Barcoding Basics for Shipping Containers

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# Table of Contents

1. **About This Guide** ................................................................. 4
2. **Introduction to Barcodes** .................................................. 5
   2.1 **What are Barcodes?** .................................................. 5
   2.2 **Benefits of Using Standard Product Identification** ............. 5
   2.3 **Where Barcodes are Used – From Manufacturer to Consumer** 5
   2.4 **Who Manages the Barcode?** ....................................... 6
3. **Barcode Terminology** .......................................................... 7
   3.1 **Global Trade Item Number (GTIN)** ................................ 7
   3.2 **Variable Length Company Prefix (VLCP)** ................. 7
4. **Next Steps** ........................................................................ 8
   4.1 **Step 1: Decide on a shipping container code** .............. 8
       4.1.1 **Fixed/Standard Containers** ........................ 8
       4.1.2 **Variable Containers** ..................................... 8
   4.2 **Step 2: Select the appropriate Barcode symbology** ........ 10
       4.2.1 **Interleaved 2 of 5 Symbology** .......................... 10
       4.2.2 **What Does Interleaved 2 of 5 Mean?** .................. 10
   4.3 **Step 3: Create the Barcode Number** ............................ 11
       4.3.1 **Understanding the GTIN-14 (Shipping Container Code)** 11
       4.3.2 **Understanding the GS1-128 Symbology** ............... 13
       4.3.3 **Understanding the SSCC-18 (Serial Shipping Container Code)** 16
       4.3.4 **Creating the Barcode Number – Review** ............. 19
   4.4 **Step 4: Make Sure the Barcode Symbols Meet Industry Standards** 20
       4.4.1 **GTIN-14 Using GS1-128 Symbology** ............. 21
       4.4.2 **SSCC-18 Using GS1-128 Symbology** ............ 21
       4.4.3 **Printing the Serial Shipping Container Code** ........ 22
       4.4.4 **Placing the Bar Code Symbol on a Shipping Container** 22
       4.4.5 **Using the GS1 Logistics Label Design** ............... 24
       4.4.6 **Placing the GS1 Logistic Label on a Shipping Container** 27
       4.4.7 **Using Application Identifiers** .......................... 28
5. **APPENDIX A: INTRODUCTION TO GLOBAL LOCATION NUMBERS** 30
6. **APPENDIX B: CALCULATING THE CHECK DIGIT CHARACTER FOR GTIN-14** 31
7. **APPENDIX C: CALCULATING THE CHECK DIGIT CHARACTER FOR SSCC-18** 32
8. **APPENDIX D: GLOSSARY OF TERMS FOR BAR CODING** .......... 33
1 About This Guide

GS1 Canada is the only authorized source to issue Company Prefix Licences in Canada. Company Prefix Licences are globally unique numbers that identify a company by providing the first six to 10 digits of a GS1 barcode number.

GS1 barcodes are the global standard required by trading partners worldwide for product identification. They have been improving the consumer experience and meeting industry’s product identification needs for over 40 years.

GS1 Canada works with Canadian industry to create and publish implementation guidelines that help promote the use of global standards.

*Barcoding Basics for Shipping Containers* is an introduction to the standards for creating and using shipping container codes. This document is designed for manufacturers, distributors and suppliers who need a basic understanding of:

1. how to create a barcode number;
2. which type of barcode symbol to use; and
3. how to apply barcodes to shipping containers

This guide deals only with barcodes for shipping containers and cases. It assumes that readers are familiar with product identification using Global Trade Item Numbers (GTINs), the numbers found at the bottom of a barcode.

For more information about product identification:

1. Refer to the *GS1 General Specifications* and related bar coding manuals.
2. Go to GS1 Canada’s subscribers only website, www.mygs1ca.org, and visit the Standards section under Resource.
2 Introduction to Barcodes

2.1 What are Barcodes?

Barcodes are symbols that can be scanned electronically using laser, CCD or camera-based systems. Barcodes are used to encode information such as product numbers, serial numbers and batch numbers. They play a key role in enabling parties like retailers, manufacturers, transport providers and hospitals to automatically identify and track products as they move through the supply chain.

2.2 Benefits of Using Standard Product Identification

The benefits of using a standardized product identification number are many:

- The product identification number is unique anywhere in the world — there are no duplicate numbers;
- The product identification number is tied to the manufacturer for branded products and the brand owner for private label products;
- The product identification number enables the ability to share item information with trading partners in an efficient manner;
- There is no need to re-label products with internal identification numbers;
- All members of the supply chain use the same number for the same product;
- Trading partners no longer need to cross-reference numbers;
- There is greater accuracy in database management;
- There is greater accuracy in communicating data, such as price changes; and
- Ordering and billing errors due to wrong product numbers can be eliminated.

2.3 Where Barcodes are Used – From Manufacturer to Consumer

The following illustration shows where the different types of barcode symbols — for both products and shipping containers — can be used in the flow of product from manufacturer to consumer.
2.4 **Who Manages the Barcode?**

To ensure that identification numbers are unique, GS1 Canada manages the assignment of barcode numbers in Canada. To support GS1 global office with the global implementation of GS1 barcodes for product identification, GS1 Member Organizations (GS1 MOs) are located in 108 countries around the world to manage barcodes.

GS1 Canada assigns manufacturer numbers in support of the GS1 System of global standards, and promotes the use of barcodes to the manufacturing, distribution and retail industries in Canada.
3 Bar Code Terminology

3.1 Global Trade Item Number (GTIN)

The GTIN is one of the GS1 Keys. Its purpose is to uniquely identify trade items (products and services) sold, delivered, warehoused, and billed throughout the retail and commercial distribution channels. It provides an accurate, efficient and economical means of controlling the flow of products and information through the use of an all-numeric identification system.

