

Australian Dairy Traceability

Implementation Guideline v1.0



Forward

The Australian Dairy Industry Implementation Guideline has been developed to aid in the adoption of consistent business practices to effectively manage and improve traceability for the Australian dairy industry.

Consumers expect safe and nutritious dairy products. 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 dairy lots when problems are suspected or confirmed. Ensuring that effective practices are in place across a complex and global supply chain is an on-going challenge.

Traceability is a business process that enables trading partners to follow products as they move from the farm to retail store or food service operator. Each traceability partner must be able to identify the direct source (supplier) and direct recipient (customer) of a product. Traceability as a business process can be utilised for a variety of business purposes including:

- Product recalls/market withdrawals
- Regulatory compliance
- Public health trace-backs
- Food safety and quality assurance
- Process and order management

The first priority of traceability is to protect the consumer through faster and precise identification of a product under review. This is critical if the product is required to be withdrawn from the supply chain.

This document is intended to guide organisations to create and maintain a traceability program that will support current food safety requirements (FSANZ Standard 4.3.4), align their traceability records to meet the needs of customers, result in successful recalls and audits and improve food safety.

This document also provides guidance on creating a model to enhance traceability practices. No matter how advanced current practices and technology may be, organisations will likely identify methods and processes to improve current traceability practices.

This document should be used in tandem with a reliable, three-pronged program to create a complete and robust traceability system:

1. Quality assurance to minimise the chance of a food safety incident
2. Food safety to catch an incident quickly, possibly before the food has even left your facility
3. Traceability to isolate a product in question and reduce or prevent brand damage if you, or one of your vendors experiences a food safety issue.



Terry Richardson
President
Australian Dairy Farmers

“ Keeping things simple is so important. A common language for traceability helps reduce complexity and improves communication. It makes lower-cost, less manual data processing possible and it helps deliver value for consumers of Australian milk products.

Disclaimer

The recommendations contained in this guideline are not a replacement to existing regulatory and other trading partner traceability and compliance requirements and processes. Rather to be used as a guide for improving the process for capturing traceability information; in a consistent way, enabling data to be shared across the whole supply chain in a more efficient and accurate manner.

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1. Introduction

1.1 Background

As world-wide demand for dairy products continues to rise, Australia's share of global trade has declined from around 16% of measured world exports in the 1990s to 6% in 2020. Over the same period, the number of dairy farms in Australia has decreased from 15,000 to just over 5,000. This has led to structural change in the industry.

With fewer larger dairy farms, productivity and profitability are increasingly dependent on the way the industry uses technology, information and data. More specifically, how different parts of the supply chain work together – identifying, capturing, sharing and using information for mutual benefit.

Dairy must continue to embrace new ways of identifying, capturing and sharing data through the supply chain to drive productivity and meet the demands of customers in Australia and abroad. This includes information about the way milk is produced, its provenance, who is involved in the process and how costs and margins have been shared.

For the industry to thrive and remain sustainable, all parties in the supply chain need to be jointly focused on customer demands and ensuring producers, transporters, processors, distributors and retailers generate a fair return on their effort and investment.

1.1.1 ACCC Dairy Inquiry

In 2018 the Australian Competition and Consumer Council (ACCC) found there was a power imbalance between farmers and processors. This power imbalance, along with uncertain world market prices, supermarket milk discounting and falling processor margins, impacted negatively on farmgate pricing.

To address the power imbalance, ensure viability and meet industry sustainability challenges, a national industry reform program was initiated by the Australian government. This included several measures explicitly addressing how information is captured, shared and used throughout the dairy supply chain.

1.1.2 Australian Dairy Plan

Launched in September 2020, the Australia Dairy Plan is a joint initiative of Australian Dairy Farmers, Australian Dairy Products Federation, Dairy Australia and Gardiner Dairy Foundation (the partners) with its development led by Independent Chair, John Brumby AO.

The last decade has seen significant challenges for the whole supply chain. What is at stake is the future of a great Australian success story, one built off the back of dairy farmers but also one of our last manufacturing industries of scale.

The genesis of this plan was widespread recognition that the industry must unite to position dairy for success in the next decade and beyond.

The Australian Dairy Plan is fundamentally different to any of those that have preceded it, having unique features of:

- A sustained commitment to collective action: this is the first time in the industry's history that the four partner organisations have worked together to deliver a plan with a single set of national priorities.
- An industry-wide, national engagement: key shared priorities for the industry have been confirmed through one of the largest listening exercises in the history of the industry, reaching over 1,500 people.
- A focus on the drivers of business success: while previous plans have focused on growth targets, the Australian Dairy Plan focused on the drivers of business success – profitability, confidence, unity – recognising the path to long-term sustained growth by driving value and value creation across the supply chain.

At the core of the plan are five commitments – to deliver on the priority issues that were loudly and consistently communicated through industry engagement across the supply chain and from all dairy regions. These commitments are backed by specific initiatives with clear action and implementation plans. Well established work programs and greater alignment of the operating plans of partner organisations will also play a key role in the industry’s success.

One of the five commitments is to ‘restore trust and transparency between farmers and processors to strengthen industry confidence’. This provides a validation for providing a consistent and integrated traceability system across the supply chain.

1.2 Industry Consultation

Industry consultation was carried out over the months of October, November and December 2020 with key dairy sector participants – producers (farmers), processors and retailers. Regulatory organisations were also invited to participate in the consultation workshops.

The aim of the industry consultation was to explore how information, not just product, moves between producers, processors, retailers, consumers and regulators. Exploring opportunities to improve traceability processes and data management was also a major component of the industry-wide consultation process.

Summary of key findings and observations;

- Manual data entry for farm inputs and records including feed, veterinary, fertiliser use, is common practice for dairy producers
- Duplication of data entry and information across the dairy supply chain
- Inconsistency of data provided across the value chain
- Product test results and records not integrated with systems, resulting in delays in receiving information, resulting in further manual data entry
- Variety of farm management systems. Whilst there are many systems available, not everyone is aware of other systems that could meet their business requirements
- Lack of interoperability and ability to share information across systems
- Traceability means something different to everyone
- Different traceability needs exist for different countries e.g. Japan vs. China
- Retailers are focussed on building trust and protecting their brand with consumers
- Lack of industry benchmarking
- Logistics issues, including lack of visibility of stock and when it has been transferred from one provider to another

1.3 Scope

This guideline builds on current industry traceability requirements specific for dairy traceability, as outlined in FSANZ Food Safety Standards 4.2.4. As well as other national and state regulatory requirements, extending to the inclusion of key elements of the GS1 Global Traceability Standard version 2.0.

The scope of this guideline establishes minimum requirements and best practice for sharing information between participants in the dairy industry.

- Traceability practices from farm to point of consumer sale to support Critical Tracking Events (CTEs) i.e. product creation (milking), repackaging, shipping, receiving, processing, and selling
- Applies to all dairy products for human consumption
- Applies to all levels of the product hierarchy that may include consumer items, cases, lots, pallets and shipments
- Includes all supply chain participants: farms, processors, raw material suppliers, transport and logistics providers, exporters, distributors, retailers, and foodservice operators

2. How to Use this Document

This document will guide you through the basic steps to achieve a robust traceability system for your facility.

1. Examining and modelling your physical property/plant to understand where new products enter and where products are transformed.
2. Creating unique product identifiers that will be used for all records and will be recognised and used by your customers.
3. Creating a record set that will assist in expedient and effective recall capability.

Modelling the physical flow of product across the supply chain will assist in identifying what needs to be recorded and shared both internally and externally. Identifying key traceability data such as batch/lot and production dates will assist in developing data sets and product labelling/marketing specifications.

2.1 Who can Use this Document

This is a practical guide that is intended to be used by those responsible for implementing traceability in their company’s operations and supply chains.

The document provides a guide for traceability practices for dairy farms, processors, transporters, exporters, suppliers, distributors, retailers and foodservice operators.

This guideline is applicable to suppliers of dairy farms such as animal health, feed, fertiliser, chemicals and other suppliers.

This guideline can also be used by IT staff who are required to design and build systems to support and enhance traceability systems and integrate into existing farm management or production processing software applications.

2.2 Minimum Standards for Traceability

This guideline is intended as a minimum level of standards for implementation of a robust traceability program. A more complex solution can be designed that will provide greater visibility of event data, improved and focussed recalls and better stock waste management. Most electronic implementations will support the more complex traceability protocol.

Whilst electronic traceability is an advantage, no specific platform or operating system is preferred for traceability success. This guideline will allow all participants in the dairy supply chain to design a program and choose individual solutions based on costs and internal justifications.

2.3 Applicable Products

The following list of items fall under the definition of ‘dairy product’.

- Milk
- Colostrum
- Liquid milk products
- Butter, butter concentrate
- Buttermilk, concentrated buttermilk, dairy blend, ghee, and anhydrous milk fat (butter oil)
- Casein, caseinate, and cheese
- Cultured milk and yoghurt
- Ice-cream and ice-cream mix
- Buttermilk powder, lactose powder, milk sugar, powdered milk, skim milk powder, whey powder, milk protein powder and other milk concentrates
- Cream and thickened cream
- Whey and whey cream

3. Key Traceability Definitions, Principles & Elements

The importance of consistent product identification cannot be understated. Consistent identification that provides sufficient information for full traceability can be a challenge for many facilities.

The guideline provides examples for implementing consistent product identification, product marking and data capture and provides human readable information, keeping automation requirements to a minimum.

Important principles of a traceability program

The guideline explains the concepts to understand and implement a successful traceability program. When using the guideline, a facility can establish a robust and effective plant-wide traceability program with minimal time and expense.

3.1 Traceability Definitions

Traceability is the ability to trace the history, application or location of an object. [ISO 9001: 2015]

External traceability is the business processes that occur between trading partners and the information/data exchanged to execute traceability.

Internal traceability is the proprietary data and business processes a company uses within its own span of operations to execute traceability.

3.2 Traceability Standards

The guideline is based on the [GS1 Global Traceability Standard \(GTS\)](#) and incorporates key requirements detailed in the [Australian Food Safety Standard 4.2.4](#).

Developed by industry, the GS1 Global Traceability Standard defines the globally-accepted method for uniquely identifying:

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

The GS1 Global Traceability Standard defines 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 geographies.

While the GS1 Global Traceability Standard may be implemented independently of any specific technology, best business practice requires the adoption of barcoding on packaging and/or pallets where it is practical to do so. Businesses are further encouraged to adopt electronic messaging to exchange essential business information.

3.3 Traceability Principles

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

A traceable item can be:

- A product or traded item e.g. bulk raw milk, bulk processed milk, bottle of milk, crate of milk bottles, carton of cheese, tub of ice-cream
- A logistic unit e.g. bulk delivery of milk, pallet of bottled milk, pallet of cheese
- A shipment or movement of a product (or products)

There must be agreement between trading partners on what the traceable item is. This ensures that both partners are tracking the same thing, otherwise the chain will be broken.

Each trading partner must define at least one level of a traceable item for each shipment.

- All traceable items must be uniquely identified with this information shared between all affected supply chain partners
- At a minimum, the identification of products for the purpose of traceability requires:
 - The assignment of a unique GS1 Global Trade Item Number (GTIN)
 - The assignment of a batch/lot
- When a product is reconfigured and/or repacked, the new product must be assigned a new unique product identification (i.e. GTIN). A linkage must be maintained between the new product and its original inputs.
- When a logistic unit is reconfigured, the new logistic unit must be assigned a new unique identification (i.e. SSCC). A linkage must be maintained between the new logistic unit and its original input.
- All supply chain parties must systematically link the physical flow of products with the flow of information about them. Traceable item identification numbers must be communicated on related business documents.

