Barcode labeling of primary packaging
Quick guide: Barcode type and content

Do you sell medicine to Danish hospitals via Amgros? Then you need to put a barcode on not only the secondary, but also the primary package.

Why?
At the hospital nurses use scanning in the medication process to ensure that the right drug is given to the right patient.
When drugs are placed on the dispensary shelves, they are often taken out of the secondary package, and therefore it is very important that the primary package is marked with a barcode.

In this quick guide you can read how the primary package is barcoded correctly.

1. Allocation of Global Trade Item Number (GTIN) to the primary package

You must allocate the same GTIN to the primary packages, although the primary packages are stored in different secondary packages (see figure 1).

Figure 1: Each syringe has the same GTIN, but the different secondary packs have different GTINs
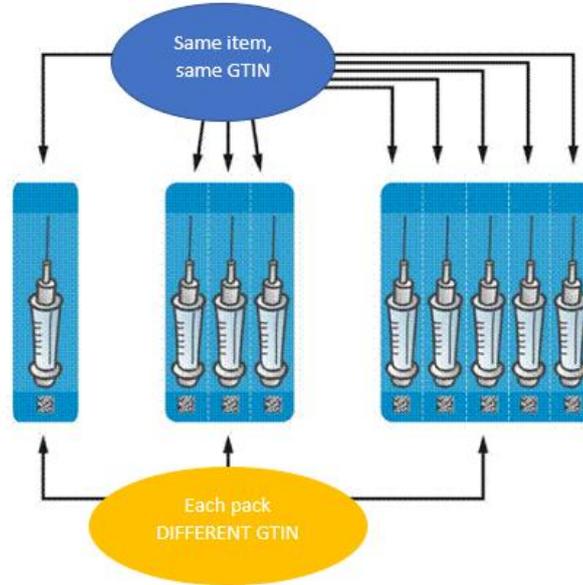
2. Which barcode should be chosen to label the primary packaging?

Amgros requires at least a GTIN on the primary packaging, and it must be contained in either an EAN-13 or a GS1 DataMatrix.

3. Labeling the primary packaging with an EAN-13 barcode

Figure 2: Structure of the EAN-13 barcode
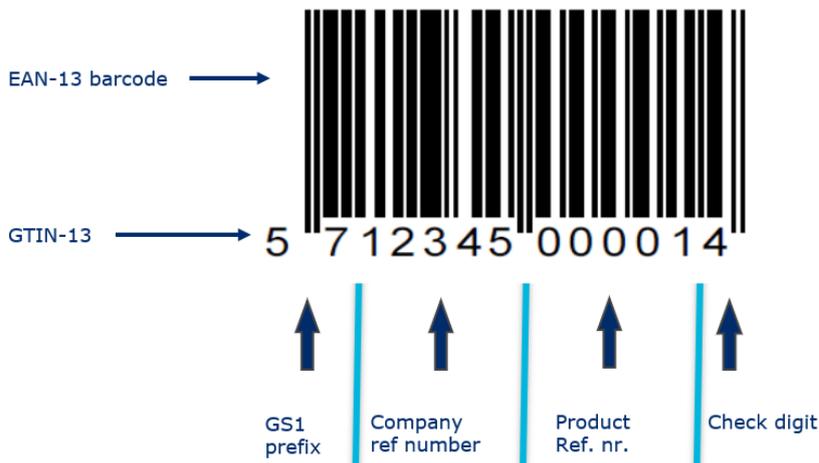
3.1 If the EAN-13 barcode is used on surfaces with a curvature

If an EAN-13 barcode is placed on a curvature container with a diameter of less than 5 centimeters, it must be placed in ladder format to ensure that it can be scanned.

Figure 3: The EAN-13 barcode placed on a vial in ladder format

4. Labeling the primary packaging with a GS1 DataMatrix

It may be beneficial to use a GS1 DataMatrix for small products, since the barcode can be very small.

The first character in a GS1 DataMatrix data string is FNC1 (technically called ASCII, with the coded value 232). This character signifies that this is a GS1 DataMatrix and not an ISO Data Matrix. In most barcoding software programs, a GS1 DataMatrix can be selected, and the FNC1 character is automatically inserted.

Since a GS1 DataMatrix can contain a lot of information, it is important to specify what information is encoded in the barcode. This is done by applying Application Identifiers. Application Identifier for GTIN is (01). Note that the parentheses must only be expressed in the human readable text and not encoded in the barcode.

Figure 4: Example of a GS1 DataMatrix containing a GTIN

Note:
In a GS1 DataMatrix, the predefined length of a GTIN is 14 digits. If you use a GTIN-13 (which consists of 13 digits), remember to add a 0 in front of the 13 digits.

4.1 But the barcode needs to be on a small object, which has a curvature surface!

If a square GS1 DataMatrix is put on packaging that has a curvature surface, there is a risk that the scanner is not able to capture data in the barcode. Therefore, it is beneficial to use the rectangular GS1 DataMatrix and place it in an upright position. See Figure 5.

