



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

MET LABORATORIES; INC
914 West Patapsco Avenue
Baltimore, MD 21230
Frank Casbolt Phone: 410 949 1867
Frank.casbolt@metlabs.com http://www.metlabs.com

MECHANICAL

Valid to: January 31, 2019

Certificate Number: 0591.04

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

<u>Test Technology</u>	<u>Test Method(s)</u>
Physical Testing	
Adhesive	GR-1221
Attenuation	GR-487, Issue 5; GR-950; GR-1209; GR-1221; GR-1435; FOTP-107A; FOTP-20; FOTP-78; FOTP 30; FOTP-46; FOTP-50; FOTP-53
Cable Clamping	GR-950
Cable Core Blocking Ability	GR-950
Cable Freezing	FOTP-3; FOTP-12
Cable Jacket Testing	ASTM D2444; ASTM D2794-93 (2010); ASTM D518; ASTM D638; FOTP-89; FOTP-86
Cable Materials Testing	FOTP-12; FOTP-81
Chemical Sequences	GR-950;
Component Impact	FOTP-2; ANSI B109.1, 2 and 4
Compression Test	GR-950; FOTP-41
Corrosion Resistance - Acidified Salt Water	ASTM D610; FOTP-12
Compressive Properties of Rigid Plastics	ASTM D695-15
Corrosion Resistance - Salt Fog Spray	GR-487, Issue 5; GR-950; FOTP-16; ASTM B117; ASTM D610; IEC 60068-2-52

Test Technology

Test Method(s)

Physical Testing (cont'd)

Durability	FOTP-21
Earthquake Resistance/Seismic (Hydraulic: Sine/Random/Earthquake Seismic: (1 to 500) Hz; up to 40,000 lbf; up to 6,000 lbs load)	GR-487, Issue 5; GR-63, Issue 4; ETS 300-019-2-3; ETS 300-019-2-4; ICC-ES-AC156
Environmentally Induced Vibration	GR-487, Issue 5; FOTP-11; MIL-STD-810 E
Fiber Flexing	GR-487, Issue 5; GR-950; FOTP-1; FOTP-33; FOTP 104
Fluid Immersion	FOTP-12
Groundwater Immersion	FOTP-12
Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)	ASTM D2794
Insertion Loss	GR-487, Issue 5; GR-950; GR-2898; FOTP-107A; FOTP-20; FOTP-78; FOTP 170
Installation Shock	GR-487, Issue 5; MIL-STD-810E
Paint Adhesion	GR-487, Issue 5
Plastics Hardness	GR-950; ASTM D2240
Polarization-Dependent Loss (PDL)	FOTP-122; FOTP-124
Polarization-Mode Dispersion (PMD)	FOTP-113
Reflectance	FOTP-107A; FOTP-20
Rockwell Hardness Test	GR-950; ASTM D785
Sheath Retention	GR-950; FOTP-6
Shear Strength of Plastic by Punch Tool	ASTM D732
Side Pull	GR-1435; ASTM D638; FOTP-33; FOTP-6; FOTP-89
Tensile Testing (Up to 2000 lbf)	GR-487, Issue 5;-GR-950; ASTM D638; ASTM E8; FOTP-33; FOTP-89; FOTP-38; FOTP-28
Tensile, Compressive, and Flexural Creep and Creep-Rupture of Plastics	ASTM D2990-01 ¹



Test Technology**Test Method(s)****Physical Testing (cont'd)**

Tension Test for Seams in Stuffed Toys and Beanbag-Type Toys

ASTM F963-03 (Section 8.9.1)¹

Transmission with Applied Tensile Load

FOTP-33

Twist/Torsion Testing

GR-950; FOTP-36; FOTP-85

Visual Inspection and Dimensions

GR-487, Issue 5; GR-950; FOTP-13; FOTP-123; FOTP-173; FOTP-179; ASTM E29

Environmental Simulation

Acoustic Pressure (Sound Pressure Level/Sound Power Level)

GR-63, Issue 4; GR-487, Issue 5; ETS 300 753; ISO 7779; ISO 3744; EN 60945

Airborne Contamination

GR-63, Issue 4; GR-487, Issue 5; ASTM B827; EIA-364-65; ASTM B827

Altitude (up to 80,000 feet)

GR-63, Issue 4; RTCA/DO-160 D, E & F, Sec 4.0; SAE J1455; MIL-STD-810 A through G, Method 500.4; MIL-STD-202 F & G, Method 105C

