



The Global Language of Business

North American Industry Guidance for Standard Case Code Labeling

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1 Purpose of this document

The purpose of The North American Case Labeling Guideline is to provide best practices for case labeling information for finished products in the grocery and foodservice sectors related to the GS1-128 symbol. This document also takes common business practices and various supply chain processes into consideration. These guidelines have been developed with input and participation from all segments of industry through a collaborative process.

! Important: As with all GS1 Standards and solutions, this guideline is voluntary, not mandatory. It should be noted that use of the words “must” and “require” throughout this document relate exclusively to technical recommendations for the proper application of the standards to support the integrity of your implementation.

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)*
- The Food Industry Association (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)*
- International Fresh Produce Association (IFPA)
- Retail Council of Canada (RCC)*
- National Restaurant Association (NRA)*
- National Fisheries Institute (NFI)

*These associations were part of the 2014 Version of this Guideline.

Other GS1 data carriers that can be considered for case labeling include RFID and two-dimensional (2D) barcodes. For more information, visit: [EPC Tag Data Standards \(TDS\)](#) and [GS1 Data Matrix Guideline](#).

1.1 Why these guidelines are needed

The consumer-packaged goods (CPG) industry has traditionally used the information printed on case-level labels to facilitate the distribution of goods from the manufacturer through the supply chain to retail stores or foodservice operators. This information has been provided using both human readable text and machine-readable data carriers. The most widely used data carrier in general distribution to date has been the GS1® Interleaved 2-of-5 (ITF-14). While the ITF-14 is common, it is limited to providing the case-level Global Trade Item Number® (GTIN®) only and cannot carry additional information. However, efficient supply chain practices that enable cross-docking, stock rotation, product traceability, and regulatory compliance require that trading partners be able to exchange both static (i.e., GTIN) and dynamic shipment information beyond what the

ITF-14 barcode provides. 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.

This document is also intended to outline how the use of GS1 Application Identifiers (AIs) can streamline business processes and improve product traceability, regulatory compliance, and food safety in the supply chain. There are over 180 AIs in the GS1 system, but each GS1 data carrier has different data-carrying capacities and implementation considerations. For example, the GS1-128 barcode can encode a maximum of 48 characters, which includes the AI codes and their values, and excludes the parentheses. Given these inherent character limitations, companies must choose which AIs are most important for their products, customers, and corporate objectives. GS1 US and GS1 Canada have collaborated to develop recommendations for the voluntary adoption of the AIs that provide the most value to trading partners across the supply chain. Adopting a common set of AIs will drive efficiency across the industry by enabling product manufacturers to consistently identify finished products that are 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 efficient supply chain management solutions and improved product traceability. Other advanced data carriers, such as RFID and 2D data carriers, use these same AIs.

In addition to aligning on recommended AIs for communicating machine-readable product information, it is equally important to align on the human readable interpretation (HRI). HRI is the human readable text that matches what is encoded in the barcode or RFID tag. The HRI does not include the additional human readable text on the package, label, or item, known as non-HRI. For additional information on HRI and non-HRI see [GS1 General Specifications section 4.15](#). GS1 Canada are also collaborating to provide guidance to manufacturers for a common set of human readable case marking for all case-level finished products.

It should be noted that 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 the GS1-128 barcode and associated AIs for case labeling are being recommended as a best practice for trading partners that choose to migrate to the GS1-128 barcode to enable specific supply chain practices. These guidelines for human readable, text-based case marking are representative of current GS1 Standards, industry requirements, and regulatory requirements, and therefore should be adhered to by all product manufacturers. Regardless, all regulatory requirements should be adhered to by all product manufacturers in all circumstances.

Trading partners that choose to implement the GS1-128 barcode on cases can look to this guideline, which was developed in consensus with the GS1 US community and other specific industry guidance. It is also important to consider data sharing best practices. Please reference the [EDI 856 Foodservice ship notice explained which is a summary of GS1 US ASN 7050 Guideline Summary](#) or go to [mygs1us.org](#) for steps to access the full ASN Guideline: UCS v7050 - Foodservice.pdf please go to [Additional Resources](#) in this document.

1.1.1 Barcode Print Quality

A consistent, high-quality case-level labeling process enables trading partners within the supply chain to capture product information and track a product by lot/batch. This will help enable targeted and precise recalls in the event of a food safety issue and will open full end-to-end supply chain visibility for other process improvements, such as inventory management, sustainability, and transparency.

To utilize the full benefits of case labeling, it is imperative that manufacturers, or any other entity creating the case labels, implement rigorous barcode data and readability quality checks in each of the plants, lines, or printers where a product will be manufactured. Approval of the label accuracy and scanability should be given before production begins.

Ongoing printer maintenance and monitoring will be needed to maintain high quality and consistency. Also, careful consideration should be given to the type of material on which the barcode is printed. White labels are proven to work best. Directly printing case labeling information on corrugate has been known to cause readability issues and high maintenance costs, as the printer needles need to be constantly cleaned to avoid smearing the ink.

Other key considerations:

- GS1-128 is not the same as Code 128. GS1-128 is a subset of Code 128 that uses an FNC1 character to enable it to carry GS1 element strings. Barcodes should be tested to ensure the required FNC1 is present, and the AIs are properly formatted.
- Human readable parentheses should not be included in the actual barcode.
- The 48 data-character maximum limit should always be confirmed.

