

From Concept to Product

When paper industry meets RFID – designing pulpable RFID labels for pulp bale identification

In Äänekoski, Finland, construction is underway on the world's first next-generation bio-product mill to convert wood raw material into a diverse range of products while producing essential bio-energy and various bio-materials. This incredible operation is the largest ever investment in the forest industry in Finland, and is expected to have an annual impact on the Finnish economy of over half a billion euros while providing 2,500 jobs.

This mill will be exporting massive amounts of pulp which will be used in the global pulp and paper industry — a 500 billion euro (\$567 billion) industry with 2,315 businesses employing more than 745,000 people — to manufacture products like high-quality tissue and writing papers, industrial paper and cardboard.

RFID brings pulp logistics into a new era

The mill's operator, Metsä Fibre, is a forerunner in utilizing wireless technology. The company is ensuring the efficient management of its massive logistics chain using an innovative radio-frequency identi-

fication (RFID) label solution from Confidex which the company has been utilizing over the past four years in its manufacturing and distribution operations.

Four years ago, RFID was in use at one Metsä Fibre mill, two seaports and at one customer. Today, Metsä Fibre's RFID system is running in all of their pulp mills in Finland, several seaports, and in multiple customer operations.

Barcodes gets easily damaged during handling

This solution came about from a Confidex project started for Metsä Fibre in early 2011. The world-leading producer of softwood and birch pulp wanted to get more visibility in their logistics, specifically in tracking huge bales of pulp. They also wanted to eliminate loading errors and verify automatically the correct pulp type. Metsä Fibre was using barcode tracking, which was problematic in that it only reliably

covered the initial part of the company's logistics chain. This was because the barcodes were getting easily damaged and becoming unreadable during handling because they were so tightly packed in containers.

Metsä Fibre was only able to track initial outbound orders, but when the bales were reaching destination harbors, they didn't have reliable automatic way of tracking them. The company started to develop a new approach for pulp logistics with RFID.

The solution Confidex developed for the company's RFID application centered on custom-designed RFID labels which are inserted directly into huge bales of pulp. These labels

“We needed a very reliable, accurate and efficient way of tracking the pulp units throughout the supply chain.”

Matti Alanen, Metsä Fibre Vice President, Logistics Finland

are trackable with handheld, fixed, and forklift-based RFID readers, providing high-quality, reliable

digital integration which connects the pulp to Metsä Fibre logistics systems for real-time data sharing.

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prototypes. Production prototypes are used often in customer pilot and once the results are approved, the product is transferred in mass production. Confidex works closely with the customer in each step of the process.



A completely soluable RFID label that meets the need

One of the unique elements of this particular project is the fact that Confidex was challenged with creating an RFID label with quality radio frequency performance which could also dissolve in the pulping process without negatively impacting the papermaking process. This required strict adherence to European Economic Community (EEC) and Food and Drug Administration (FDA) regulations.

Confidex got involved with the project through its partner Vilant Systems which was working with Metsä Fibre setting up reader gates. After intensive testing and close co-operation with Metsä Fibre, Confidex was able to develop a completely soluable, reliable RFID label meeting the company's standards and requirements.

“We partnered with Confidex not only for their experience in designing RFID labels for unique requirements, but also for their capabilities in manufacturing such custom labels in high quantities. In our co-operation with Confidex

Inside the design process

Although the unique Metsä Fibre requirements were completely new with the pulpable RFID pulp label, the design process was similar to other projects in that everything starts with building the complete picture of the requirements together with the customer. This includes very detailed product description for making sure that the designed product has the best possible fit for customer's application and existing processes.

The normal Confidex design phase includes various steps in research and development: characterizing and testing the materials, simulating the use conditions, defining the antenna for suitable RF performance and so on. The strict food compatibility for Metsä Fibre was certified by external laboratories.

A larger production prototype batch is produced after successful testing and validation of design

Resulting optimized inventories and improved customer services

As a result of the intensive testing and verification, Metsä Fibre uses Confidex RFID Pulp Label™ today in their continuously running RFID logistics tracking system. Labels are installed with an applicator in Metsä Fibre production line and read with fixed, handheld and forklift trucks from pulp mill until Metsä Fibre's customers. Besides bringing various



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benefits in pulp logistics, the labels can help suppliers like Metsä Fibre manage their customers' inventory more easily and provide better service.

A unique benefit Confidex provides customers like Metsä Fibre is the ability to optimize any product from beginning to end, as the company

owns the full chain of quality with its own in-house design and manufacturing. Because of this, and wide experience in multiple industries and with industry organizations, Confidex doesn't need to make compromises.

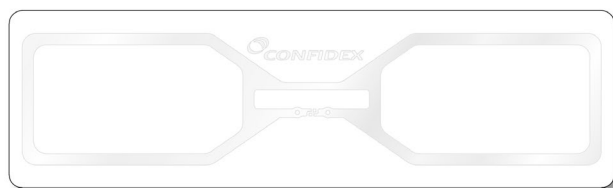
Focusing on customized RFID solutions

Often, Confidex performs customer-specific personalization for products in addition to supplying RFID tags and labels. This can range from various printing or encoding to helping customers find the optimal tag attachment method in addition to a myriad of other services.

"Typically in customer cases we can utilize some of our existing product platforms to develop a customized solution, but this was a completely new approach for us, requiring the design and development of a new antennae, as well as all-new materials, certification and testing," said Jari Ovaskainen, Director of Products at Confidex.

"We're excited that Metsä Fibre has been able to successfully utilize our customized RFID solution to help manage their entire pulp manufacturing chain over the past four years as this mature industry sector continues to evolve," he added.

In addition to Metsä Fibre project, Confidex RFID labels have recently been implemented further along in the pulp and paper value chain in automatic identification of paper reels. Confidex offers RFID labels also for post-processed paper products such as packaging materials where RFID can be used for product identification, tracking and brand authentication. In this way, Confidex covers the full chain of identification in paper industry from pulp to finished products. In parallel, customers rely on Confidex RFID tag and label technology in factory operations; factory maintenance; reliable tool and asset management; and tracking vehicles used in logistics.



Confidex RFID PulpLabel™

- Type: EPC Global Class1 Gen2 (ISO 18000-6C) UHF RFID label
- Operational frequency: Global 860-960MHz
- RF performance optimized for: Pulp bales
- Product compliancy:
 - Directives 80/590/EEC and 89/109/EEC
 - FDA 21 CFR Ch. I § 176.170 (04/2011 edition)

