

Global Integrated Supply Chain Traceability and Coding Manual

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1. OBJECTIVE

A primary objective of Mondelēz International is to market safe products of consistent quality that meet or exceed the expectations of our customers and consumers. The requirements given in this manual are designed to help our supply chain in meeting this objective end to end, by identifying those programs which will help protect product safety and quality, prevent product retrievals, ensure full product traceability and improve supply chain efficiency.

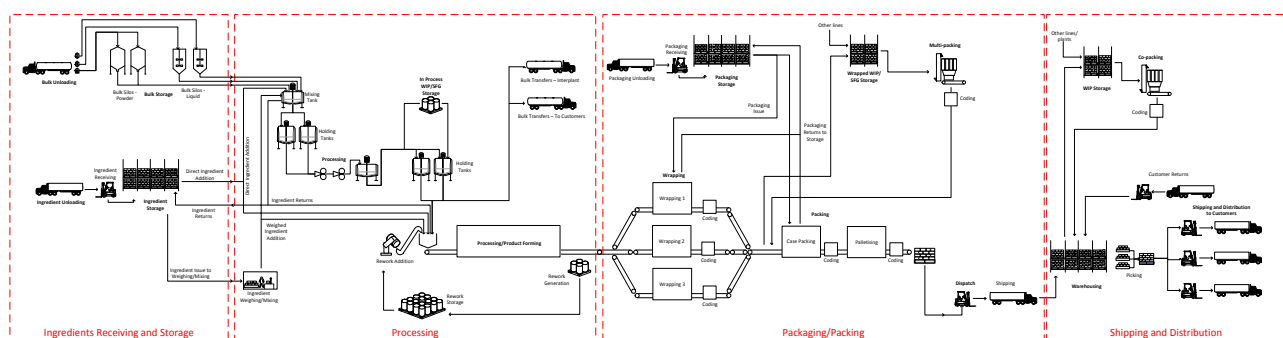
In summary, the application of these requirements and other documents, contain the basic elements needed to assure effective management of Food Safety and Quality and the protection of our products such as special situation management. Efficient traceability systems are key, in order to handle consumer, industry and trade focus areas such as Organic, GMO free, Sustainability and Allergens.

These expectations and associated documents do not alter, override or replace any requirements given in government regulations, which must also be met.

2. SCOPE AND PRINCIPLES

- The scope of this manual is all Mondelēz International Geographical Regions.
- **Mondelez Full supply chain traceability** is a combination of “internal” (Manufacturing plants, Mondelēz International owned Warehouses and Distribution centers) and “external” (Material Suppliers and contracted 3rd party logistic service providers for Warehousing, Distribution, Co-packing, Co-manufacturing, Supplier) information. Mondelēz International must provide within 24h, or shorter timelines, (based on local regulation or customer requirements) the entire product history.
- Every Step in the Mondelez Value Chain has:
 - defined Program Requirements (PR) which are mandatory and auditable to achieve full product history objective.
 - defined Best of Current Approach (BA) which is supporting the company strategy to improve the end to end traceability system capability.

Diagram 1: Mondelēz International full supply chain traceability scheme:

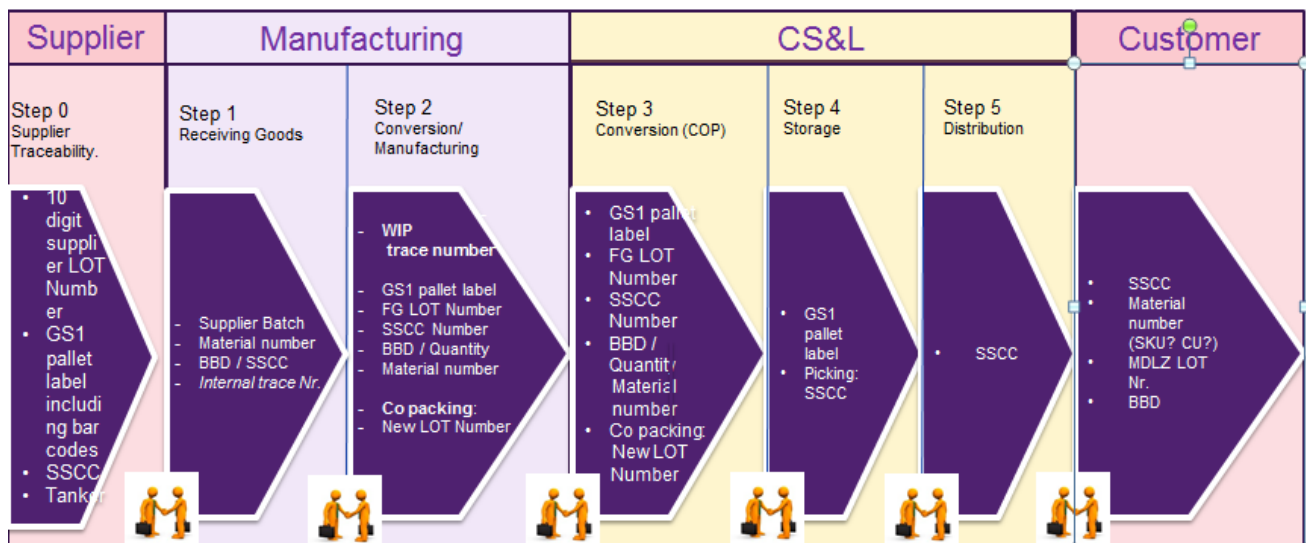


Note: the scheme is a high level overview of the entire Mondelez supply chain scope. Detailed sections of the scheme are in section 4 of this manual

Diagram 2: Traceability information content hand over between supply chain stages:

What Information do we hand over at the individual stage

(what we expect an end to end traceability system to gather from the individual stages and convert into a full traceability history output)



Note: 10 digit or fewer lot numbers can be transmitted into Mondelēz International SAP, more digit formats need to be linked and converted to an internal traceability number

Diagram 3: Traceability information needed at each of the individual supply chain stages:

Traceability information needed at each of the individual supply chain stages

	Supplier	Manufacturing	CS&L	Customer	Consumer
Step	Step 0 Supplier Traceability.	Step 1 Receiving Goods Step 2 Conversion/ Manufacturing	Step 3 Conversion (Repacking) Step 4 Storage Step 5 Distribution		Consumer feedback
GS1 Data application	First application of GS1 Data	<ul style="list-style-type: none"> Records GS1 data for traceability Applies GS1 data to Finished Goods 	<ul style="list-style-type: none"> Records GS1 data for traceability 	<ul style="list-style-type: none"> Records GS1 data for traceability 	MDLZ lot code data and BBD
What is the input / output needed. MDLZ timeline Step 0 to 5 is 24hrs	Day and time of manufacture (batch) Target timeline of response = 4 hours	<ul style="list-style-type: none"> Day, shift, batch of material concerned (ingredient, WIP or FG) Target timeline of response = 4 hours 	<ul style="list-style-type: none"> Day, shift, batch of material concerned Target timeline for response = 4 hours 	<ul style="list-style-type: none"> Batch Code, BBD, Material number Target timeline for response = 4 hours 	
What is the information source	Process Controls COA for delivered products to MDLZ Ingredients, product contact packaging	<ul style="list-style-type: none"> Specifications (Meridian) Analytical and Sensory results COA's (ingredients batches used) Process Control Records Consumer / customer Complaints Non Conformity records, Disposition data Rework records Dispatch Data 	<ul style="list-style-type: none"> Process controls Warehouse Controls Incoming and dispatch records Picking trace Inventory / Disposition data 	<ul style="list-style-type: none"> Master data Customer Complaint 	<ul style="list-style-type: none"> Consumer complaints
	GS1			MDLZ	

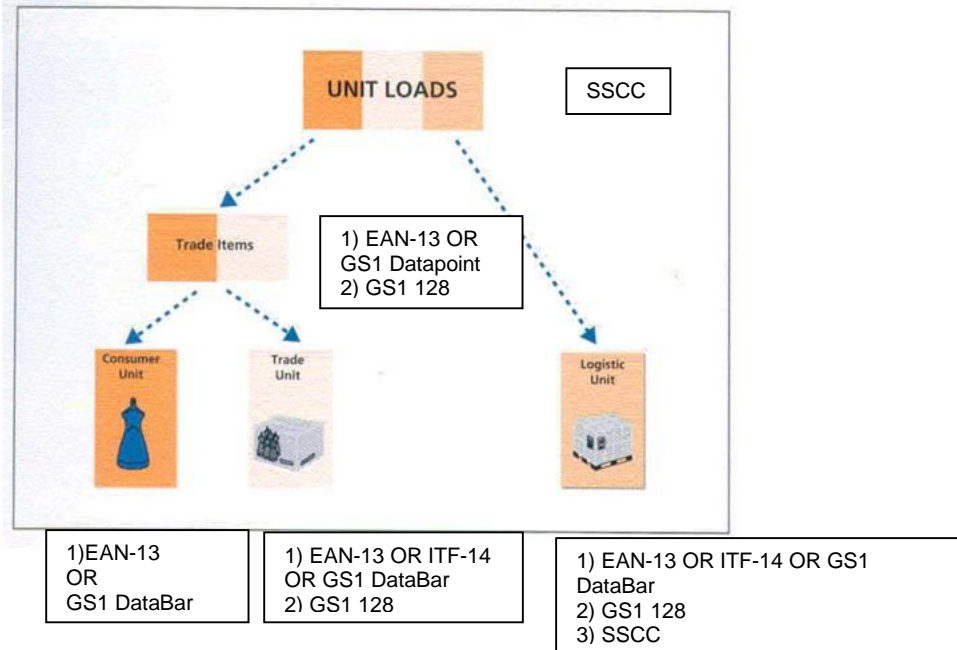
3. Program Requirements - BAR CODES SYMBOL USED IN SUPPLY CHAIN (GS1 Codes)

The **GTIN** (Global Trade Item Number) can be represented by different bar coding standards. Diagram 1 illustrates the various numbering structures in correspondence to different unit loads.

