RFID for the Wine Industry

Quality Tracking from Vineyard to Glass

A unique RFID tracking system has been developed after wine companies from the Bordeaux region in France expressed concerns over the difficulty of ensuring that the quality of their wines was preserved during handling, transportation and distribution.

Maintaining temperatures in a reasonable range during shipment and storage plays an important part in preserving the quality of fine wine and spirits. However, there isoften no record of variations of temperatures after the wine has left the wine

producer's cellars.

A semi-active RFID tag placed inside each case enables wine producers and distributors to monitor and log ambient temperatures in each case three times a day. Some vineyards enhance this "pedigree" by installing sensors and readers in the specific vineyard to track its microclimate history throughout the growing and harvesting season.

This issue needed to be addressed as until now, the authenticity and knowledge of storage temperatures had been, at best, "*unverifiable*".

Fine wines face other risks during distribution. To perform shipment verification and to discourage pilferage, the tracking system also includes an IPICO Dual-Frequency passive RFID tag with a unique code. The tag is attached to the base of each bottle, which can be individually tracked.

"*Each consumer can be reassured that the product is authentic. The system also facilitates inventory management*", explained Jack Falkner, President & CEO of FALKEN Secure Networks Inc.

WHY IPICO? " Reading RFID tags close to people and liquids is a vital engineering and physics issue which must be understood and resolved. The key reason we use the IPICO Dual Frequency RFID technology is because Dual Frequency overcomes one of standard UHF RFID's biggest performance problems and that is reliable tag reading on containers filled with liquids, since liquids absorb the RF signals and prevent the tag from being read. The Dual Frequency operating frequencies are such that tags are not screened by human bodies, conducting liquids, etc. Compared with other low frequency technologies, much longer reading ranges can be achieved, mainly because the return link (Tag to Reader) operates at 6.8MHz, which is much higher than the forward link (for powering the Tag), which operates at 125 kHz. These products employ the robust IP-X TM anti-collision algorithm, allowing up to 120 tags to be read simultaneously, at a rate of up to 30 tags/s. It handles dynamic tag populations extremely well; the Reader does not have to complete reading a group before new tags are added. Therefore it is ideally suited for reading multiple cases of wine travelling on a conveyor belt or pallet on a fork lift at speed. These are challenges which standard RFID does not overcome.

The technology is ideal for tracking people, animals, and containers with 'lossy medium' such as liquids.

The final feature of this tracking system, a proprietary, tamper-evident neck seal with a covert code at the base of the capsule, is aimed at preventing counterfeiters by authenticating the bottle's content. The RFID reader/authenticator can then read the invisible code on the neck seal.
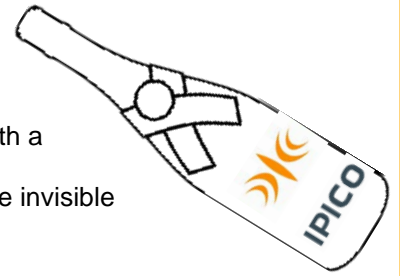
Key benefits for Wine/Spirits Producer:

- Accurate reports on distribution channel storage temperature allow the producer to positively influence the best practices in the distribution channel.
- RFID bottle tag provides secure traceability and simplifies inventory management.
- Assuring authenticity builds brand value and prevents counterfeiting.

These three components are coordinated in an encrypted Internet database. According to Falkner, "*these combined data create an ePedigree for each bottle of fine wine, which consists of authentication data from the château or vineyard, shipment data and temperature records*".

Using RFID To Track and Monitor Wine

While the most famous examples of wine fraud involve older bottles, counterfeits of current vintages are also a problem. RFID tags are now available to create what is termed an "intelligent bottle." This system uses a semi-active RFID tag inside the case to monitor temperatures and shipping information, a passive RFID tag on the base of the bottle for tracking and inventory management, and a tamper-proof bottle neck seal that has a covert code applied at the base of the capsule to authenticate the wine inside the bottle and thwart counterfeiters.

Sake is just as heat sensitive as wine (some say more so) and now thanks to the techno-magic of RFID tags, the industry has developed a fail-safe way of ensuring their sake stays cool. A new system has been developed utilizing RFID tags, Bluetooth, and 3G networks to provide the ultimate in temperature monitoring for bottles of sake on their way to retailers whereby every bottle arrives at the store with the complete history of temperature changes stored on the RFID chip on the bottle. One swipe through a reader-device and you can tell whether your bottle has been cool as a cucumber or cooked like a chicken.

