for Traceability

The minimum requirements for case level traceability call for a combination of the GTIN and Batch/Lot or Serial Number. The best practice for case level traceability is achieved by electronically capturing the traceability information of the case and associating that information with all movements of that product throughout the supply chain. This is best achieved through barcode scanning and then the use of an electronically transmitted Advanced Ship Notice, or ASN. (See below for additional information regarding ASNs). The case equivalent to the GS1 DataBar, the GS1-128 bar code format is the recommended format to support electronic data encoding within the bar code for traceability for both fixed- and variable-weight cases as it is the bar code format that enables the encoding of the GTIN and Batch/Lot or Serial Number.

Figure 23 shows the case label from **Section 5.2** with a GS1–128 bar code. Scanning the bar code captures all of the Key Data Elements required for traceability. The human-readable elements are still present, but not required to be manually recorded if scanning technology is used.

Figure 23 - **Case Label Best Practices**

Figure 24 details the flow of case & consumer item traceability information within a dairy, deli, and bakery retailer. Note that the Sell By date is captured at the point of receipt and shared throughout the process providing traceability from the original case through point of sale purchase.
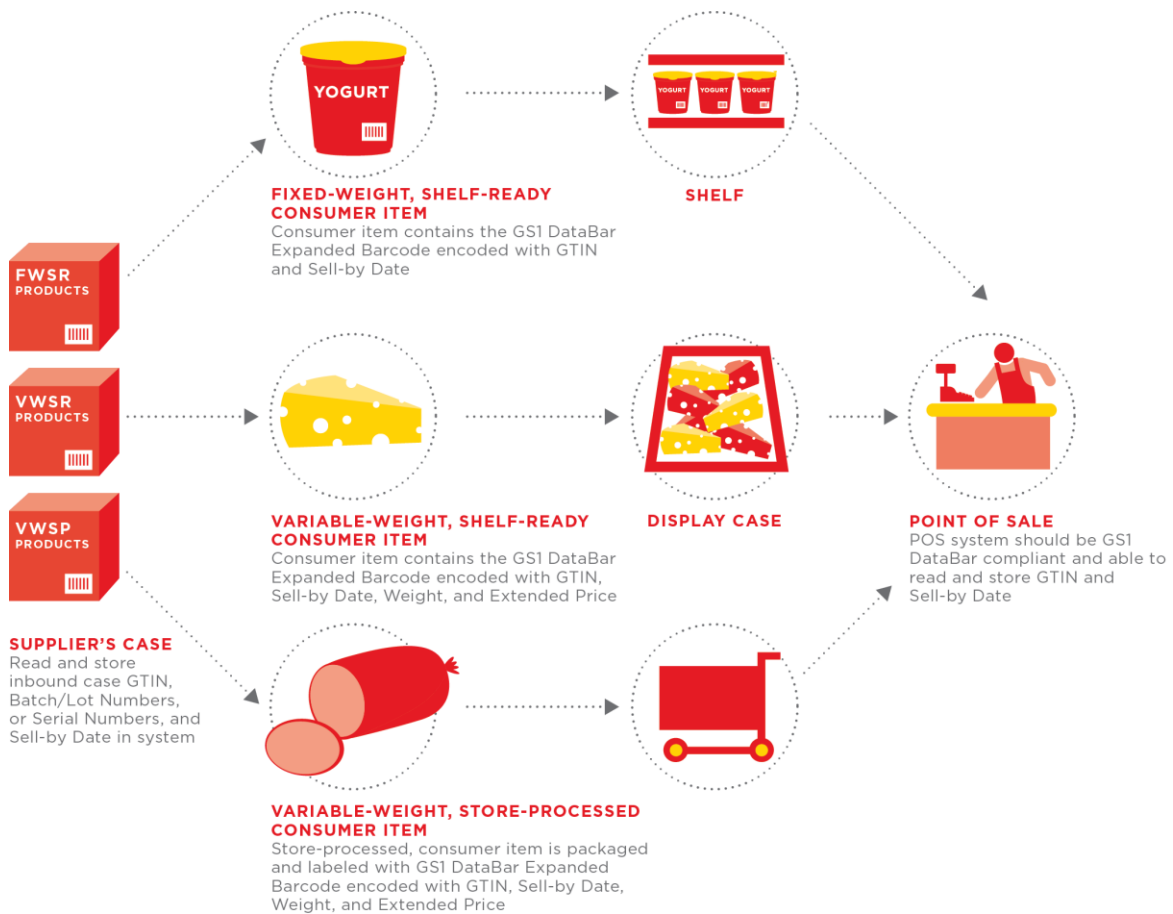

Figure 24 - Consumer Item Flow and Traceability

6.3. Best Practices for Pallet Traceability

Once cases have been picked and placed on a pallet, the best practice is to assign a GS1 Serial Shipping Container Code (SSCC) to each pallet. The SSCC uniquely identifies a logistics unit (i.e. box, tote, pallet, cargo container, trailer etc.) that make up the unit. Each SSCC number is unique to the individual logistics unit and is based on your company's GS1 Company Prefix number. This ensures unique SSCC numbers world-wide. The SSCC is typically part of a larger label affixed to the pallet. Additional information may be shown on the label, depending on the requirements of the trading partner. Most often the additional human-readable information includes the shipper name and address, carrier, and the delivery information.

When using a SSCC, this shipment identification exists only for the duration of the shipment between trading parties, as shipments are broken down upon arrival, it is not intended to be considered a primary identifier for product traceability. However, it can provide some links when contents are related to the larger shipment identifier. Unique shipment identification information may be used as a reference, along with other document identification such as Bills of Lading, Manifests, Shipping Notice, etc. 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 currently in the supply chain. The best practice is to not re-issue an SSCC number for a period of at least one year.

