



AN INTRODUCTION TO THE GLOBAL TRADE ITEM NUMBER (GTIN)



THE GLOBAL LANGUAGE
OF BUSINESS



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What Is a Global Trade Item Number?

One of the main building blocks of the GS1[®] System, a Global Trade Item Number[®] (or GTIN[®]) is a number that uniquely identifies trade items as they move through the global supply chain to the ultimate end-user.

What Is a GTIN Used For?

GTINs are encountered most frequently at retail point of sale and on inner packs, cases, and pallets of products in a distribution/warehouse environment. They are commonly used on purchase orders and in delivery and payment documents.

The GTIN is a required component of the Global Data Synchronization Network[™] (GDSN[®]) and various types of e-commerce transactions. This global identification system of GS1 ensures that the GTIN placed in a barcode or Electronic Product Code[™] (EPC[®]) is the same information contained in the corresponding electronic documents processed between trading partners.

WHAT IS A TRADE ITEM?

Any product or service that may be priced, ordered, or invoiced at any point in the supply chain. Trade items include individual items as well as all of their different packaging configurations.

Key Attributes of the GTIN

UNIQUENESS

The GTIN uniquely identifies trade items at all item and package levels, thus ensuring that they are always identified correctly anywhere in the world. Each trade item that is different from another is allocated a separate, unique GTIN. The rules for assigning GTINs ensure that every variation of an item is allocated a single number that is globally unique. A GTIN can be assigned by a GS1 Company Prefix licensee anywhere in the world and can be used throughout the world.

DATA QUALITY

The GTIN delivers trade item data using a standardized format and structure. The GTIN does not contain any meaningful information in itself; rather it is simply a pointer to database information that can be directly used in any company and in any country.

An item can be looked up in a database and its associated information retrieved at any point or location. The uniqueness of GTINs is provided through a standardized format that includes a Check Digit. The Check Digit ensures the integrity of data passing through the system.

Business Benefits of Using GTINs

As the building block for all GS1 Systems for global trade, the GTIN is well established as the standard in every country for trade items. GTINs enable items to be sourced and traded globally in the knowledge that they can be scanned and data retrieved for them in any application that is GS1 compliant. If you are a retailer or manufacturer, then this is a vital component of your business and will be or has already become an integral part of all your business systems. Other industries, such as healthcare, are rapidly adopting the GTIN to help reap the rewards seen in other sectors.

Simply put, using the GTIN simplifies supply chain management and provides accuracy, speed, and efficiency for your business. Providing GTINs for your trade items:

- **DRIVES E-COMMERCE:** Using the GTIN facilitates the global flow of trade items and associated information used in electronic commerce. One of the key benefits of the GTIN is that it can be encoded into various types of automatic data capture technologies, such as barcodes and EPC-enabled RFID tags. Machine reading allows the information to be linked to the physical flow of trade items throughout the supply chain.
- **ENHANCES COMPATIBILITY:** Because GTINs work within any business and across business sectors, companies can trade goods and services knowing that the identification will be compatible. For example, a healthcare item that is sold in a retail pharmacy or through a healthcare supply chain is assigned the same GTIN.
- **FACILITATES ACCURACY:** Use of the GTIN improves scanning at checkout, in a warehouse, or in a hospital. It is also essential for accurate stock control and order replenishment.
- **FOSTERS GDSN COMPLIANCE:** The GTIN identifies trade items for electronic data exchange between trading partners as a required component of a GDSN.
- **PROVIDES FLEXIBILITY:** Use of GTINs offers companies the ability to include additional information such as date codes, weight, batch numbers, etc.

How Is the GTIN Formed?

The GTIN is assigned by the brand owner of the product. Once assigned, all trading partners and internal users can use the GTIN.

