



THE GS1 HANDBOOK

How To Barcode Your Product

GS1 is the most widely used system globally at point of sale and in the supply chain. Adopting the universal standard helps you to get products to your business partners and consumers in an **efficient, fast and safe way**. It might look overwhelming if you are just starting to explore the GS1 system, but this handbook aims to clarify the standards and help you become compliant in hours. Let's start creating barcodes that scan successfully first time, every time.



Introduction to GS1

What is GS1?

GS1 is a global, not-for-profit organisation with more than 110 member organisations serving businesses around the world. It aims to create and promote a universal language for business which enables customers, suppliers and partners to understand each other. The GS1 system is the most widely used supply chain standards system in the world and it requires a barcode that is scannable anywhere in the world. This standard makes it possible for companies to use the power of information by identifying, capturing, and sharing data about products, locations and more.

Today over two million companies around the world use GS1. More than five billion GS1 barcodes are scanned every day.

Note

The story of how the first ever barcode was created is really interesting. Find out more [here](#)

What do barcodes do and why you need them?

If you are creating barcodes for the first time, you might think that it's just another regulatory item that will make life more difficult. But this is not the case.

Imagine you are Christmas shopping and give the items to the cashier. Any item with a barcode is simply held to the scanner, there's a 'beep', and the clerk continues with the next item in seconds. Without barcodes, the cashier would need to manually calculate the prices by reading tags and entering them onto the computer. You would find yourself standing in line for hours and the chance of an error would be considerably high. Barcodes simplify this process with data that machines can read, transferring the product's information and price in moments. This is why any business planning to sell products in the retail market needs barcodes, it is the only way the product information can be communicated in the supply chain - that is, through the information embedded in the code.

Here is why barcodes are essential and the benefits of using them:

- 1 Eliminate human error:** scanning is faster and more reliable than manually managing inventory and costs.
- 2 Better product inventory:** especially if there is a large variety of them. Barcodes identify and differentiate products.
- 3 Versatility:** barcodes can be used for different kinds of data collection like price, inventory, accounting and shipment.
- 4 Less supply chain errors:** barcodes help identify products, locations and assets better. Hospital staff, for example, can identify which medication needs to be given to which patient and for how long, with the help of barcodes.

5

Global product identification language: any product with a barcode can be sold and shipped globally.

6

Improved efficiency: provides a faster, more reliable process for inventory management. Reduces time and allows optimized inventory levels which cut costs.

7

Avoid traceability and delivery issues: barcodes eliminate the chance of sending wrong items to wrong places, or not sending them at all.

8

Readable format for end consumers: the right barcode transfers data of a scanned item to a receipt which the consumer can read easily.

Basic GS1 terminology

These are some of the common terms you will come across when learning about GS1 standards and creating barcodes for your company:

Company Prefix: a unique business number licensed after an application to the GS1 office, based on your identification needs. These needs are determined by what the company needs to identify: products, locations or other things. Businesses need to specify the variations of products, as well as consider future plans to license the ideal company prefix.

Global Trade Item Number (GTIN): a globally unique 14-digit number used to identify trade items, products or services. It is the number you see beneath the barcode. It is composed of your company prefix, item reference number (assigned by you) and a check digit.

Serial Shipping Container Codes (SSCC) - 18-digit number used to identify logistics units, like boxes and pallets. It is used to track the physical movement of logistic units along the supply chain. This unique

identifier is comprised of an Extension Digit, a GS1 Company Prefix, a Serial Reference, and a Check Digit.

Global Location Number (GLN) - a unique number that identifies a company or organisation. It can also be used to number legal entities such as factories, headquarters, delivery places, invoicing addresses, workplaces and branches as well as functions or roles, like goods recipient or authorised purchaser.

Universal Product Code (UPC) – this is used for product at the point of sale and is predominantly known and used in the US. It is basically the same thing with EAN-13 (used in Europe), but has 12 digits instead of 13.

Human Readable Interpretation (HRI): the text/numbers beneath the barcode that humans can read, in case the barcode scan fails.

Industries that use GS1 barcodes

GS1 is the most widely used system for supply chains and global trading, and has transformed many industries in a positive way. Although barcodes are available to use in many industries, retail, healthcare, transport and logistics, and healthcare are the four core sectors. You can read more about the industries that use GS1 barcodes and how they are affected [here](#) .



Using barcodes for the **first time**



1. Getting a GS1 company prefix

There is a common misconception that GS1 is the institution that creates barcodes for companies, and businesses should contact GS1 to obtain them.

