

Polymer Characterization and Thermal Analysis

DELSEN'S TOOLS AND EXPERIENCE can help you to understand many polymer-related problems. With DSC, we can determine properties such as melting points and heats of exotherm. TMA allows us to effectively measure coefficient of thermal expansion and glass transition temperatures. TGA measures weight change versus temperature.

Summary of Services

DELSEN TESTING LABORATORIES offers a wide range of testing services of varying degrees for many diverse industries. Included among our esteemed clients are companies from:

- Aerospace – Military • Automotive
 - Electronics • Medical
- Infrastructure Construction
- Scientific Instrumentation

Mechanical Laboratory Services

- Tensile, Flexural, Compressive and Shear
- G_{IC} & G_{IIC}
- K_{IC} and $dadN$
- Krieger (KGR) Shear Modulus
- -300°F to 800°F Temperature Range
- Fatigue
- Stress/Strain Instrumentation and Analysis
- Hydrostatic and Cyclic Pressure Testing
- Random Spectrum Fatigue
- Expert Specimen Preparation from Advanced Composites
- Structures Testing with Multichannel Data Acquisition
- Instrumented Impact

Specimen Preparation Services

- Precise Specimen Layout and Panel Mapping
- Precision Cutting and Grinding
- High Accuracy Composite Hole Drilling
- Complex Profile Machining
- Surface Finish to 6 μ in RMS
- Tapping, Potting, Bonded Fixturing

Printed Board Laboratory Services

- Qualification and Quality Conformance to MIL-PRF-55110, MIL-PRF-31032 and IPC-6012
- Qualification to MIL-P-50884 and IPC-6013
- Qualification to MIL-I-46058 and IPC-CC-830
- IPC-SM-840
- Ball Grid Array Solder Joint Reliability
- Surface Insulation Resistance (SIR) Testing

Polymer Laboratory Services

- Polymer Kinetics
- Morphological Characterization
- Heat Distortion – Melting Point
- Melt Flow Index

Thermal Analysis Services

- Thermomechanical Analysis
- Differential Scanning Calorimetry
- Thermogravimetric Analysis
- Assorted Properties Testing
- Dynamic Mechanical Analysis

Flammability Test Services

- NBS Smoke Density
- Toxicity
- OSU Heat Release Rate
- DOT Motor Vehicle Safety
- Limiting Oxygen Index
- FAA Horizontal and Vertical Ignition

Electrical Properties Evaluation

- Dielectric Constant & Loss Tangent
- Volume & Surface Resistivity
- Insulation Resistance
- Dielectric Strength
- "Q" Resonance
- Arc Resistance

Environmental Test Services

- Temperature/Humidity Exposure
- Salt Spray/Fog Exposure
- Thermal Shock and Temperature Cycling
- Vibration and Shock
- QUV Exposure
- Durability and Life Cycle Testing
- Thermal Oxidative Stability

Over 50 Years of Competence and Confidence

DELSEN TESTING LABORATORIES has withstood one of the business community's most important tests... the test of time... thanks to a rigid adherence to detail and precision. In every test we perform, it is also a test of our own capabilities. For more than 50 years, we have responded with innovation, integrity and an innate understanding of our highly demanding field. As a result, you can expect results that entail less risk and liability, less problems... and more definitive answers.

Our diverse technical disciplines have made us a respected testing laboratory in many different arenas. Respected for our ability to meet your toughest testing demands within your prescribed schedule and budget. And respected for our research and development expertise, an accumulation of knowledge that can save you valuable time and money in your quest for a quality product.

When you rely upon Delsen Testing Laboratories, you can expect a group of professionals who take individual responsibility and who keep pace with the continuing changes in the testing industry. Our modern facilities and state-of-the-art testing equipment assure the most comprehensive testing available. You will be pleased to know that Delsen is accredited by A2LA in the field of Mechanical Testing per ISO/IEC 17025 as shown on A2LA Certificate 0096.01. Delsen is also approved by many key aerospace, automotive and electronics firms.

We welcome the opportunity to give you a personal tour of our facilities and to demonstrate why, for more than 50 years, the name Delsen has passed the most demanding tests for competence and quality.

