GS1 DataMatrix Frequently Asked Questions for the Canadian Cannabis Community

Background

The Canadian cannabis community is using and implementing GS1 standards to increase efficiencies in various value chain processes, including product identification, warehouse and inventory management, traceability, as well as product recalls. A key element of the GS1 system of standards is barcodes, which play a key role in supply chain management and enable trading partners to automatically identify and track products as they move through the supply chain. GS1 manages several types of barcode symbologies; depending on the industry or sector, and the type of product, different barcodes can be used.

In environments with automated systems, the physical article needs to be identified in a machine-readable form, such as a barcode. Barcodes are symbols that can be scanned electronically using laser or camera-based scanners. They are used to encode information such as product identification, packaging date and batch numbers.

Based on information provided in January 2020 by Canadian cannabis stakeholders and Cannabis Work Group participants, stakeholders agreed that implementation of GS1 barcodes across the industry needed harmonization to ensure unique barcoding standard is utilized across the Canadian cannabis industry. The last step of this harmonization is the move to the GS1 DataMatrix by January 1, 2025. This Frequently Asked Questions (FAQ) document has been developed to support the Canadian cannabis community with their GS1 DataMatrix implementation. This document will be updated as questions from the cannabis community are received.

1. What is GS1 DataMatrix?

A single barcode that can hold a significant amount of information and may remain legible even when printed at a small size or etched onto a product. GS1 DataMatrix is a two-dimensional (2D) matrix symbology that has been used in the public domain since 1994.

The GS1 system has adopted the GS1 DataMatrix because it can encode GS1 system data structures (e.g., Application Identifiers), and offers many technical advantages over other barcodes. The GS1 DataMatrix has a compact design and is able to be developed through multiple production methods, allowing it to be placed onto various surfaces.

When implementing the GS1 DataMatrix, choosing the form of the symbol must be made based on a number of criteria, including configuration, available space on the product type, amount of data to encode, the printing process.

It is possible to encode the same data in both forms of the GS1 DataMatrix:

Square

Rectangle

GS1 DataMatrix can carry additional information such as batch/lot number and packaging date using GS1 Application Identifiers. In its square-form, the GS1 DataMatrix has a maximum capacity of 3116 numeric or 2335 alphanumeric characters.

In its rectangle-form, the GS1 DataMatrix has the maximum capacity of 96 numeric or 71 alphanumeric characters. GS1 DataMatrix symbols are read by two-dimensional camera scanners. Scanners that are not camera-ready cannot read the GS1 DataMatrix.

2. What are benefits of GS1 DataMatrix?

- Recommended globally for all regulated healthcare products (e.g., pharmaceuticals and medical devices).
    - Canadian pharmacy sector implementation of GS1 DataMatrix is well underway.
    - US Drug Supply Chain Security Act (DSCSA) for pharmaceutical products (due date, November 27, 2018).
- Can encode required variable data (e.g., lot/batch #, packaging date, etc.).
- Small and ideal for all packaging sizes.
- Capacity of up to 3,116 numeric or 2,335 alphanumeric characters.
- Uses Reed-Solomon error correction. This feature allows, to a certain extent, the correction of error in the barcode. For example, if the barcode is damaged through transportation and logistics, to a certain extent, the barcode will still be readable by scanners.

3. What is the GS1 DataMatrix implementation timeline for cannabis products?

The Canadian cannabis community agreed to implement the GS1 DataMatrix on all products that go through point-of-sale by January 1, 2025.

4. How do we create barcodes at each packaging level?

Consumer items

For consumer items or the products that go through Point-of-Sale (POS), first you need to assign a Global Trade Item Number (GTIN) to each packaging level. To assign a GTIN, you need to:
- Obtain your unique GS1 Company Prefix from GS1 Canada.
- Using your GS1 Company Prefix, you will create and assign GTINs to each packaging hierarchy.

After you have assigned a GTIN to your product, the GTIN, lot and packaging date can be encoded in the GS1 DataMatrix and affixed on the product.

Shipping and Logistics Units

If the packaging level is shipping or logistic units such as a shipping case or a pallet, the GS1 Identification Key that is used to identify shipping and logistic units is Serial Shipping Container Code (SSCC). The GS1 barcode that is used for shipping and logistics units is GS1-128.

To obtain information about SSCC visit https://www.gs1.org/standards/id-keys/sscc. Additional information can be found in GS1 General Specifications sections 4.2.2 and 4.4. Information about the GS1 DataMatrix can be found in section 5.6 of GS1 General Specifications.

If the case and pallet level are logistic units, as well as consumer items (they go through POS), the GS1 Identification Key that is used to identify these products will be the GTIN. In this scenario two GS1 barcodes will need to be affixed to the product: GS1-128 and GS1 DataMatrix. The GS1-128 barcode will be used for shipping and logistics processes and the GS1 DataMatrix will be used at POS. Note that both barcodes must have the same GTIN encoded in them.