A GTIN is used for the unique identification of trade items worldwide within the GS1 System. The GTIN can be used to identify any packaging level (e.g., consumer unit, inner pack, case, pallet). A GTIN has a 14-digit data structure; however, its data carrier (barcode) may contain only 8 digits (GTIN-8), 12 digits (GTIN-12), 13 digits (GTIN-13) or 14 digits (GTIN-14). The GTIN is defined as a 14-digit number to accommodate all of these different data carrier structures.

The term trade item refers to any product or service upon which there is a need to retrieve predefined information; this product or service may be priced, ordered, or invoiced at any point in the supply chain. Trade items include individual items as well as all of their different packaging configurations.

These GTIN data structures each provide unique numbers when right justified in a 14-digit database field.

The GTIN may be encoded in any GS1 approved symbology, the appropriate data structure and symbology combination is determined by many factors:

- Product type
- Printing method
- Packaging material
- Designated environment (retailer point of sale; general distribution, etc....)

Additional information regarding the GTIN is available at www.mygs1ca.org under Standards.

3.2 Variable Length Company Prefix (VLCP)

GS1 Canada issues variable length Company Prefixes based on the number of GTINs (products) that an organization needs. For example, a six-digit Company Prefix will allow an organization to barcode up to 100,000 products. For a list of all lengths, refer to the following table:

<table>
<thead>
<tr>
<th>Company Prefix Length (# of Digits)</th>
<th>Maximum # of Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>100,000</td>
</tr>
<tr>
<td>7</td>
<td>10,000</td>
</tr>
<tr>
<td>8</td>
<td>1000</td>
</tr>
<tr>
<td>9</td>
<td>100</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>
4 Next Steps

4.1 Step 1: Decide on a shipping container code

The type of shipping container code that should be used depends on whether the contents of the containers are fixed or variable, as defined below. The shipping containers themselves are also called fixed or variable, depending on their contents.

4.1.1 Fixed/Standard Containers

The contents of a shipping container are considered to be fixed (also referred to as a standard container), when all the units in the shipping container are identical — they all have the same description, size, count, weight and/or price, and GTIN.

The following are examples of fixed or standard containers:

- a carton containing 24 boxes of 500g breakfast cereal with the same GTIN
- a garment rack containing 50 one-size-fits-all dresses in the same style and color identified with the same GTIN.

A standard container uses a **GTIN-14 Shipping Container Code**.

Since all the units in each container share the same GTIN-12/13, the container code is based on the GTIN-12/13 and includes some additional information about the packaging. The same GTIN-14 is used on all like containers.

4.1.2 Variable Containers

The contents of a shipping container are considered to be variable when the units in the shipping container vary in some respect — different GTINs, size, weight, quantity, freshness, etc.

The following are examples of variable containers:

- a carton containing a mix of products packed to order
- a pallet loaded with a variety of products
- a garment rack containing 50 dresses in a range of styles, sizes and colors.

A variable container uses an **SSCC-18 (Serial Shipping Container Code)**.

There is no correlation between the SSCC-18 and GTINs of the units inside. The information linking these numbers is sent to the customer via the appropriate Electronic Data Interchange (EDI) transaction set. Instead, the Serial Shipping Container Code uses a unique number that identifies just one container. The Serial Shipping Container Code must not be repeated on another container for at least one year or while the original container is still in use.
Deciding on Barcode Symbol
Use the following diagram to decide which barcode symbol to use:

Is your container Fixed or Variable?

Fixed

Use the GTIN14 and...

Variable

Use the SSCC-18 with the GS1-128 symbology

Are you using an Application Identifier?

No

You can use the Interleaved 2 of 5 or the GS1-128

Yes

You can only use the GS1-128 Symbology
4.2 **Step 2: Select the appropriate Barcode symbology**

Before creating the number portion of the shipping container code, select the appropriate symbology to create the barcode. The term symbology means the method used to represent the machine-readable, scannable shipping container code by a barcode symbol.

There are two different symbologies used to create shipping container barcode symbols. These are:
- Interleaved 2 of 5 (ITF-14; ITF; I25)
- GS1-128

4.2.1 **Interleaved 2 of 5 Symbology**

The Interleaved 2 of 5 symbology is used to create GTIN-14 barcodes for standard containers. It can be printed directly on corrugated cardboard.

Several features are built into the Interleaved 2 of 5 symbol to help the scanner locate and read the symbol when it is printed on a rough surface. These features include:
- Bearer bars: the thick lines around the symbol, which provide support for the printing plate when printing directly on corrugate.
- Quiet zones: the clear space to the left and right of the bars.

4.2.2 **What Does Interleaved 2 of 5 Mean?**

Interleaved 2 of 5 describes the way the bars are designed:
- There are only two widths for the bars and spaces: wide and narrow (GS1-128 symbology uses bars of this different widths);
- Five bars or spaces represent one digit. Two out of five are wide; three out of five are narrow; and
- The first five bars represent the first digit, the first five spaces represent the second digit, the next five bars represent the third digit, and so on, hence the term interleaved.
The following illustration shows how the number 3852 is read using Interleaved 2 of 5 symbology. (The start and stop characters are not shown.)

4.3 Step 3: Create the Barcode Number
Before creating a barcode number, gain an understanding of the GTIN-14 and SSCC-18 shipping container codes.

4.3.1 Understanding the GTIN-14 (Shipping Container Code)
The GTIN-14 shipping container code is 14 digits long and is based on the GTIN of the items inside the container.
The parts of the ITF-14 shipping container symbology are described below.

Step 1: Indicator
Provides the Indicator digit in the GTIN-14 number. Indicators are used to identify different sized containers containing the same item. For fixed measure trade items, Indicator digits 1, 2, 3, 4, 5, 6, 7, or 8 are used. Manufacturers set the Indicator for their own products.

0 Zero is used when the shipping container is also the packaging for the consumer item. E.g. on a single item such as a television. When there is a standard assortment of items in the container -- E.g. six red dresses and six green dresses -- the item number portion of the container code will be different from that on the item GTIN.
1-8 To allow flexibility in the way they are used in different industries, the numbers 1 to 8 have not been strictly defined.