The **SSCC** (serial shipping container code) provides a link between the bar coded information of a pallet unit (logistics unit) and information pertaining to the unit communicated between different trade partners using EDI (electronic data interchange).

EAN-13 is the preferred solution. Region Derogation process needs to be applied if a different code should be used like ITF 14 (see below for details) and documented.

Diagram 4: bar code symbols used in supply chain:



EAN/UPC (GS1 13 – GTIN)

- Are specified for retail Point-of-Sale (POS) because they are designed for the high volume scanning environment = Omnidirectional
- Limited to carrying GS1 Keys, measure trade items and internal numbering, 13 Numeric = GTIN-13



GS1-128 (previously referred to as UCC/EAN-128 or EAN-128)

- can carry all GS1 Keys and attributes but cannot be used to identify items crossing POS
- 48 Alphanumeric capacity, carries AI for Shelf Life, Lot code and GTIN
- Not Omnidirectional
- Cannot be printed offline, need printers at production line



ITF-14

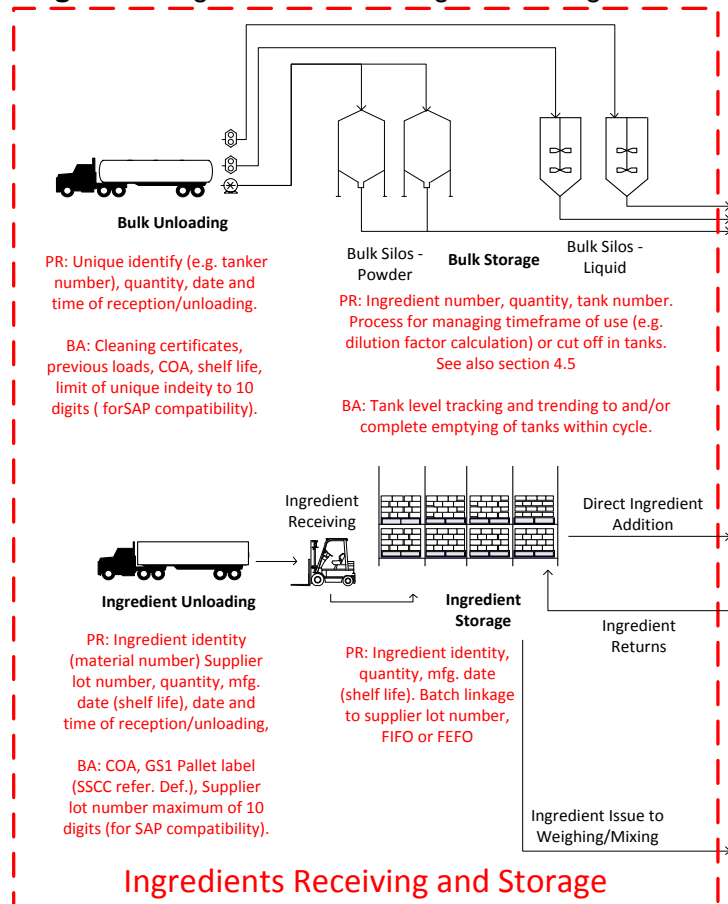
- ITF-14 bar codes can **only** carry GTINs (= GTIN 13 plus one fixed digit "0" at the front to end up in 14 digits = ITF 14)
- can be printed directly on corrugated cartons, but **cannot** be used to identify items crossing POS



4 Ingredient and Process Traceability

4.1 Ingredient Receiving and storage traceability

Diagram 5: Ingredients Receiving and Storage Traceability Scheme



4.1.1. Expected Program Requirements (PR) – Refer also to **Diagram 5:**

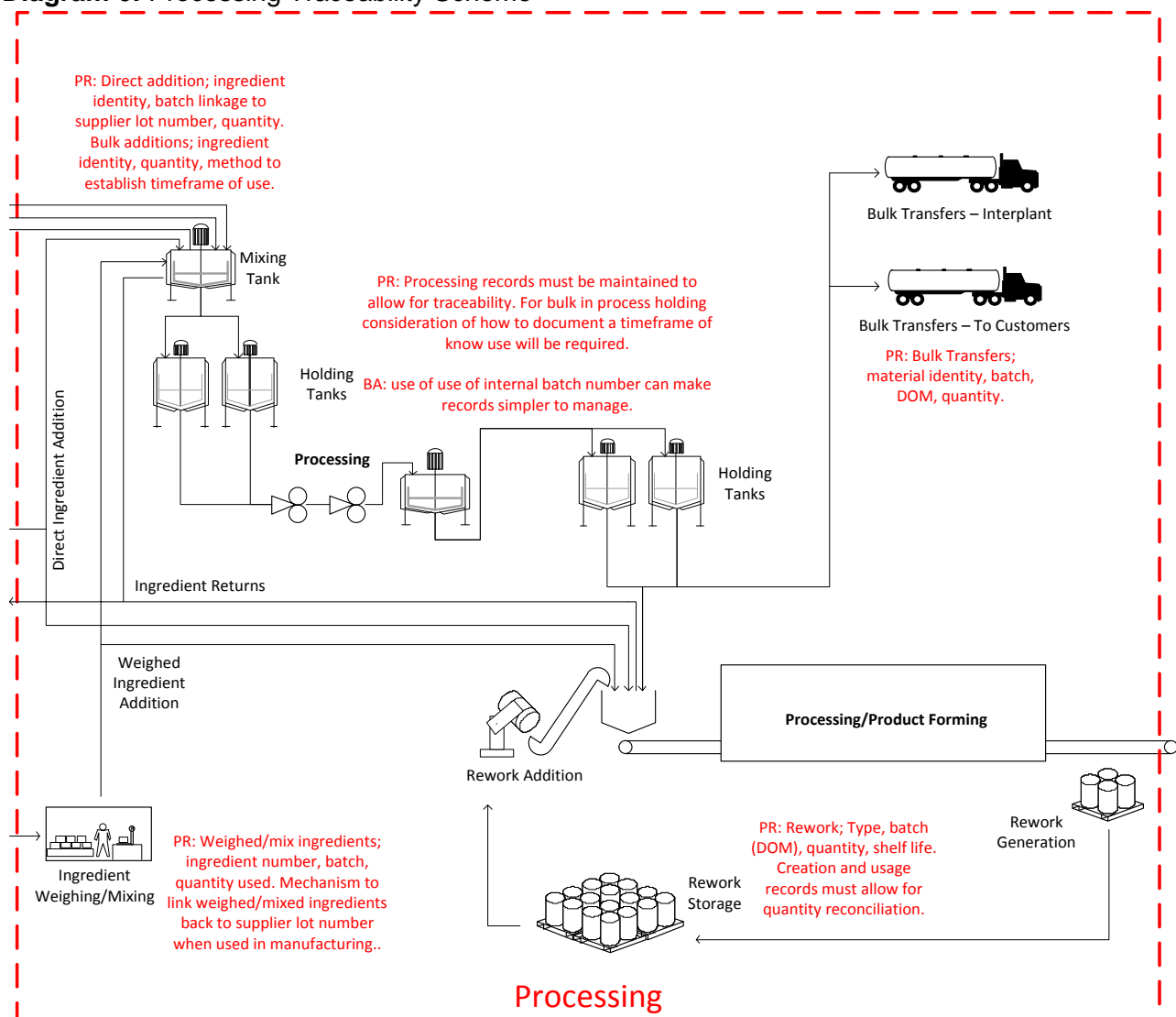
- Supplier lot number and quantity of ingredient received by lot must be documented upon receipt.
- A mechanism must be in place for retaining the supplier lot number (batch information) and the quantity of that lot received.
- There must be a mechanism to link the supplier lot number to the point of use in processing of that ingredient. This can be done either by recording the supplier lot during processing or by assigning an internal plant identification (plant batch code). Where plant identification is used it must be able to be linked to the supplier lot number.
- For all stored ingredients an inventory of received, issued and returned quantities shall be maintained by supplier lot or plant identification (plant batch code).
- First in First Out or First Expiry First Out (FIFO or FEFO) practices must be in place to minimize usage timeframes for ingredients.
- Bulk and material storage shall be subject to an evaluation in line section 4.5 of this manual.