Elements of the GTIN

- **INDICATOR DIGIT:** The leftmost digit of a GTIN is a GTIN-14. The digit 0 indicates a base unit GTIN, the digits 1 to 8 are used to define packaging hierarchy of a product with the same Item Reference, and digit 9 indicates a variable measure trade item.
- **GS1 COMPANY PREFIX:** The globally unique number assigned to a company by GS1 Member Organizations to create the identification numbers of the GS1 System. Company Prefixes, which vary in length, are comprised of a GS1 Prefix and a Company Number.
- **ITEM REFERENCE:** The part of the GTIN that is allocated by the user to identify a trade item for a given Company Prefix. The Item Reference varies in length as a function of the Company Prefix length.
- **CHECK DIGIT:** A mod-10 algorithm digit used to check for input errors. To understand how this digit is calculated, refer to: www.gs1us.org/checkdig.

GTINs can be 8, 12, 13, or 14 digits in length. Each type of GTIN provides unique numbers that correspond to specific company and product information. GS1 recommends that every GTIN be represented in software applications as 14 digits by right justifying and zero filling left, as appropriate. The following table demonstrates the structure of GTINs in a GTIN-compliant database:

Type of GTIN	GTIN Digit													14
	1	2	3	4	5	6	7	8	9	10	11	12	13	
GTIN-8	0	0	0	0	0	0	N	N	N	N	N	N	N	C
GTIN-12	0	0	N	N	N	N	N	N	N	N	N	N	N	C
GTIN-13	0	N	N	N	N	N	N	N	N	N	N	N	N	C
GTIN-14	N	N	N	N	N	N	N	N	N	N	N	N	N	C

Components and examples of each type of GTIN:

GTIN-8

The GTIN-8 is used in EAN-8 barcodes. Components include:

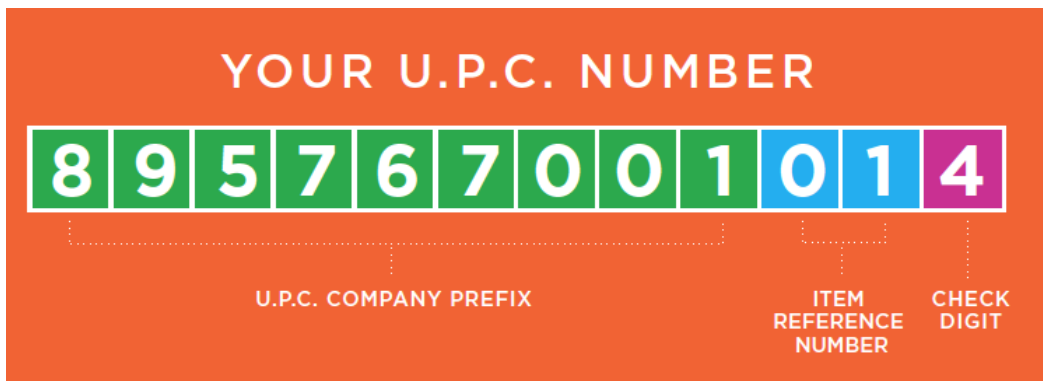
- Seven digits containing a GS1-8 Prefix and the Item Reference assigned by your company
- One digit representing the Check Digit

GTIN-12

The GTIN-12 is used in U.P.C.-A barcodes. Components include:

- Eleven digits containing a U.P.C. Company Prefix and the Item Reference assigned by your company
- One digit representing the Check Digit

EXAMPLE:



EXAMPLE:

U.P.C.-A barcode symbol


GTIN-13

The GTIN-13 is used in EAN-13 barcodes. Components include:

- Twelve digits containing a GS1 Company Prefix and the Item Reference assigned by your company
- One digit representing the Check Digit

EXAMPLE:

EAN-13 barcode symbol


GTIN-14

The GTIN-14 is used in ITF-14, GS1-128 (formerly UCC/EAN-128), GS1 DataBar™, and Data Matrix symbols as well as EPCs. The GTIN-14 is also the data format that is used in IT applications and online. Components include:

- One digit representing the Indicator Digit to indicate packaging level
- Twelve digits containing the GS1 Company Prefix and the Item Reference assigned by your company
- One digit representing the Check Digit

EXAMPLE 1:

GS1-128 barcode symbol



Note:

- When GS1-128 symbology is used to encode a GTIN, the Application Identifier of (01) must precede the GTIN.
- The GS1-128 barcode symbol allows for placement of multiple pieces of data (including the GTIN) in a single barcode. In this example, net weight in pounds is also included.

