North American Industry Guidance for Standard Case Code Labeling for Extended Product Attributes

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Contributors

Name	Company
Steve Mavity	Bumble Bee Foods
Dan Hartley	ConAgra Foods Inc.
Toni Roberts	Costco Wholesale
Jeff Chester	Food Services of America
Curt Vansickle	General Mills, Inc.
Jeanne Iglesias	Grocery Manufacturers Association
Larry Oberkfell	International Foodservice Manufacturers Association
Larry Roth	Kimberly Clark Corporation
Doug Naal	Kraft North America Foodservice
Beckey James	McLane Foodservice, Inc.
Syndee Stiles	McLane Foodservice, Inc.
Mark Galletta	Nestle USA
Aileen Ngo	Nestle USA
Greg Buckley	PepsiCo, Inc.
Doug Moody	PepsiCo, Inc.
Noam Broinstein	Procter & Gamble Company
Sally Robinson	Safeway
Phyllis Koch	Schwan's Food Service, Inc.
Mark Radke	Schwan's Food Service, Inc.
Joe Spreitzer	Target Corporation
Craig Gilchrist	The Coca-Cola Company
Phil Dammarell	The Kroger Company
Paul Lothian	Tyson Foods Inc.
Lela Tripp	Tyson Foods Inc.
Brenda Lloyd	Unified Foodservice Purchasing Cooperative
Dave Devlin	US Foods
Eleanor Haan	Ventura Foods, LLC
Fumbi Chima	Wal-Mart Stores Inc.
Bill Greetan	Wal-Mart Stores Inc.

Robert Irby	Wal-Mart Stores Inc.
Ron Moser	Wal-Mart Stores Inc.

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1.   Introduction

1.1.   Purpose of this Document

The purpose of the ***North American Industry Guidance for Standard Case Code Labeling for Extended Product Attributes*** *i*s to provide best practice guidelines for industry-wide adoption of a common standard for case labeling information for finished products in the grocery and foodservice sectors.   Adoption of the guidance offered in this document is voluntary and will be determined by the trading partner relationship.

In addition to key definitions and descriptions for core elements for case label information for extended product attributes in human and machine readable formats, this document offers "how to" guidance and recommendations for implementing GS1-128 barcodes for case labeling of product taking into consideration common business practices and various supply chain processes. These guidelines have been developed with input and participation from all segments of industry through a collaborative process. The following trade associations and industry groups have participated in or followed the development of these guidelines:

- Canadian Federation of Independent Grocers (GFIG)
- Food and Consumer Products of Canada (FCPC)
- Food Marketing Institute (FMI)
- Grocery Manufacturers Association (GMA)
- International Dairy Deli Bakery Association (IDDBA)
- International Dairy Foods Association (IDFA)
- International Foodservice Distributors Association (IFDA)
- International Foodservice Manufacturers Association (IFMA)
- Meat and Poultry B2B Data Standards Organization (mpXML)
- National Association of Chain Drug Stores (NACDS)
- National Association of Convenience Stores (NACS)
- National Grocers Association (NGA)
- Produce Marketing Association (PMA)
- Retail Council of Canada (RCC)
- National Restaurant Association (NRA)
- National Fisheries Institute (NFI)
- United Fresh Produce Association (UFPA)

Why these guidelines are needed now

The consumer packaged goods industry has traditionally used the information printed on case level labels to facilitate the distribution of goods from manufacturer through the supply chain to retail stores or foodservice operators. This information has been provided using both human readable text and machine readable barcodes. The most commonly used standard for barcodes to date has been the GS1 Interleaved 2-of-5 (ITF-14). While the ITF-14 is a mature GS1 standard, it is limited to providing the case level Global Trade Item Number only.   However, efficient supply chain practices which enable cross-docking, stock rotation and product traceability require that trading partners be able to exchange both static (GTIN) and dynamic shipment information beyond what the ITF-14 barcode provides today. **The GS1-128 barcode format is one option to enable the sharing of both static and dynamic product information by encoding additional attributes within the barcode.** A GS1 Application Identifier (AI) is the field of two or more digits at the beginning of an Element String that uniquely defines its format and meaning enabling the encoding of this additional product information.

This document is also intended to outline how the use of AIs can streamline business processes and improve product traceability and food safety in the supply chain. There are over 100 Application Identifiers that can be encoded into the GS1-128 barcode format. The GS1-128 barcode is capable of encoding a maximum of 48 characters, which includes the AI codes and their values. Given these inherent character limitations, companies must choose which Application Identifiers are most important for their particular products, customers, and corporate objectives. In order to provide guidance for product manufacturers on the most commonly used Application Identifiers, GS1 US and GS1 Canada are collaborating to develop recommendations for the voluntary adoption of the Application Identifiers (AIs) that provide the most value to trading partners across the supply chain. Adoption of a common set of Application Identifiers will drive efficiency across the industry by enabling product manufacturers to consistently identify finished product that is distributed across multiple trade channels. The use of AIs will also allow supply chain partners to access a broader range of product information which may enable more effecient supply chain management solutions and improved product traceability.

In addition to aligning on recommended Application Identifiers for communicating machine readable product information, it is equally important to align on required human readable, text-based case markings so that manufacturers can consistently identify finished product that is distributed to multiple trading partners and across multiple trade channels. For this reason, GS1 US and GS1 Canada are also collaborating to provide guidance to manufacturers on a common set of human readable case marking that are required on all case level-finished products.

It should be noted that while the **use of GS1-128 barcodes is not a required standard by all trading partners in the food supply chain**, these guidelines for the use of GS1-128 barcode and associated Application Identifiers (AIs) for case labeling is being recommended as a best practice for trading partners that choose to migrate to the GS1-128 barcode as a means to enable specific supply chain practices that they have agreed to implement. **Guidelines for human readable, text-based case marking are however representative of current GS1, industry and regulatory requirements, and should be adhered to by all product manufacturers.**

The industry acknowledges these guidelines will be accepted by trading partners who choose to implement the GS1-128 barcode on cases effective as of January 18, 2013 (initial publication date).

Note: This document will be updated periodically as additional best practices can be shared. The updated document will be located at www.GS1US.org/industries/cpg-grocery/tools-and-resources.

