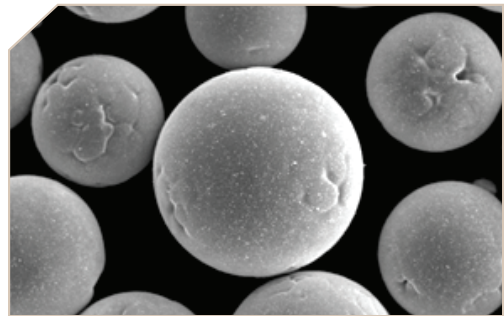
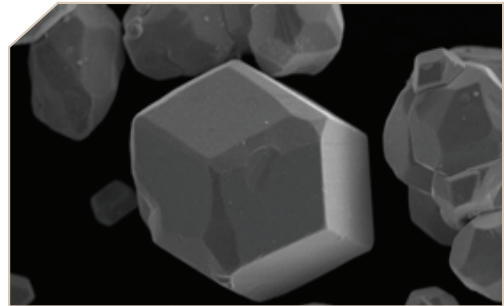


EWI SERVICES:

# Metal Powder Evaluation for Additive Manufacturing

Adoption of powder-based, metal additive manufacturing (AM) is accelerating quickly. With the rapid expansion of the AM industry comes the need for high quality, affordable powder materials. Reliable feedstock is critical to ensure quality and repeatable AM builds. This is the first and most important step in certifying any process.

The growing materials market can be challenging to penetrate. Each powder-based AM process – laser powder bed fusion (L-PBF), electron beam powder bed fusion (EB-PBF), laser directed energy deposition (L-DED), and binder jetting – has its own requirements. Standards for quality are still in development, custom process parameters often need to be developed for new powders, and parts are typically certified for a specific powder manufacturer.



Tekna 15kW Plasma Spherodization System

EWI offers a complete suite of validation services for powder suppliers and their clients who use powders in any application. A full range of testing and measurement technologies to quantify characteristics are available in the EWI labs.

**Powder characterization testing** provides confidence in the consistency of a product, quantify variability within batches from a supplier, define the impact of recycling on powder properties, and create a starting point for future powder development.

See the next page for a list of our  
**Comprehensive Powder Evaluation Services**

# EWI's Comprehensive Evaluation Services

## PARTICLE DENSITY

**Helium Gas Pycnometry** works by filling a sealed chamber with Helium gas to measure the total volume of the sample no matter its shape. Density is then calculated based on mass.

**Hall Flow Funnel and 25cm<sup>3</sup> Crucible (ASTM B212).** Powder flows through a standard hall funnel into a standard size crucible enabling measurement of apparent density as well as packing density to determine how well the powder packs naturally.

## FLOWABILITY

**Hall Flow Funnel (ASTM B213)** times the flow of 50g through standardized funnel orifice.

## PARTICLE SIZE DISTRIBUTION

**Measured with a Beckman Coulter LS-13-320 using Laser Diffraction (ASTM B822).** The system shines concentrated light towards the particles in a dry environment and uses the angle which the light is reflected to calculate the size and distribution of particles in a sample.

## ADDITIONAL POWDER PROCESSING AND EVALUATION SERVICES:

- *AM application identification and process selection*
- *Printing and testing of sample parts to prove feasibility*
- *Plasma spherodization (using the TekSphero-15) to improve flowability, increase density, and reduce powder impurity when recycling*
- *Process parameters evaluation and modification to improve build results*
- *Process parameters development and testing to enable the use of a new powder product*

## PARTICLE MORPHOLOGY

**Scanning Electron Microscope** is used to take high detail, high magnification images of particle shape, size and texture.

## CHEMICAL COMPOSITION

**LECO ONH836 using Inert Gas Fusion Method (ASTM E1019)** melts the powder to release oxygen, nitrogen and hydrogen which are then measured by infrared detection.

## INTERNAL POROSITY

**Optical Microscopy** reveals whether there are internal voids or gas bubbles in the powder particles. A sample is mounted in an epoxy that is polished down to a mirror finish to reveal the particle cross section and image with a microscope.

**Computed Tomography** is a nondestructive method using x-rays to scan through a sample, revealing its internal structure to identify if there are voids or cracks in the powder. CT has extremely high resolutions, capable of revealing 10um features.

## The EWI Advantage

EWI empowers manufacturers to overcome complex manufacturing challenges and integrate new processes to bring products to market more quickly and efficiently. Our specialists offer comprehensive engineering services to help companies identify, develop, and implement the best options for their specific applications. With unmatched expertise, state-of-the-art lab facilities, and technology resources, we offer customized solutions that deliver game-changing results.

*#IdentifyDevelopImplement*

## Get Started

To find out how EWI can help you develop, qualify, and enhance the quality of your metal powders for AM, please contact us at :

[info@ewi.org](mailto:info@ewi.org) or 614.688.5152



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