Additional information regarding the use of SSCCs can be found at:
http://www.gs1us.org/resources/standards/sscc

Figure 25 is an example of a pallet label from ABC Company as they shipped product to Pilot Processing at the end of **Section 3**:

Figure 25 - Pallet Label with SSCC

6.4. Capturing Product Data

Capturing logistics unit and product information *electronically* upon receipt (or manufacturing) is considered best practice to manage traceability and product inventory. The use of GS1 Standards for marking products (GTINs) and pallets (SSCCs) in the supply chain is a primary enabler for maintaining product visibility throughout the supply chain. The example below shows a pallet comprised of multiple cases of two different items (GTINs). The shipper creates the SSCC, places it on a label on one of the cases on the pallet, and sends the data to the receiver via an ASN.

(Note: To fully utilize the SSCC, it should be used in conjunction with an EDI 856 Advance Ship Notice (ASN). The SSCC can then be used as a reference key to additional logistical information provided in the ASN.)

SSCC:
(00)006141411234567890

GTIN:
(01)90614141052960

GTIN:
(01)90614141083247
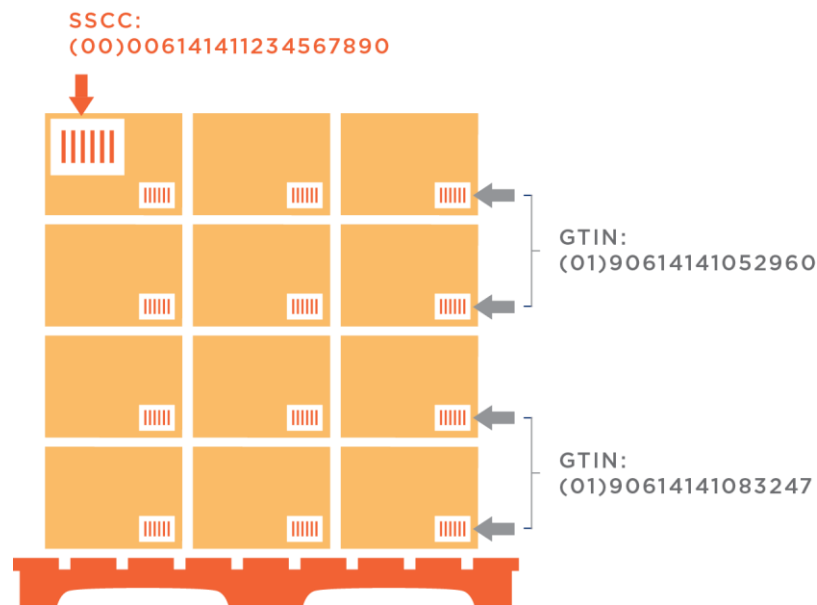
Figure 26 - A pallet of multiple products identified by a SSCC

Upon arrival, the receiver confirms the SSCC by scanning the label which validates and links the information from the previously received ASN to decode the data. Without the SSCC, the receiver would need to scan each of the cases individually to get the same information. Receiving ASNs can be used to access information for all aggregated product on that shipping unit via the SSCC.

When orders are shipped, scanning the SSCC from the shipping unit and using the information from the ASN can provide some of the traceability information for the receiver. If that shipping unit has not been re-configured since its original configuration (i.e., the scan of the SSCC tied to the ASN information), it may be used to support traceability. It is the "owner" of the shipping unit configuration that is responsible for the accuracy and the attributes that are associated with the product configured on the shipping unit. The use of human readable information captured is used in conjunction with electronic scanning. As a result, today the traceability processes are dependent on both electronic and human readable traceability information.

When breaking the pallet down to a warehouse item or a consumer item, the best practice is to scan the unit and link it to the "parent" of the configuration.

6.5. Advance Ship Notice (ASN)

The Advance Ship Notice (ASN) is an electronic data file sent from shippers to receivers via Electronic Data Interchange (EDI) and can be used as an efficient alternative to pallet/case scanning. The ASN serves as an electronic packing slip by identifying all items (and their captured attributes such as Batch/Lot code) on a delivery. ASNs should arrive prior to delivery and can improve productivity and accuracy by reducing keying errors and processing time. Companies that use ASNs only need to scan the SSCC of each high level logistics unit in the shipment rather than each case in the shipment individually.

Similarly, companies that break down shipping units and restack cases onto outbound shipping units should scan case and pallet bar codes and create a new ASN to be sent to the subsequent receiver of the product. In this way, the flow of traceability information for that product is always efficiently available to all partners in the supply chain.

If ASNs are not exchanged between trading partners, the Key Data Elements (**Section 3**) for the shipping transaction need to be captured and stored by the shipper. Similarly, the receiver needs to capture the Key Data Elements for the receiving transaction.