3.3.1 Business and Location Identification

Organisations (companies or persons) can use either a Property Identification Code (PIC) or a Global Location Number (GLN) or a combination of both, to identify the business or location they manage and then share that number with suppliers and customers. Other location or organisation identifiers may exist, however the PIC and GLN are unique thus avoiding any potential conflict of number duplication.

The PIC and GLN provide a uniform means of identifying a dairy farm that is registered with the relevant authority in their state or territory. The PIC is allocated by the relevant state Department of Agriculture (or equivalent). The GLN is allocated by GS1 Australia. GLN's can be used to identify the organisation as well as locations, down to a specific field or lot on a farm.

The GLN is also used for supply chain messaging including electronic data interchange, for defining 'ship to' or other locations that may be physical (a place) or digital (a virtual space like an electronic mailbox).

3.3.2 Traceable Objects

Various processing and packaging activities occur within dairy supply chains. Milk may undergo various 'transformations' before it arrives at the final consumer. The product will need to be traceable across all its various packaging levels.

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

The table below lists the GS1 identification keys that are available for the identification of traceable objects. For the purposes of the dairy industry, the three main identification keys leveraged are the product (GTIN), location (GLN) and logistics units (SSCC). Additionally, both internal and returnable assets (GIAI & GRAI) can be leveraged for assets such as vehicles or re-usable containers and crates.

Item being traced	Description	Full Name	GS1 Key
Products	Types of products at any packaging level e.g. consumer unit, inner pack, case, pallet	Global Trade Item Number	GTIN
Locations	Physical locations e.g. farms, fields, warehouses, processing facilities, delivery addresses	Global Location Number	GLN
Logistical units	Logistics units, combination of trade items packaged together for storage and/or transport purposes e.g. a case, pallet or package	Serial Shipping Container Code	SSCC
Internal assets	Assets such as vehicles, transport equipment, warehouse equipment, spare parts	Global Individual Asset Identifier	GIAI
Returnable assets	Returnable transport items such as pallets, crates, roll cages	Global Returnable Asset Identifier	GRAI

A complete list of relevant GS1 Identification keys is available in the [GS1 General Specifications](#).

3.3.3 How to Identify Traceable Objects

Dairy producers, processors and retailers currently use internal 'identifiers' such as part numbers, item codes or SKU's to recognise products in their supply chain. These types of identifiers are not unique across the supply chain and cannot be easily put into a barcode.

The Global Trade Item Number (GTIN) resolves many challenges created by internal numbering systems and enables the GTIN plus additional traceability information (such as batch/lot number) to be encoded into a barcode.

3.3.3.1 Global Trade Item Number (GTIN)

The GTIN can be used to identify bulk, manufactured or pre-packed trade items at any stage of the supply chain, up to the end consumer.

To ensure traceability throughout the entire supply chain, the GTIN should be allocated as early as possible. The brand owner (e.g. dairy farmer, processor) is usually responsible for the allocation of the GTIN.

When retailers, distributors or operators request suppliers for own-label products, they (the retailers) are the brand owner. It is the responsibility of brand owners to identify their products in the supply chain. Best practice is to identify own-label items using the GTIN. In these cases, the retailers, distributors or operators will provide the GTIN to use on the product's packaging.

If a company further processes and packages a product in the supply chain, such as a store-processed product, then that company becomes the manufacturer and is responsible for assigning a GTIN and traceability attributes. This may be achieved using a combination of human-readable and scannable product information. This information should also be stored for future retrieval if necessary.

3.3.3.2 Logistic Units (SSCC)

The SSCC (Serial Shipping Container Code) is intended for use in transport and logistics processes. It provides a unique serial number that can be used to identify the logistic units in a shipment e.g. a pallet.

An SSCC can be used to identify pallets containing packaged products, as well as bulk units such as containers, bags and sacks.

An SSCC is independent of the GTIN and can be used to identify logistic units with homogeneous as well as mixed contents.

Logistic unit Example

Pallet containing 36 cases of product: SSCC 164000010000517889



3.3.3.3 Batch/Lot, Date and Serial Identification

The minimum requirements for traceability rely upon a combination of the GTIN and batch/lot number and/or serial number.

Special care needs to be taken to ensure uniqueness of the batch/lot and serial numbers, especially in situations where multiple parties (e.g. subcontractors) or functional units (e.g. vessels) concurrently assign these numbers for the same GTIN.

Note: If both the batch/lot number and serial number are present, as sometimes happens, the batch/lot number takes precedence in case of a recall.

3.3.3.4 Industry Practice for Product Dating

The following section details the requirements for product dating, particularly focussing on product best before, production and expiry date.

Product date marking and recording should align with current regulatory and trading partner terms and conditions.

Industry practice for product dating by product type and date type

- Raw milk – use production date
- Further processed foods – If the process that you use alters the life of the product such as cooking or freezing a refrigerated product, the appropriate date is the packaging date
- Repacked dairy– Neither of these change the useful life of the product. The original production date should be on the case label as described above
- Products for end customers should be marked with either:
 - Use by date (= expiration date)
 - Best by date (= best before date)
 - Sell by date






3.3.4 How to Mark Traceable Objects (Labelling, Barcoding)

Automatic identification (e.g. scanning) is a prerequisite for the fast and precise tracking of traceable objects. At a minimum, the identification key (i.e. GTIN or SSCC) and batch/lot number needs to be marked on the traceable object.

Encoding other frequently required data elements such as the production or pack date will often be valuable as well. This can be achieved using barcodes and RFID tags.

3.3.5 Supported data carriers (barcode symbologies)

The following data carriers are supported by the dairy industry sector.

GS1 Barcode	Example Barcode	Point-of-Sale (Retail)		General Distribution (raw materials, packaging materials, ingredients, vaccines, processed goods)	
		GTIN	GTIN + Attributes	GTIN	GTIN + Attributes
EAN		Yes	No	Yes	No
GS1 DataMatrix		Note: The use of GS1 DataMatrix and QR Codes in the current Australian Dairy supply chain is currently under discussion.			
GS1 QR Code		These barcodes require image readers to be able to scan the barcode.			
		Embedding links into the barcode (Digital Link) is also currently being developed through industry consultation and working groups.			
ITF-14		No	No	Yes	No
GS1-128		No	No	Yes	Yes – Use for product identification and on pallet labels
RFID		The only method of identification permitted for cattle is the National Livestock Identification System (NLIS) and the use of accredited tags/devices.			
		For more information, please go to: https://www.nlis.com.au/NLIS-Information/			

3.3.6 How to Automatically Capture Traceable Object Data

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

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

Products can be scanned for Critical Tracking Events e.g. as they enter a distribution centre, as they are shipped out of the distribution centre, as they are received at a retailer store or foodservice operator or as they are opened for processing or consumer display.

The Institute of Food Technologists (IFT), in its 2009 Traceability (Product Tracing) in [Food Systems Technical Report](#), defined Critical Tracking Events (CTEs) as ‘those events that must be recorded in order to allow for effective traceability of products in the supply chain.’ These are ‘those instances where product is moved between premises, is transformed or is otherwise determined to be a point where data capture is necessary to trace a product. As best practice, retailers, foodservice operators, processors, distributors and wholesalers should put processes in place to collect and store at least the minimum product information required to support traceability.’

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

3.3.7 Critical Tracking Events

Critical Tracking Events identify those core business processes where traceability data capture is vital for a successful traceability process.

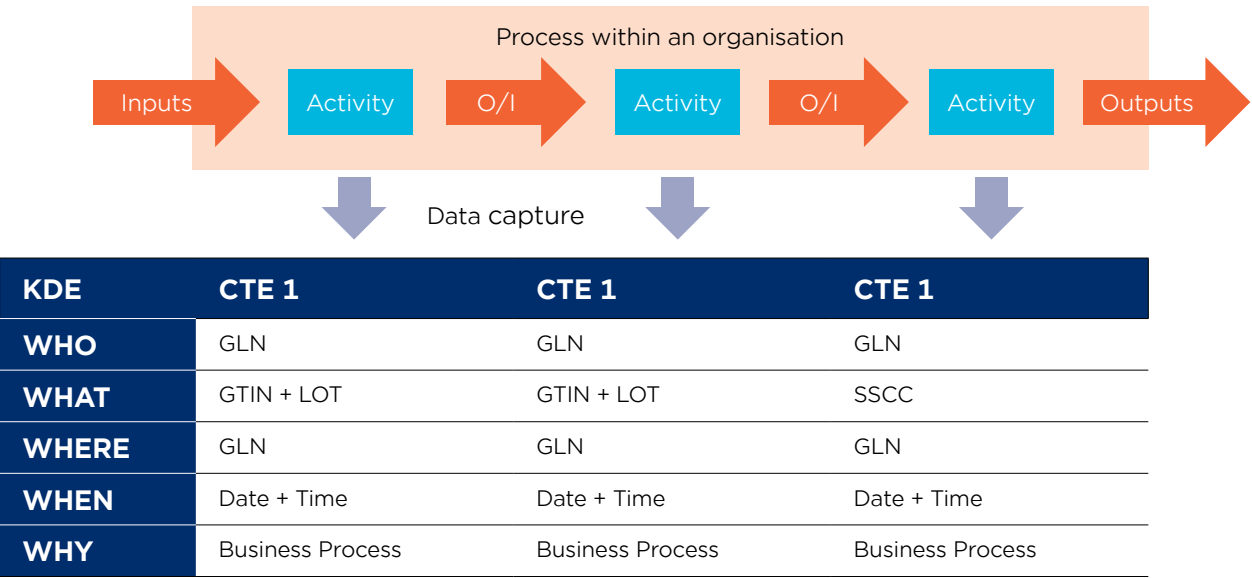
The guideline outlines the Critical Tracking Events relevant to the dairy supply chain from farm through to retail/sales of dairy products.

It is important for suppliers, producers, processors, retailers, distributors, wholesalers and foodservice operators to understand the value of collecting and maintaining product information that supports, at the very least, one up/one down traceability.

Critical Tracking Events identify those core business processes where traceability data capture is vital to a successful traceability process including:

- **Creation Events** - Harvest, hatch, grow, catch
 - Creation CTEs
- **Transportation Events** (transfer/exchange/movement of goods)
 - Transfer CTEs; Shipping CTEs; Receiving CTEs
- **Transformation Events** (aggregation/disaggregation/manipulation of products/ commingling)
 - Transformation Input CTEs; Transformation Processing CTEs; Transformation Output CTEs; Aggregation CTEs; Disaggregation CTEs; Commingling CTEs
- **Terminal Events** (these events exist at the terminals of a supply chain, for example cooling, washing and sorting)
 - Terminal CTEs
- **Depletion Events** (when the traceable object exits from the system)
 - Consumption CTEs; Disposal CTEs

The following diagram depicts a generic supply chain model depicting how CTEs and KDEs work together to create a traceability model.



3.3.8 Traceability Data and Record Keeping

Dairy traceability data and data records are required to provide parties downstream with information of what happened upstream. The required data to be recorded by each individual party is defined in this guideline. Referred to as Key Data Elements and Critical Tracking Events these form the backbone of a robust traceability implementation system.

Traceability data can be pushed from one party to the next party or provided on request.

Traceability processes are only as good as the weakest link. Therefore, it is important for farm input suppliers, producers, processors, retailers, distributors, wholesalers and foodservice operators to understand the value of collecting and maintaining product information that supports, at the very least, “one up/one down” traceability.

