Radio Frequency Identification Tags for Tracking Plastic Pallets and Reusable Containers

Intermec®

Introduction

Transporting things in quantity, efficiently, is an activity that affects cost and profitability across the supply chain. Fruits and vegetables must go from the field to the retail store quickly to preserve their freshness and therefore the price they can command. Parts and components in manufacture must arrive where needed, when needed to keep the lines moving. The challenge is to move quantities quickly with the least amount of handling in the most efficient and profitable way possible. One of the latest tools to manage quantity distribution is radio frequency identification (RFID) applied to plastic pallets and reusable plastic containers (RPCs). Plastic pallets and RPCs are environmentally friendly, and often retail-display-ready, containers that can be used repeatedly.

A major challenge in incorporating plastic pallets and RPCs into the supply chain has been tracking them throughout the entire cycle, allowing pallet and RPC providers complete visibility to track their containers – from origin to delivery point and back again. In this paper, we'll explore the use of RFID tags with pallets and RPCs to provide accurate tracking and reduce the administration time and costs associated with them.

The Pallet And RPC Marketplace

The model for cycle tracking reusable containers is the pallet market. Though the wooden pallet market has matured, the market for plastic pallets is growing by nearly 20% annually. RPCs account for about 2% of the case container market but that percentage should grow significantly over the next few years to over 25%1 . Many companies and industries are using more plastic pallets and RPCs because of economic and environmental concerns. By using plastic pallets and containers, companies realize lower waste collection cost as well as reduced product damage and labor cost. The saving for retailers is obvious when comparing the cost of repeat purchases of corrugated fiberboard to the onetime cost of a plastic container. The material cost associated with plastic requires only a few cycles to pay back the original cost for the asset. Furthermore, today's containers can be used an estimated 15 cycles or more per year for 5 to 20 years. The savings in packaging alone over this time period are very significant.

In sum, the growth of plastic pallet and RPC use is being driven by:
• Increased environmental awareness
• High rate of product damage/shrinkage
• Retail consolidation
• Packaging cost reduction
• Labor costs in retail produce departments
• Government standards for food safety
• Improved supply chain management technologies2

In the food industry, plastic pallets and RPCs are seeing the greatest growth in produce and poultry. Plastic is having the greatest impact in the produce industry because retailers want fresh produce from the field to be delivered in the highest quality condition by the most cost-effective, environmentally friendly process. Less physical handling significantly reduces spoilage. In-store costs are also a consideration for retailers. Because produce can be merchandized directly from RPCs, using them reduces the time it takes to display these items and replace them when empty, thus reducing labor costs. One of the major factors in this growth is the influence of large volume customers, such as Wal-Mart. Wal-Mart uses RPCs at multiple retail sites as well as in all of their distribution centers, and requires all their vendors to ship items in RPCs.

Several third-party management companies, led by IFCO, Chep, and Georgia Pacific, are greatly increasing the number of plastic pallets and RPCs in their pooling systems, helping drive the increased growth in the industry. Using the example of agriculture, pooling is a self-contained system in which a pallet/RPC is sent to producers, who fill the containers with produce and then ship them to distribution centers where the containers are then delivered to grocery retail stores. From the stores, the containers are sent back to the third-party processing center to be washed and inspected so they can be safely returned to the pool.

To help track RPCs through the supply chain, some management companies are turning to technology to help track and manage their pools. The most effective technology is RFID tagging.

RFID For Tracking Plastic Pallets And RPCs

RFID tags, like Intermec's Intellitag® products, can help solve some of the logistical problems that affect the pallet/RPC industry. Inefficiencies in inventory tracking, lost and misplaced containers, inaccurate data on usage rate that can result in incorrect customer billing and lost revenues, and inefficiencies in pool fleet management can be relieved by better access to accurate data. The data needed to resolve these issues can now be written directly to, and stored on, RFID tags attached to RPCs as these items move throughout different points in the supply chain. Using RFID tags, companies are better able to manage their pallets and RPCs and obtain more accurate product data. With millions of RPCs in use, it is important to have 100% accurate data about these containers at all times, and be able to track them with less labor.

1 Source: Pallet Enterprise, "Rental, Other Changes Shaking Pallet Industry," July 2000.

2 Source: Produce Marketing Association, "The Latest in the Shipping Container Debate," 1999

Third-party management companies like Chep, Georgia Pacific and IFCO are competing to offer every business advantage to their customers for pooling of pallets and RPCs. RFID is a competitive advantage companies can offer their customers—and assist their own pooling system—to operate more efficiently and cost effectively. RFID is the technology with the performance necessary to track containers and store the data companies will use in their supply chain management programs, improving the pool's profitability.