Below shows the best practice flow of traceability information at the case level for retailers using the ASN:

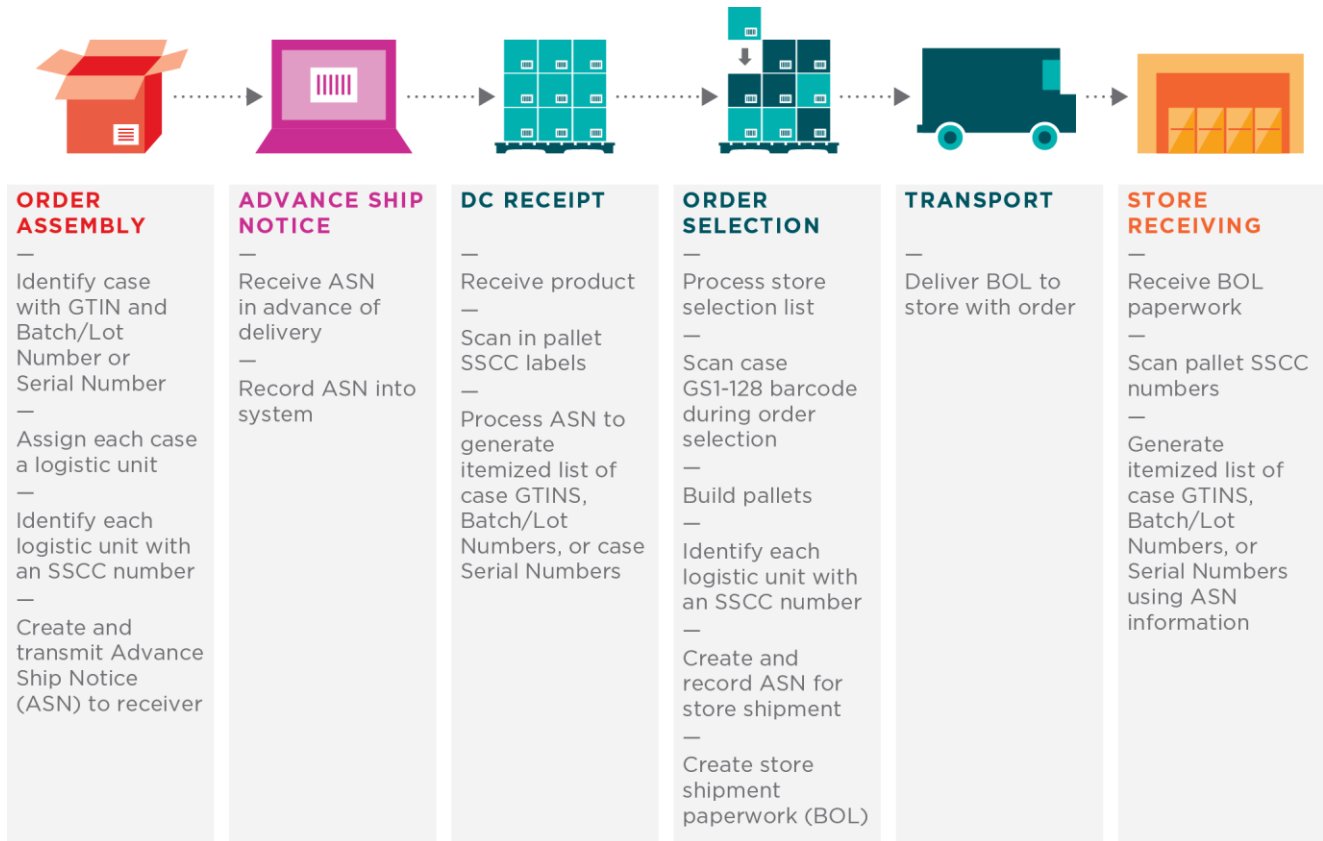| ORDER ASSEMBLY	ADVANCE SHIP NOTICE	DC RECEIPT	ORDER SELECTION	TRANSPORT	STORE RECEIVING
—	—	—	—	—	—
Identify case with GTIN and Batch/Lot Number or Serial Number	Receive ASN in advance of delivery	Receive product	Process store selection list	Deliver BOL to store with order	Receive BOL paperwork
—	—	—	—		—
Assign each case a logistic unit	Record ASN into system	Scan in pallet SSCC labels	Scan case GS1-128 barcode during order selection		Scan pallet SSCC numbers
—		—	—		—
Identify each logistic unit with an SSCC number		Process ASN to generate itemized list of case GTINS, Batch/Lot Numbers, or case Serial Numbers	Build pallets		Generate itemized list of case GTINS, Batch/Lot Numbers, or Serial Numbers using ASN information
—			—		
Create and transmit Advance Ship Notice (ASN) to receiver			Identify each logistic unit with an SSCC number		
			—		
			Create and record ASN for store shipment		
			—		
			Create store shipment paperwork (BOL)		

Figure 27 - Best Practices for Pallet/Case Level Traceability using ASNs

6.6. Application of Existing and Future Technologies

While none of the technologies listed below are currently required by the Dairy, Deli, and Bakery Industry Traceability Implementation Guide, they do enable a standardized way to capture and maintain data for the purposes of traceability. Unique identification (the GTIN) is the key and the link to making use of these technologies and solutions.

Electronic Data Interchange (EDI) is used by most organizations as a means to exchange transactional data about business processes among trading partners including purchase orders, invoices, receipt of product, etc.

EPC-enabled RFID (Electronic Product Code Radio Frequency Identification) has made some inroads in the logistics area of the supply chain and at the item level for some categories of products. While not a requirement by the Dairy, Deli, & Bakery traceability guidelines, RFID technology, when applied to the some levels of the product hierarchy, has shown potential to be a contributing technology for enabling traceability. EPC® tags can contain a number of different types of data including a serialized version of a GTIN (SGTIN).

EPC Information Services (EPCIS) is a standardized means of exchanging data about the physical events of a product throughout its lifecycle; these physical events describe Critical Tracking Events (CTEs) as defined by the Institute of Food Technologists (IFT) to enable traceability.