Records should be maintained and readily available regarding the production and distribution of dairy products, as well as input materials to facilitate prompt traceback to the immediate previous source and trace forward to the next subsequent recipients, if a known or probable adverse effect on consumer health is identified.

Records should be used for timely and effective withdrawal or recall of products, if known, or probable adverse effects on consumer health are identified.

Minimum Data Required to Meet Traceability Requirements (KDE’s)

KDE		Description of KDE	
WHO			
GLN of party		Used to identify the dairy farm, processor etc. Also used to identify buyers and sellers of dairy products further downstream.	
WHAT			
GTIN +		Used to identify the item. This can be either an input material (e.g. fertiliser) or output material from a farm (e.g. raw milk) The Global Trade Item Number (GTIN) that identifies the trade item.	
		+ Batch/lot number	The batch/lot number associates a trade item with information the producer considers relevant for traceability of the trade item. The data may refer to the trade item itself or to items contained in it. In combination with the GTIN the batch/lot number identifies a group of trade item instances.
		+ Serial number	A code, numeric or alphanumeric, assigned to an individual instance of an entity for its lifetime. In combination with the GTIN the serial number identifies exactly one trade item instance.
		+ Quantity	The quantity of the respective trade item.
		+ Net weight	Used to identify the net weight of the trade item. Net weight excludes any packaging materials. Must be associated with a valid unit of measurement.
SSCC		Serial Shipping Container Code that identifies an individual logistic unit. Used when tracking shipment of products.	
WHERE			
GLN of physical location		Used for identifying specific locations, if required, of dairy sources, processor locations, fields, etc. Used also to identify production and inventory locations.	
WHEN			
Date and time of Critical Tracking Event (CTE)		For example, when milking occurred, when a product shipped, when processing occurred and date of receipt. Note: Throughout the document reference to date and time formats are provided for every Critical Tracking Event. YYMMDD date format is a requirement if date information is to be encoded, shared or captured. The addition of Time is optional.	
WHY			
Business process of Critical Tracking Event (CTE)		Used to record the process context of the critical tracking event. Examples include production, shipping, receiving and processing.	
Disposition		Status of the traceable object subsequent to the CTE. Example: Available for sale, quarantined.	
Transaction reference		For example, sales note, PO reference, consignment note or National Vendor Declaration	

4. Dairy Supply Chain



4.1 Supply Chain Requirements

The main drivers for dairy traceability are regulatory requirements, improved visibility of events (testing, movements, processing), improved food safety and the need for greater transparency across the supply chain.

This section outlines the specific traceability related requirements for implementation across the full dairy supply chain and is based on both the Dairy Food Safety guidelines document published by Dairy Australia and the FSANZ Dairy Food Safety Standards 4.2.4.

4.1.1 Regulatory Overview

The following information has been sourced from the Dairy Australia Food Safety Guidelines document.

The national Australian dairy food safety regulatory framework is an integrated preventative system developed by industry organisations and federal and state regulatory agencies. Internationally recognised Codes and Standards provide important guidelines for the framework.

Customer requirements, food safety and product traceability are paramount drivers for the quality systems along with animal welfare, bio-security and environmental sustainability.

The responsibilities and accountabilities of all industry members through the supply chain are incorporated into the food safety and quality systems.

Potential risks are monitored on an ongoing basis with industry updated on a regular basis of possible challenges. Quality science supports the risk management process. The industry approach is preventative and outcomes based rather than process driven.

Federal agencies develop policy and standards, while state government regulators enforce, verify and monitor or conduct surveillance of food standards.

The [Food Standards Code](#), and particularly Standard 4.2.4 - The Primary Production and Processing Standards for Dairy Products, the Export Control Act 1982, the Export Control (Prescribed Goods – General) Order 2005 and Export Control (Milk and Milk Products) Orders 2005 are important regulations for the Australian dairy industry.

Standard 4.2.4 sets out several food safety requirements for dairy primary production businesses (covering on-farm milk production activities), dairy transport businesses (covering the collection and bulk transport of milk and dairy products) and dairy processing businesses (covering activities up to, but not including, retail). Distribution of dairy products and retail sale activities are covered by the requirements of Chapter 3 of the Code (Standard 3.2.2 and Standard 3.2.3).

[Download the Dairy Food Safety Guide](#) (PDF, 2.5mb)

4.1.2 Roles and Responsibilities

All parties in the dairy supply chain have a shared responsibility when it comes to ensuring traceability. Traceability responsibilities will be driven by regulatory requirements.

Role	Description	Responsibilities
Supplier (Pre-farm)	Supplier of input materials to farms such as stockfeed, animal care, animal stock, breeding cows	Responsible for providing product master data and traceability data, recall initiator/recipient. Responsible for meeting specific regulatory requirements with regards to product testing, risk assessments, product declarations, animal registrations etc. Supply of National Vendor Declarations
Dairy Farmer	Producer of milk	Adherence to regulatory compliance, brand owner, data source for master data and event data, recall initiator
Quality Testing Agency	Quality testing of milk	Carry out testing of milk
Transport provider	Transporter of raw milk from farm to processor	Carrier, warehouse, physical builder of logistic unit, data source for event data, recall recipient
Manufacturer/Processor	Processor of raw milk, bottler/ packager of dairy product	Adherence to regulatory compliance, brand owner, data source for master data and event data, recall initiator/recipient
Distributor/Wholesaler	Distributor of packaged dairy products	Adherence to regulatory compliance, shipper, receiver, data source for event data, recall recipient
Retailer	Seller of dairy products to consumers	Receiver, seller, recall recipient
Consumer	Consumer of dairy products	

4.2 Pre-farm Processes

Pre-farm processes refer to processes that occur prior to the supply of raw materials, chemicals, stock feed being delivered to the farm.

4.2.1 Regulatory Requirements

Specific regulatory requirements for pre-farm processes have been sourced from the Dairy Australia Food Safety Guide and have been used as input for enhancing traceability requirements for the dairy industry.

Potential risks to food safety and product integrity from initial inputs such as feed, livestock, fertilisers, water and chemicals are assessed by government and national industry agencies on an ongoing basis.

The [Australian Pesticide and Veterinary Medicines Authority \(APVMA\)](#) determines the types of chemicals that can be used for the production of stockfeed and veterinary chemicals used for treatment of animals plus the recommended withholding periods after treatment.

[Vendor declarations](#) providing background information must be supplied with stockfeed consignments and animals sourced from on off farm.

Stockfeed and grains industries have HACCP based accredited QA programs to ensure the feed is safe for use by dairy animals.

Electronic ear tags used to identify all animals on the farm provide a key tool for traceability of animals from birth to death or slaughter. The [National Livestock Identification System \(NLIS\)](#) provides the framework for the identification of Australian livestock.

State legislation ensures that fertilisers are appropriately labelled and maximum limits are set for elements that may pose a risk to agriculture.

Farm Food Safety programs must ensure water supplies are suitable to protect animal health and prevent contamination of milk.

[Environmental Protection Authorities \(EPAs\)](#) regulate the disposal of farm effluent.

4.2.2 Pre-farm Traceability Requirements

Based on food safety and minimum traceability requirements, the following pre-farm requirements have been established:

- 1. Supplier identification – legal and physical
- 2. Unique product identification
- 3. Supply of traceability data – e.g. batch/lot number, serial number, date information (expiry, production, best before)
- 4. Product labelling and barcoding

4.2.2.1 Supplier Identification

Using the one step up, one step down traceability approach, each supplier of farm inputs (livestock, animal feed, fertiliser, chemicals, animal health) need to be identified uniquely.

If a supplier delivers goods from multiple locations, each location should also be uniquely identified.

In addition to existing location identifiers, such as PIC codes, the Global Location Number (GLN) can also be used to identify a farm and locations on a farm.

4.2.2.2 Unique Product Identification

Products/items sold to farms are to be uniquely identified through the application of Global Trade Item Numbers (GTIN) or equivalent industry identification systems (e.g. NLIS tag and identifier).

This information should be shared with direct customers (farms) to enable better tracking of products receipted at the farm.

4.2.2.3 Traceability Data

Suppliers must assign a batch/lot number to the products they supply if required. The creation and format of the batch/lot number is defined by the supplier. For example, a batch number may represent a production run or a shift of production. Where appropriate, additional traceability data such as serial numbers and product dates (use by or expiry date or production date) are to be provided and supplied with products.

The combination of the GTIN and Batch provides the minimum data to enable traceability.

4.2.2.4 Product Labelling and Barcoding

Where applicable and possible, all products are to be physically marked or labelled in compliance with local product labelling requirements.

The recommended minimum data to support traceability that should be provided on product packaging/labelling is:

- Supplier name
- Supplier identification
- Product name/description
- Product GTIN
- Batch/lot number
- Date – Production, expiry, best before
- Quantity/net content & UOM
- Printed barcode containing the product's GTIN
 - Batch & date information should also be incorporated into the printed barcode

4.2.2.5 Data Sharing

Prior to trading with dairy producers, suppliers should share both location and product master data with farms. This is to ensure that product information is updated within farm systems, should they wish to automate product receiving and usage via the use of barcode scanners.

Changes to products and locations should be communicated and shared with trading partners in a timely fashion to ensure data alignment across all supply chain activities.

4.2.3 CTE and KDE Summary

The following table summarises the key Critical Tracking Events and Key Data Elements for pre-farm activities.

Critical Tracking Event	Description	Key Data Elements
Picking product/item for farm delivery	Picking of product/item/stock based on farm order or pre-established arrangement/contract	<ul style="list-style-type: none">• Product ID and Batch of picked product,• QTY picked• Supplier ID• Farm ID• Date/Time/Time Zone of pick• Order or Contract reference number• Relevant Vendor Declarations/Certificates
Delivery of goods (Despatch)	Loading and despatch of goods to producer	<ul style="list-style-type: none">• Product ID and Batch Qty• Supplier ID• Farm ID• Date/Time/Time Zone of despatch• Transport provider• Order or Contract reference number• Delivery note/consignment number• Certificates of Analysis• Relevant Vendor Declarations

4.2.3.1 Picking Product for Farm Order/Delivery

The following information should be captured for traceability purposes.

1. Picking of Product for Farm		
	Description	Traceability Data
WHO	Supplier of farm supplies/ inputs	Supplier ID (GLN) Farm ID (GLN/PIC)
WHAT	Product ordered and picked	Product ID (GTIN) including: <ul style="list-style-type: none">Batch/Lot NumberSerial number (if applicable)Quantity picked Pallet ID (SSCC)
WHEN	Date/time of pick	YYMMDD format (if encoded in a barcode or if sent electronically)
WHERE	Specific location where product picking occurred	Picking location (site or specific location on site)
WHY/LINKS	Picking	Customer Order Pick List Reference Contract Reference

4.2.3.2 Delivery of Goods (Despatch)

The following data should be captured for traceability purposes.