4.1.2. Best of Current Approach (BA) – Refer also to **Diagram 5:**

- The use of a consistent plant identification (plant batch code) for ingredient traceability can make recording in production simpler and help to reduce errors. Some common examples are:
 - Using ingredient manufacture date as the plant identification. In this case using a reverse format (for example: YYYYMMDD, where Y is year, M is month and D is day) is recommended as it eliminates numbers beginning with a zero (0).
 - Other mechanisms such as plant batch codes generated based on sequential code number or receipt dates must be able to be linked the supplier lot code.
 Consideration should be given to the time impact for reconciling.
- At point of reception scan supplier pallet label (GS1 bar codes) to pick up Material Number, best before date, quantity, supplier batch code (should be maximum 10 digits due to SAP field capabilities).
- For bulk storage, have sufficient tanks to have each tank emptied before refilling. This can limit the bulk traceability windows. Continuous level trending for tanks can also be used to improve traceability windows by eliminating the need to rely on worst case scenarios – refer also to Section 4.5.

4.2 Processing Traceability

Diagram 6: Processing Traceability Scheme



4.2.1. Expected Program Requirements (PR) – Refer also to **Diagram 6**:

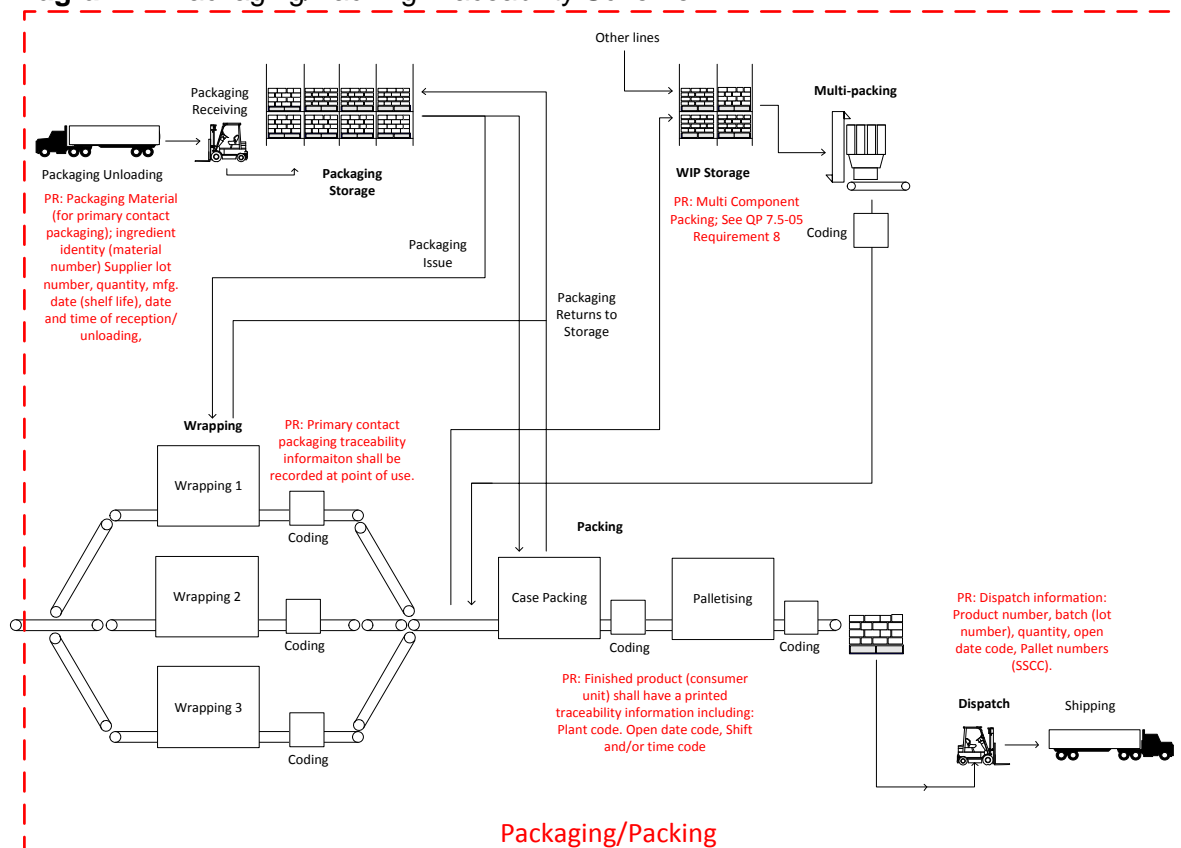
- Mechanisms must be in place to maintain traceability throughout processing.
- Semi-finished Goods (SFG), rework and weighed and mixed ingredients shall be:
 - Labeled with quantity and/or weight and information sufficient to maintain traceability to the date of its production (at a minimum).
 - Quantities and/or weight, and traceability information shall be recorded at production and consumption.
- Bulk and continuous processing operations shall be subject to an assessment in line with section 4.5 of this manual.

4.2.2. Best of Current Approach (BA) – Refer also to **Diagram 6**:

- A batch managed interface between WH and manufacturing systems.
- In-system staging (issue material to the line) and return management.
- Scan of the material label at point of use and scan of remaining material returned to storage, using real batch approach at manufacturing level.
- For bulk storage have;
 - sufficient tanks to have 1 batch per tank dedicated, and/or
 - continuous level trending for tanks, tank level recording.
- Bar code labeling of rework with batch and quantity information.

4.3 Packaging/Packing Traceability

Diagram 7: Packaging/Packing Traceability Scheme



4.3.1. Expected Program Requirements (PR) – Refer also Diagram 7:

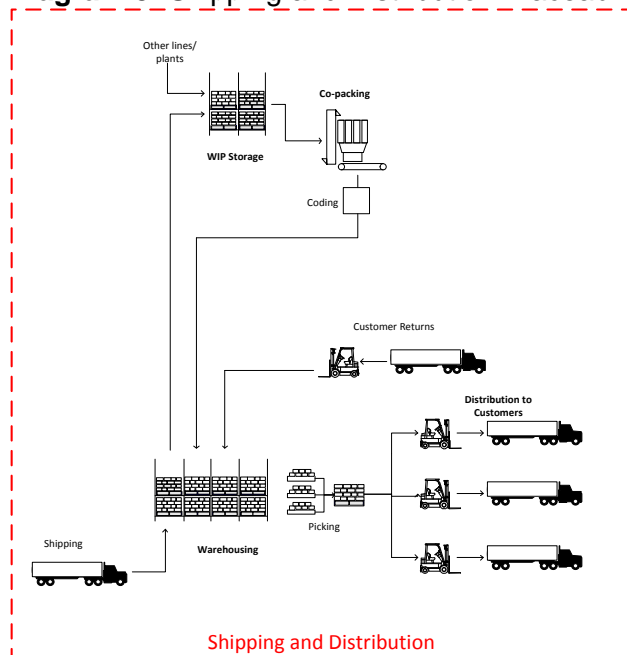
- Packaging suppliers to provide lot / batch traceability information on primary packaging and all packaging containing ingredient label information (even when this is not product contact packaging).
- For all stored materials maintain inventory of quantities by batch currently in storage.
- Inventory management system to ensure quantity and traceability (at least to a date of production level) of SFG/WIP in storage is available.
- Finished goods coding is covered in Section 5 of this manual.

4.3.2 Best of Current Approach (BA) – Refer also Diagram 7:

- Scan of material label at point of usage and scan of remaining material returned to storage, using real batch information approach.
- Interface between warehouse and manufacturing systems, staging and return management (FEFO).
- Bar code labeling of rework with batch and quantity information – standard label approach to be developed.

4.4 Shipping and Distribution

Diagram 8: Shipping and Distribution Traceability Scheme



4.4.1. Expected Program Requirements (PR) – Refer also Diagram 8:

- For all stored materials / finished goods maintain inventory of held product by batch currently in storage.
- First point of shipment information to be maintained including quantity by batch of product shipped.
- There shall be an interface between Third Party Logistics Service Provider (3PL) and Mondelez internal system to reflect real batch information.
- Records of product batches and quantities shipped to customers must be maintained.

4.4.2. Best of Current Approach (BA) – Refer also Diagram 8:

- Scan of material label at point of use and scan of remaining material returned to storage, using real batch information approach.
- Automatic interface between 3PL / Customer service / manufacturing systems.
- Business Intelligence (BI) report for traceability using the FG real batch number information from 3PL goods movement messages sent back to Mondelez enterprise systems/real batch number in enterprise systems.

4.5 Bulk material traceability

4.5.1 Expected Program Requirements (PR):

See QP 7.5-05 Traceability and Open Date Code Information Requirement 2.2.

To meet the expectation of the policy to evaluate the time frame of known use for bulk materials there are two broad approaches:

1. Use break cleaning to separate batches (common in liquid processes with Cleaning in Place (CIP), particularly common in dairy and grocery processes).
2. Use a theoretical method to assess the traceability window for processes that cannot be regularly emptied and cleaned (common in chocolate, biscuits, gum and candy).

For the second case the following is provided as guidance in terms of the methods of theoretical calculation for the development of the evaluation.

4.5.2.1 Suggested approach for liquid processes without break cleaning:

Ideally all tanks and storage vessels will have records detailing transfers, removals and held volumes. Automatic records are preferred; however, these may be manual. When conducting traceability evaluations possible improvements to the method with which volume and consumption data is collected should be considered.

For liquid systems it is, in most cases, appropriate to consider the system as well mixed (i.e. without layering of batches in tanks/vessels/silos). This is particularly true when tanks are agitated (stirred). For highly viscous fluids without agitation this model does not apply well. For such cases it would be more appropriate to consider it as plug flow; refer to suggested approach for powders (4.5.2.2).