EXAMPLE 2:

ITF-14 barcode symbol



Note:

- ITF-14 is the GS1 System's only use of Interleaved 2 of 5, a particular type of barcode symbol. It is only used to encode the GTIN.
- Any of the GTIN data structures may be used, as long as they are expressed as 14 digits.

Which GTIN Is Right for Your Product?

A GTIN may be encoded in EAN/U.P.C., ITF-14, GS1-128, GS1 DataBar, and Data Matrix symbols as well as EPCs. The appropriate GTIN and barcode or EPC combination is determined by many factors, such as the type of product, point of sale vs. distribution, and printing material used for the product packaging.

The following table provides examples of unique product identification at various levels. It also demonstrates how various GS1 barcodes can be used for GTINs.

Description	Item	Level	Barcode Type	Encoded GTIN	GTIN in Database
Product A	1 Unit	Consumer	U.P.C.-A	614141000012	00614141000012
Product A	96 Unit Case	Consumer	ITF-14	00614141000029	00614141000029
Product B	1 Unit	Consumer	U.P.C.-A	614141000777	00614141000777
Product B	6 Pack	Consumer	U.P.C.-A	614141000883	00614141000883
Product B	12 Pack	Consumer	U.P.C.-A	614141000999	00614141000999
Product B	2x12 Pack	Case	GS1-128	10614141000996	10614141000996
Product B	4x12 Pack	Case	GS1-128	30614141000990	30614141000990
Product B	8x12 Pack	Case	ITF-14	50614141000994	50614141000994

Frequently Asked Questions About the GTIN

What is a GTIN?

A Global Trade Item Number, or GTIN, is a term used to describe the various versions of number structures that uniquely identify products and services.

Does the GTIN replace the U.P.C.?

No, a GTIN is a term only. The U.P.C. barcode symbol (also known as a U.P.C.-A) encodes a 12-digit GTIN. The U.P.C. does not go away; companies that place a GTIN-12 (U.P.C.) on products now should continue to do so.

Is a unique GTIN required for every level of packaging?

Yes. There should be a unique GTIN identifying the consumer unit, inner pack, multi-pack, case, or pallet where applicable.

What is GTIN compliance?

A company is considered GTIN compliant when it is able to process, store, and communicate information about its products with trading partners using all types of GTINs, whether 8, 12, 13, or 14 digits. Companies become GTIN compliant by expanding the appropriate systems and applications to 14 digits. This will support the GTIN on products at all levels of packaging (consumer, inner packs, multi-packs, cases, pallets, etc). A company must be GTIN compliant in order to take advantage of:

- Data synchronization using the Global Data Synchronization Network (GDSN)
- GS1 DataBars
- Electronic Product Codes (EPCs)

Does my company need a new GS1 Company Prefix to create GTINs?

No. You should continue to use the Company Prefix you have already licensed.

If a change is made to a product, does the GTIN need to change?

A separate, unique GTIN is required whenever any of the pre-defined characteristics of a trade item are different in any way that is relevant to the trading process. The guiding principle here is that a new GTIN should be assigned to the new trade item if the consumer is expected to distinguish the new trade item from the old trade item and purchase accordingly. (Note that the product package and shelf edge label declarations should appear the same to the consumer.) For more information, refer to the GTIN Allocation Rules (available through the GS1 US Product Catalog) or to the Barcodes and Identification Numbers section of the Solutions Center.