For information on how to assign a GTIN, review General Specifications section 4.2.1 and 4.3, additional information can be found in GTIN Management Standard. To obtain information about the GS1-128 and the GS1 DataMatrix barcodes review section 5.4 and 5.6 of GS1 General Specifications. For information on barcoding for shipping containers review "Barcoding Basics for Shipping Containers".

If you have questions, contact GS1 Canada's Industry Support Services team at info@gs1ca.org.

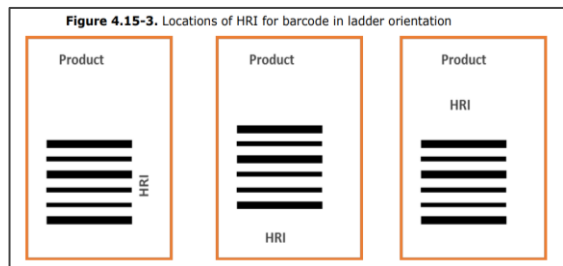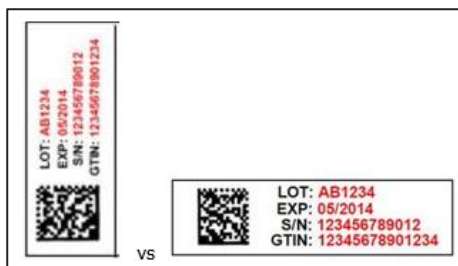# 5. Do I always need to print HRI?

As per GS1 General Specifications, Human Readable Interpretation (HRI) SHALL appear except in rare circumstances for specific applications where there are extreme space constraints (e.g., direct part marking). For the list of exceptions, review section 4.15 Human Readable Interpretation (HRI) Rules of GS1 General Specifications on page 249. If the GS1 barcode symbology cannot be read or scanned and the HRI does not appear on the label, package, or item, non-HRI text **should** be used as backup information.

6. What is the orientation of the Human Readable Interpretation (HRI) (vertical or horizontal)?

The HRI can either be provided/printed vertically or horizontally; however, the most common orientation is vertically stacked. You can also rotate the text to be vertical or horizontal. *For additional information on GS1 HRI check GS1 General Specifications, section 4.15.*
Send a sample of your barcode to GS1 Barcode Scan Verification Service to validate.

Examples:

7. What are the words associated with the Application Identifiers (13) and (10)?

Application Identifier 13: PACK DATE
Application Identifier 10: BATCH/LOT

8. What is the format of the date to encode a packaging date?

The packaging date is encoded in the barcode as YYMMDD. It can appear in the human readable section as DD Mon YYYY to make it easier for the reader. For example: 141120 vs. 20 Nov 2014. The rules for defining and applying HRI are described in _GS1 General Specifications_, Section 4.15.

9. What type of 2D barcode do I need?

The Canadian cannabis industry's position is that only the GS1 DataMatrix barcode is what should be used on consumer items (for products that are sold at Point of Sale (POS)). GS1 DataMatrix is the ISO/IEC recognized and standardized implementation of the use of the ISO DataMatrix.

GS1 DataMatrix is the only version of a DataMatrix barcode that supports GS1 system data structures (e.g.: GS1 Application Identifiers), including Function 1 Symbol Character (FNC1). Therefore, if a non-GS1 DataMatrix is used, the GTIN, Lot/batch and expiry date Application Identifiers may not be readable by scanners.

10. What packaging level requires the GS1 DataMatrix?

The Canadian cannabis industry position is that all products that go through point-of-sale will require the GS1 DataMatrix. GS1-128 is mandatory for all shipping/logistic units.

Consumer Item   Shipping & Logistic Units

11. How do I know if my barcode is created correctly?

GS1 Canada offers a Barcode Scan Verification service to its subscribers for a nominal fee. Barcode Scan Verification assesses your printed barcode images to ensure that they can be scanned the first time, and every time.

By identifying any problems with barcodes before wide-scale production of packaging begins, brand owners can avoid the unwelcomed scenario where products must be withdrawn, packaging redesigned and reprinted all because a barcode does not scan when it should.

To access this service, go to _https://gs1ca.org/barcode-scan-verification/_, click on "Submitting Product, Print Proofs or Labels for Barcode Scan Verification" and follow the steps to submit your barcode for verification.

12. What type of GTIN can be encoded in GS1 DataMatrix?

GS1 DataMatrix requires a 14-digit GTIN.
If you have a GTIN-12 (or UPC), you need to add two leading zeros to make it a 14-digit GTIN.
If you have a 13-digit GTIN, you need to add one leading zero to make it 14-digits GTIN.

13. Is there a minimum size for GS1 DataMatrix applicable to cannabis products?

The minimum size of a GS1 DataMatrix for Cannabis products is dependent on the following factors:

- The amount and format of the encoded information
- The minimum X-dimension is 0.375 mm, or 0.0148 inches as indicated in "Table 1 – Trade items scanned in general retail POS and not general distribution", under section "5.12.3 GS1 symbol specification tables" in GS1 General specifications.

It is recommended to use a barcode generator tool to create a GS1 DataMatrix according to GS1 Standards. Your barcode solution provider could assist with this task. Once you have generated a sample barcode, send it to a barcode verification service. You can use the Barcode Scan Verification Service offered by GS1 Canada to ensure the barcode has been created according to GS1 Standards.