2.   Statement of Direction

This industry guideline reflects the collective desire of the North American consumer packaged goods, fresh food, grocery and foodservice industries to adopt a single standard for expressing human readable and machine readable product information with extended product attributes on cases. A consistent approach to case labeling minimizes supply chain costs and provides the greatest value to trading partners.

While one solution is to provide additional product information through the adoption of the GS1-128 barcode, it is recognized that a common standard for communicating human readable information is also needed in order to support certain supply chain practices across the industry.

This approach is intended to supersede other proprietary case labeling guidelines, which may have been proposed or implemented by trading partners across the industry. This guideline will replace the GMA document *Case Markings A Common Language for Shipping Cointainers.*

The common case labeling guidelines outlined in this document accommodate the need for both a core set of information for all product categories and incremental information that is applicable to specific product categories.

2.1.   Scope

This industry guideline applies to grocery and foodservice products that are distributed in finished cases in the United States or in Canada.

While non-food products are outside the scope of this industry guideline, companies trading non-food products should adopt this guideline if they should elect to implement the GS1-128 case label at any time in the future.

2.2.   Future Changes to this Guideline

The introduction of new collaborative supply chain practices may trigger the need for additional human readable and/or machine readable information to be provided on cases. These requests may be brought forward by any of the participating trade associations listed above or by individual trading partners. GS1 US and GS1 Canada will organize the necessary community of stakeholders to consider changes/additions to this guideline. Any changes to the guideline will be communicated throughout the industry and will respect the lead-time necessary to accomodate system and procedure changes.

3.   Common Industry Best Practice Recommendations

3.1.   Key Definitions

Human Readable Interpretation (HRI): Information that is used to replicate the structure and format of barcoded information. Characters, such as letters and numbers, which can be read by persons and are encoded in GS1- 128 barcodes. The Human Readable Interpretation is a one-to-one illustration of the encoded data, although the parenthesis that separate the Application Identifier within the HRI must not be encoded in the GS1-128 barcode. However, stop, start, shift and function characters, as well as the symbol check character, are not shown in the human readable interpretation.

Human Readable Text: Characters such as letters and numbers that can be read by persons and may or may not be encoded in GS1 barcodes and are not confined to a structure and format based on GS1 Standards (e.g., a date code expressed in a national format, brand owner name, consumer declarations).

3.2.   Case Information

Case labeling formats today vary by manufacturer. One of the objectives for this guideline is to provide guidance on common formats that meet the requirements of trading partners across the food supply chain. Case labeling includes both core information that is applicable to all products as well as incremental information and attributes that apply to specific product categories.

3.2.1. Core Case Labeling Information

All trade item cases should bear standard case markings that express the following core information.
Core case labeling information includes:

Data Element	Expressed as Human Readable Text	Expressed as Machine Readable Form + Human Readable Interpretation
Global Trade Item Number or GTIN	Yes	Yes
Batch/Lot or Serial Number	Yes	Yes

Product Date:
    Best Before/Best By/Sell By <u>or</u>
    Expiration/Use By <u>or</u>
    Production <u>or</u>
    Packaging
	Yes	Yes^

Brand Owner or Supplier Name	Yes	No
Product Name or Description	Yes	No

Figure 1 – Core case labeling information

^Note: Machine Readable + Human Readable Interpretation product date is REQUIRED by some trading partners for shelf stable or dry goods, however it is NOT a core requirement for some fresh food product categories. Please refer to Section 3.3 for more information on industry-specific core requirements.

For clarity, the following definitions apply to product dates:

Expression	**Definition**
Production Date	This date is the production or assembly date determined by the manufacturer. The date may refer to the trade item itself or to items contained. For fresh foods, this may be the packing or packaging date.
Packaging Date	This date is the date when the goods were packed as determined by the packager. The date may refer to the trade item itself or to items contained.
Best Before or Best By or Sell By Date	This date on the label or package signifies the end of the period under which the product will retain specific quality attributes or claims even though the product may continue to retain positive quality attributes after this date.
Expiration or Use By Date	Expiration date is used when the open date labeling (a date that is in a calendar format for easy reading rather than a coded date not decipherable by consumers) is directed to consumers. This date signifies the last date in which the quality attributes (i.e. nutrient content, color, flavour, texture) expected by the consumer are guaranteed. The product should not be marketed after this date. For food, the date will indicate the possibility of a direct health risk resulting from use of the product after the date, for pharmaceutical products, it will indicate the possibility of an indirect health risk resulting from the ineffectiveness of the product after the date). It is often referred to as "use by date" or "maximum durability date."

Since the product date is often related to the product Batch/Lot Number and because the product date is critical for inventory management and can be used to support product traceability, it should be included in human readable form on all finished cases. If GS1-128 barcodes are being used, then this same date information should also be included in machine readable form by using the appropriate Application Identifiers. It is most common to have one date code per product. The request to have multiple date code requirements would need to be addressed between trading partners.

The date type used should be selected based on the type of product being produced. Current industry practices for product dating are as follows:
- Date Requirements By Product Type:

    o **Minimally Processed, Refrigerated or Frozen Meat** – Use the Production Date, AI "11".

    o **Further Processed Foods** – If the process that you use alters the life of the product such as cooking or freezing a refrigerated product, the appropriate date is the Packaging Date, AI "13".

    o **Raw Materials and Ingredients** – These blends, intended for use in other processes, should be identified by the Expiration/Use By date, AI "17". By using an Expiration/Use By Date, the items can be produced to satisfy volume needs without regard for final use. The Expiration/Use By date should be calculated based on the oldest ingredient used to produce

the new product.

- Date Requirements By Date Type:
    - **Production Date** – To represent the actual production date, you should use the Production Date, AI "11". For uses that require you to know the age of refrigerated meat, this is an appropriate entry.

    - **Packaging Date** – This type of dating should be used if the process that you use alters the life of the product such as cooking or freezing a refrigerated product. With this type of situation the appropriate date is the Packaging Date, AI "13".

    - **Best Before/Best By/Sell By Date** – This type of date, AI "15", should be used on product destined for and that will be viewed by end customers. "The date represented should be the same as the description of the human readable date and should be agreed upon by the trading partners. Examples would be fresh tray pack items or frozen retail items.
    - **Expiration or Use By Date** – This type of date, AI "17", should be used in those industries where product is going to be used in another process. Its advantage is that it shows the user the last date a product can be used.