The Global Data Synchronization Network™ (GDSN®) facilitates product description information at all levels of the packaging hierarchy. With a standard, choreographed method for exchanging product attributes, trading partners can achieve quality master data for use not only in their traceability processes, but also in everyday business processes from order to cash and in labeling activities.

Rapid Recall Exchange™ is an online service that applies industry expertise and best practices to standardize product recall and withdrawal notifications between retailers/wholesalers and suppliers. The service enables prompt and accurate information exchange to protect customers and save trading partners time and money. Rapid Recall Exchange takes advantage of global GS1 Standards to ensure accuracy and enhance speed of recalls. See **Section 7.10** for additional details.

7. Industry Recalls

7.1. Recall Goals

A primary objective of traceability is prompt and accurate identification of product along the supply chain. The overriding goal of any recall is to ensure that targeted product is quickly and easily identified, removed from the supply chain, and not consumed by consumers. A secondary goal is to minimize the amount of non-targeted product that may also be removed from the supply chain as part of a recall. This can be accomplished by ensuring that the target items are identified using their unique identification numbers.

Note that regulatory bodies define a *Product Recall* and a *Market Withdrawal* as two distinct situations as described below. This document will incorporate guidance for both situations under the term "Recall".

7.2. Recall Terminology

<u>Case label</u> is a printed label affixed to a case of product that identifies the Brand Owner/Company Name, Consumer Item Product Description, Batch/Lot number, GTIN, and Open-dating format which is specific information about the product placed in the case. Similar information may be printed on the shipping case in lieu of a label.

<u>Case label panel</u> is the side of a case to which the case end label is affixed. This is typically the shortest vertical surface of the case. The case end panel may also contain printed, non-lot specific information such as the supplier's name and address.

Case product is product that has not been removed from the supplier's shipping container, which is typically a case.

Human-readable information is information printed on the case label, or case label panel, and understandable without special training or knowledge of code values or syntax. The print should be of a size sufficient to be readily noticeable, and legible.

Market Withdrawal is a firm's removal or correction of product that involves minor infraction that does not cause product to be adulterated or misbranded.

Recall is a firm's removal of distributed products from commerce when there is reason to believe that such products are adulterated or misbranded under provisions of various food safety regulations.

Recall notice is a notification from a supplier to a participant in the supply chain that provides sufficient product identification information to allow the participant to effectively identify and remove target product from the supply chain.

Targeted Product is product which is the subject of a recall or withdrawal and can be identified by specific and globally unique identification numbers.

Scannable information is information printed on the case label, or case label panel that is encoded in a bar code.

Scope is the range of the product being recalled.

Unique Identification Number(s) are data elements used to identify one group of products from another. They may include SSCCs, GTINs, Batch/Lot numbers or Serial numbers.

7.3. Recall Principles

In general, to execute a recall efficiently, information needs to flow throughout the supply chain to quickly and effectively identify the targeted product for prompt removal. This needs to be accomplished regardless of the technological capability of each supply chain partner. The information must be specific enough to accurately delineate the scope of the recall. This means defining the product and/or batch/lot of product (WHAT), the location the product was delivered to (WHERE), and the date/time of the delivery (WHEN).

To ensure preparedness in the event of a recall, every company should have a recall plan in place and simulate recall events regularly to test the effectiveness *and* timeliness of their traceability processes and systems.

7.4. General Recall Steps

The supply chain participant initiating a recall request must communicate at least the product identification and as much of the additional information listed below to their supply chain partners. Subsequently, the partners must communicate downstream to their partners until all of the targeted cases have been identified.

RECALL INFORMATION:
- Product identification or an attribute of the product
- Batch or lot codes
- Trading partners affected
- Location of the product
- Delivery date/time period
- Tracking information – Purchase Order #, Bill-of-Lading #
- Quantity

Notification to supply chain participants should include all the necessary information to help the partner identify where the targeted product is located within their distribution system. In turn, participants should identify back to the supplier how far into the supply chain the product has gone, and specifically, if any of the targeted product has reached consumers.

It is assumed that if the targeted product has reached store shelves or the foodservice operator, it has reached the consumer. If targeted product has reached consumers, public notification of a recall should be initiated and, if possible, supply chain partners should directly contact purchasing consumers.

Steps need to be taken to ensure that targeted product remaining in the supply chain does not reach consumers. This may mean removing product from store shelves or food prep areas, or placing product in the warehouse "on hold" to prevent further shipping. Targeted product should be marked and moved to a "quarantine" area to wait for further disposition.

Once all targeted product has been accounted for, guidance for disposition of any remaining in the supply chain is determined by the initiating party. Disposition generally involves destruction of the product or return to a designated facility.

7.5. Recall Scope

The scope of a recall notice can be as specific as a single product produced at a single facility on a specific date and time, or as broad as every product produced by a supply chain participant. The following are examples of recall scope:

- All products produced at a given facility, regardless of GTIN or production date

- All products of a given GTIN, regardless of production date

- Products of a given GTIN, produced within a specific date range

- Products of a given GTIN, produced within a specific date range, at a specific facility

- Products of a given GTIN, produced within a specific date range, at a specific facility, on a specific line

- Products of a given GTIN, with a given Batch/Lot Number or range of Serial Numbers

Remembering the Critical Tracking Events and the Key Data Elements discussed in prior sections, communicating a combination of product and organization identification data, such as the product GTIN and the participants' GLNs, along with transactional data about the physical flow of the products will best enable the successful retrieval of the targeted product. The granularity of the product information required is dependent upon the scope of the recall request. It is recommended that minimally, the information include the GTIN, Batch/Lot Number(s) (or Serial Numbers), and quantity regardless of the scope. Generally, two methods are used to identify targeted product:

1. **Human-readable identification** - in which targeted product is visually identified by an employee by reading the case label.

