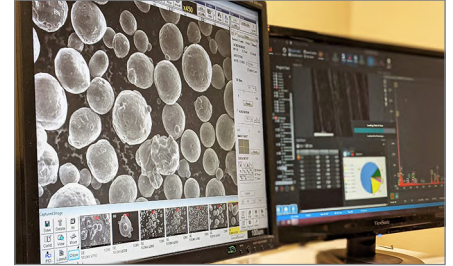


POWDER CHARACTERIZATION

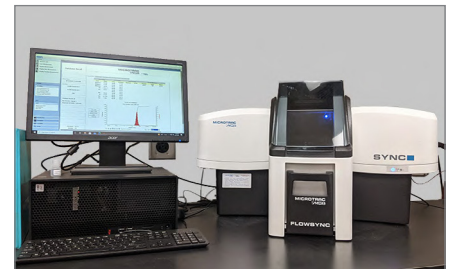


DATA YOU CAN BUILD ON



Powdered Metal Characterization Services

Our powder characterization suite of services includes testing and analysis for chemical composition, particle size distribution, and porosity.



Expertise & Contributions

LTI has been testing metal materials since 1984 and has an outstanding reputation for quality and contributes to many committees:

- ASTM F42
- ASNT
- AMS
- ITA Medical Technology

Technical engineers available with experience in Aerospace, Space, Medical and many other industries.



Powder Management Solution

The quality of the powders used in additive manufacturing impact the physical properties of the finished product. LTI can be part of your powder use strategy by testing a variety of metal powders for the appropriate feedstock selection based on reliable data and appropriate handling.

- ✓ Virgin Powder Validation
- ✓ Blended Powder Checks
- ✓ Recycled
- ✓ 100% Lot Traceability

Bulk Elements	Chemical Composition ICP-AES/OES	Alloy Dependent
Trace Elements	ICP-MS (Mass-Spectrometry)	Alloy Dependent
Interstitial Gases (Oxygen, Nitrogen, Hydrogen)	Inert Gas Fusion - LECO	Alloy Dependent
Interstitial Elements (Carbon & Sulfur)	Combustion - LECO	Alloy Dependent
Element Mapping	SEM-EDX	For information only
Particle Size Distribution	Particulate Properties Microtrac SYNC - Light Scattering/Laser Diffraction	ASTM B922 / ISO-13320-1
Particle Size Distribution	Sieve Analysis	ASTM B214
Particle Shape Analysis (2D image)- Morphology	Microtrac SYNC - Dynamic Image Analysis	ISO 13322-2
Particle Shape Analysis (3D image)- Morphology	SEM (100X, 200x, 500x photos)	For information only
Specific Surface Area	Physical Adsorption	ASTM B922
Flowability	Flow Analysis Hall Flowmeter (Free Flowing)	ASTM B213
Flowability	Carney Flowmeter (Non-Free Flowing)	ASTM B964
Dynamic Flow Rates	Avalanche-Drum Rheometer	For information only
Apparent Density	Density Analysis Hall Funnel (Free Flowing)	ASTM B212
Apparent Density	Scott Volumeter (Free Flowing)	ASTM B329
Apparent Density	Carney Funnel (Non-Free Flowing)	ASTM B417
Tap Density	Balance & Graduated Cylinder	ASTM B527
Skeletal Density	Gas Pycnometry	ASTM B923
Moisture Analysis	Moisture Content Absorbent Method	For information only
Moisture Analysis	Karl Fischer Titration	ASTM D6304
Cross Contamination & Element Mapping	Contamination or Cleanliness SEM-EDX	For information only
Cleanliness	Microscopy 20x	For information only

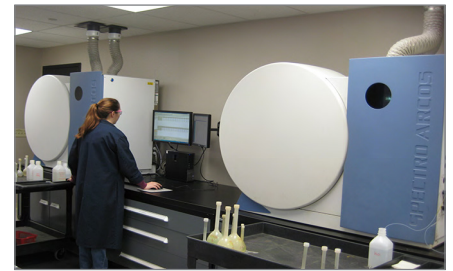
Quality & Compliance



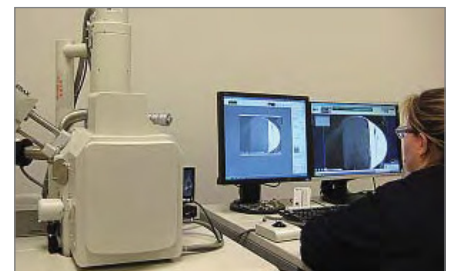
POWDER CHARACTERIZATION



BE SURE YOUR POWDER IS READY FOR 3D PRINTING



Additional Additive Manufacturing Testing



CHEMISTRY

- Chemical Composition
- Trace Analysis
- FTIR Analysis

METALLOGRAPHY

- Microscopic Examination
- Macroscopic Examination
- SEM Analysis
- Microhardness

MECHANICAL TESTING

- Tensile
- Elevated Temperature
- Charpy Impact
- Stress Rupture
- Creep
- Hardness

FATIGUE & FRACTURE MECHANICS

- High & Low Cycle Fatigue
- Fatigue Crack Growth
- Fracture Toughness

NONDESTRUCTIVE

- Liquid Penetrant
- Magnetic Particle
- X-ray Inspection
- Ultrasonic Testing

SPECIMEN MACHINING

- Complex Extraction
- Specimen Machining

The Microtrac SNYC & SEM Technology Advantage

LTI offers “well rounded” data packages for consistent particulate property analytics enabling fact-based decision making with our state-of-the-art equipment and degreed metallurgical staff.

Microtrac Snyc:

- PSD Laser Diffraction - Size
- Dynamic Image Analysis- Shape

SEM:

- Image Analysis
- 100x, 300x, 500x photos

Size and Shape	
Shape Analysis	Yes
Measurement < 1µm	Yes
Mixtures and Oversize	Very Good
Versatility	High
2D and 3D Imaging	Yes

Summary: Simultaneous laser diffraction AND dynamic image analysis with the Microtrac Sync + SEM image analysis = Your Advantage.

