



The Global Language of Business

An Introduction to the Global Returnable Asset Identifier (GRAI)

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About GS1

GS1® is a neutral, not-for-profit, global organization that develops and maintains the most widely-used supply chain standards system in the world. GS1 Standards improve the efficiency, safety, and visibility of supply chains across multiple sectors. With local Member Organizations in over 110 countries, GS1 engages with communities of trading partners, industry organizations, governments, and technology providers to understand and respond to their business needs through the adoption and implementation of global standards. GS1 is driven by over a million user companies, which execute more than six billion transactions daily in 150 countries using GS1 Standards.

About GS1 US

GS1 US®, a member of GS1 global, is a not-for-profit information standards organization that facilitates industry collaboration to help improve supply chain visibility and efficiency through the use of GS1 Standards, the most widely-used supply chain standards system in the world. Nearly 300,000 businesses in 25 industries rely on GS1 US for trading-partner collaboration that optimizes their supply chains, drives cost performance and revenue growth while also enabling regulatory compliance. They achieve these benefits through solutions based on GS1 global unique numbering and identification systems, barcodes, Electronic Product Code-based RFID, data synchronization, and electronic information exchange. GS1 US also manages the United Nations Standard Products and Services Code® (UNSPSC®).

1 What is a Global Returnable Asset Identifier?

A Global Returnable Asset Identifier (GRAI) is the GS1 Identification Key used to identify a returnable asset. This unique identifier is comprised of a GS1 Company Prefix, an Asset Type, a Check Digit, and an optional serial number.

2 What is a GRAI used for?

The GRAI is one of the two GS1® keys used for asset identification. GRAI is used to identify returnable assets, re-usable packages, or transport equipment, such as a tray, pallet, or beer keg. The GRAI enables returnable assets to be identified by type or individually for tracking or inventory purposes. In simple terms, this means an asset that will be sent outside the company and will be used for multiple trips.

The GRAI identifies the asset being used for the purpose of tracking its location and return. It can be used for tracking only or as part of a lease or rental system in which companies collaborate on the use of these assets.

The GRAI can be used globally to identify the asset. Detailed information regarding the asset is recorded in a database, and the GRAI is the key that provides the link to that information. The GRAI may be produced as a GS1-128 or GS1 DataMatrix barcode, encoded in an Electronic Product Code (EPC®)-enabled Radio Frequency Identification (RFID) tag, or used in a database.

3 Key Attributes of the GRAI

The GRAI will identify each individual asset type uniquely, thus ensuring that it is always identified correctly anywhere within a business or throughout the world. Each asset type is allocated an Asset Type number to ensure that it can be identified correctly. There is an option to also include a serial number, which will allow unique identification of each instance of the asset type. The GRAI itself has no meaning, so the asset can be looked up in a database and its associated information retrieved at any point or location.

GRAIs will work in any business sector. Having an identifier for a returnable asset allows businesses to identify, track, and manage their assets. Because GRAIs are based on the GS1 System, derived using a GS1 Company Prefix, an Asset Type and, optionally, a serial number, allocation of numbers is simple and uniqueness is guaranteed.

If your business uses returnable assets and you want to track and manage them, GRAI is an effective tool to enable this capability. Assets may have their GRAI in either a barcode or encoded in an EPC-enabled RFID tag.

4 Business Benefits of Using GRAIs

There are a number of benefits to using the GRAI to identify returnable assets:

- The structure of the GRAI and its assignment rules are administered by GS1, a not-for-profit standards organization that is supported by implementation guidance, business examples, and maintenance.
- The GRAI can be used throughout world with no need for trading partner(s) to assign proprietary numbers to ensure uniqueness.
- The GRAI offers a low-cost solution to the challenge of tracking assets.

- The GRAI employs the globally accepted GS1 System, whose language is standardized, understood, and used by multiple industries.
- The GRAI uses existing printing, scanning, and database storage methods, making it a low-cost option for organizations searching for a solution to marking and tracking assets that are either rented or loaned.
- The GRAI provides a standard format for organizing, displaying, and communicating data, allowing all members of the industry or process to benefit from improved control, information, and efficiencies.
- The “open” approach of the GRAI promotes innovation and the development of systems and applications to identify, track, and manage these assets.
- Use of the GRAI helps to produce improved accuracy and completeness of a firm’s information.
- The GRAI eliminates redundant activities and reduces or eliminates paperwork.


5 How is the GRAI formed?

A GRAI is formed with the following components:

- **APPLICATION IDENTIFIER (AI):** AI (8003) to indicate GRAI
- **LEADING ZERO:** Added to the leftmost position to generate 14 digits in the asset identification number field
- **GS1 COMPANY PREFIX:** A globally unique number issued to a GS1 member company
- **ASSET TYPE:** The number allocated to identify the returnable asset
- **CHECK DIGIT:** A modulo 10 digit used to check for input errors
- **SERIAL NUMBER:** An optional alpha-numeric identification for individual returnable asset identification

Figure 5-1 GRAI Structure

Application Identifier	GS1 Company Prefix						Asset Type						Check Digit	Serial Number (optional)	
8003	0	N ₁	N ₂	N ₃	N ₄	N ₅	N ₆	N ₇	N ₈	N ₉	N ₁₀	N ₁₁	N ₁₂	N ₁₃	X ₁X ₁₆

 **Note:** GRAI is a 14 digit numerical number, including a zero in the leftmost position and the ending Check Digit. The combined length of the GS1 Company Prefix and Asset Type will always total 12 digits.