For further information on GS1-128 barcodes, please see [GS1 General Specification section 5.2](#) Linear barcodes - GS1-128 symbology specifications.


1.2 Key for Application Identifier Notations

The notations for AI formats throughout this document indicate the format and length of the AI, plus (+) the format and length of the data value. For example, the format for AI (17) for an expiration date is N2+N6. For more information on additional AIs and formats, please reference [GS1 General Specifications section 3](#).

In these notations:

- n = implied decimal point
- N = numeric digit
- X = character (includes numbers, letters, and some special characters)
- N3= 3 numeric digits, fixed length
- X3 =3 characters, fixed length
- N..3 = up to 3 numeric digits
- X..3 = up to 3 characters

Figure 1 Example of GS1-128 Barcode with AIs in HRI

 Note: Parentheses are not counted as part of the 48 data-character maximum limit and shall not be encoded



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 and machine-readable product information with extended product attributes on cases. A consistent approach to case labeling and data sharing practices 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 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.

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 applies 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 and Canada.

While non-food products are outside the scope of this industry guideline, it is recommended that companies trading non-food products adopt this guideline if they elect to implement the GS1-128 case label.


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. GS1 US and GS1 Canada will continue to work with the community of stakeholders to consider changes/additions to this guideline. Any changes to the guideline will be communicated throughout the industry.

3 Common Industry Best Practice Recommendations

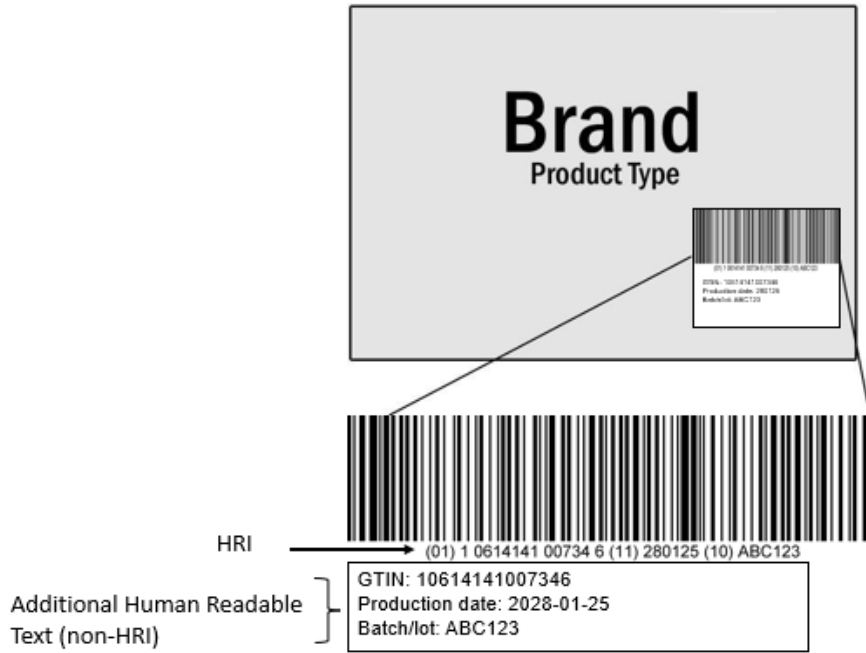
3.1 Key Definitions

Human Readable Interpretation (HRI): HRI refers to the characters printed below, beside, or above a barcode or tag that is encoded in the barcode or tag. It is a one-to-one illustration of the encoded data within the barcode that serves as a fallback option in situations where there is a need to manually interpret or process encoded data. The HRI rules enable industry to create consistent packaging designs that can be distributed to multiple countries and used in the same way.

 **Note:** The parentheses () that separate the AI code within the HRI are not encoded in the barcode. Additionally, the stop, start, shift, function characters, and symbol check character are not shown in the HRI.

Additional Human Readable Text (non-HRI text): These are characters, such as letters and numbers, that can be manually interpreted. Additional human readable text that may or may not relate to information encoded in GS1 barcodes and is not confined to a structure and format based on GS1 Standards. This may include a date code expressed in a national format, brand owner name, or consumer declarations. More information on the HRI and non-HRI text can be found in [GS1 General Specifications section 4.15](#).

Figure 2 Sample Case Label with a GS1-128 Barcode



3.2 Case Information

Case-labelling formats vary by manufacturer, industry, and trading partners. One of the objectives of this document is to provide guidance on common date formats and types that meet the requirements of trading partners and regulations across the food supply chain. Case labeling includes both core information that applies to all products, as well as incremental information and attributes that apply to specific product categories and industries.

3.2.1 Core Case Labeling Information

All trade item cases should bear standard case markings that express the following core information. Reference [Appendix A - Application Identifiers Recommended for GS1-128 Barcodes](#) for further information on the formats for these AIs. Core case labeling information includes:

Table A. Core Case Labeling Information

Data Element	Expressed as Human Readable Text	Expressed as Machine-Readable Form/Barcode + HRI
Global Trade Item Number (GTIN)	Yes	Yes
Batch/Lot or Serial Number	Yes	Yes
Brand Owner or Supplier Name	Yes	No
Product Name or Description	Yes	No

! Note: The product date is REQUIRED in the Machine-Readable + Human Readable Interpretation 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.

Table B. List of Product Dates and their Definitions

Expression	Definition
AI (11) for 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.
AI (13) for Packaging Date	This reflects 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.
AI (15) for Best Before Date (best before or best by)	The best before date, also known as best before date or best by 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).
AI (16) for Sell by Date	The sell by date indicates the date specified by the manufacturer as the last date the retailer is to offer the product for sale to the consumer. The product should not be merchandised after this date.