Where tank volumes are tracked then dilution of a contaminant in a well-mixed tank can be calculated as follows:

$$= C \left(\frac{V_{1^{st}Pre\ Delivery}}{V_{1^{st}Post\ Delivery}} \times \frac{V_{2^{nd}Pre\ Delivery}}{V_{2^{nd}Post\ Delivery}} \times \frac{V_{3^{rd}Pre\ Delivery}}{V_{3^{rd}Post\ Delivery}} \dots \times \frac{V_{n^{th}Pre\ Delivery}}{V_{n^{th}Post\ Delivery}} \right) \times 100$$

Dilution Factor (%)

Where C is the initial contamination fraction and V are the volumes before and after subsequent additions to the vessel. If product is removed between deliveries the rate of dilution will decrease.

Incomplete data will require modification of the approach. For example should only the addition to a tank be known (e.g. via a batch transfer log) then a ‘worst case’ scenario could be applied where the assumption is that the tank has only the space in it at each transfer to accommodate that delivery (i.e. the removal rate is the addition rate). This will create a dilution factor calculation as follows:

$$\text{Dilution Factor}_{\text{Worst Case}} (\%) = C \left(\frac{V_{\text{Tank}} - V_{1^{\text{st}} \text{Delivery}}}{V_{\text{Tank}}} \times \frac{V_{\text{Tank}} - V_{2^{\text{nd}} \text{Delivery}}}{V_{\text{Tank}}} \times \frac{V_{\text{Tank}} - V_{3^{\text{rd}} \text{Delivery}}}{V_{\text{Tank}}} \dots \right. \\ \left. \times \frac{V_{\text{Tank}} - V_{n^{\text{th}} \text{Delivery}}}{V_{\text{Tank}}} \right) \times 100$$

Where tanks are routinely emptied (but not cleaned) then it is appropriate to consider the residue remaining on the tank and create a best case scenario based on the assumption of only a residue of ingredient or product remaining on the interior surface of the tank. This residue volume can be calculated based on the dimensions of the tank as follows:

$$\text{Residue Volume} = \text{Residue Depth} \times \text{Surface Area of the Tank Interior}$$

The calculation for the surface area of the tank will be dependent on the tank design. Common calculations are as follows (often this will be a combination of one or more type):

Area of a circle (flat base)	Lateral (side wall) area of a cylinder	Lateral (not the base) area of a cone:
$A = \pi r^2$	$A_L = 2\pi r h$	$A_L = \pi r \sqrt{h^2 + r^2}$

Example dilution calculation sheets can be found [here](#).

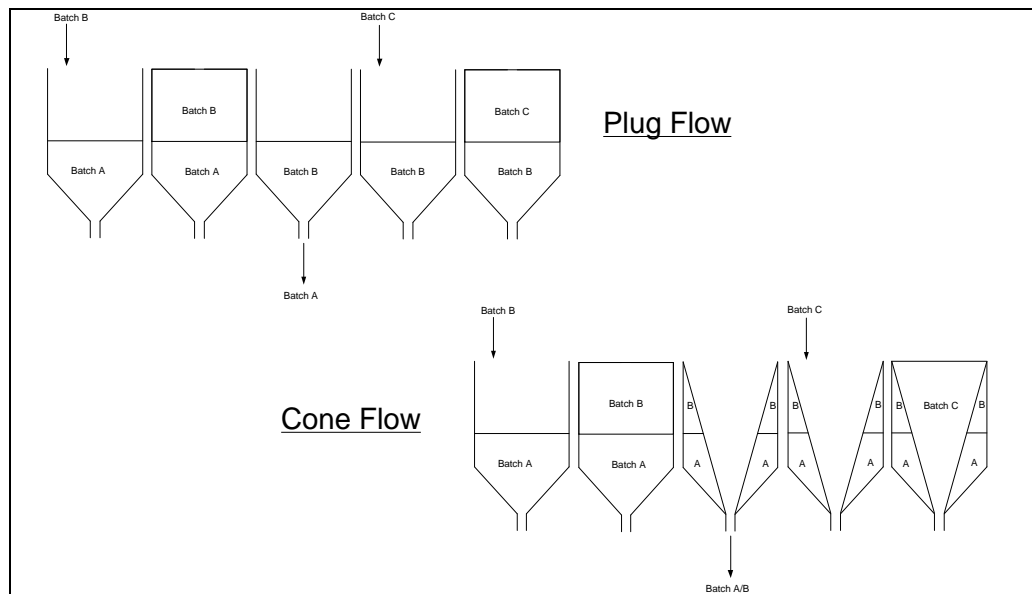
4.5.2.2 Suggested Approach for Powder Processes Without Break Cleaning:

Powder processes, such as sugar and flour, pose a different challenge as it is less appropriate to assume vessels are well mixed (as most powder systems are not mechanically agitated). The most common approach in this case is to assume a ‘plug’ (or layered) flow where added batches are consumed in the sequence that they are added. With this assumption a mass balance approach can be used to calculate usage time frames for delivered batches.

As with the assumption of a well-mixed tanks in liquid processes the assumption of ‘plug’ flow is non-ideal. Many powder systems (particularly semi-conical hoppers for bulk flour and sugar storage) are known to cone (where the flow of material through the center of the silo is faster than that at the walls, creating a situation where newly delivered batches can be transferred out of the vessel before older ones – refer to **Diagram 9**) or mix in other way.

There should also be a consideration of the risks associated with these assumptions as part of the bulk traceability evaluation. Examples of how to accommodate such mixing include: expanding traceability windows by one lot either side of the considered lot, or adding a set quantity of buffer either side of mass balance calculated traceability windows.

Diagram 9: Illustration of Plug Flow versus cone flow in powder silos



4.5.2.3 Best of Current Approach (BA) – Minimizing Traceability Window:

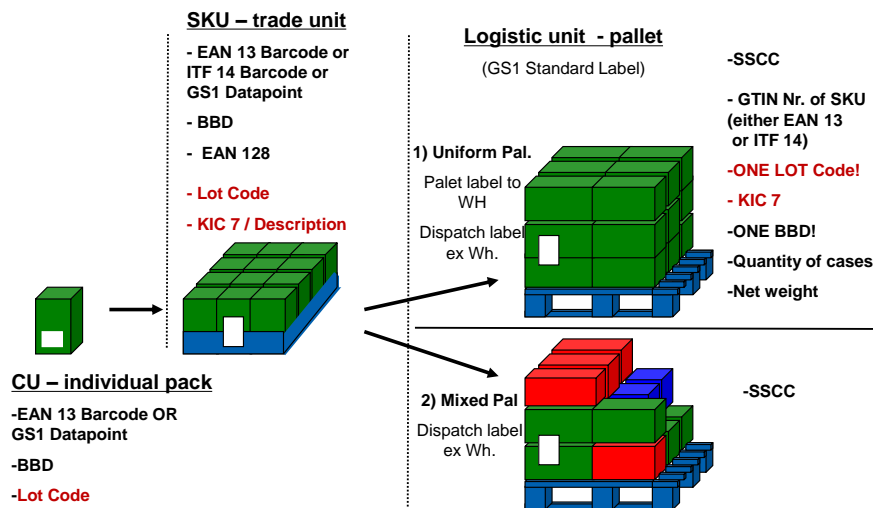
Certain practices can be implemented to minimize the additional window required for bulk traceability:

- Providing sufficient tanks to allow storage tanks to be fully drained before each refilling cycle.
- Providing full level/volume and transfer history electronically (PLC/SCADA Historian) for all tanks (minimizing reliance on worst case).
- Implement full emptying of powder silos at a determined frequency.
- Minimise use of rework or return processes into bulk storage tanks or processes. Rework addition should be as close to finished product as possible.
- Powder silos and other storage vessels should be selected for the material type to reduce coning and other non-linear flow patterns.

5 PROGRAM REQUIREMENTS: FINISHED PRODUCT TRACEABILITY

5.1 CODING RULES Principles

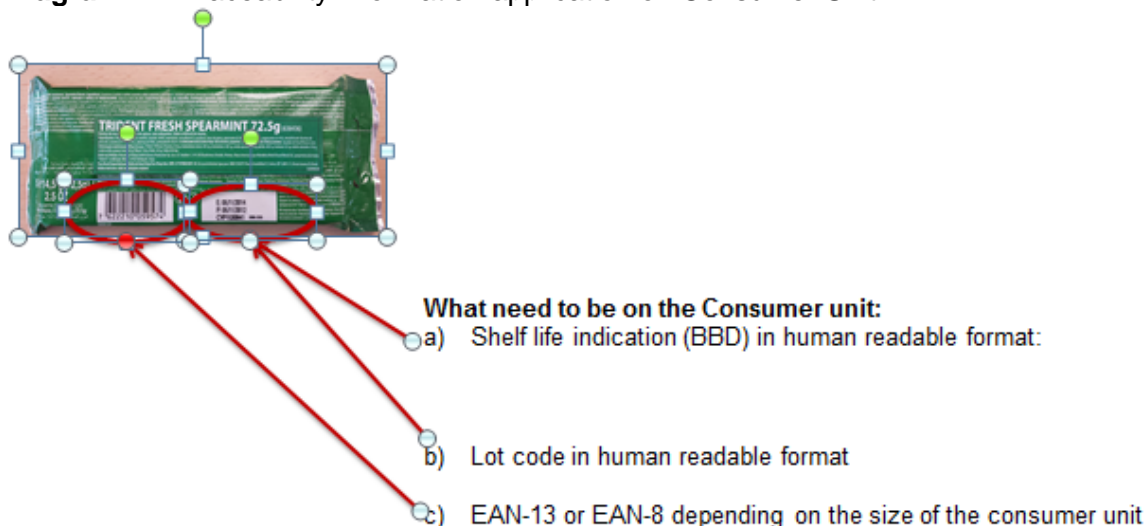
Diagram 10: Coding rule principles on CU / SKU / pallet (Unit load)



Note: All item points need to be followed, to highlight the source of format requirements, RED font requirements are based on Mondelēz International format requirement, black font requirements are GS1 requirements.