Cable Aging

FOTP-3

Chemical / Fluid Compatibility

MIL-STD-810 A through G, Method 504; RTCA/DO-160 D, E & F, Sec 11.0; NEMA 250; EN 60945; GR-487, Issue 5; SAE J1455

Chemical Resistance

ANSI B109.1, 2 and 3

Drop / Shock Tests (Free Fall)

ASTM D5276-98 (2009); IEC 60068-2-32; EN 60945; SAE J1455; GR-63, Issue 4; GR-487, Issue 5; GR-950; ETS 300-019-2-1 through 8; MIL-STD-810 A through G, Method 516.5 (IV & VI)

Dust Test (Blowing)

MIL-STD-810, A through G, Method 510, Procedure I; ANSI/EIA/TIA 455-35 (FOTP-35); IEC 60068-2-68, Method Lc1, Variant 2

Dust Test (Enclosure)

IEC 60529, IP5x and 6x; IEC 60068-2-68, Method La2; ISO 20653, IP5K and 6K

Dust Test

GR-487, Issue 5; GR-950; FOTP-35



Test Technology

Test Method(s)

Environmental Simulation (cont'd)

Enclosure Integrity

NEMA 250; IEC 60529-2001; ISO 20653;
EN 60945; IEC 60529:2013 (*excluding IPX9*)

Fiber and Cable Retention (Straight Pull)

ASTM D638; FOTP-33; FOTP-6; FOTP-89

Fire Resistance

GR-487, Issue 5; GR-950; ASTM D2863-13;
ASTM D56;

Flame Spread and Analysis (of Electrical Products
and Components)

GR-63, Issue 4; Verizon VZ TPR 9305

Fungus Resistance

ASTM G21; ISO 846; SAE J1455;
MIL-STD-810 A through G, Method 508.5;
RTCA/DO-160D, E & F, Sec 13.0;
GR-487, Issue 5; GR-950;
IEC 60068-2-10 (part 2-10, test J)

Gaseous Contaminates/Corrosion

ASTM B810 (rev 01a, 2011);
ASTM B827 (2009 E2); ASTM G85-11;
EIA-364-65; ISO 9227; NEMA 250;
UL 1332-1995, 3rd Ed., Sec. 8; GR-63, Issue 4;
GR-487, Issue 5

High / Low Temperature

GR-63, Issue 4; GR-950; GR-487, Issue 5;
RTCA/DO-160 D, E & F, Sections 4.0 and 5.0;
EN 60945; SAE J1455; NEMA 250;
MIL-STD-810 A through G, Method 501.4 and
502.4; MIL-STD-202 F & G, Method 108A;
MIL-STD-883 E & F, Method 1010.7;
IEC 60068-2-1; IEC 60068-2-2; IEC 60068-2-14;
ETS 300-019-2-1 through -8; GR-487, Issue 5;
GR-950; FOTP-3; FOTP-4; FOTP-98;
ANSI B109.1, 2, 4; ANSI C12.1, C12.20;
TR-TSY-000949

Humidity (Moisture Resistance) / Humidity Aging

GR-63, Issue 4; GR-487, Issue 5; GR-950;
EN 60945; SAE J1455;
RTCA/DO-160D, E & F Sec 6.0;
MIL-STD-810 A through G, Method 507.4;
MIL-STD-202 F & G, Methods 103B and 106G;
MIL-STD-883 E & F; IEC 60068-2-30;
IEC 60068-2-56; ETS 300-019-2-1 through 8;
FOTP-3; ANSI C12.1, C12.20; FOTP-5B

Humidity and Condensation Cycling Test

GR-487, Issue 5; GR-950; FOTP-3; FOTP-5B

Immersion/Corrosion

FOTP-12



Test Technology

Test Method(s)

Environmental Simulation (cont'd)

Insect Resistance

GR-950; GR-487, Issue 5

Icing

NEMA 250; MIL-STD-810, Method 521.2;
RTCA/DO 160 D & E, Sec 24.0

Illumination

GR-63, Issue 4

Immersion

MIL-STD-202 F & G, Method 104A;
MIL-STD-810 A through G, Method 512.4;
GR-950; EN 60945; SAE J1455

