

Indian oxygen and nitrogen supplier Kay Nitroxygen is using EPC Gen 2 UHF tags and readers to record the status of its reusable cylinders, resulting in increased productivity.

By Claire Swedberg

Mar. 30, 2010—Kay Nitroxygen Pvt. Ltd., an oxygen and nitrogen gas company in Satara, Maharashtra, owned by engineering firm [Kay Group](#), has reduced its product turnaround time by using an RFID system to record the status of its reusable cylinders. Since October 2009, the company has been utilizing the technology not only to track which cylinders are loaded, shipped to customers and returned, but also to identify which need to be tested before being reused, in keeping with federal guidelines.

Kay Nitroxygen faced several challenges when it began seeking an RFID solution for its 135-pound steel cylinders, which are approximately 5 feet in height and 8 inches in diameter, and which cost about \$300 apiece. Kay Nitroxygen's facility fills empty cylinders with oxygen or nitrogen, and ships them to customers. After depleting the gas within the tanks, customers then send back the empties. It was the responsibility of staff members to read the ID number painted on the side of each cylinder as it was received from a customer, refilled with gas, or shipped back to that sender, and to write down that ID number, as well the event just completed—returned by customer, refilling, or shipping back to customer. Employees in the office would then input that data into a computer. By so doing, the staff could not only have a better understanding of where the cylinders were going and when they returned, but also track which cylinders needed to be removed from the supply chain and retested for leaks.

In fact, each cylinder's ID number was typically recorded and entered into the system 18 times every month, including all check-in, filling and check-out events. What's more, the process of recording ID numbers on paper required three employees to work eight hours apiece to receive and enter 1,000 cylinders into the system before they could be refilled and shipped to customers. The cylinders' ID numbers were often smudged or unreadable, and the low lighting during the night shift made reading the painted ID numbers even more challenging. "Our goal was bringing efficiency in production, and getting accuracy in cylinder numbers going in and coming out," says Yogendra Choudhary, Kay Nitroxygen's manager.

Kay Nitroxygen purchased a solution from [Technology Solution Partners](#) (TSP), an IT consulting and services firm based in Shelton, Conn., to reduce the incidence of errors and improve the cylinders' cycle time. TSP, with Kay Nitroxygen, then conducted a six-month pilot study involving 250 cylinders to ensure the tags could be properly read in the dusty, hot and highly metallic environment, before launching a full-scale deployment in October.

There were several challenges involving RFID usage in this industry, says Girish Gupta, a TSP consultant. The manufacturing floor and loading dock were hot, dusty and humid, and skilled personnel were not available to manage or maintain a complicated system, such as one with a fixed portal. In addition, the high volume of tightly packed metal cylinders made the reading of RFID tags even more challenging. Finally, tag placement would be difficult, as the tags needed to be accessible to RFID

interrogators when cylinders were stacked on their sides, but could not be attached to valves, which are often replaced.

UPM Raflatac developed a tag containing a UPM Raflatac Belt RFID inlay made with an [NXP Semiconductors](#) U-Code G2XM EPC Gen 2 RFID chip. The tag is encased in an explosion-proof casing shaped in a curved fashion so that it could be taped directly to a cylinder's round shoulder. This tag, used in conjunction with a [Motorola](#) 9050G handheld interrogator, offered the company a read distance of 2 to 12 inches. The group also found that when stacked upright on the loading dock, or when being filled, the cylinders need to be placed in rows of four to allow staff members to reach over their tops and read each tag with the interrogator.

With the new system in place, when empty cylinders arrive from a customer, a worker utilizes the Motorola 9050G to read the tanks' tags. The device, which emits a beep to indicate a tag was successfully read, stores data regarding each cylinder, including which customer used it most recently, and when its next test is due. To accomplish this, the handheld uses TSP's Trakaid CyTrack Plant Mobile software, which also provides data to the user, such as an alert if the cylinder will soon need to be tested. The software also enables the staff to input information about a particular cylinder, such as any noticeable damage.

Data is stored on the handheld unit until a staff member places it in a USB cradle, at which time the handheld's software uploads its information to the back-end Trakaid CyTrack Tracking software residing on Kay Nitroxigen's Microsoft Windows 2008 database, via an interface also provided by TSP, known as Trakaid CyTrack Interact. Finally, Trakaid CyTrack Dsync synchronizes data between the interface software and the handheld device, thus enabling the handheld to validate data related to the cylinder tag being read.

As the cylinders are refilled, a worker enters information into the handheld indicating the type of gas, and then reads the tag, so that the software is updated to show that the cylinder is filled and ready for shipment. As it is shipped, a worker inputs the customer's ID number into the handheld, then scans the tags on each canister prior to loading. The handheld software sends an alert either if the tanks have not yet been filled, or if they are filled with a type of gas other than what the customer ordered.

With the system in place, the company has eliminated the need for paperwork, thereby increasing the efficiency of data entry into the tracking system by 80 percent. The turnaround time for each cylinder has been reduced by 15 percent, the firm reports, thus increasing the quantity of production. What's more, inventory information is now 100 percent accurate, and labor costs have been reduced by 33 percent. Because the company is now able to know exactly which empty cylinders have been returned by each customer, as well as which cylinders are missing, it has reduced the quantity of lost cylinders, thereby resulting in an expected savings this year of \$18,000. In addition, Choudhary says, the incidence of shipping an empty cylinder to a customer instead of a filled cylinder has been eliminated.

"Production staff is very happy," Choudhary says, "as this [RFID system] eliminated the laborious

process of manually reading, writing and then entering data into the [computer] system three times in one production cycle." While night-shift workers had complained in the past about their inability to read cylinder numbers, he notes, those complaints have ended with the use of RFID.

At some future date yet to be determined, TSP intends to provide a Bluetooth-enabled mobile printer that can receive instructions from the handheld reader, to print a receipt of delivery at the customer's facility.