5.2 Traceability Information on CONSUMER UNIT (CU)

Diagram 11: Traceability information application on Consumer Unit



Area of application

The consumer unit code is associated with the selling price in the retailer database for scanning at POS (point of sale) of the trade partner. Advanced customers are using the bar code for their inventory management at point of sale, it is pre-printed on the packaging material.

Never allow two bar codes encoding different GTIN numbers to be visible on a package. This is particularly relevant to multi-packs, especially those with clear wrapping.

Multi-packs must carry a separate GTIN, with all internal bar codes obscured.

If the item is random wrapped, the same bar code can be printed more than once on the wrapping. This ensures that one complete bar code is always visible.

The different series of numbers that can be used to identify any product or service:

GTIN-13 (EAN / UPC): This is the code that will be used for the majority of our packs.

GTIN-8 (EAN-8): This code is used for small items where a reduced size of symbol is necessary:

- if the GS1 13 bar code symbol, in the size required as a result of print quality studies, exceeds either 25% of the largest side of the printed label area or 12.5 % of the total printable area.
- if either the largest side of the printed label is less than 40 cm² or the total printable area is less than 80 cm².
- on cylindrical products with diameter less than 3 cm.

Table 2: RACI Traceability information Consumer Unit

	Re packer	Plant, Co man	Region Quality	PM Printer	PCM	IS	GS1
EAN 8 or EAN 13				Verify conformity to Spec	Brief D2P agency Create GTIN, check GTIN content		Provide GCP (Global Company Prefix)
LOT CODE	Verify conformity to Specification*	Verify conformity to Specification*	Approve Format for Site	Design defined print area		Provide Printer set up	
BBD	Verify conformity to Specification*	Verify conformity to Specification*		Design defined print area		Provide printer set up	

*Verification checks as part of the process controls (content and quality) minimum 1x per shift at start/product change.

5.3 Traceability Information on traded units (SKU):

Diagram 12: Examples of SKU traceability label application



Bar Code requirements and area of application:

- a) Mondelēz International manufacturing units (including External manufacturer, Co-packer, re-packer) are scanning the bar code of trade units as the basis for creation of label for logistics units (pallets) at the end of production line.
- b) Mondelēz International Supply Chain, trade partners (including 3rd party WH, DC) scan the bar code of trade units for case identification.
- c) Cash & Carry markets are scanning the bar code of trade units for identification at point of sale.

GTIN 13 (EAN-13):

This is the code that will be used for the majority of our traded units.

ITF-14:

Requested by the trade. Region CS&L need to agree with manufacturing about application and requirements.

GS1-128

On traded units is the preferred solution as more customers are using it and the information can be scanned. Requested by the trade. Region CS&L need to agree with Manufacturing about application and requirements.

Summary: What traceability information need to be on the Case (SKU):

This information can be either printed directly on the boxes or placed on a sticker/label, or several supports can be used, e.g. some information printed directly on the box and the rest on a label or ink jet-printed. There is no need to duplicate any information from a regulatory point of view e.g. if 'best before' is already printed on the case there is no need to print it on the sticker and vice versa.

- a) GTIN of the SKU, EAN-13 (GS1 requirement).
- b) Lot code in human readable format, (GS1 requirement).
- c) BBD in human readable format: (GS1 requirement).
- d) GS1 128 code (Trade requirement, conform to Gs1) Region CS&L need to agree with manufacturing about application and requirements.

Table 3: RACI Traceability information SKU

	Co packer	CS&L	Plant, Co man	Region Quality	PM Printer	PCM	IS	GS1
EAN 8 or EAN 13 (pre-printed)					Verify conformity to Specification	Brief D2P agency create GTIN check GTIN content		Provide GCP (Global Company Prefix)
EAN 8 or EAN 13 (online, barcode)	Verify conformity to Specification*		Verify conformity to Specification *			request GTIN check GTIN content		
GS1 128 (online, bar code)	Verify conformity to Specification*	Define requirements for Manufacturing	Verify conformity to Specification *				Provide Printer set up	Verify conformity
	Co packer	CS&L	Plant, Co man	Region Quality	PM Printer	PCM	IS	GS1
LOT CODE (online, human readable)	Verify conformity to Specification*		Verify conformity to Specification *	Approve Format for Site			Provide Printer set up	
BBD (online, human readable)	Verify conformity to Specification*		Verify conformity to Specification *				Provide printer set up	

*Verification checks as part of process controls (content and quality)- minimum 1x per shift as start/product change.

5.4 Traceability Information on Outer Box

Another type of SKU is the Outer box. It is used in case you have to put the labeled “trade units” into a box called a “shipper”. The shipper is used for transportation reasons. The shipper needs to be identified by a label or direct print, following GS1 rules.

Example:

12 SKU boxes available. Each of them contains 12 CU. On the SKU they have printed an SKU-label containing the information 12x60gr, article: “Lacta Milk”

12 of the SKU's are put in the shipper and the shipper needs to get an identification label with an information of (60GRX12)X12 article “Lacta Milk”.

In some cases this outer is the selling unit. In this case the labelling rule for SKU needs to be applied.

Note: If a shipper box is a transport unit, it needs to carry an SSCC code.

Diagram13: examples for labelling of outer box (direct print / label)



5.5 Labelling of LOGISTICS UNITS (PALLET):

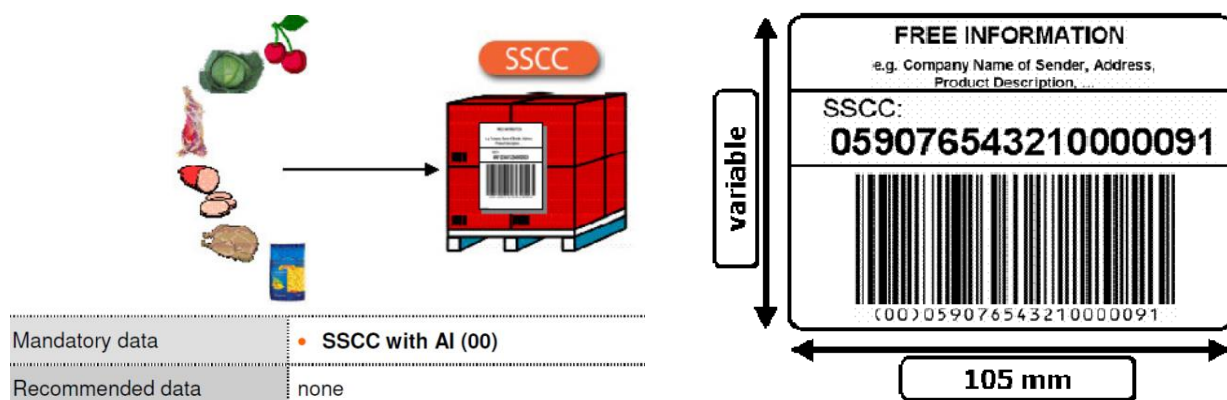
Area of application:

For inbound identification, stock management and tracking forward from the distribution centre. The GS1 logistics label provides clear and concise information about the logistic unit to which the label is fixed, in both machine and readable form. **mandatory features are:**

5.5.1 For Heterogeneous Pallets (mixed /picked pallets).

Minimum Requirement: GS1 logistic label with SSCC as minimum traceability relevant information shall be the SSCC.

Diagram 14: Scheme of Requirements for heterogenous pallets



5.5.2 Mandatory information for standard homogenous pallets

- (15) Best Before Date (BBD) (6 numeric digits in format YY MM DD)
this format applies for the bar code section only (including the human readable interpretation beneath the bar code) and not in the human readable section.
- The BBD in the human readable section of the pallet in DD.MM.YY or DD.MM.YYYY description see pallet label example minimum font size 1cm, preferred 2.5cm, no month only format, only exact day even if fixed day. Pallet label barcode section - all barcode formats shall be converted into global GS1 requirement format YYMMDD (this is the relevant bar code section "(15)").
- (10) Lot code.
- (240) Material code (maximum 8 digits).
- (00) SSCC code / Unique Pallet Identification number.
- (02) GTIN of trade units.
- (37) Count of trade units on pallet.
- Pallet net weight.
- Material description (display from SAP master-data, short text).
- Header with Manufacturer information.
- Bar code formats and dimensions / GS1 standard requirements.