Lawn Sprinklers

GR-487, Issue 5

Mechanical Impact

GR-487, Issue 5; GR-950; FOTP-2; FOTP-25

Mechanical Shock

(Avco: half-sine/sawtooth up to 30,000g's
Electrodynamic: half-sine/sawtooth/triangle/
rectangular/trapizoid/haversine/transient(SRS) up
to 18,000 lbf; Hydraulic: half-sine up to 40,000
lbf; up to 6,000 lbs load, up to 20g's)

GR-487, Issue 5; GR-63, Issue 4;
FOTP-2A; MIL-STD-810; MIL-STD-202;
MIL-STD-883; IEC 60068-2-27; RTCA/DO160;
SAE J1455; ETS 300-019-2-1 through 8

Mechanical Vibration

(Sine/ Random/ Gunfire/ Sine on Random/
Random on Random/ Sine and Random on
Random) (5 tp 3,000) Hz; Up to 9,000 lbf

GR-63, Issue 4; GR-487, Issue 5; FOTP-11;
MIL-STD-810; MIL-STD-883 E & F;
RTCA/DO-160 D, E & F, Sec 8.0;
MIL-STD-202 F & G, Methods 201, 204 and 214;
MIL-STD-167-1 & 167-1A, Type 1;
ASTM D3580; ASTM D4728-06 (2012);
IEC 60068-2-6; IEC 60721-3-4; EN 60945;
SAE J1455; ETS 300-019-2-1 through 8

Module Impact

FOTP- 2

Package / Shipping Testing

ASTM D4169-16; 49 CFR 178

Salt Spray

GR-487, Issue 5; RTCA/DO-160 D, E & F, Sec
14.0; GR-950; ISO 21207; ISO 9227; EN 60945;
SAE J1455; ASTM G85-11; ASTM B117;
MIL-STD-810 A through G, Method 509.4;
MIL-STD-202 F & G, Method 101E;
NEMA 250; UL 1332-1995, 3rd Ed., Sec. 7;

Solar Radiation

MIL-STD-810 A through G, Method 505.4;
GR-487, Issue 5; IEC 60068-2-5; DIN 75220;
EN 60079-0, Clause 26.10; EN 60945

Temperature Cycling

GR-487, Issue 5; GR-950; FOTP-3; FOTP-4;
MIL-STD-810 E; SAE J1455



Test Technology

Test Method(s)

Environmental Simulation (cont'd)

Transparent Armor

ATPD 2352R 3.2.8/4.2.4 (marking);
3.2.9/4.2.5 (tolerance);
3.3.7/4.3.7.2 (chemical);
3.2.6/4.2.6 (de-icing);
3.3.1.1/4.3.1.1 (low temperature);
3.3.1.2/4.3.1.2 (high temperature);
3.3.2/4.3.2 (humidity);
3.3.4/4.3.4 (temperature shock);
3.3.5/4.3.5 (sun exposure weathering) (*excluding optical test section 3.4 and 4.4*)

Thermal Shock

GR-63, Issue 4; GR-487, Issue 5; FOTP-3;
ASTM D 3332; FOTP-4; FOTP-71; FOTP-98;
MIL-STD-202; MIL-STD-810;
MIL-STD-883; EN 60945; SAE J1455;
ANSI B109.1, 2, 4

Tension / Compression

GR-950; NEMA 250

UV Exposure

ASTM G154; ASTM G155; GR-487, Issue 5;
GR-950; EN 60079-0, Clause 26.10;
UL 746C, Sections 25 and 27;
UL 969, Section 7.1.6B;
IEC 62093, Section 11.10;
IEC 61215, Section 10.10;
IEC 61646, Section 10.10; CO/PD 04-19

Fluid Immersion

GR-950; FOTP-12; IEC 60529; ISO 20653;
EN 60945; SAE J1455

Water Penetration

FOTP-82

Waterproofness / Rain

GR-487, Issue 5;
RTCA/DO-160 D, E & F, Sec 10.0;
MIL-STD-108 E;
MIL-STD-810 A through G, Method 506.4;
IEC 60529; ISO 20653; NEMA 250; EN 60945;
IEC 60068-2-18; ETS 300-019-2-1 through -8

Wind Driven Rain

MIL-STD-810, Method 506.4; GR-487, Issue 5;
GR-771

Battery Testing

250N Steady Force Test

UL 2054

Mold Stress Relief Test

UL 2054; IEC 62133



Test Technology

Test Method(s)

Battery Testing (cont'd)

