

BARCODE

Today, barcodes are everywhere at the cash register at the shop, in online stores, at warehouse, virtually everywhere in the product supply chain between the manufacturer and the consumer, as well as in the healthcare system where barcodes are used to identify drugs, medical devices, and even patients.



DEFINITION

A barcode is an image consisting of a combination of numbers and/or letters produced with the help of a computer that can be scanned digitally, using laser or optical camera scanners.

The computer converts human-readable symbols (numbers or letters) into an image that is readable by automatic devices, i.e. a barcode. Thanks to this, data can be entered automatically using a scanner connected to a computer.

Every barcode has two parts: the machine-readable part (the barcode) and the human-readable part (the number).

Not all barcodes are the same. There are hundreds of different kinds of barcodes used globally. Barcodes have become the simplest way to collect data and enter them in a computer, because barcode scanning is much faster, more accurate and convenient than entering data with a computer keyboard.

By running a ray of light across the bars, you can read 20 or more symbols per go. Just like there exists a variety of software, there are different code systems. For example, to identify various assemblies and parts, a car manufacturer can use its own internal system, but it can be very difficult for multiple companies working together to combine different identification systems, similarly to people speaking different languages. It is perfect if all parties involved in trade transactions speak the same language, i.e. use the same identification system, and the same barcodes. There is such a language: the GS1 system that uses GS1 barcodes. Of the entire range of barcodes, GS1 uses the following barcode symbols: EAN/UCC, ITF-14, GS1-128, GS1 DataBar and Data Matrix. Each of these has its own use (Figure 1).

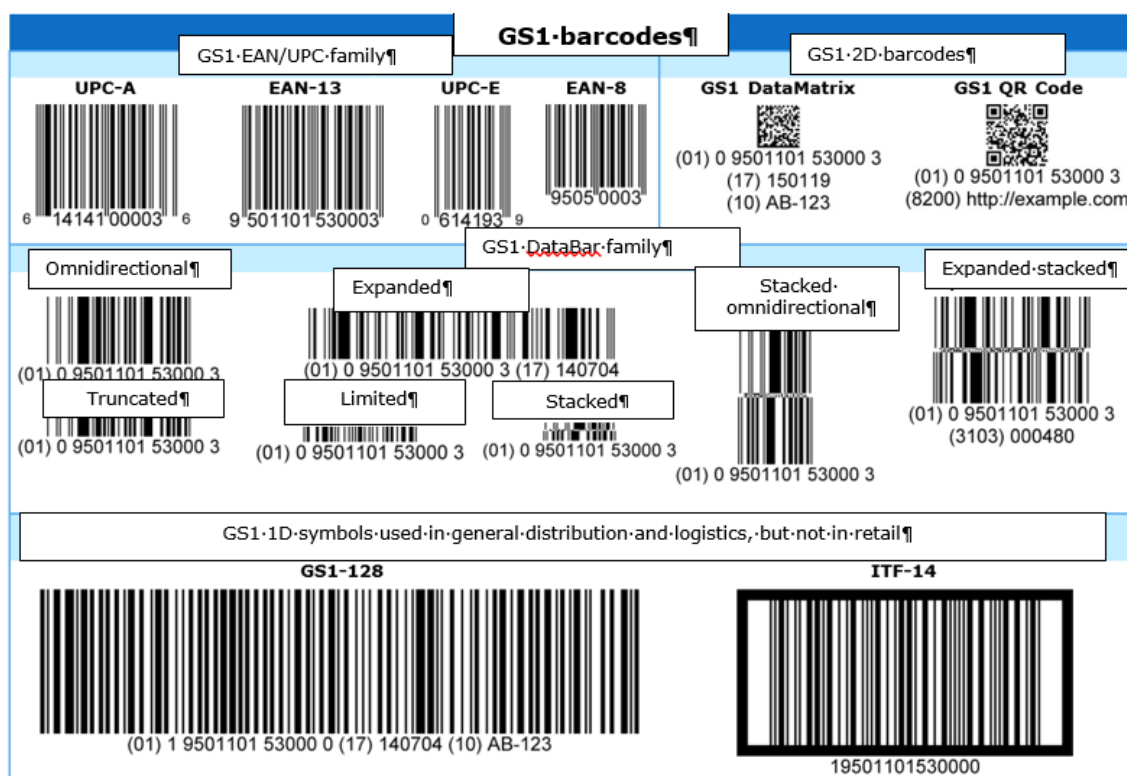


Figure 1. GS1 barcode overview. Source: https://gs1lv.org/Svitrkodu_ieviesanas_10_soli

New sales channels and rising demand for products and services have made information technologies vital in business processes. GS1 standards facilitate national and international communication among all parties in transactions, in any supply chain, including raw material suppliers, manufacturers, wholesalers, distributors, retail companies, hospitals, and end consumers. A company that wants to sell its products or services, or just even to communicate with the outside world, may potentially have to deal with high costs maintaining various systems. The GS1 system is a set of standards for effectively managing global, multisectoral value chains, identifying unique products, supply units, fixed assets, locations and services. They facilitate traditional and digital commerce and help achieve full transparency and traceability. Identification keys are the basis of the GS1 system of standards. These can be represented using barcodes or EPC/RFID tags, in order to enable automatic scanning or reading at cash registers, warehouse receptions and at any other point in a business process where this is necessary. In addition to delivering unique identification numbers to users, the system also makes it possible to retrieve data like expiry dates or serial and batch numbers, which is critical for ensuring traceability.