14. Can you give an estimate of how much smaller a DataMatrix barcode can be than an equivalent content DataBar?

GS1 DataMatrix is considerably smaller than GS1 DataBar Expanded or GS1 DataBar Expanded Stacked barcodes and can be used for very small or hard to mark products. Please see images below to compare different barcodes. Note that the images below are enlarged for visibility.

GS1 DataMatrix

(01)00068780000108
(13)220705
(10)A52D

GS1 DataBar Expanded Stacked

(01)00068780000108(13)220705(10)A52D

GS1 DataBar Expanded

(01)00068780000108(13)220705(10)A52D

15. If LPs are not registered with GS1, can they still print GS1 DataMatrix barcodes?

Licensed Producers (LPs) can print the GS1 DataMatrix. However, to obtain the correct Global Trade Item Number (GTIN), which is the number below the barcode, they must first reach out to GS1 Canada to receive their GS1 Company Prefix which enables LPs to create GTINs to identify the product and to encode the GTIN in the GS1 DataMatrix.

GS1 DataMatrix Barcode

GTIN → (01)09504000059101

16. When should we expect to start seeing these on products? Because Jan 1, 2025, is the latest that products should be updated with this barcode?

Licensed Producers (LPs) should have GS1 DataMatrix barcode symbology on all their products by January 1, 2025. Each LP will communicate their specific implementation timeline with their trading partners. Retailers need to have the ability to scan GS1 DataMatrix when LPs start shipping products with GS1 DataMatrix.

17. Based on a fixed set of information, can we shrink the barcode to fit the label?

Since the GS1 DataMatrix symbology allows to encode large amounts of data in a very small barcode, we do not recommend shrinking it more than the barcode minimum size. Pease review GS1 General Specification to determine the minimum size for your barcode.

Please ensure to verify your barcodes using a barcode verification service. You can use the Barcode Scan Verification Service offered by GS1 Canada.

18. Will Jurisdictions (e.g., OCS, AGLC) be in line with what needs to go in the barcode.?

Jurisdictions have been participating in the community discussion since its creation and they are aligned with the current identified requirements which includes including the GTIN, lot/batch and packaging date in a GS1 DataMatrix by January 1, 2025.

19. Can an LP encode/add extra information in the barcode if they want to?

Currently the community identified information are GTIN, lot/batch number and packaging date. All supply chain partners will be ready by January 1, 2025, to encode this information in GS1 DataMatrix or to receive and use this information via scanning the GS1 DataMatrix. If LPs encode additional information in the barcode their trading partners may not be ready to receive this

data. As a result, it is recommended not to add additional data that has not been agreed to by the cannabis community.

Note: If there is a need to add other information in the barcode, bring this to the attention of cannabis work group. To open a work request for the Cannabis community visit [Work Request Submission (Login required)](#). Once the request is approved by the community, all trading partners will be ready to use the change based on an implementation timeline identified by the community.

20. Will products be printed with both types of barcodes initially or is the expectation for manufacturers to switch from DataBar to DataMatrix when they want?

The Cannabis work group has approved to move from other barcodes to GS1 DataMatrix barcode symbology and the expectation is that LPs will switch to GS1 DataMatrix. Products will not have two types of barcodes on them.

21. The retail selling units will have a GS1 DataMatrix. Will the shipping cases will still have GS1-128? or will it also be required to have GS1 DataMatrix?

The shipping or logistic units that do not go through point-of-sale will continue to only have GS1-128.

22. What is the added value of migrating GS1-128 to GS1 DataMatrix, if we have no additional information encoded?

The shipping or logistic units that do not go through point-of-sale will continue to have only GS1-128.
If the shipping unit is also a consumer unit and will go through the point-of-sale, it will require to have a GS1 DataMatrix as the POS systems cannot read the GS1-128. These cases may have both GS1-128 and GS1 DataMatrix.

23. What resources are available to support GS1 DataMatrix implementation?

- [GS1 General Specifications](#) (Technical specifications)
    - GTIN assignment - sections 4.2.1 & 4.3
        - Additional information can be found in [GTIN Management Standard](#).
    - GS1-128 & GS1 DataMatrix - sections 5.4 & 5.6
    - Human Readable Interpretation (HRI) - section 4.15
    - GS1 Application Identifiers - section 3

- [2D symbols in distribution and logistics](#)

- [Image-based scanners recommendation](#)

- [Barcode scanner environments and printing methods](#)

- [GS1 Human Readable Interpretation (HRI) Implementation guideline](#)

- [GS1 Canada Standards Page](#)

- [Barcoding for Designers, Printers and Packagers](#)

- [Barcode Scanning Equipment Selection Criteria](#)

- [Symbology Placement Guidelines](#)

- [GS1 Barcode Scan Verification Service](#)

- [GS1 Canada Barcode Standards page](#)

- [Barcoding for shipping containers](#)

For additional support contact GS1 Canada Industry Support Services team at info@gs1ca.org