



HOW TO GET THE RIGHT POWDERED METAL PRODUCTS





INTRODUCTION

Manufacturers are always looking for an advantage in quality, cost, and production time – all to provide better services and product options for their target markets.

As a result, they often compare side to side but look outside the box when they crave innovation or a more cost-effective solution for their manufacturing needs. One of those solutions utilizes powdered metal products.



WE WILL EXPLORE THESE TOPICS IN THE FOLLOWING PAGES:

- What are Powdered Metal Products?
- Industry Applications of Powdered Metal Products
- Powdered Metal Products Processing Methods
- Key Benefits of Powdered Metal Products
- Choosing the Right Powdered Metal Products Manufacturer
- Why Choose Allied Sinterings as Your Powdered Metal Products Partner



WHAT ARE POWDERED METAL PRODUCTS ?

Powdered metals are powdered metal alloys formed through compression and heat. Common metals are stainless steel, copper, brass, bronze, and iron, all of which can be mixed with other alloys to achieve the material's desired properties.

Powdered metals are highly versatile in terms of material combinations, mechanical properties and customization. Powder metallurgy is a highly repeatable process that creates strong, cost-effective components that is also quicker than other manufacturing techniques.

Choosing the metals that will go in your components depends on your application's performance requirements. Through the aid of lubricants, the selected materials are compacted into a die. The pressure gives the alloy "green strength," which makes it strong enough to handle but still requires sintering.

Sintering heats the components just below the melting point to bond the metal particles together and burn off the lubricating material. The sintered parts are then ready for additional finishing or heat treatments to improve its desired qualities.

An added benefit of powder metallurgy is that it is eco-friendly, as it limits production waste to just 3% and creates only harmless byproducts of nitrogen and hydrogen.

INDUSTRY APPLICATION OF POWDERED METAL PRODUCTS

Powdered Metal Products offer innovative and cost effective solutions for a wide variety of industry applications:

Medical Components -

The medical industry has seen strong growth and increased popularity of powdered metal components. In an industry known for groundbreaking techniques in biotechnology, microsurgery, microelectronics and instrumentation, the ability to make reliable miniature and micro components within extremely tight tolerances is essential.



Automotive Components -

Manufacturers in the automotive industry choose powder metallurgy for various reasons, including cost-effectiveness, application versatility, part-to-part uniformity and shape and material flexibility. With powder metallurgy, manufacturers have more control over the design, shape, and porosity of end components. Miniature automotive components have some of the tightest tolerances on the market today and they must also be functional, long-lasting and aesthetically pleasing.



INDUSTRY APPLICATION OF POWDERED METAL PRODUCTS

Motion Control -

The electric vehicle industry is rapidly growing, and while we can expect the market to maintain a compounded annual growth rate of 29% over the next ten years, the technology behind electric vehicles is still maturing. One of the core premises of electric vehicles’ popularity is efficiency — cars need to be lightweight, thermally efficient, and energy-efficient all while providing a pleasant driving experience.



Industrial & Mechanical -

The industrial and mechanical industry relies on many types of equipment to complete critical processes. A diverse array of applications require small mechanical components to perform basic operations. Some of these applications include ATMs, lighting fixtures, vending machines, printers and computer peripherals, and mail and passport systems. Miniature components are also crucial in camera mounts, shock and sound dampening and gear lubrication.



INDUSTRY APPLICATION OF POWDERED METAL PRODUCTS

Robotics & Automation -

Powdered metallurgy (PM), allows making precision robotic machine parts of different complexities quickly and efficiently. It is even cost-effective to fabricate those parts you cannot fabricate with other methods. Plus, powdered metal is a near-to-net or net manufacturing process. This means minimal material wastage occurs, making it more environmentally sustainable and efficient. As the powdered metal parts are closely connected with technology-driven manufacturing, you can create parts optimized for weight, stiffness, hardness, and strength, necessary for a range of applications in various industries including aerospace.





POWDERED METAL PRODUCTS PROCESSING METHOD

Powdered metals are powdered metal alloys formed through compression and heat. Common metals are stainless steel, copper, brass, bronze, and iron, all of which can be mixed with other alloys to achieve the material’s desired properties. Powdered metals are highly versatile in terms of material combinations, mechanical properties, and customization. Powder metallurgy is also a highly repeatable process that creates strong, cost-effective components.

Powder metallurgy is also quicker than other manufacturing techniques. It consists of three main steps: selecting the powder composition, compaction, and sintering.

Choosing the metals that will go in your components will depend on your application’s performance requirements. Through the aid of lubricants, the selected materials are compacted into a die. The pressure gives the alloy “green strength,” which makes it strong enough to handle but still requires sintering. Sintering heats the components just below the melting point to bond the metal particles together and evaporate the lubricating material.

The sintered parts are then ready for additional finishing or heat treatments to improve its desired qualities. An added benefit of powder metallurgy is that it is eco-friendly, as it limits production waste to just 3% and creates harmless byproducts: nitrogen and hydrogen.



