



WESTMORELAND

MECHANICAL TESTING & RESEARCH

COMPOSITES TEST EXPERTS

**Cryogenic
to 3000°F**

**Customizable
Test Setups
& Analyzation**

**1 Million lb
Capacity**



Do You Need To...

- Determine material properties?
- Meet design allowables?
- Verify lot release?
- Support material improvement or research?
- Compare testing results?

Why Westmoreland?

Westmoreland Mechanical Testing & Research is a family owned and operated, independent testing and research laboratory that provides all-inclusive testing for a wide variety of non-metallic and metallic materials, offering standardized and customized testing solutions.

Services

- Adhesives and Honeycombs
- Creep and Stress Rupture
- Shear, Flexure, etc
- Tensile and Impact
- Physical Properties
- Abrasion
- Compression
- Fracture Toughness
- Fiber/Void Content
- Thermal Analysis
- On-Site Conditioning
- Flammability Testing

- ✓ Over 50 Years of Materials Testing Expertise
- ✓ Customizable Test Setups and Fixtures
- ✓ Wide Variety of Materials (Honeycombs, Adhesive, etc)
- ✓ Accredited, High-Quality Testing and Analyzation
- ✓ All-Inclusive Services by One Company
- ✓ On-Site Machining and Specimen Preparation
- ✓ On-Site Heat Treatment and Conditioning Services
- ✓ Entrusted by Thousands of Companies Worldwide
- ✓ State-of-the-Art Composites Center of Excellence



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COMPOSITES TESTING

ASTM / AITM Testing List

Abrasion

ASTM D4060 Abrasion Resistance of Organic Coatings by the Taber Abraser

Bearing Strength

AITM 1-0009 Bearing Strength by either Pin or Bolt Bearing

ASTM D953 Bearing Strength of Plastics

ASTM D5961 Bearing Response of Polymer Matrix Composite Laminates

Compression

AITM 1-0008 Plain/Open Hole/Filled Hole Compression Strength

ASTM C364 Edgewise Compressive Strength of Sandwich Constructions

ASTM C365 Flatwise Compressive Properties of Sandwich Cores

ASTM C695 Compressive Strength of Carbon and Graphite

ASTM C773 Compressive (Crushing) Strength of Fired Whiteware Materials

ASTM D395 Standard Test Methods for Rubber Property-Compression Set

ASTM D695 Compressive Properties of Rigid Plastics

ASTM D1621 Compressive Properties Of Rigid Cellular Plastics

ASTM D3410 Compressive Properties of Polymer Matrix Composite Materials with Unsupported Gage Section by Shear Loading

ASTM D6484 Open-Hole Compressive Strength of Polymer Matrix Composite Laminates

ASTM D6641 Compressive Properties of Polymer Matrix Composite Materials Using a Combined Loading Compression (CLC) Test Fixture

ASTM D6742 Filled-Hole Tension and Compression Testing of Polymer Matrix Composite Laminates

ASTM D7137 Compressive Residual Strength Properties of Damaged Polymer Matrix Composite Plates

Creep

ASTM C1181 Compressive Creep of Chemical-Resistant Polymer Machinery Grouts

ASTM C1291 Elevated Temperature Tensile Creep Strain, Creep Strain Rate, and Creep Time-to-Failure for Monolithic Advanced Ceramics

ASTM C1337 Creep and Creep Rupture of Continuous Fiber-Reinforced Advanced Ceramics

ASTM C1337 Under Tensile Loading at Elevated Temperatures

ASTM D2990 Tensile, Compressive, and Flexural Creep and Creep-Rupture of Plastics

ASTM D7337 Tensile Creep Rupture of Fiber Reinforced Polymer Matrix Composite Bars

Curved Beam Strength

ASTM D6415 Measuring the Curved Beam Strength of a Fiber-Reinforced Polymer-Matrix Composite

Fatigue

ASTM D3166 Fatigue Properties of Adhesives in Shear by Tension Loading

ASTM D3479 Tension-Tension Fatigue of Polymer Matrix Composite Materials

ASTM D7615 Open-Hole Fatigue Response of Polymer Matrix Composite Laminates

ASTM D7774 Standard Test Method for Flexural Fatigue Properties of Plastics

ASTM D7791 Standard Test Method for Uniaxial Fatigue Properties of Plastics

Flexure

ASTM C393 Core Shear Properties of Sandwich Constructions by Beam Flexure

ASTM C651 Flexural Strength of Manufactured Carbon and Graphite Articles Using Four-Point Loading at Room Temperature

ASTM C1161 Flexural Strength of Advanced Ceramics at Ambient Temperature

ASTM C1341 Flexural Properties of Continuous Fiber-Reinforced Advanced Ceramic Composites

ASTM C1684 Flexural Strength of Advanced Ceramics at Ambient Temperature- Cylindrical Rod

ASTM D790 Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials

ASTM D6272 Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials by Four-Point Bending

ASTM D6416 Two-Dimensional Flexural Properties of Simply Supported Sandwich Composite Plates Subjected to a Distributed Load

ASTM D7249 Facing Properties of Sandwich Constructions by Long Beam Flexure

ASTM D7250 Determining Sandwich Beam Flexural and Shear Stiffness

ASTM D7264 Flexural Properties of Polymer Matrix Composite Materials

Fracture Toughness

AITM 1-0005 Interlaminar fracture toughness energy, Mode I.