However, they are commonly used in the following way:

1 When there is only one shipping container size, or for the first level of packaging,

2-8 For inner packs or additional shipping container sizes,

9 When additional information about weight or quantity is encoded.

**Step 2: Zero Filler**

Step 2 is required when a GTIN-12 number is used to identify the unit level of packaging because there is an empty position between the Indicator digit and the GTIN-12. When the GTIN-12 is used to identify the unit level and a GTIN-14 is used to identify packaging above the unit level, a 0 (zero) is used to fill position 2.

**Step 3: GS1 Company Prefix**

Positions three through eight in this example make up a GS1 Company Prefix, formerly known as the Manufacturer Identification Number. GS1 Canada assigns this globally-unique number to suppliers of products and/or services. In the example below, GS1 Canada has assigned the 6-digit Company Prefix 012345 in positions three through eight for this supplier. While this Company Prefix example is six digits long, note that a Company Prefix is not always six digits long. (See Variable Length Company Prefix.)

**Step 4: Item Reference**
Positions 9 through 13 make up the GTIN’s item reference. This is a number that a supplier assigns to their products or services. In this example, the item reference numbers 67890 are used in positions 9 through 13. Note: the item reference will not always be five digits long. (See Variable Length Company Prefix.)

**Step 5: Check Digit**

Position 14 is the check digit for the entire GTIN. Typically, barcode design or printing software calculates this number using the 13 preceding digits. In this example, the calculated check digit 6 is placed in position 14. The check digit will change when the 13 preceding digits in the GTIN number change.

For a check digit calculator, visit www.mygs1ca.org under Tools.

### 4.3.2 Understanding the GS1-128 Symbology

The GS1-128 (formerly known as the EAN/UCC128 and SCC-14 Code 128) is used to carry GTIN-14 numbers that identify fixed measure trade items above the individual (unit) level. The term GS1-128 refers to the standard that describes how these barcode symbols are created.

Note: GS1-128 symbols are often used for trade item identification because additional information can be added to them.

In general, a barcode symbol created using the GS1-128 symbology is more complex than the Interleaved 2 of 5 symbol. One obvious difference is that there are bars of varying widths, whereas the Interleaved 2 of 5 symbol uses only thick and thin bars.

There are also additional characters built into the GS1-128 symbol for specific purposes. These codes are not shown as part of the number.

They are generated automatically by the computer that creates and prints the symbol.

This section identifies packages/containers that require additional information (e.g. lot numbers or date codes) beyond the primary GTINs.
Identification of trade items that require additional information is slightly different because a GS1-128 symbol is required to carry the additional information. Note that the GS1-128 symbol is also capable of combining the GTIN and additional information into one barcode. This process, called concatenation, can only be used if the additional information is available at the time the barcode carrying the GTIN is printed. Concatenation makes the overall area required for the barcode smaller.

The ID number for trade items that require additional information is comprised of two parts. The first part is the GTIN itself (Part A), which can be used on its own, or it can be combined with the second part which allows the GTIN to carry additional information (Part B). The steps for building this ID number are outlined below.

**Step 1: Application Identifier**

An Application Identifier must precede the GTIN-14 number when it is carried by a GS1-128 symbol. For fixed measure trade items packaged above the unit level, the AI (01) precedes the GTIN-14 number. For more information on Application Identifiers, see Using Application Identifiers.

**Step 2: Indicator Digit**

Indicator digits 1, 2, 3, 4, 5, 6, 7 or 8 are used. This provides up to eight different GTIN-14 numbers that are associated with the GTIN-13 or GTIN-12 number used to identify the unit level packaging. In this example, an Indicator digit of 1 is used in position 1 of the GTIN-14 number. The 1 indicates a level of packaging above the unit level (e.g. multi-pack, case, pallet) that relates to the unit level.

**Step 3: Zero Filler**
Step 3 is required when a GTIN-12 number is used to identify the unit level of packaging because there is an empty position between the Indicator digit and the GTIN-12 number. When the GTIN-12 number is used to identify the unit level and a GTIN-14 number is used to identify packaging above the unit level, a 0 (zero) is used to fill position 2.

**Step 4: GS1 Company Prefix**

Positions three through eight in this example make up a GS1 Company Prefix, formerly known as the Manufacturer Identification Number. GS1 Canada assigns this globally unique number to suppliers of products and/or services. In the example below, GS1 Canada has assigned the 6-digit Company Prefix 614141 in positions three through eight for this supplier. While this Company Prefix example is six digits long, they are not always six digits long. (See Variable Length Company Prefix.)

**Step 5: Item Reference**

Positions 9 through 13 make up the GTIN’s Item Reference. This is a number that a supplier assigns to their products or services. In this example, the item reference numbers 54321 are used in positions 9 through 13. Note: The Item Reference will not always be five digits long. (See Variable Length Company Prefix.)
**Step 6: Check Digit**

Position 14 is the check digit for the entire GTIN (excluding the AI). Typically, barcode design or printing software calculates this number using the 13 preceding digits. In this example, the calculated check digit 9 is placed in position 14. The check digit will change when the 13 preceding digits in the GTIN change.

For a check digit calculator, visit www.mygs1ca.org under Tools.

### 4.3.3 Understanding the SSCC-18 (Serial Shipping Container Code)

The Serial Shipping Container Code is 18 digits long, and here are the six steps for creating the SSCC-18.

**Step 1: Application Identifier**

Since the SSCC must be carried by the GS1-128 symbol, an additional step is indicated. This step provides an Application Identifier (AI) that must precede the SSCC when it is carried by the GS1-128 symbol. In this case, the AI (00) precedes the 18-digit SSCC.

Note: For an SSCC-18, the application identifier is always (00). For more information, see Using Application Identifiers.