The first step to creating a barcode is licensing a company prefix through your local GS1 organization, which will be a unique number administered to the GS1 database for your company.

The company prefix will be given based on your identification needs, which include factors like:

- Products or locations
- Number of items
- Number of variations - size, colour, package

Find

the closest member organization by visiting [here](#)

Once you have a company prefix, you will be able to create unique numbers to identify your products, locations and assets, and track your products in the market. Company prefix becomes a component of the larger identification number you will create for your items (GTIN) that will be displayed underneath your barcodes. They are also used to create SSCC and GLNs.

You should note that a GS1 Company Prefix comes in five different

“capacities” that allow you to create as few as 10 unique items and as many as 100,000 unique items. The estimated range/number of barcodes you plan to create will change the fee you pay for a company prefix, as well as the number of digits in your company prefix. For example, if you want to create barcodes for only 10 unique items, your company prefix will have 10 digits, and for 100,000 unique items, it will have six digits. You can find more information about company prefix capacities and estimation of your business needs [here](#).

Tip

To keep your company prefix unique, you need to renew your license annually with GS1 before it expires.



2. Assigning GTIN numbers

GTINs are the identification numbers below the barcodes and are specifically assigned for the product, container or location they represent, which helps to identify them in the global supply chain. With a single company prefix, you can create as many GTINs within the predefined item capacity you have licensed from GS1. It is important to consider all current and possible future needs of your business when applying for a license.

Tip

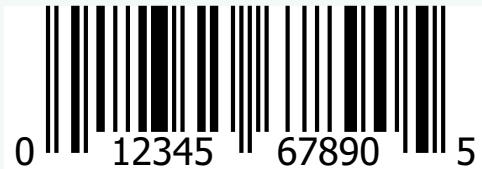
If your company exceeds your expectations, you can obtain a new company prefix. However, this can complicate your relationship with customers as you will either have two prefixes or you will change existing product codes. Since this is a difficult transition, we suggest you leave some margin when you first apply.

This ebook won't go into further detail about the different GTIN structures and uses, but make sure to check out our detailed guide, [Understanding GTINs](#).

While the numbers in the name represent the number of digits in the GTIN, it is important to note that 12 and 14 are commonly used for North America, and 8 and 13 are predominantly used outside of North America.

- **GTIN-12 (UPC)** - individual products - intended for use at checkout
- **GTIN-13 (EAN-13)** - individual products - intended for use at checkout
- **GTIN-14 (EAN/UCC-128 or ITF-14)** - products groupings (package or case) not intended for checkout
- **GTIN-8 (EAN-8)** - used for very small products

GTIN-12 (UPC)



GTIN-13 (EAN-13)



GTIN-14 (EAN/UCC-128 or ITF-14)



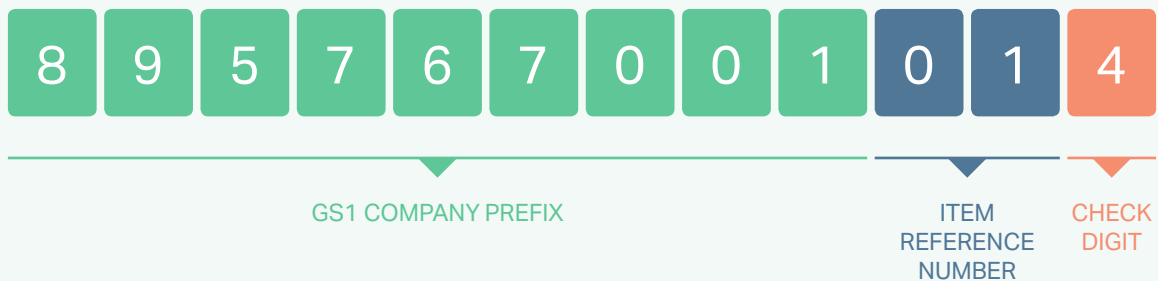
GTIN-8 (EAN-8)



Structure of the GTIN

GTINs are usually composed in the following way, although the length may vary depending on the type of GTIN you will create. It is made up of a combination of company prefix and item reference number, with an additional check digit at the end. There is an indicator digit at the beginning for certain types of GTIN.

YOUR GTIN



*You can refer to this calculator to check your check-digit:
[here](#)

For a detailed look on GTINs, make sure to check out our detailed guide, [Understanding GTINs](#).