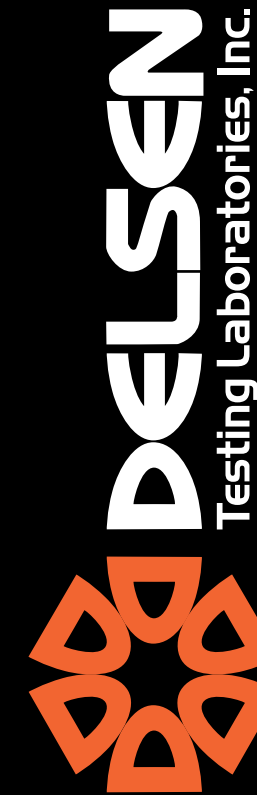


1024 Grand Central Avenue, Glendale, California 91201

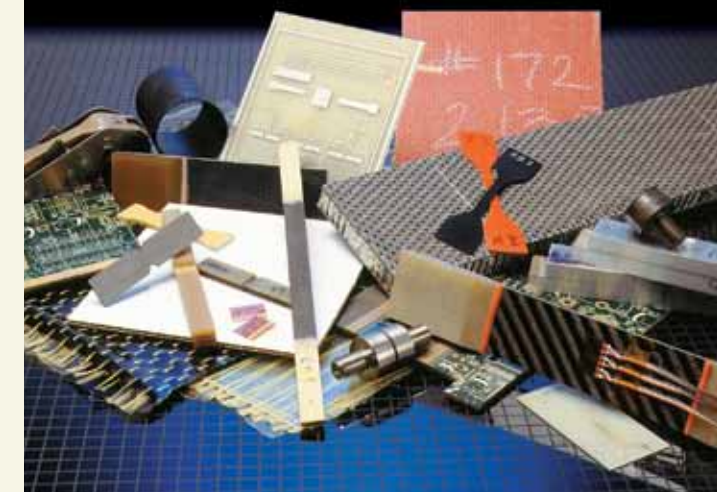
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888-433-5736

Internet: www.delsen.com Email: info@delsen.com



Accurate
and
Reliable
Test
Results



888-433-5736

Composites Testing Specialists

AS A LEADER in testing advanced composite materials, Delsen utilizes carefully honed techniques to obtain the most reliable data with the lowest scatter. These methods include special attention to specimen preparation in our complete specimen fabrication laboratory. Key equipment includes diamond-coated tooling, surface grinders, mills and laboratory presses. We perform nearly all mechanical property tests (ASTM, SACMA, etc) of interest to the composites community, including:

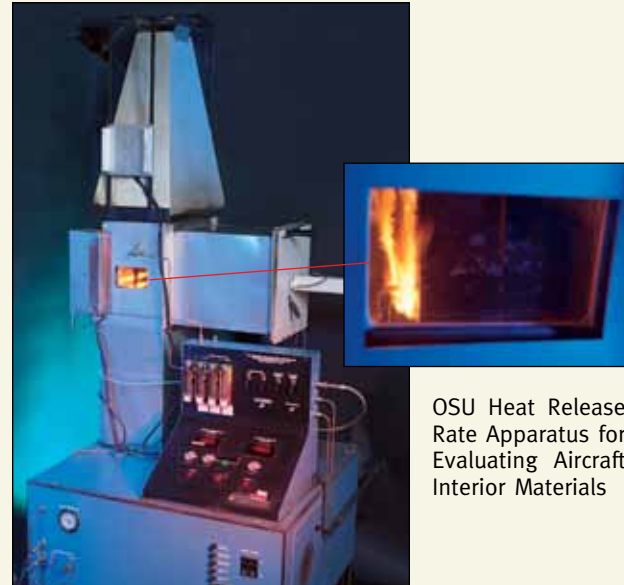
- Tensile, Compressive and Shear Properties
- Temperature Capability from -300°F to 800°F
- Impact and Compression after Impact
- Fracture Toughness including G_{IC} and G_{IIC}
- Fatigue
- Structural Tests with multi-channel data acquisition

All data are recorded using data acquisition systems and are available to the client for importing into databases or for further analysis.



