SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

WESTMORELAND MECHANICAL TESTING & RESEARCH, INC.[1]
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Youngstown, PA 15696
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MECHANICAL

Valid Until: September 30, 2025 Certificate Number: 0621.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory at the location listed above as well as the one satellite laboratory location listed below to perform the following types of tests on aircraft components, automotive components, fasteners, metals & alloys, and plastics & polymers:

Test:	Test Method(s):
Environmental Simulation	
Chemical Passivation Treatment for Stainless Steel Parts	AMS 2700; ASTM A380, A967 Practice B & D
Humidity Exposure	MIL-STD-1312-3; NASM 1312-3
Corrosion Testing	
Determining the Susceptibility to Intergranular Corrosion of 5xxx Series Aluminum Alloys by Mass Loss after Exposure to Nitric Acid (NAMLT Test)	ASTM G67
Intergranular Corrosions Susceptibility	ASTM A262 (all methods), G28 (all methods), ISO 3651-1, 3651-2 (all methods)
Exfoliation Corrosion	ASTM G34, G66
Pitting & Crevice Corrosion Susceptibility	ASTM A923 Method C, A1084 Method C, G48 (all methods)
Stress Corrosion Cracking Susceptibility	ASTM G30, G38, G39, G44, G47, G49
Salt Spray Testing	
CASS - Copper-Accelerated Acetic Acid-Salt Spray (Fog) Testing	ASTM B368
Corrosion Tests in Artificial Atmospheres – Salt Spray Tests	ISO 9227 (all methods)
Modified Salt Spray (Fog) Testing	ASTM G85 (all methods)
Salt Spray (Fog)	ASTM B117; NASM 1312-1
Mechanical Testing	
Bearing Strength	ASTM E238
Drop Weight	ASTM E208
Dynamic Tear Strength	ASTM E604

Test:	Test Method(s):
Mechanical Testing continued	
Ductility (Bend)	ASTM E190, E290
Impact (Charpy, Izod)	ASTM E23, A370
Jominy	ASTM A255
Stress Durability (Hydrogen Embrittlement)	NASM-1312-5
Weld Operator and Procedure Qualification – Coupon Bend, Impact, Tensile, and Hardness Testing (non-Metallographic)	AWS D1.1, D1.2, D1.5, D4.0; ASME Sec. IX
Compression	ASTM E9
Elevated Temperatures with Conventional or Rapid Heating Rates and Strain Rate	ASTM E209
Fatigue	
Crack Growth	ASTM E647
Low/High Cycle, Axial, Flexural, Rotating Beam	ASTM E466, E606; NASM-1312-11; ISO 1143; EN 6072
Fracture Toughness Testing	ASTM E399, E1820; EN 2002-23; ISO 12737
Fracture Testing of Surface-Crack Tension Specimens	ASTM E740/E740M
K-R Curve Testing	ASTM E561
Plane-Strain (Chevron-Notch) Fracture Toughness	ASTM E1304
Hardness Testing	
Brinell (10 mm – 500 & 3000 kg)	ASTM E10; ISO 6506
Rockwell (A, B, C, E, F)	ASTM E18; ISO 6508; NASM-1312-6
Superficial (15, 30, 45 N & T)	ASTM E18; ISO 6508; NASM-1312-6
Vickers (5, 10) kg	ASTM E92; ISO 6507
Microhardness Knoop (10, 25, 50, 100, 200, 300, 500, 1000) gf Vickers (10, 25, 50, 100, 200, 300, 500, 1000) gf	ASTM E384; ISO 6507; NASM-1312-6
Shear / Double Shear	ASTM F606/F606M; NASM 1312-13, 1312-20
Shear Testing of Aluminum Alloys	ASTM B769, B831
Tensile	ASTM E8/E8M, E21; EN 2002-1; ISO 148-1, 6892-1
Tensile (1,000,000 lbs. capacity)	ASTM A370, E8/E8M, E21
Wedge, Axial and Proof Load	ASTM F606/F606M, E111; NASM-1312-8, 1312-18
Tensile Properties of Aluminum and Magnesium Alloy	ASTM B557
Tensile Plastic Strain Ratio (r) and Strain-Hardening Exponents (n-Values) of Metallic Sheet Materials	ASTM E646, E517; ISO 10113, 10275
Tension Testing of Structural Alloys in Liquid Helium	ASTM E1450
Poisson's Ratio at Room Temperature	ASTM E132
Electrical Conductivity	ASTM E1004
High Pressure (Hydraulic) Burst	ABM 2-3026; AMS 4081, 4083, 4071; MIL-T-7081D; WMT&R-6900[2]

