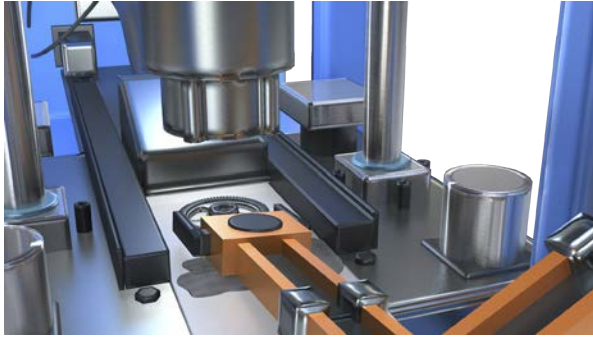


# POWDER METALLURGY BASICS

*eLearning courses designed to increase productivity and profits*



## **Learning made Simple, Visual, and Interactive**

Powder metallurgy is an ancient technology that has made a resounding comeback and has enhanced modern engineering capabilities. The THORS course Powder Metallurgy Basics presents a comprehensive view of powder metallurgy technology. This introductory course, replete with audio, video, and interactive learning experiences, enables learners to discover powder processing and part processing methods. In addition, this course offers insights into the characterization of metal powders and its impact on the behavior of the bulk material.

Credit Hours **2.5**

## **Learning Objectives**

- 💡 Gain comprehensive knowledge on the life cycle of manufacturing an engineered component from powder metal.
- 💡 Understand the principles and practices of major metal powder production methods.
- 💡 Learn the powder characterization methods in powder metallurgy.
- 💡 Learn the relationship between powder characteristics and powder processing methods.
- 💡 Compare and contrast the powder processing methods.
- 💡 Gain a broad knowledge of the process parameters associated with powder production.
- 💡 Identify the powder production method suitable for a particular powder processing method.

## **Table of Contents**

### **I. Powder Production Methods**

- **Melt Atomization**
  - o Mechanics of Droplet Formation
  - o Water Atomization
  - o Gas Atomization
  - o Centrifugal Atomization
- **Chemical Methods**
  - o Electrolysis
  - o Oxide Reduction
  - o Thermal Decomposition
  - o Solid-State Reduction
- **Mechanical Disintegration**
  - o Milling
  - o Other Mechanical Processes

### **II. Powder Properties and Nomenclature**

- **Post-Production Processes**
  - o Formulation, Scrap
- **Powder Characterization**
  - o Powder Morphology
  - o Granulometric Properties
  - o Internal Structure
  - o Flowability
  - o Apparent Density
  - o Green Strength
  - o Specific Surface Area
  - o Powder Chemistry
- **Nomenclature**

### **III. Powder to Part**

- **Part Processing**
  - o Press and Sinter
  - o Powder Metal Forging
  - o Isostatic Pressing
  - o Metal Injection Molding
  - o Additive Manufacturing
  - o Hard Metal Production
- **Application Drivers**
  - o Prime Application Drivers
  - o Size and Production Volume
  - o Part Density
- **Powder Production Selection**

