RFID based Cylinder Tracking

WHITE PAPER

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Industrial gases play a vital role in the operations of manufacturing, electronics and healthcare industries. These gases are delivered to the customers through pipelines, tankers and cylinders. These cylinders move across the supply chain through different channel partners - dealers, warehouses, customers and back to factories for refilling. Theses gas companies make huge investments in cylinders to deliver gases to their customers. As each regular cylinder costs between $150 and $200, the overall asset value is very high. Tracking these cylinders is very complex due many factors like varied gases being manufactured, various channel partners and assets. It is estimated that, on an average, a gas manufacturing company loses 1% of its cylinders every year. All though the supply chain process, cylinders need to undergo periodic hydrostatic tests and the maintenance schedule and record of each cylinder delivered needs to be maintained for safety and regulatory reasons.

The RFID enabled cylinder management systems would help improve productivity, as well as improve the quality, reliability and efficiency of the cylinder management process, thus making an investment in cylinder management worthwhile. It improves the rotation of returnable assets, overcoming number transcription errors, and avoiding the loss of cylinders.

Issues faced by industrial gas companies

- Underutilization of cylinders due to the inefficient and inaccurate tracking methods in use today.
- Difficult to differentiate between customer-owned, dealer-owned and company-owned cylinders.
- Difficult to determine which cylinders are due for scheduled maintenance and testing.
- The damage/pilferage of a cylinder cannot be identified and attributed to a specific customer or delivery.
- Effort in identifying cylinders increases the time of operation and lost productivity.
- Cylinder audit or census is extremely difficult as companies have to dig up records to locate the company-owned cylinders.
- Reconciling discrepancies in customer's and company's cylinder holding records.
- The accounting procedure in the present system is time consuming since the dispatch and warehouse officers have to upload the record of each customer manually after deliveries. This may also result in errors that are difficult to track.
- The present system doesn’t offer a fool-proof check for preventing the wrong gas to be filled in the cylinder. This is a major safety issue.
- Cylinders which are condemned, or identified as lost or stolen are not reported in the system which leads to inaccuracy in records.
RFID based Cylinder Tracking throughout the Supply Chain

Figure 1: Flow chart of RFID based Cylinder Tracking

The above diagram explains how the industrial gas companies can achieve cylinder tracking using RFID technology.

Cylinder Management System

RFID tagging to new cylinders

Every new cylinder that comes from the manufacturer is carried to warehouse and checked with the delivery challan and based on the details obtained, cylinder is tested. If there are any discrepancies, the cylinder is returned to the manufacturer else RFID tag is attached to the new cylinder.
Receiving Empty cylinders from customers

While delivering filled cylinders to clients, empty cylinders attached with RFID tags received from the clients are manually checked by the diver using GPRS enabled handheld readers. If the cylinder is manufacturer is different, then it is returned to the client else delivery note of the filled cylinder is prepared & given to the customer. The empty cylinder loaded into the truck & carried to the warehouse. Cylinder information captured in the handheld reader by the driver is downloaded & updated in the warehouse system.

Refilling of Empty/new cylinders

Empty cylinder is tested for due date before it is refilled. An alarm is raised if the cylinder is due for testing & it is again sent to the manufacturer else it is sent to refilling. Readers attached at the filling point read the tag attached to the cylinder & cylinder is refilled. Cylinder is collected by the driver to deliver it to the client. Using handheld readers RFID tag attached to the cylinder which is ready for delivery is read & cylinder details like Cylinder Serial No, Weight, filling time, issue date, time, is updated in the server.

Upload of the cylinders data which is ready for delivery into the handheld reader

Driver tracks the tag Ids attached to the cylinder through the handheld readers & uploads the cylinder details before loading into the truck. Received Tag ID details are updated into the server.

Verification & dispatch of the cylinder

Delivery challan is issued to the drivers for security clearance. After security clearance the cylinders that are ready for delivery are loaded into the truck & are dispatched to the client side. Same procedure is repeated every time.