KEY BENEFITS OF POWDERED METAL PRODUCTS

The powder metallurgy process provides a host of advantages over competing metalworking technologies. These all add up to part-to-part uniformity for improved product quality, shape and material flexibility, application versatility, and cost effectiveness.

- Is cost effective
- Produces good surface finish
- Permits a wide variety of alloy systems
- Provides controlled porosity for self-lubrication or filtration
- Offers long-term performance reliability in critical applications
- Minimizes machining by producing parts at, or close to, final dimensions
- Is suited to moderate- to high-volume component production requirements
- Provides materials which may be heat treated for increased strength or increased wear resistance
- Minimizes scrap losses by typically using more than 97% of the starting raw material in the finished part
- Facilitates manufacture of complex shapes which would be impractical or impossible with other processes



CHOOSING THE RIGHT POWDERED METAL PRODUCTS MANUFACTURER

Choosing the right powdered metal products manufacturer for your application is critical. The process of finding a new supplier can be both stressful and challenging, given so many requirements and risks surrounding these applications.

Here are five important questions you should ask any prospective powdered metal products manufacturer

Q. What technology do you use to manufacture your powders?

Metal powders must meet certain characteristics, like particle shape and size, powder density and low-gas content. They can be produced using methods such as electrolysis, chemical processes and atomisation, with atomisation regarded as the best method for producing metal powders because it produces the most geometrically suitable (spherical) powders.

Q. Do you have the capacity to meet my operational needs?

It is important to understand what capacity your supplier can offer. As more manufacturers approach high production volumes, supply will tighten quickly. Make sure your powder supplier can meet your anticipated volumes and in an acceptable time frame. Additionally, if your supplier can produce powders in high quantities, it's important to make sure that it also translates into high yield. The lower the yield, the higher the waste and cost. Therefore, a supplier that can deliver high yield provides you with the most value.

Q. What materials do you specialize in? Can you customize powders for my requirements?

As you become more experienced with powdered metal products, you may consider using more materials. The right supplier will have a vast range of chemistries and sizes to best suit your application requirements. In addition to standard stock materials, ask if your supplier can develop specialty alloys. The right supplier will have the knowledge and capability to fine-tune material properties to help satisfy your part requirements.



CHOOSING THE RIGHT POWDERED METAL PRODUCTS MANUFACTURER

Q. How do you deal with risks involved in powder handling?

Handling metal powder is inherently hazardous, as it can be prone to fire and explosion, and there is also the physiological concern of long-term inhalation of, and contact with, metal powders. From production, blending and screening, to shipping, safety must be a top priority and encompass equipment maintenance, handling processes and employee safety. The supplier should be willing to share their best practices of handling powder.

Q. How do you ensure you meet regulatory compliances?

When considering a supplier, you want to be sure they understand the requirements and have the proper certification. When it comes to working with powdered metal products, there are many material compliances, including, but not limited to, documenting material composition, ensuring traceability and measuring the purity of raw material. Partnering with a supplier who understands how to meet these requirements is essential.



WHY CHOOSE ALLIED SINTERINGS AS YOUR POWDERED METAL PRODUCTS PARTNER

As a recognized world leader in the manufacture of custom-engineered powder metal products for small applications, including small gears and miniature components for planetary drives, assemblies and subassemblies for medical devices and a number of industrial, commercial and consumer products, Allied Sinterings, Inc. maintains strict quality assurance practices.

Every effort is made to produce high-quality results that meet design specifications with dimensional and repetitive accuracy:

- Highly Skilled Team of Professionals
- **Aid in Design for Manufacturability**
- Competency with Complicated & Intricate Geometries
- Precision Measuring
- Use Only High Quality Powders & Materials
- High Tech, State-of-the-Art Facilities & Equipment
- **Environmentally Controlled Facilities for Accurate Measurement**
- Computer Supported S.P.C.
- Fully Calibrated Process Monitoring
- Red Line Gear Checking Double Flank Machine
- Hardness Testing
- Very Tight Tolerances Held



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- Density Checking
- 90% of Tooling Maintenance In-house for Quicker Turn Around
- Scheduled JIT (Just In Time) Delivery
- **ISO 9001:2015 Certified**
- **Fast Response Times**
- AGMA Quality Guarantee
- CAD Facilities
- Courtesy, Professionalism and Communication
- **Fully Calibrated Process Monitoring**
- **Only Use high quality powders & materials**

Allied Sinterings has achieved the distinction as an award winning, world-class manufacturer of some of the smallest and most intricate powder metal parts in the industry. You can work with a company whose controlled, expedient and consistent process offers you the highest degree of quality assurance available, providing you with the part you need on time every time and at a significant cost savings.

Contact Allied Sinterings today at (203) 743-7502 to learn more about our powdered and sintered metal products.