CURTISS-WRIGHT
IMR TEST LABS

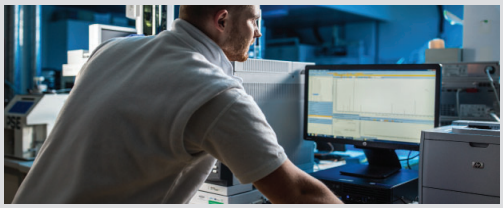
Additive Manufacturing Analytical Services

Not Just Data, Knowledge

Company Profile

Established in 1998, IMR Test Labs is an international network of labs (Ithaca, NY; Louisville, KY; Portland, OR; Singapore, and Suzhou, CN) offering a complete scope of accredited materials testing services, including chemical analysis, mechanical testing, metallurgical analysis, cleanliness testing, corrosion testing, failure analysis, fatigue testing and much more.

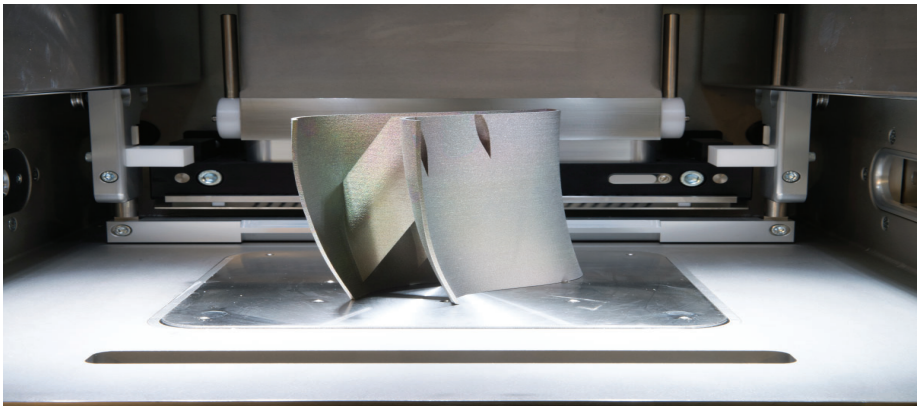
In 2014, we were added to the Curtiss-Wright Surface Technologies family. Now, with the support of an over 90 year-old industry innovator, IMR continues to grow our capabilities, equipment, and personnel to remain the first choice provider of materials testing services.



Our materials testing labs are ISO/IEC 17025 accredited (A2LA - All locations), Nadcap (All locations), GE S-400 (All locations) and many major OEMs around the world. We continue to align our stringent quality control systems with our customer's needs, as well as accreditation organization's standards.

Behind the doors of our facilities are over 200 knowledgeable, experienced professionals — engineers, chemists, metallurgists, technicians and support staff — who work side by side with clients across the world in a diverse range of industries including Aerospace, Additive Manufacturing, Automotive- EV/Fuel, Medical Device, Oil & Gas and Energy.

IMR's Additive Manufacturing Testing and Analysis Ensures Material Quality from Powder to End Product



Material Characterization | Density-Porosity | Finished Parts

IMR's Additive Manufacturing testing services have been expanded for performing powdered metal characterization, used powder quality, and a wide assortment of AM-specific testing. Our experienced technicians are proficient at helping manufacturers quickly and accurately evaluate their product's manufacturing design and effectiveness throughout each phase of production.

For example, IMR provides comprehensive powder analysis to fully characterize the starting powder utilizing the following test methods:

Chemical Analysis (ICP-AES, ICP-MS, OES)
Percent Crystallinity Testing
Particle Size Testing (Microtrac)
Morphology Analysis of Density and Flow (XRD, SEM and Optical)

For finished parts and components, we are equipped to provide world-class mechanical and fatigue testing.