Drop Test	UL 2054; IEEE 1725; CTIA Certification Requirements for Battery System Compliance to IEEE 1725
Heating / Thermal Abuse (High Temp)	UL 1642; UL 2054; IEC 62133
Temperature Cycling	UL 1642; UL 2054; UN/DOT 38.3; IEC 62133
Altitude Simulation	UL 1642; UN/DOT 38.3; IEC 62133
Fire Propagation and Projectile Hazard	GR 3150; GR 3168
Simulated Brush Fire	GR 3150; GR 3168
Simulated Telecom Environmental Cycles	GR 3150; GR 3168; GR 4228
Operating Altitude	GR 3150; GR 3168; GR 4228
Immersion Test	GR 3150; GR 3168
Temperature and RH - Shock - Transportation	GR 3150; GR 3168; GR 4228
Particulate Contamination and Corrosive Gas Resistance	GR 3150; GR 3168; GR 4228
Salt Fog Exposure	GR 3150; GR 3168
Cold Start	GR 3150; GR 3168
Isolation Properties	IEEE 1725; CTIA Certification Requirements for Battery System Compliance to IEEE 1725
Shrinkage Allowance	IEEE 1725; CTIA Certification Requirements for Battery System Compliance to IEEE 1725
Cell Thermal Test on Cycled Cells	IEEE 1725; IEEE 1625; CTIA Certification Requirements for Battery System Compliance to IEEE 1725 & IEEE 1625
Electrode Geometry	IEEE 1725; IEEE 1625; CTIA Certification Requirements for Battery System Compliance to IEEE 1725 & IEEE 1625
Electrode Tabs (Connection to Cell Terminals)	IEEE 1625; CTIA Certification Requirements for Battery System Compliance to IEEE 1625



Test Technology

Test Method(s)

Battery Testing (cont'd)

Application of Insulation

IEEE 1725; IEEE 1625; CTIA Certification Requirements for Battery System Compliance to IEEE 1725 & IEEE 1625

Cell Vent Mechanism

IEEE 1725; IEEE 1625; CTIA Certification Requirements for Battery System Compliance to IEEE 1725 & IEEE 1625

Internal Short Avoidance

IEEE 1725; IEEE 1625; CTIA Certification Requirements for Battery System Compliance to IEEE 1725 & IEEE 1625

Positioning of Insulating Material

IEEE 1725; IEEE 1625; CTIA Certification Requirements for Battery System Compliance to IEEE 1725 & IEEE 1625

Tab Positioning

IEEE 1725; IEEE 1625; CTIA Certification Requirements for Battery System Compliance to IEEE 1725 & IEEE 1625

External Mechanical Force

IEEE 1725; CTIA Certification Requirements for Battery System Compliance to IEEE 1725

Impact

UL 1642; UL 2054; UN/DOT 38.3

Shock

UL 1642; UL 2054; UN/DOT 38.3; IEC 62133

Vibration

UL 1642; UL 2054; UN/DOT 38.3; GR 3150; GR 3168; GR 4228; IEC 62133

Unpackaged / Packaged Drop (Free Fall)

GR 3150; GR 3168; GR 4228; IEC 62133

Crush

GR 3150; UL 1642; UL 2054; IEC 62133

Earthquake

GR 3150; GR 3168; GR 4228

Thermal Sensor Design

IEEE 1725; CTIA Certification Requirements for Battery System Compliance to IEEE 1725

Projectile

UL 1642; UL 2054



Test Technology

Lighting

Airport (*excluding photometrics*)

Test Method(s)

FAA Specification for L-823 Plug and Receptacle, Cable Connectors
AC No: 150/5345-26D;
FAA Specification for Wind Cone Assemblies –
AC No: 150/5345-27E;
FAA Specification for Obstruction Lighting Equipment – AC No: 150/5345-43G;
FAA Specification for Runway and Taxiway Light Fixtures – AC No: 150/5345-46E;
FAA Specification for Series to Series Isolation Transformers For Airport Lighting Systems –
AC No: 150/5345-47C

On the following products or types of products: Information Technology Equipment, Industrial Equipment, Audio/Visual Equipment, Wireless Equipment, Medical Electrical Equipment, Radio Equipment, Telecommunications Equipment, Batteries

¹This 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

MET LABORATORIES, INC.

Baltimore, 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 5th day of June 2017.

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

President and CEO
For the Accreditation Council
Certificate Number 0591.04
Valid to January 31, 2019

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