3.2.2 Use of Human Readable Text

Product manufacturers should provide case information in human readable text to maintain regulatory compliance and to support trading partners who are not able to scan barcode information. (Note: For additional human readable text guidelines within specific product levels, please refer to Section 3.3)

Human readable date information must be expressed in two parts:

Part 1 – One of the following printed date types:
- Best Before/Best By
- Expiration/Use By
- Production
- Packaging

Note: For distribution in Canada, both English and French translations are required, i.e. Best Before/Meilleur Avant.

Part 2 – How to read the date

GS1 Standards provide guidance on how to convey date and time in human readable format. This includes using the ISO 8601 Date Time global standard for human readable date format. The following details how date information is expressed:

- YYYY   = four-digit year
- MM   = two-digit month
- DD   = two-digit day of month

Expressed as "YYYY-MM-DD"
 (e.g. Best Before 2010-06-29, Best Before/Meilleur Avant 2010-06-29)

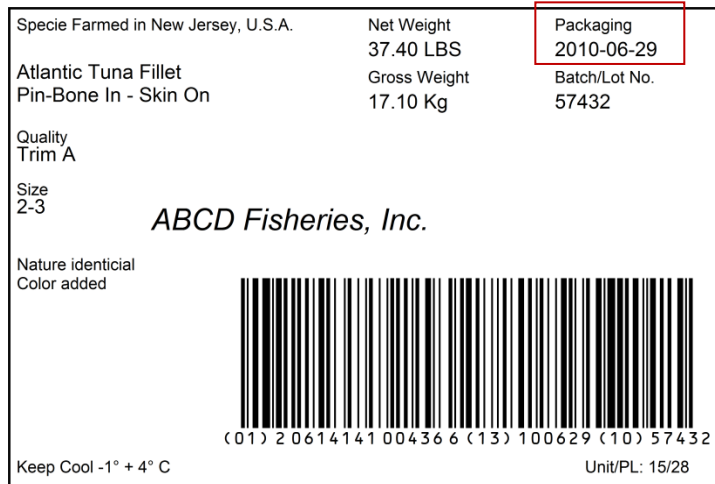Example June 29, 2010 is shown as 2010-06-29

Figure 2 – Example of human readable text on label

3.2.3 Use of the GS1-128 Barcode Symbology

The GS1-128 barcode symbology currently supports a wide range of data attributes including those described in this guideline. This symbology can be used to enable a wide variety of business use cases and supply chain capabilities.

Figure 3 - Sample GS1-128 barcode with GTIN (01), Best Before Date (15), and Batch/Lot Number (10)

For product manufacturers who have made the decision to implement GS1-128 barcodes on cases, the following Application Identifiers are recommended as a best practice. For a complete list of AIs that are part of this guideline, refer to Appendix A. Refer to Appendix B for information about GS1-128 barcode printing and symbol placement considerations.

Application Identifiers for Fixed Weight Products:

1. **AI (01) Global Trade Item Number** – The standard 14-digit number used to identify individual cases.

2. **AI (11) Production Date** – The Production Date is the production or assembly date determined by the manufacturer. The format for Production Date is YYMMDD. *Note: Appropriate product date can be used as an alternative for production date.*

3. **AI (10) Batch/Lot Number** – The Batch/Lot Number associates an item with information the manufacturer considers relevant for traceability of the trade item. The Batch/Lot Number is 1-20 characters and is alphanumeric. The number may be, for example, a production lot number, a shift number, a machine number, a time, or an internal production code.

Formats for Recommended AIs on Fixed Weight Products			
AI	Full Title	Format	Data Title
01	Global Trade Item Number	n2+n14	GTIN
11[1]	Production Date (YYMMDD)	n2+n6	PROD DATE
10[2]	Batch/Lot Number	n2+an...20	BATCH/LOT

[1]   When only year and month are required, DD must be filled with "00"
[2]   The Batch/Lot Number AI format should be generated by the manufacturer of the product for maximum traceability purposes and could include information such as production facility, date, time, line number, shift number etc. If a company has multiple manufacturing facilities, the lot number should include a unique plant identifier.

Figure 4 - Sample GS1-128 barcode with GTIN (01), Production Date (11), and Batch/Lot Number (10)

(01) 1 0614141 00734 6 (11) 121231 (10) A1B2C3D4
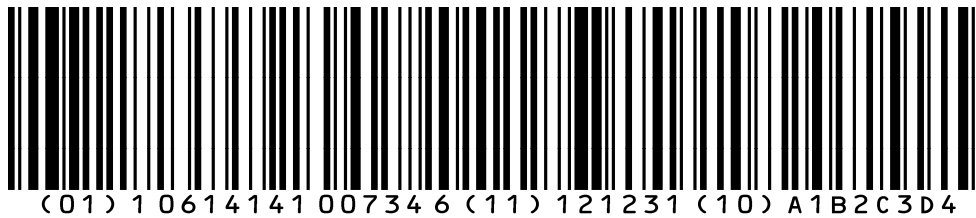
Application Identifiers for Random Weight Products:

1. **AI (01) Global Trade Item Number** – the standard 14-digit number used to identify individual cases. For variable measure trade items (random weight or count), the number '9' must be used in the first position of the GTIN.

2. **AI (3202) Net Weight** – the actual weight of the individual case to the hundredths of a pound.

3. **AI (10) Batch/Lot Number*** – The Batch/Lot Number associates an item with information the manufacturer considers relevant for traceability of the trade item. The Batch/Lot Number is 1-20 characters and is alpha-numeric. The number may be, for example, a production lot number, a shift number, a machine number, a time, or an internal production code.

Formats for Recommended AIs for Random Weight Products			
AI	**Full Title**	**Format**	**Data Title**
01	Global Trade Item Number	n2+n14	GTIN
3202	Net Weight in Hundredths of a Pound	n4+n4.n2	NET WEIGHT (lb)
10[1]	Batch/Lot Number	n2+an...20	BATCH/LOT

[1] The Batch/Lot Number AI format should be generated by the manufacturer of the product for maximum traceability purposes and could include information such as production facility, date, time, line number, shift number etc. If a company has multiple manufacturing facilities, the lot number should include a unique plant identifier.