Expression	Definition
AI (17) for Expiration Date (use by or expiry)	<p>The expiration date, also known as use by or expiry, is used when the open date labeling is directed to consumers (i.e., a date that is in a calendar format for easy reading, rather than a coded date not decipherable by consumers). This date signifies the last date in which the quality attributes (e.g., nutrient content, color, flavor, texture, etc.) expected by the consumer are guaranteed. The product should not be marketed after this date.</p> <p>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."</p>

Because the product date is often related to the product batch/lot number, is critical for inventory management, and supports product traceability, it should be included in additional human readable text (non-HRI) form on all finished cases. If GS1-128 barcodes are being used, then this same date information should also be included in the machine-readable form by using the appropriate AIs. It is a best practice to have one date code per product to align with the human readable text on the case. The request to have multiple date code requirements would need to be addressed between trading partners.

The date expression can be selected based on the type of product being produced. Note in the HRI that the AI will be enclosed in parentheses, however, parenthesis should not be encoded in the barcode. Current industry practices for product dates are as follows:

Date Requirements by Product Type:

- Production date – This represents the date the item was produced, such as indicating the age of refrigerated, processed, or frozen meat or for some further processed foods. Here, production date AI (11) is used.
- Packaging date – This type of date labeling applies to unprocessed fresh foods or if the processing method used alters the life of the product, such as cooking or freezing a refrigerated product. Use packaging date AI (13) or production date AI (11) to indicate this information.
- Best before date (best by date) – For products that are destined for, and viewed by, end customers, AI (15) for best before date is appropriate for use. The date represented should be the same as the description on the HRI and should be agreed upon by the trading partners. Examples include fresh tray pack items or frozen retail items.
- Sell by date – Sell by date, represented by AI (16), should be applied by the retailer to indicate the last date the product can be merchandised.
- Expiration date (use by or expiry) – The expiration date states the last date the product can be used and is represented by AI (17). The expiration date for raw materials and ingredients (blends) intended for use in other processes, should also be identified by AI (17). By using an expiration date, the items can be produced to satisfy volume needs for a certain time period. AI (17) should be calculated based on the oldest ingredient used to produce the new product.
- For additional information on AIs see [GS1 General Specifications section 3](#). For sector specific date labeling requirements please see [section 3.3](#) of this document.

! IMPORTANT: The dates and date formats should match on all packaging hierarchies. For example, the outer case should be the same as the inner packs and individual items that end customers need to reference. If the inner pack dates vary, then the date on the case or higher level of packaging needs to match the one that represents the shortest shelf life.


3.2.2 Use of Additional Human Readable Text (Non-HRI)

Product manufacturers should provide case information in the human readable text to maintain regulatory compliance and to support trading partners who are not able to scan barcode information. This is referred to as “Non-HRI” in the GS1 General Specifications. (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 – Use one of the Following Printed Date Types that Correspond to the Correct AI:

- For AI (11), refer to additional human readable text: production date
- For AI (13), refer to additional human readable text: packaging date
- For AI (15), refer to additional human readable text: best before/best by
- For AI (16), refer to additional human readable text: sell by date
- For AI (17), refer to additional human readable text: expiration date

 Note: These additional human readable text labels might change per trading partner/industry requirements. For distribution in Canada, both English and French translations are required, i.e., Best Before/Meilleur Avant.

Part 2 – How to Read the Date

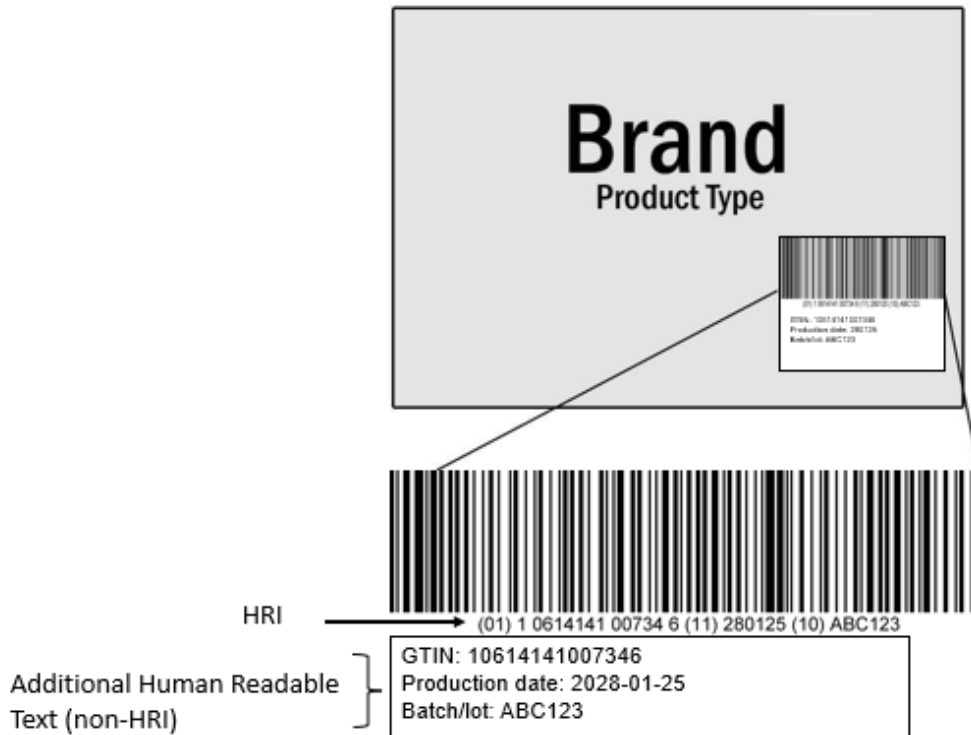
GS1 Standards provide guidance on how to convey date and time in an additional human readable format. This includes using the [ISO 8601 Date Time](#) global standard for human readable date format. Date information associated with AIs is expressed in a “YYYY-MM-DD” format.