Test:	Test Method(s):
Metallographic Evaluation	
Alpha Case	EN 2003-9; GE P3TF19, GE P3TF32; WMTR-7003
Characterization of Particles	ASTM F1877
Delta Ferrite	AMS 2315
Depth of Decarburization	ASTM E1077; SAE J121; ISO 3887
Detecting Detrimental Intermetallic Phase in Duplex Austenitic / Ferritic Stainless Steels	ASTM A923 (Method A)
Detection of Cuprous Oxide in Copper	ASTM B577
Detecting Susceptibility to Intergranular Attack in Austenitic Stainless Steels	ASTM A262 (Method A)
Determination of Beta Transus in Titanium	EN 3684
Grain Size, ALA Grain Size	ASTM E112, E930, E1181; ISO 643; E50TF133
Inclusion Content	ASTM E45 (Methods A & D); DIN EN 2951
Macro Examination	E340, E381, A604; AMS 2643
Microetching and Identification of Microstructures	ASTM E407; ASM Metals Handbook Vol. 9
Microstructure of Graphite in Iron Castings	ASTM A247
Microstructure of High Carbon Bearing Steels	ASTM A892
Plating Thickness	ASTM B487; NASM-1312-12
Preparation	ASTM E3
SEM with Energy Dispersive Spectroscopy	ASTM E1508; WMT&R-7302[2]
Surface Finish	ASME B46.1
Volume Fraction	ASTM E562, E1245; E50AD001; EN 3683

I. Dimensional Testing[3]:

Parameter	Range	CMC[4] (±)	Equipment
Linear	Up to 3 in Up to 12 in Up to 1 in Up to 1 in Up to 1 in Up to 21 mm X:15 in, Y:18 in, Z:12 in X:1 in, Y:15 in X: 8 in, Y: 4 in	0.00016 inch 0.001 inch 0.0003 inch 0.0005 inch 0.0001 inch 0.0002 mm 0.0002 inch 0.00008 inch 0.00014 inch	Digital Micrometers Digital Calipers Dial Indicators Height Gauge (analog) Laser Micrometer Scanning Electron Microscope CMM RAM Optical Optical Comparator
Angle	Up to 180°	18 minutes	Optical Comparator
Radii	Up to 10 in	0.0004 in	Optical Comparator

Buildings AP14 and AP209

Test:	**Test Method(s):**
Metallic Materials Testing	
Mechanical Properties	
Bearing Strength	ASTM E238
Charpy Impact	ASTM E2248
Compression	ASTM E9, E209
Electrical Conductivity	ASTM E1004
Fatigue (Ambient & Non-Ambient)	ASTM E466, E606; EN 6072; NASM 1312-11; ISO 1099
Fatigue Crack Growth Rate (FCGR)	ASTM E647
Fracture Toughness	ASTM E399, E1820
K-R Curve Testing	ASTM E561
Shear Testing of Aluminum Alloys	ASTM B831
Stress Durability (Hydrogen Embrittlement)	ASTM F519; NASM-1312-5
Stress Rupture / Creep	ASTM E139, E292
Tensile	ASTM A370, E8/E8M, E21, E111, B557, F606/F606M; ISO 6892; NASM 1312-8
Hardness	
Brinell (10 mm – 500 & 3000 kg; 2.5 mm – 187.5 kg)	ASTM E10; ISO 6506
Rockwell (A, B, C, E, F)	ASTM E18; ISO 6508; NASM 1312-6
Superficial (15, 30, 45 N & T)	ASTM E18; ISO 6508; NASM 1312-6
Metallographic Evaluation	
Alpha Case	WMTR-7003[2]; GE P3TF19, GE P3TF32; EN 2003-9
Delta Ferrite	AMS 2315
Depth of Decarburization	ASTM E1077; SAE J121; ISO 3887
Detecting Detrimental Intermetallic Phase in Duplex Austenitic / Ferritic Stainless Steels	ASTM A923 (Method A)
Detection of Cuprous Oxide in Copper	ASTM B577
Determination of Beta Transus in Titanium	EN 3684
Grain Size	ASTM E112, E930, E1181; ISO 643; E50TF133
Inclusion Content	ASTM E45 (Methods A & D); DIN EN 2951
Macro Examination	ASTM E340, E381, A604; AMS 2643
Microetching and Identification of Microstructures	ASTM E407; ASM Metals Handbook Vol. 9; EN 3114
Microstructure of Graphite in Iron Castings	ASTM A247
Microstructure of High Carbon Bearing Steels	ASTM A892
Plating Thickness	ASTM B487; NASM 1312-12

