



Wine Supply Chain Traceability

GS1 Application Guideline



This document provides recommendations and guidance needed to understand and implement the GS1 System of numbering and bar coding from the grape grower to the retailer. The use of GS1 standards is subject to the “General GS1 Specifications” and membership of GS1 (www.gs1.org).

Disclaimer

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1. Introduction

GS1 co-established the Wine Traceability Working Group in 2003 together with the British Wine and Spirit Association (WSA) and its French counterpart - Association Française des Eleveurs, Embouteilleurs et Distributeurs de Vins et Spiritueux (AFED). The objective was to adapt the GS1 System for its implementation by the wine industry to facilitate compliance with the traceability-related provisions of the General Food Law - Council Regulation (EC) No. 178/2002.

Although work has been done primarily with the involvement of wine industry companies supplying to the European Union the focus has been on building a traceability model that has global applicability. The Wine Traceability Working Group was composed of representatives of international wine trading companies from France, Germany, South Africa, United Kingdom and United States. Industry peers in Argentina, Australia, Chile, New Zealand, Spain, and other wine regions have reviewed the document.

Effective wine traceability is based upon the accuracy of the information about the products contained in records held by the various supply chain partners. This document provides recommendations and guidance needed to understand and implement the GS1 System of numbering and bar coding from the grape grower to the retailer. The use of GS1 standards is subject to the "General GS1 Specifications" and requires membership in a GS1 Member Organisation. Please consult <http://www.gs1.org/members.html> or (<http://www.gs1.org>).

The adoption of the full set of GS1 standards is especially timely in view of the release of a new GS1 standard for Radio Frequency Identification (RFID), which is known as the Electronic Product Code (EPC). Leading retailers have announced guidelines for RFID rollout using the EPC standard. The investment in GS1 identification keys (GLN, GTIN, SSCC) is solid and lasting because these are an integral part of the EPC number. The critical path towards industry adoption of RFID is founded on the accelerated adoption of GS1 identification keys and the use of the GS1-128 bar code and Despatch Advice.

2. Traceability

The most internationally recognised definition of traceability defines it as the "ability to trace the history, application or location of an entity by means of recorded identifications" (ISO 8402). There are however other definitions, such as the one contained in the General Food Law - Council Regulation (EC) No. 178/2002 and the one established by the Codex Alimentarius Commission.

3. GS1 Standards

In this document, the Wine Traceability Working Group describes the GS1 System for the unique identification of standard trade item groupings not crossing the point of sale, logistic units and trading partners, as well as the data standards, bar code labelling and electronic data exchange as best practices for traceability.

The key reason for this is that the GS1 System provides global, generic, voluntary standards suitable for use by all trading partners to facilitate the identification of companies and their products and to exchange information about them. These standards provide a common language of business used in retail trade and beyond.

If properly used by each member of an extended supply chain, products and data, including information required to manage traceability and shelf life, can be



exchanged through each link in the chain - facilitating the seamless flow of information with the flow of goods.

GS1 is the global not-for-profit organisation that creates, develops and manages the GS1 System of Standards. These are open, global, multi-sector information standards, based on best business practices. GS1 has 108 Member Organisations that support the needs of more than 1 million member companies worldwide.

4. GS1 Traceability Tools

The introduction of GS1 standards can improve the efficiency of recording and exchanging information between supply chain participants. When used in conjunction with databases containing accurate and timely records, GS1 standards provide all supply chain participants with the technical capability to see the origin of a product, both in their own locations and across the entire supply chain.

At the simplest level, item numbering is what the name suggests – a system for identifying items by giving each one a unique number (e.g. a bottle will have a different number to a case). Numbering can be applied at every stage of production and distribution. It is used to identify products and services. While the most visible aspect of item numbering is the bar code, it is only a machine-readable representation of a number. It is the number, which is the most important element in the GS1 System, because the number identifies the item to which it is assigned.

The GS1 numbering system provides for global uniqueness and overcomes problems of confusion, duplication and misinterpretation, because all users of the GS1 System follow the same coding rules. A GS1 number can be recognised not only by local trading partner companies, but by companies operating overseas as well. Each GS1 number is unique worldwide, so there is no possibility of confusion. The GS1 numbering system also provides the ability for items to also carry, within the numbering convention, extra or attribute information pertaining to the item.

GS1 standards carry data, which allow supply chain participants to track and trace products. The application of these standards requires manufacturers, importers/exporters, carriers, distributors and retailers to keep records of serial numbers of logistics units (SSCC), identification numbers of trade items (GTIN) and their attribute information (Application Identifiers), and location numbers of their origin (GLN).

4.1. Global Location Number (GLN)

A GLN is a numeric code that identifies any legal (e.g. company, division), functional (e.g. accounts dept) or physical entity (e.g. plot of land) within a business or organisation. Each location is allocated a unique number. The use of a GLN is a pre-requisite for efficient Electronic Data Interchange (EDI).

4.2. Global Trade Item Number (GTIN)

The GTIN is a number used for the unique identification of trade items worldwide. A trade item is any item (product or service) upon which there is a need to retrieve pre-defined information and that may be priced, ordered or invoiced for trade between participants at any point in any supply chain.

4.3. Serial Shipping Container Code (SSCC)

The SSCC (Serial Shipping Container Code) is a number, which is used for the unique identification of logistic units. A logistic unit is an item of any composition



established for transport and/or storage, which need to be managed throughout the supply chain. The SSCC provides an unambiguous identification for logistic units (e.g. a flexi tank or a container). All parties in the supply chain can use it as a reference number to the relevant information held in electronic or human readable files.