RFID technology enables efficient use of assets in gas cylinder industry

“The RFID solution helps Kay Nitro improve the visibility of the cylinders” operational cycle and improve customer-facing processes while reducing untraceable assets,” -- Yogendra Chaudhary, Manager of Kay Nitro, 29 March, 2010.
Benefits of RFID in Cylinder Tracking

- Auto updating the cylinder details like shipment, cylinder return into the system eliminates any possible error.
- Accurate information with less effort & lower labor costs.
- Cylinders can be tracked on the dock, at a customer site, at fill plants, at testing facilities, or at other distributors.
- Warehouse cylinder stocks can be counted in a fraction of seconds.
- Real time visibility of stocks & location of cylinders.
- Time to time maintenance of cylinders improve efficiency & avoid unplanned maintenance which increases revenues by reducing the turnaround time.
- Complete history of the cylinders that helps to identify the cylinders which are due for test & assures the complete safety to the workers & customers.
- Simplify the process of delivery process by saving time, reducing errors and enhances the customer satisfaction.
- Decrease in lost cylinders or cylinders credited to the wrong account. Greater efficiency in inventory used and ordered.
- Able to prevent pilferage/theft of cylinders.
- Gas cylinder filling process becomes operator free.
- System calculates the rentals and costs automatically.
What IAITO can Provide

1. Understanding the requirement with end customer/partner.
2. Visiting the end customer/partner site and studying the system & IT.

1. Justifying the business value of RFID in Cylinder Tracking System.
2. Calculating the ROI (Return on Investment).
3. Integration of hardware and software in lab environment.

1. Defining the software and hardware requirement study (SRS & HRS).

1. Customer site deployment of the hardware & software.
2. Testing the System.
3. Commissioning the system.

1. Customer Support
2. Full telephonic & Email support.
4. AMC & Warranty Support.

Why you should select IAITO Infotech as your partner

• We understand the RFID Technology, Solution and have knowledge of the Industry with the top Notch IIT Kanpur R&D engineers who are having more than 5+ years experience in the same domain.

• Our understanding about the RFID Business Values & ROI Realization is with 15+ years experience business people in team.

• We provide High Quality Product & Testing process (ISO 9001: 2008 Certified Company).

• We Have High Techno Commercial viability – ROI.

• Indigenous Setup (Design, Developed & Tested in world class RFID lab of IIT Kanpur).

• We have Local Support & Strong Partner Network Framework to ensure better support.
Conclusion

Advanced Cylinder Tracking System provides excellent process control, cylinder management automated tracking with less errors thereby increasing efficiency in the overall functioning of the system. RFID implementation provides improved asset visibility to the gas suppliers and manufacturers and hence can be used to make decisions on the supply. The benefits of an RFID implementation to the gas cylinder industry are measurable. Automation of the process improves overall accuracy, allows an efficient use of assets, enables a faster turnaround of inventory, increases employee and customer safety, reduces cylinder loss and enhances the customer experience. The companies can gain competitive advantage by adopting this technology at its nascent stage.

About **IAITO INFOTECH PVT LTD (ISO 9001:2008 certified)** an incubate company of IIT Kanpur provides state of the art integrated traceability, identification and authentication solution. It provides software as well as integrated turnkey solution of both(hardware, software & services) in various technologies like RFID, NFC, GPS, Mobile technologies etc.

With the knowledge of experienced professional, we are able to help you to deploy right combination of technology that will maximize your ROI right from start and ensure its expandability as the application grow through the evolution of the technology.

With our R & D experienced team, we have developed different integrated solutions for various industries and carry one of the most comprehensive product/solutions.

IAITO’s turnkey solutions model covers industries like Aviation, Manufacturing, Transportation, Retail, Government, Renewable Energy, BFSI and Mining.

For more Information kindly visit our website [http://www.iaito.co.in/](http://www.iaito.co.in/)

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