5.5.2.1 Detailed GS1 logistics label description – see GS1 standard

Diagram 15: Examples of GS1 Standard based PALLET LABEL FOR FINISHED GOODS
(note: format is not in original dimensions)

<p>Mondelez Italia Biscuits Production S.p.A.</p> <hr/> <p>SSCC</p> <p>3 8000090 001604071 3</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">CONTENT</td> <td style="width: 33%;">COUNT</td> <td style="width: 33%;">NET WEIGHT kg</td> </tr> <tr> <td>08000090604753</td> <td>0036</td> <td>108,000</td> </tr> </table> <p>MINCR 250G OLIVE 12C A.</p> <p style="font-size: 2em; text-align: center;">116539</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">BEST BEFORE (DD.MM.YYYY)</td> <td style="width: 50%;">BATCH/LOT</td> </tr> <tr> <td>31.10.2014</td> <td>OCAL034540</td> </tr> </table> <div style="text-align: center;">  <p>(15)141031(10)0CAL034540(240)116539</p>  <p>(00)380000900016040713(02)08000090604753(37)0036</p> </div>	CONTENT	COUNT	NET WEIGHT kg	08000090604753	0036	108,000	BEST BEFORE (DD.MM.YYYY)	BATCH/LOT	31.10.2014	OCAL034540	<p>Mondelez Deutschland Production GmbH & Co. KG</p> <hr/> <p>SSCC: 3 8593893 10 40644393</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">EAN-TRADE-No:</td> <td style="width: 33%;">Qty:</td> <td style="width: 33%;"></td> </tr> <tr> <td>07622300408183</td> <td>0060</td> <td>KOLLI</td> </tr> </table> <p>M 180G CHOCO WAFER 18KT</p> <p>SKU-No: 764044</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">BEST BEFORE: (DD.MM.YY)</td> <td style="width: 50%;">BATCH/LOT:</td> </tr> <tr> <td>26.11.15</td> <td>OPA4450923</td> </tr> </table> <div style="text-align: center;">  <p>(15)151126(10)OPA4450923(240)0764044</p>  <p>(02)07622300408183(37)0060</p>  <p>(00)385938931040644393</p> </div>	EAN-TRADE-No:	Qty:		07622300408183	0060	KOLLI	BEST BEFORE: (DD.MM.YY)	BATCH/LOT:	26.11.15	OPA4450923
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07622300408183	0060	KOLLI																			
BEST BEFORE: (DD.MM.YY)	BATCH/LOT:																				
26.11.15	OPA4450923																				

5.5.3 LABEL LOCATION

- The bar code, including the human readable digits underneath (identification number) must be visible and free of any obstacles preventing it from scanning.
- For logistics units and other units greater than 1 meter in height, labels should be placed so that all the bar code symbols are at a height of between 400 mm and 800 mm from the base of the unit (y), and no closer than 50 mm from the vertical edge (x) (see Diagram 16).
- Each logistics unit should have minimum two GS1 pallet labels. For units lower than 1 meter the labels should be allocated in a readable and scannable way to the unit.

Diagram 16: Label application on pallets

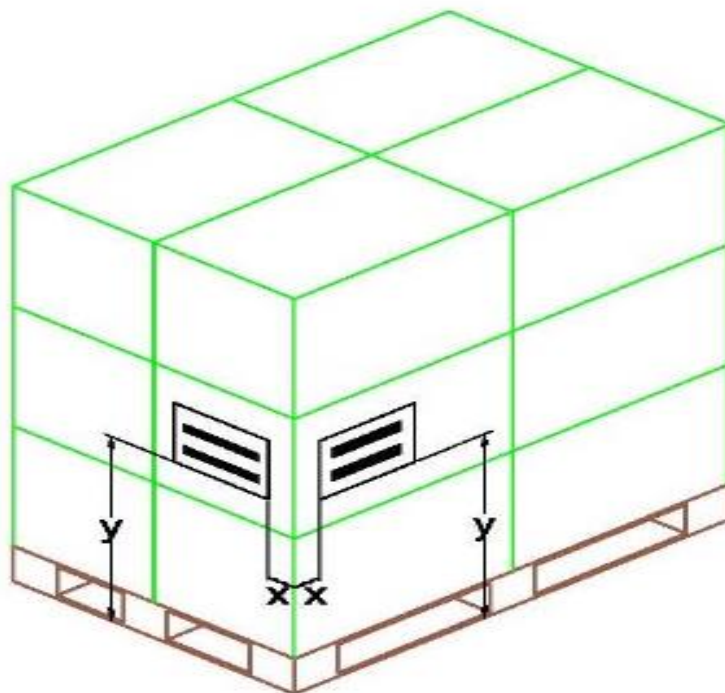


Table 4: RACI Traceability labelling unit load – pallet

	Co packer	Plant, Co man	LOG OPS	PM Printer	PCM	IS	GS1
Bar Codes	Verify conformity to Specification*	Verify conformity to Specification*				Provide Printer set up	
LOT CODE	Verify conformity to Specification*	Verify conformity to Specification*				Provide Printer set up	
BBD	Verify conformity to Specification*	Verify conformity to Specification*				Provide Printer set up	
Label Verification	Verify conformity to Specification*	Verify conformity to Specification*	Label compliance Reports from selected WH monthly				
Label approval during design and test	Customization team send to GS1 (or verify with Scanner) and receiving WH	Customization team send to GS1 (or verify with Scanner) and receiving WH					Verify conformity to GS1

* Verification checks as part of process controls (content and quality) - minimum 1x per shift at start / product change

6. TECHNICAL REQUIREMENTS

6.1 Program requirements

- Readable for high speed scanners in the trade.
- GTIN for product identification itself (Global Company Prefix given by GS1, registered by Mondelēz International).
- Scanning is most successful when the bar code is printed on a reasonably smooth surface. Avoid printing around the corners or on folds, creases, seams, and any other uneven packaging area.
- SSCC for identification and tracking forward of logistic units (pallets).
- Lot code for tracing.
- Data titles MUST be provided in English as specified in the GS1 General Specifications. In addition, data titles can be provided in local language if necessary.
- Shelf life indication format: For shelf life calculations see [Global Shelf Life Policy](#) (Master data standard).
- The “production day” (not packing day, see glossary) is used as calculation basis for shelf life indication and lot code. (Production day is based on local shift pattern, production day + remaining shelf life).
- Multi-packs with mixed codes- the shelf life indication data of the finished package/SKU/pallet label shall be the same as the component with the earliest expiration date (e.g. shortest shelf life indication).

- j. The use of Application Identifiers (AI) is governed by certain rules. Some must always be used with others, e.g. AI (02) must be followed by AI (37). Some Application Identifiers must never be used together, e.g. AI (01) and AI (02). Companies must respect these basic rules which are fully explained in the GS1 general specifications.
- k. Flexible software for scanning equipment and WH system is required in order to recognise order of AIs, unknown content should be ignored (e.g. third barcode)
- l. If possible, Pallet label + Case label need to be at least in one common face of the four of the pallet = permit to double check the consistency between info pallet and case.

6.2 Code printing quality:

ANSI and ISO standards reflect the symbol's likely scanning performance. The target for all symbols is ANSI grade 2, 0 equivalents CEN grade C. Printer adjustment shall be verified by GS1 local organizations. Readjustment is required if repeated complaints occur. Other colours than black (e.g. lilac) are not readable by all scanning systems and shall be avoided.

Printing direction of bar codes should be perpendicular to the printer exit to avoid illegibility of the whole bar code if there is an imperfection on the printer head.

Traceability information and open date codes shall be marked on product package in a noticeable and obvious place in such a way as to be easily visible, clearly legible and indelible. The codes shall not in any way be hidden, obscured, detracted from or interrupted by any other written or pictorial matter or any other intervening material. The codes shall be clear and understandable in order to assist consumers to make better-informed choices.

Easy legibility is an important element in maximizing the possibility for labeled information to influence consumers. Illegible product information is one of the main causes of consumer dissatisfaction with food labels. Therefore, a comprehensive approach shall be developed in order to take into account all aspects related to indelibility and legibility, including font, color and contrast.

Laser coding technology, including etching, ablation and color activation (with laser sensitive inks), is currently a proven solution recommended to address legibility and indelibility. It should be considered for date coding applications on all LOF/CBA (Line of the Future / Current Best Approach) and new installations where feasible or practical.

Legible/Legibility means the physical appearance of information, by means of which the information can be easily read by the general population. Legibility is determined by various elements, including but not limited to: font size, letter spacing, spacing between lines, stroke width, type color, typeface, width-height ratio of the letters, the surface of the material, and significant contrast between the print and the background.

Indelible/Indelibility means the information cannot be removed, deleted or erased.

Contrast means the distinction of the perceptual effect of different colors positioned side by side or close together. For example, dark color will show differences when compared to light color.

6.3 Approval of Bar Code Compliance

Bar code readability needs to be tested and verified with receiving warehouses and GS1. See RACI tables link.

- Part of verification during design phase (print to Design for Consumer unit)
- Verification at project development (SKU, pallet label) – PCM/CS&L/EME/BD
- Ongoing verification checks as part of process controls – ISC
 - BBD / LOT CODE on CU/SKU.
 - Pallet label GS1 128 / BBD/Lot code.
 - SKU GS1 128 / BBD / Lot code (off line/online printing).

