The coffee manufacturer employs EPC Gen 2 passive UHF RFID tags to automate the replenishment of packaging materials supplied by Goglio Cofibox, and used to create products Lavazza sells to consumers.

By Rhea Wessel

Dec. 15, 2009—Italian coffee producer Lavazza and its packaging supplier, Goglio Cofibox, have implemented a radio frequency identification system that automates the replenishment of reels of packaging materials used to create Lavazza's products, and to improve those materials' traceability.

According to the two companies, the system—which employs EPC Gen 2 passive ultrahigh-frequency (UHF) RFID tags—enables just-in-time delivery of reels of printed packaging materials manufactured by Goglio Cofibox in Cadorago (near Como, Italy), and an automated process for receiving the reels at Lavazza's facility near Turin. The technology has reduced Lavazza's inventory of packaging, as well as the space required to store it, and provides the coffee company with real-time visibility of stock levels, says Fabio Marzorati, an industrial engineer at Goglio Cofibox who works in product development. Marzorati and Antonio Rizzi, the director of the University of Parma's RFID Lab, presented the Lavazza project results at October's RFID Journal LIVE! Europe 2009 conference, held near Frankfurt, Germany. The RFID Lab, Rizzi says, engineered the solution and carried out tests to assess the technology's benefits.

After loading four reels of packaging materials onto a pallet, Goglio Cofibox attaches two adhesive EPC Gen 2 RFID labels onto the exterior of the plastic stretch wrap, as well as an extra tag directly on the pallet.

Lavazza converts the packaging materials into the bags that it then fills with coffee. The company is required by law to monitor the quality of packaging materials, in order to ensure that high-quality coffee is delivered to consumers. Because the materials have a limited shelf life, the company must use packaging on a first-in/first-out (FIFO) basis. Hence, it required a more efficient way than the manual

system it previously utilized to trace the materials.

The RFID system that the companies implemented tracks pallets loaded with reels of packaging materials. During the project's initial testing phase, the partners also tracked individual reels of packaging for a particular coffee brand, Allegro. The purpose, the firms indicate, was to test item-level tracking. Each Allegro reel weighs 135 kilograms (297 pounds) and measures 60 centimeters (23.6 inches) in diameter. Four reels fit on a single pallet. The reels are used to package coffee after it is produced on the factory line.

Before RFID was implemented, Lavazza never knew the status of the orders it sent to Goglio Cofibox. Conversely, the packaging supplier never knew if Lavazza received the reels it delivered, or the number of reels the coffee producer had in inventory. In addition, orders had to be triggered manually every time Lavazza needed to replenish its stock of packaging materials.

To address these issues, the two companies initiated an RFID implementation that commenced in April 2009 and was fully deployed in September. During the testing phase conducted at the item level, and once reels of packaging were produced, Goglio Cofibox printed and encoded RFID labels containing UPM Raflatac tags using a Toshiba RFID printer-encoder. A worker applied a label to the inner cardboard ring of each packaging reel.

After a machine applied stretch wrap around the four tagged reels on the pallet, a worker placed two additional adhesive RFID labels onto the plastic stretch wrap covering the reels, thereby forming a rectangular package of goods on the square pallet. (An extra tag was also applied inside, directly on the pallet, on the short end of the rectangular bundle of reels, so that the pallet could be identified after the tagged stretch wrap was removed.) The company attached labels containing UPM Raflatac Hammer tags to reels, and encoded the tags with a serialized global trade item number (SGTIN). For the pallets, the firm employed UPM Raflatac's DogBone tags, encoded with a Serial Shipping Container Code (SSCC) number.

Goglio Cofibox's Fabio

Marzorati

Once the pallet is wrapped and tagged, the employee moves it to the company's storage area via a forklift. As the pallet passed an Impinj portal reader at the gate of the storage area, the tags were interrogated, and the pallets and reels of packaging were identified by their encoded SGTIN and SSCC numbers. The system used the information to automatically update Goglio Cofibox's inventory levels.

Now that tagging is performed only at the pallet level, the same process takes place, except that tags are no longer placed on individual reels. Goglio Cofibox tags approximately 30 new pallets each day, and will maintain inventory levels of 150 tagged pallets. Lavazza stores about 3,000 pallets of stretch-wrapped reels. By mid-December, all of the pallets in inventory had been tagged.

As materials are loaded onto trucks to be shipped to Lavazza, the pallets' RFID tags are read for a

second time. A green light indicates to the forklift operator that the goods have been identified, and that the system has located the related bill of lading. At this point, the system is able to send bill-of-lading data electronically, via the Internet.

When the reels arrive at Lavazza, a worker uses a handheld reader to interrogate the RFID tag on the outside of the pallet's stretch wrap, then moves the pallet of reels into storage. Lavazza chose to utilize a handheld reader for this step, because it wants a single device for all read points. The handheld interrogators—one used by Lavazza, another by Goglio—were provided by Psion Teklogix. Both shipment and traceability information are automatically fed into a logistics dashboard—a Web application shared by the two companies.

"It provides real-time visibility on the flow of goods and provides traceability data," Rizzi says.

As Lavazza produces coffee and requires packaging, the company uses the RFID system to pick the oldest packaging in storage off the shelves. An employee utilizes a forklift to retrieve a pallet, and then interrogates the tag with a handheld reader. The system identifies the reels, designating them as "headed to production." The pallets are then placed onto carts connected like train cars and moved to the production area. Later, the project partners plan to evaluate the possibility of installing a portal reader that will interrogate pallets' tags as the pallets pass by on the way to production.

Antonio Rizzi, director of the University of Parma's RFID Lab

On occasion, Lavazza's production line does not use all of a pallet's reels of packaging, and consequently returns the remaining reels to the warehouse. When this occurs, the stretch wrapping and the RFID tag on that wrapping have already been removed and disposed of. In this case, a worker uses the handheld interrogator to read the extra RFID tag on the returned pallet. A Lavazza warehouse operator then must manually input the exact number of reels on the pallet before moving that pallet back into the warehouse.

According to Rizzi and Marzorati, the system has provided Lavazza and Goglio Cofibox with almost 100 percent accuracy on their inventories, along with significant time savings, since reels no longer need to be counted manually. What's more, Rizzi says, Lavazza is better able to manage its inventory since it has a real-time overview of its stock. In fact, he adds, the company has reduced its overall inventory levels since the RFID-based ordering, shipping and receiving processes have proven so reliable.

ID Solutions, an RFID spin-off company of the University of Parma, served as the project integrator and developed the logistics dashboard especially for this project. The dashboard features data formatted according to Electronic Product Code Information Systems (EPCIS) standards. Because of this shared system, the two companies can easily collaborate to replenish Lavazza's packaging supply. The partners agreed that Lavazza would place a yearly order for packaging, based on its average annual

use of the materials.

As Lavazza gains a better overview of its production and its packaging needs each month, the firm revises its three-month forecast and sends updates to Goglio Cofibox electronically. The company also sets target delivery dates for each order. Goglio Cofibox then uses the information to update its production plan accordingly. This helps Goglio Cofibox, which has a production cycle of two weeks under normal conditions, to meet the concrete orders that arrive each Monday from Lavazza. The coffee company sends Goglio Cofibox its desired weekly delivery schedule, and the packaging supplier adjusts its production plans to match.