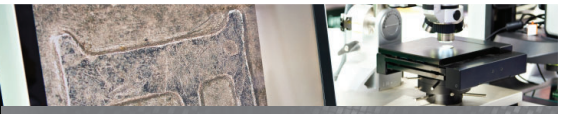
For a complete listing of our Accreditations, scan this QR Code

www.imrtest.com | 888-464-8422

CURTISS-WRIGHT
IMR TEST LABS

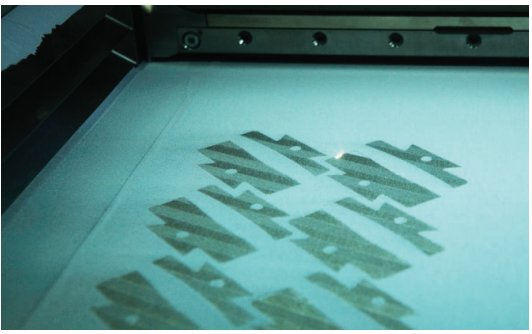
Additive Manufacturing Analytical Services

Accredited Lab Testing & Analytical Services



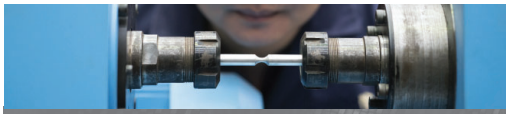
Metallurgical Analysis

Alpha Case
Case Depth
Certified Weld Inspections
Coatings Analysis
Decarburization
Failure Analysis
Fractography/Fracture Mechanics
Grain Size
Image Analysis
Inclusion Rating
Intergranular Attack
Intergranular Oxidation
Macroetch/Microetch
Metallography/Materialography
Microhardness (Knoop, Vickers, MacroVickers)
Microstructure
Orientation in Microstructure
Particle Analysis (Distribution, ID, Size)
Phase Volume Determination
Quantitative Image Analysis
Root Cause Evaluation
SEM Analysis
Welder Qualification



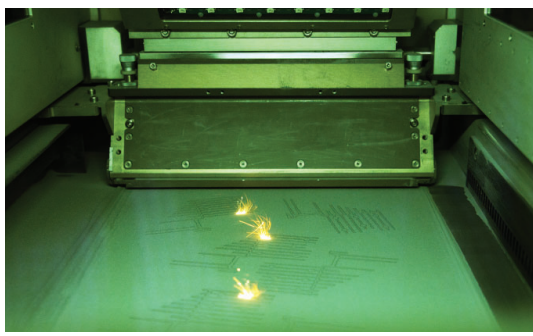
Chemical Analysis

Alloy Chemistry/Verification
Apparent Density
Ash Content
Carney Flow Rate
C, H, O, N, S
Chemical Resistance
Cleanliness Testing
Coating Weight
Contaminant/Corrodent Analysis
Tap Density
DSC Analysis (Melting Point, Glass Transition, Degree of Cure, Purity)
Fatigue Testing
-Temp from -340°F to 1800°F
Filler Content Analysis
FTIR Analysis
Hall Flow Rate
Halogen Analysis (IC)
Heavy Metal Impurities
Hexavalent Chromium
ICP-AES Analysis
ICP-MS Trace Analysis
Ion Chromatography (IC)
Material Certification
Metal Vericiation/ID
OES Analysis
Particle Size Analysis
Percent Crystallinity
Phase Identification
Positive Material ID
Powder Diffraction
SEM/EDX
Tensile Testing: Flatwise, Cruciform, Hoop, Standard, -240F to 660F
Trace Element Analysis
XRD / XRF



Mechanical Testing

Bend Testing (3 Point, 4 Point)
Bond Strength Testing
Charpy Impact Testing (-320°F to 450°F)
Coefficient ofThermal Expansion by TMA
Composite Testing (FRC, CMC)
Creep & Stress Rupture
Fatigue Testing (Axial, Low Cycle, High Cycle, Rotating Beam, Coating Shear)
Flexural Properties (Modulus, Strength, Stress-Strain Response)
Fracture Mechanics
Hardness (Rockwell, Brinell)
Heat Aging
Indentation Toughness
Impact Testing (Charpy, IZOD)
Lap Shear Testing
Open Hole Tension/Compression
Shear Properties
Slow Strain Rate
Taber Abrasion/ Wear Resistance
Tensile Testing - Metals (to 2000°F)
Torsional/Axial Fatigue (200 lb)



IMR- Ithaca
131 Woodsedge Dr.
Lansing, NY 14882
607-533-7000

IMR- Louisville
4510 Robards Ln.
Louisville, KY 40218
502-810-9007

IMR- Portland
5687-A SE Int'l Way
Portland, OR 97222
503-653-2904

IMR- Singapore
30 Loyang Way #03-16
Singapore 508769
+65 6592-5325

IMR- Suzhou
4 Jiangpu Road 75
Jiangsu, China 215126
+86 0512-6295-2682