2. **Electronic identification** - in which the information is captured by scanning a case label or receipt of a supplier electronic message.

Typically a combination of human-readable and electronic identification is used to find all products in the supply chain. As an example, on a recall of a given Batch/Lot or Serial Number of a specific GTIN, employees of the retailer, wholesaler, distributor, or foodservice operator may visually review product cases in a cooler or warehouse to locate targeted product; or a warehouse manager will use the warehouse inventory management system to locate targeted product in storage.

Electronic identification can, in theory, be implemented as part of a regular inventory management process, depending on the extent of scanning within a company's operations. High visibility to the presence and location of targeted product throughout a company's distribution system can be achieved if cases are scanned:

a) Upon receipt and put away,
b) Prior to shipping from their distribution center,
c) Prior to further processing, or re-packing at the store, and
d) Consumer items at the point of sale scan with a GS1 DataBar Expanded bar code

A more likely scenario is identification through a combination of human-readable and electronic identification, or even human identification only. If a company lacks scanning ability within their facility, identification needs to be fully human-readable. Additionally, if retailers have not implemented the use of the GS1 DataBar Expanded bar code at the point of sale, then removal of product from the shelf must be accomplished through human identification.

It is the responsibility of the supply chain partner initiating the recall to provide all trading partners with both human-readable and scannable product identification information (when it exists) to support the use of both human-readable and electronic identification of recalled product.

7.6. Logistics Information

For all product recalls regardless of scope, the supplier/shipper must record and provide to all recipients the logistics information on targeted product deliveries. Logistics information includes the following data:

- Name, address and telephone number (fax and e-mail if available) of the shipper;
- Name, address and telephone number (fax and e-mail if available) of transporting company;
- Trailer or container ID if possible;
- Delivery location, on a facility by facility basis;
- GTINs, brand & item description, carton/case configuration and lot number(s) of each product;
- Total logistics units delivered to each location; and
- Delivery date, and if available delivery time and dock door.

Each recipient must also record this information, and confirm the date and quantity received.

7.7. Scannable Data

For all product recalls regardless of scope, the shipper must provide the recipient the information for the recalled product that is contained on the applicable bar code, for all product hierarchy levels. This must occur for all legs of the supply chain. If a company receives targeted product from their supplier and ships it to one of their customers, they act as a recipient and a shipper and must pass the information along.

Hierarchy Level	Bar Code Type	Bar Code Data
Pallet	GS1-128	SSCC
Case	GS1-128	GTIN and Batch/Lot Number or Serial Number
Fixed-Measure Item	UPC-A	GTIN
Variable-Measure Item	U.P.C Number System 2	Item Reference Number
Fixed-Measure and Variable-Measure Consumer Item*	GS1 DataBar	GTIN and Open Date Code (i.e. Sell-By Date)

*Available after GS1 DataBar Expanded adoption

Figure 28 - Scannable Recall Data

7.8. Batch/Lot and Serial Number Ranges

In a recall situation a shipper will provide either Batch/Lot or Serial Numbers to the recipient of the targeted product. Ideally the starting and ending Batch/Lot or Serial Numbers are provided when the suspect values are part of a range of numbers.

The effectiveness of any recall is in part dependent upon the ease with which recalled product can be identified. Providing non-sequential Batch/Lot or case Serial Numbers instead of sequences of Batch/Lot or Serial Numbers will significantly increase the complexity of a visual recall of product. It also increases the likelihood of all recalled product not being removed from the supply chain.

If a supplier is unable to provide a single or a limited number of numeric sequences to the recipient, other traceability information such as Production Date, Sell-By Date, or establishment number should be provided. While this will increase the likelihood of removing unrecalled product, the recipients need manageable product information that ensures the recall of all target products and the safety of all consumers.

7.9. Human-Readable Information

The human-readable information a shipper needs to provide in a recall varies depending on the scope of the recall. Shippers must provide to the supply chain partners the consumer item information, in addition to case information, that is needed to quickly and effectively identify and remove targeted product from consumer display cases. Shipper-provided information must be specific enough to accurately delineate the scope of the recall while respecting the staffing challenges that their supply chain partners face in recall situations. The following shows the human-readable information that would typically be provided for each type of product recall at the case or consumer item level:

- Supplier Company Name
- Supplier Product Number or Item Code
- Case-Level Product Description
- Date Information
- Quantity

7.10. Rapid Recall Exchange™

Industry supply chain participants are encouraged to use the Rapid Recall Exchange to initiate, target, deliver and receive comprehensive product recall and withdrawal information. Rapid Recall Exchange is an online service that provides a method for suppliers to communicate to retailers 24/7, alerting them that there is a product recall or withdrawal event. There may be other programs that perform similar functions.

Rapid Recall Exchange was commissioned by the Food Marketing Institute (FMI) Associate Member Advisory Board and developed by GS1 US (creators of the U.P.C. barcode system) in collaboration with FMI, the Grocery Manufacturers Association (GMA) as part of their commitment to enhanced food and product safety, brand protection and consumer confidence. It is also endorsed by the National Grocers Association (N.G.A.).

Rapid Recall Exchange was developed with input from a variety of industry sectors to provide a product recall or withdrawal notification process that can be used by food and fast moving consumer goods companies. Its capabilities and functionality are designed for all retailers, wholesalers, manufacturers and processors regardless of size and breadth of product line. Rapid Recall Exchange is available to all types of industry associations as a way for their members to enhance their recall capabilities.

