CropLife
INTERNATIONAL

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CRISTAL On-boarding Handbook

Version 2 – January 2017

Contents

Purpose of the document

The purpose of the document is an implementation guide for supply chain partners in the agro business (with primary focus on crop chemicals and in future seeds) regarding Track and Trace.

Details of the implementation have to be aligned on local / country level, based on the requirements and objectives regarding traceability.

CRISTAL Track and Trace Goal, Mission and Benefits

Transparency of the supply chain is an enabler for stewardship in the area of crop protection and seed business. In addition, it enables efficient information management of the supply chain and facilitates new services. Prerequisites are the identification of logistic objects and their attributes, monitoring and documenting of events associated with the movement of the products from production to the end user. Standardized coding of information and information exchange are important tools for easy information management of modern logistics which ideally encompasses all stakeholders and, thus, creates benefits for them.

There are four enablers of supply chain transparency:

- Identification of logistic objects (e.g. primary or consumer unit, trade unit, logistics unit, i.e. pallet)
- Connectivity via suitable links
- Recording and storage of data
- Data communication

The bidirectional information exchange take place between partners, via networks, clouds or industrial hubs. Interoperability is a key success factor.

CRISTAL recommendations

- **Article**
- **Production batch & date**
- **Shipping unit**

1. Identify
2. Manage links
3. Record data
4. Communicate
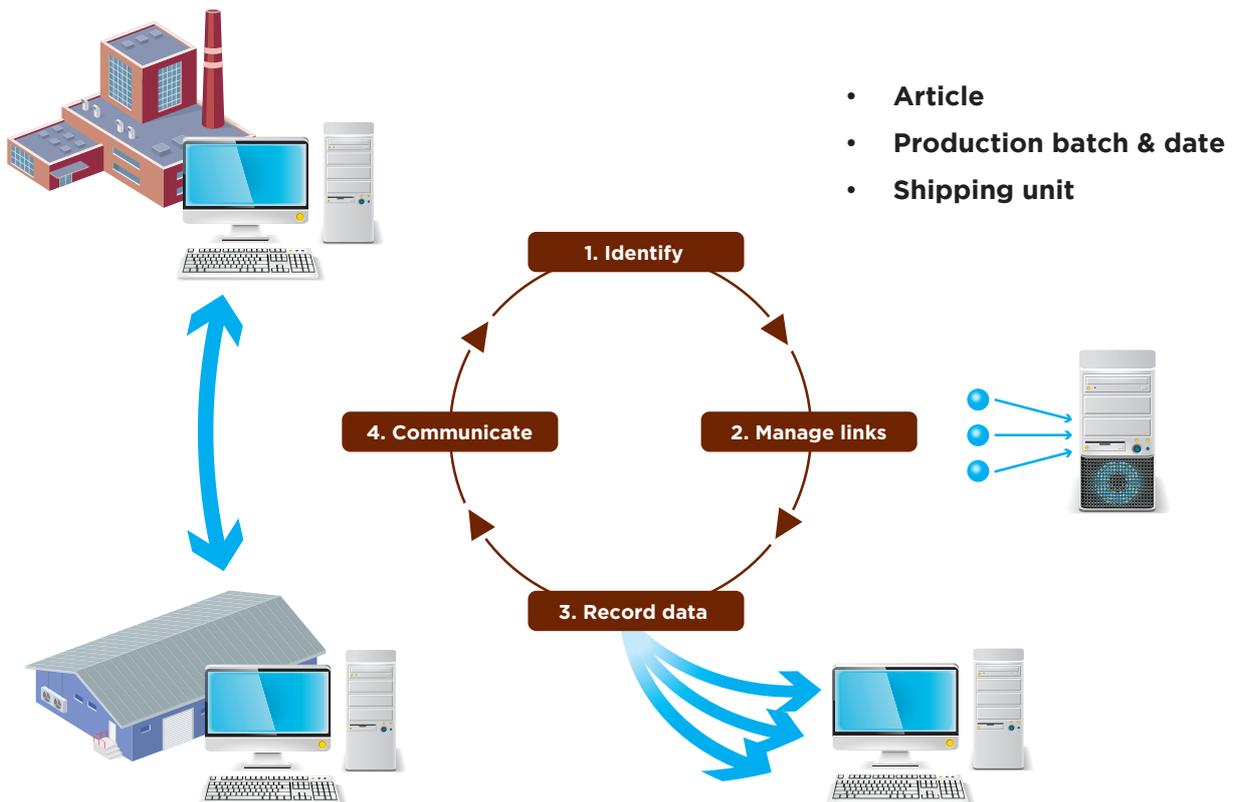
Benefits

A transparent supply chain from production to the end user delivers benefits to all stakeholders of crop protection and seed business and helps to significantly improve product safety and stewardship and providing new services. Some of the specific identified benefits are:

- Traceability helps farmers to use registered crop protection products in the right quality and protects against the use of illegal products with unknown contents – an important step to produce safe and healthy food

- Supports supply chain agility from production to end users: Improved traceability creates the possibility of product recall, relabeling and withdrawal

- Interoperability across the supply chain through standardized information and messages

- Possibility for companies to enhance their Total Quality Management

- Reduces product obsolescence along the distribution chain

- Creates new opportunities for each company in their Customer Relationship Management.