4.4. Application Identifier (AI)

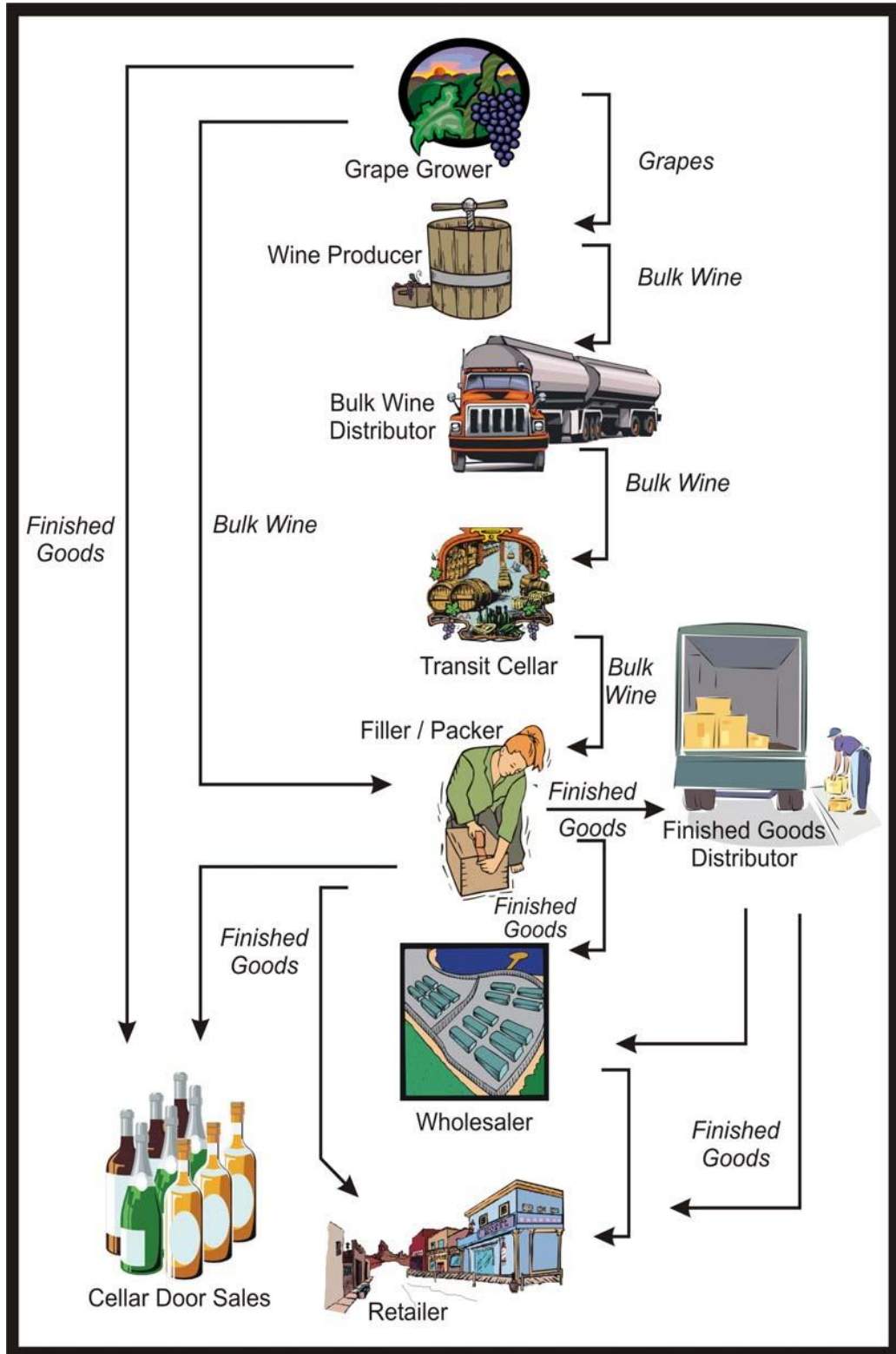
Attribute information is any variable information required over and above the trade unit or logistics unit identification, such as a batch number, production date or customer purchase order. In the GS1 System, this information is expressed by means of GS1 Application Identifiers (AI). Attribute information is bar coded in the GS1-128 bar code symbol.

4.5. Bar Codes and RFID

GS1 bar codes allow automatic data capture of GS1 numbers, which is a key business solution in an efficient supply chain. The GS1 numbering and bar coding system allows fast accurate and timely data input into computer systems, automating the flow of information into business processes. It also enables improved data capture and transfer of information, while reducing costs. Recent GS1 standardisation developments in the field of RFID are internationally known as the EPCglobal Network.

For more information, please see <http://www.epcglobalinc.org/>

The Wine Supply Chain



5. The Wine Supply Chain Model

The wine supply chain has always been complex and fragmented and with more distant suppliers and ever-more demanding customers, the unique characteristics of this supply chain bring challenges to implementing an effective traceability system.

The largest companies account for a significant percentage of the industry and have significant technology requirements. The remainder of the industry is comprised of small to medium enterprises, many of which have found niches in specialty products and branding. There is also a myriad of other support companies that provide materials, transportation, storage and other services that are also impacted by traceability.

Companies vary greatly in their technical capabilities; from phone, fax and paper based transactions, through robust e-commerce, bar code, and other internal systems. Their ability to identify implicated product, and perform track and trace activities is directly related to their technical capabilities.

The Working Group determined that the wine supply chain could be broken down into the following key areas:

- Grape Grower
- Wine Producer
- Bulk Distributor
- Transit Cellar
- Filler / Packer
- Finished Goods Distributor
- Retailer

Each area was examined with a view to explaining traceability within that business process, and to determine the relevant GS1 standards to be deployed.

5.1. Key Area 1: Grape Grower

5.1.1. Scope

The grape grower is responsible for the production (in accordance with integrated production principles), harvest and delivery of the grapes, as well as record keeping of appropriate information about what is received and what is sent. Vineyard treatment details should be available on request.