7 PROGRAM REQUIREMENTS FOR IDENTIFICATION OF MONDELĒZ INTERNATIONAL PRODUCTS:

7.1 LOT CODE requirements for Mondelēz International products

Each Manufacturing facility (including Co-manufacturer and Co-packer/Re-packer) must use a standard lot code for product traceability identification on the pallet, trade unit (SKU) and consumer unit in the following formats. The lot code is the traceability basis for Mondelēz International business, Customers, Distributors and contracted services like Warehousing, Distribution, Re-packing and Co-packing. The lot code in the GS1 pallet label bar code section is used in some regions to calculate the release time for Mondelēz International products to the market applying time based release (remaining Quarantine time for Mondelēz International products calculated by Scanning of the lot code at point of reception in the Warehouse/Distribution center/Co-packer/Re-packer + Quarantine time value defined in the Mondelēz International Master Data per SKU). Deviations for standard lot code applications shall be controlled and documented in region specific procedures. SAP application limits the lot code length to a maximum of 10 digits.

7.1.1.MEU/ EEMEA format:

Table 5: MEU / EEMEA Lot code structure

Digit	1	2	3	4	5	6	7	8	9	10
Code	I	P	P	L	L	Y	W	W	D	S
Meaning	PRE-IDENTIFIER	PLANT	PLANT	Production LINE	Production LINE	PRODUCTION YEAR	PRODUCTION WEEK	PRODUCTION WEEK	PRODUCTION DAY	PRODCUTION SHIFT
	alphabetical	alphabetical	alphabetical	numerical	numerical	numerical	numerical	numerical	numerical	numerical
Example	O	O	V	0	3	6	3	2	2	3

I: pre-identifier “C” for co-packer; “Z” for external manufacturer; “O” for Mondelēz International plants.

PP: Unique plant identifier for Mondelēz International plants, co-packer and co-manufacturer.

Remark: First 3 digits are assigned by Mondelēz International quality and tracked on the [MEU Quality Hub share point site](#).

LL: PRODUCTION line number assigned by the plant (not sole packaging lines, machines).

Y: Production year (last digit of actual year).

WW: Calendar week of Production.

D: Day of Production (Monday =1).

S: Shift of production (Morning shift = 1).

Note: Y, WW, D definition has to follow ISO Standard 8601 definitions – see Glossary.

7.1.2. NA format:

Table 6: NA Lot code structure

NA Region Code Date Formats	Country of Sale	
	USA	Canada
Biscuit *	DD MMM YYYY PPSLB	YYYY MM DD PPSLB
Biscuit **(some CAN local Food Service)	Not Applicable	JCDM
Confections (NA plant manufacture)	DD MMM YYYY XPPJJJYYLLS hh:mm	YYYY MM DD XPPJJJYYLLS hh:mm
Confections (Imported from other regions)	DD MMM YYYY (other region lot code format)	YYYY MM DD (other region lot code format)
Halls branded products under regulation	DD MMM YYYY XPPJJJYYLLS hh:mm	YYYY MM DD (L) XPPJJJYYLLS hh:mm

Key	Definition	Example
DD	Date of expiry	20
MM	Month of expiry for Canada (see Table 6.1)	AU
MMM	Month of expiry for USA (see Table 6.2)	AUG
YYYY	Year of expiry	2017
XPP	Plant code ("X" notes an External Plant and is omitted for internal plants)	XBV or GT
JJJ	Julian date of manufacture	180
YY	Year of manufacture	16
LL	Line of manufacture	1
S	Shift of manufacture	1
hh:mm	time code (optional) in military time	23:00
(L)	regulator notation for "Lot"	(L)

** Note after the lot code and before the time code a machine code may be added if desired (alpha or numerical)

Biscuit Key *	Definition	Example
DD	Date of expiry	20
MM	Month of expiry for Canada (see Table 6.1)	AU
MMM	Month of expiry for USA (see Table 6.2)	AUG
YYYY (or YY)	Year of expiry (YYYY preferred)	2017 (17)
(X)PP	Plant code ("X" may be used as External Plant)	XJO or AZ
S	Shift of manufacture	2
L(L)	Line of manufacture	12
(B)	Machine Wrapper(optional)	4
(hh:mm)	time code (optional) in military time	23:00

Biscuit Key **	Definition	Example
J	Last digit of Year	6
CDM	Julian date	212

Table 6.1 Canadian Code Date Format and Month Designation

Format: Preferred YYYY MM DD (Accepted YYYYMMDD)

January	JA
February	FE
March	MR
April	AL
May	MA
June	JN
July	JL
August	AU
September	SE
October	OC
November	NO
December	DE

Table 6.2 USA Code Date Format and Month Designation

Format: Preferred DD MMM YYYY (Accepted DDMMYYYY)

(Note reversed position of year and day from Canada)

January	JAN
February	FEB
March	MAR
April	APR
May	MAY
June	JUN
July	JUL
August	AUG
September	SEP
October	OCT
November	NOV
December	DEC

7.1.3 AP format:

Table 7: AP lot code structure – not used in all locations.

P	P	N	N	N	Y	J	J	J	S
Plant Code	Line Code				Year	Reverse Julian Code			Shift

PP is the plant code – two letter alphabetic code.

NNN is a three number line code.

Y is the a single digit year code (i.e. 2010 = 0, 2011 = 1, 2012 = 2, etc.).

JJJ is a reverse Julian code that represents the day of the year (i.e. 1st of January = 001, 19th of January = 019, etc.).

S is a shift code. 1 = Day Shift, 2 = Afternoon Shift, 3 = Night Shift.

7.1.3 LA format:

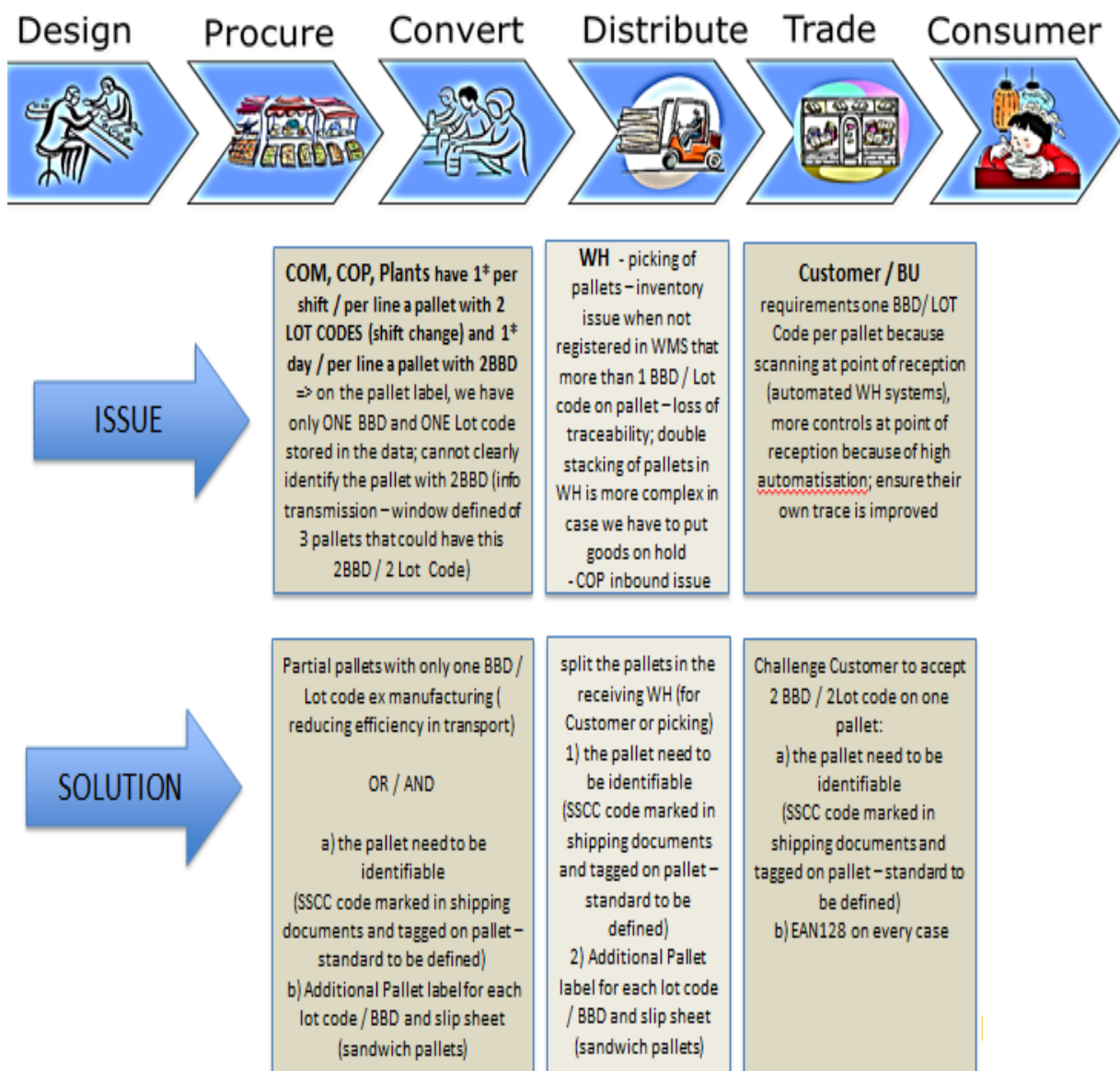
No standardized format

Best of Current Approach - Global:

- Scan of the lot code + calculation from PROD Data (BU Quarantine time per SKU) is defining the remaining Quarantine time in the Warehouse for time based release. (production date and shift information).
- Maximum number of digits: 10.
- SAP plant number usage as the Plant designation code.
- Global harmonized lot code structure.