**Step 2: Extension Digit**

Position one (1) in the SSCC is called the extension digit. Its name refers to the fact that it is used to extend the length of the Serial Reference in Step 5 (explained later in this section). By using the extension digit in conjunction with the Serial Reference, GS1 members expand the total number of SSCCs they can assign to shipping containers.
**Step 3: Zero Filler**

Position two is always 0 filled when a North American GS1 Company Prefix is used within the SSCC-18.
Note: When a GS1 Company Prefix from outside North America is used, position two will be filled with a 1, 2, 3, 4, 5, 6, 7, 8, or 9.

**Step 4: GS1 Company Prefix**

Positions three through eight in this example make up a GS1 Company Prefix, formerly known as the Manufacturer Identification Number. GS1 Canada assigns this globally unique number to suppliers of products and/or services. In the example below, GS1 Canada has assigned the 6-digit Company Prefix 614141 in positions three through eight for this supplier. While this Company Prefix example is six digits long, note that they are not always six digits long. (See Variable Length Company Prefix.)

**Step 5: Serial Reference**

The Serial Reference number is a number that the shipper assigns to a container. It can be any number that is unique when combined with the extension digit (Step 2) for each shipment for at least 365 days.

In the above example, the nine-digit Serial Reference 123456789 is used in positions 9 through 17. The Serial Reference in this example is nine digits long because the total number of digits for Steps 3-5 must total 16 positions. For example, if Steps 3 and 4 had totaled nine digits, then the Serial Reference in Step 5 would be seven digits long because 9 digits + 7 digits = 16 digits.

The Serial Reference number should not be repeated on any other shipping container for 12 months or while the shipping container (containing the product) may still be in use, whichever is longer.
**Step 6: Check Digit**

Position 18 is a check digit for the entire GTIN (excluding the AI). Typically, the barcode printing software calculates this number using the 17 preceding digits. In this example, the calculated check digit 0 is placed in position 18. The check digit will change when the preceding 17 digits in the ID number change.

For a check digit calculator, visit www.mygs1ca.org under Tools.
4.3.4 Creating the Barcode Number – Review

Use the following steps to create a number for either a GTIN-14 shipping container code or an SSCC-18 serial shipping container code.

1. When creating a serial shipping container code, start with (00) and include the parentheses.

   For example:
   
   GTIN-14
   _ __ _____ _____ _
   
   SSCC-18
   (00) _ _______ _________ _

2. Add the appropriate packaging indicator or type.

   For GTIN-14 codes, use packaging indicators from 0 to 9; for serial codes, use the established numbers from 0 to 4.

   For example:
   
   GTIN-14
   3 __ _____ _____ _
   
   SSCC-18
   (00) 1 _______ _________ _

3. Add the GS1 Company Prefix. Be sure to add a zero to the beginning so that the Company Prefix is seven digits long.

   For example:
   
   GTIN-14
   3 00 12345 _____ _
   
   SSCC-18
   (00) 1 0012345 _________ _

4. Add the item or serial number.

   For GTIN-14 codes, if the contents of the container are identical, use the item number from the item GTIN-12.

   For SSCC-18 codes, create a different 9-digit number to identify each container.

   For example:
   
   GTIN-14
   3 00 12345 67890 _
   
   SSCC-18
   (00) 1 0012345 987654321 _

5. Calculate the check digit. (Available at www.mygs1ca.org under Tools, or refer to the Appendices to learn how to calculate the check digit manually.)

   For example:
   
   GTIN-14
   3 00 12345 67890?
   
   SSCC-18
   (00) 1 0012345 987654321?
4.4  **Step 4: Make Sure the Barcode Symbols Meet Industry Standards**

This section lists the basic requirements for printing and applying shipping container barcode symbols according to global standards. It includes:

- the size of the barcode symbol;
- the important features of the barcode symbol, e.g. quiet zones;
- printing the barcode symbol, e.g. colour and printing method; and
- placing the barcode symbol on the shipping containers.

**GTIN-14**

The barcode symbol for a GTIN-14 code can be encoded using either one of the two symbologies:

- Interleaved 2 of 5 is used most often, when a GTIN-14 is printed directly on corrugate.
- GS1-128 is used when including additional information, such as the date or product weight, in the same barcode symbol.

**GTIN-14 Using the Interleaved 2 of 5 Symbology**

The following illustrates the barcode symbol for a GTIN-14 shipping container code encoded with the Interleaved 2 of 5 symbology.

Size

- The dimensions shown are for the nominal or standard size symbol. A nominal size barcode symbol has a magnification of 100%.
- Enlargement or reduction of the symbol is permitted. The minimum size is 70% of the nominal size when printed on corrugate or 62.5% when printed on labels.
- For barcode symbols printed directly on corrugate, use a magnification of 100% or greater. In general, bigger is better.

Features

- When printed on corrugate, the bearer bars are printed on all four sides of the barcode. When printed on labels, only the top and bottom bars are required.
• The width of the bearer bar at 100% magnification is 0.19”.
• The quiet zones must be clear from any graphics or printing. The minimum width of the quiet zone at 100% magnification is 0.40”.

**Printing the Interleaved 2 of 5 Barcode**
The Interleaved 2 of 5 barcodes can be printed directly onto corrugate using contact or non-contact printing methods. To produce the best scanning results:

- Print with black, dark blue or dark green ink.
- The minimum acceptable International Standards Organization (ISO) print quality grade when using direct printing on corrugate is 0.5”.
- Print at nominal size (100%).

**Learn More**
For more information about print quality grades, refer to the *ISO/IEC 15416*, an international standard for barcode print quality test specification, published in 2000.

### 4.4.1 GTIN-14 Using GS1-128 Symbology
The GTIN-14 can also be printed with the GS1-128 symbology when used alone or when combining secondary information, such as weight, with the GTIN-14 in a single barcode symbol. The following illustrates a GTIN-14 symbol with a date, net weight and serial number encoded using the GS1-128 symbology.

![GTIN-14 Barcode Example](image)

This particular barcode is described in greater detail in the section Using Application Identifiers. The dimensions and printing requirements for the GS1-128 symbology are outlined in the next section.