When is a 9 used as the Indicator Digit in a GTIN?

A 9 is used to indicate a variable measure product, which is an item that is always produced in the same pre-defined version (e.g., type, packaging, design) that may be sold at any point in the supply chain and that may vary in weight or size or may be traded without a pre-defined weight, size, or length.

What are the correct ASC X12 EDI qualifiers for GTINs?

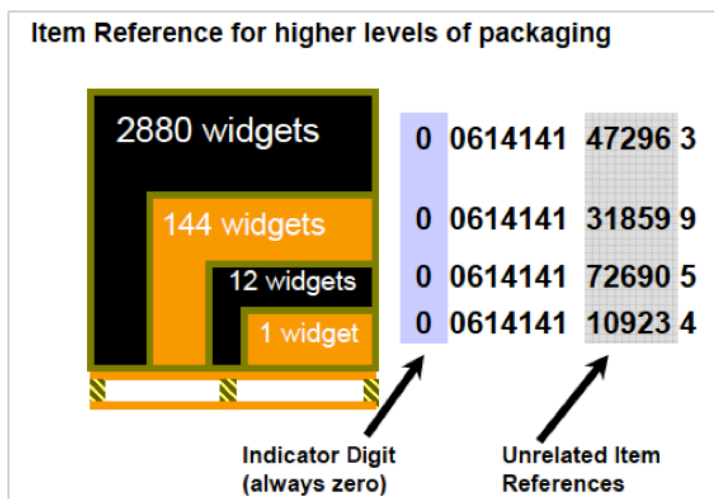
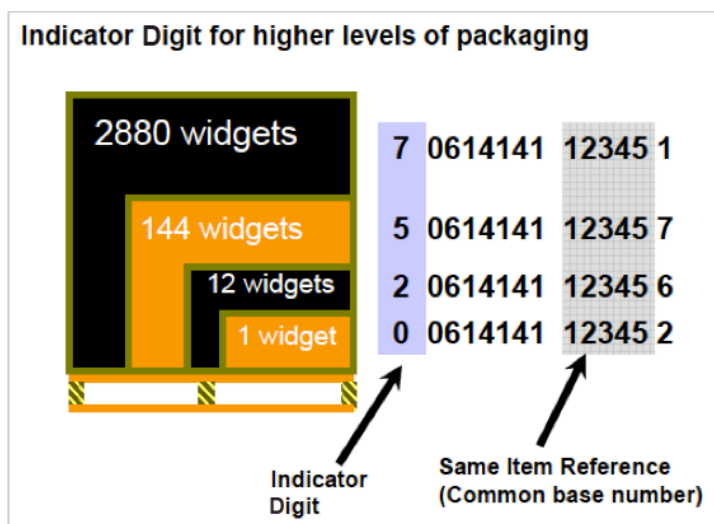
The correct qualifiers are as follows:

- UK for GTIN-14
- EN for GTIN-13
- UP for GTIN-12
- EO for GTIN- 8

GTIN Advanced Topics

ASSIGNING GTINS TO PACKAGING LEVELS

The following diagrams illustrate the assignment of GTINs at various item and package levels. Note that uniqueness can be achieved through the use of different Indicator Digits or different Item References at the higher levels of packaging.



Combination of Indicator Digit and Item Reference for higher levels of packaging


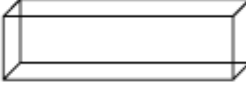


4	1234567	88888	8
2	1234567	88888	4
0	1234567	88888	0
0	1234567	10924	4

AVOIDING MISTAKES IN ASSIGNING A GTIN



When a GTIN is incorrectly assigned to products, the result is invoice errors and delays in products reaching the market. Following are several examples that demonstrate the most common mistakes made in assigning GTINs and how to avoid them.