Figure 5: Rectangular versus square GS1 DataMatrix
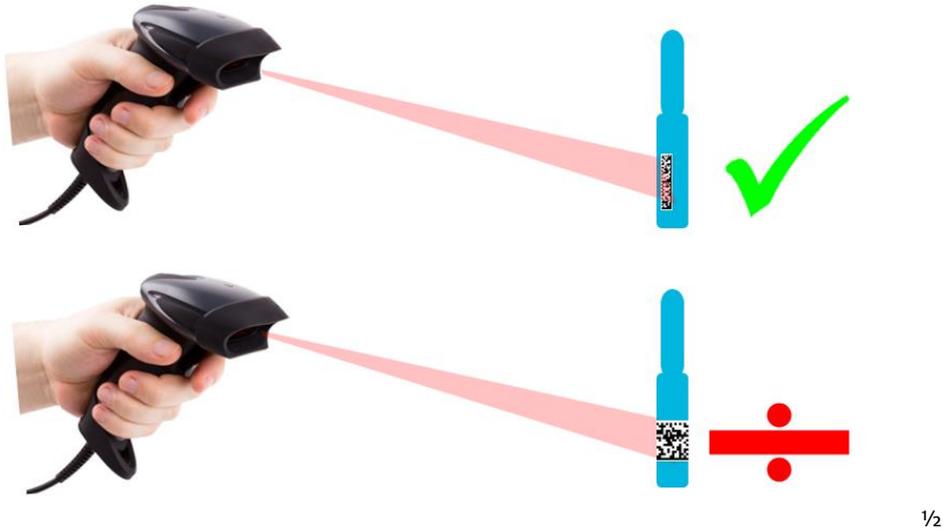
4.2 The size of the barcode

It is important that the barcode has a size that makes it scannable. If the barcode is scanned at general distribution it must be bigger compared to a barcode on a package scanned in the dispensary.

The height and width of a GS1 DataMatrix depend on the size (measured in millimeters) of each square in the GS1 DataMatrix is (this is called the x-dimension), and on the amount of data encoded. Resize the x-dimension in order to resize the GS1 DataMatrix (See figure 6).

Figure 6: GS1 DataMatrix, size difference

X-dim ideal 0,75mm

X-dim ideal 0,38mm

5. Human readable text connected to the barcode (Human Readable Interpretation)

It is important that the information encoded in the barcode also can be found in readable text close to the barcode. This is to provide for cases in which the barcode cannot be scanned.

When an EAN-13 barcode is used, the readable text is placed below the barcode. The readable text encoded shall always be printed adjacent to the GS1 DataMatrix, while protecting the quite zones. In circumstances with extreme space constrains it is possible to leave out some of the readable text or the entire text related to the barcode, however, if possible it is important to have the GTIN in readable text. For more information on human readable interpretation, see section 4.15 in GS1 General Specifications.

Figure 7: Example of readable text. Note that Application Identifier (01) must be part of the readable text when a GS1 DataMatrix is used.
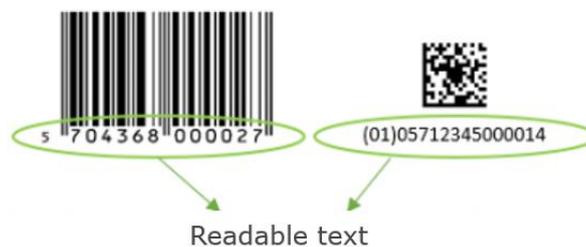
6. Barcode quality

To make sure the barcode can be scanned, print quality is very important. Below are some elements that need to be considered to ensure high quality:

- A clear contrast between dark and light modules in the barcode
- Never place the barcode on transparent packaging. If the packaging is transparent, it is recommended to print the barcode on a white field.
- Make sure to leave a clear field to the right and left of the EAN-13 barcode (called a quiet zone) with no text, image, symbols etc. For a GS1 DataMatrix the quiet zone is on all four sides of the GS1 DataMatrix.

7. No barcode without data

When an EAN-13 barcode or a GS1 DataMatrix is placed on the primary package, it is important to add the GTIN to the product in the Supplier and tendering portal at Amgros' tendering site.

8. The most common barcode errors for GS1 DataMatrix on primary packaging

- No Application Identifiers
- No leading zero before GTIN
- Parentheses encoded in the barcode
- Missing FNC1-character
- FNC1 is encoded as "FNC1" in the barcode and not as the ASCII value (codeword value 232)
- Line breaks and/or spaces etc. are inserted after GTIN
- The barcode is placed on a transparent package
- The x-dimension is too small, and thus the barcode cannot be scanned
- Quiet zones are missing

9. Reference materials
For further information see the links below:

- [Amgros technical guide (barcodes)](#)

- [GS1 DataMatrix Guideline](#)

- [A guide to a perfect barcode scan](#)