5.1.2. Description

Since traceability does not confer a guarantee of quality, disciplined record keeping is a key success factor. It is essential that the grower keep records for each plot or block of vines under his control. This includes details about the location, type and care of the vines, annual production record, origin and chemical content of water used for cleaning and irrigation, and the annual treatment record, which includes all fertilisers, pesticides, fungicides and/or any other treatments carried out. On receipt of treatment products from suppliers, a record should be made of the supplier's details, a description of the product received, as well as applicable batch numbers.

5.1.3. Traceability Data

The key data required for traceability purposes is the identification of the plot or block from which the grape comes, and the picking date. There are major benefits from having a standard globally unique location number (this number would be changed if the plot is sub-divided or if the vine variety on the plot changes). All communications and related paperwork can have a common means of identifying locations, thus eliminating the need to include names, addresses and other related information.

5.1.4. GS1 Standards

Each plot or block of vines is identified with a Global Location Number (GLN), which is allocated by the grape grower. The following information should be associated to each GLN:

- Name and address of the vineyard
- Plot map reference/cadastral reference/block identifier
- Size of plot/number of vines
- Vine variety
- Contact details

At the end of the economic life of a specific block, the GLN dies with vine uprooting. A new GLN would have to be allocated to the block on completion of the replanting programme. The same applies if the vineyard is grafted over to a different variety on the same rootstocks.

NOTE: It is not recommended that a GTIN be allocated by the grower to grape varieties that he supplies. GTINs require the product to be “branded”, and would entail Receiving Cellars having multiple GTINs for the same grape variety supplied by many different growers.

5.1.5. Traceability Process

The grower should supply with each delivery the GLN of the plot or block from which it comes and the date of picking, so that the receiving winery can link the related details to the wine made from these grapes.

5.2. Key Area 2: Wine Producer

5.2.1. Scope

The wine producer is responsible for receiving the grapes and for the production, manufacture and/or blending of wine products.

5.2.2. Description

Grapes:

Receiving records should include details of the type of product received, vine variety, identity of the supplier (grape grower) and the location from which the grapes were harvested. This information may be obtained from the GLN supplied when the grapes are delivered. The date of receipt should be recorded.

The records should also show where in the winery the grapes or juice were sent, for example, to the de-stemmer/crusher/must chiller/press, maceration or receiving tank.

Additives¹:

On receipt of additives from suppliers, a record should be made of the supplier's details, receiving date, a description of product received, as well as applicable batch numbers.

5.2.3. Traceability Data

The transformation from juice to wine can require numerous steps, but all wine is made using the same basic process. Many procedures and operations are performed, so the wine producer must keep accurate records of the procedures used to make each wine. These records are the corner stone of product traceability.

Physical samples of the finished product (per batch) may be retained for later chemical analysis. The responsibility to maintain full traceability records (by employing internal systems and procedures) rests with the business operator. The nature of internal business processes, which form the basis for a risk analysis, remains the prerogative of each business operator. The winery is responsible for identifying each production run with a batch number. Through the use of GS1 standards, the business operator is able to accurately identify to whom the finished product was delivered, isolate a distinct batch and withdraw it from the market.

The finished wine may be sent to:

- A filler/packer for the filling and packing of finished goods (trade items)
- Another wine producing cellar for inclusion as “top-up” or for blending
- A bulk wine distributor

5.2.4. GS1 Standards

- Identification of the Wine Producer:
 - The Wine Producer is identified by a GLN.
- Product Identification (trade item):
 - A product (trade item) is uniquely identified with a Global Trade Item Number (GTIN). Since the product at this stage is deemed to be a variable measure item, the use of a variable measure indicator “9” is necessary.
- Shipping Container Identification (logistics unit):
 - A shipping container (e.g. road tanker) is identified with a Serial Shipping Container Code (SSCC).
- The quantity of wine dispatched:
 - The Application Identifier AI (315n) is used to indicate the quantity (litres) of wine dispatched.²

¹ Any non-grape addition included in the wine-making process.

² The fourth (and last) digit of the AI indicates the implied decimal point position. The value 0 means that the measurement is expressed in the basic unit of measure associated with the AI (e.g. litres). A value of 1 decreases the measurement by a factor of 10, a value of 2 by a factor of 100, and so on

- The batch number of each product:
 - The AI (10) is used to indicate the batch number. The quantity dispatched and batch numbers are both attributes of the product. Therefore they must be combined with the product identifier (GTIN, AI (01)).

5.3. Key Area 3: Bulk Distributor

5.3.1. Scope

The bulk distributor is responsible for receipt, storage, dispatch, processing, sampling and analysis of bulk wine, as well as record keeping of appropriate information about what is received and what is dispatched.

5.3.2. Description

The bulk distributor receives bulk wine from the wine producer, which has been identified by a GTIN and a batch number. The bulk wine container identification (SSCC) is recorded on arrival. The information received and recorded also includes the amount of wine received (AI (315n)).

The wine is usually pumped into transport containers such as road tankers or barrels. When the wine arrives at the “tank farm”, the bulk distributor checks the receiving documents and takes samples for tasting and analysis. He approves or rejects the wine (if rejected, the wine returns to the nominated source). Two distinct processes are then identified:

- Storage and dispatch of bulk wine without any blending or any other processing. The batch number of the output is the same as the batch number of the input.
- Storage, blending of different wines and dispatch of the new bulk blend. A new batch number must be allocated, which is different from any other batch number used in the blending process.