How to work with a barcode, and what its advantages are?

Any company anywhere in the world can use barcodes, which is why they are standardised as part of the global GS1 system. The GS1 system was developed to facilitate free movement of goods by enabling active identification of unique products, locations and services, as well as sharing of information. A product needs a barcode to be bought, sold or moved. A unique GS1 number is necessary for the barcode. Unique identification numbers and barcodes see the most extensive global use, and are employed in more than 150 countries.

! NOTE

Retail products are marked with barcodes representing numbers referred to as GS1 Global Trade Item Numbers (GTIN).

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For information about how a company can obtain a barcode for marking its products for retail, see: https://gs1lv.org/Svitrkodu_ieviesanas_10_solis

Marking a product with a barcode

There are a few ways to include a barcode in a product:

- integrating the barcode in the design of the packaging;
- printing it directly onto the packaging;
- attaching a pre-printed label.

In order for a scanner to read a barcode, the barcode must be correctly produced and shown. This is why one must follow a few important rules pertaining to the size and colour of barcodes, and their location on packaging.

Barcode dimensions

Barcodes can be printed in different sizes, and the choice of size depends on the printing conditions. A smaller barcode can be used if there is a combination of good-quality printing, and a good-quality surface it is printed on. The dimensions of every barcode type can vary, but only within certain limits. Legibility decreases beyond them. Another factor that one must always keep in mind in choosing the size of a barcode is the environment where it is to be scanned. Barcodes intended for retail can be as small as the printing quality allows. If a barcode is to be scanned in a warehouse, it should be big enough for the operator to be able to read it from a longer distance.



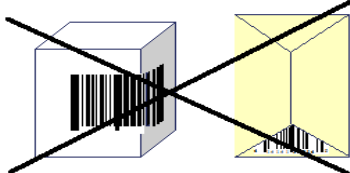
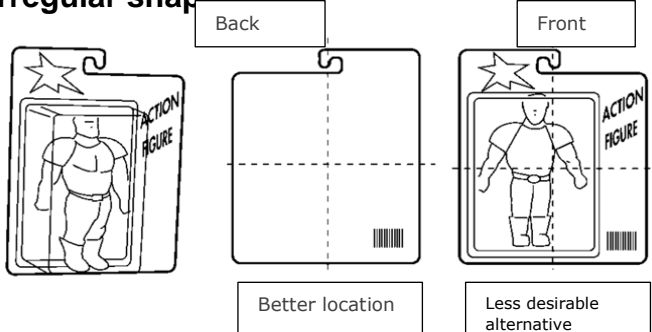
Barcode location

Pre-defining the location of a barcode increases productivity and its reading accuracy. Keeping to a standard location for the barcode helps achieve maximum productivity in any scanning environment.

Barcode location examples in Table 1.

Table 1.

Barcode location examples

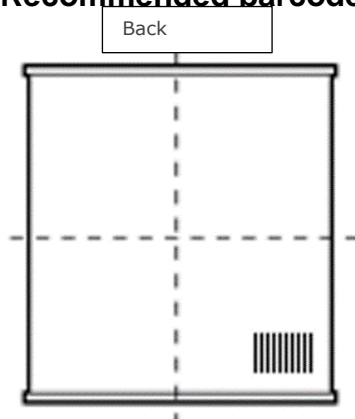
Example	Barcode location rules
Multipacks 	<p>It must be ensured that two barcodes with different GTVN are never visible on the packaging. This is mostly relevant for multipacks, especially those with transparent packaging. Multipacks must have a barcode that is distinct from the main unit of product, and all of the other barcodes must be covered.</p>
Freely orientable packaging: 	<p>If a unit of product is wrapped in freely orientable packaging, the same barcode should be printed on the wrapping material two or more times. This makes sure that once the product is packaged, at least one full barcode is always visible.</p>
Uneven surfaces: 	<p>Barcodes must always be printed on sufficiently smooth surfaces. Avoid printing over corners, bent areas, wrinkles, seams and other uneven areas in the packaging.</p>
Irregular shape: 	<p>Sometimes the irregular shape of a piece of packaging prevents the positioning of its barcode in parallel to the reading surface. This is usually the case with fibrous packaging materials, blister packs and folded packaging.</p>

Cylindrical products



If the printing direction allows this, it is preferable that the bars of barcodes on cylindrical products are perpendicular to the axis of the cylinder (looking like a stair), so that the barcode is read off a surface that is as flat surface. This includes such convex objects as bottles and cans. Stair orientation is required for curved surfaces with a small radius

Recommended barcode location



The best place for a barcode is in the bottom right quadrant of the back of the packaging, leaving proper light-coloured areas around the barcode and following the edge rule.

Edge rule: A barcode must not be closer than 8 mm and further than 100 mm from any edge of a container/ piece of packaging.

Source: prepared by the author, based on <https://www.gs1.org>