AITM 1-0053 Determination of fracture toughness energy of bonded joints - Mode I - Gic

ASTM C1421 Fracture Toughness of Advanced Ceramics at Ambient Temperature

ASTM D5528 Mode I Interlaminar Fracture Toughness of Unidirectional Fiber-Reinforced Polymer Matrix Composites

ASTM D6671 Mixed Mode I-Mode II Interlaminar Fracture Toughness of Unidirectional Fiber Reinforced Polymer Matrix Composites

ASTM E1922 Translaminar Fracture Toughness of Laminated and Pultruded Polymer Matrix Composite Materials

Impact

ASTM D256 Determining the Izod Pendulum Impact Resistance of Plastics

ASTM D3763 High Speed Puncture Properties of Plastics Using Load and Displacement Sensors

ASTM D4812 Unnotched Cantilever Beam Impact Resistance of Plastics

ASTM D5420 Impact Resistance of Flat, Rigid Plastic Specimen by Means of a Striker Impacted by a Falling Weight (Gardner Impact)

ASTM D6110 Determining the Charpy Impact Resistance of Notched Specimens of Plastics

ASTM D7136 Measuring the Damage Resistance of a Fiber-Reinforced Polymer Matrix Composite to a Drop-Weight Impact Event

ASTM D7766 Damage Resistance Testing of Sandwich Constructions

ASTM E2248 Impact Testing of Miniaturized Charpy V-Notch Specimens

Peel Resistance

ASTM D903 Peel or Stripping Strength of Adhesive Bonds

ASTM D1781 Climbing Drum Peel for Adhesives

ASTM D1876 Standard Test Method for Peel Resistance of Adhesives (T-Peel Test)

ASTM D3167 Floating Roller Peel Resistance of Adhesives

Physical Properties

ASTM C271 Density of Sandwich Core Materials

ASTM C373 Water Absorption, Bulk Density, Apparent Porosity and Apparent Specific Gravity of Fired Whiteware Products, Ceramic Tiles and Glass Tiles

ASTM D570 Standard Test for Water Absorption of Plastics

ASTM D792 Density and Specific Gravity of Plastics by Displacement

ASTM D1894 Static and Kinetic Coefficients of Friction of Plastic Film and Sheet

ASTM D2240 Rubber Property — Durometer Hardness

ASTM D2583 Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor

ASTM D2584 Ignition Loss of Cured Reinforced Resins

ASTM D2734 Void Content of Reinforced Plastics

ASTM D3121 Tack of Pressure-Sensitive Adhesives by Rolling Ball

ASTM D3171 (A-G) Constituent Content of composite material (All Methods)

ASTM D3529 Matrix Solids Content and Matrix Content of Composite Prepreg

ASTM D3530 Volatiles Content of Composite Material Prepreg

ASTM D3531 Resin Flow of Carbon Fiber-Epoxy Prepreg

ASTM D3532 Gel Time of Carbon Fiber-Epoxy Prepreg

ASTM D5229 Standard Test Method for Moisture Absorption Properties and Equilibrium Conditioning of Polymer Matrix Composite Materials

ASTM G154 Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials

Pull Through

AITM 1-0066 Pull-Through Strength of Fiber-Reinforced Plastic, Mechanical Joints

ASTM D7332 Measuring the Fastener Pull-Through Resistance of a Fiber-Reinforced Polymer Matrix Composite

Flammability

AMFTH CH 1,2,3 Various Specifications including 0°, 45°, 90° burning methods

ASTM D635 Rate of Burning Plastics in a horizontal position

ASTM D801 Measuring the Comparative Burning Characteristics of Solid Plastics in a Vertical Position

ASTM D1929 Determining the Ignition temperature of plastics

ASTM D2843 Density of Smoke from the Burning or Decomposition of Plastics

ASTM E84 Surface Burning Characteristics of Building Materials



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Shear

AITM 1-0002 Determination of In-Plane Shear Properties

AITM 1-0019 Determination of Tensile Lap Shear Strength of Composite Joints

ASTM C273 Shear Properties of Sandwich Core Materials

ASTM C1292 Shear Strength of Continuous Fiber-Reinforced Advanced Ceramics at Ambient Temperatures

ASTM D732 Shear Strength of Plastics by Punch Tool

ASTM D1002 Apparent Shear Strength of Single-Lap-Joint Adhesively Bonded Metal Specimens by Tension Loading (Metal-to-Metal)