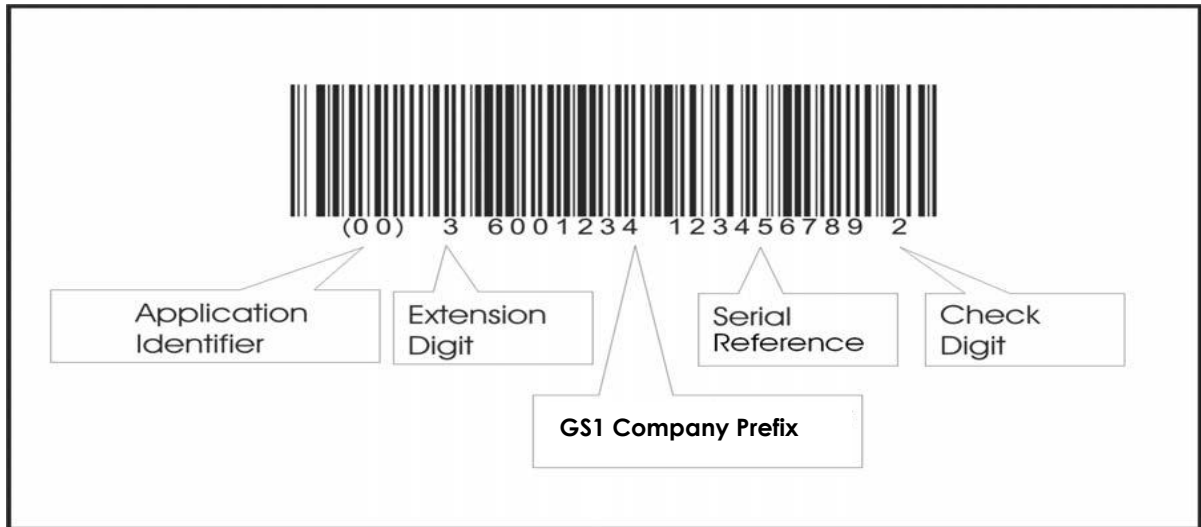
5.3.3. Traceability Data

The bulk distributor sends batches of wine to the transit cellar or to the filler / packer. Identification is handled as per the options detailed below.

5.3.4. GS1 Standards

Bulk wine containers, such as storage tanks, are identified with a Serial Shipping Container Code (SSCC) allocated by the bulk distributor. When bar coded, the SSCC is represented in a GS1-128 symbol. The AI (00) indicates that the data field contains an SSCC.

- **Option One:**
 - The bulk wine container holds mixed products, with mixed batch numbers.
 - The mandatory AI is (00) – Serial Shipping Container Code (SSCC).



Serial Shipping Container Code (SSCC) bar coded in a GS1-128 symbol

■ **Option Two:**

- The bulk wine container carries the same product, with the same batch number. The recommended Application Identifiers are:

(00) – Serial Shipping Container Code (SSCC)

(01) – Global Trade Item Number (GTIN)

(10) – Batch code

(315n) - Volume (litres)



The SSCC and attribute information bar coded in a GS1-128 symbol

5.3.5. Traceability Process

- Identification of the Bulk Distributor:
 - A bulk distributor is identified with a GLN.
- Identification of the Bulk Wine Container (SSCC, GTIN, Batch and Quantity):
 - It is essential that links between the SSCC of the container, the GTIN and batch number of the product be maintained. To ensure forward tracking, it is necessary to record the GTIN and Batch number of the delivery items and link these to the GLN of the recipient. The information regarding the SSCC and its components must be sent to the relevant supply chain partners prior to the dispatch of the goods. This information is then recorded for retrieval when the container arrives at its destination.

5.4. Key Area 4: Transit Cellar

5.4.1. Scope

The transit cellar is responsible for the receipt, storage, dispatch, processing, sampling and analysis of bulk wine, as well as record keeping of appropriate information about what is received and what is dispatched. The transit cellar can be part of the filler/packer company (geographically separate or not) or can be outsourced. What differentiates the bulk distributor from the transit cellar is that the former has a commercial role (he sends invoices) whereas the latter has only a role of transit with no commercial and no invoicing goal.

5.4.2. Description

The transit cellar receives bulk wine from bulk distributors in different kinds of containers. Each of these containers is identified with an SSCC, a GTIN and a batch number in a GS1-128 bar code, as well as in human readable form.

During the transit cellar stage, the wine is prepared for onward sale and filling. It is loaded for transit to the customer and is accompanied by all the appropriate documents. The transit cellar sends batches of bulk wine to the filler/packer. Each container sent is identified with a unique serial number (SSCC), a GTIN, a batch number and the quantity of wine (litres) sent. This information is communicated via a GS1-128 bar code and in human readable form. If the transit cellar is part of a cellar complex, then the wine is moved through pipes to the filling section, rather than in bulk containers.

5.4.3. Traceability Data

In order to maintain accurate traceability throughout the chain, it is necessary that the transit cellar records the GTIN and batch numbers, as well as the SSCC of each item dispatched.

5.4.4. GS1 Standards

- Identification of the Transit Cellar
 - A transit cellar is identified with a GLN.
- Identification of a container
 - A container is identified with an SSCC.

- Product identification
 - A product is identified with a GTIN.
- The quantity of wine dispatched
 - The AI (315n) is used to indicate the quantity (litres) of wine dispatched.
- The batch number of each product
 - The AI (10) is used to indicate the batch number.

5.4.5. Traceability Process

To ensure forward tracking, it is necessary to record the SSCC, GTIN and Batch number of the shipped items and link these to the GLN of the recipient. A correlation between the containers received by the transit cellar (SSCC, GTIN and batch numbers at arrival) and the items dispatched to the finished goods distributor (SSCC, GTIN and batch numbers at departure) must be established.

5.5. Key Area 5: Filler / Packer

5.5.1. Scope

The filler/packer is responsible for the receipt, storage, processing, sampling, analysis, filling, packing and dispatch of finished goods, as well as record keeping of appropriate information about what is received and what is dispatched.

5.5.2. Description

The filler/packer receives containers of bulk wine from the transit cellar or the bulk distributor. Each of the containers of bulk wine is identified with an SSCC, a GTIN and a batch number (carried in a GS1-128 bar code and in human readable form). “Dry goods” in contact with wine (bottles, caps, corks, etc) are also received, and therefore each logistics unit must be also identified with an SSCC, GTIN and a batch number. Additional information regarding these items must be recorded (i.e. information on the water used to wash the filling equipment, chemicals used for cleaning, etc).