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

Example: Best Before 2022-04-19, Best Before/Meilleur Avant 202-04-22

Example: In the sample barcode below, January 25, 2028, is shown as 2028-01-25 in the additional human readable text (non-HRI).

Figure 4. Example of human readable text on label



! Note: All information other than the GS1-128 barcode and pertinent HRI is subject to specific legal and trading partner requirements and not part of GS1 Standards. This image is not to scale.

3.2.3 Use of the GS1-128 Barcode Symbology

The GS1-128 barcode symbology 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 5. Sample GS1-128 barcode with GTIN (01), Best Before Date (15), and Batch/Lot Number (10)



For product manufacturers who use the GS1-128 barcodes on cases, the following AIs are recommended as a best practice. Refer to [Appendix A](#) for a complete list of AIs that are part of this guideline. Refer to [Appendix B](#) and [Appendix C](#) for information about GS1-128 barcode printing, print quality, and symbol placement considerations.

AIs for Fixed Weight Products:

AI (01) for Global Trade Item Number (GTIN) – The Global Trade Item Number (GTIN) can be used by a company to uniquely identify all its trade items. GS1 defines trade items as products or services that are priced, ordered, or invoiced at any point in the supply chain. When this is used on a GS1-128 barcode, it must be in a 14-digit format.

AI (11) for production date – The production date is the production or assembly date determined by the manufacturer. The date may refer to the trade item itself or items contained. The format for the production date is YYMMDD encoded in the GS1-128 barcode and shown in the HRI (text under the barcode).

AI (10) for batch/lot number – The batch/lot number associates an item with information that the manufacturer considers relevant for traceability of the trade item. The batch/lot number is a variable length number consisting of 1-20 characters. Examples of batch/lot numbers could be a production lot number, a shift number, a machine number, a time, or an internal production code, etc.

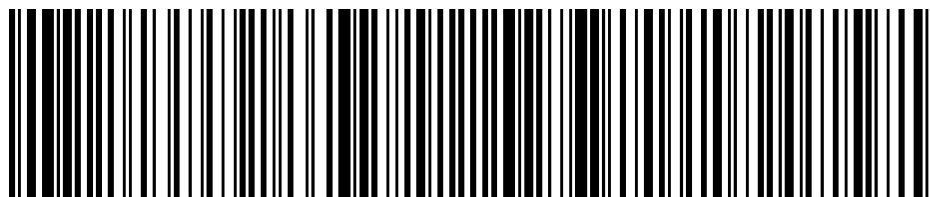
! Note: Special characters specified in the batch/lot code must match those allowed in EDI/EPCIS

Table C. Recommended Formats for AIs on Fixed Weight Products

AI	Full Title	Format	Data Title
01	Global Trade Item Number	N2+N14	GTIN
10 ¹	Batch/Lot Number	N2+X..20	Batch/Lot
11 ^{2, 3}	Production Date (YYMMDD)	N1+N6	Prod Date

1. The AI (10) for batch/lot number is generated by the manufacturer of the product for maximum traceability purposes and could include information such as production facility, date, time, line
2. Appropriate AI for date can be used as an alternative for the production date.
3. The specific day of the relevant month (e.g., second day = 02). If it is not necessary to specify the day, the field must be filled with two zeroes.
4. number, shift number, etc. If a company has multiple manufacturing facilities, the batch/lot number should include information the manufacturer can use to identify that specific plant.

Figure 6. Sample GS1-128 Barcode with GTIN (01), Production Date (11), and Batch/Lot (10)



(01) 4 0614141 006364 (11) 220101 (10) A1B2C3D4

AIs for Variable Measure Trade Items:

1. AI (01) for Global Trade Item Number – The GTIN is used for companies to uniquely identify trade items. GS1 defines trade items as products or services that are priced, ordered, or invoiced at any point in the supply chain. When the GTIN is encoded into a GS1-128 barcode, it must be in a 14-digit format. For variable measure trade items (i.e., random weight or count), the indicator digit '9' must be used in the first position of the GTIN-14.
2. AI (3202) for net weight, pounds (variable measure trade item) – The actual weight of the individual case to the hundredths of a pound.
3. AI (10) for 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 a variable length number consisting of 1-20 characters. Examples of batch/lot numbers include a production lot number, shift number, machine number, time, or an internal production code, etc.

Table D. Formats for Recommended AIs on Variable Measure Trade Items

AI	Full Title	Format	Data Title
01	Global Trade Item Number	N2+N14	GTIN
10 ¹	Batch/Lot Number	N2+X..20	Batch/Lot
11 ²	Production Date (YYMMDD)	N2+N6	Prod Date
3202 ³	Net Weight in Hundredths of a Pound	N4+N6	Net Weight (lb.)

