SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

NATIONAL TECHNICAL SYSTEMS (NTS)
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MECHANICAL

Valid To: September 30, 2018 Certificate Number: 3343.02

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following mechanical tests:

Test Description/Capabilities:	**Test Method(s) [1]:**
Adhesion Tape Test	IPC-A-600; IPC-6012; IPC-6013; IPC-TM-650 (Methods 2.4.1, 2.4.1.1, and 2.4.28.1); MIL-P-50884 [2]; MIL-PRF-50884 [2]; MIL-PRF-31032 [2]; MIL-PRF-55110 [2]
Ash Content	UL 746A (Section 44)
Ball Pressure	IEC-60695-10-2; UL 746A
Bow and Twist	IPC-A-600; IPC-6012; IPC-6013; IPC-TM-650 (Method 2.4.22); MIL-P-50884 [2]; MIL-PRF-50884 [2]; MIL-PRF-31032 [2]; MIL-PRF-55110 [2]
Bond Strength	IPC-6012; IPC-6018; IPC-TM-650 (Methods 2.4.20 and 2.4.21); MIL-P-50884 [2]; MIL-PRF-50884 [2]; MIL-PRF-31032 [2]; MIL-PRF-55110 [2]
Chemical Resistance	IPC-4202; IPC-TM-650 (Methods 2.3.2 and 2.3.4); MIL-P-50884 [2]; MIL-PRF-50884 [2]; MIL-PRF-31032 [2]; MIL-PRF-55110 [2]
Coating Thickness	ASTM D1005; MIL-I-46058

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Test Description/Capabilities:	**Test Method(s) [1]:**
Copper Purity	ASTM E53; IPC-6012; IPC-6013; IPC-TM-650 (Method 2.3.15)
Curing Time	FED-STD-141 (Method 4061.3); MIL-I-46058
Density and Specific Gravity	ASTM D792; UL 746A
Dimensional Stability	IPC-4101; IPC-TM-650 (Method 2.4.39)
DSC	IPC-4101; IPC-TM-650 (Method 2.4.25)
Ductility	IPC 6013; IPC TM 650 (Method 2.4.2.1); IPC-TM-650 (Method 2.4.3.1); MIL-P-50884 [2]; MIL-PRF-50884 [2]; MIL-PRF-31032 [2]
Dynamic Mechanical Analysis	IPC-TM-650 (Method 2.4.24.4); ASTM D5023; ASTM D5418; ASTM E1640
Flammability	UL 94 (Sections 7, 8, and 11)
Flexural Strength Range: (0 to100) kN *	ASTM D790; IPC-4101; IPC-TM-650 (Method 2.4.4) *Ambient Flex*; IPC-TM-650 (Method 2.4.4.1) *Elevated Flex*; UL 746A
Flexibility and Folding	IPC-6013; IPC-CC-830; IPC-SM-840; IPC-TM-650 (Methods 2.4.3 and 2.4.5.1); MIL-P 50884 [2]; MIL-PRF-50884 [2]; MIL-PRF 31032 [2]; MIL-I-46058; FED-STD-141 (Method 6221)
Glow Wire Ignitability (GWI)	IEC 60695-2-10; IEC 60695-2-11; IEC 60695-2-12; IEC 60695-2-13; UL 746A
Heat Deflection Temperature	ASTM D648; UL 746A
Hot Wire Ignition (HWI)	ASTM D3874; UL 746A
Ionic Cleanliness - Conductivity	IPC-A-600; IPC-4202; IPC-6012; IPC-TM-650 (Methods 2.3.25.1 and 2.3.25); MIL-P-50884 [2]; MIL-PRF-50884 [2]; MIL-PRF-31032 [2]; MIL-PRF-55110 [2]