Supply chain actors

This document provides a high level description of the relevant Track and Trace events taking place at the different supply chain (SC) actors as well as the relevant information to be exchanged.

Main SC actors can be described as:

- **Business partners**
  They provide services to the respective agrochemical or seed producer; therefore the consistent exchange of information is of very high importance. We can distinguish below partners:

- **Contract and toll manufacturer**
  Toll manufacturer responsibility covers the correct identification, capture and sharing of finished products packaging and the relevant data.

- **Third-Party Logistics and Warehousing partners**
  Their main activity is related to warehousing and transportation of agrochemical goods. In some cases they have commissioning, repackaging or relabeling activities, which have to be considered in the Track and Trace process 3PLs and Warehousing partners responsibility covers the correct

identification, capture and sharing of finished products packaging and the relevant data within the distribution process.

- **Direct customers and distribution channel,** e. g. distributors, wholesalers, retailers in the mid/long term will be able to communicate the goods receipt and goods shipment to their customers even on consumer unit level. In the short term, it will allow them to efficiently manage product related information (including documentation, product obsolescence and authentication of products), and speed up recall processes at batch level. Equally, the use of itemized logistic unit will open opportunity to streamline their inventory management.

- **End customers,** i.e. those using crop protection products and seeds in their farms. They will be able to decode the information provided with the products by using 2D matrix readers in their mobile devices (phones, tablets). This will open the door to additional services for them, e.g. authentication of the product, safety instructions.

Item Identification

Item identification (usually by labelling or direct printing) is the **key** piece for Track and Trace process. It will be used to identify each item and logistics units in the supply chain of agrochemical products and seeds.

Item identifiers must provide **machine readable** as well as **human readable** information, with the ultimate aim to enable bidirectional exchange of Track and Trace relevant information.

Machine Readable information of all types of logistics objects will be encoded in a barcode, preferably 2D data matrix according to CRISTAL recommendations (ref 1).

Events/Processes

Capture and exchange of goods identity information and other pieces of information during the different events in the supply chain process will enable transparency of the SC and e.g. ensure total quality management, batch traceability and efficient and fast recall processes.

Relevant events and processes are summarized below

- Production
- Stock management at various locations
- Goods shipment to various destinations
- Goods Receipt at various locations
- Sales
- Disposal of products
- Authentication (if applies)
- Commissioning
- Inventory movements
- Relabeling (if applies)
- Quarantine
- Recall

Contract and Toll Manufacturing

In the agrochemical industry many products are finished by external providers. Those activities are governed by bilateral contracts specifying processes and FFP (formulation, filling, packaging) related details according to industry guidelines and definitions.

From a Track and Trace perspective we need to make sure that especially for filling activities, toll manufacturers are following the way to identify products according to CRISTAL guidelines, i.e. they should be able to apply the required information onto the labels of the filled products (consumer units) and the next levels logistics units (trading units, pallets), as well as communication of that information to the specified database(s).

For that purpose toll manufacturers may need to equip their filling lines with devices to apply and capture information as specified by CRISTAL, such as printers, cameras or scanners and data management system capable of the supporting the required and agreed traceability level.

Therefore, toll manufactures should be able during:

- **Filling/Labeling of filled and capped consumer unit**
  Apply on Consumer Unit Label a barcode, 2D data matrix, and human readable information according to CRISTAL recommendations (ref 1).

  Capture, manage, store and communicate applied information to the specified database(s).

- **In boxing:**
  Apply on the trade unit a 2D data matrix and human readable information/ information as specified by CRISTAL to the trade unit.

  Capture, store and communicate applied information to the specified database(s).

- If required, serial numbers can be provided by the parent company or may be generated by the toll manufacturer according to bilateral agreement. In the most advanced scenario, the aggregation has been built between consumer units and trade unit, the aggregation will be submitted to the specified data base(s) or may be kept locally.

- **Palletizing**
  Apply Pallet label with a 2D data matrix, GS1 128 1D bar code, and human readable information according to CRISTAL recommendations (ref 1).

  Capture, manage, store and communicate applied information to the specified database(s).

  In the most advanced scenario, the aggregation has been built between boxes and pallets, the aggregation will be submitted to the specified data base(s) or may be kept locally.

Besides the usual filling activities, also reworking activities (refilling, relabeling, repackaging) are part of the track and trace process, and can be described as a combination of events (e.g. depalletization, relabeling).

Goods Shipment

To ensure the transparency of the goods journey along the supply chain, it is needed that in each of the goods transfers, T&T information is captured, stored and communicated to the specified data base(s).

