APPLICATION NOTE

CAS DATALOGGERS

Monitoring The Salt Bath Nitriding Process Using a Data Logger

CAS DataLoggers Supplies a Surface Treatment Company with Runtime Data

CAS DataLoggers supplied the industrial data logging solution to Northeast Coating Technologies (NCT) in Kennebunk, Maine. NCT is a surface treatment company specializing in Salt Bath Nitriding Melonite® Quench-Polish-Quench (QPQ), among other processes, to produce high-durability metal components including piston rods, axles and more. Engineer Conrad Woodman is using our dataTaker DT80 Intelligent Data Logger to continually monitor NCT's production Melonite® line, specifically the salt bath area. The dataTaker is recording tank temperature from multiple thermocouples and using these readings to trend the run data to prove best practices to customers.

The Melonite® QPQ process forms a nitrocarburized layer around components comprised of an outer compound layer (iron, nitrogen, carbon and oxygen compounds) and a diffusion layer underneath. Initially the process preheats components to raise their surface temperature before they're placed in a tank containing liquid Melonite® salt (MEL 1/TF 1 bath) to start the nitrocarburizing process. Alkali cyanate is the active constituent in the salt bath, and this step requires the temperature in the range of 896-1166°F with a target temperature of 1076°F. The components react with the salt and start to diffuse nitrogen and carbon into the substrate.

After a preset period of 1-2 hours the components have the proper compound layer thickness and case depth. After immersion in the salt bath, the components are placed in a cooling bath (AB 1 bath) maintained at 700 – 800°F for oxidative treatment which forms a magnetite layer on the components to improve corrosion resistance.

Tank temperature is the parameter NCT needed to monitor and trend for each of its 3 Melonite® salt tanks and the AB 1 oxidizing bath tank. With this in mind, CAS DataLoggers provided the facility with a Series 3 dataTaker universal data logger to automate their data collection.

Installation

Conrad Woodman has installed the dataTaker DT80 in a control cabinet located about 30 ft away from the salt bath tanks. For future expansion, the panel size is large enough to add a touchscreen PC running Windows 7 embedded in the face of the control panel. Another junction box is set up between the tanks and the dataTaker where the sensor cables run.

Data Retrieval

Users simply input an IP address in a web browser when they need to retrieve the temperature data. Woodman has set up a link on the desktop PC located in the salt bath nitriding area so users can export the data in CSV format and work with it in Excel. The dataTaker can store up to 10 million data points in its internal memory, allows configurable memory allocation based on sample schedule and mode so that it can be setup to log only as long as needed. Users can also retrieve data from a Flash drive via the dataTaker's USB port.

Email Alarm Notification

The dataTaker doubles as an automated alarm system giving users a quick way to tell if a potentially critical situation is developing. The dataTaker's email alert feature will notify Woodman and other users if there's an issue with the salt bath, for example if tank temperature starts boiling over and threatens to eventually cause a fire. The temperature alarm is set to send out an email alert that the process is malfunctioning whenever any tank temperature goes over 1250°F. This way workers are able to take immediate action to prevent damage and production delays.

Included Software

Using dataTaker's DPlot software, users display the data by going into the thermocouple sensor page and convert it into CSV format. Users can also view the high and low range for each sensor, and it's equally easy to open up the DBD files and plot them in a graph for presentation. DPlot is included with every dataTaker datalogger.

Using dataTaker's included dEX software, users can create dashboard displays to view real-time data, create trend charts and tables, and retrieve historical data for analysis. The Windows Explorer-type interface makes navigation easy. This built-in software runs directly from a web browser and can be accessed locally or remotely anywhere that a TCP/IP connection is available, and both DPlot and the dEX software run in Windows 10.

Benefits

The dataTaker DT80 data logger helps Northeast Coating Technologies prove that their salt bath nitriding process achieves a consistent nitride layer on all components. Not only can this single solution connect to Type-K thermocouples on all 4 tanks, but also connect with any sensor to measure nearly any value. The system's ease of programming and large internal memory gives users an effective data trending solution–now NCT can give customers detailed runtime data that shows their best practices. All the data is easy to organize and present in Excel. Conrad Woodman explains, "We had the dataTaker logger up and running seamlessly. We had a couple hiccups originally in the programming aspect of it but we quickly got through them since you don't have to be an engineer to learn the software. This unit is exactly what we needed for the process we are using it for."

As a secondary benefit NCT can also rely on the email alarm feature for additional process overview. Due to its flexible programmability, the dataTaker is setup to track both the runtime and alarming. Woodman has also received free tech support from CAS DataLoggers over the phone to get the project setup promptly.

CAS DataLoggers Applications Specialist Bill Hoon comments, "The dataTaker's software is internal so everything this application needs is there in the dataTaker unit itself. Now they have the memory, the data trending capability and the alarming feature. That's why the DT80's our workhorse."

For further information on the dataTaker DT80 Intelligent Universal Input Data Logger, salt bath nitriding, or to find the ideal solution for your application-specific needs, contact a CAS Data Logger Application Specialist at **(800) 956-4437** or www.DataLoggerInc.com.