A link between these components (bulk wine, finished product) should be maintained. During this stage, the wine is filled into different kinds of containers, such as bottles, bags, kegs or barrels. Consumer units are produced from wine batches supplied, and a lot number is allocated to them³. The next step is the packaging of the consumer units into cartons and pallets or other logistic units.

5.5.3. Traceability Data

The filler/packer dispatches cartons (identified with a GTIN and lot number) and logistic units (identified with a SSCC) to the finished goods distributor. The lot number of the consumer unit must be linked to the batch(es) of bulk wine used to fill the bottles. The recommendations concerning the identification and labelling of consumer units, cartons and logistic units are as follows;

³ While the lot number of the consumer unit refers to the filling line, the batch refers to the bulk wine blend used to fill the bottles

5.5.4. GS1 Standards

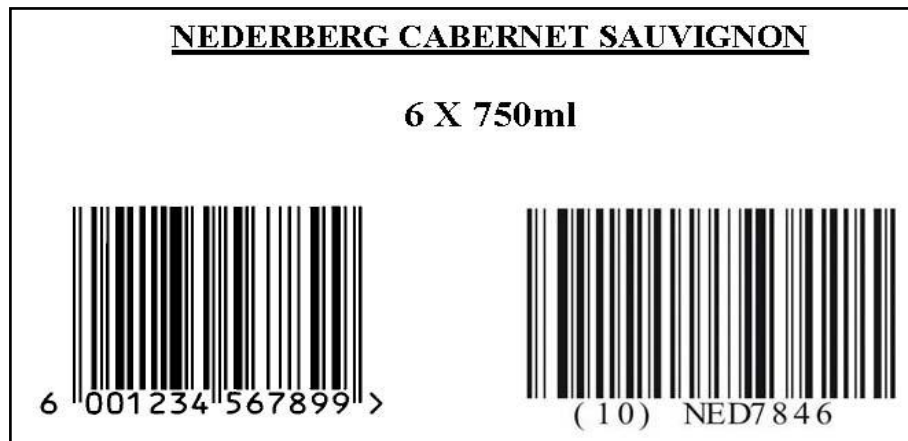
5.5.4.1. Trade items crossing the point of sale (bottle, can, jug, bag in box)

These must be identified with a GTIN and bar coded with an EAN/UPC symbol for scanning at point-of-sale. Some countries, including EU member states, require the display of a lot number allocated to each consumer unit created during the filling process. This information may be displayed in human readable form.

5.5.4.2. Trade items that may be crossing the point of sale (case, carton)

- **Option One:**

Trade items, specifically cases and cartons, sold through a retail point of sale are identified with a GTIN and bar coded with an EAN/UPC symbol. For traceability purposes, an add-on bar code symbol should be applied. This would be AI (10) indicating a lot number, encoded in a GS1-128 symbol. The preferred placement for an add-on GS1-128 bar code symbol is on the same horizontal plane as the primary EAN/UPC bar code symbol containing the GTIN. The GS1-128 add-on symbol should be as close as possible to the main symbol. Maintain the quiet zones for both symbols.



Example of Option One: EAN/UPC and GS1-128 add-on bar code

- **Option Two:**

For cases and cartons that will never be sold through a retail point of sale, identification is done through the use of Application Identifiers (01) (GTIN) and (10) (Lot Number), and encoded in a GS1-128 bar code.



Example of Option Two: GS1-128 bar code

NOTE: Should the filler/packer be uncertain where the product is to be distributed and sold (either through a retail point of sale or only in a warehouse environment), it is recommended that Option One (the EAN/UPC and GS1-128 add-on bar codes symbols) be used.

5.5.4.3. Logistic units (pallets)

Identification and traceability of pallets is ensured through the allocation of a Serial Shipping Container Code (SSCC). Any pallet, independently of its type (mixed or uniform), needs to carry a SSCC allocated by the filler/packer. A new SSCC must be allocated every time a new logistic unit (pallet) is created.

GS1 LOGISTICS LABEL	
SSCC	
0 0614141 1234567890	
CONTENT	COUNT
00614141000418	20
BEST BEFORE (ddmmyy)	BATCH
14.02.05	4512XA
	
(02)00614141000418(15)050214(10)4512XA(37)20	
	
(0 0) 0 0 6 1 4 1 4 1 1 2 3 4 5 6 7 8 9 0	

The GS1-128 bar code and the use of Application Identifiers allows the filler/packer to include any additional information that may be required. A link must be made and maintained between the SSCC and the identification numbers of the cartons it contains (i.e. GTIN and lot number). It is recommended that the format of the GS1 Logistics Label be used.

5.5.5. Tracking Process

To ensure forward tracking, it is necessary to record the SSCC, GTIN and lot number of the shipped items and link these to the GLN of the recipient.

5.6. Key Area 6: Distribution

5.6.1. Scope

The finished goods distributor is responsible for the receipt, storage, inventory management and dispatch of finished goods, as well as re-packing and re-labelling

as required, quarantining products, and record keeping of appropriate information about what is received and what is despatched.

5.6.2. Description

The finished goods distributor receives pallets and cartons from the filler/packer. These trade items and logistic units are identified with GTIN plus lot numbers, and SSCC, which are recorded. The finished goods distributor may also re-pack and re-label the products as per specific customer requirements. The finished goods distributor dispatches cartons and pallets to the retailer. These trade items and logistic units possess the same identification as when received (if the configuration is unchanged) or a new SSCC if the logistics container is re-packed. Should cartons be broken down and then re-used to pack specific orders, then the original identification on the carton must be obscured, and a new SSCC allocated by the finished goods distributor to identify the new carton configuration.

5.6.3. Traceability Data and GS1 Standards

- SSCC of the inbound pallet and GLN of its supplier
- SSCC of the outbound pallet, either unmodified or newly created
- Links between the SSCC of the newly created pallet and the SSCC of the pallets used in its creation and, if applicable the GTIN and lot number of each carton shipped to the retailer
- GLN of the retail location to which the pallet is dispatched

5.6.4. Tracking Process

To ensure forward tracking, it is necessary to record the SSCC, GTIN and Lot Number of the shipped items and link these to the GLN of the recipient.