Mistake #1: Assigning the Same GTIN to a Retail Unit and Case

Retail Unit Product A 18 oz.  GTIN-12 in UPC-A symbol: 6 14141 45324 5	Case 12 x Product A 18 oz.  GTIN-14 in ITF-14 symbol: 0 06 14141 45324 5	<div style="border: 2px solid red; padding: 5px; color: red; font-weight: bold;">Incorrect</div>
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The retail unit and the case each require a unique GTIN. In this example, the assigned GTIN for both packaging levels is 0 0614141 45324 5. The GTIN must differentiate between the two packaging levels. The symbology does not differentiate. A valid GTIN for the case would be 1 06 14141 45324 2.


Mistake #2: Using an Indicator Digit Without a Hierarchy

Retail Unit Product H 8 oz.  GTIN-12 in UPC-A symbol: 6 14141 00324 2	Case 12 x Product H 8 oz.  GTIN-14 in ITF-14 symbol: 1 06 14141 45000 5	<div style="border: 2px solid red; padding: 5px; color: red; font-weight: bold;">Incorrect</div>
--	--	--

Using an Indicator Digit without a hierarchy can cause confusion for your trading partners, who may believe this is a case for a different GTIN-12 or U.P.C.. To correct the error, either the case should be marked using the Indicator Digit 1 with the same GTIN (recalculating the Check Digit to form the ITF in the GTIN-14, 1 06 14141 00324 9) or the case with an Indicator Digit 0 should be set up as its own GTIN (0 06 14141 45000 8).

Mistake #3: Using an Indicator Digit Without a Hierarchy

Incorrect

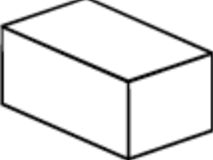


A product without a lower level of packaging, e.g. a 5-gallon pail of chocolate chip cookie dough

GTIN-14 in ITF-14 symbol:
1 06 14141 77777 5

Because there is no packaging hierarchy for this product, the GTIN-14 must have an Indicator Digit of 0. Therefore, a valid GTIN for this item would be 0 06 14141 77777 8.

Mistake #4: Assigning an Incorrect GTIN for a Mixed Case



An orderable mixed case box contains:
12 x Product C: Retail Unit (6 14141 77777 8)
12 x Product D: Retail Unit (6 14141 88888 7)

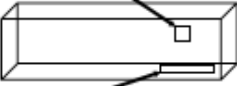
GTIN-14 in ITF-14 symbol:
1 06 14141 77777 5

Incorrect

Because there is more than one type of product in the case, the Indicator Digit may not be 1 thru 8 to indicate a packaging hierarchy. Thus, the GTIN-14 for this mixed case must have an Indicator Digit of 0 and a new Item Reference. A valid GTIN would be 0 06 14141 00444 7.

Mistake #5: Giving the Same Trade Item Two Different GTINs

Case
 12 x Product A 18 oz.
 Retail unit marked with
GTIN-12 in UPC-A symbol:
6 14141 45324 5



GTIN-12 in UPC-A symbol:
6 14141 76890 5

GTIN-12 in UPC-A symbol:
6 14141 45324 5

Incorrect

GTIN-14 in ITF-14 symbol:
1 06 14141 45324 2

Each trade item should be assigned a single unique GTIN. There should only be one symbol per package. In this case, two different GTINs have been assigned. If a second GTIN is needed based on trading partner requirements, the next best action is to assign the GTIN in the ITF-14 the same GTIN-12 that is used in the U.P.C.-A symbol: 0 0614141 76890 5.

