

# Meat technology update

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## Uniform Barcoding for Better Management of the Meat Industry Supply Chain

A key objective of the Australian meat industry is to achieve world best practice in ensuring the safety and other quality attributes of red meat products.

Implementation of HACCP and sound management systems will ensure that a safe and hygienic product is delivered to the market place. However, these systems must accommodate a growing need for irrefutable evidence of the industry's ability to reliably track meat products from the farm to the consumer and back again.

The consumer wants peace of mind; so do retailers and others in the meat industry supply chain. Major retailers in Australia are actively pushing for the general adoption of uniform product numbering and electronic data standards by the meat industry.

Whilst world best practice is in sight, several goals must be realised before best possible security in tracking is finally achieved. The main areas that need to be addressed by the meat industry are inconsistent machine-readable identification systems for numbering and data transfer. A uniform system for product identification from producer to consumer is needed for better control

through the supply chain and for better service to the customer.

Recently, an Australian industry working party—which included representatives of AUS-MEAT, Australian Meat Council, Australian Quarantine and Inspection Service, EAN Australia, Food Science Australia, Meat and Livestock Australia, and the National Meat Association of Australia—developed Guidelines<sup>1</sup> for a numbering and barcoding system based on the EAN/UCC numbering system.

This newsletter draws on the guidelines and on other sources to explain the benefits of a uniform system of numbering and barcoding, and of uniform systems for electronic commerce. Adoption of these systems means that the identity and traceability of meat items can be maintained throughout the supply chain - from the farm, through slaughter and processing, to transport to export or local markets, and finally distribution to the customer.

This information is crucial in the event of a food safety incident or concern. Information on traceability is crucial, not only to be able to act quickly to isolate and remove implicated product during a recall, but also to be able to eliminate and release product that is shown not to be implicated in a given incident.

<sup>1</sup> Australian meat industry guidelines for numbering and barcoding non-retail items

## Benefits

A uniform barcode system integrated into the Australian meat industry would have the following benefits:

- Retention of certain overseas markets and the Australian retailers who demand it;
- International equipment compatibility;
- Common machine-readable trading language;
- Improved product accountability;
- Animal and meat history and market eligibility coding;
- Improved traceability and product recall;
- Batch or production lot identification by coding;
- Electronic transfer of export certificates and other documentation or trade information;
- Shipping mark replacement; and
- Inventory management.

However, the greatest immediate commercial incentive for the early adoption of the uniform systems is the cost saving through the supply chain. The ability to trace meat is an insurance - a 'tomorrow' benefit in the event that there is a need to trace any product that does not conform to safety or other quality requirements. The 'today' commercial benefit is the reduction in the costs of collecting and processing information through each step in the supply chain.

This was illustrated by a Brisbane study that provided information on the cost of manually identifying, sorting, and recording information for cartons of beef primals from a boning room through to retail.

Each carton was handled up to 10 times during its journey from boning room to cold store to retail store. The value of the time

taken for manual reading, recording and tallying of codes for product description and weight averaged \$2.50 per carton per procedure. The cost was as high as \$25 per carton for manual identification, recording and data entry through that particular supply chain! A US model for this process showed a cost of up to \$50 per carton.

## System Requirements

A uniform barcode system promotes efficient management of the entire supply chain. It provides product inspection authorities with a reliable system that reduces physical inspection work. It also provides a trace-back (from the consumer) and trace-forward (from the farm) system to facilitate quick recovery of batches of product in the event of problems in the marketplace, and to minimize adverse publicity. Major food retailers in Australia want the meat industry to adopt EAN/UCC numbering and electronic data interchange (EDI) standards.

Their adoption would require a number of modifications because companies frequently have in-house numbering systems specific for their requirements. EAN/UCC numbers need to be consistently applied to packages, products and containers such that a scanner can easily read the barcode (Refer to the Australian guidelines).

Before they can adopt the EAN/UCC system, many companies will have to undertake some or all of:

- Up-grade computer systems for EAN barcodes, application identifiers and data transfer;
- Adjust live animal and carcass ticketing systems;
- Up-date database and scanning equipment to read EAN barcodes and attribute information;
- Make current livestock identification programs (eg. NLIS) compatible with EAN.

## EAN/UCC Numbers and Barcodes

The basic barcode for product identification is composed of an EAN/UCC company prefix, an item number and a check digit. When applying for registration with EAN Australia, meat companies must identify themselves as meat industry participants. They will then be assigned an 8-digit company prefix and also a block of 4-digit item numbers. This 4-digit code can incorporate the AUS-MEAT numbers, or internal company numbers. The check digit is the final part of the barcode and is used to ensure that the barcode has been correctly scanned or that the number has been correctly composed.