The fourth digit of AI (320n) (2) indicates the number of decimal places of the specified weight (i.e., 3202 equates to N6 = nnnn.nn pounds). See [GS1 General Specifications section 3](#) or the [AI reference list](#) for further information.

Appropriate AI for date can be used as an alternative for the production date.

The batch/lot number is 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 batch/lot number should include information the manufacturer can use to identify that specific facility.

Figure 7. Sample GS1-128 Barcode with GTIN (01), Net Weight (3202), and Batch/Lot (10)



(01) 5 0614141 00634 7 (3202) 003456 (10) A1B2C3D4

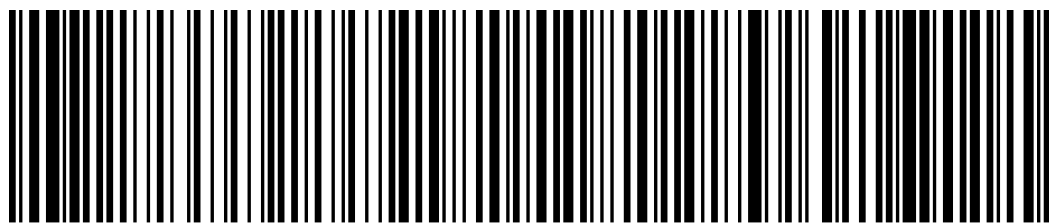
Additions/Exceptions to the Recommended AIs:

- Dates: AI (13) for packaging date can be used in place of AI (11) for production date for items that require additional stages of processing (e.g., freezing, canning, etc.). AI (15) should be used for best before date (best by date), AI (16) for sell by date, and AI (17) for expiration date. Use by or expiry can also be used in place of AI (11) to satisfy specific customer requests. The format for all dates is YYMMDD in the HRI.
 - Serial Numbers: Where appropriate, a supplier might also choose to include AI (21) for the serial number in addition or in place of a batch/lot number. Serial numbers are 1-20 alphanumeric characters. For traceability purposes, a batch/lot reference should be maintained.
- !** Note: For an 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.

Table E. Formats for Additional AIs

AI	Full Title	Format	Data Title
11	Production Date (YYMMDD)	N2+N6	Prod Date
13	Packaging Date (YYMMDD)	N2+N6	Pack Date
15	Best Before Date (YYMMDD)	N2+N6	Best Before or Best By
16	Sell By Date (YYMMDD)	N2+N6	Sell by
17	Expiration Date (YYMMDD)	N2+N6	Use By or Expiry
21	Serial Number	N2+X..20	Serial

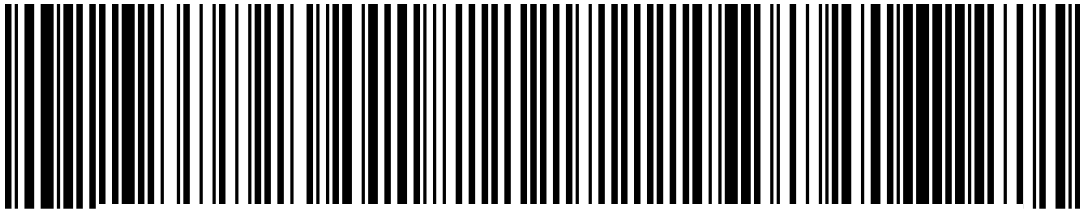
Figure 8. Sample GS1-128 barcode with AI (01) for GTIN, AI (13) for Packaging Date, AI (17) for Expiration Date, and AI (21) for Serial Number



(01) 1 0614141 00073 6 (13) 220425 (17) 280425 (21) 10987654321

- AI (01) 10614141007346 denotes the GTIN
- AI (13) 280425 denotes the packaging date of April 25, 2022
- AI (17) 282425 denotes the expiration date of April 25, 2028
- AI (21) 10987654321 denotes the serial number

Figure 9. Sample GS1-128 barcode with AI (01) for GTIN, AI (15) for Best Before Date, AI (3202) for Net Weight, AI (21) for Serial Number



(01) 9 0614141 00734 2 (15) 280401 (3202) 050000 (21) HIJ12345

- AI (01) 90614141007342 denotes the GTIN
- AI (15) 280401 denotes a best before date of April 01, 2028
- AI (3202) 050000 denotes a net weight of 5.00 pounds to the hundredth decimal place
- 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 shipping cases. All trading partners must be aware of regulations that may impact the information required on shipping cases. Therefore, each trading partner should consult with its own individual legal or regulatory advisor.

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

There are also category-specific requirements based on specific product needs. Examples of those requirements by category are provided in this section.

3.3.1 Meat and Poultry

The Meat and Poultry B2B Data Standards Organization (mpXML), which transitioned all activities and relevant oversight to GS1 US in January 2014, created and released an industry traceability implementation guideline in July 2010. This guideline was developed in collaboration with industry and provides best practices for managing product traceability at the shipment, pallet, case, and consumer level. The guideline can now be found at <https://www.gs1us.org/industries-and-insights/by-industry/retail-grocery/standards-in-use/fresh-foods>.

Minimum case-level traceability is best satisfied by a combination of the GTIN and a batch/lot or serial number. The table below provides a summary of machine-readable and human readable traceability attributes.