2. Delivery of Goods to Farm		
	Description	Traceability Data
WHO	Supplier to the farm Transport provider Vehicle ID	Supplier ID (GLN) Transport provider (GLN) Carrier ID (GLN) Farm ID (GLN)
WHAT	What product was delivered	Product ID <ul style="list-style-type: none">Batch/Lot NumberSerial number (if applicable)Quantity packed Pallet ID (SSCC) Delivery Note no. Consignment note
WHEN	Date/Time of despatch	YYMMDD format (if encoded in a barcode, or sent electronically)
WHERE	Specific location of despatch	Despatch location (GLN) Can be site or specific location
WHY/LINKS	Despatch	Delivery Note No. Customer order reference Contract Reference

Data Requirements for Suppliers

Supplier	Data to Collect	Data to Share
	From previous trading partner <ul style="list-style-type: none">Sender ID (GLN), product ID (GTIN), description, batch/lot no. From next trading partner <ul style="list-style-type: none">Purchase Order number and order detailsShip to location (GLN)Receiver identification	With previous trading partner <ul style="list-style-type: none">Receiver identification (GLN)Ship to location (GLN) With next trading partner <ul style="list-style-type: none">Logistics unit identification (SSCC)Output batch/lot numberTrade Item identification (GTIN)Trade Item descriptionQuantity and unit of measure
	Data to Record	
	<ul style="list-style-type: none">Output trade item identification (GTIN)Trade Item descriptionOutput Batch/Lot NumberTrade Item quantity and unit of measureShip DateShip from Location (GLN)Ship to location (GLN)Shipment identificationReceipt DateReceiver identificationSender identification	<ul style="list-style-type: none">Sender identificationShipment dateShip from location (GLN)Customer Order referenceCertificates of Analysis

4.3 On Farm

4.3.1 Farm Regulation

All Australian dairy farms are required to have documented food safety programs (FSP). [State Dairy Food Authorities \(SDFAs\)](#) approve the FSP before a dairy farm licence is granted. Approved auditors conduct regular audits of the farm FSP.

Core elements of the FSP include:

- Control of contaminants – physical, chemical and microbiological
- Dairy milking premises
- Hygienic milking
- Water supply and quality
- Cleaning and sanitising
- Traceability and records
- Personnel competency

All animals are individually identified from birth to death. Farmers actively monitor the health and [well being of animals](#) with the assistance of registered veterinarians.

[Vendor declarations](#) are required for animals and stockfeed purchased from external sources.

Risks from agricultural, veterinary and cleaning chemicals are minimised by using only chemicals registered by [Australian Pesticide and Veterinary Medicines Authority \(APVMA\)](#). Instructions for use and withholding periods for milk and meat are described on the label.

Trained operators use clean and sanitised equipment to milk cows with minimal stress. Water used for cleaning is monitored to ensure it will not contaminate the milk. Milk is cooled promptly and stored until collection under temperatures to minimise the growth of microbial hazards.

Comprehensive records are maintained of key parts of the farm food safety program including use of chemicals, audit results and action taken if deviations are detected.

4.3.2 Traceability Requirements

This section details the requirements by dairy farmers/producers to meet both minimum traceability requirements and regulatory requirements listed above.

4.3.2.1 Farm Identification

How to Identify the Farm?

The current process for dairy farm identification is the allocation of a Property Identification Code (PIC) code.

A Property Identification Code (PIC) is an eight-character alphanumeric code allocated by the Department of Primary Industries (or the equivalent authority in states and territories) to a property used for agricultural purposes.

Farms can also apply and assign a globally and nationally unique Global Location Number (GLN). The GLN is used by organisations trading electronically and is a key identifier throughout the traceability value chain.

What Additional Farm Information is Required?

It is recommended that dairy producers identify all plots/fields of every farm they manage and assign and apply a unique Global Location Number (GLN) accordingly. This enables the identification of all agricultural inputs used on every plot/field, as well capturing source location for outputs, if required.

4.3.2.2 Identification of Trade Items and Dairy Producer Information

Each trade item destined for a subsequent trading partner (i.e. processor) must be identified. For dairy producers, this typically represents the raw milk they produce.

The assignment of the GTIN will depend on the trading relationship between milk producers and milk processors. In most cases, the GTIN for bulk/raw milk will be provided by the processor.

Each farm may assign their own trade item identifier (GTIN) for their dairy product if not assigned by a processor.

4.3.2.3 Identification of Batches/Lots

A batch/lot number may be assigned as bulk milk is transferred from a farm to the milk transporter (tanker). The identification of specific batch/lots may be deduced from the date and time of collection. The batch/lot (if provided) should be internally linked to the farm information systems and records.

4.3.3 Critical Tracking Events and Key Data Elements

The following table summarises the Critical Tracking Events and Key Data Elements for pre-farm activities.

Critical Tracking Event	Description	Key Data Elements
1. Receiving farm supplies (inputs)	Receiving of all input products to the farm excluding breeding stock (cattle) Includes, Fertiliser, Stock Feed, Veterinary Supplies, Animals, Water	Product ID, Batch, Serial No. (where appropriate) Supplier ID Farm ID Date/Time/Time zone of receipt Location of Receipt Farm reference (e.g. PO number) Certificates of Analysis MSDS references
2. Receiving breeding animals	Receiving of breeding stock	Cattle identifiers (NLIS) Supplier ID Farm ID Date/Time/Time zone of receipt Location of Receipt Farm reference (e.g. PO number) National Vendor Declarations
3. Usage of farm supplies	Usage of farm supplies such as stock feed, chemicals, fertilisers, animal vaccines etc.	Product ID, Batch, Qty Farm ID Date/Time/Time zone of usage Location of usage Farm reference, transaction records
4. Production of milk	Recording of milking processes	Product ID, Batch Qty produced Date/Time/Time zone of milking Location of milking
5. Milk testing Note: Timing of this event may vary	Milk QA testing for milk solids, protein, fats etc	Product ID, Batch Qty tested Location of testing Tester ID Date/Time/Time zone of test Test reference number
6. Milk shipping	Shipment of bulk milk to processor	Product ID, Batch Qty shipped Location of despatch Date/Time/Time zone of despatch Transport provider ID Source destination
7. Sale of bobby calves	Despatch of bobby calves from farm	Animal identifier Farm ID Buyer ID Date/Time/Time zone of despatch off farm Farm location National Vendor Declaration
8. Sale of cull cows	Despatch of cull cows from farm	Animal ID Farm ID Buyer ID Date/Time/Time zone of despatch National Vendor Declaration

Note 1: It is assumed that master data related to supplier information (GLN, address) and products (descriptions, contents, ingredients, etc.) have been received from the supplier before ordering and receipt of products/deliveries.

Note 2: The following table includes the minimum data required to ensure traceability and interoperability and does not replace current identifiers used for products and locations.

4.3.3.1 1. Receipting Farm Supplies (Inputs/Deliveries)

To enable traceability, dairy farms must ensure that receipt of farm supplies (inputs) are captured and recorded.

1. Receipting Farm Supplies		
	Description	Traceability Data
WHO	Supplier of farm supplies Farm	Supplier identifier (GLN) Farm identification (GLN) and Property Identification Code (PIC)
WHAT	Supplier’s product supplied including traceability information	Supplier Product Identifier (GTIN) <ul style="list-style-type: none">• Batch/Lot Number• Serial Number (if applicable)• Quantity received Pallet or Logistic unit (SSCC)
WHEN	Date/Time/Time zone of receipt at farm	YYMMDD format to be encoded if provided in printed barcode or if sent electronically
WHERE	Specific receipt location	Receipt location e.g. main receiving location on farm GLN
WHY/LINKS	Receipt of supplier delivery	Receipt of supplier delivery PO number reference Certificate of Analysis (as required)

4.3.3.2 2. Receiving Breeding Animals

2. Receiving Breeding Animals		
	Description	Traceability Data
WHO	Supplier of breeding animals Farm	Supplier identifier (GLN) Farm identification (GLN) and Property Identification Code (PIC)
WHAT	Breeding animal	NLIS Codes QTY received
WHEN	Date/time/time zone of receipt at farm	YYMMDD format to be encoded if provided in printed barcode or if sent electronically
WHERE	Specific receipt location	Receipt location e.g. main receiving location on farm GLN
WHY/LINKS	Receipt of supplier delivery	Receipt of supplier delivery PO number or contract reference National Vendor Declaration

4.3.3.3 3. Recording Usage of Farm Supplies

The following data should be captured for traceability purposes.

3. Recording Usage of Farm Supplies		
	Description	Traceability Data
WHO	Farm	Farm using/applying product (GLN)
WHAT	Product used/applied including traceability information	Product Identifier (GTIN) <ul style="list-style-type: none">• Batch/Lot Number• Serial Number (if applicable)• Quantity used/applied
WHEN	Date/Time/Time zone of usage/application	YYMMDD format
WHERE	Specific location where product used/applied	Location ID e.g. plot A (GLN)
WHY/LINKS	Product usage/application	Work Order Number Transaction number

4.3.3.4 4. Recording of Production/Farm Outputs

The following data should be captured for traceability purposes.

4. Recording Production/Farm Outputs		
	Description	Traceability Data
WHO	Farm	Farm identifier (GLN)
WHAT	Product produced including traceability information	Product Identifier Quantity produced Note: Batch assigned at point of transfer to transport provider
WHEN	Date/Time/Time zone of production	YYMMDD format
WHERE	Specific location of milking	Milking Location e.g. Milking Shed A (GLN)
WHY/LINKS	Milking (production)	Milking record Transaction number

4.3.3.5 5. Milk Quality Testing

The following data should be captured for traceability purposes:

5. Milk Quality Testing		
	Description	Traceability Data
WHO	Organisation conducting Milk Quality testing Farm where testing occurs	Organisation conducting quality testing (GLN) Farm ID (GLN) Transport provider (Tanker) ID
WHAT	Product being tested including traceability information	Product Identifier (GTIN) <ul style="list-style-type: none">• Batch/Lot Number• Quantity tested Test details
WHEN	Date/Time/Time zone of testing	YYMMDD format
WHERE	Specific location where testing has occurred	Location of test e.g. Milking Shed A GLN, Tanker X
WHY/LINKS	Quality testing	Quality test number Transaction number Consignment note

4.3.3.6 6. Despatch from Farm

The following data should be captured for traceability purposes.

6. Despatch from Farm		
	Description	Traceability Data
WHO	Farm Transport Provider Processor receiving bulk milk	Farm from where delivery originates (GLN) Transport Provider ID (GLN) Processor ID (GLN)
WHAT	Product being despatched including traceability information	Product Identifier (GTIN) <ul style="list-style-type: none">• Batch/Lot Number• Quantity in despatch
WHEN	Date/Time/Time zone of despatch	YYMMDD format
WHERE	Specific location where product used/applied	Location of Despatch e.g. Gate A (GLN)
WHY/LINKS	Delivery to processor	Processor Order/Contract Number Transaction number Consignment note

4.3.3.7 7. Sale of Bobby Calves from Farm

The following data should be captured for traceability purposes.

7. Sale of Bobby Calves from Farm		
	Description	Traceability Data
WHO	Farm Transport Provider Receiver of bobby calves	Farm from where delivery originates (GLN) Transport Provider ID (GLN) Receiver ID (GLN)
WHAT	Bobby calves	Product Identifier (NLIS) + Quantity in despatch
WHEN	Date/Time/Time zone of despatch	YYMMDD format
WHERE	Specific location where product used/applied	Location of Despatch e.g. Gate A (GLN)
WHY/LINKS	Delivery to processor	Processor Order/Contract Number Transaction number Consignment note National Vendor Declaration Number

4.3.3.8 8. Sale of Culled Animals from Farm

The following data should be captured for traceability purposes.