Tools and Resources

GS1 US offers a number of easily accessible online tools and resources that can help guide you through the GS1 Standards and processes:

- **CHECK DIGIT CALCULATOR:** Helps you correctly calculate the check digit when forming GTINs
- **DATA DRIVER®:** Online tool that helps companies quickly and accurately create, download, manage, and print authentic barcodes, including GTINs.
- **GS1 US GLOSSARY:** Provides the terminology and language of the GS1 System Standards to help you better understand what you are seeing and learning.
- **GS1 US PRODUCT CATALOG:** Includes an order form for printed publications, calibration kits and more. Partner Connections members receive a premium discount.
- **GTIN ALLOCATION RULES:** Helps to ensure correct assignment of GTINs to your products.
- **PARTNER CONNECTIONS SOLUTIONS CENTER:** Provides a ready reference to education and online materials to speed your barcode and e-commerce processes.
- **RESOURCE LIBRARY:** Documents, videos, and other information to increase the value of standards for all trading partners in the supply chain.
- **FAQS:** Frequently Asked Questions about GS1 Standards, implementation, and how to get started.

For more information about GS1 US, GTINs and other GS1 Standards:

- **Email** info@gs1us.org
- **Call** 937.435.3870
- **Visit** www.gs1us.org

Partner Connections: Your Future Starts Here

Joining the GS1 US Partner Connections Program is the first step in improving your company's efficiency and building better customer relationships. Through this program you receive your unique GS1 Company Prefix, which is used as the foundation to create the identification numbers of the GS1 System, and a Universal Product Code (U.P.C.) Company Prefix that is used to create barcodes for your products. You also receive exclusive tools and resources that make using barcodes a snap:

- **Data Driver:** An easy-to-use online tool that creates, prints, and manages your barcodes and enables you to send product information to your customers electronically via data synchronization
- Access to the latest barcoding and e-commerce standards and guidelines
- Free customer service for your barcode and e-commerce questions
- Free online education and training

GS1 US: Bringing the Global Trading Community Together

For a supply chain to generate maximum value, it must move products from supplier to distributor to customer in a way that minimizes costs, redundancies, and waste and maximizes coordination and collaboration among trading partners. GS1 US makes that process possible by enabling companies to uniquely and globally identify, capture, and share information about products, locations, and more using GS1 Standards.

- **IDENTIFY:** GS1 Identification Numbers uniquely distinguish all companies, products, trade items, logistic units, locations, assets, and service relations in the supply chain—from manufacturer to consumer.
- **CAPTURE:** GS1 System Data Carriers—in the form of barcodes and Electronic Product Codes that are programmed into Radio Frequency Identification tags (known as EPC®-enabled RFID tags)—can hold various amounts of data to accommodate different needs, such as batch/lot numbers and expiration dates. This additional data can be very helpful in numerous business processes in the healthcare and fresh foods industries, to name a few examples.
- **SHARE:** GS1-enabled interoperability allows electronic commerce information, including master data, transactional data, and physical event data, to flow through the supply chain between trading partners and to the consumer.

Moving Your Business Forward with GS1 Standards

Every industry has its own needs and challenges. GS1 takes a leadership role by working with industry communities to articulate, identify, resolve, and share industry issues and best practices and by enabling standards-based solutions that help companies run their businesses more successfully. Today, more than 300,000 member companies throughout in the United States employ GS1 Standards to make their supply chain more visible, efficient, secure, and sustainable.

- **VISIBILITY:** GS1 Standards enable the reciprocal sharing of product information both internally and with trading partners throughout each step in the supply chain. Having ready access to such comprehensive data helps companies to ensure product availability, enable recalls quickly, and provide convenience, satisfaction, and safety for customers.
- **EFFICIENCY:** GS1 Standards dramatically increase the amount of data available for decision making, enabling companies to automate processes and optimize forecasting and inventory planning to reduce duplication and waste.
- **SECURITY:** GS1 Standards provide an accurate and standardized way to validate, access, send, and receive information with trading partners through the use of unique identification numbers. GS1 Standards protect your brand, promote safety for your customers, and help to combat counterfeiting.
- **SUSTAINABILITY:** GS1 Standards help companies build processes that are flexible, enduring, and adaptable. Electronic exchange of information is efficient and eco-friendly.



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