KNOWLEDGE GUIDE SERIES

Using barcodes for business and international trade

TRADE FORWARD SOUTHERN AFRICA

What this Knowledge Guide covers

❶ What are barcodes and why are they needed in business and trade?
❷ The benefits of using barcodes
❸ Different types of barcodes, and decoding their meaning
❹ How to obtain a barcode for your products: a step by step guide

❶ What are barcodes and why are they needed in business and for trade?

Barcodes are images that consist of a series of parallel black and white bars that can be read by a barcode scanner. They are applied to products in order to quickly identify them anywhere in the world.

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Barcodes can come in many shapes and sizes and a wide range of designs, and some can even be read by mobile phones. The focus of this Guide is on barcodes in 1-dimensional format, commonly required prior to placing products on supermarket shelves, for logistics, and for a range of other purposes.

The combination of symbology (the barcode) and scanner technology converts the symbols of the barcode into usable information, such as a product's origin, price, name, stock location, etc. The information obtained from the barcode can then be used to manage check-out at the till, a company's inventory levels and stock replenishment processes, accounting, and many other aspects of business and supply chain logistics, in an efficient manner.

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After capturing the information from the barcode, barcode scanners link to a host computer or tablet, transmitting the information obtained in real-time, without additional human intervention.

The use of barcodes is an essential component for businesses involved in the production, supply, shipping, wholesale and retail of goods. They play a critical role in the automation of processes, and the streamlining of business transactions.

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Businesses involved in the production of goods will almost always be required to obtain a unique barcode for each type of product being produced and sold, and incorporate this into the product packaging, in order to sell such products to resellers or retailers.

❷ Benefits of using barcodes

> *Barcodes provide a common way of uniquely identifying, accurately capturing and automatically sharing vital information about products, locations and assets.*

Error prevention	Inventory	Cost savings	Speed	Transparency	Implementation
Using a barcode to process a product's data is far more accurate than having to manually enter that data, which is significantly more prone to human error.	With improved accuracy and real-time data, retailers are able to track large stock quantities, providing for better ordering and stock management.	Businesses save costs by being able to track a greater variety of goods more accurately, freeing up staff, which can instead be utilised elsewhere in the business.	Barcodes allow business to process goods and sales faster, both when stock or inputs arrive at the business, as well as at point of sales terminals.	Tracing products throughout the production, logistics and sales process becomes more efficient and transparent when using barcode scanning technology.	Barcodes are inexpensive to source, and for producers and exporters tends to require little more effort other than incorporating these into the product label or packaging.

In international retail sales, there are essentially two types of barcode format used: **UPC** ('Universal Product Code') and **EAN** (formerly 'European Article Number', now 'International Article Number'). Both fall within the broader category of Global Trade Item Numbers (GTIN)*. The UPC is the original *12-digit barcode* format and is used in the United States and in Canada, while the EAN (13 digits) is used in the rest of the world. The design of the code is broadly the same for both (i.e. the spacing and thickness of the vertical bars matches), apart from the different number length. The *placement* of the numbers also differs slightly; it is important to note the numbers merely represent the human-readable equivalent of the symbology (barcode stripes), needed when the barcode label is damaged or needs to be entered manually. Barcode scanners read only the barcode (stripes and spaces) itself.

* The GTIN was developed by GS1, the standard setting body for barcodes used by retailers, manufacturers and suppliers.

❸ Different types of barcodes, and decoding their meaning

The choice of barcode to place on a product largely depends on the primary target market that a product will be sold in, along with any preferences or requirements of the buyer (importer, retailer) that will list the product.

Since both the UPC (U.S. / Canada) and EAN (Rest of World) barcodes use the same symbology, these codes can be universally machine-read. However, the UPC comprises 12 digits (incl. a leading '0' as the U.S./Canada country identifier), unlike the EAN system which uses 2 or 3-digit country prefixes for most other global locations. A UPC-type barcode can be retrofitted with a leading '0' added, in order to convert it into the EAN standard (but not vice-versa from EAN to UPC).

Anatomy of a barcode (EAN-13)

6 001234 567899 >

Country prefix — Producer code and specific product number — Check digit

④ How to obtain a barcode for your product: a step by step guide

Obtaining a barcode for your product may appear daunting at first, but is in fact a relatively straightforward process that holds significant benefits, and is an essential requirement if planning to list products with local or foreign importers and retailers.

One product, one barcode

It is important to note that a **unique barcode** needs to be assigned to **each product that has a different characteristic**, such as product size, colour, flavour, weight or style. In other words, if a good is produced in a 500ml bottle as well as a 2 liter container, but is otherwise the same, each must receive its own unique barcode.

Example: a producer of wheat flour

Product 1:   500g cake flour
Product 2:   2,500g cake flour
Product 3:   2,500g white bread flour

Requires 3 unique barcodes, one for each item

Where to obtain your product code: A global barcode organisation, or through local resellers?