### 4.4.2 SSCC-18 Using GS1-128 Symbology
The barcode symbol for an SSCC-18 is always encoded using the GS1-128 symbology.

The GS1-128 symbology is also used to encode any other code requiring an application identifier (including a GTIN-14 code alone or with additional information).

The following information refers specifically to serial shipping container codes but the requirements apply to all barcode symbols created with the GS1-128 symbology.
The following image illustrates the components of the serial shipping container barcode:

Size
- The dimensions shown here reflect the recommended minimum size for the serial shipping container barcode symbol.
- The maximum length is 6.24” with quiet zones of a minimum of 0.25” at either end.
- Use a minimum bar height of 1.25” for all SSCC-18 barcodes.

Features
- Bearer bars are not used on GS1-128 barcode symbols.
- The quiet zones are part of the symbol.
- In the illustration, the broken lines at either end of the symbol indicate the boundaries of the quiet zones. These lines are not actually printed.

4.4.3 Printing the Serial Shipping Container Code
For best results, print all bar code symbols created using the GS1-128 symbology on labels rather than directly on the shipping container. The exception is when using non-contact or inkjet technology. To produce the best scanning results with GS1-128 bar codes:

- print with black, dark blue or dark green ink; red ink should not be used on any bar code
- print on white, non-glossy labels,
- the minimum acceptable ANSI print quality grade is 1.5 or ‘C’.

For more information about print quality grades, refer to the ISO/IEC 15416, an international standard for bar code print quality test specification, published in 2000.

4.4.4 Placing the Bar Code Symbol on a Shipping Container
The following recommendations apply to both GTIN-14 and SSCC-18 barcode symbols, whether printed directly on the container, applied with a label, or printed using non-contact methods.

The recommendations were designed so that the symbol will remain legible if the edge of the package is damaged.
Containers 39” (1m) or Less in Height

To facilitate scanning in an automated environment, place the symbol in a similar location on all packages.

- If possible, place the shipping container code on two adjacent sides, or a minimum of one side.
- The bottom edge of the shipping container barcode should be 1.25” (+/-0.125”) from the bottom of the container. Even if the barcode cannot be placed so precisely, the bars of the barcode must extend through the range from 1.38” to 1.90” from the natural bottom of the container.
- The outermost bar of the code (excluding bearer bar and quiet zone) should be at least 1.25” from the edge. The outer edge of the quiet zone should be no closer than 0.75” to the edge.
- The shipping container code should be parallel to the bottom of the container, with the bars of the code at right angles to the bottom of the container.
Containers Greater than 39” (1m) in Height
In general, these are containers for large items in which the item packaging is also the shipping container.

The placement of shipping container codes on large containers is designed to facilitate scanning by hand.

- The bottom edge of the symbol should be within a range of 20” – 30” from the bottom of the container.
- The symbol should be right of centre, at least 2” from either edge.

4.4.5 Using the GS1 Logistics Label Design
The GS1 Logistics Label Design (also known as the GS1 US common label or an MH10 Label) was developed in response to manufacturers, distributors, carriers and retailers who identified a need for a uniform system of labeling shipping containers. With the increasing use of electronic scanning and automated systems for moving the containers throughout the distribution channel, uniform labeling is important.

GS1 recognizes the need for flexibility for this label, as shipping containers are available in many different sizes and shapes. Using a common label maximizes consistency.

Additional information can be found at: http://www.gs1.org/docs/tl/GS1_Logistic_Label_Guideline.pdf

What is the GS1 Logistics Label Design?

The GS1 Logistics Label Design is made up of several segments, each of which contains information supplied by the supplier, the customer and the carrier.

By following the label format, the completed label will be constructed and applied in a way that all users of the system can understand.

The GS1 Logistics Label Design format specifies:
• the size of the label and its segments;
• how each segment of the label should be titled and what information it should contain; and
• the size of the printing and barcodes.

For more specific information about GS1 Logistics Label Designs, see section 6.7 in the GS1 General Specification, available at www.mygs1ca.org under Standards.

**The Layout of a GS1 Logistics Label**
The illustration shows the dimensions for the complete label format. Dimensions may vary by +/− 0.2”. Certain areas of the label are optional, and certain variations to the layout are permitted to accommodate different sized packages.

<table>
<thead>
<tr>
<th>Carrier Information</th>
<th>Customer Information (Optional)</th>
<th>Serial shipping container code</th>
</tr>
</thead>
<tbody>
<tr>
<td>From: 1.25&quot;</td>
<td>Ship To Postal Code: 2.5&quot;</td>
<td>SSCC-18 4&quot;</td>
</tr>
<tr>
<td></td>
<td>To: 2.75&quot;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Carrier: 1&quot;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Trading partner information)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Store: 2.5&quot;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mark For Address: 1&quot;</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Examples of GS1 Logistics Labels

These examples show two common layouts:

4” x 6” label – the store number symbol is used for automatic sorting

4” x 3” label – all data related to the container is sent via Electronic Data Interchange (EDI). The serial shipping container code links the EDI data to the container.
4.4.6 Placing the GS1 Logistic Label on a Shipping Container

Pallets

- Each full unit load — one or more packages held together by a pallet, strapping, shrink wrap, etc. — will have at least one shipping container barcode.
- The barcode should be placed on the upper half of the load but the bottom edge of the symbol should not be higher than 60” from the bottom of the unit load.
- The barcode should be right of centre, at least 2” from either edge.

Note: The placement refers to the shipping container barcode symbol itself, not the label.

Truckloads

- A serial shipping container barcode for a truckload is placed in a pouch and attached to the container closest to the rear of the trailer.
- The pouch should be placed so that it is visible when the trailer doors are open, in an area 3’ to 5’ above the trailer floor and within 50” of the right side of the trailer.
### 4.4.7 Using Application Identifiers

An application identifier is a prefix or qualifier that tells the scanner the meaning of the characters to follow. In the human readable part of the barcode symbol, the application identifier is the number in parentheses.