RFID Simplifies Business Processes
More than a great technology, RFID is an excellent business tool that helps companies manage their supply chains better, increase their margins and profits, and decrease costs. Business that have adopted RFID technology have:
- smoother-running business environments
  – knowing what is where
- increased throughput and productivity
- reduced costs, leading to more competitive pricing
- shorter order cycles and faster shipping
- better inventory management
- reduced labor costs by reducing the workforce needed for tracking and inventory management
- increased revenues/higher profits
- better customer service

What Is RFID?
RFID is a contact-less, non-line-of-sight data capture technology that is designed for automatic operation. It is similar to bar coding, but has many advantages over it. Bar code systems use a reader and coded labels that are attached to items. Bar code uses visible symbols and light to transfer information from the label to the reader. RFID uses a reader and an RFID tag that is attached to an item or asset. It uses radio frequency signals to send and receive information from the RFID device to the reader.

RFID has advantages not available with other identification technologies:
- it can be supplied as read-only or read/write
- it can be read or written to repeatedly over the life of the asset
- it does not require contact or line-of-sight to operate
- it can function under a variety of environmental conditions
- it provides a high level of data integrity and accuracy
- the technology is difficult to counterfeit, so RFID provides high security
- eliminates double counting (not true of bar codes)

An RFID tag consists of an application-specific integrated circuit (ASIC) and an antenna that can be mounted on various substrates. Intermec designs its Intellitag RFID inserts to be integrated into application-specific packaging prior to use. Intellitag inserts are available in different sizes, frequencies and ranges for various applications. Postage-stamp size RFID inserts can be fixed into a case or package to be applied to a videocassette, for example. Paper-thin inserts may be inserted into pressure-sensitive labels applied to packages for parcel tracking. Rugged credit card-thick inserts may be used to create intelligent labels intended for use in harsh environments by encapsulating or laminating the RFID insert into durable tags and affixing them to high-value items.

The RF in RFID refers to electromagnetic waves that have a wavelength suited for use in radio communication. Radio waves transfer data between an item to which an RFID tag is attached and an RFID reader. The device can contain data about the item, such as what the item is, what time the device traveled through a certain location, to whom the item or asset belongs, and where the item is being shipped. RFID devices, such as a tag or label, can be attached to virtually anything – from a small article to a pallet of merchandise. RFID technology uses frequencies within the range of 50 kHz to 2.5 GHz. An RFID system typically includes the following components:
- a RFID transponder (or tag) that contains data about an item
- an antenna
- a RF transceiver that generates RF signals
- a RFID reader that reads and writes data to the tags

Intermec's RFID Solutions
Intermec Technologies Corporation produces a wide variety of RFID tags, including the Intellitag Series 915 MHz RPC Tag designed specifically to track the reusable plastic containers (RPC) used in the fresh produce industry over the lifetime of the container. The RPC tag is compact enough for inconspicuous application to containers. It is completely encapsulated in a heavy-duty protective thermal polyurethane/polycarbonate plastic designed to survive the rigors of shipping and washing.

Intellitag RFID inserts and tags are designed for integration into 915 MHz and 2.450 GHz solutions that require tag read range, multi-tag sort, read/write, and memory capacity not provided by older, less flexible proximity technology. All Intellitag tags and inserts are factory programmed with a 64-bit identification code which is permanently locked, ensuring unique identification for users. The remaining 960 bits of memory can be repeatedly rewritten to throughout the life of the tag. The integrity of sensitive data can be protected by customer-assigned read and overwrite privileges, and static data can be permanently locked. Licensed RFID scanners and tags using Intellitag products can be integrated or used in applications that require read ranges greater than 6 meters.

To Learn More
For more information on Intermec's RFID solutions for the RPC industry, contact Intermec Technologies Corporation at 1-800-347-2636 or visit Intermec's Web site at www.intermec.com.

The following sites offer a wealth of industry-specific information:
- Produce Marketing Association: www.pma.com
- United Fresh Fruit & Vegetable Association: www.uffva.org
- Pallet Enterprise: www.palletenterprise.com
- AIM, the worldwide authority on automatic identification, data collection, and networking in a mobile environment: www.aimglobal.org/technologies/rfid/

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