Figure 5 - Sample GS1-128 barcode with GTIN (01), Net Weight (3202), and Batch/Lot Number (10)

(01) 9 0614141 00734 2 (3202) 001246 (10) A1B2C3D4

Additions/Exceptions to the Recommended Application Identifiers:

- **Dates:** In place **of AI 11** (Production Date), **AI 13** (Packaging Date) can be used for those products requiring additional "stages" of processing (e.g. - freezing or canning, etc.). **AI 15** (Best Before/Best By Date), and **AI 17** (Expiration Date/Use By) can also be used in place of **AI 11 t**o satisfy specific customer requests. The formats for all dates is YYMMDD.

- **Location: AI 414** (Global Location Number – Identification of a Physical Location) can be used to identify a single point of access with a physical address, such as a particular room in a building, warehouse, warehouse gate, loading dock, delivery point, cabinet, or a cabinet shelf, as well as operational locations such as EDI mailboxes.

- **Serial Numbers**:** Where appropriate, a supplier might also choose to include **AI 21** (Serial Number) in place of a Batch/Lot Number. Serial Numbers are 1-20 characters and are alpha-numeric.

***Note:** For operator or distributor of proprietary labeled products where the operator or distributor company prefix is being used, steps should be taken, through the manufacturer, to assure Serial Number uniqueness.*

Formats for Additional AIs			
AI	Full Title	Format	Data Title
11	Production Date	n2+n6	PROD DATE
13	Packaging Date (YYMMDD)	n2+n6	PACK DATE
15	Best Before Date (YYMMDD)	n2+n6	BEST BEFORE or BEST BY
17	Expiration Date (YYMMDD)	n2+n6	USE BY or EXPIRY
21	Serial Number	n2+an…20	SERIAL
414	Global Location Number (GLN)	n3+n13	LOC No

Figure 6 - Sample GS1-128 barcode with GTIN (01), Packaging Date (13), Expiration Date (17), and Serial Number (21)
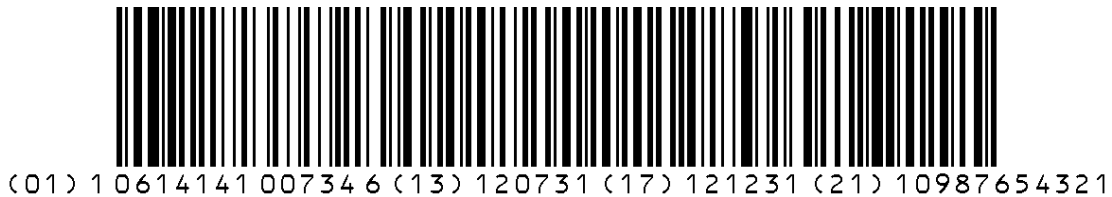

Figure 7 - Sample GS1-128 barcode with GTIN (01), Best Before Date (15), Net Weight (3202), Serial Number (21)

- **AI (01) 1061414100734** denotes the GTIN
- **AI (15) 110815** signifies a Best Before Date of August 15, 2011
- **AI (3202) 000500** denotes a net weight of 5.00 pounds
- **AI (21) HIJ12345** denotes the serial number.

3.3 Additional Guidance/Incremental Case Labeling Information for Category-Specific Requirements

Many countries regulate the information that must be printed on consumer items and on shipping cases. It is important that all trading partners are aware of regulations which may impact information required on shipping cases.

In Canada, when the shipping or master case can be sold as a consumer unit, all consumer labeling regulations apply. Details about consumer labeling are available online provided by the Canadian Food Inspection Agency: www.inspection.gc.ca/english/toce.shtml.

There are also product category specific requirements based on specific product needs. Examples of those requirements by category include:

3.3.1 Meat & Poultry

The Meat and Poultry B2B Data Standards Organization (mpXML) created and released an industry traceability implementation guideline in July 2010. This guideline provides best practices for managing product traceability at the shipment, pallet, case and consumer level, and is the tangible result of many industry representatives working together.

The minimum requirements for case level traceability are best satisfied by a combination of the GTIN and Batch/Lot or Serial Number. The chart below provides a summary of machine readable and human readable traceability attributes.

Data Element	Scan Length	Variable-Weight			Fixed-weight		
		Hmn Rdbl	Scan	ASN	Hmn Rdbl	Scan	ASN
Supplier Company Name	N/A	●			●		
Supplier Product Number /Item Reference	N/A	●			●		
Case-Level Product Description	N/A	●			●		
Global Trade Item Number (GTIN) AI "01"	2+14		●	●		●	●
Batch/Lot Number AI "10"	2+12 max	●	●*	●	●	●*	●
Serialized Case Code AI "21"	2+12 max		●*	●^		●*	●^
Product Date AI "11", "13", "15", "17"	2+6	●	●	●	●		
Net Weight AI "3202"	4+6	●	●	●	●#		
Hmn Rdbl = Human Readable label text; Scan = Barcoded; ASN = Advance Ship Notice/Ship Notice Manifest; AI = Application Identifier							
* = Use Serial Number when present on case and useful for traceability and use Batch/Lot Number if no Serial Number present on case.							
^ = Include Serial Number when present on case and useful for traceability.							
# = For fixed weight products, net weight may be shown as (1) the total net weight of the case (i.e. Net Weight: 10 Lbs.) or (2) the total number of inner units and the net weight of each (i.e. Contains 10 units, 1 Lb Each).							
Note: As stated earlier, per GS1 Standards, the maximum field length for AI 10 and AI 21 is 20 alphanumeric characters, however, the reduced limits above ae necessary due to the additional data elements included in the barcode.							

Additional attributes for meat and poultry

| Attribute	Expressed as Human Readable Text	Expressed as Machine Readable Form + Human Readable Interpretation
Country of Origin**	Yes	No
USDA Establishment number (as required for product traded in the US)	Yes	No
** For covered commodities as defined by the United States Agricultural Marketing Act of 1946, as amended by the 2002 Farm Bill, 2002 Supplemental Appropriations Act, and 2008 Farm Bill.		

