

KnarrTek Data Sheet License-Plate-Number (LPN) Container Tracking Methods

Introduction

License-Plate-Number (LPN) container tracking is how UPS, FedEx, and Amazon track the real-time flow of materials in their supply chains. This tracking is performed by attaching a tracking barcode containing a unique alphanumeric tracking number to each container. This barcode is then scanned when materials are added to the container, the container is moved, or materials are withdrawn from the container.



This same methodology can be used to track the flow of materials within industrial plants and warehouses, as well as outdoors at building and other field sites. It can also be used to track the processing and distribution of food and pharmaceutical products.

LPN Tracking is used by KnarrTek's Materials Tracking System (MTS) and Job and Materials Tracking System (JMTS) standard software products. It is also used as the basis of most WIPTracker™ custom systems implemented by KnarrTek.

The use of LPN container tracking is in contrast to systems such as traditional Warehouse Management Systems (WMS) and Enterprise Resource Planning (ERP) systems which simply track the quantity of inventory at a location. These item-locator systems lack the ability to track which materials were used to make which products, which is essential for applications requiring materials traceability, such as the processing of food and pharmaceutical products.

LPN container tracking systems are ideal for tracking inventory at many different locations and the flow of materials between locations, including materials in-transit on vehicles. They also work well to track assets such as tools and computers that may be issued to people as well as to locations.

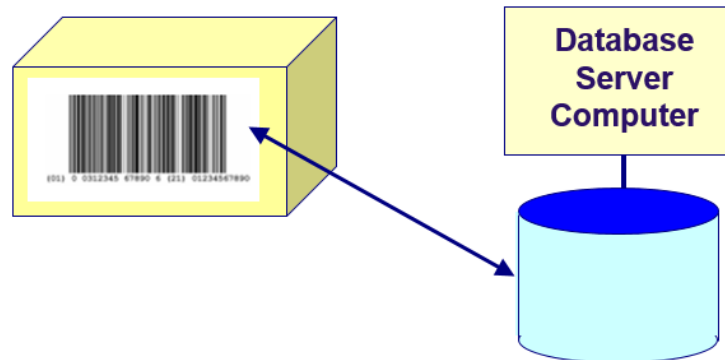
License-Plate-Number Container Tracking

The concept behind License-Plate-Number (LPN) container tracking is that a unique tracking barcode is applied to each container and then all the information about the container is stored in a database, where it can quickly be accessed. Also, data about that container, such as its location and the quantity in the container, can quickly be changed by scanning the tracking barcode on the container.



License-plate-number container tracking gets its name from what happens at the registry of motor vehicles when you go there to register a new car or truck. Here, they hand you a license plate with a unique set of letters and numbers and the state of issue marked on the plate. The license plate number is unique but otherwise is just a random set of letters and numbers. All the data about your car or truck is stored in a database so that, when you get pulled over for speeding, the police officer simply reaches over to his on-board computer and types in your license plate number and is able to see all the information about your car or truck.

In practice, we use a similar principal for license-plate tracking of materials except that we put a unique tracking barcode or RFID tag on each container instead of an aluminum license plate.



Note this is very different from using barcodes with data such as item number, quantity, and lot number on each container. With license-plate tracking all the data is kept in a database and the tracking barcode is simply a reference to the database record.

For containers such as boxes and pallets, which are discarded when they are empty, we typically print and apply a license-plate tracking barcode to the container of materials when it is first entered into inventory. For reusable containers, such as totes or bins, we can use permanent metal barcodes, as we do not have to change the license plate just because we changed the contents of a container (analogous to the license-plate on a car or truck).

The benefit of this is that data such as part number, location, quality control status, and quantity of materials in the container can be changed as needed without replacing the tracking barcode on the container.

License-plate tracking is a GS1 (Global Supply Chain 1) standard, where GS1 standard barcodes are used for Serialized Shipping Container Code (SSCC) barcodes which uniquely identify the containers to which they are attached on a world-wide basis. This enables a shipper to record what materials were placed in on a pallet in China and send the information related to a warehouse in the USA in the form of an ASN (Advanced Shipment Notice). When the materials are received in the USA all that is necessary is to scan the SSCC license-plate barcode to receive the materials without first breaking down the pallet.

The license-plate tracking barcode may be as complex as a GS1 composite barcode, printed on-demand, with a GTIN, Lot Number, and Serial number, for use in the Global supply chain, or as simple as a barcode taken from a pre-printed roll of serialized barcodes, such as that shown here, for internal use within the plant. The license-plate tracking barcode may also contain an RFID chip with the same tracking number or a separate ruggedized RFID tag may be used depending on the application.



As well as being placed on containers, license plate tracking barcodes are placed on items that are not in containers. Examples include large electric motors and other electro-mechanical assemblies which may need to be tracked independent of being in an external container. These

individually barcoded items may also have serial numbers which may be used as their tracking barcodes or the serial numbers may be different.

Some types of container are obvious, such as boxes, pallets, and totes. Others are not so obvious, such as reels and rolls, which contain a quantity of an item. These can be treated as a container with so many feet, for example, of material, or as individually barcoded items where dimensions such as length, width, and thickness may be treated as attributes of the individually barcoded item.

