

Security in Packaging

An overview of RFID Technology for Retail and Healthcare Packaging

Background

It has been more than 50 years since the first UPC barcodes were introduced as a means to drive speed and efficiency at retail, and identify data related to a product. Today, it is estimated that the chirp of a barcode being scanned is heard more than 6 billion times per day*.

Over time, barcode technology grew to address the need for accountability, efficiency and visibility throughout the supply chain, hence the evolution of GLN (global location number) and GTIN (global trade item number) codes. This level of traceability translated beyond retail products into the manufacturing and healthcare sectors. Advancements in mobile and wireless technology, paired with advanced software and hardware, make data analysis and verification faster and more convenient than ever.

*<https://www.gs1us.org/>

The Value of RFID

Although barcode technology has become critical to global infrastructure, it can be limited by the need to scan individual barcodes at close proximity. This limitation can be overcome by utilizing a combination of RFID tag, hardware, and software technology, allowing for rapid batch processing of the data from a distance.

This approach improves accuracy and drastically reduces the time required to collect and use the data, presenting a wealth of new operational opportunities.

An Introduction to RFID Technology

Radio frequency identification technology (RFID) uses radio frequencies to transfer data between an RFID tag, which stores the data, and an RFID reader, which transfers the data to software for use in various tasks.

Four key components comprise RFID – a tag with an antenna, a reader, and the host system – working together to identify an object. In passive RFID applications used commonly in packaging, the network-connected reader uses radio waves to transmit a signal, which in turn activates the tag to return its encoded data back to the reader for processing by the host system. The host system can store, evaluate, and activate tasks and processes by interfacing with connected software.



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Growing Demand

In the early days of RFID technology, the cost of entry limited widespread commercial adoption, but the rapid development of hardware and wireless technology in recent years has spurred growth in RFID use. Today, RFID applications go beyond commonplace inventory management to more diverse applications across many industries. From tracking of pets, livestock, assets, and equipment, to cargo, inventory, and access control. The use of RFID tools is in demand across retail, foodservice, logistics, and healthcare industries. A growing number of major retailers are requiring suppliers to apply RFID tags to their goods prior to sale. RFID systems have become a critical means of support in IoT (internet of things) deployments. Combining RFID with GPS technology and smart sensors enables access to richer data such as location, temperature, and movement to be tracked and communicated.

The benefits of widespread adoption of RFID:

- Improves the availability and accuracy of data allowing full visibility of products from the point of manufacture through delivery to store shelves. Retailers benefit from improved inventory accuracy, leading to more successful omni-channel strategies like BOPUS (buy online for pickup in-store).
- Enhances quality and traceability through RFID and smart sensor transmission of data. Alerts to damage, temperature, movement, or other critical issues help companies understand when and where issues occur across an integrated supply chain.

Key Benefits of RFID vs. Barcodes*

RFID TAGS	BARCODES
Can identify objects without direct line of sight	Direct line of sight is required for scanning
Can scan items from up to 10 feet away or more, depending on tag	Requires close proximity for scanning
Data can be updated in real time	Data is read-only and cannot be changed
Read time is 100 milliseconds per tag	Read time is half a second or more per barcode
Can be concealed within a label or inside packaging.	Printed on the outside of an object or onto product label.

RFIDs Practical Application in Packaging

In retail, RFID tags are commonly inserted into product hang tags, added as primary or secondary UPC labels onto packaging, or concealed within primary product labels. The information within these tags identifies the product for inventory counting.

Additional data like MFG/expiry dates and production lot codes can be added for retailer or supplier product security benefits.

Examples of applications include:

- Reading the hidden unique tag ID (UID) to authenticate products and identify counterfeits.
- Using product code data to count inventory more frequently and with improved accuracy, which can improve record keeping and identify security gaps in the supply chain.
- Tracing retailer, manufacturer, or distribution center lot codes from recovered goods that were stolen or sold through unauthorized channels.
- More frequent and accurate management of food items with expiry dates, allowing retailers to better stock and discount items accordingly.

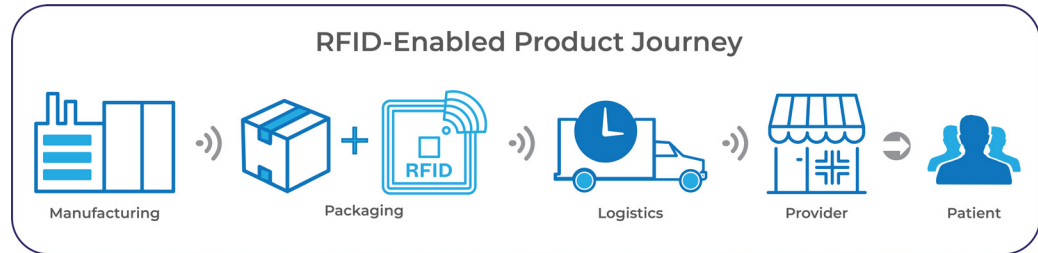
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RFIDs Impact on Healthcare

With DSCSA requirements now enacted, standardized data sharing is critical for greater visibility and accountability by pharmaceutical and healthcare companies to ensure product traceability in manufacturing and throughout its journey. The demand for interoperable electronic tracing of products at the package level has created a perfectly teed-up scenario for the use of robust RFID technology.

Considering the landscape of smart sensor technologies, it is important to identify the type of RFID tag that will best address customer needs and avoid blind spots such as those that exist in the pharmaceutical cold chain. In this situation, having the ability to track item numbers, serial numbers, entities, locations, timestamps, movement, and temperature, throughout the journey to the patient, is essential.



To ensure patient safety and packaging security, the pharma industry will soon require a closing of the gaps between all participants in the supply chain for interoperability and traceability from manufacturing, distribution, logistics, retail and healthcare providers. Finding the right sensor technology that addresses the functionality required by the application is key to achieving interoperability.

About Colbert Packaging

Each day, for 65 years and counting, Colbert Packaging is committed to producing safe, smart, and sustainable packaging for customers who include some of the biggest names in the pharmaceutical, healthcare and consumer goods markets. Colbert's Kenosha, Wisconsin, facility produces offset and flexographic printed folding cartons, pressure-sensitive roll labels and package inserts; the Elkhart, Indiana, operation includes folding carton production and paper tray forming. Learn more at www.colbertpkg.com.

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