3. Selecting a barcode

Different barcode types are available for different purposes, and it is crucial to select the correct one for your needs. These are some of the most commonly used barcodes:

- **EAN/UPC symbol:** use if you need to barcode a trade item that will be scanned at the retail point-of-sale (POS). This symbol is guaranteed to be scanned by POS systems all over the world. In some cases GS1 DataBar symbol may be applied.
- **GS1-128, GS1 DataBar, or GS1 DataMatrix:** use if you are printing a barcode with variable information like serial numbers, expiry dates, or measures.
- **GS1 QR Code:** use if you want to encode a URL into a barcode to make extended packaging information available to the end consumer.
- **ITF-14:** Use if you need to barcode an outer case to be scanned in a logistics environment, and you want to print directly on corrugated carton.

Tip

For detailed information on types of barcodes and the best one for your needs, we suggest speaking to your GS1 member organization.

4. Barcode quality control checklist

Optimizing your barcode processes is just as important as creating barcodes for your company assets and you should check for data content symbology, position and print quality to ensure that printed barcodes comply with the standards, and will scan successfully. Following a quality control checklist will reduce the chance of barcode failures significantly and should become a standard procedure for your product and quality departments.

1. Correct item number (GTIN)

Identify each product or consumer unit with a GTIN, which is the unique number that is the key to accessing information on your product in a database. Following a quality control checklist will reduce the chance of barcode failures significantly and should become a standard procedure for your product and quality departments.

Tip

To correctly identify all your products, first list all your products including their variables. Determine the specifics of your products - colour, size, volume, and allocate a different GTIN to each product.

2. Correct symbol

Refer to '**Selecting a barcode**' section and check with your GS1 member organisation to make sure your selected symbol matches your needs.

Tip

Most commonly used symbol is EAN-13 in EU and UPC in the US, which is for all products sold through a retail point of sale.

3. Located correctly

For point of sale scanning, the best place to locate your barcodes is based on the need for speed and efficiency. They should be in a standard and predictable place that the operator can easily find. The lower right quadrant of the back of the package is usually selected, this can differ however since each item can be a different size and shape.

Tip

Scanning is most successful when it is on a flat surface.

4. Oriented correctly

Orientation is important for good scanning performance and it refers to the direction of the barcode, in reference to the standard standing position of the package. It can be vertical (ladder) or horizontal (picket fence). Ladder is recommended for cylindrical packages.

Tip

Product and label designers should ensure the correct placement and orientation.

5. Sufficient quiet zones

Quiet zone is the solid light area to the left and right of the barcode. When designing, the full size of the barcode should be considered.

Tip

There shouldn't be any text, graphics, watermarks or logos on the barcode.

6. Full bar height - no truncation

The standard retail barcode size is 22.85mm X 37.29mm.

Tip

It should look almost like a square, not a rectangle.

7. Magnification factor —> 80%

Target magnification is 100% by standard, but it can be kept in between 80-120% for point of sale if products allow.

Tip

Printing tolerances are much tighter when magnification is smaller than 100%.

8. Correct colour combinations

Darker bars must appear on a light background. Scanners measure the distance in contrast between the spaces using red light. It is important to use colours that maximise this contrast.

Tip

Since packaging is important to the product, GS1 provides a few other colour options. However, best practice is to use black and white, and red cannot be used at all.



9. Sufficient contrast

If using a transparent or semi-transparent substrate, do not rely on the package background. Print a background in white, orange, or yellow to provide a solid contrast with the bars.

Tip

No matter what type of printing technology is used, the bars needs to be a solid colour.