Tracking the Location of Materials

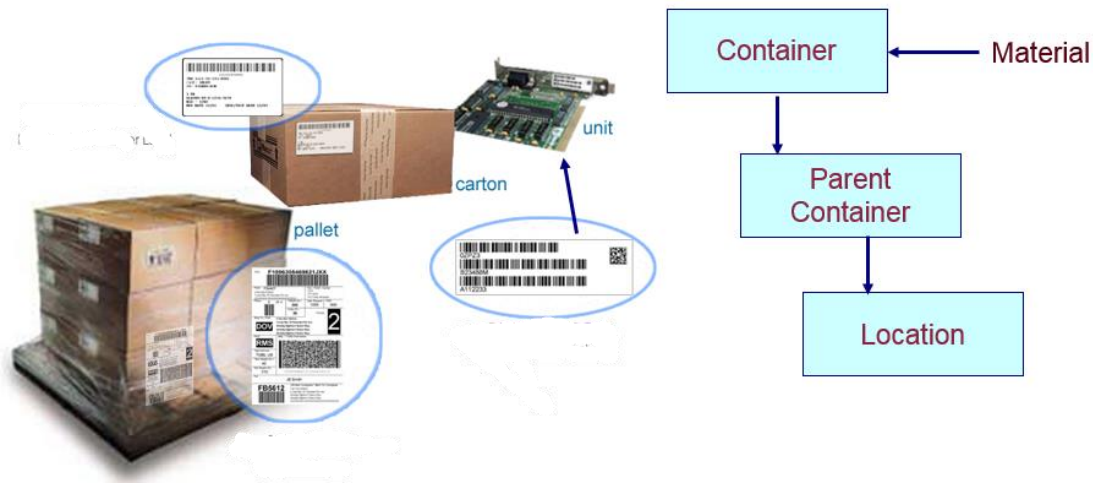


Whenever a container of materials is moved, the materials handler scans the LPN tracking barcode on the container and a location barcode on a shelf, rack, floor post, or hung overhead. These location barcodes uniquely identify each location, so that the location of each container can be tracked in real-time. These location barcodes can also be scanned when performing cycle counting or inventory auditing.

It is noteworthy that, with an LPN container tracking system, it is only necessary to shut down a single location, such as a shelf or rack, when taking inventory rather than needing to shut down the whole of a warehouse in order to take inventory.

Nested Container Tracking

One of the problems that is very hard for traditional inventory tracking systems to handle is how to track nested containers. In a nested container situation, such as the above example, we may have parts with serial numbers in cartons, with cartons containing many different part numbers stacked on a pallet, with multiple such pallets at an inventory location.



In a traditional ERP inventory tracking scheme, when you move a pallet to new location you have to record the withdrawal of all the parts from the old location and enter them into the new location.

KnarrTek's software tracks materials, which may have their own license-plate tracking barcode, in containers, which will have their own tracking barcodes, and may have a tree of parent containers, each with their own tracking barcodes, that are at a location.

Then, when you want to record the movement of the container, you simply scan the barcode on the outer parent container (in this case the pallet) and record its new location. All the data about all the materials on the pallet is automatically associated with the new location.

The same goes for shipping the parent container, when all the materials in the parent container can be recorded as having been shipped to the customer simply by scanning the tracking barcode on the outer container.

Even better, the nested container data forms the basis of Advanced Shipment Notice (ASN) data, that can be sent by EDI (Electronic Data Interchange) to your customer so that all your customer has to do is to scan the tracking barcode on the shipping container, such as the pallet, and associate it with the ASN to receive all the materials into their inventory, with no additional data entry work. Similarly, LPN based systems can also use ASN data to minimize the work needed to record the receipt of materials from suppliers.

Difference from Traditional Inventory Tracking

The big difference from traditional inventory tracking is that when we want to know how much inventory we have in stock, we add up the quantity of all like materials in all the containers wherever they are located, even if they are being moved from one place to another.

Because recording a change in location is as easy as scanning the tracking barcode on the container and a location barcode on a shelf or rack, where we put it, we can use much finer grained locations for tracking. This enables us to know that our box of parts is on shelf A-10-6 rather than just somewhere in the warehouse.

It also makes "inventory taking" much easier in that you do not have to shut down your operations to count the inventory in the whole of your warehouse but only have to validate that the containers of material on a shelf match those those in your tracking system, one shelf at a time. As a result you can do inventory validation incrementally without shutting down or disrupting operations, in order to take inventory.

This encourages checking inventory frequently rather than waiting for a once-a-year inventory taking to discover your inventory discrepancies.

The use of LPN tracking enables KnarrTek's software to track which containers of material were used to make which products, as well as to accurately track the actual cost of making products.

LPN tracking also enables KnarrTek's software to prevent mistakes such as picking or using the wrong materials when making products or shipping the wrong products to customers.

Commentary

KnarrTek's software products are based on the use of the BellHawk® Work-in-Process, Job and Materials tracking software platform, which performs the LPN container tracking. Please see the "BellHawk Software Handbook" for details. A PDF form of this 168 page handbook can be downloaded from www.KnarrTek.com or please request a hard copy by sending an Email to marketing-support@KnarrTek.com.

ERP, WMS, and other item-locator inventory tracking systems cannot perform LPN container tracking because they do not use a containers table as the basis of their tracking materials, whereas KnarrTek's software does.