7.2 Run rules for pallets containing 2 open day codes (BBD) or LOT codes (shift change / open day code change)

Diagram 17: Run rule schemes for pallets containing 2 open day codes / lot codes





Not the same
LOT CODE / BBD

A) Packing line defined in LOT CODES - changes from CU to SKU to Pallet

B) SHIFT CHANGE (3* /DAY)

SOLUTION

1	2	3	4	5	6	7	8	9	10
PRE-IDENTIFIER	PLANT	PLANT	PACKAGING LINE	PACKAGING LINE	PRODUCTION YEAR	PRODUCTION WEEK	PRODUCTION WEEK	PRODUCTION DAY	PRODUCTION SHIFT
alpha-numeric	alpha-numeric	alpha-numeric	numerical	numerical	numerical	numerical	numerical	numerical	numerical
Production line identifier	Plant code	Plant code	Packaging line number	Packaging line number	Production year	Production week	Production week	Production day	Production shift

A) a) Have only a PREFIX in complex line set up to ensure same LOT CODE

b) Description in LOT Code has to be „Production line“ not packaging line

B) If we prefix the SHIFT from the LOT CODE, 2/3 of partial pallets could be eliminated. But the traceability window is 2/3 wider (testing, recall). => RISK (timestamp is not part of lotcode but used by plants to define SSCC)

Full, uniformed pallets (homogenous) need to have products with one BBD and Lot code on it. Deviations need to be agreed with the receiving BU/customer and documented by the sending site. Run rule options:

- Split the pallets in the receiving WH before delivering to customer or for picking.
- Have EAN 128 on the SKU, challenge customer to accept 2 BBD/2Lot code.
- Partial pallets with only one BBD/Lot code ex manufacturing (reducing efficiency in transport).
- SAP settings for shift change/BBD change need to match (no change at 00:00h for new BBD if night shift is defined to finish later).
- Complete the pallet at shift end and start new shift.
- Where allowed to have mixed BBD codes on a pallet the difference in BBD shall not be more than two calendar days.
- **Shift change rule:** if having a part pallet of SKUs from shift “A” the pallet needs to be completed with SKUs from shift “B”. The pallet label will show traceability information from shift “B” – this is driven by the label system.
- Business agreement to ensure full traceability and having control about the release process:
 - Plants need to have internal documentation, which pallet (SSCC code) contains 2 different batch numbers, but it is not shown on the pallet labels (WH providers do not have this information on full pallets available).
 - In case of recall for batch “A”, we have to communicate the additional SSCC codes of the pallets with the 2 batch numbers on it (pallet label shows “B”)
 - Until this dedicated information is available from the plants, batch number “A” and “B” need to be put on hold in the supply chain.
 - See excel file traceability at shift change [[Traceability sharepoint site](#)].
 - BBD change at shift change.

7.3. Open date code format

- Day exact best before date (BBD) format enables alternatives for “fixed day per month”(monthly BBD with a fixed day for example 28.02.2013/28.04.2013. Seasonal business and products with legal/customer requirement for day exact BBD).
 - For BBD calculation: see shelf life calculation [Global Shelf Life Policy](#) (Master data standard).
 - The “production day” is used as calculation basis for shelf life indication and Lot code. (Production day is based on local shift pattern, prod day + remaining shelf life)
 - The human readable shelf life indication printed on Consumer Unit, SKU and pallet label need to follow customer specific/local regulation specific requirements.
 - Pallet label barcode section - all barcode formats shall be converted into global GS1 requirement format YYMMDD (this is the relevant bar code section “Application Identifier (15)”).
 - For packages that contain more than one component or mixed code dates (Co packed SKU’s / Displays), the shelf life indication data of the Consumer unit/SKU/pallet label shall be the same as the component with the earliest expiration date (e.g. shortest shelf life indication).

7.4 Code responsibility: when to change / not to change a GTIN

Mondelēz International is fully engaged to comply and follow the agreed GS1 industry standards for GTIN allocation. These rules are published on <http://www.GS1.org>.

The lead PCM assigned to the product change or New Product Development project is responsible to apply the GS1 rules and assign the appropriate GTIN for any new SKU or CU (reference to global I2M process see Chapter 8).

8. Other Sources for Information:

- [GS1 global user manual](#)
- [ECR Unit Load Identification and tracking](#)
- [GS1 Logistics Label and Serial Shipping Container Code](#)
- [GS1 Barcode Quality Guide](#)
- [ECR blue book “using traceability in the SC to meet consumer’ safety expectations”](#)
- [GS1 traceability self assessment score card](#)
- Global I2M process : <https://intranet.mdlz.com/sites/i2m>
- [QP 7 5-05 Traceability and open date code](#)
- [ISO 8601](#)

GLOSSARY

- **Consumer unit** Trade item purchased by the consumer. May also be referred to as 'consumer package' or 'retail package'. May be an individual item (e.g. individual chocolate bar, jar of coffee), or a multipack.
- **Traded unit - SKU** : Trade item which does not pass the point of sale, e.g. carton, case, bag , stand alone product display.
- **Logistics unit (Pallets)**: A defined quantity of product established for transport and/or storage that needs to be managed through the supply chain. Includes 'Shippers' [packages containing multiple Traded Units, which the retailer removes prior to displaying the Traded Units in store], partial pallets and full pallets.
- **GS1**: (Global Standards One), is a not-for-profit, international organization that develops and maintains standards for supply and demand chains across multiple sectors.
- **Year, Week, Day: - ISO 8601**: Representation of dates and times is an international standard covering the exchange of date and time-related data. It was issued by the International Organization for Standardization (ISO) and was first published in 1988. The purpose of this standard is to provide an unambiguous and well-defined method of representing dates and times, so as to avoid misinterpretation of numeric representations of dates and times, particularly when data is transferred between countries with different conventions for writing numeric dates and times.
- **AI**: Application Identifier Each Application Identifier (AI) has a two, three, or four digit numeric Prefix in front of the data to tell what the data means. For example, the AI for Serial Shipping Container Code (SSCC) is (00) and for : Global Trade Item Number (GTIN) it is (01)
- **EAN Code**: (NOTE:The GS1 system has replaced the previous system EAN and UCC code systems. Essentially the code structures have not changed but the 2 organizations have merged so the now unified GS1 code names are used in this document
- **GS1 128 Code**: GS1-128 is an application standard of the GS1 implementation using the Code 128 barcode specification. The former correct name was UCC/EAN-128. Other no longer used names have included UCC-128 and EAN-128. GS1-128 uses a series of Application Identifiers to include additional data such as best before dates, batch numbers, quantities, weights and many other attributes needed by the user.
- **128 Code**: Code 128 is a very high-density barcode symbology. It is used for alphanumeric or numeric-only barcodes. It can encode all 128 characters of ASCII and, by use of an extension character (FNC4), the Latin-1 characters defined in ISO/IEC 8859-1[citation needed].
- **Automated WH systems**: Some warehouses are completely automated, and require only operators to work and handle the entire task. Pallets and product move on a system of automated conveyors, cranes and automated storage and retrieval systems coordinated by programmable logic controllers and computers running logistics automation software. These systems are often installed in refrigerated warehouses where temperatures are kept very cold to keep product from spoiling, as automated storage systems can use vertical space efficiently. (high-bay storage areas)
- **Lot code**: A lot number is an identification number assigned to a particular quantity or lot of material from a single manufacturer. Lot numbers can typically be found on the outside of packaging. The idea is that the lot number enables tracing of the constituent parts or ingredients as well as labor and equipment records involved in the manufacturing of a product. Unique identity given to a defined quantity of a material usually based on time and location of manufacture. For continuous processes, a lot cannot exceed the amount of material produced in one 24 hour period. For non-continuous processes, the batch, blend, shift, or other time segment may be used to identify a lot. For materials received in bulk, the lot would usually be identified as the contents of the bulk vehicle. Note: the definition of 'Lot' is different to 'Compliance lot' for net contents control purposes.
- **Batch code** = LOT CODE, but a lot can contain several batches of manufactured product.

- **Uniform pallet/ homogeneous pallet:** assembled finished goods / semi-finished goods pallet containing the same Article
- **Picking pallet:** In logistics, picking refers to the task of selecting an item for shipment.
- **Mixed pallet:** assembled finished goods/semi-finished goods pallet containing different Articles
- **GTIN:** Global Trade Identification number, see GS1 standard
- **Internal traceability:** Movement, Transformation, Storage, and Destruction
- **External traceability:** When a traceable item is physically handed over from a partner to another (i.e. “one step up/one step back” principle)
- **Third-party logistics** (abbreviated **3PL**, or sometimes TPL) in logistics and supply chain management is a company's use of third party businesses to outsource elements of the company's distribution and fulfillment services.