



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

NATIONAL TECHNICAL SYSTEMS (NTS) – BALTIMORE
 5 North Park Drive
 Hunt Valley, MD 21030
 Mrs. Sarah D. Brammer Phone: 410 584 9099

MECHANICAL

Valid To: December 31, 2018

Certificate Number: 0214.35

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following tests on the following product types: Aerospace, Automotive, Avionics, Consumer Products, Electronics, Industrial, Medical, Military Telecommunication and Textiles.

Test Technology:

Test Method(s):

Plating Adhesion

IPC-TM-650 (Section 2.4.1); IEC 60664; IEC 61086

Strength/Compression

(Bond Strength, Lap Shear Strength, Shear Strength, Compression/Compression Strength, Tension/Tensile Strength, Tack, Tear Strength, Tear Resistance, Propagation Tear, Peel Strength, Scratch Resistance)

ASTM D638; IPC-TM-650 (Sections 2.4.8, 2.4.8.1, 2.4.18, 2.4.18.1, 2.4.21, and 2.4.44); MIL-STD-883, Method 5011; UL 796; IEC 60664

Range:

Up to 10,000 lbs
 (-170 to 425) °C

Bow and Twist/Warpage

IPC-TM-650 (Section 2.4.22.1);
 IPC-TM-650 (Section 2.4.22)

Failure Analysis using Techniques Included in Method O-17 or in the Chemical, Electrical and/or Mechanical Scope

Trace Method Procedure O-17¹

Electronic Part Authenticity Testing/Counterfeit Detection

Trace Method Procedure O-27¹;
 SPOC-419 (*Excluding Paragraphs 9 to 13*)

Flammability

UL 94 (Sections 7 and 8)

Flexibility Endurance/Folding Flexibility

IPC-TM-650 (Section 2.4.3);
 MIL-P-50884²; IEC 61086

Test Technology:

Test Method(s):

Fungus Resistance (Non-Nutrient Growth)

ASTM G21;
IPC-TM-650 (Sections 2.6.1 and 2.6.1.1);
MIL-STD-810;
MIL-I-46058² Amendment 7 (Sections 3.7 and 4.8.4);
IEC 61086

Hardness
(Pencil, Shore A, Shore D, Shore O, Knoop,
Vickers)

ASTM D3363; ASTM D2240;
ASTM E92; ASTM E384;
IPC-TM-650 (Section 2.4.27.2)

Temperature/Humidity Exposure/Damp Heat

IPC-TM-650 (Sections 2.6.11 and 2.6.15);
Delphi/Delco Q-1000, Methods 105 and 106;
MIL-STD-202, Method 108; IEC 60664; IEC 61086

Range:
(10 to 98) %RH
(-170 to 500) °C

Corrosion of Flux using Temperature/Humidity
Chamber

IPC-TM-650 (Section 2.6.15)

Hydrolytic Stability/Temperature/Humidity Aging

IPC-TM-650 (Sections 2.6.11 and 2.6.11.1);
MIL-I-46058²

Life at Elevated Ambient Temperature

MIL-STD-202, Method 108

High/Low Temperature Exposure

IPC-TM-650 (Sections 2.6.11 and 2.6.15);
Delphi/Delco Q-1000, Methods 105 and 106;
MIL-STD-202, Method 108; IEC 60664; IEC 61086

Range:
(-75 to 180) °C

Shelf Life

MIL-I-46058²; IPC-CC-830

Microscopic Evaluation/Visual Examination/
Microsection Analysis (Cross-Section)
(3 to 10,000x)

Delphi/Delco Q-1000, Method: Cross-section Analysis,
105, 106, and 201;
IPC-TM-650 (Sections 2.1.1, 2.1.2, 2.1.5,
and 2.1.10); IEC 60664; IEC 61086

Solder Slump

IPC-TM-650 (Section 2.4.35)

Thickness – Micrometer

ASTM D1005; MIL-I-46058²

Goniometer/Hydrophobic Contamination/
Contact Angle/Surface Wettability

ASTM C813; ASTM D7334

Ultraviolet Exposure

ASTM G154

Xenon Arc Exposure

ASTM G155

Test Technology:

Shock
(Thermal Shock, Air-to-Air, Liquid-to-Liquid,
Thermal Cycling, Temperature Cycling,
Rapid Change of Temperature)

Range:

(-75 to 180) °C

Solderability/Steam Aging

Rework Simulation/Thermal Stress/
Solder Shock/Resistance to Soldering Heat

Water Absorption/Moisture Absorption

Water Vapor Transmission

X-Ray Radiography

Test Method(s):

Delphi/Delco Q-1000, Method 101;
IPC-TM-650 (Sections 2.6.7, 2.6.7.1, and 2.6.7.2);
MIL-STD-202, Method 107; IEC 60664; IEC 61086

Delphi/Delco Q-1000, Method 202;
IPC-J-STD-002; IPC-J-STD-003

IPC-TM-650 (Sections 2.4.13.1, 2.4.36, and 2.6.8);
MIL-STD-202, Method 210; IEC 60664

ASTM D570;
IPC-TM-650 (Sections 2.6.2 and 2.6.2.1)

ASTM E96

MIL-STD-883, Method 2012

Supporting the following documents: IPC-SM-840, IPC-CC-830, IPC-6012, IPC-6013,
MIL-A-28870, MIL-I-46058, MIL-P-50884, MIL-PRF-31032, MIL-PRF-55110, IPC-J-STD-004,
IPC-J-STD-005

This laboratory also uses customer supplied specifications and/or methods directly related to the testing technologies and parameters listed above.

Facility studies performed according to IPC-QL-653 “Certification of Facilities that Inspect/Test Printed Boards, Components and Materials.”

¹ In-house Test Method.

² This laboratory’s scope contains withdrawn or superseded methods. As a clarifier, this indicates that the applicable method itself has been withdrawn or is now considered “historical” and not that the laboratory’s accreditation for the method has been withdrawn.



Accredited Laboratory

A2LA has accredited

NATIONAL TECHNICAL SYSTEMS (NTS) BALTIMORE

Hunt Valley, MD

for technical competence in the field of

Mechanical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General requirements for the competence of testing and calibration laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009).



Presented this 25th day of January 2017.

A handwritten signature in black ink, written over a horizontal line.

President and CEO
For the Accreditation Council
Certificate Number 0214.35
Valid to December 31, 2018

For the tests to which this accreditation applies, please refer to the laboratory's Mechanical Scope of Accreditation.