Table F. Meat and Poultry Traceability Attributes

Data Element	Scan Length	Variable Measure			Fixed Measure		
		Human Readable	Scan	ASN	Human Readable	Scan	ASN
Supplier Company Name	N/A	•			•		

Data Element	Scan Length	Variable Measure			Fixed Measure		
Supplier Product Number/Item Reference	N/A	•			•		
Case-Level Product Description	N/A	•			•		
AI (01) for Global Trade Item Number (GTIN)	N2+N14		•	•		•	•
AI (10) for Batch/Lot Number	N2+X..12 (max)	•	•*	•	•	•*	•
AI (21) for Serialized Case Code	N2+X..10 (max)		•*	•^		•*	•^
Product Date(s) using AI (11), AI (13), AI (15), AI (16), AI (17)	N2+N6	•	•	•	•		
AI (3202) for Net Weight	N4+N6	•	•	•	•#		

Human Readable = Human readable label text

Scan = Barcoded

ASN = Advance Ship Notice/Ship Notice Manifest

AI = Application Identifier

* Use AI (21) when present on case and useful for traceability. Use AI (10) if no serial number is present on case.

^ Include AI (21) when present on case and useful for traceability. A lot code may be required by certain partners or for regulatory compliance for specific products or industries.

For fixed measure products, AI (3202) 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: Per GS1 Standards, the maximum field length for GS1AI (10) and AI (21) is 20 characters. It is important to check with trading partners and software providers, as special character acceptance can vary. The reduced limits noted above are necessary due to the additional data elements included in the barcode.

Table G. 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 products 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.

3.3.2 Seafood

In collaboration with industry and the National Fisheries Institute (NFI), GS1 US released the [Traceability For Seafood: U.S. Implementation Guide](#) in March 2011. This guideline provides best practices for managing product traceability at the shipment, pallet, case, and consumer levels.

Minimum case-level traceability is best satisfied by a combination of the GTIN and a batch/lot or serial number. The table below provides a summary of machine-readable and human readable traceability attributes.



Table H. Seafood Traceability Attributes

Data Element	Scan Length	Variable Measure			Fixed Measure		
		Human Readable	Scan	ASN	Human Readable	Scan	ASN
Supplier Company Name	N/A	•			•		
Case-Level Product Description	N/A	•			•		
AI (01) for Global Trade Item Number (GTIN)	N2+N14	•	•	•		•	•
AI (10) for Batch/Lot Number	N2+X..12 (max)	•	•*	•	•	•*	•
AI (21) for Serialized Case Code	N2+X..10 (max)		•^	•		•^	•
Various Date(s) using AI (11), AI (13), AI (15), AI (16), AI (17)	N2+N6	•			•		
AI (3202) for Net Weight	N4+N6	•	•	•	•#		

Human Readable = Human readable label text

Scan = Barcoded

ASN = Advance Ship Notice/Ship Notice Manifest

AI = Application Identifier

** Use Serial Number AI (21) when present on case and useful for traceability. Use batch/lot number AI (10) if no serial number is present on case.*

^ Include AI (21) for serial number when present on case and useful for traceability.

For fixed measure products, AI (3202) for 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 characters, including special characters based on trading partner and software provider capabilities. However, there are different maximum levels when used for seafood items due to GS1-128 capacity of 48 characters.

Table I. Additional Attributes for Seafood

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 products 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.

** USDA Establishment number – applies only to Siluriformes fish regulated by USDA FSIS

3.3.3 Produce

The Canadian Produce Marketing Association (CPMA), GS1 Canada, GS1 US, and International Fresh Produce Association (IFPA) are administering organizations for the U.S. Produce Traceability Initiative (PTI). These associations worked with industry stakeholders to create and release a case-label best practice guideline for the community. Minimum case-level traceability is best satisfied by a combination of the GTIN and a batch/lot number. Additional case information may be exchanged between trading partners. The table below provides a summary of machine readable and human readable traceability attributes. (For guidance on using voice pick codes, please refer to Appendix D).

For more information on produce labeling requirements, please see www.producetraceability.org.

Table J. Produce Traceability Attributes

Data Element	Scan Length	Variable Measure			Fixed Measure		
		Human Readable	Scan	ASN	Human Readable	Scan	ASN
Supplier Company Name	N/A	•			•		
Produce Name, Variety, Size, Count	N/A	•			•		
AI (01) for Global Trade Item Number (GTIN)	N2+N14	•	•	•		•	•
AI (10) for Batch/Lot Number	N2+X..20 (max)	•	•	•	•	•	•
Voice Pick Code	N/A	•			•		
Various Date(s) using AI (13), AI (15), AI (16)	N2+N6	•	•		•	•	

Human Readable = Human readable label text

Scan = Barcoded

ASN = Advance Ship Notice/Ship Notice Manifest

AI = Application Identifier

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.

3.3.4 Dairy, Deli, and Bakery

GS1 US collaborated with the International Dairy, Deli, & Bakery Association (IDDBA) and the International Dairy Foods Association (IDFA) to create [Traceability for Dairy, Deli & Bakery – U.S. Implementation Guide](#) for the industry. This guideline provides best practices for managing product traceability at the shipment, pallet, case, and consumer level.

Minimum case level traceability is best satisfied by a combination of the GTIN and batch/lot or serial number. The table below provides a summary of machine readable and human readable traceability attributes.