Specific label examples:
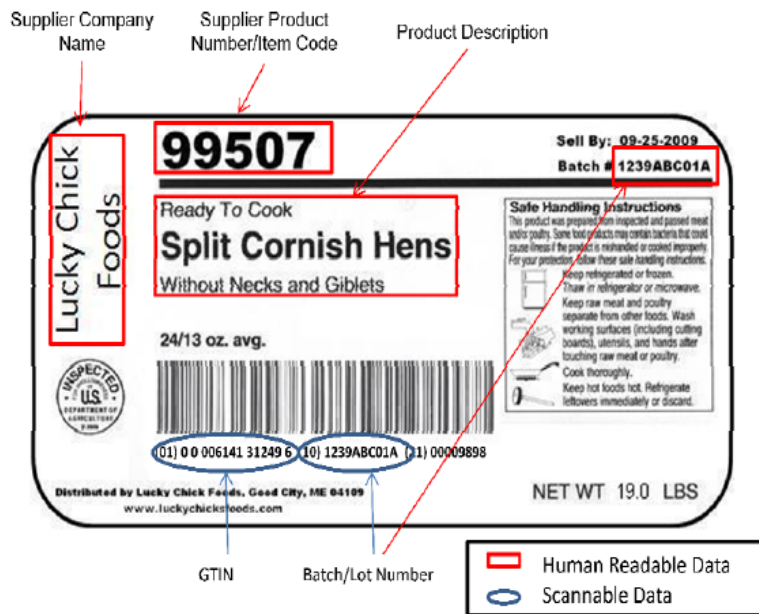
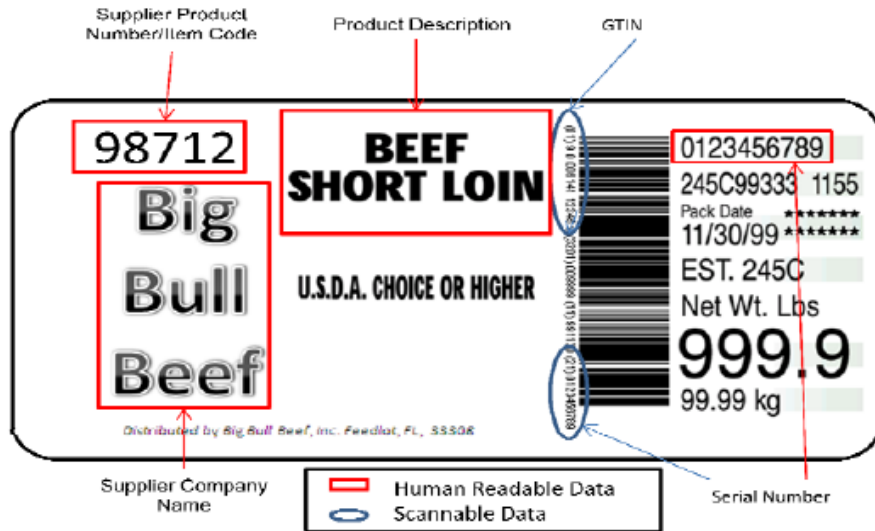**Figure 8 - Case label example for fixed weight meat and poultry product.**

Figure 9 - Case label example for variable weight meat and poultry product.

3.3.2 Seafood

The National Fisheries Institute (NFI) and GS1 US created and released an industry traceability implementation guideline for the industry in March 2011. This guideline provides best practices for managing product traceability at the shipment, pallet, case and consumer level, and is the tangible result of many industry representatives working together.

The minimum requirements for case level traceability are best satisfied by a combination of the GTIN and Batch/Lot or Serial Number. The chart below provides a summary of machine readable and human readable traceability attributes.

Data Element	Scan Length	Variable-Weight			Fixed-Weight		
		Hmn Rdbl	Scan	ASN	Hmn Rdbl	Scan	ASN
Supplier Company Name	N/A	●			●		
Case-Level Product Description	N/A	●			●		
Global Trade Item Number (GTIN) AI "01"	2+14	●	●	●		●	●
Batch/Lot Number AI "10"	2+12 max	●	●*	●	●	●*	●
Serialized Case Code AI "21"	2+12 max		●^	●		●^	●
Product Date AI "11", "13", "15", "17", "XX"	2+6	●			●		
Net Weight AI "3202"	4+6	●	●	●	●#		
Hmn Rdbl = Human Readable label text; Scan = Barcoded; ASN = Advance Ship Notice/Ship Notice Manifest; AI = Application Identifier;							
* = Use Serial Number when present on case and useful for traceability and use Batch/Lot Number if no Serial Number present on case;							
^ = Include Serial Number when present on case and useful for traceability							
# = For fixed weight products, net weight may be shown as (1) the total net weight of the case (i.e. Net Weight: 10 Lbs.) or (2) the total number of inner units and the net weight of each (i.e. Contains 10 units, 1 Lb Each).							
Note: As stated earlier, per GS1 Standards the maximum field length for AI 10 and AI 21 is 20 alphanumeric characters, however, there are different max levels when used for seafood items due to the additional requirements stated above.							

Additional attributes for seafood

Attribute	Expressed as Human Readable Text	Expressed as Machine Readable Form + Human Readable Interpretation
USDA Establishment number (as required for product traded in the U.S.)	Yes	No
Country of Origin**	Yes	No
** For covered commodities as defined by the United States Agricultural Marketing Act of 1946, as amended by the 2002 Farm Bill, 2002 Supplemental Appropriations Act, and 2008 Farm Bill.		

```
Specie Farmed in New Jersey, U.S.A.      Net Weight        Use-By Date
                                          37.40 LBS         June 29, 2010
Atlantic Tuna Fillet                      Gross Weight      Batch/Lot No.
Pin-Bone In - Skin On
                                          17.10 Kg          57432
Quality
Trim A

Size
2-3                       ABCD Fisheries, Inc.

Nature identicial
Color added


      ||||||||||||||||||||||||||||||||||||||||||||||||||

  (01) 9 06141 41 00436 5 (17) 100629 (3201) 000374 (30) 02 (10) 57432
Keep Cool -1° + 4° C                                    Unit/PL: 15/28
```

Figure 10 - Case label example for seafood product

3.3.3 Produce

The Canadian Produce Marketing Association (CPMA), GS1 US, Produce Marketing Association (PMA), and United Fresh Produce Association (UFPA) are administering organizations for the U.S. Produce Traceability Initiative. These associations worked with industry stakeholders to create and release a case label best practice guideline for the community. The minimum requirements for case level traceability are best satisfied by a combination of the GTIN and Batch/Lot Number. Additional case information may be exchanged between trading partners and these options are summarized in the table below. For guidance on using voice pick codes, please refer to Section C of the Appendix. The chart below provides a summary of machine readable and human readable traceability attributes.