5.7. Key Area 7: Retail

5.7.1. Scope

The retailer receives pallets and cartons from the finished goods distributor and picks and dispatches goods to the retail stores.

5.7.2. Description

The SSCC of an incoming pallet is recorded and linked to the GLN of the supplier. Each time the pallet is moved within the retail distribution centre, its SSCC is recorded and linked to the GLN of its new location. The SSCC of an unmodified pallet picked for distribution from the storage area or cross-docked without any storage is recorded and linked to the GLN of its destination. A newly created pallet contains cartons originating from different pallets. In this case, a new SSCC is assigned to it and linked to SSCC numbers of all other pallets used in its creation and/or, if applicable, the GTIN and Lot Code of each carton used. This can create the need for an enormous effort and can be solved through the application of a “time window”, to be defined by each company, when a product is packed. Newly created pallets during this time window can be linked to pallets used up within the same time frame. The SSCC is recorded and linked to the GLN of its destination.

5.7.3. Traceability Data

The retailer keeps a record of the SSCC and the lot numbers of the components of the pallets and cartons he receives. The retailer sells consumer units (bottles, cartons) to the final consumer. These units are identified with a GTIN-13 allocated by the brand owner. The use of EAN/UPC symbol ensures the scanning of the product through the point of sale. In the event that the retailer returns goods to his supplier, it is important to ensure that the traceability links are not broken. In effect, the retailer then has similar responsibilities to the finished goods distributor. To ensure this “return” tracking, it is necessary to record the GTIN and Lot number of the returned items and link these to the GLN of the recipient.

5.7.4. GS1 Standards

- Standard groupings of trade items not crossing the point of sale (cartons) are identified with a GS1-128 bar code, which contains the Application Identifiers:
 - (01) – Global Trade Item Number (GTIN)
 - (10) – Lot Number
- Logistic units (pallets) are identified with a GS1-128 bar code, which must contain the AI (00) – Serial Shipping Container Code (SSCC). The optional AI set could consist of:
 - (02) – GTIN of the items contained
 - (37) – Count of the items contained
 - (13) – Packaging date
 - (10) – Batch/Lot Number

NOTE: The optional AI set may only be used for a homogeneous pallet, i.e. composed of the same trade item all with the same packaging date and same batch/lot number. If the pallet is mixed or heterogeneous, then the optional data would be communicated in the Despatch Advice transaction.

5.7.5. Traceability Process

The SSCC of the outbound pallet is recorded and linked to the GLN of its destination (point of sale). The SSCC of the inbound pallet is recorded and linked to the GLN of the sender (finished goods distributor).

6. Best Practice Foundation Elements

6.1. Data Alignment

Some companies already have effective internal traceability systems in place. The next step is to achieve full supply chain traceability. The main requirements for handling product withdrawals⁴ and recalls⁵ across the supply chain are having reliable data, the possibility to exchange the data and properly mapped business processes. A good internal traceability system is a prerequisite to a chain traceability system. The investments in an internal traceability system will not be wasted in moving towards chain traceability. All good supply chain traceability software should be able to integrate seamlessly to any internal system. The application of GS1 standards is a prerequisite for the alignment of traceability systems.

The reason for using GS1 standards is to overcome the barriers to commerce that national, industry and company specific standards create when they are used in place of international multi-industry standards. Trading, tracking and tracing goods become more expensive because of the need to fulfil different identification and communication requirements of each importing country or company. The key to designing cost-effective and efficient traceability systems is to satisfy different customer and legal requirements by applying one global standard.

Companies that implement collaborative best practices and GS1 standards need to encourage their partners to do the same. Before any GS1 bar code label can be scanned, there has to be an exchange of master data between the trading partners. This data defines the specific trade item, such as its GTIN; the logistic unit, such as its SSCC; and the trading partner details, such as its GLN. Because this information is retrieved from the receiver's files, it is crucial that the receiver is able to maintain the necessary GS1 data standards in its database. As the full product data is built from both the sender and receiver's information, it is vital that the data is aligned. Therefore, it is very important that data alignment occurs prior to any physical transaction between the sender and receiver.

6.2. Bar Code Print Quality

Although technical improvements are continuously being made, printing GS1-128 bar codes onto corrugated boxes does not provide the optimal scanning quality (in terms of the combination of the quality of the corrugated board and/or the quality of the printing devices). Therefore, GS1-128 bar codes are currently printed onto labels, which are then applied onto the corrugated box.

6.3. Migration to GS1 Standards

In a supply chain where many trading partners are involved it is important to invest in technology that supports properly aligned product identification and traceability processes to ensure that the full potential benefits of the investment can be

⁴ A procedure to withdraw products from the market where they have left the immediate control of the brand owner

⁵ A procedure to withdraw products from the market where they have left the immediate control of the brand owner and where they may have reached the consumer

achieved. Manufacturers and retailers, large and small companies can participate. Achieving proper alignment is the main driver for recommending companies to assess their current position and to consider implementing best practice as described in GS1 standards⁶.