8. Sale of Culled Animals from Farm		
	Description	Traceability Data
WHO	Farm Transport Provider Receiver of culled cows	Farm from where delivery originates (GLN) Transport Provider ID (GLN) Receiver ID (GLN)
WHAT	Culled animals	Animal identifier (NLIS) + Quantity
WHEN	Date/Time/Time zone of sale/ despatch	YYMMDD format
WHERE	Specific location where product used/applied	Location of Despatch e.g. Gate A (GLN)
WHY/LINKS	Delivery to processor	Processor Order/Contract Number Transaction number Consignment Note no. National Vendor Declaration Number

Data Requirements for Dairy Farms (Producers)

Producers	Data to Collect	Data to Share
	From previous trading partner <ul style="list-style-type: none">• Supplier GLN• Farm input receipt details (product, batch)• Product master data• Certificate/Vendor declarations From next trading partner <ul style="list-style-type: none">• Purchase Order number/contract ID• Ship to location (GLN)• Receiver identification (GLN)	With previous trading partner <ul style="list-style-type: none">• Receiver identifier (GLN)• Ship to location (GLN) With next trading partner <ul style="list-style-type: none">• Logistic unit identification (SSCC)• Shipment identifier• Output batch/lot number• Trade Item identification (GTIN)• Trade Item description• Quantity and unit of measure
	Data to Record	
	<ul style="list-style-type: none">• Input trade item identification (GTIN)• Animal identifiers (NLIS)• Input Batch/Lot Numbers• Trade Item descriptions• Output trade item identification (GTIN)• Trade Item descriptions• Output Batch/Lot Numbers• Trade Item quantity and unit of measure• Ship Date• Ship from Location• Ship to location• Shipment identification• Receiver identification• Receipt dates• Sender identification• National Vendor declaration number	<ul style="list-style-type: none">• Sender identification (GLN)• Shipment date• Ship from location (GLN)• NLIS information• NVD number

4.4 Milk Transport

4.4.1 Regulatory Requirements

The following information is an extract from the FSANZ Dairy Standard 4.2.4.

Division 3 – Dairy collection and transportation

7. Controlling food safety hazards

A dairy transport business must control its potential food safety hazards by implementing a documented food safety program.

8. Specific requirements

For clause 7, the control measures must manage hazards arising from –

(a) transport vehicles, equipment and containers used in the collection and transport of the milk or dairy product; and

(b) persons engaged in the dairy transport business.

and must include a support program that ensures that the food contact surfaces of transport vehicles, and equipment and containers used in collecting and transporting of the dairy products are clean and sanitary.

9. Product tracing

As part of the documented food safety program in clause 7, a dairy transport business must have a system to identify the immediate supplier and immediate recipient of the dairy product.

10. Time and temperature controls

A dairy transport business must transport dairy products using time and temperature controls that prevent or reduce the growth of microbiological hazards in the product.

11. Skills and knowledge

A dairy transport business must ensure that persons undertaking milk or dairy product collection and transport activities have skills and knowledge of food safety and hygiene matters commensurate with their work activities.

4.4.1 Traceability Requirements

This section outlines the requirements by transport providers to meet both traceability requirements and regulatory requirements listed above.

4.4.1.1 Transport Operator and Carrier Identification

How to identify the transportation mode

Transport providers can assign and apply unique identifiers for both their organisations (legal entities, physical locations) as well as unique identifiers for their transport vehicles. For this purposes Global Location Numbers (GLNs) can be assigned.

What additional farm information is required?

It is recommended transporters share and receive location information from dairy producers and dairy processors noting both pick-up and delivery locations.

4.4.1.2 Identification of Logistic Units

Deliveries of bulk milk (e.g. tanker of milk) should be assigned a unique identifier. This is usually in the form of the Serial Shipping Container Code (SSCC). This number may be printed in barcode format on relevant documentation to enable scanning devices to read the information and can also be sent via electronic messaging.

4.4.2 Critical Tracking Events and Key Data Elements

The following table summarises the Critical Tracking Events and Key Data Elements for transport activities.

Critical Tracking Event	Description	Key Data Elements
1. Receiving farm outputs (goods pick-up)	Receipt and transfer of raw milk from farm	Product ID, Batch, Pallet or Logistic unit (SSCC) Transport provider ID Date/Time/Time zone of receipt Location of Receipt Farm reference
2. Monitoring during transportation	Monitoring of temperature during milk transportation	Product ID, Batch Number Pallet or Logistic unit (SSCC) Transport Vehicle Date/Time/Time zone of read Temperature record Location of read
3. Milk delivery	Delivery/transfer of raw milk to processor	Product ID, Batch Number, Qty Transport Vehicle Date/Time/Time zone of delivery Delivery Location

4.4.2.1 1. Milk Pick-up

The following data should be captured for traceability purposes.

1. Milk Pick-up		
	Description	Traceability Data
WHO	Farm Manufacturer/Processor Transport provider (tanker)	Farm from where delivery originates (GLN) Manufacturer/Processor ID (GLN) Transport provider (GLN)
WHAT	Bulk milk despatched including traceability information	Shipment Identifier (SSCC) • Batch/Lot Number • Quantity in delivery
WHEN	Date/Time of pick-up	YYMMDD format
WHERE	Specific location of bulk milk pick-up/transfer to transport vehicle	Pick-up/transfer location
WHY/LINKS	Delivery to processor	Processor Order/Contract Number Consignment note Pallet or Logistic unit (SSCC)

4.4.2.2 2. Goods Monitoring

The following data should be captured for traceability purposes.

2. Goods Monitoring		
	Description	Traceability Data
WHO	Milk transport provider tracking device	Transport provider identifier (GLN) Monitoring device ID
WHAT	Bulk milk being transported	Shipment ID Pallet or Logistic unit (SSCC) Product ID <ul style="list-style-type: none">Batch NumberQuantity in delivery Temperature recordings
WHEN	Date/Time of monitoring/record capture	YYMMDD MMHH. Note: Capturing time of temperature recording critical for this CTE
WHERE	Specific location where monitoring takes place	Vehicle Identifier, GPS Coordinates
WHY/LINKS	Milk monitoring (temperature)	Pallet or logistic unit (SSCC) Record ID

4.4.2.3 3. Milk Delivery

The following data should be captured for traceability purposes.

3. Milk Delivery		
	Description	Traceability Data
WHO	Milk transport provider Processor	Transport provider (GLN) Processor ID (GLN)
WHAT	Bulk milk delivery	Shipment ID Pallet or logistic unit (SSCC)Product identifier (GTIN) <ul style="list-style-type: none">Batch/lot NumberQuantity in delivery
WHEN	Date/time of despatch	YYMMDD format
WHERE	Specific location where product is delivered to	Processor receiving location (GLN)
WHY/LINKS	Delivery to processor	Processor Order/Contract Number Consignment note Pallet or Logistic unit (SSCC)

Data Requirements for Transport Providers

Transport Provider	Data to Collect	Data to Share
	From previous trading partner <ul style="list-style-type: none">Shipment/logistic unit identifierShip to location (GLN) From next trading partner <ul style="list-style-type: none">Ship to location (GLN)Receiver identification (GLN)	With previous trading partner <ul style="list-style-type: none">Receipt of goods (transfer)Delivery of goods confirmationDelivery location (GLN) With next trading partner <ul style="list-style-type: none">Logistic unit identification (SSCC)
	Data to Record	
	<ul style="list-style-type: none">Output trade item identification (GTIN)Trade Item descriptionOutput Batch/Lot NumberTrade Item quantity and unit of measureShip DateShip from LocationShip to locationShipment identificationReceiver identificationSender identification	<ul style="list-style-type: none">Shipment identifierQuantity and unit of measureSender identificationShipment dateShip from location (GLN)

4.5 Manufacturer/Processor

4.5.1 Regulation

Once milk has been delivered to the manufacturer, it is processed in modern and automated factories using responsible environmental practices. The relevant [State Dairy Food Authority](#) licenses all dairy factories while factories manufacturing product for export also require [Department of Agriculture \(DoA\)](#) registration. An approved Food Safety Program (FSP) is required prior to licensing.

Core elements of the FSP include:

- Pathogen reduction technologies including pasteurisation
- Temperature controls
- Processing
- Cleaning and sanitising
- Storage
- Traceability forwards and backwards through the supply chain from farm to customer
- Post-pasteurisation hazard management
- Raw material and ingredient management
- Records
- Personnel competency

Product specifications reflect compliance with customer requirements, regulatory requirements within the [FSANZ Food Standards Code](#) and in the case of exports, the requirements of DoA and the importing country.

All suppliers of ingredients, cleaning chemicals, packaging and services work with dairy companies to ensure their materials and services meet specific requirements, especially regarding the traceability of ingredients and materials.

All dairy manufacturers have product recall systems based on the [FSANZ Product Recall Protocol](#).

Auditors approved by regulatory agencies including DoA audit all FSPs. In addition, state dairy food authorities monitor the safety of milk and dairy products through investigations, including the Australian Milk Residue Analysis Survey.

4.5.2 Traceability Requirements

This section outlines the requirements of dairy farmers/producers to meet both traceability requirements and regulatory requirements listed above.

4.5.2.1 Manufacturer/Processor Identification

How to identify the manufacturer/processor?

Processors and manufacturers should assign and apply a globally (and nationally) unique Global Location Number (GLN). The GLN is used by organisations trading electronically and is a key identifier throughout the traceability value chain.

What additional information is required?

GLNs can be assigned to specific locations on a site, e.g. receiving location, manufacturing/processing location, storage location and despatch locations.

4.5.2.2 Identification of Trade Items Both Input and Output

Each trade item destined for a subsequent trading partner (i.e. further processing, retailer, foodservice) must be identified with a unique identifier. For processors, this typically represents the products they produce.

Each processor assigns their own trade item identifier (GTIN) for their own-branded dairy-based products, ensuring each level of packaging for that product is also assigned a unique GTIN.

GTIN allocation for private label product is the responsibility of the retailer (the brand owner).

4.5.2.3 Identification of Batches/Lots

Processors must assign a batch/lot number to the products they produce. The batch /lot number itself depends on the processor's criteria. For example, a batch/lot number can represent a production shift, or batch of production. The batch/lot should be internally linked to the processor's information systems and records.

4.5.2.4 Product Labelling and Barcoding

All packaged products are to be physically marked or labelled. The minimum data that must appear on product packaging/labelling is:

- Supplier Name
- Supplier Identification
- Product name/description
- Product GTIN
- Batch/Lot number
- Date – Production, Expiry, Best Before
- Quantity
- Barcode containing GTIN, Batch, Date information for Non-Retail items such as Inners, Cases
- Barcode containing GTIN for retail point of sale items

Note 1: All levels of packaging are to be labelled e.g. consumer units, inner packs and cases

Note 2: The information listed above is necessary to meet minimum traceability requirements. Product labelling must conform to current industry regulations and requirements.

4.5.3 Critical Tracking Events and Key Data Elements

The following table summarises the Critical Tracking Events and Key Data Elements for manufacturing/processing activities.