Data Element	Scan Length	Variable-Weight			Fixed-Weight		
		Hmn Rdbl	Scan	ASN	Hmn Rdbl	Scan	ASN
Supplier Company Name	N/A	•			•		
Product Name, Variety, Size, Count	N/A	•			•		
Global Trade Item Number (GTIN) AI "01"	2+14	•	•	•	•	•	•
Batch/Lot Number AI "10"	2+20 max	•	•	•	•	•	•
Voice Pick Code	N/A	•			•		
Product Date AI "13" or "15"	2+6	•	•^		•	•^	

Hmn Rdbl = Human Readable label text; Scan = Barcoded; ASN = Advance Ship Notice/Ship Notice Manifest; AI = Application Identifier;

^ = In the case where a shed packer elects to cross a date boundary on a Batch/Lot Number, a Pack/Harvest Date (AI 13) or Best Sell By Date (AI 15) should be encoded following the Batch/Lot Number in the GS1-128 barcode with the appropriate Application Identifier (AI)

Additional attributes for produce

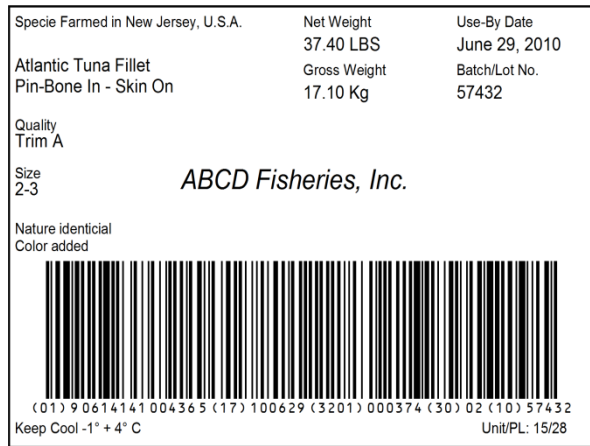| Attribute	Expressed as Human Readable Text	Expressed as Machine-Readable Form + Human-Readable Interpretation
Country of Origin**	Yes	No
** For covered commodities as defined by the United States Agricultural Marketing Act of 1946, as amended by the 2002 Farm Bill, 2002 Supplemental Appropriations Act, and 2008 Farm Bill.		

Figure 11 - Case label example for produce product

3.3.4 Dairy, Deli, & Bakery

GS1 US is currently working with the International Dairy, Deli, & Bakery Association (IDDBA) and the International Dairy Foods Association (IDFA) to create a traceability implementation guideline for the industry, which is scheduled to be released in early 2013. This guideline provides best practices for managing product traceability at the shipment, pallet, case and consumer level, and is the tangible result of many industry representatives working together.

The minimum requirements for case level traceability are best satisfied by a combination of the GTIN and Batch/Lot or Serial Number. The figure below provides a summary of machine readable and human readable traceability attributes.

Data Element	Scan Length	Variable-Weight			Fixed-Weight		
		Hmn Rdbl	Scan	ASN	Hmn Rdbl	Scan	ASN
Supplier Company Name	N/A	•			•		
Case-Level Product Description	N/A	•			•		
Global Trade Item Number (GTIN) AI "01"	2+14	•	•	•		•	•
Batch/Lot Number AI "10"	2+12 max	•	•	•	•	•	•
Case Count AI "30"	2+8 max		•	•		•	•
Product Date AI "15"	2+6	•	•	•	•	•	•
Hmn Rdbl = Human Readable label text; Scan = Bar Coded; ASN = Advance Ship Notice/Ship Notice Manifest; AI = Application Identifier;							
Note: As stated earlier, per GS1 Standards the maximum field length for AI 10 and AI 21 is 20 alphanumeric characters, however, there are different max levels when used for dairy/deli/bakery items due to the additional requirements stated above.							

Figure 12 - Case label example for dairy, deli, bakery product

3.3.5 Other

Other categories, such as shelf stable and dry goods, which are defined as products that can subsist at an ambient temperature (not too hot, not too cold), do not have industry traceability guidelines. The purpose of this guideline is to provide guidance for case labeling on shelf stable products to enhance traceability processes. Please refer to Section 3.2.1 of the guidelines for core case labeling information.

4   Application of Case Labels

4.1   Supplier Implementation Considerations

Printing Specifications: For linear barcodes with unattended, fixed position scanner applications in general distribution, the GS1 General Specifications recommended a narrow bar width of .0195 inches (0.495 mm) with a barcode height of 1.25 inches (32.0 mm). For linear barcodes with attended, hand held scanner applications, the GS1 General Specifications recommended a narrow bar width of .0104 inches (0.264 mm), with a barcode height of .50 inches (12.7 mm). For more information on how to properly create GS1-128 barcodes, see Section 5.5 - Barcode Production and Quality Assessment of the GS1 General Specifications.

Function Code 1 (FNC1): The Function Code 1 in the first position following the Start Character of a Code-128 Symbol is at all times a reserved use, which identifies the GS1 System information within a GS1-128 Symbol. In the case of separating multiple variable-length element strings, the delimiter shall be a Function 1 (FNC1) character.

Edge Rule : When possible, the barcode must not be closer than .3 inches (8 mm) or farther than 4 inches (100 mm) from the nearest edge of the package/container. Previous guidelines suggested a distance of .2 inches (5 mm) as a minimum. Practical experience has shown this to be inadequate. For example, cashiers often grab the edges of bags and other trade items with their thumbs. Avoid placing the barcode too close to the edge.

