

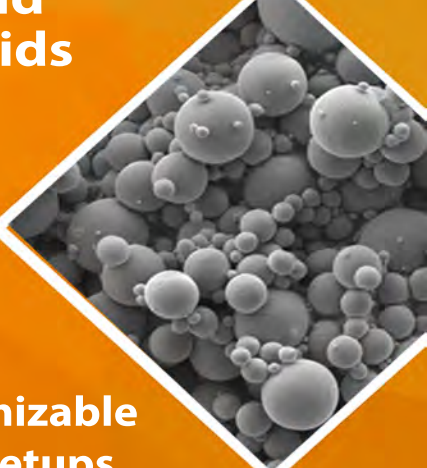


# WESTMORELAND

MECHANICAL TESTING & RESEARCH

**ADDITIVE  
MANUFACTURING  
TEST EXPERTS**

**Powders  
and  
Solids**



**Extensive  
Scope**

**Customizable  
Test Setups  
& Analyzation**



## Do You Need To...

- Gain regulatory approval?
- Improve product performance?
- Verify engineering specifications?
- Determine material characterization?
- Identify material failures?
- Outsource Quality Assurance or Quality Control?

## Services

- Compression
- Chemical Analysis
- Fatigue
- Metallography
- Tensile
- Shear
- Crack Growth
- Fracture Toughness
- Heat Treatment
- On-Site Machining
- Thermal and Physical Analysis
- Extensive Specimen Traceability

## 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.

- ✓ Over 50 Years of Materials Testing Expertise
- ✓ Customizable Test Setups and Fixtures
- ✓ Wide Variety of Materials (Powders, Solids, As-Built)
- ✓ Accredited, High-Quality Testing and Analyzation
- ✓ All-Inclusive Services by One Company
- ✓ On-Site Machining and Specimen Preparation
- ✓ On-Site Heat Treatment Services
- ✓ Entrusted by Thousands of Companies Worldwide
- ✓ State-of-the-Art Facilities and Laboratories



**USA**

(1)724 537 3131  
us.sales@wmtr.com  
www.wmtr.com

**UK**

+44(0)1295 261211  
salesuk@wmtr.com  
www.wmtr.co.uk



# Additive Manufacturing

## Standardized Testing List



Chemical / Analytical	
<b>ASTM E1447</b>	Standard Test Method for Determination of Hydrogen in Titanium and Titanium Alloys by Inert Gas Fusion Thermal Conductivity/Infrared Detection Method
<b>ASTM E1409</b>	Standard Test Method for Determination of Oxygen and Nitrogen in Titanium and Titanium Alloys by Inert Gas Fusion
<b>ASTM E1941</b>	Standard Test Method for Determination of Carbon in Refractory and Reactive Metals and Their Alloys by Combustion Analysis
<b>ASTM E1019</b>	Standard Test Methods for Determination of Carbon, Sulfur, Nitrogen, and Oxygen in Steel, Iron, Nickel, and Cobalt Alloys by Various Combustion and Fusion Techniques
<b>ASTM E1251</b>	Standard Test Method for Analysis of Aluminum and Aluminum Alloys by Spark Atomic Emission Spectrometry
<b>ASTM E415</b>	Standard Test Method for Analysis of Carbon and Low-Alloy Steel by Spark Atomic Emission Spectrometry
<b>ASTM E1086</b>	Standard Test Method for Analysis of Austenitic Stainless Steel by Spark Atomic Emission Spectrometry
<b>ASTM E2371</b>	Standard Test Method for Analysis of Titanium and Titanium Alloys by ICP
<b>ASTM E1479</b>	Standard Test Method for Analysis of All Other Materials by ICP
<b>ASTM E1184</b>	Standard Test Method for Determination of Elements by GFAA
<b>ASTM E2823</b>	Standard Test Method for Analysis of Nickel by ICP-MS
Fatigue	
<b>ASTM E606</b>	Standard Practice for Strain-Controlled Fatigue Testing
<b>ASTM E466</b>	Standard Practice for Conducting Force Controlled Constant Amplitude Axial Fatigue Tests of Metallic Materials
<b>EN 6072</b>	Aerospace Series - Metallic Materials - Test Methods - Constant Amplitude Fatigue Testing
Fracture Mechanics	
<b>ASTM E238</b>	Standard Test Method for Pin-Type Bearing Test of Metallic Materials
<b>ASTM E399</b>	Standard Test Method for Linear-Elastic Plane-Strain Fracture Toughness K <sub>IC</sub> of Metallic Materials
<b>ASTM E561</b>	Standard Test Method for K-R Curve Determination
<b>ASTM E1820</b>	Standard Test Method for Measurement of Fracture Toughness
<b>ASTM B769</b>	Standard Test Method for Shear Testing of Aluminum Alloys
<b>ASTM B831</b>	Standard Test Method for Shear Testing of Thin Aluminum Alloy Products
Metallography	
<b>ASTM E10</b>	Standard Test Method for Brinell Hardness of Metallic Materials
<b>ASTM E18</b>	Standard Test Method for Rockwell Hardness of Metallic Materials
<b>ASTM E384</b>	Standard Test Method for Microindentation Hardness of Materials
<b>ASTM E92</b>	Standard Test Methods for Vickers Hardness and Knoop Hardness of Metallic Materials
<b>ASTM E112</b>	Standard Test Method for Determining Average Grain Size
<b>ASTM E3</b>	Standard Guide for Preparation of Metallographic Specimens
Stress and Creep Rupture	
<b>ASTM E139</b>	Standard Test Method for Conducting Creep, Creep-Rupture, and Stress-Rupture Tests of Metallic Materials
<b>ASTM E292</b>	Standard Test Methods for Conducting Time-for-Rupture Notch Tension Tests of Materials
Tensile	
<b>ASTM E8</b>	Standard Test Methods for Tension Testing of Metallic Materials
<b>ASTM E9</b>	Standard Test Methods of Compression Testing of Metallic Materials at Room Temperature
<b>ASTM E21</b>	Standard Test Methods for Elevated Temperature Tension Tests of Metallic Materials
<b>ASTM E23</b>	Standard Test Methods for Notched Bar Impact Testing of Metallic Materials
Thermal Properties	
<b>ASTM E228</b>	Standard Test Method for Linear Thermal Expansion of Solid Materials With a Push-Rod Dilatometer
<b>ASTM B311</b>	Standard Test Method for Density of Powder Metallurgy (PM) Materials Containing Less Than Two Percent Porosity
<b>ASTM E1269</b>	Standard Test Method for Determining Specific Heat Capacity by Differential Scanning Calorimetry
<b>ASTM E1461</b>	Standard Test Method for Thermal Diffusivity by the Flash Method (Thermal Conductivity)
<b>ASTM B214</b>	Standard Test Method for Sieve Analysis of Metal Powders