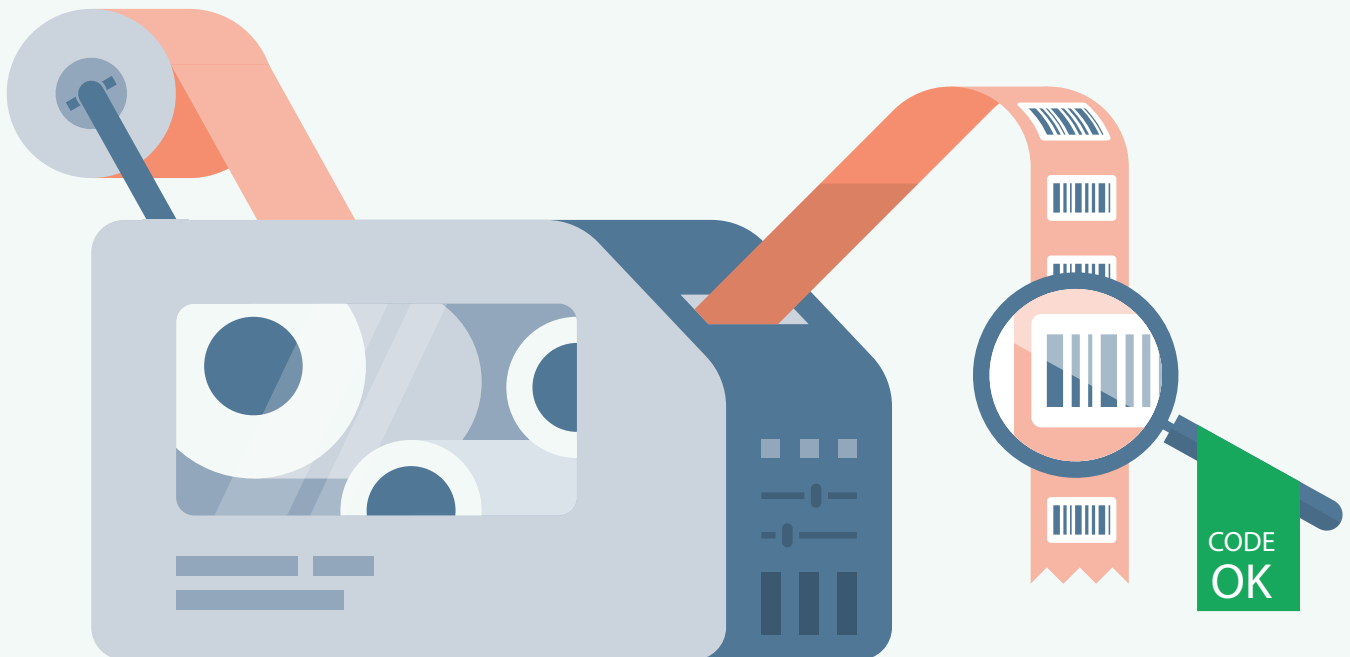
10. Adequate bar widths

With increased use in technology and computerised graphics, more designers are using integrated software packages to create images of barcodes as part of the packaging design. Different print technologies have different impacts on the final production of the barcode symbol. Usually, the bars of a printed symbol will be wider than the original design. This is known as print gain and allowances should be made before printing. The only way to ensure barcodes are not oversized in printing is by verifying the barcodes. Verification measures the printer quality of the barcode to international quality standards.

Tip

When used correctly, graphic design programs can produce really good barcode images, however the designer should consult the printer who will be printing the labels.

Verifying and printing your **barcodes**



Making a standard barcode quality control checklist for your business will improve and optimize your barcode quality. However to prevent human error, save time and guarantee a successful result, it is best practice to use software equipped to create GS1 compliant barcodes.

NiceLabel is built with parameters that prevent implementing an invalid barcode and its smart features guide users to create a compliant barcode and label.

Some other benefits include:

- Enables creating a complete label with human readable and barcode sections.
- Displays the fields of information you should enter.
- Label dimensions and font sizes are flexible so you can create labels that fit product dimensions and compliance requirements.
- Warns if you haven't filled in the necessary number of digits.
- Automatic check digit calculator.

The best part is, the tool will enable you to quickly create a simple system that you can manage by yourself without errors. You will be cutting down on significant costs related to training and more. NiceLabel software aims to get your barcodes printer-ready in the shortest time!

Another method of verification before printing is done using an o-verifier which measures barcodes for ISO standards. It takes precise measurements of bars and spaces and the light reflected from each.

What are the benefits of verification?

- Verification helps you correct any costly errors before printing.
- It makes sure your barcodes are scannable first time, every time.
- It strengthens your position in the supply chain.
- You know all your products are passing ISO standards, helping with customer satisfaction.

Tip

You can also get help from local GS1 organisation for verification, as well as a provisional artwork verification report before the packaging design is finalised.



Conclusion

GS1 is an established system and sets the standards to help businesses and products speak for themselves and carry information around the global supply chain. The information embedded in the barcodes are key to a better and more efficient way of doing business globally. They also guarantee a stronger sales chain and improved customer satisfaction for your company.

If you are a GS1 beginner and don't have much experience with creating barcodes, the steps might seem overwhelming. However once you have read through this handbook and licensed a company prefix from GS1, you are ready to create your own barcodes and shipping labels. Along with NiceLabel's label creator you won't have to worry about your compliance with the standards.

Start using our online label printing solution now

Learn

This ebook is the first of a series of 3. Learn more about how to create GTIN's for your trade items in ebook [number 2](#), and if you will be shipping your trade items, learn how to create logistic labels in ebook [number 3](#).