Symbol Placement: For cartons and outer cases, symbol placement will vary slightly in practice. However, the target placement for the bottom of the barcode symbol is 1.25 inches (32 mm) from the natural base of the item, assuming a barcode height of 1.25 inches (32 mm), which results in a center line of 1.875 inches (47.6 mm) from the base of the item. The barcode height may vary, but the target centerline should remain the same. The symbol including its Quiet Zones should be at least .75 inches (19 mm) from any vertical edge to avoid damage. Symbol placement guidelines are the same, irrelevant of the data carrier selected. The ITF-14 and GS1-128 barcode labels have identical placement guidelines.
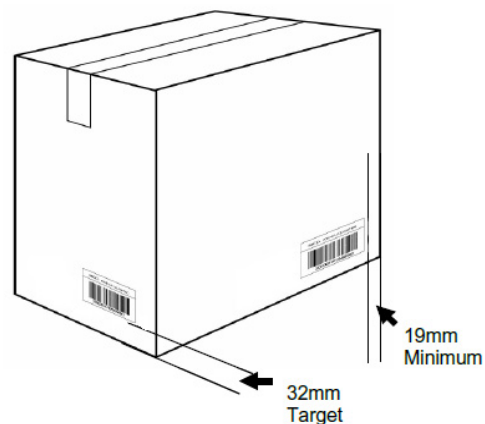

Figure 13A – Symbol placement

If the height of a case or tray is less than 2 inches (50 mm), making it impossible to print a full height barcode with the HRI below the bars, or if the construction of the unit is such that the full symbol height cannot be accommodated, the following options should be considered in this order of preference:
* Place the HRI to the left of the symbol, outside the compulsory Quiet Zones.

Figure 13B – Symbol placement

- When the height of the unit is less than 1.25 inches (32 mm), the symbol may be placed on the top of the package. The symbol should be placed with the bars perpendicular to the shortest side, no closer than .75 inches (19 mm) from any edge.

Whether a GS1 barcode encodes a GS1 identification number, GS1 product attribute, or a combination of both, the HRI should be placed below the barcode and grouped together wherever physically possible while maintaining the HRI legibility and minimum barcode height (as specified in the appropriate Symbol Specification Table referenced by the GS1 AIDC Application Standard).

Figure 14A - GS1-128 Barcode

If the HRI for GS1 identification numbers and GS1 product attributes is split (for example GS1 identification number HRI is below the barcode and GS1 product attributes HRI is above the barcode), the preference for GS1 identification number HRI placement is always below the barcode. Parentheses shall surround AIs in HRI but are not encoded in the GS1-128 barcode. See example in Figure 14

Figure 14B - GS1-128 Barcode

4.2   Buyer Implementation Considerations

For industry buyers to implement the capability to utilize the GS1-128 barcode on cases, there are three areas of consideration.

1. **Hardware:** Scanners used in warehouse operations would need the ability to scan the GS1-128 barcode. Most scanners available and currently in use today have the ability to read the GS1-128 barcode. If you have scanners today for your operations, we recommend you validate if it has the capability to read the GS1-128 barcode as it may have the capability, but is disabled for current use.

2. **Software:** When scanning the GS1-128 barcode, the warehouse management system in use will need the ability to read and store the additional information that is encoded in the GS1-

128 barcode. When scanning the ITF-14 these systems only read and need to store the 14 digit GTIN. However, since other data elements are encoded into the GS1-128 barcode, the software being used will need to accommodate additional data fields to capture the data encoded, such as Batch/Lot/Serial Number and specific dates.

3. **Business Processes:** Utilizing the GS1-128 barcode will require business process changes to current warehouse operations, such as receiving, shipping, and inventory management. We recommend that companies consider the advantages the additional data the GS1-128 barcode provides, and determine how this data will be utilized in the system to understand the full impact on current business processes within the company's operations.

5   Summary

Companies within the North American consumer packaged goods, fresh food, grocery and foodservice industries have determined that there is a collective need and intention to develop a single and consistent standard for expressing human and machine readable product on cases. As a result, representatives from each of these industries, along with trade organizations have worked collaboratively to develop the *North American Industry Guidance for Standard Case Code Labelingfor Extended Product Attributes.* The purpose of this document is to provide "how to" guidance and best practice recommendations for implementing GS1-128 barcodes for case labeling of products in the food industry taking into consideration common business practices and various supply chain processes. The guide outlines:

- Basic definitions needed to understand and implement standardized product case labeling

- Use of human readable text for labels

- Use of the GS1-128 barcode symbology

- Additional guidance for category-specific requirements

- Technical considerations for the application of case labels, including printing specifications and symbol placement

The *North American Industry Guidance for Standard Case Code Labeling for Extended Product Attributes* is an ever-evolving document that needs to reflect process changes, regulatory requirements and technological developments taking place in industry. As industry stakeholders deepen their implementation efforts to use GS1-128 barcodes on cases, they may identify issues that can potentially affect the guidance and best practice recommendations offered in this document. These issues will be addressed by periodic updates to the document to ensure timeliness and maximum value to industry.

The adoption of the guidance offered in this document is voluntary by industry participants, and the level of rigor to which companies will adhere to the guidance should be determined by the trading partners on a case by case basis.

Appendix A - Application Identifiers Recommended for GS1-128

When a fixed-length GS1 Key and attributes are encoded together, the GS1 Key should appear before the attributes. In most cases fixed-length element strings should be followed by variable-length element strings. The sequence of fixed-length and variable-length element strings should be at the discretion of the brand owner.

Example: The featured model encompasses a fixed-length element string, GTIN (01) & Expiration (17), followed by a variable-length element, Serial Number (21): (01)006141419996 (17)121231 (21)98765.

In this instance, since the example is following the fixed-length to variable -length sequence, only one Function code 1 (FCN1) is required at the beginning of the data string.

The next featured model encompasses a fixed-length element, GTIN (01), to a variable-length element, Serial Number (21), ending with a fixed-length element, Expiration (17): (01)006141419996 (21)98765 (17)121231

In this instance, while still being standards compliant, the example is not following the fixed-length to variable-length sequence Two Function Code 1's would be required; one at the beginning of the example and one directly following the Serial Number (21). Since the barcode would now feature two FNC1's, the barcode may expand in length.

