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TrazeTag Designs Rubberized RFID Labels for Abusive Environments

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Each tag's passive RFID inlay is protected by a flexible plastic material that can be custom-molded with wear-resistant text and graphics, for identifying pipes, cable or heavy equipment.

By Claire Swedberg

Jan. 26, 2011—Startup company TrazeTag has designed a tough, rubber passive RFID label for use in harsh environments, such those found in construction, aerospace, manufacturing and in storage-yard applications. Because the label's RFID inlay is enclosed in a flexible, durable material, the company says, it can survive rugged handling, physical abuse and exposure to heat and water. The label, which is commercially available now with a variety of low-frequency (LF), high-frequency (HF) or ultrahigh-frequency (UHF) passive RFID inlays, is also designed to be visually readable. Unlike other RFID tags and labels that typically have text printed or painted on the surface—which has the potential of being scratched or damaged—the TrazeTag label is embossed with graphic information, such as company logos, ID numbers or letters, that appears on the front and back.

The tags are being marketed and distributed by Etiflex, the manufacturer of the rubber label in which the RFID inlays are embedded. The two companies will be demonstrating the tags at RFID Journal LIVE! in Orlando, Fla., in April of this year.

Leandro Margulis

This month, General Dynamics Electric Boat, which designs, builds and maintains submarines for the U.S. Navy, completed tests performed on a sampling of about 20 TrazeTag tags, exposing them to ultraviolet radiation, salt fog and temperatures of -80 degrees Fahrenheit for four weeks. When the tests were finished, Electric Boat reported to TrazeTag that the tags remained intact, with no signs of distortion, material degradation or crack formation. TrazeTag then evaluated the functionality of the passive HF tags' embedded RFID inlays and found they still read effectively. General Dynamics Electric Boat has indicated, Margulis says, that it could use the TrazeTag tags for tracking of heavy equipment in its submarine-building operations, although no commitment has yet been made.

TrazeTag's founder, Leandro Margulis, identified a need for the rubberized tag when working for General Electric, at its locomotive production site in Erie, Pa. He noticed that the factory's workers found it difficult to track of wire cable—used by cranes to lift heavy steel items—when the staging area was filled with numerous types of cable identified only with a printed label that could at times be hard to read.

In some cases, use of the wrong cable could be a critical mistake. Some wire ropes are designed to handle more weight than others. To the eye, however, many wire ropes may appear the same. "I saw a need for something visual that is durable and trackable," Margulis says.

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Later, while serving as a technology consultant at Deloitte Consulting, Margulis imagined the benefits of RFID. "I worked with heavy-industrial manufacturers and saw the need to manage their equipment and materials outdoors and in harsh environments in an efficient way [electronically]." He found that simply having a clearly noticeable label on materials was beneficial, but an automated system that could track the usage of material, and therefore its degradation, as well as inspection history in a back-end server could be much more valuable.

The TrazeTag label's protective rubber exterior can be embossed with wear-resistant text or images.

Two years ago Margulis formed the company TrazeTag to solve two problems—create a tough RFID label for harsh environments, and, for redundancy, accommodate a visual set of information on the front and back of the label.

The company completed a prototype of the product and first tested the tag in Margulis' home. He put the tags in the freezer, dropped them several stories from the window, and stomped on them in an effort to damage them. Several summer interns assisted in the abuse, Margulis says, but the tags remained

undamaged.

To manufacture the tags, Etiflex uses TrazeTag's proprietary and patent-pending process to embed RFID inlays into rubber labels shaped and colored to suit the user's requirements. Durable visual aids (logos and words) are molded into the material—not painted or printed on it. Any type of passive inlay can be embedded within the tag. Margulis expects most users of the TrazeTag labels will encode the embedded RFID chips with simply an ID number, linking to data about the item being tagged in a back-end system. Some TrazeTag customers, however, might request an RFID inlay on which more data could be encoded , such as each time an item was used or inspected.

In one scenario, a construction company could attach the tags to cables such as those used by cranes. Staff would glance at the front of the label to identify a cable initially, and then use a handheld reader to read the tag's inlay, thereby confirming that cable's identity. If the cable is the correct one, staff could then enter information into the handheld to indicate that the item was being used, and how, thereby allowing the company to store an electronic record of the cable's history. If the cable was due for an inspection, staff could be immediately alerted to that status on the handheld, if the site had a cellular or Wi-Fi connection. Inspectors could use the handhelds similarly to update data about an item's inspections or maintenance.

A TrazeTag label can be attached to materials, such as pipes or large pieces of equipment, in multiple ways. For example, it could be tied to an item via cord or cable, or it could be glued, stitched, heat-sealed or welded onto it.

The labels are made to order, and most, Margulis says, will include an RFID tag pre-encoded with a unique ID number only, which the user can later link to data stored in a back-end server. However, he says, Etiflex or the end user can also encode additional data to the tag if that option is requested. TrazeTag estimates a lead time of four weeks per order. This may vary depending on the individual specifications of the customer.