Critical Tracking Event	Description	Key Data Elements
1. Receiving of input materials	Receiving of ingredients, packaging to be used in production process	Product ID, Batch, Serial No. (where appropriate) Quantity Pallet or logistic unit (SSCC) Supplier ID Date/time/time zone of receipt Location of receipt Farm reference (e.g. PO number) Delivery documents
2. Milk receiving	Receipt of bulk raw milk	Product ID Quantity Supplier ID Transporter ID Date/Time Location of receipt Contract reference Delivery documents
3. Processing	Usage of input materials in manufacturing/processing step	Product ID, batch, serial no. (where appropriate) Quantity Location of usage/application Date/time/tme zone of usage Work order reference
4. Packing	Production/packing of processed product	Processed product IDs Quantity Packaged product ID Processor location Work order reference
5. Inspection/Testing	Quality inspection of produced goods	Product ID Batch/lot number Date/time of test Inspection reference no. Location of test
6. Storage	Storage of goods (packed or unpacked)	Product ID, batch/lot number Quantity Storage location Date/time of movement to storage
7. Picking	Picking of stock for customer order	Customer order number Product ID, batch/lot number Quantity picked Date/time of pick Location of pick Pallet or logistic unit (SSCC)
8. Despatch	Despatch of goods to customer	Customer order number Product ID, batch/lot number Quantity picked Date/time of pick Location of pick Pallet or logistic unit (SSCC) Despatch/delivery note Transport provider

4.5.3.1 Product Receipting (Raw Materials, Ingredients, Packaging)

1. Product Receipting (Raw Materials, Ingredients, Packaging)		
	Description	Traceability Data
WHO	Supplier Manufacturer/processor Transport Provider	Supplier identifier (GLN) Manufacturer/processor identification (GLN) Transport provider ID (GLN)
WHAT	Product Supplied including traceability information e.g. Packaging, raw materials, ingredients	Product Identifier (GTIN) <ul style="list-style-type: none">• Batch number• Use by or expiration date• Serial number (if applicable)• Quantity received Pallet or logistic unit (SSCC)
WHEN	Date/time of receipt at processor	YYMMDD format
WHERE	Specific receipt location	GLN of receipt location e.g. main receiving location of Manufacturer/processor GLN
WHY/LINKS	Receipt of supplier delivery	Receipt of supplier delivery PO number reference Delivery note Certificate of Analysis

4.5.3.2 2. Bulk Milk Receipting

2. Bulk Milk Receipting		
	Description	Traceability Data
WHO	Supplier Manufacturer/processor Transport Provider	Supplier identifier (GLN) Manufacturer/processor identification (GLN) Transport provider ID (GLN)
WHAT	Bulk Milk	Product identifier (GTIN) <ul style="list-style-type: none">• Batch Number• Quantity received Pallet or logistic unit (SSCC)
WHEN	Date/time of receipt at processor	YYMMDD format
WHERE	Specific receipt location	GLN of receipt location e.g. main receiving location of Manufacturer/processor GLN
WHY/LINKS	Receipt of supplier delivery	Receipt of supplier delivery PO or number reference Delivery note Certificate of analysis

4.5.3.3 3. Processing/Manufacturing

The following data should be captured for traceability purposes.

3. Processing/Manufacturing		
	Description	Traceability Data
WHO	Manufacturer/processor	Processor GLN
WHAT	Includes both the product produced and the ingredients, raw materials and packaging consumed in the making of the product	Produced Product Identifier (GTIN) <ul style="list-style-type: none">• Batch number• Serial number (if applicable)• Quantity produced Ingredients, packaging, products consumed/processed identifiers (GTINs) Batch/lot number Quantity consumed
WHEN	Date/Time of production	YYMMDD format
WHERE	Specific location where product produced	Production location (GLN)
WHY/LINKS	Processing	Processor order/contract number Consignment note

4.5.3.4 4. Packing/Bottling

The following data should be captured for traceability purposes.

4. Packing/Bottling		
	Description	Traceability Data
WHO	Processor	Processor
WHAT	Processed product to be packed, packaging materials Finished product bottled/packaged	Input product (bulk processed product) - Product Identifier (GTIN) <ul style="list-style-type: none">• Batch number• Quantity consumed Output product ID <ul style="list-style-type: none">• Batch/lot number• Serial number (if applicable)• Use by or best before information• Quantity packed• Pallet or logistic unit (SSCC)
WHEN	Date/Time of packing	YYMMDD format
WHERE	Specific location where product packing occurred	Packing/processing location
WHY/LINKS	Packing	Processor packing work Order

4.5.3.5 5. Storage/Putaway

The following data should be captured for traceability purposes.

5. Storage/Putaway		
	Description	Traceability Data
WHO	Processor	Processor
WHAT	Packaged product or bulk product	Product ID (GTIN) <ul style="list-style-type: none">• Batch/lot Number• Serial number (if applicable)• Quantity packed Pallet or logistic unit (SSCC)
WHEN	Date/Time of putaway into storage	YYMMDD format
WHERE	Specific location where product is stored in warehouse	Storage location
WHY/LINKS	Storage/Putaway	Transfer order SSCC

4.5.3.6 6. Inspection

The following data should be captured for traceability purposes.

6. Inspection		
	Description	Traceability Data
WHO	Processor Inspector	Processor (GLN) Inspector ID (GLN)
WHAT	Inspection/QA testing	Product ID <ul style="list-style-type: none">• Batch/lot Number• Serial number (if applicable)• Quantity packed• Pallet or logistic unit ID (SSCC)• QA test
WHEN	Date/Time of inspection/testing	YYMMDD format
WHERE	Specific location where inspection took place	Product location (GLN or Bin)
WHY/LINKS	Inspection/Testing	Test number Test record

4.5.3.7 7. Picking

The following data should be captured for traceability purposes.

7. Picking		
	Description	Traceability Data
WHO	Processor	Processor ID (GLN) Warehouse ID (GLN)
WHAT	Product ordered and picked	Product ID <ul style="list-style-type: none">Batch/lot numberSerial number (if applicable)Quantity picked Pallet ID (SSCC)
WHEN	Date/Time of pick	YYMMDD format
WHERE	Specific location where product picking occurred	Picking location
WHY/LINKS	Packing	Customer order Internal sales order Pick list reference

4.5.3.8 8. Despatch

The following data should be captured for traceability purposes.

8. Despatch		
	Description	Traceability Data
WHO	Processor Transport Provider Vehicle	Processor ID (GLN) Transport provider (GLN) Carrier ID (GLN) Customer ID (GLN)
WHAT	Despatch of goods to customer	Product ID <ul style="list-style-type: none">Batch/lot NumberSerial number (if applicable)Quantity packed Pallet ID (SSCC) Delivery note number Consignment note
WHEN	Date/Time of despatch	YYMMDD format
WHERE	Specific location of despatch	Despatch location (GLN)
WHY/LINKS	Despatch	Delivery note number Customer order reference

Data Requirements for Processors

Processor	Data to Collect	Data to Share
	From previous trading partner <ul style="list-style-type: none">Trade item identification (GTIN), batch/lot numberTrade item descriptionLogistic unit identification (SSCC) From next trading partner <ul style="list-style-type: none">Purchase Order numberShip to location (GLN)Receiver identification	With previous trading partner <ul style="list-style-type: none">Receiver identifier (GLN) With next trading partner <ul style="list-style-type: none">Logistic unit identification (SSCC)Output batch/lot numberTrade Item identification (GTIN)Trade Item descriptionQuantity and unit of measureSender identification
	Data to Record	
	<ul style="list-style-type: none">Output trade item identification (GTIN)Trade Item descriptionOutput Batch/Lot NumberTrade Item quantity and unit of measureShip DateShip from LocationShip to locationShipment identificationReceipt DateReceiver identificationSender identification	<ul style="list-style-type: none">Shipment dateShip from locationTest resultsCertification of Analysis

4.6 Distributors

4.6.1 Regulation

Prior to despatch to customers, finished product is stored in warehouses operated by the dairy company or by external contractors.

The effective implementation of a Food Safety Program (FSP) is required for all warehouses and are licensed by [State Dairy Food Authorities \(SDFAs\)](#). Warehouses used for export product need to be registered by the [Department of Agriculture \(DoA\)](#).

Key elements of the FSP are:

- Prevention or control of potential hazards to food safety
- Identification and thus traceability of product

The warehouse must have a product recall system based upon the [FSANZ Food Industry Recall Protocol](#).

Prior to loading of product, the cleanliness of the interior of transport vehicles and shipping containers is checked. Where required, product temperature is checked at loading and monitored throughout the distribution chain.

Transporters of bulk product between dairy manufacturing plants intended for further processing are required to have a Food Safety Program conforming to the requirements of [FSANZ Standard 4.2.4](#).

Containers destined for export are sealed and appropriate documentation is completed prior to shipping. Companies use the [DoA ExDoc electronic system](#) for certification of dairy exports.

Auditors approved by regulatory agencies including DoA conduct audits of the warehouse FSP. Australian and international customers also conduct audits on all or part of a warehouse’s quality assurance program.

4.6.1 Traceability Requirements

This section outlines the requirements for dairy farmers/producers to meet both traceability requirements and regulatory requirements listed above.

4.6.1.1 Distributor Identification

How to identify distributors?

Distributors should apply and assign a globally (and nationally) unique Global Location Number (GLN). The GLN is used by organisations trading electronically and is a key identifier throughout the traceability value chain.

What additional information is required for distributors?

It is recommended that distributors identify all sites and locations they manage to store and move products and allocate a unique Global Location Number accordingly.

4.6.1.2 Product Labelling and Barcoding

Distributors typically do not relabel or repackage product. Product labelling requirements are more focussed on pallet labelling and identifying logistics units.

All logistics units/pallets (where possible) are to be physically marked or labelled with a standard logistics label. The minimum data that must appear on product logistics label is:

- Ship to name
- Ship from name
- SSCC number
- Product GTIN/description
- Batch/Lot number
- Date – Production, expiry, best before
- Quantity on logistic unit
- Barcode containing SSCC
- Barcode containing GTIN, batch, date information (for homogenous pallets)

4.6.2 Critical Tracking Events and Key Data Elements

The following table summarises the Critical Tracking Events and Key Data Elements for Distributor activities.

Critical Tracking Event	Description	Key Data Elements
1. Receipt of product	Receiving of processed product	Product ID, batch, serial number (where appropriate) Quantity Pallet ID Supplier ID Date/Time/Time zone of receipt Location of receipt Farm reference (e.g. PO number)
2. Storage/Putaway	Putaway of receipted stock into Warehouse storage	Product ID, batch, serial number (where appropriate) Quantity Pallet ID Putaway location Date/Time/Time zone of putaway
3. Monitor/inspection	Monitoring or inspection of goods whilst on-site	Product ID, batch Quantity
4. Picking	Picking of stock for customer order	Customer order number Product ID, Batch/Lot number Quantity picked Date/Time of pick Location of pick Logistics units
5. Despatch	Despatch of goods to customer Customer order number	Product ID, batch/lot number Quantity picked Date/Time of pick Location of pick Logistics units Despatch/delivery note Transport provider

4.6.2.1 1. Receipt of Processed Product

The following data should be captured for traceability purposes.

1. Receipt of Processed Product		
	Description	Traceability Data
WHO	Distributor Processor Transport provider	Distributor (GLN) Processor (GLN) Transport provider (GLN)
WHAT	Packaged product	Product Identifier (GTIN) <ul style="list-style-type: none">• Batch number• Serial number (if applicable)• Quantity in despatch Pallet or logistic unit ID (SSCC) Delivery note
WHEN	Date/Time of receipt	YYMMDD format
WHERE	Receipt Location	Receiving location
WHY/LINKS	Delivery to processor	Order number Delivery note number

4.6.2.2 2. Stock putaway/storage

The following data should be captured for traceability purposes.

2. Stock Putaway/Storage		
	Description	Traceability Data
WHO	Distributor	Distributor location ID (GLN)
WHAT	Product being despatched including traceability information	Product Identifier (GTIN) <ul style="list-style-type: none">• Batch number• Serial number (if applicable)• Quantity to putaway Pallet or logistic unit ID (SSCC)
WHEN	Date/Time of putaway	YYMMDD format
WHERE	Specific location where product stored	GLN of location e.g. warehouse location (GLN)
WHY/LINKS	Storage/putaway of product	Transfer order reference

4.6.2.3 3. Inspection/Monitoring

The following data should be captured for traceability purposes.