Test Description/Capabilities:	**Test Method(s) [1]:**
Microsection Analysis	ASTM E3; IPC-A-600; IPC-6012; IPC-6013; IPC-TM-650 (Methods 2.1.1.2 and 2.1.1); MIL-P-50884 [2]; MIL-PRF-50884 [2]; MIL-PRF-31032 [2]; MIL-PRF-55110 [2]
Moisture Absorption	ASTM D570; IPC-4101; IPC-4202; IPC-TM-650 (Methods 2.6.2.1 and 2.6.2); UL 746A
Peel Strength	IPC-4101; IPC-4103; IPC-4202; IPC-4204; IPC-6013; IPC-TM-650 (Methods 2.4.8.3 and 2.4.8); MIL-P-50884 [2]; MIL-PRF-50884 [2]; MIL-PRF-31032 [2]; MIL-PRF-55110 [2]
Rework Simulation	IPC-6012; IPC-6013; IPC-TM-650 (Method 2.4.36); MIL-P-50884 [2]; MIL-PRF-50884 [2]; MIL-PRF-31032 [2]; MIL-PRF-55110 [2]
Solderability	IPC-A-600; IPC-4101; IPC-6012; IPC-6013; J-STD-003; MIL-P-50884 [2]; MIL-PRF-50884 [2]; MIL-PRF-31032 [2]; MIL-PRF-55110 [2]
Tensile Strength of Plastics Range: (0 to100) kN *	ASTM D638; ASTM D882; ASTM E345; UL 746A
Tensile Strength, Elongation of Copper	ASTM E345; IPC-6012; IPC-6013; IPC-TM-650 (Method 2.4.18.1 and 2.4.18); MIL-PRF-31032 [2]
Thermal Shock Range: (-70 to 180) °C *	IPC-6012; IPC-6013; IPC-TM-650 (Methods 2.6.7, 2.6.7.1, 2.6.7.2, & 2.6.7.3); IPC-CC-830; IPC-SM-840; J-STD-004; MIL-I-46058; MIL-P-50884 [2]; MIL-PRF-50884 [2]; MIL-PRF-31032 [2]; MIL-PRF-55110 [2]; MIL-STD-202 (Method 107) Section 4.2.1 Test Conditions A, B, & F

Test Description/Capabilities:	**Test Method(s) [1]:**
Thermal Stress Range: (-70 to 343) °C *	IPC-4101; IPC-6012; IPC-6013; IPC-TM-650 (Method 2.6.8E); MIL-P-50884 [2]; MIL-PRF-50884 [2]; MIL-PRF-31032 [2]; MIL-PRF-55110 [2]
Thermal Stress, Convection Reflow Range: (100 to 300) °C *	IPC-6012; IPC-TM-650 (Method 2.6.27); MIL-PRF-31032 [2]
Temperature and Humidity	IPC-4101; IPC-6012; IPC-6013; IPC-A-600; IPC-TM-650 (Method 2.6.25); IPC-TM-650 (Method 2.6.3); MIL-P-50884 [2]; MIL-PRF-50884 [2]; MIL-PRF-31032 [2]; MIL-PRF-55110 [2]
TMA	IPC-4101; IPC-TM-650 (Methods 2.4.24.1 and 2.4.24); MIL-PRF-31032 [2]
Vicat Softening	ASTM D1525; UL 746A
Visual Inspection	IPC-A-600; IPC-A-610; IPC-TM-650 (Methods, 2.1.8, 2.2.1, 2.2.2, and 2.2.5); IPC-SM-840; MIL-I-46058; MIL-P 50884 [2]; MIL-PRF-50884 [2]; MIL-PRF 31032 [2]; MIL-PRF 55110 [2]
Viscosity	ASTM D1084; IPC-SM-840; IPC-CC-830

*Including Customer Specifications directly related to the test technologies and within the parameters listed above

[1]When the date, revision or edition of a test method standard is not identified on the scope of accreditation, the laboratory is required to be using the current version within one year of the date of publication, per part C., Section 1 of A2LA *R101 - General Requirements - Accreditation of ISO-IEC 17025 Laboratories*.

[2]These methods are Performance Specifications which make reference to test methods identified on the scope of accreditation. The laboratory is not accredited to these Performance Specifications.

On the following materials/products

Circuit Boards and Circuit Board Components; Electronics; Adhesives; Aircraft Components; Automotive Components; Plastic and Rubber Insulating Materials.

Accredited Laboratory

A2LA has accredited

NATIONAL TECHNICAL SYSTEMS (NTS)

Anaheim, CA

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 27th day of December 2016.

President and CEO
For the Accreditation Council
Certificate Number 3343.02
Valid to September 30, 2018

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