For example, on this logistic label, three different barcodes are identified by application identifiers:

- (420) ship-to postal code
- (91) store number
- (00) SSCC-18

All barcodes that include an application identifier are encoded using the GS1-128 symbology.

In addition to the “stand-alone” applications, such as postal code and store number shown above, secondary product attributes, such as weight and production date, can be combined with a GTIN-14 code in a single concatenated barcode. Each part of the barcode is identified by an application identifier.

The following illustration shows how the combined information is encoded on a shipping container label for a random weight perishable product.
The application identifiers for the various elements in this barcode symbol include:
(00) SSCC-18
(01) GTIN-14
(11) the production date, e.g. Oct. 1, 1993
(3102) the net weight in kilograms to 2 decimal places, e.g. 21.00 kg
(21) a serial number

Learn More
For more information about using application identifiers, refer to the GS1 General Specifications, available at www.mygs1ca.org under Standards.
For a list of service and solution providers for bar coding, visit www.mygs1ca.org under Tools.
5 APPENDIX A: INTRODUCTION TO GLOBAL LOCATION NUMBERS

As organizations trade products, they also exchange business information internally and externally with their trading partners in Canada and around the world. Effective information sharing demands precise information to clearly identify company locations in one standard fashion. That is why GS1 developed the Global Location Number (GLN) to address the need for a unique numeric identifier that is structured and read one way throughout the world. Just as Global Trade Item Numbers (GTINs, also called U.P.C.s) are used to identify products, GLNs now identify locations.

The GLN is part of the GS1 System of global standards. It is a 13-digit numeric code that provides an organization with the means to identify its corporate structure to its trading partners. GLNs can be used to define:

- Legal entities (e.g. ABC Canada Ltd.)
- Whole companies, subsidiaries or divisions such as a supplier, customer, bank, etc.
- Functional entities within legal entities (e.g. Western region sales office, central billing)
- Purchasing department, accounting department, returns department, nursing station, ward, customer number within a legal entity, etc.
- Physical entities (e.g. store, factory, warehouse).
- A particular room within a building, such as a warehouse, dock door, delivery point, or transmission point, etc.

For more information, visit [www.gs1ca.org](http://www.gs1ca.org).
APPENDIX B: CALCULATING THE CHECK DIGIT CHARACTER FOR GTIN-14

The software that generates the barcode also calculates the check digit, which is the last digit or character in a barcode. Since it is important to know how the number is derived, below is the calculation.

Note: If the code includes an Application Identifier, do not include it in the calculation.

To calculate the check digit, the numbers of the shipping container code are read from left to right.

The check digit for each GTIN-14 is calculated using a six-step algorithm based on the first 13 digits.

<table>
<thead>
<tr>
<th>Sample GTIN-14</th>
<th>3</th>
<th>0</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>0</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
</tr>
</tbody>
</table>

Step 1 - Starting from the **LEFT**, add all the characters in the **ODD** positions (1,3,5, etc.)

\[3 + 0 + 2 + 4 + 6 + 8 + 0 = 23\]

Step 2 - **Multiply** the sum by 3.

\[23 \times 3 = 69\]

Step 3 - Starting from the **LEFT**, add all the characters in the **EVEN** positions (2,4,6, etc.)

\[0 + 1 + 3 + 5 + 7 + 9 = 25\]

Step 4 - **ADD** the sum of Step 2 to the sum of Step 3.

\[69 + 25 = 94\]

Step 5 - **Round up** the total to the nearest multiple of 10.

\[94 + ? = 100\]

Step 6 - The check digit is the number added to round up to the nearest multiple of 10.

**Check Digit = 6**
APPENDIX C: CALCULATING THE CHECK DIGIT CHARACTER FOR SSCC-18

The software that generates the barcode also calculates the check digit. Since it is important to know how the number is derived, below is the calculation?

Modulo ’10 check digit calculation, with an 18-digit code:

Sample SSCC-18

<table>
<thead>
<tr>
<th>0</th>
<th>0</th>
<th>8</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>9</th>
<th>9</th>
<th>9</th>
<th>9</th>
<th>9</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
</tr>
</tbody>
</table>

Position

Step 1 - Starting from the LEFT, add all the characters in the ODD positions (1,3,5, etc.).

\[0 + 8 + 1 + 3 + 9 + 9 + 9 + 9 + 9 = 57\]

Step 2 - Multiply the sum by 3.

\[57 \times 3 = 171\]

Step 3 - Starting from the LEFT, add all the characters in the EVEN positions (2,4,6, etc.).

\[0 + 0 + 2 + 4 + 9 + 9 + 9 + 9 = 42\]

Step 4 - ADD the sum of Step 2 to the sum of Step 3.

\[171 + 42 = 213\]

Step 5 - Round this total up to the nearest multiple of 10.

\[213 + ? = 220\]

Step 6 - The check digit is the number added to round up to the nearest multiple of 10.

Check Digit = 7

Note: If the total in step 4 is already a multiple of 10, then the check digit is 0.
**APPENDIX D: GLOSSARY OF TERMS FOR BAR CODING**

