

The Xerafy logo is positioned in the upper right corner of a green rounded rectangle. It consists of the word "XERAFY" in a white, bold, sans-serif font. The letter "X" is stylized with a horizontal bar that extends to the left and then curves upwards and to the right, resembling a signal or a stylized 'X'.

Metal Skin RFID – The New “Stealth” Information Technology

Consider for a moment the immense variety of different skins that play an important role in our lives each and every day. Modern electronics have a plethora of skins, including thin urethane skins that cover keyboards to protect them from dust, moisture and other contaminants that might damage their functionality. Apply the same logic to portable electronics such as smart phones and smart tablets ranging from screen protectors to full gel-type cases that mold to the form of the device and allow the usage of exterior buttons. Going further into the technological realm, consider the stealth “skin” of high tech air and watercraft used by military forces. Finally, but certainly not least, the skin that plays one of the most vital roles in our lives is our own skin, which allows us to function in everyday life with tactile sense, protection against things that might harm us, and in the case of fingerprints, contribute to our unique identify.

Challenges of RFID and Metal Asset Tracking

RFID and metal asset tracking is no stranger to the challenges of physics. Radio wave in general has a love-hate relationship with metal. Depending upon the dielectric of the surface either contacting or in proximity of a radio wave, in this case an RFID tag, the metal may act either as a reflector, amplifier or interferer. Common problems with using RFID on/near metal challenging early adopters working for a solution to metal asset tracking rejoiced at the introduction of a tag that could be mounted directly to a metallic or equivalent dielectric surface without major modification (this may evoke the memory of the “38 business card rule” for early users of passive UHF RFID where approximately 38 business cards, or the equivalent of 1 cm was used to space a passive UHF RFID label off metal to bring it into tune). Fast forward to present day where not only do tags that work *on* metal exist, but tags metal that may be embedded *in* metal are also available, such as Xerafy’s award winning iN series of tags.

However, for metallic applications with more rigorous requirements, such as curved surfaces requiring a flexible RFID tag that needs to conform to the surface having a thin and robust profile and a superior read performance,

the roster of offerings up till recently, did not fit the bill. The introduction of the Xerafy Metal Skin, the world's first true UHF EPC RFID inlay designed for tracking metal assets, helped meet this challenge.

Another challenge is that of human readable information such as part numbers, serial numbers and barcodes.

Traditionally, any RFID tag that was to contain human readable data needed to have a paper or thin plastic label printed and then affixed to the actual RFID tag due to the simple fact that the RFID tag itself was too rigid and thick to fit through a conventional RFID label printer.

Global companies with a mix of metallic and non-metallic assets often face the issue of having to use two different tags either from the same vendor or different vendors to achieve a desirable solution in terms of read range, readability and even use across the globe (which will then double or triple the number of tags that must be specified in a scope of design, depending upon the region of the world they are used in). This creates an additional set of problems for global companies that need to track assets through international depots. This is often addressed by affixing two to three tags to an asset with the same EPC, but with tags optimized for different world frequencies.

Such applications include:

- Product authentication (laptops, IT, consumer electronics)
- Cylinder tracking (chemical ampoules, beverage containers)
- Pipe tracking (gas line, water, industrial facility)
- Industrial equipment tracking



FIGURE 1: METAL SKIN MERCURY LABEL AFFIXED TO THE CURVED SURFACE OF A METAL KEG

- IT server and asset tracking
- Mobile assets (portable devices, communication equipment, scanners)
- FDA UDI devices (medical equipment with Unique Device Identification)
- Global supply chain management
- Pharmaceutical authentication of foil packaged drugs
- Returnable transport items/containers
- Retail for high value products

Case Study

Consider the application of IT asset management. This is perhaps a "classic" application of RFID where companies wish to track company issued assets either as a check-in/check-out application or perhaps track within the walls of an office where assets move in the event of an IT audit where every piece of capital equipment needs to be accounted for through a typical "goal post" portal reader which requires a tag to have a read range of around 5 to 10 feet depending upon the width of the portal.



