**F4T™ / D4T™**

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# Meeting *Nadcap* Requirements with Modern Data Logging Methods

## Summary:

Modern process controllers not only help suppliers in the aerospace industry to comply more easily with *Nadcap* requirements and speed up audits—they also help guarantee quality. A great example of such a controller is Watlow's F4T, which incorporates batch mode functionality and hassle-free, pre-formatted reports.

Officially, *Nadcap* (National Aerospace and Defense Contractors Accreditation Program) exists to make auditing of aerospace companies and their strategic suppliers easier by providing a single set of standards. However, the thoroughness of *Nadcap* requirements can make ensuring compliance (and handling audits) a long and tedious process. Anything that can help aid in data collection, make reporting easier and help guarantee overall quality is a welcome asset. The purpose of this white paper is to review *Nadcap* requirements as they pertain to process sensors (temperature, pressure, other) and the logging of process data, and to show how modern sensors can make compliance much easier through batch mode functionality (and compatible dashboard software).

# Compliance: A Recap of *Nadcap*

Anyone who works in thermal processing for the aerospace industry has heard of **Nadcap**. **Nadcap** establishes centralized requirements and standards for accreditation, agreed upon both by technical experts in the industry and government regulators. The idea is both to ensure quality and to eliminate redundant auditing throughout the aerospace industry.

Large aerospace manufacturers like Boeing and Airbus require **Nadcap**, which means that most suppliers selling to these companies must also meet **Nadcap** requirements. This particularly affects companies that are heat treating components or otherwise need to guarantee a given temperature soak band during the manufacturing process.

## *The relevant requirements are specified in the AMS 2750E standard, which:*

"... covers pyrometric (high temperature) requirements for thermal processing equipment used for heat treatment. It covers temperature sensors, instrumentation, thermal processing equipment, system accuracy tests, and temperature uniformity surveys. These are necessary to ensure that parts or raw materials are heat treated in accordance with the applicable specification(s)." (AMS2750E Section 1.1)

**AMS2750E Section 3.2.7 specifically discusses electronic records and recording devices, stating:**

3.2.7.1.1    The system must create electronic records that cannot be altered without detection.

3.2.7.1.2    The system software and playback utilities shall provide a means of examining and/or compiling the record data, but shall not provide any means for altering the source data.

3.2.7.1.3    The system shall provide the ability to generate accurate and complete copies of records in both human readable and electronic form suitable for inspection, review, and copying.

3.2.7.1.3.1    The system shall be capable of providing evidence the record was reviewed—such as by recording an electronic review, or a method of printing the record for a physical marking indicating review.

3.2.7.1.4    The system shall support protection, retention and retrieval of accurate records throughout the record retention period. Ensure that the hardware and or software shall operate throughout the retention period as specified...

**Records are also needed for testing and calibration of sensors, as indicated in AMS2750E Section 3.4.5.1:**

"The displayed temperature indication and/or recording of the sensor being tested as used in production, with appropriate offsets or correction factors, at any operating temperature, shall be compared with the corrected temperature indication of the test sensor on a test instrument."

Meeting these requirements can be trickier than it seems at first glance. Heat treatment processes are not as easily measured as some other industrial processes; even when sensors are in place to do this and correlating that data with other information, such as batch or operator information, can prove difficult via manual means of collecting. Collecting, storing and displaying such records is absolutely vital for maintaining **Nadcap** compliance.

# Batch Mode Functionality on Modern Controllers

Batch mode functionality (like that available with Watlow's F4T or D4T) can make data recording for **Nadcap** compliance that much easier—and help guarantee quality, too.

With these devices, users can enter non-thermal "batch" or job-related data such as user/operator, LOT #, serial numbers and so on. Data can be uploaded to the F4T or D4T using a wireless (USB) barcode scanner connected to a USB port. This non-thermal batch information from the bar code entries is combined with the thermal data received by the sensor in an encrypted data log.

That data log can then be exported in a single hassle-free, pre-formatted batch report, which can be stored in internal memory, downloaded to a USB drive or pushed out onto a network via Ethernet port. The color touchscreen also allows snapshot screen capture, which can create images for export, viewing or printing as well. These features make possible the "human readable and electronic form suitable for inspection, review, and copying" specified in the AMS2750E.

Another benefit of this simplified reporting is the degree of quality control it allows. If there is a problem with a run, it is much easier to see when it happened and which items were potentially affected. Reporting can also help prove quality if a problem arises further down the supply chain; with batch reporting, it is relatively easy to show that a given batch met operational parameters, and thus that part failure must be due to some other step in the process.

## SpecView SCADA Software Provides an Excellent Dashboard

User interaction with multiple controllers can be made simpler and more direct with the right software dashboard. SpecView is Watlow's Supervisory Control and Data Acquisition (SCADA) software for controllers such as the F4T; it provides a graphical overview of what's happening across a number of controllers—a single dashboard—providing flexible data logging and report generation to help users comply with regulatory requirements like AMS2750E *Nadcap*. It can also greatly simplify record-keeping by consolidating measurements, operator comments and batch information into a single, understandable report.



Dashboard monitoring 12 sensors running on Windows® 10 machine

While SpecView allows for a great deal of customization, Watlow also offers a library of project files with standard set-ups (supporting up to 12 controllers) that can save time during set-up. Since the F4T and SpecView were designed to be used together, installation is seamless. Organizations considering using the F4T or D4T for data recording purposes would do well to also obtain SpecView for easier data display and central controller management.

## Takeaways

**Nadcap** compliance requires much when it comes to data reporting for thermal processes, especially those used for heat treating components. Modern controllers like the F4T make the collection and reporting of that data much easier, which speeds up the auditing process and helps guarantee quality control. If you have more specific questions, feel free to contact Watlow at www.watlow.com.