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Quick Summary

► COMPANY

A major U.S. pharmaceutical products manufacturer

► PROBLEMS

- Slow and labor-intensive manual scanning and verification of correct picks
- Challenges with item positioning and RFID scan reliability
- Challenges with signal interference from water content in products
- Challenges with RFID scan timing and proximity control
- Added time and cost despite automated material handling

► SOLUTIONS

- Zebra RFID technology
- RFID4U's Tagmatiks software
- Custom-designed Faraday shield
- ScanTexas system design, deployment and support

► RESULTS

- 100% automated and accurate scanning of bulk shipments
- Verification of all items reduced from 3 minutes to 3 seconds per bin
- Thousands of dollars per month in labor savings
- 99.75% scanning accuracy for items with no orientation control
- Resolution of all scan timing, reliability, and interference issues

Fulfillment Verification on Conveyor Lines with RFID

Major Pharmaceutical Manufacturer Verifies Correct Bulk Picks and Shipments with a Wireless and Automated RFID System

A major U.S.-based pharmaceutical products manufacturer was struggling with manual scanning and verification of correct picks for its bulk order fulfillment and shipping. Working with ScanTexas and Zebra technologies, the company was able to upgrade its current system with radio frequency identification (RFID) and achieve 100% automated and accurate tracking for its bulk-for-stock order fulfillment and 99.75% scanning and verification accuracy of all items for its customer-specific orders. This has created a savings of thousands of dollars per month while significantly improving its overall shipping speed and accuracy.

The Problem

Scanning and verifying correct picks for customer orders and bulk shipments can be a major challenge, even when using automated material handling systems with conveyors. While barcode-based systems have traditionally been used in many fulfillment and shipping processes, barcode scanning still requires manual labor in most cases, and it can create inefficiency and lead to human error.

Also, when products are picked and placed in bins for bulk and standard order fulfillment, products might be scattered and not stacked, and barcodes might not be easily and immediately accessible for scanning.

This was the case at one major U.S.-based pharmaceutical products manufacturer, which was struggling with manual scanning and verification of correct picks for its bulk order fulfillment and shipping processes.

The company had an automated material handling system in its shipping area, which transports items to its shipping areas for removal, boxing, labeling, and shipping. But, when items needed to be verified, workers had to be present and had to manually scan barcodes for each item, to ensure the right products were matched to the right order.

This was time-consuming and took about three minutes to complete for each order, since there could be as many as 100 items in a bin, and the company was often handling large or bulk orders where extensive scanning was required. In addition to the added time and labor requirements, the manual scanning processes also introduced the risk of human error, and sometimes mistakes were being made.

As an additional complication, when items for its customer-specific orders were picked, the automated material handling system would dump them into a bin, and the items could end up in any random orientation. This posed huge challenges and delays when trying to access the barcode for each item and scan it.

Even with its bulk orders, where 100 of the same items are routinely picked and loaded through a different mechanism, which allows uniform stacking and easily access and alignment of barcodes, the process was still slow and inefficient.

The Solution

The company sought to solve these issues and upgrade its material handling system by implementing RFID to automatically detect, identify, and verify every picked item for each order with RFID. RFID allows each item to be tagged with a simple label that contains an identifying chip and a microtransmitter. This allows RFID readers to read, verify, and locate each tag wirelessly and automatically, without a barcode scan or requiring physical access to the label. Using wireless radio frequency technology, similar to Wi-Fi, the reader can automatically verify an entire bin's worth of products in a single read, regardless of the orientation of items, with machine accuracy and with no human labor or interaction required.

To design the right solution and upgrade its system, the company turned to ScanTexas, a leading system designer and provider of RFID and barcoding solutions since 2000. After working closely with the company to assess its requirements and environment, ScanTexas got to work on proposing a designing a full solution, including Zebra RFID technology and Tagmatiks RFID tagging and tracking software from its partner, RFID4U.

To enable fully automated RFID tracking and verification on the company's conveyor lines, ScanTexas specified Zebra's FX9600 fixed RFID reader with a pair of Zebra AN480 antennas. These devices would allow each tote and all items in the tote to be tagged, and the hardware would read and verify all tags automatically, with slightly different setups to handle the differences between its conveyor-line tracking for customer-specific orders and its shipping station RFID scanning for bulk-for-stock orders.

However, to design and perfect the right system, ScanTexas also had to help the company overcome several significant challenges that posed potential difficulties in ensuring the right RFID read-rates, timing, and accuracy, especially considering the products involved and the company's unique operating environment.

Overcoming Challenges

As a leading pharmaceutical products manufacturer, the business routinely handled products that posed significant challenges to RFID, including products which contained solutions or water. The presence of liquids can interfere with radio waves as they try to pass between an RFID tag and reader.

To get reliable and accurate reads, ScanTexas tested numerous antenna types and power levels to get the scanning and reading performance needed.

However, boosting the signal also creates added RFID range, so, to prevent the system from scanning tags on return totes that have already passed through its scanning stations, it installed a Faraday shield, to block the wireless signals from extending beyond the immediate area where verification is needed.

Additionally, since items on conveyors are actively moving, there is a challenge in ensuring that RFID reads take place at the right time and that they're limited to each specific bin as it passes within range of the RFID reader and antennas.

To achieve this, ScanTexas added photocells to the solution, to detect when bins are moving into the scan area, turn on the RFID reader, and tightly control when it should search for and detect each tagged tote and the tagged items inside it.

It also used an EPC spec feature called Session 2 for the RFID tags, which tells each tag that, once it communicates with the reader, to quit 'talking' or trying to communicate. This ensures that tags toward the top of the tote don't 'talk over' or drown out the signaling and communication of the tags that are deeper down in the tote.





The Results

Through its initial system design and subsequent testing and improvement, ScanTexas was able to solve all of these challenges and deploy an RFID system that now provides 100% automated and accurate tracking for the company's bulk-for-stock order fulfillment. It has also achieved 99.75% verification accuracy of all items for the company's customer-specific orders in totes on the conveyor, where there is no control over item orientation or polarity.

This has created a savings of thousands of dollars per month while creating significant improvement in the company's shipping efficiency and accuracy. Its overall picking and shipping verification are now operating at 99.75 accuracy with 100% automation. To get to 100% accuracy, ScanTexas and the company are now working with the RFID inlay manufacturer to enable further tag improvements.

Inlay improvements should allow 100% read accuracy, even in the extremely rare cases where the orientation of an item dumped in a bin is so unusual that it causes interference or issues with an accurate RFID.

As Mark Alyn, President of ScanTexas points out, "An important issue with RFID is to never let perfection be the enemy of the good. In really challenging applications like these, we'll miss a tag every now and then, and we may have to work to close that gap. But even before you do that, the accuracy and the labor and cost savings are far better than barcode scanning, which relies on human effort and introduces risks of human error."

With that bigger picture in mind, the company is now enjoying thousands of dollars in monthly savings from 100% automation and 99.75% overall accuracy in its fulfillment and shipping, and future improvements will hopefully get it to the ultimate goal of 100% accuracy.

Click [here](#) to watch a video of the complex conveyor RFID application in action.



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