The following steps are used to form GRAIs:

1. **START WITH YOUR GS1 COMPANY PREFIX.** Your GS1 Company Prefix is the globally unique number issued to your company by GS1 US® or another GS1 Member Organization. GS1 Company Prefixes are assigned to companies in varying lengths.
2. **CREATE THE ASSET TYPE.** The Asset Type is a number assigned by you, the holder of the GS1 Company Prefix, to uniquely identify a type of returnable asset within your company. The Asset Type varies in length as a function of the GS1 Company Prefix length. Note that the combined length of the GS1 Company Prefix and Asset Type is always 12 digits.

✔ **Hint:** Assign your Asset Types sequentially, and do not build any intelligence into the number. The scheme that defines a particular Asset Type range as having a set meaning today will mean nothing a short time into the future when your company reorganizes, buys or merges with another firm, or another staff member takes over GRAI assignment duties.

3. **CALCULATE THE CHECK DIGIT.** The Check Digit is a calculated one-digit number used to ensure data integrity. To understand how this digit is calculated, refer to www.gs1us.org/checkdig.
4. **(OPTIONAL) ASSIGN THE SERIAL NUMBER:** The serial number gives you the option of tracking not only specific returnable asset types, but also specific instances of each asset type (i.e., not just a rolling rack, but this specific rolling rack). You can assign an alphanumeric serial number up to 16 characters in length for each GRAI. Again, we recommend assigning serial numbers sequentially, not building any type of intelligence into the serial number itself.

6 Frequently Asked Questions About the GRAI

What are some examples of how GRAIs are used?

GRAIs can be used for any type of asset that is a reusable package or transport equipment and that changes ownership, either between your company and a trading partner or between different departments within your own company. Following are some examples of how GRAIs can be used with different business processes.

- **Within a company in a GS1 barcode or EPC-enabled RFID tag:**
 - On all returnable assets to enable tracking within a warehouse or from a warehouse to a store
 - To identify handling parameters for specific returnable asset types
 - To identify cleaning regimens for specific returnable asset types
 - As part of a manual or automated sortation system
 - To record a returnable asset loaded for dispatch at all shipping locations (it's about to leave for another location)
 - To track an asset as it comes back from another location
 - To scan at hubs for re-use or re-routing
 - To provide complete control of movement of assets, when combined with asset tracking software
- **At a customer's warehouse in a GS1 barcode or EPC-enabled RFID tag:**
 - To record movement of returnable assets at all points
 - To provide tracking visibility with the originating company
 - To facilitate rental or trip charges as part of a business application
 - To help identify returnable assets that are lost or in the wrong location

What is the difference between "inventory," "consumables," and "assets"?

Supply chain terminology can be a bit confusing, but here's a quick way to know which is which:

- **INVENTORY:** Items that exist in raw material format, in the "pipeline," or in storage. Inventory is ultimately intended for sale to consumers and to produce operating income.
- **CONSUMABLES:** Items that are used by an organization in the course of conducting operations. These items generally have a comparatively short life or are of relatively low cost and are charged to the cost of doing business in a particular fiscal year.

- **ASSETS:** Items used by an organization in the course of conducting operations. These are long-lived items and are charged to the cost of doing business over many fiscal periods.

What is the difference between fixed assets and returnable assets?

Fixed assets do not leave the immediate control of the asset owner. Returnable assets are delivered by the owner to the custody of another entity, sometimes for a fee.

Can the GRAI be used in place of a GTIN?

No. GTINs and GRAIs serve two distinctly different purposes. The GTIN is used to uniquely identify trade items during the data align, order, deliver, and receiving processes (e.g., a brewer purchasing beer kegs from the keg manufacturer). The GRAI is used to identify different types of assets during their use (e.g., tracking beer kegs between the brewer, beer distributors, and bars/pubs).

Are there any differences between using a GRAI in a barcode and encoding a GRAI in an EPC?

Yes. The GRAI EPC corresponds directly to a serialized GRAI defined in the *GS1 General Specifications*. Because an EPC always identifies a specific physical object, only GRAI keys that include the optional serial number have a corresponding GRAI EPC encoding.



Note: All GS1 identifiers use the same GS1 Company Prefix assigned to the company or organization.

7 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 ensure that the GRAI components have been entered correctly
- [Resource Library](#): Documents, videos, and other information to increase the value of standards for all trading partners in the value chain.
- [FAQs](#): Frequently Asked Questions about GS1 Standards, implementation, and how to get started.

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

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



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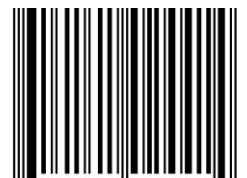
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