

Important Considerations for RFID Compliance Tagging

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RFID: Then and Now

RFID is a mature technology with decades of success tracking airplanes, railcars, and over-the-road tractor trailers. RFID has been integrated into access control, toll collection, and retail security systems in businesses and schools, in libraries and stores, even at the gas pump. Now it is becoming an integral part of the supply chain for manufacturers and retailers of consumer products—tracking cartons and pallets from shipper to receiver.

A major cause for rapid, widespread adoption of the technology has come from Wal-Mart, the world's largest

RFID tagging for compliance with retail and military mandates will continue to dominate industry attention on RFID well past the 2005 and 2006 deadlines. Manufacturers and retailers affected by these mandates are looking at their distribution operations and the available RFID tagging products and systems hoping to find a solution that is practical, appropriate, and affordable. Few RFID compliance tagging solutions are truly “off-the-shelf.” Companies that are evaluating particular offerings of hardware and software can improve their chances of success by considering the following five attributes of leading RFID compliance tagging solutions.

1. Optimal tag selection

Variations in tag design, application, and environment can greatly affect the readability of tags and ultimately the level of compliance.

The RFID UHF tags typically used in distribution applications are identical in basic construction; a silicon chip is attached to an antenna and together they are adhered to a base material. The base material of the RFID tag can vary (e.g., paper, mylar, plastic) as well as its size. It is the variations in the antenna, its surface area and shape that have the greatest effect on a tag's performance. For example, any type of tag may work on a carton of bathroom tissue, but detergent in foil packaging may require a more expensive, high-performance tag.

In addition to tag design, RFID performance can be affected by the physical characteristics of the packaging and the product contained. Because metals and liquids adversely affect RFID, tags on cartons containing these materials should be placed in locations that optimize performance.

Understanding the physics of RFID is critical to achieving acceptable read rates. No single tag design outperforms all other tags in all solutions. Make sure that the solution you choose accounts for the variables in tag design, placement and environment in your application.

retailer. The company has mandated that by January 1, 2005, its top 100 suppliers must provide RFID tags on all cases and pallets for shipment to three specified distribution centers and 150 stores. Three additional distribution centers and another 100 stores will be added by June 2005, and by October 2005 a total of 800 stores will accept RFID-tagged shipments. The company's 200 second-tier suppliers are expected to comply with these requirements by January 1, 2006, with the majority of remaining getting on board by the end of 2006.

The U.S. Department of Defense (DoD) has issued a similar mandate,

2. Intelligent tag handling

Any given batch of RFID tags may contain tags that are totally unreadable or readable only at a reduced range. Tags also can be damaged during application and subsequent handling, further reducing read rates at the receiving end.

An automated LPA (label printer/appliator) with an intelligent reject mechanism can detect and remove defective tags prior to application. Secondary verification on outbound cartons can detect and remove defective tags prior to shipment.

Verifying tags throughout the tagging process assures that only good tags enter the supply chain.

3. Best way versus one way

RFID compliance tagging can be achieved using either manual or automated systems. Manual systems certainly have lower startup costs and may be appropriate for low-volume operations. However, when labor costs are factored in, they may not be as cost-effective for high-volume operations.

The principal advantages of manual systems include mobility and minimal space requirements. Disadvantages include the need for an operator, limited throughput (10 to 12 cartons per minute), no validation of RFID to bar code matches, and inoperability with other systems creating isolated RFID "islands."

The advantages of an automated system include labor savings; higher throughput (up to 30 cartons per minute and more with multiple applicators); elimination of invalid tags; 100 percent validation of RFID and bar code matching; and real-time diagnostics and reporting. Disadvantages include initial higher cost than a manual system; a larger footprint; and the need for routine, preventive maintenance.

Because there is no one right system for every application, the key to selecting the optimal RFID tagging solution is to take into account the total cost of compliance.

requiring its more than 40,000 suppliers to be RFID-compliant starting in January 2005. Some industry sources believe this initiative potentially has even more far-reaching consequences than Wal-Mart's, noting the DoD purchases consumer goods, as well as military equipment. Moreover, it may eventually impact everyone selling to the federal government. ■

4. Compatibility with existing technologies


Supply chains can be disrupted by deploying a new system that does not accommodate existing technologies or processes. Businesses have significant investments and experience in the print/apply solutions that best meet their needs. A company currently using ink jet printing, for example, may want to consider an RFID tagging system that employs this technology. In this case, introduction of a new technology such as thermal printing could lead to longer start-up time and the need for additional maintenance, training and spare parts.

5. Scalability and expandability

Scalability simply means the ability to do more with the same equipment. Expandability means the ability to add new functionality. The question then becomes, how scalable or expandable is one RFID tagging solution compared with another? How easy and at what cost?

Positive answers to the question of scalability might include the option of adding RFID LPAs to a single line rather than having to add multiple processing lines. In a scalable solution, this is easily accomplished through *user configuration* of the integration software (plug and play) rather than *vendor customization*. With minimal investment, throughput can keep pace with increasing demand and volume. Further scalability is possible when one automated controller can manage multiple tag application lines—with each line having all of the necessary components for automated RFID tagging.

Positive answers to the question of expandability include options for tag validation and for integration into existing material handling and information systems. Examples of expandability for tag validation include the ability to add automatic identification and material handling devices such as handheld readers, reconciliation lanes and operator display terminals.



Expandability also means the ability to migrate to new tag protocols without replacing the existing RFID tagging system. It means having options for batch processing or adding SKUs on the same RFID LPA line.

As companies move from applying tags at the point of outbound shipment to applying tags further upstream (e.g., WIP tracking), integration with existing material handling and information systems becomes critical. This is true especially for companies that have invested in laser or camera bar code technology.

RFID compliance tagging systems that can scale upward with volume and expand outward with added functionality can achieve a satisfactory return on investment for the suppliers themselves.

Thinking beyond compliance

The immediate benefits of RFID to Wal-Mart and other retailers are obvious: enhanced labor efficiency and fewer receiving errors. Yet their suppliers stand to reap even greater rewards. In distribution centers, RFID can eliminate the need for operators to hand scan bar codes on pallets, cases, racks and at dock doors for faster, more streamlined operations. RFID tags can be read to log out items and build shipping manifests, and when interfaced with shipping and order fulfillment applications can dramatically reduce errors.

In the manufacturing environment, RFID can be used to improve inventory control and asset management, allowing manufacturers to track materials, components, sub-assemblies and finished goods through the production process and in transit. This capability, in turn, can help balance output and demand, reduce downtime due to supply shortages, improve security and reduce inventory shrinkage.

Summary

One fact is inescapable—RFID tagging for compliance adds costs to distribution operations (tags, equipment, labor, etc.) and may not yield any immediate or appreciable return on investment. The challenge becomes that of minimizing startup costs while opening the door to longer-term benefits. This is best accomplished by selecting and working closely with a vendor that has extensive RFID experience; that offers proven hardware and software platforms; whose solutions accommodate and can be integrated with existing technologies and systems; and that can think beyond compliance.

About Accu-Sort

Accu-Sort Systems, a Danaher company, is a world leader in auto-ID and has the full range of stationary reading technologies from lasers to vision to RFID. The company has more than 40 successful RFID installations and is uniquely qualified to help companies meet the challenges of RFID tagging for compliance.

Accu-Sort also has 30 years of experience deploying and supporting material handling and auto-ID systems. For more information about Accu-Sort's RFID compliance tagging solutions, call 1-877-ASI-RFID or visit www.accusort.com/systems/fast_suite/fasttag.html.