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>AI</td>
<td>Abbreviation for Application Identifier.</td>
</tr>
<tr>
<td>AIDC</td>
<td>Abbreviation for Automatic Identification and Data Capture.</td>
</tr>
<tr>
<td>Alphanumeric (an)</td>
<td>Describes a character set that contains alphabetic characters (letters), numeric digits (numbers), and other characters, such as punctuation marks.</td>
</tr>
<tr>
<td>Application Identifier</td>
<td>The application identifier is a qualifier added to the barcode number, which tells the scanner the meaning of the numbers that follow. In the human readable part of the barcode symbol, the application identifier always appears in parentheses.</td>
</tr>
<tr>
<td>X12</td>
<td>X12, chartered by the American National Standards Institute, develops and maintains EDI standards and XML schemas which drive business processes globally.</td>
</tr>
<tr>
<td>Attribute</td>
<td>A piece of information reflecting a “characteristic” related to an identification number, symbology (e.g. decode, decodability, defects).</td>
</tr>
<tr>
<td>Background</td>
<td>The lighter portion of a barcode symbol, including the quite zones and spaces between the bars.</td>
</tr>
<tr>
<td>Bar</td>
<td>The dark (low reflectance) rectangular element of a barcode symbol.</td>
</tr>
<tr>
<td>Barcode</td>
<td>A precise arrangement of parallel lines (bars) and spaces that vary in width to represent data. One example is a U.P.C. comprised of Company Prefix, item number and check digit.</td>
</tr>
<tr>
<td>Barcode Character</td>
<td>A group of bars and spaces that represents a letter, number, or other information in the symbology.</td>
</tr>
<tr>
<td>Barcode Height</td>
<td>The dimension of a bar (line) measured from its top to its bottom. Note: this includes the human readable numbers.</td>
</tr>
<tr>
<td>Barcode Width</td>
<td>The thickness of a bar (line) measured from one of its edges to the other.</td>
</tr>
<tr>
<td>Bearer Bars</td>
<td>Bearer bars is the thick line around the barcode in an Interleaved 2 of 5 (ITF) shipping container code. They help define the edges of the barcode when it is printed on a rough surface.</td>
</tr>
</tbody>
</table>
Bonus pack  
A trade item that has increased quantity (e.g. net weight, count, or volume) and is sold at the same price as the regular quantity item.

Bookland EAN Number  
A 13-digit number including GS1 Prefix 978, the first nine digits of the ISBN, and a Check Digit used to identify books.

Bookland EAN Price Code  
A supplementary five-digit number for Bookland EAN Numbers consisting of a one-digit currency designator followed by a four-digit price code without punctuation.

Brand Owner  
The party that is responsible for allocating GS1 System numbering and barcode symbols on a given trade item. The brand owner administers and maintains the Company Prefix.

Carrier  
The party that provides freight transportation services. A physical or electronic mechanism that carries data.

Check Digit  
The check digit is the last digit that is calculated from the preceding numbers in accordance to a specific formula. It is used to confirm that the numbers in have been encoded and decoded correctly.

Clear Area  
See Quiet Zone Code 128 Code 128 is a continuous, variable length alphanumeric symbology encoding the ASCII 128-character set.

Company Number  
See Company Prefix.

Company Prefix  
Uniquely identifies the manufacturer who is licensed to use the Company Prefix. It is part of the barcode structure.

Consumer Unit  
The consumer unit is usually the smallest unit of a product that is normally sold to the consumer. It may also be referred to as an item.

Concatenation  
The representations of several Element Strings in one barcode symbol.

Contrast  
See Symbol Contrast.

Corrugated  
A material comprised of one or more sheets of fluted paper stuck between flat sheets of paper (e.g., a brown box used for case packs).

Decodability  
A parameter specified by ANSI/UCC-5 and ISO-15416 that measures how closely the Scan Reflectance Profile is to approach decode failure for a given printed symbol.

Decode  
Converting the bars and spaces in a barcode symbol into its corresponding data.

Decoder  
The part of the scanning system equipment that interprets the barcode.

Defect  
A parameter specified by ANSI/UCC-5 and ISO-15416 that measures the voids present within the bars and the spots present within the
spaces or Quiet Zones of the barcode symbol.

**Digitable Barcode Font**
A barcode character set representing the individual data characters intended to form a barcode symbol.

**Digitable Offset**
A process of sending digitized images directly to an "offset" printing press without using intermediate film or printing plates.

**Digits**
Any one of the Arabic numerals 0 to 9.

**Direct Print**
A process in which the printing apparatus prints the symbol by making physical contact with a substrate (i.e. ink jet, thermal transfer).

**Distributor**
A retail sales entity selling finished goods to the consumer, or a wholesale entity selling finished goods to other retailers.

**GS1 Company Prefix**
Part of the international GS1 System data structures consisting of an GS1 Prefix and a company number, both of which are allocated by a GS1 Member Organization, such as GS1 Canada.

**GTIN-13**
The 13-digit GS1 System data structure composed of a data structure, GS1 Company Prefix and check digit as well as an item reference, location reference, or asset type.

**GS1-128**
A subset of code 128, a high density alphanumerical symbology.

**EAN/UPC Symbology**
A family of barcode symbols including EAN-8, EAN-13, UPC-A, and UPC-E barcode symbols. Although UPC-E barcode Symbols do not have a separate Symbology Identifier, they act like a separate symbology through the scanning application software. See also EAN-8 barcode Symbol, EAN-13 barcode Symbol, UPC-A barcode Symbol, and UPC-E barcode Symbol.

**EANCOM®**
The international Electronic Data Interchange (EDI) standard provided by GS1 International, conforming to the UN/EDIFACT standard.

**EC**
Abbreviation for Electronic Commerce.

**Edge Determination**
A parameter specified by ISO-15416 that counts the number of crossings over the global threshold of the Scan Reflectance Profile to verify whether the number obtained conforms to a legitimate barcode symbology.