BARREL TRACKING

Barrel Tracking enables the winemaker or operations manager to track barrels, an important and costly winery asset, and provides the winemaker with a complete history of barrel usage and flavor profiles. Sometimes barrels are stacked four or five high, making it hard to identify them. With RFID, it's easy since workers don't have to be right next to the barrel for a reader to recognize the unique ID on the barrel's tag. Barrel Tracking provides winemakers with complete wireless access to all critical data while they are working with the wine at the barrel.

Barrel Tracking offers wineries a unique, affordable solution to many of the problems that directly affect their revenue stream - the very real issues of product loss, production inefficiencies and general waste.

TRACKING A WINEMAKER'S KEY ASSET

For wineries, oak barrels are uniquely valuable assets. Winemakers rely on them as critical components in the winemaking process. Barrels are a primary tool used to infuse a winemaker's unique personality into their carefully crafted wines. Each barrel has a distinctive flavor profile that imparts a series of distinguishing attributes to the wine it contains.

Because barrels are expensive and have a typical service life of only five years, it is important that each barrel is tracked carefully. Today, wineries use several tracking systems, all with serious limitations. The most sophisticated is barcode labeling used with handheld optical scanners, but many wineries still use hand printed 3x5 note cards or scrawled chalk marks. These limitations can affect the quality of the wine, and, more importantly, impact the bottom line. These include:

- Barcode labels and other markings can be easily damaged or misread, resulting in lost or misplaced barrels, process interruption and wine waste
- Current systems do not provide the ability to record barrel/wine history or winemaker notes while at the barrel
- Chance of human errors increases dramatically when applying/using barcode labels, paper tags, or chalk marks
- Restricted data field length requiring frequent, often daily, label reprinting and replacement
- Barcode systems, in particular, have particularly onerous operational issues. They require special printers and label stock; label adhesives are poorly suited to the winemaking environment and often fall off or require staples; and labels become torn, faded, dirty or moldy. When barcode data is updated, stacks of labels must be reprinted, old labels removed and new labels re-installed - all with an associated labor cost and a potential for error. Barcode scanners are also prone to human error when reading data, resulting in misplaced or lost barrels, wine contamination and loss of the final product. Additionally, all data captured by the scanner must be manually synchronized with back-end database systems.

How the System works:

FSN's RFID enabled Barrel Tracking System goes beyond barcode systems to provide a winemaker with reliable data, better labor utilization, and the ability to access and update data at the barrel.

RFID Tags: Approximately the size of a quarter, a RFID Tag is a nearly indestructible tag that holds a variable number of bytes of data, depending on the model selected. Each wine barrel is provided with a unique serialized tag that mounts to the head end of a barrel with a food grade adhesive.

At the Retail Level:

Shoppers in a gourmet store in Switzerland can now learn more about the grapes used to make their wines or the foods that fit well with a certain vintage. A store there has introduced an RFID-based shopping assistant that provides wine connoisseurs with additional information and even videos. Shoppers move an RFID tagged bottle close to an information pod and interactive information pops up on the screen.

Restaurants and wine distributors can also use RFID to monitor their stocks of wine, giving sommeliers and managers more time to focus on the customer. Bottles can be tagged with IPICO Dual Frequency RFID labels. They are kept in so-called "smart" wine racks: Each time a bottle is put in or taken out, the system is updated on the status of the inventory. Combined with temperature sensors, the system could also make sure wine is aging under the best-possible conditions.

FALKEN Secure Networks(FSN)—Your partner for RFID automation

If you choose to pursue RFID implementation in your organization, here is the FALKEN Secure Networks commitment to you:

- FSN will provide solution architects to work with you to define system requirements for your particular installation. Multiple locations can be networked together for a central and real-time view and centralized management.
- FSN will do a RFID site survey to validate radio frequencies, tag types, system design and performance
- FSN will provide all necessary hardware and software to make the system work for you
- FSN will integrate the system with your existing enterprise management software
- FSN will provide documentation for the system, including operating procedures
- FSN will train your people
- FSN will provide warranty and continued system support

Contact Us

FALKEN Secure Networks (FSN) is the leading System Integrator and Solution Architect for advanced Active/Passive Unified RFID systems that leverage standards-based technologies. FSN integrates RF technologies for asset visibility, using EPC global standard RFID, Wi-Fi and Real-Time Location Systems (RTLS) for cost-effective design, and turn-key project implementation.

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