Table K. Traceability Attributes for Dairy, Deli, and Bakery

Data Element	Scan Length	Variable Measure			Fixed Measure		
		Human Readable	Scan	ASN	Human Readable	Scan	ASN
Supplier Company Name	N/A	•			•		
Produce Name, Variety, Size, Count	N/A	•			•		
AI (01) for Global Trade Item Number (GTIN)	N2+N14	•	•	•		•	•
AI (10) for Batch/Lot Number	N2+X..20 (max)	•	•	•	•	•	•
Voice Pick Code	N/A	•			•		
Various Date(s) using AI (13), AI (15), AI (16)	N2+N6	•	•		•	•	

Human Readable = Human readable label text

Scan = Barcoded

ASN = Advance Ship Notice/Ship Notice Manifest

AI = Application Identifier

! Note: As stated above, per GS1 Standards, the maximum field length for AI (10) and AI (21) is 20 characters. However, there are different max levels when used with dairy/deli/bakery items due to the additional requirements stated above.

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 (i.e., 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](#) for core case labeling information.

4 Application of Case Labels

4.1 Supplier Implementation Considerations

Printing Specifications: The maximum physical length of the GS1-128 barcode is 6.5 inches (165 mm), including Quiet Zones. The barcode should not be compressed to fit into a smaller label if all 48 data characters are used.

Figure 10. GS1-128 Barcode with Quiet Zones Highlighted



For linear barcodes with unattended, fixed position scanner applications in general distribution, the GS1 General Specifications indicates a narrow bar width of 0.0195 inches (0.495 mm) with a maximum barcode height of 1.25 inches (31.75 mm). For linear barcodes with attended, hand-held scanner applications, the GS1 General Specifications indicates a narrow bar width of 0.0104 inches (0.264 mm), with a barcode height of 0.500 inches (12.70 mm). For more information on how to properly create GS1-128 barcodes, see Barcode Production and Quality Assessment of the [GS1 General Specifications Section 5.12](#).

Function Code 1 (FNC1):

The Function Code 1 (FNC1) in the first position, following the start character of a Code 128 symbol, is a reserved use, which identifies the GS1 System information within a GS1-128 symbol.

The FNC1 also serves as a separator character that indicates where one variable length AI data ends and another begins. It is placed immediately after a variable length AI element string and is followed by the GS1 Application Identifier of the next element string. Should multiple variable length AIs be concatenated within a single data string, the FNC1 comes after each variable length AI element string.

As a best practice, all variable length AIs should come at the end of the data string, otherwise, the barcode can physically grow larger and cause errors. A variable length AI that comes in the final position of the data string does not require an FNC1 to be present following the end of the associated data.



Note: The FNC1 is not shown in the human readable interpretation as it is a non-keyboard character.

Sizing:

The maximum physical length of the GS1-128 barcode is 165 mm (6.5 inches), and the maximum height should be 1.25 inches including Quiet Zones. The barcode should not be compressed to fit into a smaller label if all 48 data characters are used. See [GS1 General Specifications figure 5.12.3.2-1](#) for further information.

Edge Rule:

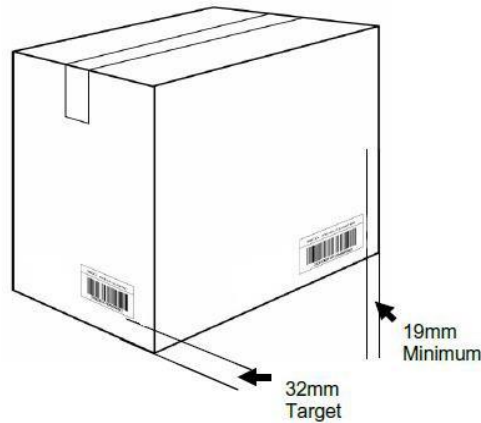
When possible, the barcode must not be closer than 0.30 inches (8 mm) or farther than 4 inches (100 mm) from the nearest edge of the package/container. Previous guidelines suggested 0.20 inches (5 mm) as a minimum, however practical experience has shown this to be inadequate. For example, cashiers often grab the edges of bags and other trade items with their thumbs. Therefore, avoid placing the barcode too close to the edge of the label.

Symbol Placement:

The HRI should be placed below the barcode wherever physically possible. The minimum barcode height is specified in the GS1 symbol specification Table 2 in the [GS1 General Specifications, Figure 5.12.3.2-1](#).

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. This assumes a barcode height of 1.25 inches (32 mm), which results in a centerline 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 the Quiet Zones) should be at least 0.75 inches (19 mm) from any vertical edge to avoid damage. Symbol placement guidelines are the same, regardless of the data carrier selected. The ITF-14 and GS1-128 barcode labels have identical placement guidelines.

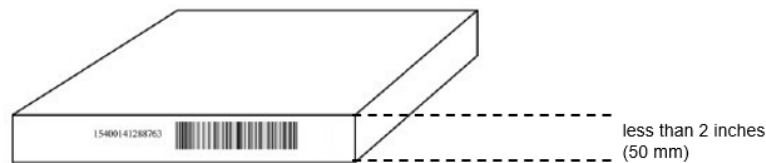
Figure 11. Symbol placement and Quiet Zone, the unprinted clear area to the left and right of the ITF-14 or GS1-128



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 shall be considered in this order of preference:

Place the HRI to the left of the symbol, outside the compulsory Quiet Zones.

Figure 12. Human Readable Interpretation to the Left of Symbol



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 0.75 inches (19 mm) from any edge.



4.2 Buyer Implementation

For industry buyers to implement the capability to utilize the GS1-128 barcode on cases, it is important to discuss scanning and interpretation capabilities with trading partners, hardware providers, and software providers.

