

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:



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. It is worth mentioning that a square is a type of rectangle that has four equal sides.

2. What are the 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 #and packaging date).
- 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 helps correct for partially damaged barcodes.

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

[This chart](#) outlines the transition start date for each jurisdiction. Many began as early as 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 level.

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

If the case and pallet levels are both logistic units and consumer items, meaning they also go through Point-of-Sale, 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, refer to question 12 or review [General Specifications section](#) 4.2.1 and 4.3. Additional information can be found in the [GTIN Management Standard](#) guide. To obtain information about the GS1-128 and the GS1 DataMatrix barcodes, review section 5.4 and 5.6 of the 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?

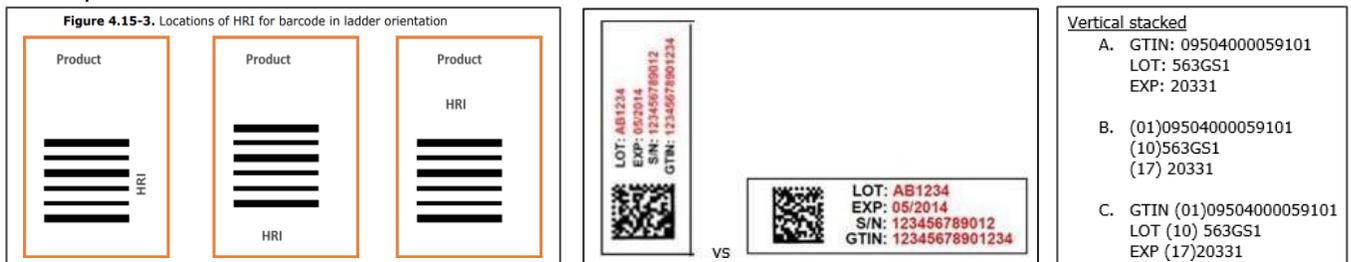
As per GS1 General Specifications, Human Readable Interpretation (HRI) SHALL appear, except in rare circumstances for specific applications where there are extreme space constraints (e.g., direct part marking). For the list of exceptions, review section 4.15 Human Readable Interpretation (HRI) Rules 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:

Figure 4.15-3. Locations of HRI for barcode in ladder orientation



Vertical stacked	
A.	GTIN: 09504000059101 LOT: 563GS1 EXP: 20331
B.	(01)09504000059101 (10)563GS1 (17) 20331
C.	GTIN (01)09504000059101 LOT (10) 563GS1 EXP (17)20331

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)).

The GS1 DataMatrix is the only version of the Data Matrix barcode that supports GS1 system data structures (e.g.: GS1 Application Identifiers). If a non-GS1 DataMatrix is used, the data encoded in the barcodes using GS1 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.



Consumer Item



Shipping & Logistic Units

GS1-128 is mandatory for all 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 scanning Environment the barcode is being printed for, e.g., Point-of-Sale, or distribution and logistics.

To find the minimum required size of the GS1 DataMatrix review section 5.12.3 GS1 symbol specification tables in [GS1 General specifications](#). For cannabis consumer items that are only sold at Point of Sale, use "Figure 5.12.3.1-3. Symbol specification table 1 addendum 2 for 2D barcodes" to determine the required size of the GS1 DataMatrix.

A barcode generator tool is recommended 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 Licensed Producers 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. A GS1 Company Prefix enables LPs to create GTINs to identify the product and to encode the GTIN in the GS1 DataMatrix.



16. When should we expect to start seeing the GS1 DataMatrix on cannabis products?

While LPs should be actively preparing for the transition to GS1 DataMatrix barcodes, products should only be shipped to jurisdictional warehouses with GS1 DataMatrix barcodes when that jurisdiction has confirmed its official transition start date. Each jurisdiction will communicate its go-live date directly to LPs. The most up to date go-live dates can be found in [this chart](#). Retailers need to have the ability to scan GS1 DataMatrix when LPs begin shipping products with the new barcodes.

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

Since the GS1 DataMatrix symbology allows the encoding of large amounts of data in a very small barcode, we do not recommend shrinking it beyond the barcode minimum size. Please review [GS1 General Specification](#) to determine the minimum size for your barcode. For cannabis consumer items are only sold at Point of Sale, use "Figure 5.12.3.1-3. Symbol specification table 1 addendum 2 for 2D barcodes" to determine the size of the GS1 DataMatrix.

Please 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 Cannabis Work Group discussion since the GS1 DataMatrix creation and they are aligned with the current identified requirements, including the GTIN, lot/batch and packaging date in a GS1 DataMatrix.

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

Currently, the community-identified information include GTIN, lot/batch number and packaging date. All supply chain partners will be ready 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 to refrain from adding 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 the 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. Should I print multiple barcode formats on my cannabis product?

Products should only display one barcode symbology. The Cannabis Working Group has approved a full transition to the GS1 DataMatrix, meaning the linear (1D) barcode will be phased out and no longer appear on cannabis product packaging. However, it is important to confirm with the jurisdiction you trade with that they have officially begun accepting GS1 DataMatrix barcodes into their supply chain.

21. Is the expectation for manufacturers to switch from DataBar to DataMatrix when they want?

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

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

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

23. When would a shipping unit need a GS1 DataMatrix in addition to a GS1-128?

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

If the shipping unit is also a consumer unit which will go through point-of-sale, it will be required to have a GS1 DataMatrix, as the POS systems cannot read the GS1-128. These cases may have both GS1-128 and GS1 DataMatrix.

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

- GS1 Canada [Cannabis](#) Page
- [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