ASTM D2344 Short-Beam Strength of Polymer Matrix Composite Materials and Their Laminates

ASTM D3163 Determining Strength of Adhesively Bonded Rigid Plastic Lap-Shear Joints in Shear by Tension Loading

ASTM D3164 Strength Properties of Adhesively Bonded Plastic Lap-Shear Sandwich Joints in Shear by Tension Loading

ASTM D3165 Strength Properties of Adhesives in Shear by Tension Loading of Single-Lap-Joint

ASTM D3518 In-Plane Shear Response of Polymer Matrix Composite Materials by Tensile Test of a $\pm 45^\circ$ Laminate

ASTM D3528 Strength Properties of Double Lap Shear Adhesive Joints by Tension Loading

ASTM D3846 In-Plane Shear Strength of Reinforced Plastics

ASTM D4255 In-Plane Shear Properties of Polymer Matrix Composite Materials by the Rail Shear

ASTM D5379 Shear Properties of Composite Materials by the V-Notched Beam Method

ASTM D5656 Thick-Adherend Metal Lap-Shear Joints for the Stress-Strain Behavior of Adhesives in Lap Shear Adhesion for Fiber Reinforced Plastic (FRP)

ASTM D5868 Shear Properties of Composite Materials by V-Notched Rail Shear Method

ASTM D7078 Shear Properties of Composite Materials by V-Notched Rail Shear Method

Tensile

AITM 1-0007 Tensile Properties of Plain, Open-Hole, and Filled-Hole Fiber-Reinforced Plastics

AITM 1-0025 Flatwise Tensile Test of Composite Sandwich Panel

ASTM C297 Flatwise Tensile Strength of Sandwich Constructions

ASTM C749 Tensile Stress-Strain of Carbon and Graphite

ASTM C1273 Tensile Strength of Monolithic Advanced Ceramics at Ambient Temperatures

ASTM D412 Vulcanized Rubber and Thermoplastic Elastomers — Tension

ASTM D638 Tensile Properties of Plastics

ASTM D1414 Rubber O-Rings

ASTM D1708 Tensile Properties of Plastics by Use of Microtensile Specimens

ASTM D2095 Tensile Strength of Adhesives by Means of Bar and Rod Specimens

ASTM D2290 Apparent Hoop Tensile Strength of Plastic or Reinforced Plastic Pipe I

ASTM D3039 Tensile Properties of Polymer Matrix Composite Materials

ASTM D5766 Open-Hole Tensile Strength of Polymer Matrix Composite Laminates

ASTM D6742 Filled-Hole Tension and Compression Testing of Polymer Matrix Composite Laminates

ASTM D7205 Tensile Properties of Fiber Reinforced Polymer Matrix Composite Bars

ASTM D7291 Through-Thickness "Flatwise" Tensile Strength and Elastic Modulus of a Fiber-Reinforced Polymer Matrix Composite Material

Thermal Analysis

ASTM C531 Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing and Polymer Concretes

ASTM D3418 Transition Temperatures and Enthalpies of Fusion and Crystallization of Polymers by Differential Scanning Calorimetry

ASTM D3850 Rapid Thermal Degradation of Solid Electrical Insulating Materials By TGA

ASTM D5023 Dynamic Mechanical Properties: In Flexure (3-Point Bending)

ASTM D5024 Dynamic Mechanical Properties: In Compression

ASTM D5026 Dynamic Mechanical Properties: In Tension

ASTM D5028 Curing Properties of Pultrusion Resins by Thermal Analysis

ASTM D5418 Dynamic Mechanical Properties: In Flexure (Dual Cantilever Beam)

ASTM D7028 Glass Transition Temperature (DMA Tg) of Polymer Matrix Composites by Dynamic Assignment of the DSC Procedure for Determining Tg of a Polymer or an Elastomeric

ASTM D7426 Linear Thermal Expansion of Solid Materials by Thermomechanical Analysis

ASTM E831 Standard Test Method for Linear Thermal Expansion of Solid Materials With a Push-Rod Dilatometer

ASTM E228 Compositional Analysis by Thermogravimetry

ASTM E1131 DSC - Glass Transition Temperature Standard Test Method for Assignment of the Glass

ASTM E1356 Transition Temperatures by Differential Scanning Calorimetry

ASTM E1269 Determining Specific Heat Capacity by Differential Scanning Calorimetry

ASTM E1461 Thermal Diffusivity by Flash Method

ASTM E1545 Assignment of the Glass Transition Temperature by Thermomechanical Analysis

ASTM E1640 Assignment of the Glass Transition Temperature By Dynamic Mechanical Analysis

ASTM E2092 Distortion Temperature in Three-Point Bending by TMA

ASTM E2160 Heat of Reaction of Thermally Reactive Materials by DSC (Degree of Cure)

ASTM E2550 Thermal Stability by Thermogravimetry

For a full scope of testing, including EN, ISO, JIS, SACMA, etc. Contact Us:



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