3. Inspection/Monitoring		
	Description	Traceability Data
WHO	Distributor Inspector	Distributor ID (GLN) Inspector ID
WHAT	Inspection/Monitoring (e.g. Temperature)	Product ID <ul style="list-style-type: none">• Batch/lot number• Serial number (if applicable)• Quantity packed Pallet or logistic unit ID (SSCC) QA test
WHEN	Date/Time of inspection/monitoring	YYMMDD format
WHERE	Specific location where inspection took place	Product location (GLN or Bin)
WHY/LINKS	Inspection/monitoring/observation	Test number Test record Quality certificate number/record

4.6.2.4 4. Picking

The following data should be captured for traceability purposes.

4. Picking		
	Description	Traceability Data
WHO	Distributor	Distributor ID (GLN)
WHAT	Product ordered and picked	Output product ID <ul style="list-style-type: none">• Batch/lot number• Serial number (if applicable)• Quantity picked Pallet or logistic unit ID (SSCC)
WHEN	Date/Time of pick	YYMMDD format
WHERE	Specific location where product picking occurred	Picking location
WHY/LINKS	Picking	Customer order Pick list reference

4.6.2.5 5. Despatch

The following data should be captured for traceability purposes.

5. Despatch		
	Description	Traceability Data
WHO	Distributor Customer	Distributor ID(GLN) Customer ID (GLN)
WHAT	Product being despatched including traceability information	Product identifier (GTIN) <ul style="list-style-type: none">• Batch number• Serial number (if applicable)• Quantity in despatch Pallet or logistic unit ID (SSCC)
WHEN	Date/Time of despatch	YYMMDD format
WHERE	Specific location where product used/applied	GLN of location e.g. milking shed
WHY/LINKS	Delivery to processor	Processor order/contract number Transaction number Quality/test certificates

Data Requirements for Distributors

Distributor	Data to Collect		Data to Share	
	From previous trading partner <ul style="list-style-type: none">• Supplier ID• Product Master Data		With previous trading partner <ul style="list-style-type: none">• Receiver id (GLN)• Ship to location (GLN)	
	From next trading partner <ul style="list-style-type: none">• Purchase Order number• Ship to location (GLN)• Receiver identification		With next trading partner <ul style="list-style-type: none">• Logistic unit identification (SSCC)• Output batch/lot number• Trade Item identification (GTIN)	
	Data to Record		<ul style="list-style-type: none">• Trade Item description• Quantity and unit of measure• Sender identification• Shipment date• Ship from location• Quality/test certificates	
	<ul style="list-style-type: none">• Output trade item identification (GTIN)• Trade Item description• Output Batch/Lot Number• Trade Item quantity and unit of measure• Ship Date• Ship from Location• Ship to location• Shipment identification• Receipt Date• Receiver identification• Sender identification			

4.7 Markets

Markets refers to retailers, foodservice operators, export markets and industrial (ingredient customers). The following sections outline the main processes and requirements related to traceability.

4.7.1 Regulatory Requirements

Standard 4.2.4 Primary Production and Processing Standard for Dairy Products does not apply to retail sale activities; however these are covered in Standard 3.2.2 and 3.2.3 – Food Safety Practices and General Requirements.

Standard 3.2.2 - Food Safety Practices and General Requirements sets out specific food handling controls related to the receipt, storage, processing, display, packaging, transportation, disposal and recall of food. Other requirements relate to the skills and knowledge of food handlers and their supervisors, the health and hygiene of food handlers, and the cleaning, sanitising and maintenance of the food premises and equipment within the premises. If complied with, these requirements will ensure that food does not become unsafe or unsuitable.

The FSANZ Food Standard Code (FSC) covers all food products either manufactured within Australia or imported. The FSC includes requirements for:

- General Food Standards including - Labelling and other required information
 - Substances added to foods
 - Contaminants and residues including Maximum Residue Limits (MRLs)
 - Foods requiring pre-market clearance
 - Microbiological and processing requirements
- Product standards
- Food safety standards
- Primary production and processing standards

Under the FSANZ FSC, all manufacturers, wholesalers, distributors and importers of food are required to have in place a written recall plan. The recall plan should be modelled upon the FSANZ Product Recall Protocol.

Under Australia’s export legislation and importing country requirements, Department of Agriculture, Water and Environment is the competent authority for export inspection and certification. Export regulations cover many requirements including the importing country’s food safety requirements, product standards, biosecurity, quarantine standards and traceability.

4.7.2 Traceability Requirements

This section outlines the requirements by markets (retail, foodservice and industrial) to meet both traceability requirements and regulatory requirements listed above.

4.7.2.1 Retail, Foodservice and Industrial Identification

How to identify retailers, foodservice and industrials?

Retailers, foodservice and industrials should assign and apply a globally (and nationally) unique Global Location Number (GLN). The GLN is used by organisations trading electronically and is a key identifier throughout the traceability value chain.

What additional information is required for retailers, foodservice and industrials?

It is recommended for retailers, foodservice and industries to identify all sites and locations they manage for storage and movement of products and allocate a unique Global Location Number accordingly.

4.7.2.2 Identification of Trade Items Both Input and Output

Each trade item must be identified with a unique identifier. For markets, this typically represents the products they purchase.

The brand owner is responsible for assigning their own trade item identifier (GTIN) for dairy-based products and ensures each level of packaging for that product is also assigned a unique GTIN.

GTIN allocation for private label product is the responsibility of the retailer.

4.7.2.3 Identification of Batches/Lots

Processors must assign a batch/lot number to the products they produce. The batch/lot number itself depends on the processor’s criteria. For example, a batch/lot number can represent a production shift or batch of production. The batch/lot should be internally linked to the processor’s information systems and records.

4.7.3 Critical Tracking Events and Key Data Elements

The following table summarises the Critical Tracking Events and Key Data Elements for retail, foodservice and industrial markets.

Critical Tracking Event	Description	Key Data Elements
1. Receipt of product	Receiving of packaged product	Product ID, batch, serial number (where appropriate) Quantity Pallet ID Supplier ID Date/time/time zone of receipt Location of receipt Order reference Quality certificates
2. Storage/Putaway	Putaway of receipted stock into warehouse storage	Product ID, batch, serial number (where appropriate) Quantity Pallet ID Putaway location Date/time/time zone of putaway
3. Monitor/Inspection	Monitoring or inspection of goods whilst on-site e.g. temperature	Product ID, batch Quantity Temperature reading
4. Picking	Picking of stock for store replenishment	Customer order number Product ID, batch/lot number Quantity picked Date/time of pick Location of pick Logistics units
5. Despatch	Despatch of goods to customer	Customer order number Product ID, batch/lot number Quantity picked Date/Time of pick Location of pick Pallet or Logistic unit Despatch/delivery note Transport provider
6. Receipt at store or Restaurant	Receipt of foods at store/site/ restaurant	Product ID, batch/lot number Quantity delivered Date/time of receipt Store order reference
7. Sale of goods	Sale or consumption of goods	Not applicable

4.7.3.1 Product Labelling and Barcoding

All products are to be physically marked or labelled. The minimum data that must appear on product packaging/labelling is:

- Supplier Name
- Supplier identification
- Product name/description
- Product GTIN
- Batch/lot number
- Date – Production, expiry, best before
- Quantity
- Barcode containing GTIN, batch, date information (non-retail)
- Barcode containing GTIN (retail - POS)

4.7.3.2 Receipt of Packaged Product

The following data should be captured for traceability purposes.

1. Receipt of Packaged Product		
	Description	Traceability Data
WHO	Processor or distributor Retail DC or direct to store	Distributor or processor from where delivery originates (GLN) Retail DC ID (GLN) Store ID (GLN)
WHAT	Product being despatched including traceability information	Product Identifier (GTIN) <ul style="list-style-type: none">• Batch number• Serial number (if applicable)• Quantity in despatch Pallet or logistic unit ID (SSCC) Quality/test certificates
WHEN	Date/Time of despatch	YYMMDD format
WHERE	Specific location where product received	Retail DC (GLN) Store location (GLN)
WHY/LINKS	Delivery to retail market	Order Transaction number

4.7.3.3 Stock Putaway/Storage

The following data should be captured for traceability purposes.

2. Stock Putaway/Storage		
	Description	Traceability Data
WHO	Retail, foodservice or industrial organisation	Supplier from where delivery originates (GLN) Retail/foodservice or industrial organisation (GLN)
WHAT	Product being despatched including traceability information	Product Identifier (GTIN) <ul style="list-style-type: none">• Batch number• Serial number (if applicable)• Quantity in despatch Pallet or logistic unit ID (SSCC)
WHEN	Date/Time of Putaway	YYMMDD format
WHERE	Specific location where product putaway/stored	GLN of location e.g. Warehouse location (GLN)
WHY/LINKS	Product putaway and storage	Transfer order number

4.7.3.4 Inspection/Monitoring

The following data should be captured for traceability purposes

3. Inspection/Monitoring		
	Description	Traceability Data
WHO	Retail, foodservice or industrial organisation Inspector	Retail/foodservice or Industrial organisation (GLN) Inspector ID
WHAT	Inspection/monitoring (e.g. temperature)	Product ID <ul style="list-style-type: none">• Batch/lot number• Serial number (if applicable)• Quantity packed Pallet or logistic unit ID (SSCC) Quality assurance test
WHEN	Date/time of inspection/monitoring	YYMMDD format
WHERE	Specific location where inspection took place	Product location (GLN or Bin)
WHY/LINKS	Inspection/monitoring/observation	Test number Test record

4.7.3.5 Picking

The following data should be captured for traceability purposes.

4. Picking		
	Description	Traceability Data
WHO	Retail/foodservice or industrial organisation DC	Retail/foodservice or industrial organisation DC ID (GLN)
WHAT	Product ordered and picked	Output product ID <ul style="list-style-type: none">Batch/lot numberSerial number (if applicable)Quantity picked Pallet or logistic unit ID (SSCC)
WHEN	Date/Time of pick	YYMMDD format
WHERE	Specific location where product picking occurred	Picking location
WHY/LINKS	Picking	Customer order Pick list reference

4.7.3.6 Despatch

The following data should be captured for traceability purposes.

5. Despatch		
	Description	Traceability Data
WHO	Retail/foodservice or industrial organisation Customer (store, restaurant)	Retail/foodservice or industrial organisation ID (GLN) Customer ID (GLN)
WHAT	Product being despatched including traceability information	Product Identifier (GTIN) <ul style="list-style-type: none">Batch numberSerial number (if applicable)Quantity in despatch Pallet or logistic unit ID (SSCC)
WHEN	Date/Time of despatch	YYMMDD format
WHERE	Specific location where product despatched from	GLN of location e.g. Despatch bay A (GLN)
WHY/LINKS	Delivery to processor	Customer or store order reference number

4.7.3.7 Receipt of Packaged Product at Store or Restaurant

The following data should be captured for traceability purposes:

6. Receipt of Packaged product		
	Description	Traceability Data
WHO	Retail DC or Direct to Store Retail or Foodservice DC	Retail or Foodservice DC from where delivery originates (GLN) Retail Store ID (GLN) Restaurant ID (GLN)
WHAT	Product being receipt including traceability information	Product Identifier (GTIN) <ul style="list-style-type: none">Batch NumberSerial Number (if applicable)Quantity in despatch Pallet or Logistic unit ID (SSCC)
WHEN	Date/Time of receipt	YYMMDD format
WHERE	Specific location where product received	Retail Store ID (GLN) Restaurant (GLN)
WHY/LINKS	Delivery to retail market	Store or customer order Transaction number

4.7.3.8 Sale of Goods

Note 1: This CTE currently only includes sale at Point of Sale.