Goods Shipment events happen at different actors (toll manufactures, distribution warehouses, retailers), and all of them should equip themselves to fulfill these requirements using devices to automatically capture these data, and software to communicate the events to the specified database(s), as agreed between business partners.

Depending on the level of the logistic unit to be shipped, the shipper will need to scan the pallet label, the trade unit label or the consumer unit label.

Goods Receipt

Similar to the Goods Shipment event, capture of Goods Receipt events at various locations are required to provide full visibility of the products location at any moment.

Goods Shipment events and Goods Receipts happen along all the SC actors (contract and toll manufacturers, distribution warehouses, retailers and farmers).

Actors will need to scan the higher level of the logistic unit containing Track and Trace information, to store and communicate to the specified database(s).

Disposal

The traceability information has to be managed accordingly.

Authentication

It is the action of determining whether objects are, in fact, what they are declared to be. The elements of the CRISTAL data set in conjunction with event management can be used to support authentication of products.

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Table 1: Example of events along the downstream supply chain, taking into account the use of serial shipping container codes (SSCC) for the shipping units and also aggregation via SSCC codes on pallets and boxes

The use of serial numbers on individual bottles is not included in this example.

	Step	Identify	Manage Links	Record data	Communicate
1	Production	2D data matrix code on • Consumer unit (GTIN, batch, prod date) • Trade unit (+ SSCC) • Pallet (+ SSCC)	Aggregation between cartons and pallet via SSCC	Internal IS of the supplier	If tolling: Identification, aggregation and recording data should be done by the toller and then communicated to the company)
2	Transfer to an internal storage		Link between storage location and the SSCC of the pallet	Use of the data on the 2D for • FIFO (First In First out) and/or FEFO (First expired First out) • Inventory management	
3	Transfer to an external distribution warehouse	Reading of the SSCC of the pallets and/or the SSCC of the trade units if picking in order to prepare the delivery	Generation of a new SSCC for the pallets (= **new shipping unit**), result of the picking (including aggregation **with the** SSCC of theses trade units)	Stock update, based on the delivery, by taking in account FIFO or FEFO for the product to **be delivered**	Delivery information for the external warehouse, allowing them to prepare the goods receipt
4	Goods receipt in the external warehouse	Reading of the SSCC (pallets) and also trade units, if they are sent as standalone	Link between the scanned SSCC and the delivery information given in **step 3**	Integration of all related data in the local IS (WMS or other) for : • Stock management (storage location, FIFO, FEFO) • Inventory management	
5	Delivery to a distributor **(wholesaler)**	On the whole, same approach as **step 3**			
6	Goods receipt in the wholesaler's warehouse	See **step 4**			
7	Delivery from a wholesaler to a reseller	The wholesaler has to perform the same processes as in **step 3**, depending on his delivery: reading the SSCC of full pallets – generation of SSCC for pallets, i.e. new shipping units, if picking – update his IS and provide the delivery information for the reseller. **If on this level there are already consumer units sent individually, he also has to read the 2D of each consumer unit, to generate a new shipping unit (SSCC) if he regroups them in a trade unit – if batch number and/or article are different – and to manage the data (IS, delivery inf.) consequently**			
8	Goods receipt in the reseller's warehouse	Same as **step 4**, by taking in account individual consumer unit management if required (see below)			
9	Delivery from a reseller to a retail store	Same as **step 7**, including individual consumer units			
10	Goods receipt in the retail store	Same as **step 8**			
11	Sales to a **farmer**	Reading of the 2D code (bottles, trade units)	Link between pallet and carton (SSCC), if sale of a full pallet?	Update of the IS (stock management, FIFO/FEFO)	

Handling of Serial Numbers

When serialization is required the need for the serial numbers handling arises.

Those actors, **mainly toll manufacturers**, with the need to apply SN during their activities may generate them by themselves or may receive them from the contractor. They have the responsibility to control their stock of serial numbers. Depending on the parent company strategy, serial number generation can be an 'in house' facility or a service provided by a third party.

Specified database

CRISTAL related data can be stored either in local databases, central databases or cloud databases, with appropriate access management.

Information exchange

The supply chain actors will need to transfer the captured Track and Trace information to the database(s) as agreed between the SC partners and/or state regulatory authorities (e.g. France, Argentina).

Communication channels can be set up using direct communication between the supply chain actors through existing portals via B2B exchanges using EDI messages or through other third party web service providers or through state and regulatory authority portals.

It is recommended that sharing information has to be shaped according the GS1 EPCIS messages standards in the case of usage of serial numbers or EDI standards (UN/CEFACT standard).

THE CRISTAL PROJECT: ENHANCING THE STANDARDS

CropLife International is the voice of the global plant science industry. It champions the role of agricultural innovations in crop protection and plant biotechnology in supporting and advancing sustainable agriculture; helping farmers feed a growing population while looking after the planet; and progressing rural communities. The world needs farmers, and farmers need plant science. CropLife International is proud to be at the heart of helping farmers grow.

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