

# METALLURGICAL ENGINEERING

**Innovation.  
Integrity.  
Dependability.**



***Dayton T. Brown, Inc.'s metallurgical lab is your resource for failure and engineering investigations, and metallurgical testing and analysis. Our comprehensive range of metallurgical services include:***

- Failure analysis ranging from aircraft structural components to electronics packaging
- Detailed conformance-to-blueprint inspections
- Fatigue and corrosion testing
- Corrosion analysis and control
- Wear/abrasion evaluations
- Coating replacement evaluations
- Weld evaluations
- Reverse engineering programs
- Development of advanced non-destructive testing techniques

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**Product Life Cycle Support Services**  
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Since 1950



\* Accredited Test Lab  
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Visit our web site at: [www.dtb.com](http://www.dtb.com)

\* Please visit [www.dtb.com](http://www.dtb.com) for testing covered under our scopes of accreditation.

DTB's staff includes **experienced metallurgists/materials engineers** (M.S./Ph.D.) and **technicians** (Level 2/Level 3 in various NDI techniques). Our metallurgical lab is fully equipped with:

- **Scanning electron microscope with energy dispersive spectroscopy**
- **Arc emission spectroscope**
- **Metallographic sample preparation equipment**
- **Stereomicroscopes**
- **Borescopes**
- **Various non-destructive flaw detection testing techniques and equipment**
- **Hardness measurement machines**
- **Inverted optical metallograph**
- **High resolution digital imaging equipment**
- **Advanced image analysis software**
- **Comprehensive reference library and specifications database**

#### **Failure Analysis**

The metallurgical lab has immediate access to in-house expertise in a wide range of technical specialties, including EMI/EMC, Shock and Vibration, Environmental Testing, Life Support Systems, Stress Analysis, Engineering Design, and Manufacturing Engineering. This allows us to field a highly skilled interdisciplinary team to perform detailed root cause analysis. Our practical recommendations can be rapidly tested using our extensive test capabilities.

#### **Metallurgical Conformance Inspections**

Our metallurgical lab performs full conformance-to-blueprint inspections using our extensive facilities, while our experienced staff generates highly reliable data on which to base your decisions. Conformance inspections include evaluation of Shot Peening, Temper Etching, Hardness Measurements, Compositional Measurements, Microstructural Analysis, Plating/Coating Analysis, Grain Size Measurements, Grain Flow Evaluation, Case Hardening and Decarburization Analysis, Electrical Conductivity Measurements, and Passivation Measurements.

#### **Reverse Engineering and Materials Selection**

Reverse engineering programs are undertaken as a team effort in which the metallurgical lab participates as one of the team members. We analyze every metallurgical characteristic to determine alloy selection, manufacturing processes such as forging, casting and thermo-mechanical sequences, joining methods, surface finishes such as plating and coating, and surface treatments such as shot peening. We also identify the governing specifications and participate in developing technical data packages and vendor qualifications.

#### **Corrosion Evaluation/Analysis**

Our coupled expertise in engineering analysis and testing enables us to develop and proof-test practical recommendations for corrosion control. During a typical investigation, we evaluate interactions between alloy selection, manufacturing techniques, surface treatments, structural design, stress levels, environmental species, corrosion pathways, and erosion damage. We have performed corrosion analysis of a wide range of components and assemblies, including: aircraft engine cold section module, antenna grounding structure, arresting truss assemblies, bearing assemblies, beverage cans, biopsy instruments, and much more.

#### **Engineering Development and Investigations**

The metallurgical engineering lab undertakes diverse investigative and development programs, ranging from evaluation of gun barrel damage accumulation to testing cadmium replacement coatings to measuring powder mixture compositions from X-ray images.



*A World of Engineering and Testing Under One Roof™*

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**DAYTON T. BROWN, INC.**  
**ENGINEERING & TEST DIVISION**



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