

RFID Fuels Gas Tank Security

Hi-G-Tek seals allow an Eastern European oil company to ensure that the correct type and amount of gas is delivered to stations, and that the fuel is not stolen en route from depots.

By Claire Swedberg

April 25, 2008—Eastern European oil company Rompetrol is employing RFID seals known as Hi-G-Locks as part of the Hi-G-Tek Tanker Truck Monitoring Solution (TTMS) used on 80 company fuel trucks to protect and manage its product. Trucks transport fuel from gas depots to gas stations in remote areas of Romania and Bulgaria.

The company ships crude oil from Russia and Saudi Arabia to its refinery on the Black Sea. From there, the refined gasoline is shipped by rail and truck to oil depots in Eastern Europe. Rompetrol stores the fuel in such depots until it is shipped by truck to gas stations. It is this secondary distribution chain—from depot to gas station—that the oil company is tracking with Hi-G-Tek seals.

Until recently, the trucks were tracked manually, and security was one of the company's greatest concerns. With the high price of fuel, a portion of a truck's gas was often stolen before a vehicle reached a gas station. For instance, a driver could siphon off gas without being detected by Rompetrol. In addition, the company sought a system that would reduce excess inventory that was being stored for transportation or delivered to gas stations because employees didn't know the exact amount of gas already on the road or delivered at any given time. Before the Hi-G-Tek system was installed in September 2007, workers spent hours on manifest reconciliation, attempting to track the location and movement of gas, as well as determine how much fuel was delivered where, all on paper.

The company is now using a monitoring solution provided by Hi-G-Tek. The system includes RFID-based seals on trucks, as well as RFID interrogators deployed at depots and gas stations and on trucks. With this solution, the company can now track when its trucks and fuel arrive at a station, as well as when they leave and return to a depot. Thanks to a built-in alerting system, Rompetrol can ensure that the wrong fuel is not pumped into the incorrect tank, says Hi-G-Tek's president and CEO, Larry Blue.

With the RFID system, each truck is equipped with several Hi-G-Locks. Some are used to seal hatches located on the top of the tank for inspection of the tank's interior, while another slightly different variation is utilized to seal the valves through which fuel is loaded and then dispensed into gas station tanks. A truck typically has a total of five Hi-G-Locks. Each seal includes both a 433 MHz active tag and 125 kHz passive RFID tag. The 125 kHz version stores a unique ID number, and as the vehicle is loaded with fuel at a depot, its driver can use a handheld Hi-G-Tek interrogator to encode the tag with data, such as the shipment manifest, the specific product being delivered and where it is headed. Approximately 10 Rompetrol depots in Romania and Bulgaria presently use the system.

The trucks deliver fuel to about 300 gas stations in Romania and 150 in Bulgaria, Blue says. If a seal is opened before it is in the interrogator's vicinity at the appropriate gas station, the reader queries a GPS device on the truck regarding the vehicle's location, then transmits an alert via a GSM cellular connection that can be

received once the truck arrives at the station, indicating when and where a seal was breached.

Most of the gas stations, located in remote areas, are fully automated and have no employees present. At those unmanned stations, customers fill up their own tanks, using prepaid or credit cards to pay for fuel. Each station's gas tank is equipped with its own Hi-G-Lock, which transmits at 433 MHz to an RFID reader installed at the station.

Before delivery drivers can refill a gas tank, the station's RFID interrogator receives unique ID numbers encoded to the active tags embedded in the truck's and station's Hi-G-Locks. The reader then sends that data to Rompetrol's back-end system, where Hi-G-Tek software translates the information and issues alerts in the event of a seal breach or improper fueling at the station. If a driver is about to make a mistake—for instance, if a particular tank that person is about to fill requires a different grade of fuel—the truck's RFID reader sends out an alert.

RELATED_ARTICLES All data is stored in an Internet-based server using Hi-G-Tek enterprise software, hosted by Hi-G-Tek. Rompetrol expects the system to reduce excess inventory by 25 percent, Blue says, adding, "Now they know where everything is" since the truck's interrogator transmits its location and its seals' status via a GSM signal.

Not only is the system helping Rompetrol prevent excess fuel from being delivered to stations, Blue says, but it also enables the oil company to reduce the number of trucks and train cars carrying that fuel by 25 percent. In addition, the firm has reduced the amount of data entry and manual tracking previously performed by employees.

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