FIGURE 2: METAL SKIN TITANIUM FROM XERAFY

The extra read range requirement isn't necessarily limited to the physical width of the portal, but also to allow for being inside a briefcase, computer case or purse. "We've just concluded a study and the market has indicated Consumer Electronics is looking to adopt RFID for Product Authentication at an accelerated scale within the next few years" states Drew Nathanson, Vice President of AutoID at VDC Research.

For example, a company wishes to track iPads and laptop computers. What complicates this application more is such devices contain a mixture of both metal and non-metallic components. A laptop and an iPad contain metallic and plastic components. Even internal metal components such as PCB assemblies, frames and other parts will have an effect (mostly negative) on a conventional RFID asset tag. In

addition, both assets are thin and small in profile and in the case of protective skins and cases, need to be devoid of anything making the surfaces non-flat.

An RFID tag required for this application cannot be bulky or rigid. It also cannot be tuned for one dielectric or another. Even a “low profile” on-metal tag will likely be too thick or have the surface area to fit on a discrete location on the aforementioned devices.

Xerafy Metal Skin



FIGURE 3: METAL SKIN TITANIUM AFFIXED TO AN IPAD

A RFID tag solution is now available that solves all of the challenges mentioned, including: low profile, flexible over different surfaces, compatibility with conventional RFID label printers and superior performance no matter where in the world it is utilized. As a product, the Metal Skin is the “middle product” between a peel-and-stick inlay and a metal substrate tag. This means the Metal Skin offers cost effective on/off-metal performance but could potentially also be used as a disposable tag for the mass market, which was previously un-heard of.

With relatively balanced read ranges on and off metal, the Metal Skin will work seamlessly in the majority of current applications without major variation in read range. With a standard label reel of 2,500 inlays, when used with a standard RFID label printer or even a



FIGURE 4: METAL SKIN MERCURY INLAY IN A ROLL

conveyor line asset labeler, companies may remove the now unnecessary step of having to print separate labels to affix to their asset tags.

For the iPad and laptop tracking case study, the solution includes Xerafy Metal Skin tags affixed to both varieties of devices. In addition the tags are directly printed with human readable and barcode identification. This seamlessly enables check-in and check-out ability that is fully integrated with the company’s security system which reconciles employee ID with asset ID of the mobile device. These fold into the company’s inventory management system.

The end result is:

- Increased security which resulted in reduction of asset thefts
- Lowered costs of compliance with Sarbanes Oxley
- Easy and fast inventory management
- Reduction of cost needed to replace laptops and iPads due to theft or

Conclusion

Bringing us back to the original thought of the different skins that play an important role in our everyday lives, the new Xerafy Metal Skin now adds to RFID the ability to deliver all of the benefits of RFID already in play all over the world: product identification/authentication/traceability, medical equipment maintenance and sterilization tracking, IT blade server management and even tracking cycles of beverage containers used in restaurants we eat at every day, in the form of a stealth skin. Who knew skin could do so much and more?

About Xerafy

Xerafy is committed to bringing our customers the world's smallest and most reliable passive UHF RFID metal tags that are qualified and tested to meet extreme conditions over the lifetime of the asset. Xerafy's innovative technology offers the industrial, manufacturing, defense, IT, and supply chain markets an affordable, durable, high temperature smart tag that can be easily attached to or embedded to metal assets. Xerafy's products enable packaging solutions for automatic check-in / check-out tools, work in progress, IT auditing, product authentication and asset management with a competitive advantage in size, cost, design, quality, and performance of tags. The company is headquartered in Hong Kong, and maintains sales and support offices in Dallas, Texas, and in Shanghai, China.

Contact Us

For more information on the new Metal Skin and all of Xerafy's products, please visit our website: www.xerafy.com.