**EDI**
Abbreviation for Electronic Data Interchange.

**EDI Transaction**
The conversion of application data to and from the X12 standard format.

**EDI Translator**
Software that converts application information to and from an EDI transaction format.
<table>
<thead>
<tr>
<th><strong>Efficient Consumer (ECR)</strong></th>
<th>A grocery initiative aimed at reducing inefficient practices and wastes in the supply chain.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Efficient Foodservice (EFR)</strong></td>
<td>A foodservice initiative aimed at reducing inefficiencies in the foodservice supply chain.</td>
</tr>
<tr>
<td><strong>Electronic Commerce</strong></td>
<td>The conduct of business communications and management through electronic methods, such as Electronic Data Interchange (EDI) and automated data collection systems.</td>
</tr>
<tr>
<td><strong>ECCnet Registry</strong></td>
<td>The most comprehensive and continually validated registry of its kind in Canada, ECCnet Registry enables trading partners across industry sectors to exchange standardized, accurate and up-to-date product data electronically, through a single central location – greatly streamlining the product listing process.</td>
</tr>
<tr>
<td><strong>Electronic Data Interchange</strong></td>
<td>The computer to computer transmission of business Interchange (EDI) information using a public standard format.</td>
</tr>
<tr>
<td><strong>Electronic Funds</strong></td>
<td>A method for payment of monies owed in which the payer orders the bank to electronically debit the payer’s account and forward credit information to electronically credit the payee’s account.</td>
</tr>
<tr>
<td><strong>GS1</strong></td>
<td>GS1 is an international not-for-profit association with Member Organizations in 108 countries. The GS1 System of standards is the most widely used supply chain standards system in the world. GS1 is the organization that administers the barcode standards outside of Canada and the United States.</td>
</tr>
<tr>
<td><strong>GS1 Canada</strong></td>
<td>The GS1 Member Organization that administers the GS1 System in Canada.</td>
</tr>
<tr>
<td><strong>GS1 US</strong></td>
<td>GS1 US which in cooperation with GS1 administers the GS1 System of global standards. The GS1 System consists of product and serialized identification codes, application identifiers and associated symbologies.</td>
</tr>
<tr>
<td><strong>GTIN</strong></td>
<td>Global Trade Item Number is an umbrella term used to describe the entire family of GS1 data structures for trade item identification. GTIN is a 14-digit product identifier that has to be adopted for all globally available products by January 1, 2005. GTIN assignment is governed by the rules contained in the GS1 General Specifications.</td>
</tr>
<tr>
<td><strong>GTIN-12</strong></td>
<td>The 12-digit GS1 Identification Key composed of a GS1 Company Prefix, Item Reference, and Check Digit used to identify trade items.</td>
</tr>
<tr>
<td><strong>GTIN-13</strong></td>
<td>The 13-digit GS1 Identification Key composed of a GS1 Company Prefix, Item Reference, and Check Digit used to identify trade items.</td>
</tr>
<tr>
<td><strong>GTIN-14</strong></td>
<td>The 14-digit GS1 Identification Key composed of an Indicator digit (1-9), GS1 Company Prefix, Item Reference, and Check Digit used to identify trade items.</td>
</tr>
<tr>
<td><strong>Indicator</strong></td>
<td>A digit from 1 to 9 in the leftmost position of the GTIN-14.</td>
</tr>
<tr>
<td><strong>Interleaved 2 of 5</strong></td>
<td>Interleaved 2 of 5 also referred to as ITF, is a symbology for creating barcodes for standard shipping containers. ITF barcodes can be printed directly on rough surfaces, such as corrugated cardboard using inkjet printing method.</td>
</tr>
<tr>
<td><strong>Item number</strong></td>
<td>The manufacturer assigns a unique item number to each product they are applying a barcode. This information must be maintained in the manufacturers database. The length of the assigned item number is dependant upon the licensed Company Prefix. (See Variable Length Company Prefix.)</td>
</tr>
<tr>
<td><strong>Machine Readable Data</strong></td>
<td>Machine-readable refers to the symbology barcode itself (bars and spaces), which is read by a scanner.</td>
</tr>
<tr>
<td><strong>Nominal Size</strong></td>
<td>The barcode dimension size specifications uses nominal size = 100% of magnification (preferred size) for best scanning results. barcodes may be larger or smaller than the nominal size. Maximum and minimum sizes are outlined in the specifications for the different types of barcodes.</td>
</tr>
<tr>
<td><strong>Packaging Indicator</strong></td>
<td>See Indicator</td>
</tr>
<tr>
<td><strong>Packaging Type</strong></td>
<td>Within the structure of an SSCC-18, the packaging type denotes a general type of container. Note: The application identifier is always shown in parentheses preceding the packaging type. (See SSCC-18 structure.)</td>
</tr>
<tr>
<td><strong>Quite Zone</strong></td>
<td>An area to the left and right of a barcode that is free of all printing or graphics, which enables the scanner to read the barcode symbology. The quiet zones are an integral part of the barcode symbol.</td>
</tr>
<tr>
<td><strong>Scanner</strong></td>
<td>A scanner is an electronic device to read barcodes and convert them into electrical signals understandable by a computer devise.</td>
</tr>
<tr>
<td><strong>Serial Number</strong></td>
<td>The serial number is a unique 9-digit number assigned by a manufacturer to identify a shipping container. The number should not be repeated on any other shipping container for 12 months or while the shipping container (containing the product) may still be in use, whichever is longer. The serial number is part of the serial shipping container code. It may also refer to a stand-alone alphanumeric or numeric character using application identifier 21 or 250.</td>
</tr>
<tr>
<td><strong>Standard Containers</strong></td>
<td>A standard container is a shipping container in which all the units in the container are identical – they all have the same description, size, count, weight and/or price.</td>
</tr>
<tr>
<td><strong>Symbology</strong></td>
<td>A defined method of representing numeric or alphabetic digits using bars and spaces that are easily scanned by computer systems. A symbology is a specific type of barcode.</td>
</tr>
<tr>
<td>------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Substrate</strong></td>
<td>The material on which a barcode symbol is printed.</td>
</tr>
<tr>
<td><strong>Unit Load</strong></td>
<td>A unit load is one or more transport packages or other items held together by means such as a pallet, slip sheet, strapping, or shrink wrap, interlocking, glue, or net wrap, making them suitable for transport, stacking or storage as one unit.</td>
</tr>
<tr>
<td><strong>U.P.C.</strong></td>
<td>See GTIN-12.</td>
</tr>
</tbody>
</table>

For GS1 Barcode guidelines visit www.gs1ca.org or www.mygs1ca.org under Standards.