GS1 is a neutral, not-for-profit standard setting global organisation that develops and maintains the system of barcodes. While it is headquartered in Brussels, Belgium, it has offices in over 100 countries, including in **South Africa** and in **Namibia**, providing easier access to local and regional businesses. However, it is not essential to obtain a barcode from any specific local office. GS1 maintains a global company registration database of its member organisations (the companies that have joined with the purposes of obtaining unique barcodes, or barcode ranges), manages country and company prefixes, and allows users to verify the authenticity and registration status of a barcode. Through the registration process, member companies are added to the global database and the barcodes assigned to them are attributed to them in this database. This "direct" form of company registration with GS1 is often a requirement by retailers.

There has also been a proliferation of local barcode resellers in most countries. Often these codes are accompanied by a certificate of authenticity (issued by the reseller) to warrant the uniqueness of the barcode, i.e. that the same barcode is not already in use elsewhere. These barcodes often originate in another country and are usually registered with another entity (the original applicant), and then put up for resale. When buying barcodes through a reseller, it is important to note that while the process may be cost-effective and appear straightforward, the lack of named registration on the GS1 database (often required by retailers), along with barcode prefixes that may be assigned to other countries and vendors, may be an issue for some entities. While resellers tend to issue final barcodes, the GS1 system allows companies to obtain barcode banks linked to the company name, and allows the company to manage the final barcode assignment itself.

Choose the correct barcode format	Obtain prefix and assign barcodes	Plan and implement placement and printing	Have a barcode quality plan
01	02	03	04
Different barcode formats serve different purposes and applications, but for purposes of producing goods for retail sale (to be scanned by retail point-of-sale systems) locally or internationally, the two common code formats are the 12 or 13-digit GTIN numbers as expressed through the UPC (United States / Canada) and EAN (Rest of World) barcode, respectively.	If obtaining a barcode through the GS1 barcode authority, one can apply for a GS1 global company prefix; this enables one to implement a barcode system for one's products. The prefix contains a global location number that identifies the business entity (but note, this is no '*country of origin*' indicator of the product itself) .	If a barcode is based on static information (the exact same barcode is used for each item of the same characteristics), then the barcode can be integrated into the design process and printed directly onto the product or product packaging during the print run.	Engagement with sales channels and retailers should form part of a business' barcode quality plan, so that the appropriate and preferred barcode format is used (a retailer sometimes imposes additional barcode requirements). It is also important to ensure that the placement and print quality is sufficient and in-spec, to assure full readability by point-of-sales systems globally.
Where the characteristics of the product do not change on a regular basis, use a EAN / UPC barcode, depending on the main sales market.	The entity chooses the number of barcodes required (GS1 issues single barcodes, as well as barcode ranges, e.g. 10, 100, 1000, etc. Remember that each product variation will require its own unique barcode.	**Key steps include:**	
Where the individual traded product is of variable measure (weight, expiry date) or additional information must appear in the barcode, then a different barcode is more suitable (GS1-128 barcode).	The business then assigns the individual barcodes, from the range allocated, to each of its products.	*Choosing the placement of the barcode on the product.*	*Consider barcode testing services of the product for compliance with global standards in terms of numbers, print quality, size etc.*
		Using appropriate barcode size on your product: the nominal dimension for EAN / UPC barcodes is 37.29 mm x 27.85 mm (with a magnification factor of 80% minimum, and 200% maximum).	*Attend bar code training (for example as offered by GS1, and included in the barcode cost) to ensure correct use of barcodes.*
		Use high contrast colours: ideally black / dark lines on a white background.	
		Ensure that the human readable text (numbers below code) is legible.	

Note: *due to the inherent limitations of 1-dimensional barcodes that are no longer able to keep up with the demands for greater product information transparency, traceability, and authentication, the industry is moving towards new 2-D barcode standards (such as QR codes), with the transition for UPC codes set to begin in 2027.* ■ **Read more at the following link:** *bit.ly/barcode-sunrise2027* ■

Other barcode types and applications

This **Guide** focuses on the standard 1-dimensional 12/13-digit (UPC/EAN) barcodes that are affixed to products being put up for retail sale, and are usually an essential requirement. Various other barcodes exist and serve other purposes, or contain additional functions and information. For example, **QR codes** (like those alongside) can be customised with website links, addresses, brand / product information, and other content. Barcodes used in distribution and logistics (for example where bulk quantities of a product are delivered to a warehouse on a palette) are additional to product-specific barcodes, and would generally require an **ITF-14 barcode**. Other expanded barcodes / 'DataBars' are used especially for certain food products in supermarkets, and can contain price, weight, volume, and expiry date information.

Additional barcode resources

SCAN CODE

GS1 South Africa
bit.ly/GS1-SA

GS1 Namibia
bit.ly/GS1-NA

Global Barcode Information Registry (GS1)
bit.ly/GS1-GEPIR

Guide to Barcoding and Best Practices (GS1)
bit.ly/GS1-GUIDE

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