The numeric code numbers are represented in the barcode as a pattern of bars and spaces and the information contained in the barcode is read with a scanner. The format of the EAN number that is allocated depends on the type of item and the additional information that is required on the package. Products fall into the following categories:

- Retail items (or consumer items) that are for sale to the final consumer through a retail point of sale;
- Non-retail (or trade items) that are created for the purpose of shipping or handling, such as a carcass or carton which may be ordered or picked from stock at any point in any supply chain;
- Logistic units (transport lots) that are transported throughout the supply chain, and include pallets (of cartons, tubs), module lots, or shipments (e.g. container or truckload).

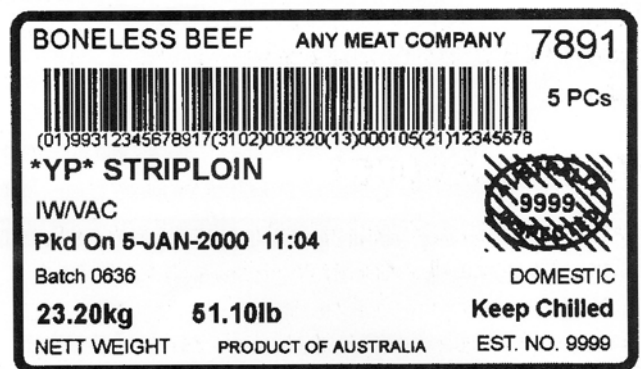
The format adopted by the Australian meat industry as the uniform code for non-retail items from Australian plants is termed EAN-128.

The EAN-128 number allows expansion of the system beyond the basic identification parameters. This additional information is any variable information that is required in addition to the product identification, such as:

- Serial number,
- Packaging date,
- Production date (kill date),
- Variable weight,
- Batch/lot number,
- Use by date.

Certain product attributes are incorporated into the barcode as application identifier (AI) numbers. These appear in brackets within the EAN-128 barcode and are prefixes that are used to identify the meaning and the format of the data that follow them. Several AIs are shown in the barcode example in Figure 1. A list of specific AIs for attribute information required by the Australian meat industry is included in the meat industry guidelines.

An 18-digit serial shipping container code (SSCC) number uniquely identifies each transport lot. A label encoding the SSCC is applied to the logistic unit using the appropriate A1 and the EAN-128 format. The important information within the SSCC is the company prefix followed by the serial number assigned to the transport lot. This format uniquely identifies the logistic unit for the lifetime of that unit.



**Figure 1** A carton label with an EAN/UCC-128 barcode showing attribute information, and supplementary information.

All participants in the transport and distribution chain can use it. It is essentially a reference number to access information held in computer files within the information

systems of recipients. Other non-barcoded 'in clear' information may be printed on the labels as agreed by the trading partners. Some may be required to meet statutory requirements. The supplementary information included in the EAN-128 barcode can be used to greatly improve the management of the supply chain.

## Electronic Commerce

Electronic commerce is essentially 'paperless trading' and operates in conjunction with the numbering system. Accurate allocation of numbers and the correct use of barcodes allow electronic commerce to function efficiently so that the entire supply chain is linked from animal producer to processor, cold store, manufacturer, distributor, transport agent, retailer, inspection authority and financial institution.

In the proposed uniform code, all wholesale transport lots from Australian plants will be allocated unique numbers. As explained previously, the type of number that will be used is able to accommodate the item identification, additional attribute information and a serial shipping container code (SSCC) for the identification of the transport lot. Details of each transport lot will be transmitted via EDI to customers and/or regulators in Australia and overseas.

The format of the electronic information will conform to international EDI message guidelines referred to as EANCOM. At any point through distribution, customers and regulators will be able to scan the SSCC and identify the contents of the transport lot. The EANCOM standard enables data to be communicated quickly, efficiently and accurately irrespective of users' internal hardware and software types. Electronic commerce has a number of advantages:

- Removal of errors caused by manual data input;
- Decreased costs by reducing paper work; and
- Improved management and control of production, processing, purchasing and delivery.

Barcoding and EDI is a more secure method of validating shipments than manual methods and offers a high level of clearance on documentation without having to unload and inspect packages. A general industry adoption of the EAN/UCC and EANCOM system has the potential to eliminate the reliance on shipping marks for import inspection.

## What is EAN/UCC?

EAN International was previously referred to as the European Article Number Association. It administers an internationally compatible system for the identification of items, services, logistic units and locations. This is done jointly with the Uniform Code Council (UCC), which is based in North America. The system provides an open standard that meets the needs of all industry sectors. At present, there are 850,000 member companies in 90 countries. The EAN/UCC barcode was first developed for the retail industry, is most commonly seen on grocery products, and carries relevant information such as product codes, batch numbers, use-by dates and serial numbers.

EAN Australia administers the EAN/UCC system of numbering and barcoding in this country and liaises with EAN International to ensure Australian business needs are considered in the international developments of the EAN system. EAN/UCC numbers can be used at every stage of manufacture and distribution to identify products, shipments of goods, services, locations, and companies and organisations.