Throughout this process a collaborative approach is recommended including dialogue between all supply chain partners. This dialogue will lead to the identification of all essential supply chain information and material flows to be received, handled and generated within a company's boundaries and at interfaces between the company and its trading partners (e.g. at receiving and dispatch of materials and finished goods). The important information that must be properly recorded and exchanged includes:

- Identification of all supply chain partners through unambiguous coding using the Global Location Number (GLN)
- Identification of all unique products using the Global Trade Item Number (GTIN)
- Identification of logistic units using the Serial Shipping Container Code (SSCC)
- Bar coding of trade items and logistic units with appropriate GS1 bar codes
- Precise and cost efficient electronic data interchange using standard electronic message formats (EANCOM[®] or GS1 XML)

A clear analysis should be completed to identify and describe the current status of your company organisation, IT systems and business processes ("as is") and an analysis should be prepared to describe the desired future status ("to be"). The analysis of the current practices of the wine supply sector and their expected future development are to be taken into account in order to assess the timeframe needed to reach a critical mass of players for implementation. This will help identify and document the steps required to implement a migration programme and achieve a successful implementation of standards including:

- Organisational changes
- Investments in technology
- Integration of new technology process designs

The final key step in the migration plan is to find the best sequence in which to implement the solution, starting with organisational change and driving into technological implementation whilst preserving the benefits achieved through each step of the process improvements. All steps developed should be documented including investment, impact and expected improvements and results. An established timeline taking account of legislation, coupled with sound economic analysis is the backbone of the migration plan.

6.4. Self Assessment Scorecard

A self-assessment scorecard should be developed to measure the degree of compliance and implementation of best practice. This self-assessment can be presented as a checklist with a score that indicates the degree of implementation

⁶ GEPIR allows our members to use the Internet to look for a company (by its GLN), a product (by its GTIN) and shipment identification (by its SSCC). For more information, please see www.gepir.org



achieved. The following example can be further expanded or reduced depending on each company's objective.

Level 1: Identification and Labelling of Products	Score*
a. Products are identified as appropriate using GS1 bar code standards at each level of product hierarchy and step in the supply chain (e.g. consumer unit, box, and pallet).	
b. Logistic units are labelled using GS1 bar code standards in pack houses and warehouses.	
c. Clear information profiles are exchanged upstream and downstream to supply chain partners to ensure end-to-end traceability of products including raw material, ingredients, packaging materials, etc.	
d. Risk Assessments have been completed to identify and minimise risk within production and supply chain processes.	
Level 2: Scanning Capabilities combined with Electronic Information Flow	
a. Bar Code Scanning capabilities are implemented in pack houses and warehouses to ensure accurate data capture and improved material and information handling (e.g. scanning of incoming pallets)	
b. A flow of information, which describes the goods dispatched / received, is exchanged with trading partners (i.e. electronic flow of information supported by the Dispatch Advice message).	
c. The flow of information on dispatched / received goods contains all the relevant information for traceability.	
d. The flow of information on dispatched / received goods is processed 'just in time' to achieve accurate data integration. This principle also applies to paper based information processing.	
Level 3: Data Recording	
a. All stock movements are recorded electronically and in an internal centralised database in such a way that the information can be accessed easily and rapidly by all the people who need it to help manage an incident / crisis. Paper based solutions must comply with the same conditions as described for electronic data recording.	

* The scores could be based on the following suggestion:

- 0 = No action taken
- 1 = Plans have been established but the work has not started
- 2 = Implementation has started with a limited scope (e.g. some product categories)
- 3 = Rollout of the full implementation has started
- 4 = Plans fully implemented

6.5. Electronic Dispatch Advice

The Dispatch Advice is an EDI message specifying details for the goods dispatched with the function of advising the receiver (consignee) of the detailed contents of a consignment. The message relates to a single dispatch point and a single or

multiple destination points and it may cover a number of different items, packages or orders. The message allows the receiver to know what materials were dispatched and when, allowing him to prepare the reception of the goods and to crosscheck the delivery with the order. It also allows companies the means to extract and store traceability data, ensuring accurate record keeping of relevant information. The data elements in the following table are the minimum information that needs to be shared between the different parties (one step forward, one step backward) to ensure product traceability.

Uniform Pallet	Mixed Pallet
Unique identification of Dispatch Advice Message	Unique identification of Dispatch Advice Message
GLN of the “ship from”	GLN of the “ship from”
GLN of the “ship to”	GLN of the “ship to”
Date of shipment	Date of shipment
SSCC of the container/pallet	SSCC of the container/pallet
Identification of the product on the container/pallet: - GTIN of the pallet or GTIN of the Traded Unit packed on the pallet	For each Traded Unit on the container/pallet - GTIN of the Traded Unit - Batch/Lot code - Quantity
Batch/Lot Code	
Quantity (linked to the GTIN of the Traded Unit packed on the pallet)	

6.6. Lot/Batch Definition

Lot/batch composition is a critical point in the traceability process. It determines the accuracy of any traceability system. The more homogeneous the lots/batches are, the more accurate the traceability system. Generally, being able to trace to the detail (product or a small batch level) will increase the costs in the traceability system. Deciding on large heterogeneous batches will probably make the system less costly, but will increase the risks because if a defect arises, more products will be involved than would have otherwise been necessary. Based on the cost/benefit analysis the ideal balance should be sought between present and future costs. This analysis should then be taken into account in the design of the traceability system.

It is difficult to recommend a suitable traceability model for wine producers and retailers by looking at the most cost efficient process and the reliability of the links throughout the supply chain. Situations vary from case to case. In case of a product recall, a retailer may not necessarily take the smallest possible batch/lot off the shelves. Retailers will often withdraw all similar products, whether they belong to the affected batch/lot or not. This is more efficient for the retailer, as mistakes can be avoided in-store and consumers are provided with the reassurance that everything is under control.

6.7. Stock Withdrawal and Product Recall

Withdrawing or recalling a product is an organisational procedure that relies on accurate information extracted from the internal traceability system / database and requires close collaboration between all the parties involved. Food safety and quality assurance functions control the status of the products and communicate these to supply chain distribution, which is responsible for applying this status and treating the products accordingly.

The objective of a lot withdrawal process is to prevent availability of the product at the point of sale. Lot withdrawal requires total control of the stock. This means that all supply chain partners implicated in the stock withdrawal process must be able to correctly identify the product (i.e. GTIN, SSCC) and the batch/lot code involved, its location and the quantity stored there. The traceability process ensures that the trade partners can answer these questions.