Utilizing the example from above:

[START]**[FNC1]**01 00614141999996 21 98765 **[FNC1]** 17 121231

AI	Name	Format	Date Title
01	Global Trade Item Number	n2+n14	GTIN
10	Batch/Lot Number	n2+an...20	BATCH/LOT
11	Production Date (YYMMDD)	n2+n6	PROD DATE
13	Packaging Date (YYMMDD)	n2+n6	PACK DATE
15	Best Before/Best By Date (YYMMDD)	n2+n6	BEST BEFORE
17	Expiration/Use By Date (YYMMDD)	n2+n6	USE BY OR EXPIRY
21	Serial Number	n2+an...20	SERIAL
414	Global Location Number (GLN)	n3+n13	LOC No
3202	Net Weight in Hundredths of a Pound	n4+n4.n2	NET WEIGHT (lb)

# Appendix B - Technical Implementation Considerations for GS1-128

Additional Use Case Examples

Sample case label showing use of GS1-128 barcode and human readable text to communicate GTIN (01), Batch/Lot Number (10) and Production Date (11)
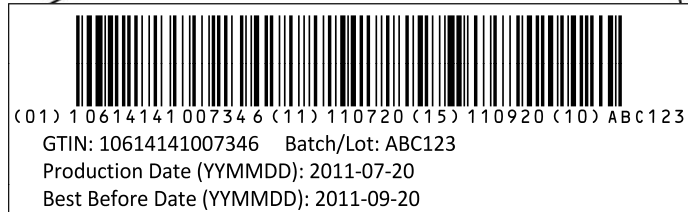
Sample case label showing use of GS1-128 barcode and human readable text to communicate GTIN (01), Batch/Lot Number (10), Production Date (11) and Best Before Date (15)
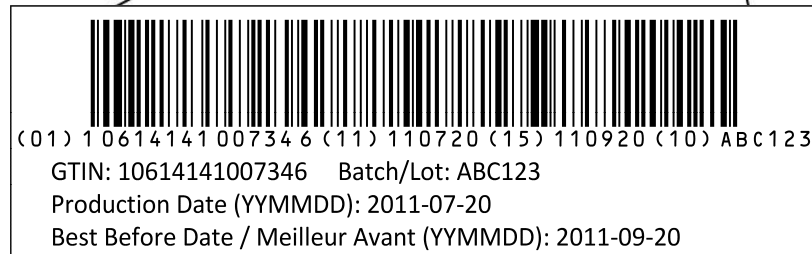
Sample case label showing use of GS1-128 barcode and human readable text to communicate GTIN (01), Batch/Lot Number (10), Production Date (11) and Best Before Date (15) as well as both English and French translations which are required when distributing to Canada

Appendix C - GS1-128 Print quality Guidance

Below is a summary of print quality grading parameters. Details are found in the GS1 General Specifications.

ISO Print Quality Grading Chart - Barcode verifiers provide grades that **report against** the ISO Standard ISO/IEC 15416 and **conform to** ISO/IEC 15426-1.

ISO/IEC Grade	ANSI Letter Equivalent	
≥ 3.5	A	
≥ 2.5 and < 3.5	B	
≥ 1.5 and < 2.5	C	
≥ 0.5 and < 1.5	D	**Does not conform to the GS1 Standards for the GS1-128 barcode**
< 0.5	F	

Parameters for GS1/ISO Print Quality Grading[1]

List of nine specific areas that affect print quality and their definitions can be found in ISO/IEC 15416 or the AIM (Association for Automatic Identification and Mobility[2]) Layman's Guide to ANSI, CEN, and ISO Barcode Print Quality Documents:

1. Edge Determination (ED)
2. Minimum Reflectance (R_{MIN})
3. Minimum Edge Contrast (EC_{MIN})
4. Symbol Contrast (SC)
5. Modulation (MOD)
6. Defects (DEF)
7. Decodability (DEC)
8. Decode (DCD)
9. Quiet Zones (QZ)

Levels Needed to Achieve Minimum Print Quality Grading

Shaded are the technical specifics for each of the nine parameters needed to achieve a 1.5 overall print quality grade for a GS1-128 symbol:

Grade	ED	R_{MIN}	EC_{MIN}	SC	MOD	DEF	DEC	DCD	QZ
4.0	PASS	≤ 0.5 * R_{MAX}	≥ 15%	≥ 77.5%	≥ 75%	≤ 12.5%	≥ 68%	PASS	PASS
3.0				≥ 62.5%	≥ 65%	≤ 17.5%	≥ 56%		
2.0				≥ 47.5%	≥ 55%	≤ 22.5%	≥ 43.5%		
1.5				≥ 40%	≥ 50%	≤ 25%	≥ 37%		
1.0				≥ 30%	≥ 45%	≤ 27.5%	≥ 31%		
0.0	FAIL	> 0.5 * R_{MAX}	< 15%	< 10%	< 35%	> 32.5%	< 19%	FAIL	FAIL

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[1] Details and definitions for the nine parameters on print quality can be found in Section 3 of AIM Layman's Guide ANSI-CEN-ISO and Section 5.4 of ISO/IEC 15416 (2000) ED1

[2] AIM Website: http://www.aimglobal.org/

Appendix D - Voice Pick Code Guidance

The Produce Traceability Initiative created a voice pick code for use on case labels. This guidance is not specific to produce and can be utilized for other product categories. The voice pick code is a 4-digit number computed using the GTIN, Batch/Lot Number and optional Date from a case label representing a hash of this information. This computation is performed as follows:

1. Compute Plain Text:
    a. Plain Text is the 14-digit GTIN appended by the Batch/Lot Number and the Date (where present) in that order.
    b. Do not include the Application Identifier, prefixes or parentheses.
    c. Do not include spaces between the GTIN, Lot and Date fields.
    d. Date, if present, is presented in YYMMDD format, with zero packing and no "/" characters
2. Compute ANSI CRC-16 Hash of the Plain Text ASCII bytes using the standard CRC-16 hash with the polynomial of $X^{16} + X^{15} + X^2 + 1$
3. Compute the voice pick code from the Hash by taking the four least significant digits in decimal form (Hash mod 10000).
4. Print the two least significant digits large, and the most significant digits small.
5. Example: This input data:
    GTIN = (01) 10850510002011,
    Batch/Lot Number = (10) 46587443HG234,
    Plain Text = 1085051000201146587443HG234
    CRC-16 Hash = 26359
    Yields this result:
    Voice pick code – 6359
    Large Digits = 59
    Small Digits = 63

Per the PTI voice pick code (CRC-16 Hash) should be included in the lower right hand corner of the case label for produce products.