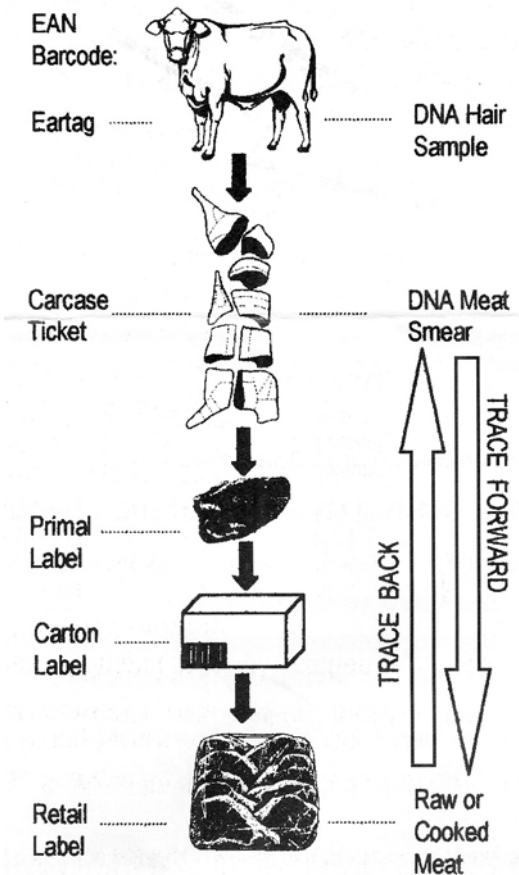
## Roadtests of the System

There have been two recent projects to roadtest the guidelines and show how they work in practice. The first was undertaken by Australian Country Choice (ACC) with the assistance of Meat & Livestock Australia (MLA) and support from Coles Supermarkets. The second was carried out by Australia Meat Holdings and MLA.

The areas addressed in the first project include:

- Introduction of EAN numbering and barcoding from slaughter to retail;

- Development and implementation of EDI EANCOM messaging guidelines throughout the supply chain covering production, cold store, transport and wholesale;
- Trace-back system based on DNA fingerprinting:
  - DNA hair sample (live cattle identification);
  - DNA meat smear (carcase identification);
  - DNA analyses of retail product to validate link to source carcase and live animal.



The ACC project demonstrated that the cost of implementing a trace-back system is dependant on the particular requirements of the plant. A complex tracking system provides the highest level of identification from the live animal to the primal cut. A less sophisticated basic system provides little pass-forward identification and relies on DNA fingerprinting to identify a source carcase when trace-back is required. A cost-effective balance is achieved at a point between the complex system and the simple system. A graphical representation of traceability in the meat industry is shown in Figure 2.

The ACC project showed that the EAN/UCC system fully meets industry requirements for machine readability of labels for carcasses, cartons and primal cuts. The EANCOM standard provides a secure means for electronically transferring carton identification along the supply chain.

Validation of these systems using DNA fingerprinting demonstrated complete linkage from retail cuts to specific carcasses. Supply chain management from producer to consumer was demonstrated to be achievable at a commercial level and to be cost effective.

The second project was undertaken to test the operation of EAN Meat Industry barcodes and electronic data transmission of information in the export supply chain. The objective of the trial was to demonstrate to industry and regulators the benefits of barcoding and electronic data transmission as compared to existing systems. All technical aspects of the trial were completed without a hitch including compatibility with EXDOC, the AQIS electronic documentation system. It was clearly demonstrated that barcodes could provide an effective substitute for shipping marks. The trial showed that major improvements were possible in documentation, import inspection and recall systems. Officials from USDA recognised that barcoding could provide improved efficiency, security and product safety over existing systems. A major review by USDA of import inspection systems is about to start and EAN barcoding will be incorporated into the review. Further discussions are being held between all interested parties to progress this issue.

## Access to EAN/UCC Numbers

EAN Australia provides many services to its 11,000 members including a barcode testing service; a number catalogue (a register of products showing their EAN Nos, descriptions, location and electronic commerce number), and technical and implementation advice and training.

## Further information

A video and CD-ROM about EAN/UCC numbering, barcoding and DNA traceability are available from Meat & Livestock Australia ([e-mail: hphilpott@mla.com.au](mailto:hphilpott@mla.com.au)).

EAN Australia

Ph. (03) 9569 9755, Fax. (03) 9569 1525

Web site: [www.ean.com.au](http://www.ean.com.au)

EAN Australia Technological Information Manuals eg. "Australian Meat Industry Guidelines for Numbering and Barcoding of Non-Retail Items". Available from the download section of [www.ean.com.au](http://www.ean.com.au)

## Contact us for additional information

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