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 readable and machine-readable product information 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 Labeling. This document is meant 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 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.

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.

6 Appendix A – Application Identifiers Recommended for GS1-128 Barcodes

When a fixed length GS1 Identification Key and additional attributes are encoded together, the GS1 Identification Key should be encoded before the attributes. As a best practice, fixed length element strings should be encoded before variable length element strings. The sequence of fixed length and variable length element strings should be at the discretion of the brand owner.

Example Element String in a GS1-128: (01)006141419996 (17)251231 (10)98765

Example 1 encompasses the fixed length GS1 Identification Key with the GTIN AI (01), followed by the fixed length element string expiration date AI (17), followed by the variable length element string serial number AI (10). For this data string, the only FNC1 used will be at the beginning to make the barcode a GS1-128. FNC1 is not needed as a group separator because the variable length AI comes at the end

Table L. Summary of AIs in this Guidance.

AI	Name	Format	Data Title
01	Global Trade Item Number	N2+N14	GTIN
10	Batch/Lot Number	N2+X..20 (max)	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
16	Sell By Date (YYMMDD)	N2+N6	SELL BY
17	Expiration/Use by Date (YYMMDD)	N2+N6	USE BY OR EXPIRY
21	Serial Number	N2+X..20 (max)	SERIAL
3202	Net Weight in Hundredths of a Pound	N2+N6	NET WEIGHT (lb)

For further AI selection: <https://www.gs1.org/standards/barcodes/application-identifiers>

7 Appendix B – Technical Implication Considerations for GS1-128 Barcodes

Additional Use Case Example:

Figure 17. Sample case label showing the 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)



! It is a best practice to include only one date, so no additional training/communication is needed. If companies use two additional human readable dates on the label, warehouses, distribution centers, and food outlet employees should be trained on which one to use and enter in systems in case the barcode does not scan.

8 Appendix C - GS1-128 Barcode Print Quality Guidance

Below is a summary of print quality grading parameters. Details are found in the [GS1 General Specifications section 5.4.5](#).

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.

Table M. ISO Print Quality Grading Chart

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 Does not conform to the GS1 Standards for the GS1-128 barcode

Parameters for GS1/ISO Print Quality Grading*

* A list of nine specific areas that affect print quality and their definitions can be found in [ISO/IEC 15416](#) or the [AIM \(Association for Automatic Identification and Mobility³\) Layman’s Guide to ANSI, CEN, and ISO Barcode Print Quality Document](#)

** 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 15416:2016 Automatic identification and data capture techniques — Barcode print quality test specification — Linear symbols

*** AIM Website: <http://www.aimglobal.org/>

Levels Needed to Achieve Minimum Print Quality Grading

The shaded cells show the technical specifics for each of the nine parameters needed to achieve an overall print quality grade of 1.5 for a GS1-128 symbol:

Table N. GS1-128 Print Quality Specifications

GRADE	ED	RMIN	ECMIN	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

9 Voice Pick Code Guidance

The Produce Traceability Initiative (PTI) endorsed 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 GTIN in a 14-digit format appended by the batch/lot number and the date (where present) in that order.
 - b. Do not include the AI, prefixes, or parentheses.
 - c. Do not include spaces between the GTIN, batch/lot number, and date fields.
 - d. Date, if present, is presented in YYMMDD format, with zero padding 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, the voice pick code (CRC-16 Hash) should be included in the lower right-hand corner of the case label for produce products.



Check the PTI website at <http://www.producetraceability.org/> for the voice pick calculator.



10 Additional Resources

1. Get started with GS1 Standards at <https://www.gs1us.org/upcs-barcodes-prefixes>
2. Obtain a GS1 Company Prefix at <https://www.gs1us.org/upcs-barcodes-prefixes/how-to-get-a-upc-barcode>
3. Learn more about the Produce Traceability Initiative at <http://www.producetraceability.org>
4. Download whitepapers, case studies, and additional resources for Foodservice at <https://www.gs1us.org/industries-and-insights/by-industry/foodservice>
5. Download whitepapers, case studies, and additional resources for Retail Grocery at <https://www.gs1us.org/industries-and-insights/by-industry/retail-grocery/standards-in-use/fresh-foods>
6. Download whitepapers, case studies, and additional resources for Fresh Foods at <https://www.gs1us.org/industries-and-insights/by-industry/retail-grocery/standards-in-use/fresh-foods>
7. [GS1 US Supply Chain Visibility](#)
8. [EPC Tag Data Standard \(TDS\) 2.0](#)
9. [GS1 Data Matrix Guideline](#)
10. [An Introduction to the SSCC](#)
11. [Food Industry Guidance for Streamlining Your Logistics Labels](#)
12. To access the full ASN for Foodservice Guideline follow these steps:
 - a. You need to be a **GS1 US Member company** (such as when you purchase a Company prefix)
 - b. Go to <https://my.gs1us.org/>
 - c. Go to myGS1 US on the top menu
 - d. Go to Member-Only EDI Documents
 - e. Select **Uniform Communication Standard (USC) EDI**
 - i. Navigate to UCS Implementation Guideline 007050
 - ii. Go to 2.2 Transaction Sets
 - iii. Go to 856 **UCS v7050 - Foodservice.pdf**



All section references to the GS1 General Specifications refer to Release 22.0. Section numbers may change with subsequent releases.

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IAPMO

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*If applicable

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