Trends: Regulatory compliance and evolving industry standards AMS2750G | CQI9 4th ed.

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Regulatory Compliance

Nadcap (National Aerospace and Defense Contractors Accreditation Program) is an industry-driven program that provides accreditation for special processes in the aerospace and defense industries. Heat treatment is considered a “special process” under Nadcap because it has specific characteristics crucial to aerospace and defense components’ quality, safety and performance. These characteristics include:

Process sensitivity: Heat treatment processes involve precise control of temperature, time and atmosphere to achieve the desired material properties. Minor variations in these parameters can significantly change the mechanical and metallurgical properties of the treated components. This sensitivity makes heat treatment a critical process in the aerospace and defense industries.

Limited traceability: Heat treatment processes typically result in changes to the material’s microstructure, which are not easily detectable through visual inspection or non-destructive testing methods. This limited traceability makes it crucial to have strict process controls to ensure the desired outcome is achieved consistently.

Critical performance requirements: Aerospace and defense components often have strict performance requirements due to the extreme conditions in which they operate, such as high temperatures, high loads or corrosive environments. The heat treatment process ensures that these components meet the specifications and can withstand these demanding conditions.

High risk: The failure of a critical component in the aerospace or defense sector can result in catastrophic consequences, including loss of life, significant financial loss and reputational damage. Ensuring that heat treatment processes meet stringent quality and safety standards is essential to mitigate these risks.

Nadcap heat treatment accreditation ensures suppliers meet industry standards and best practices for heat treatment processes. The accreditation process includes rigorous audits, thorough documentation and ongoing process control monitoring to maintain high quality, safety and performance levels.

The aerospace industry’s AMS2750™G pyrometry specification and the automotive industry’s CQI9

Issue 4 regulations are crucial for ensuring consistent and high-quality heat-treated components. Adherence to these regulations is essential for meeting the stringent quality requirements of the aerospace and automotive industries and other industries with demanding specifications.

Temperature uniformity is a crucial requirement of both AMS2750G and CQI-9 Issue 4, mandating specific temperature uniformity requirements for heat-treating furnaces to ensure the desired mechanical properties are achieved throughout the treated components. AMS2750G Class 1 Furnaces with strict uniformity requirements +/-5°F (+/-3°C) provide both quality output with predictable energy use. However, maintaining this uniformity requires significant maintenance oversight due to all the components involved in the thermal loop.

Calibration and testing procedures are specified in the standards to help ensure the accuracy and reliability of the temperature control systems used in heat-treating processes.

Detailed process documentation is required by AMS2750G and CQI-9 Issue 4, including temperature uniformity surveys, calibration records and furnace classifications. This documentation ensures traceability, enabling manufacturers to verify that the heat-treating process is consistently controlled and meets the required specifications.

Figure 4. **Eurotherm** Data Reviewer

(abcimg://data%20reviewer%20on%20three%20computer%20screens)

Download the complete white paper: Thermal Loop Solutions: A Path to Improved Performance, Sustainability and Compliance in Heat Treatment (/-/media/documents/white-papers/wp_thermal-loop_heat-treat_0423-(1).ashx?la=en&hash=FE753D1AFFCC19FD19C1971ACB9BFE3714534155)

Figure 4. **Eurotherm** Data Reviewer

(abcimg://thumbnail%20of%20data%20reviewer%20software)