Best practice for stock withdrawal is based on the following principles:

- Stock withdrawal management is based on the logistic units using the SSCC as the identifier
- Pallet contents are identified using the product identification (GTIN) and batch/lot codes
- Pallet tracking within the area controlled by the brand owner means from internal / external origin to internal / external destination
- Targeted withdrawal at destinations, which have or may have received the affected goods that need to be withdrawn
- Companies must define procedures for the identification of blocked goods, communication and instructions for withdrawal
- Regular training and periodical exercises

Traceability of wine at batch/lot level ends at the retail distribution centre. Batch/lot tracking forward in the retail distribution centre is complex and expensive due to its large portion of mixed pallets sent to the points of sale and received from suppliers. Due to the lack of tracking in the retail distribution centre, all the stores of the implicated retailers must be included in the recall. The brand owner must therefore assume that the product is already available at the point of sale and initiate a recall after delivery to the retail distribution centre. Depending on the nature and severity of the quality or safety issue, a recall could include the involvement of trade associations and broadcasting information to all potential consumers via mass media. The implicated product and batch/lot must be identified and exchanged if not already consumed.

6.8. Developing Internal Competencies and Skills

Regular training should be given to all the employees, who may be involved in product traceability, incident and crisis management. The scope of this training should include:

- Traceability processes implemented by the company, based on the best practice documented in this document
- Instruction on incident / crisis management
- Role of the Incident / Crisis Management Team
- Role of the person being trained
- Whom to contact



- The importance of coordinated actions and communication within the company
- What to do and what to avoid doing
- How to use the traceability documentation
- How to use internal product traceability and record systems

The training should also include simulated exercises on:

- Crisis Management
- Product Traceability
- Product withdrawal
- Product recall
- Management of quarantined stock

7. Annex

7.1. EPC (RFID)

Radio frequency identification (RFID) is a growing technology that utilises electronic tags to identify products (trade items), pallets (logistic units) and/or returnable assets throughout the supply chain. Recent GS1 standardisation developments in the field of RFID are internationally known as the Electronic Product Code (EPC) Network⁷. As a critical component of EPCglobal Network technology, low-cost, passive RFID tags enable the immediate, automatic transmission of identification, time, date and location information. RFID may contribute to improve the traceability process in the medium and long term when industry standards are fully developed and implemented.

For more information, please consult <http://www.epcglobalinc.org/>.

7.2. Contact Details of some GS1 Member Organisations in Wine Trading Countries and Territories

Please consult <http://www.gs1.org/contact/worldwide.php>

7.3. Bibliography

- Voluntary Code of Practice for Traceability in the Wine Sector, EFWSID, 2001
- The Origin of Wine Scheme, South African Wine and Spirit Board, 2002
- Regulation (EC) No 178/2002 of the European Parliament and of the Council of 28 January 2002, OJEC, 2002
- GS1 Traceability Implementation, GS1(EAN International), 2003
- General GS1 Specifications V5.1, GS1(EAN International), 2004
- Implementing Traceability in the Food Supply Chain, CIES, 2004
- Using Traceability in the Supply Chain to Meet Consumer' Safety Expectations, ECR Europe, 2004

7.4. Getting Started

■ Where do I start?

Contact your local GS1 Member Organisation and register as a member. Construct Global Trade Item Numbers (GTIN) and/or Global Location Numbers (GLN) and/or Serial Shipping Container Codes (SSCC) using the GS1 Company Prefix allocated to you. Communicate your intentions to all trading partners that will read GS1 bar

⁷ GS1 EPCglobal is leading the development of industry-driven standards for the Electronic Product Code (EPC) Network to support the use of Radio Frequency Identification (RFID). It is a member-driven organisation comprised of leading firms and industries focused on creating global standards for the EPCglobal Network. Its goal is increased visibility and efficiency throughout the supply chain and higher quality information flow between trading partners



codes representing the above numbers and/or EANCOM[®] EDI or GS1 XML messages.

■ **What does it cost to become a member of a GS1 Member Organisation?**

Membership costs vary from one country to another and in general depend on the numbering capacity of the GS1 company prefix and the services required. The membership fees usually consist of an annual fee and a one-time joining fee.

■ **What do I get in return?**

A member company receives a GS1 Company Prefix, a capacity to number its products and basic support in implementing the GS1 system. The numbering capacity given to member companies depends on their requirements. Should a company wish to use EDI via EANCOM[®] messages, it can request the necessary information and manuals from its national GS1 Member Organisation.

■ **How do I administer the number bank allocated to me by a GS1 Member Organisation?**

When you join a GS1 Member Organisation, it will provide you with the necessary documentation to administer the numbering system. It is advisable that all companies centrally allocate product numbers.

■ **How do I print GS1 bar codes on labels?**

Label composition software should permit you to use desktop laser or ink jet printers, or you can use specially designed high performance thermal direct or thermal transfer printers. These may be self-contained units able to print pre-programmed label formats, or may require the use of a personal computer.

■ **Do I have to become a member of a GS1 Member Organisation in every country I operate in?**

No. One GS1 Member Organisation membership should meet all the identification and communication needs of a company. However, if there is a need for continuous GS1 Member Organisations support in other countries (i.e., in the local language) it is then advisable to seek membership in those countries too.

■ **Do I need to become a member of a GS1 Member Organisation to use GS1-128?**

Yes. Membership in a GS1 Member Organisation is required to use GS1 data structures. These data structures are represented in GS1 data carriers (bar codes). If you are not already a member of a GS1 Member Organisation, you will have to apply for membership if you wish to use GS1-128. If you are already a member of a GS1 Member Organisation, your annual membership fee includes support concerning all GS1 standards, including GS1-128.

■ **Is GS1-128 used only to identify pallets?**

No, it is being used for the identification of trade units, identification and tracking and tracing of logistics units (mainly pallets) and assets, as well as encoding of additional information, such as batch numbers, production or best before dates, etc. Many other applications also utilise the GS1-128 standards and symbology.



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