DELSEN specializes in Testing Advanced Composite Materials

Flammability Testing Services



OSU Heat Release Rate Apparatus for Evaluating Aircraft Interior Materials

DELSEN SPECIALIZES in flammability testing for the aerospace community. Our quality flammability lab is approved by the FAA and by Boeing. An on-staff FAA DER provides added assurance.

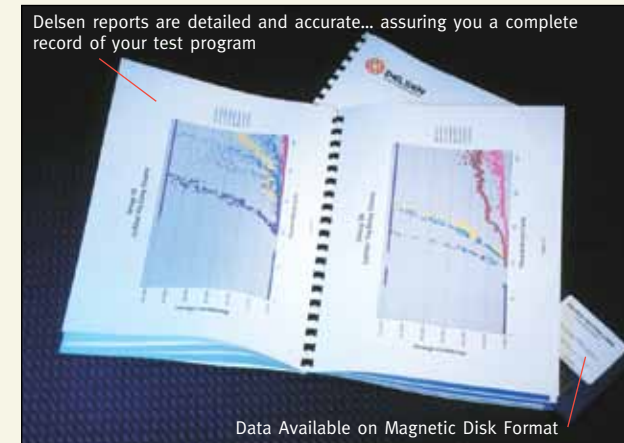
Tests include:

- OSU Heat Release Rate
- NBS Smoke Density ASTM E 662
- Toxic Products of Combustion
- Horizontal and Vertical Ignition FAR 25.853, UL 94, ASTM D 635
- Limiting Oxygen Index ASTM D 2863
- DOT MVSS 302, BSS 7238, Airbus ABD 0031

Quality Systems

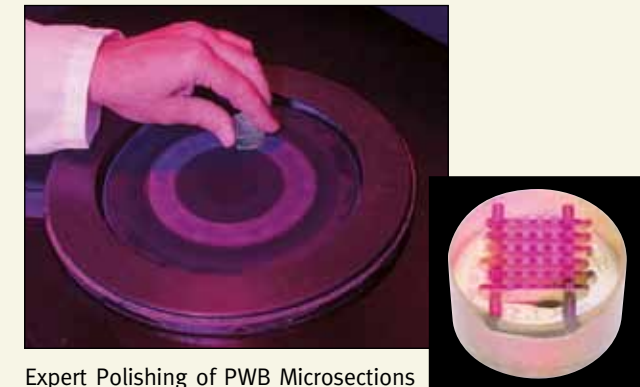
DELSEN TESTING LABORATORIES, INC. has been audited and continuously accredited by A2LA in the field of mechanical testing for over 20 years. This accreditation is per ISO/IEC 17025. "General Requirements for the Competence of Calibration and Testing Laboratories".

The Delsen quality system has also been approved by most major aerospace firms and the Defense Supply Center Columbus (DSCC).



Test Reports

Delsen's reports are complete and consistently accurate. All information required by the applicable standard is included. Each report is signed by the responsible technical staff member and undergoes additional technical reviews to ensure its highest degree of precision. When applicable, reports are supplemented by digital data and photographs.



Expert Polishing of PWB Microsections

Printed Board Evaluation

DELSEN has long been a leader in the evaluation of printed boards and related materials for the electronics industry. Our activity in IPC test methods and standards development assures that we are abreast of the latest techniques in this rapidly changing industry. Our metallographic cross-sectioning of printed boards may be the finest anywhere, and we often are selected as a referee laboratory for the evaluation of high reliability electronics. Delsen also specializes in reliability tests such as thermal cycling, thermal shock and torsional cycling. During these tests, coupons may be monitored continuously for resistance change, using a multi-channel data acquisition system.

Surface Insulation Resistance (SIR) testing is used to evaluate materials and processes for cleanliness. Delsen dedicates special chambers to these tests to ensure precise humidity control. Continuous data acquisition makes certain that critical events, such as dendritic growth, will be observed.



Horizontal cross-section of PWB Plated through hole

888-433-5736