A growing number of retailers, wholesalers and manufacturers of varying sizes and types subscribe to the Rapid Recall Exchange. The service is available through an annual individual subscription. The annual subscription

fee provides receipt of product recall notifications and withdrawals and associated communications and information. To learn more about the Rapid Recall Exchange go to: www.rapidrecallexchange.org.

8. Summary

The Bioterrorism Act of 2002 requires the establishment and maintenance of records to identify contact information and product data for immediate previous sources and immediate subsequent recipients (one step forward, one step back) of food, including its packaging. The Food Safety Modernization Act of 2011 affirms the Bioterrorism Act and is expected to require additional recordkeeping for high risk foods. To date, additional information has not been published detailing the identification of high-risk foods or additional traceability requirements. This guide recommends an additional voluntary approach in best practices for identifying and tracking of dairy, deli, and bakery products from processor/manufacturer to point of sale or consumption.

Traceability in the dairy, deli, and bakery industry can be implemented at a fundamental level across the supply chain when each trading partner can identify its product by GTIN and Batch/Lot or Serial Number and location numbers by either GLN or Batch/Lot Code. GS1 standards facilitate the ease of managing this traceability information electronically, and the adoption of case scanning, the use of Advanced Shipping Notice electronic messages, and the use and scanning of the GS1 DataBar Expanded on consumer packages at point of sale will dramatically enhance the effectiveness of supply chain to trace and recall dairy, deli and bakery products.

Adoption of the GS1 DataBar Expanded for item label applied at the retail level and the GS1-128 bar code formats encoding both the GTIN and Batch/Lot or Serial Number for case traceability processes provide the foundation for a successful traceability system. Additionally, capturing, storing, and sharing that information with your trading partners promotes timely and accurate traceability processes.

To be successful in this process, a trading partner that processes, packages, and/or labels product should ensure that all inbound product batches are linked to outbound product batches so that there is no breakdown in the ability to trace product flow through the supply chain. Minimum requirements for traceability may always depend to a certain extent on human readable information, but the best practice for all supply chain partners is to build a traceability process that allows for electronic data capture, storage, and retrieval of critical product traceability information for all product hierarchy levels throughout the supply chain, from the origin to the ultimate consumer.

9. Appendix and Reference Documents

9.1. Global Traceability Standard

http://www.gs1.org/docs/gsmp/traceability/GS1_Global_Traceability_Standard_i1.pdf

9.2. Establishment and Maintenance of Records

http://www.fda.gov/downloads/Food/GuidanceComplianceRegulatoryInformation/GuidanceDocuments/FoodDefenseandEmergencyResponse/UCM113920.pdf

9.3. Building the Fresh Foods Supply Chain of the Future

http://www.iddba.org/pdfs/roadmap.pdf

9.4. GS1 DataBar

http://www.gs1us.org/resources/standards/gs1-databar

9.5. Guidelines for Voluntary Open Dating of Food

The following is taken from *Guidelines for Voluntary Open Dating of Foods*, Open Date Labelling Task Force, National Food Processors Association, Washington, D.C., May 1999 and applies to shelf-stable, refrigerated, and frozen foods.

Definitions

- **Best Before/Best Before End/Better If Used By**

The date on the label or package signifies the end of the period under which the product will retain specific quality attributes or claims, even though the product may continue to retain positive quality attributes after this date. Safety of the shelf stable product is not in question beyond the specified date.

- **Sell-by Date/Pull Date**

These terms generally are used when the open date labelling is directed primarily to the retailer. This is the last date of offer for sale to the consumer. The product should not be marketed after this date. Safety of the shelf-stable product is not in question beyond the specified date.

- **Use By (Expiration Date)**

These terms generally are used when the open date is directed primarily to consumers. This date signifies the last date in which the quality attributes (i.e., nutrient content, color, flavor, texture) expected by the consumer are guaranteed. The product should not be marketed after this date. Safety of the shelf-stable product is not in question beyond the specified date.

9.6. GS1 Application Identifiers

Application Identifiers Relevant for the Dairy/Deli/Bakery Supply Chain

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

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

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

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

(FNC1): All GS1 Application Identifiers indicated with (FNC1) are defined as of variable length and must be limited by a Function 1 Symbol Character unless this Element String is the last one to be encoded in the symbol.

AI	Data Content	Format*	FNC1 Required
00	SSCC (Serial Shipping Container Code)	n2+n18	
01	Global Trade Item Number (GTIN)	n2+n14	
10	Batch or Lot Number	n2+X….20	(FNC1)
11 (**)	Production Date (YYMMDD)	n2+n6	
13 (**)	Packaging Date (YYMMDD)	n2+n6	
15 (**)	Best Before Date (YYMMDD)	n2+n6	
17 (**)	Expiration Date (YYMMDD)	n2+n6	
254	GLN Extension Component	n3+X….20	(FNC1)
30	Count of Items (Variable Measure Trade Item)	n2+n….8	(FNC1)
310 (***)	Net weight, kilograms (Variable Measure Trade Item)	n4+n6	
320 (***)	Net weight, pounds (Variable Measure Trade Item)	n4+n6	
330 (***)	Logistic weight, kilograms	n4+n6	
390 (***)	Applicable Amount Payable, local currency	n4+n….15	(FNC1)
391 (***)	Applicable Amount Payable with ISO Currency Code	n4+n….15	(FNC1)
392 (***)	Applicable Amount Payable, single monetary area (Variable Measure Trade Item)	n4+n….15	(FNC1)
393 (***)	Applicable Amount Payable with ISO Currency Code (Variable Measure Trade Item)	n4+n3+n…..15	(FNC1)
410	Ship to - Deliver to Global Location Number	n3+n13	
411	Bill to - Invoice to Global Location Number	n3+n13	
412	Purchased from Global Location Number	n3+n13	
413	Ship for - Deliver for - Forward to Global Location Number	n3+n13	
414	Identification of a Physical Location - Global Location Number	n3+n13	
415	Global Location Number of the Invoicing Party	n3+n13	
422	Country of Origin of a Trade Item	n3+n3	(FNC1)
423	Country of Initial Processing	n3+n3+n….12	(FNC1)
424	Country of Processing	n3+n3	(FNC1)
426	Country Covering full Process Chain	n3+n3	(FNC1)