Test:	Test Method(s):
Metallographic Evaluation continued	
Preparation	ASTM E3
Surface Texture (Roughness)	ASME B46.1
Volume Fraction	ASTM E562, E1245; E50AD001; EN 3683
Non-Metallic Materials Testing	
Bearing Strength	ASTM D5961/D5961M, D953
Charpy / IZOD Impact	ASTM D256, D4812, D5420, D6110, D7766; ISO 179, 180
Conditioning (Composites)	ASTM D5229, EN 3615
Constituent Content	ASTM D3171 (Method I – Procedure A, B, C, D, E, F, G), D3529; D3530; EN 2329, 2330, 2331, 2557, 2558, 2559
Creep Rupture	ASTM D2990
Durometer Hardness (A, D)	ASTM D2240
Pull-Through Resistance	ASTM D7332
Residual Stress by Hole Drilling Strain Gauge	ASTM E837
Specific Gravity / Density	ASTM C693, D792; ISO 10119, 1183-1
Tear	ASTM D1004, D1938
Water Absorption	ASTM D570; ISO 62; EN 2378
Compression	EN 2850; ISO 14126-2
Strain Measurement	ASTM D695, D6641/D6641M, B8066; ISO 604, 14126
Plain, Open Hole and Filled Hole	ASTM D6484/D6484M
Edgewise / Flatwise Sandwich	ASTM C364/C364M, C365/C365M
Shear Loading	ASTM D3410/D3410M
Compression Set	ASTM D395
Compression After Drop Weight	ASTM D7136, D7137
Miscellaneous Compression	ASTM C1424, D1621
Fatigue	
Flexural	ASTM D7774
Uniaxial	ASTM D7791
Flammability	
Cabin and Cargo Component Materials	AMFTH CH 1, 2, 3
Flexural	
Ambient & Non-Ambient	ASTM C393, C1161, C1341, D6272, D6415, D7249/D7249M, D7250, D790, D7264; EN 2562, 2476; ISO 178, 14125
Fracture Toughness	
Mode I Interlaminar Fracture Toughness, GIc	ASTM D5528; EN 6033
Mixed Mode	ASTM D6671/D6671M (Propagation Option Only)
Mode II Interlaminar Unidirectional	ASTM D7905/D7905M

Test:	Test Method(s):
Fracture Toughness continued	
Plane-Strain Fracture Toughness	ASTM C1421, D5045
Peel	
Adhesive Peel	EN 2243-1, 2243-2, 2243-3
Climbing Drum Peel	ASTM D1781
Floating Roller Peel	ASTM D3167
Peel (180º)	ASTM D903
T-Peel	ASTM D1876
Shear	
Ambient Temperature by Compression	ASTM D3846
Ambient Temperature by SBS	ASTM D2344/D2344M; ISO 14130; EN 2377, 2563
Ambient Temperature ±45 º Tension	ASTM D3518/D3518M; ISO 14129
Ambient Temperature by V Notch	ASTM C1292, D7078/D7078M, D5379
Core Shear (-320 to 572) °F	ASTM C273/C273M
Lap Shear, Double Lap	ASTM D1002, D3163, D3164, D3165; D3528; EN 2243-1, 2667-1
Plane -Strain Fracture Toughness	ASTM D5045
Shear by Punch	ASTM D732
Tensile	ASTM C1273, C1275, C1359, D638, D882, D3039, D5766, D6742; ISO 527; EN 2561, 2597, 2747
Adhesion or Cohesion Strength of Thermal Spray Coatings	ASTM C633
Flatwise Tension	ASTM C297, D7291; EN 2243-4
Tension-Tension Fatigue of Polymer Matrix Composite Materials	ASTM D3479; ISO 13003
Plastics — Determination of Tensile Creep Behavior	ISO 899-1
PTFE	ASTM D1708
Vulcanized Rubber / Thermoplastic Elastomers	ASTM D412, (Except for Method A Straight and Method B Ring Specimens)
Thermal Analysis	
DMA (Dynamic Mechanical Analysis)	ASTM D7028, E1640, EN 6032
DSC (Differential Scanning Calorimetry)	ASTM D3418, E1269, E2160; EN 6041, EN 6064; ISO 11357-2
LFA (Laser Flash Analysis)	ASTM E1461
TMA (Thermomechanical Analysis)	ASTM E831, E1545, E2092
Dilatometry	ASTM E228

[1]This accreditation covers testing performed at the main laboratory and the satellite laboratory listed above.

[2]In-house test method.

[3]This laboratory offers commercial dimensional testing services only. These tests are not equivalent to that of a calibration.

