Heat treatment of tool steels, annealing fasteners, weldment stress relieving, solution heat treatment of aluminum, and heat treatment of rivets, bolts and other parts with Aircraft Grade Industrial Furnaces by L&L Special Furnace Co Inc.
The L&L Difference
Confirmed Quality

L&L’s proprietary element support design system evenly distributes the radiant heat throughout the furnace and promotes the kind of uniformity required for aircraft-grade heat treating. L&L’s hard ceramic holders support the heating coils for long life, promote even heat transfer, and allow for easy, quick, inexpensive, in-house maintenance. L&L also uses convection and multi-zone control to guarantee temperature gradients within ±5°F (±2.8°C) in the work zone.

"We have been very pleased with our L&L furnace. The quick ramp up to temp without extreme spiking makes for quicker turn times on our parts. We are also pleased with how tight it holds to set temp.”

Kris Schwab, T/L Fab & Tooling
Goodrich Aerostructures

"Our company, Aerospace Testing and Pyrometry, Inc., provides nationwide onsite calibration & testing services to the thermal processing industry. While recently performing a uniformity survey on two L&L furnaces for an aerospace client I was amazed by how uniform both these furnaces were. Both furnace uniformities were actually ±2°F at lower temperatures and ±5°F at higher temperatures (the requirement was ±10°F from 250°F to 1400°F on one furnace, and ±10°F from 450°F to 1600°F on the second furnace). In the fifteen years I have conducted temperature uniformity surveys, which include many types of furnaces, this is one of the BEST I have ever tested. With the thermal processing specifications that govern the Aerospace, Automotive and Nuclear Industries getting tighter & tighter, it is good to see a furnace manufacturer that can provide equipment that can stand up to these specifications. I will not hesitate to recommend to any one of my clients who may be looking for an excellent, heat treat furnace, L&L Special Furnace has my vote of confidence.”

Andrew Bassett, President of Aerospace Testing And Pyrometry, Inc. (abassett@atp-cal.com)
Aircraft Maintenance and Aerospace Manufacturing
Confmed Quality is Essential

Problem
Many aircraft maintenance facilities require heat treatment. Hardening of tool steels, annealing fasteners, stress relieving of weldments, and solution heat treatment of aluminum are just some of these processes. Most of these are critical where certifiable uniformity and traceability are fundamental requirements of the job. Old, unreliable equipment can fail or may not meet the ever changing and increasingly stringent requirements of the aircraft industry (See the description of the AMS 2750E Specification on the back cover). Outsourcing wastes time and money and adds another layer of risk to the control of your most precious asset – your reputation. L&L has several proven solutions.

Solution
L&L Special Furnace Co., Inc. designs, manufactures, and services a wide variety of heat treat equipment. We have several lines that are specific to the aircraft and aerospace industry. See the range of sizes and types on the back cover. Our FNA and XLA series, specifically designed for aircraft industry, include such standard features as calibrated thermocouples, complete NIST documentation certifications, zone control and optional in-house uniformity survey prior to shipment.

Customers

With the DynaPro Multi Zone Control System, actual furnace temperature is guaranteed to stay within ± 5°F (± 2.8°C) of setpoint!
AMS Revision E allows for several classes of equipment. The class 1 equipment calls for a temperature uniformity requirement of ±5°F (±2.8°C). There are also specifications for calibrated thermocouples and standard instrument accuracy. Class 2 requires ±10°F (±5.5°C) and same system requirements. Class 3 requires ±15°F (±8.3°C) and same system requirements. Class 4 requires ±20°F (±11°C) and same system requirements. Class 5 requires ±30°F (±16.7°C) and same system requirements. Class 6 requires ±50°F (±27°C) and same system requirements. Refer to Table 2 on Page 16 of the AMS-2750E for complete list of classification.

Class A instrumentation calls for each zone to have an independent control thermocouple. Each zone must be recorded by a recording instrument along with a reference thermocouple port located within 2" of the control sensor. Two additional recording sensors in each control zone located to best represent the hot and cold points in the oven based on the most recent survey. L&L accommodates this by having one thermocouple port located at each corner of the oven along with a reference thermocouple port located next to each control sensor and overtemperature thermocouple respectively. Refer to Table 3 Page 36 of AMS-2750E for complete information on instrumentation.

The survey interval is specified in Tables 8 and 9 of AMS-2750E. The required minimum number of sensors is specified in Table 11 of AMS-2750E. Type, quantity, and location of thermocouples will have an impact on the frequency of calibration and testing. Optional type N thermocouples do not drift like type K and may not require monthly calibration.

L&L Aircraft Grade Furnaces are capable of meeting the requirements as specified in AMS-2750E, AMS-5590E, AMS-5589E, AMS-2772E, Boeing BAC5621, Airbus Industries 01-03-12, 01-03-17, 01-03-18, Rolls Royce 70-00-00-300-711, 70-49-01-370-002, 70-49-11-370-004, and AMS2770H for aluminum, along with many other specific aircraft requirements.