9.7. Glossary

Term	Description
Bioterrorism Act of 2002	The Act includes a number of provisions designed to improve the food safety efforts of the Food and Drug Administration (FDA) in cooperation with U.S. Customs and Border Protection (CBP), including new authority to protect the food supply against terrorist acts and other threats.
Advanced Ship Notice	An electronic data file sent from a shipper to a receiver (prior to receipt) that contains information about a delivery.
Application Identifier (AI)	The field of two or more characters at the beginning of an Element String that uniquely defines its format and meaning.
Batch / Lot Number	A batch unites products/items that have undergone the same transformation processes. Batch and Lot are considered synonyms. GS1 Global definition: Reference number assigned by manufacturer to a series of similar goods or dairy, deli and bakery under similar conditions.
Bill of Lading	A legal document between the shipper of a particular good and the carrier detailing the type, quantity and destination of the good being carried. The bill of lading also serves as a receipt of shipment when the good is delivered to the predetermined destination. This document must accompany the shipped goods, no matter the form of transportation, and must be signed by an authorized representative from the carrier, shipper and receiver.
Brand Owner	The party that is responsible for allocating GS! System Identification Keys. The administrator of a GS1 Company Prefix
Case Ready Product	Products with information communicated by the supplier to the retailer that can be used by the retailer through their supply chain system to the point of sale to the consumer. Also know as Shelf Ready product.
Check Digit	A digit calculated from the other digits of an element string, used to check that the data has been correctly composed or correctly keypunched.
Consumer item	The trade item intended to be sold to the end customer.
Critical Tracking Event	Events that identify those core business processes where traceability data capture is vital to a successful traceability process.
Electronic Data Interchange (EDI)	The computer-to-computer exchange of structured information, by agreed message standards, from one computer application to another by electronic means and with a minimum of human intervention.
Event	An occurrence of a process in a specific time or a period of time.
External Traceability	External traceability takes place when instances of a traceable item are physically handed over from one trading partner (traceable item source to another (traceable item recipient).
Fixed-Measure	A term used to denote that a product's weight is constant from case to case or from item to item. It is sometimes known as set weight or fixed weight. A fixed-measure product is typically priced per selling unit rather than per weight.
Food Safety Modernization Act 2010	The Food Safety Modernization Act of 2010 aims to ensure the U.S. food supply is safe by shifting the focus of federal regulators from responding to contamination to preventing it
Further-Finished Product	Any treatment such as combining ingredients, cooking, curing, smoking, baking, filling, decorating, or topping that would change the original core product. May include repacking, portioning, seasoning, partially or fully cooking, or decorating.
Global Data Synchronization Network (GDSN)	The GS1 Global Registry and a network of interoperable, certified Data Pools that enable data synchronization per GS1 System standards.
GS1-128 barcode	A subset of Code 128 that is utilized exclusively for GS1 System element strings. Code 128 symbols have a special start code pattern (consisting of a Start Character in the first symbol character position followed by the Function Code 1 in the second character position) to designate the data that follows will comply with GS1 System standards