[4]Calibration and Measurement Capability (CMC) is the smallest uncertainty of measurement that a laboratory can achieve within its scope of accreditation when performing more or less routine measurements of nearly ideal measurement standards or nearly ideal measuring equipment. Calibration and Measurement Capabilities represent expanded uncertainties expressed at approximately the 95% level of confidence, usually using a coverage factor of k = 2. The actual measurement uncertainty of a specific measurement performed by the laboratory may be greater than the CMC due to the behavior of the customer's device and to influences from the circumstances of the specific measurement.

Accredited Laboratory

A2LA has accredited

WESTMORELAND MECHANICAL TESTING & RESEARCH, INC.

Youngstown, PA

for technical competence in the field of

Mechanical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *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 April 2017*).

Presented this 19th day of September 2023.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 0621.01
Valid to September 30, 2025

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

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

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CHEMICAL

Valid To: September 30, 2025 Certificate Number: 0621.02

In recognition of the successful completion of the A2LA evaluation, accreditation is granted to this laboratory to perform the following metals and fastener tests on steel, stainless steel, aluminum & alloys, nickel & alloys, titanium & alloys, cobalt & alloys, copper & alloys and magnesium & alloys:

Test:	**Test Method(s):**
Spectroscopy	
Atomic Absorption (AAS)	ASTM E1184, E1834; WMT&R-5110[1]
Ag, As, Bi, Cd, Cu, Hf, Mg, Nb, P, Pb, Sb, Se, Si, Sn, Te, Tl, Zn	
Combustion / Fusion (LECO)	ASTM E1019, E1447, E1409, E1941; EN 10276, 2003-10, 3976; ISO 671; WMT&R-5168[1], WMT&R-5161[1]
C, H_2, N_2, O_2 & S	
ICP - AES	ASTM E2371, E2594, E3061; WMT&R-5900[1]
Ag, Al, As, Au, B, Ba, Be, Bi, Ca, Cd, Ce, Co, Cr, Cs, Cu, Dy, Er, Eu, Fe, Ga, Gd, Ge, Hf, Ho, In, Ir, La, Li, Lu, K, Mg, Mn, Mo, Nb, Nd, Ni, Os, P, Pb, Pd, Pr, Pt, Rb, Re, Rh, Ru, Sb, Sc, Se, Si, Sm, Sn, Sr, Ta, Tb, Te, Th, Ti, Tl, Tm, U, V, W, Y, Yb, Zn, Zr	
ICP - MS	ASTM E2823; WMT&R-5925[1]
Ag, Al, As, Au, B, Ba, Be, Bi, Ca, Cd, Ce, Co, Cr, Cs, Cu, Dy, Er, Eu, Fe, Ga, Gd, Ge, Hf, Ho, In, Ir, La, Li, Lu, K, Mg, Mn, Mo, Nb, Nd, Ni, Os, P, Pb, Pd, Pr, Pt, Rb, Re, Rh, Ru, Sb, Sc, Se, Si, Sm, Sn, Sr, Tb, Te, Th, Ti, Tl, Tm, U, V, W, Y, Yb, Zn, Zr	
Optical Emission Spectroscopy (OES)	ASTM E415, E1086, E1251, B954, E3047, E2994; WMT&R-5173[1]
Ag, Al, B, Ba, Be, Bi, C, Ca, Cd, Ce, Co, Cr, Cu, Dy, Er, Fe, Ga, Gd, Hf, In, La, Li, Mg, Mn, Mo, Nb, Nd, Ni, P, Pb, Pd, Pr, Pt, Re, Ru, S, Sb, Sc, Se, Si, Sn, Sr, Ta, Te, Th, Ti, V, W, Y, Yb, Zn, Zr	

Test:	Test Method(s):
Spectroscopy continued	
XRF	ASTM E1621, E1085. E572, E2465, E539; WMT&R-5400[1]
Al, Bi, Ca, Co, Cr, Cu, Fe, Ga, Li, Mg, Mn, Mo, Nb, Ni, P, Pb, Pd, Ru, Sb, Si, Sn, Sr, Ta, Ti, V, W, Y, Zn, Zr	
Additive Manufacturing Testing	
Apparent Density	ASTM B212, B417; WMT&R-5320[1]
Flow Rate	ASTM B213, B964; WMT&R-5330[1]
Particle Size Distribution	ASTM B822; WMT&R-5075[1]
Sieve Analysis	ASTM B214; WMT&R-5050[1]
Tap Density	ASTM B527; WMT&R-5310[1]
Density of Powder Metallurgy (PM) Materials Containing Less Than Two Percent Porosity	ASTM B311; WMT&R-3625[1]

[1]In-house test method.

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Youngstown, PA

for technical competence in the field of

Chemical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *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 April 2017*).

Presented this 19th day of September 2023.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 0621.02
Valid to September 30, 2025

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