



fourtec - DataNet Case Study

Organization: Leading global pharmaceutical company

Application: Wireless temperature monitoring of an automated storage facility

fourtec Solution: DataNet wireless ZigBee system

Background

Rapid expansion in the pharmaceutical industry has also brought with it increased regulatory inventory controls. In response, state-of-the-art automated storage and retrieval systems have emerged, ensuring product integrity and accommodating high volume distribution.

About the Customer

Among the top 15 pharmaceutical companies in the world, this organization specializes in the development, production and marketing of branded pharmaceuticals and active ingredients. The company has recently installed one of the top ten largest automated storage and retrieval systems in the world at one of their production sites, with a volume of over 226,800 square meters and a capacity of 38,069 storage locations. PLC and control technology are used to manage the facility's logistical system, automatically tracking and retrieving each inventoried item.



Key Customer Challenges

Strict Regulations

- All temperature sensors must maintain an accuracy of $\pm 0.5^\circ \text{C}$.
- Specifically for the air-conditioned, climate controlled warehouse, materials must be stored between 15 and 25° C to avoid spoilage.
- Regular audits and validation directives demand comprehensive reports and do not tolerate any data loss.

Highly perishable goods

- Extremely sensitive materials can be ruined if they are exposed to temperatures that cross predefined thresholds for more than 30 minutes.



Implementation Obstacles

- The vast scale of the warehouse requires a very robust data logging system. Metallic material throughout the facility such as pallets, cranes, stairwells, floors, etc. create RF obstacles. Each storage aisle alone measures 40 meters in height and 150 m in length, providing a very condensed clean space for data transmission.
- Measuring points span several floors throughout the warehouse, each floor with a complex system of electrical power grids and air conditioning units, using high voltage currents.



DataNet Implementation

Functioning as a backup to the facility's existing built-in sensors, the DataNet system increases the sensor density, ensuring limitless monitoring points throughout every zone of the warehouse. The DataNet solution allow for flexible onsite deployment, providing a secure, real-time data backup.

System Configuration

85 Mini DataNet (DNL808) units with external NTC temperature sensors were installed and configured to 10 minute sampling rate and 20 minute transmission rate. Low and high alarm levels of 15 °C and 25 °C respectively were also configured. To accommodate the warehouse dimensions and ensure robustness of the DataNet network, 9 Mini Repeaters (DNR800) were also installed, for an extended transmission range.



Operational Procedure

A bi-weekly procedure driven by regulatory-compliance is implemented. Accuracy of all temperature probes are verified in a calibration bath before a one-week deployment throughout the warehouse. Specific deployment of each logger may differ depending on the season, after taking into account heat, humidity and air flow changes. After one week, recorded data is exported to Microsoft Excel™ and a PDF report is generated with alarm notifications defined. All units are retested to ensure their sensor accuracy was maintained. This process produces reports with a 3-year validation, satisfying the Ministry of Health and FDA regulations, as well as customer and internal audits.



Measurable Results

- **Zero data loss** - The units' internal memory stores data, no matter what transmission disruptions occur, allowing full data retrieval and transfer at any time.
- **Standalone** – The Mini DataNet's long battery life allows the system to be deployed anywhere, without requiring electrical points or extension cables.
- **Scalable and reliable monitoring** - ZigBee technology overcomes transmission obstacles, automatically finding the most cost effective, efficient and secured data path to the PC. As units are constantly relocated, or Repeaters introduced to increase the network range, the intelligent system remains flexible and trustworthy.
- **User-friendly software** – In this complicated and large-scale environment, the DataNet software provides a clear visual map of the data network path, deployed units, alarms indications, and data strength and flow throughout the facility.
- **Multi-setup** – Rather than individually configuring each logger, 85 Mini DataNet units were configured with a single click, saving valuable installation time.
- **Meeting regulatory requirements** - Using the data export to Excel™ feature proves data integrity and the intuitive Reports module provides transparent data records for achieving regulatory compliance.