Term	Description
GS1 Company Prefix	Part of the GS1 System identification number consisting of a GS1 Prefix and a Company Number, both of which are allocated by GS1 Member Organisations. GS1 Member Organisations assign GS1 Company Prefixes to entities that administer the allocation of GS1 System identification numbers. These entities may be commercial companies, not for profit organisations, governmental agencies, and business units within organisations. Criteria to qualify for the assignment of a GS1 Company Prefix are set by the GS1 Member Organisations.
GS1 DataBar	A linear barcode symbology that is part of the GS1 System and has seven different configurations: 1. GS1 DataBar Omnidirectional, 2. GS1 DataBar Stacked Omnidirectional, 3. GS1 DataBar Truncated, 4. GS1 DataBar Stacked, 5. GS1 DataBar Limited, 6. GS1 DataBar Expanded, 7. GS1 DataBar Expanded Stacked.
GS1 DataBar Expanded Bar Code	A bar code 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 programmed Point-of-Sale scanners.
GS1 DataBar Expanded Stacked Bar Code	A bar code that is a variation of the GS1 DataBar Expanded Bar Code that is stacked in multiple rows and is used when the normal symbol would be too wide for the application.
GS1 Global Location Number (GLN)	The GS1 Identification Key comprising a GS1 Company Prefix, Location Reference, and Check Digit used to identify physical locations or legal entities. *GS1 Global definition*: Unique location number mandatory within the Global Data synchronization process to identify data owners/info providers, etc., such as Distributors, Brokers, and Manufacturers.
GS1 Global Shipment Identification Number (GSIN)	The GS1 Identification Key comprising a GS1 Company Prefix, Shipment Reference, and Check Digit used to identify unique shipments.
GS1 Global Traceability Standard (GTS)	A document that describes the traceability process independent from the choice of enabling technologies. It also defines minimum requirements for all organizations, industry sectors, countries, and corresponding GS1 Standards to be used in combination with information management tools. It can be accessed at: http://www.gs1.org/docs/gsmp/traceability/Global_Traceability_Standard.pdf
Global Trade Item Number (GTIN)	The format in which Global Trade Item Numbers (GTIN's) must be represented in a 14 digit reference field (key) in computer files to ensure uniqueness of the identification numbers. *GS1 Global definition:* A particular Global Trade Item Number, a numerical value used to uniquely identify a trade item. A trade item is any trade item (trade item or service) upon which there is a need to retrieve pre-defined information that may be planned, priced, ordered, delivered and/or invoiced at any point in any supply chain.
GS1 Global Returnable Asset Identifier (GRAI)	GRAIs identify a reusable package or transport equipment, such as pallets, barrels, milk crates, bossy carts, rail cars, and trailers. The GRAI is defined as a physical item with no reference to the contents and it enables tracking as well as recording of all relevant data.
GS1 Serial Shipping Container Code (SSCC)	The 18-digit GS1 System Identification Key comprising an extension digit, GS1 Company Prefix, Serial Reference, and Check Digit used to identify a logistic unit.
GS1 System	The specifications, standards, and guidelines administered by GS1.
GTIN Indicator Digit	The leftmost digit of a Global Trade Item Number in a GTIN-14. The digit '0' indicates a base unit Global Trade Item Number, digits 1 to 8 are used to define a packaging hierarchy of a product with the same Item Reference, and digit 9 indicates a variable measure trade item.
Human-Readable Data	Characters that can be read by humans, such as letters and numbers, as opposed to symbol characters within barcodes, which are read by machines.
Internal Process	A series of actions, changes or function(s) within a company or organization that brings about a result.
Internal Traceability	Internal traceability takes place when a trading 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.

Term	Description
ITF-14 barcode	A barcode symbol used by the GS1 System to carry Global Trade Item Numbers.
Key Data Element	The data captured during a Critical Tracking Event to support a successful traceability process.
Label / Case Markings	A tag, sticker, or printing on product packaging that provides information about the product inside.
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.
Master Data	Master Data describes each item and party involved in supply chain processes. Master data is defined as data having the following characteristics: • Permanent or lasting nature • Relatively static, not being subject to frequent change • Accessed/used by multiple business processes and system applications Can either be neutral or relationship dependant.
Open Dating	The marking of perishable food products with a clearly readable date indicating when the food was packaged or the last date on which it should be sold or used.
One Step Up, One Step Down Traceability	The ability to identify contact information and product data for immediate previous sources and immediate subsequent recipients
Party	A party (or) location is any legal, functional 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 GS1 Global Location Number.
Private-Label Product	Products where the retailer, distributor, or operator is the brand owner.
Process	A series of actions or steps towards achieving a particular end. Examples of common processes include Production, Transformation, Quality Control, Storage, Transportation, Movement, Recycle, Return, Packing, Receiving, and Traceability.
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.
Serial Number	A code, numeric or alphanumeric, assigned to an item for its lifetime. A unique individual item may be identified with the combined Global Trade Item Number and Serial Number.
Serialized Global Trade Item Number (SGTIN)	SGTIN is a method of identifying unique 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 and Item Reference (GTIN), combined with a Serial Number. Where UCC/EAN bar codes have traditionally been used, the SGTIN specification combined with an RFID tag can give visibility beyond the Item Reference right down to the exact Serial Number of the item.
Share	Act of exchanging information about an entity or traceable item with another Trading Partner.
Ship Date	GS1 Global definition: Date on which goods should be shipped or dispatched/despatched by the Supplier.
Ship from Location	GS1 Global definition: Identification of the party from where goods will be or have been shipped.
Ship to Location	GS1 Global definition: Identification of the party to where goods will be or have been shipped.
Shipment	An item or group of items delivered to one party's location at one moment in time that have undergone the same dispatchdespatch and receipt processes.
Shipment Reference Number	GS1 Global definition: The reference number assigned to a shipment.

Term	Description
Stock Keeping Unit (SKU)	An internal number or code used to identify a product within a company. It may be unique within a company, but NOT globally unique and not recommended for traceability.
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, Retailers, wholesalers, distributors, or operators.
Targeted Product	Product identified by a specific GTIN – Batch/Lot Code combination. Term commonly used in a recall or withdrawal process.
Traceability	Traceability is the ability to track forward the movement through specified stage(s) of the extended supply chain and trace backward the history, application or location of that which is under consideration.(GS1 Global Traceability Standard, issue 2) [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. This may be either Master Data or Transactional Data.
Traceable Item	A physical object where there may be a need to retrieve information about its history, application or location. The level at which the traceable item is defined within a product packaging or logistical hierarchy is dependent on the industry and degree of control required. Could be tracked, traced, recalled or withdrawn. 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. 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 fulfillfulfil the original request. The requesting party requires a response from the data source.
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 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.
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 include combining or blending ingredients, curing, smoking, baking, seasoning, partially or fully cooking
Transporter	The party that handles and or stores the traceable item from one point to another without transforming the item. They can receive, carry, and deliver one or more traceable items. The Transporter may only have "possession, custody, control" of a traceable item, as distinct from ownership.
Variable-Measure	A term used to denote that at least one characteristic of a product can vary whilst other characteristics remain the same. The variable characteristic may be weight, dimension, number of items contained, or volume information. A variable-measure product is typically priced on the true weight of the item rather than per selling unit.

THE GLOBAL LANGUAGE
OF BUSINESS

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