Note 2: Currently Point of Sale systems can only scan basic barcodes that do not include traceability information.

Additional work is required to determine capabilities and processes at restaurant.

The following data should be captured for traceability purposes.

Sale of packaged product		
	Description	Traceability Data
WHO	Retail store /restaurant Customer reference?	Product sold (GTIN) Store ID (GLN)
WHAT	Product sold at POS	Product Identifier (GTIN) <ul style="list-style-type: none">Batch number (future)Serial number (if applicable) (future)Quantity sold
WHEN	Date/time of sale	YYMMDD format
WHERE	Specific location where product sold	Retail Store id (GLN) Store location (GLN)
WHY/LINKS	Sale of product	Order Transaction number

Data Requirements for Markets

Markets	Data to Collect	Data to Share
	From previous trading partner <ul style="list-style-type: none">• Supplier ID	With previous trading partner <ul style="list-style-type: none">• Ship to location (GLN)• Receipt confirmation
	From next trading partner <ul style="list-style-type: none">• Purchase Order number• Ship to location (GLN)• Receiver identification	With next trading partner <ul style="list-style-type: none">• Logistic unit identification (SSCC)• Output batch/lot number• Trade Item identification (GTIN)
	Data to Record	<ul style="list-style-type: none">• Trade Item description• Quantity and unit of measure• Sender identification• Shipment date• Ship from location
	<ul style="list-style-type: none">• Output trade item identification (GTIN)• Trade Item description• Output Batch/Lot Number• Trade Item quantity and unit of measure• Ship Date• Ship from Location• Ship to location• Shipment identification• Receiver identification• Sender identification	<ul style="list-style-type: none">• Shipment date• Ship from location

5. Technology Considerations

This section provides insights into supporting technologies that enable traceability information to be captured and shared across the end-to-end supply chain.

5.1 Blockchain

5.1.1 Introduction

Companies are under pressure to embrace new technologies to meet growing consumer demand for safer food and pharmaceuticals, as well as the transparency, traceability and verifiability of the products they buy. One solution that is rising to the top is blockchain technology.

The industry is coming together to cut through hype in order to invoke:

- Clear definitions of business problems that need to be solved
- Foundational data requirements for effective traceability and other business processes
- Interoperability of data-sharing ecosystems

Developing safer and more effective supply chains requires leveraging innovative technologies to address clear business needs. Industry must define these business needs collaboratively and identify the intersections where interoperability is required—as well as the standards needed to ensure success globally.

5.1.2 Blockchain for Sharing Data

Blockchain is one component of a broader traceability system. It is not typically considered a means of communication (like standards-based EDI or EPCIS). Nor is blockchain a standalone business application system. Therefore the term “blockchain-based applications” is often used.

Blockchains provide a distributed ledger that catalogues transactions in an immutable, time-ordered manner. In their simplest form, they provide proof—or an audit—of a transaction that has happened. They also help to show that data has not been altered. The graphic below shows how a blockchain layer can fit into a solution that is designed to capture and share data.

5.1.3 Understanding the Blockchain Layer

It is important to understand the specific requirements of the blockchain layer for a use-case, industry or ecosystem.

What data gets stored on a blockchain?

The data that gets written to a blockchain ledger can vary depending on the system and/or solution being implemented. The type of data written to a blockchain ledger can be:

1. Fully formed, cryptographically signed plain text event data. There is a concern about scalability and performance if full events are written to a ledger.
2. A cryptographic hash of the data that has little meaning by itself. This requires off-chain data exchange via a separate traceability application and a hash comparison to verify that data hasn't been altered since the hash was written to the ledger.
3. A cryptographic hash of the data and a pointer to off-chain data. This is the same as above with a pointer to the off-chain data source. Such an approach can enable the ledger to act as part of a discovery mechanism for parties who need to communicate and share data.
4. Some combination of the above.
5. Potentially many other methods.

Who gets to see the data stored on a blockchain?

The parties who are allowed to see the data that is stored on a blockchain ledger can vary depending on the underlying ledger technology. Options here include:

1. Public: Everyone sees all transactions.
2. Private: This includes a permission layer that makes transactions viewable to only approved parties.

5.1.4 Blockchain Application in the Dairy Sector

Blockchain and Distributed Ledgers

Blockchain (and distributed ledgers in general) may help the industry partners better manage information, build greater trust, improve transparency and the way the dairy industry works together providing a ‘shared view’ of truth for business transactions. Everyone knows they are all looking at the same records and the history of their business relationship. Neither side controls the records (each party has a copy) by themselves, and they do not have to give up control to another third party. This transparency can reduce the cost and time for reconciliation – not just for financial records, but for any shared business data.

Smart Contracts on Distributed Ledgers

Businesses can also use distributed ledgers to store and run small, shared programs. These are called ‘smart contracts’. For example, ‘transfer funds immediately when all parties agree that a transaction, say product delivery, is complete’. These automation rules can reduce or eliminate manual work, reduce the risk of errors, and reduce delays. Smart contract terms are determined in the same way legal agreements work and can be run automatically, in a reliable way, with all parties able to see the results and workings of the agreed rules. Rules may include calculations or complex price determinations based on quality testing or other reliable or valid data input.

How does a Distributed Ledger Work?

Distributed ledger technology can give life to the new standard form contracts in the dairy industry, and build trust, transparency and efficiency between dairy farmers and processors.

A decentralised, peer-to-peer (person to person) network can give each farmer and each processor their own ‘node’ to keep information secure and private. When a farmer sells milk to a processor, their nodes use a ‘shared ledger’. This can be thought of as a duplicate/identical digital copy of a physical ledger, multi-column account or production record book.

The ledger keeps a record of the contracts, milk that has been ordered and delivered, milk quality testing results, and payments. Key terms for delivery and payment in the standard contract can be shared and run as smart contracts on the ledger. When a farmer sells milk, supply chain events are recorded on the shared ledger and linked to the contract. The contract on the shared ledger can then automatically calculate the final price. Payment can be made between bank accounts as normal, with receipts automatically recorded and linked to the contract. Automated payments can be made immediately or be scheduled.

Only the farmer and the processor can add information to their shared ledger, so they each know and can both see the full history of their shared business relationship.

Nodes can be connected to other systems to save costs and streamline processes.

- Sensors can automatically collect information about the milk.
- Scanners can automatically record milk deliveries and supply chain events.
- Banking systems can automatically make payments.
- Regulators can view information to monitor the industry but cannot change the ledgers.

5.2 IoT Devices

The Internet of Things (IoT) has enabled the interaction between the physical and digital worlds and has revolutionised how data can be captured. These ‘devices’ sense the physical world capturing information such as ambient temperature and light, humidity, weather conditions, etc. This has led to a proliferation of applications and uses most notably in the area of supply chain traceability, where products are recorded as they travel from the manufacturer to the consumer.

An IoT system can read data from a range of devices such as smart tags (RFIDs, NFC, Barcodes, Bluetooth Low Energy), along with sensory data like ambient temperature and humidity, vehicle speed or geolocation.

Supply Chain tracking offers numerous advantages to all parties in the supply chain ranging from:

- Food safety and quality
- Perishable product protection
- Origin verification
- Brand certification

The use of IoT technologies can offer low cost services, as the cost of hardware (sensors and other related equipment, for example tags) has significantly decreased over time, owing mainly to the technological advances in hardware and software.

IoT technologies which comprise communication protocols, interoperability standards, IoT/cloud architectures, security & privacy algorithms have also substantially matured making IoT-based supply chain tracking an appealing and feasible solution.

5.3 Smart Barcodes

A lot has changed since the introduction of the barcode over 45 years ago, but businesses still use on-pack barcodes and symbols as they benefit manufacturers and customers alike.

The barcode on your product CAN do more

Business and regulatory demands on product packaging have grown dramatically in recent years. In the past, every product sold at point of sale had a single barcode that served the purpose of going ‘beep’ at the checkout. Today, product packaging often contains multiple barcodes and symbols that are intended to meet the need for more data and that serve varied purposes. Unfortunately, they cause consumer and supply chain confusion and don’t always communicate with each other.

Consumer expectations have evolved

Consumers use their powerful smartphones to learn about products inside and outside of the store. In addition, manufacturers and retailers seek to interact with shoppers to share information about the benefits of their products and to unlock direct brand-consumer engagement. This means that all products must deliver accessible, accurate data for the companies who manufacture, transport, and sell them – and ultimately for the consumers who purchase them.

Technology exists today to do more with product codes

As consumer expectations have evolved, technology solutions have advanced to try to meet an ever-growing need for data that extends beyond the consumer to your trading partners and even to regulators. You may be a retailer seeking to improve ROI and checkout speed. Perhaps you are a brand owner looking to make a promotional QR code provide more value to your customer and your business. Or maybe you are a solution provider working to serve industry. Whatever your role in the supply chain, there are things you can do today to reduce costs, provide transparency (and data), and create more engaging experiences that were not available just a few years ago.

What is happening in Australia?

Moving beyond traditional point of sale barcodes and into the next generation of technology is not a new concept. Symbols and codes on-pack can help improve sustainability, share important sourcing information, create customer engagement and improve consumer experiences. Manufacturers and retailers, along with their customers, have already begun to experience the benefits of newer solutions, such as:

The Woolworths Supermarket chain has begun rolling out the use of the 2D GS1 DataMatrix in all stores nationwide.

Starting with own label meat products, the new barcode symbology ensures that traceability data, such as best before dates, can be encoded into the barcode. This enables product past its best before date to be sold to the end consumer.

Woolworths has also implemented the use of 2D GS1 DataMatrix barcodes on quick sale labels.

The information encoded allows Woolworths to capture sale of the product and automatically providing a discount price at point of sale.

Appendix A:

About Australian Dairy Farmers Limited

Australian Dairy Farmers (ADF) is the national policy and advocacy body working to improve the profitability and sustainability of dairy farming in Australia. Representing Australia's six dairying states, ADF state membership is comprised of representatives from Tasmania, Victoria, New South Wales, Queensland, South Australia and Western Australia. These state bodies are known as State Dairy Farmer Organisation (SDFO) members, whom ADF provides support and representation to on a national level.

Alongside the dairy processor representative body, the [Australian Dairy Products Federation \(ADPF\)](#), both organisations form the [Australian Dairy Industry Council \(ADIC\)](#). Through the ADIC, dairy farmers and processors work together to create a more prosperous and sustainable future by advocating to government, industry and the community.

About GS1 Australia

GS1 is a neutral, not-for-profit organisation that develops and maintains the most widely used global standards for efficient business communication. We are best known for the barcode, named by the BBC as one of ‘the 50 things that made the world economy’. GS1 standards improve the efficiency, safety and visibility of supply chains across physical and digital channels in 25 sectors. Our scale and reach – local Member Organisations in 115 countries, 2 million user companies and 6 billion transactions every day – help ensure that GS1 standards create a common language that supports systems and processes across the globe. Find out more at www.gs1au.org

Appendix B: Reference Documents

Document name	Location
Australian Dairy Plan	https://www.dairyplan.com.au/
Dairy Food Safety Booklet	Dairy Food Safety Booklet
Dairy Food Safety Standard 4.2.4	Dairy Standard (Australia only)
GS1 Traceability Standard V2.0	https://www.gs1au.org/download/GS1au-traceability-global-standard-v2.pdf/file
ISO 9000: 2015	https://www.iso.org/standard/45481.html

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