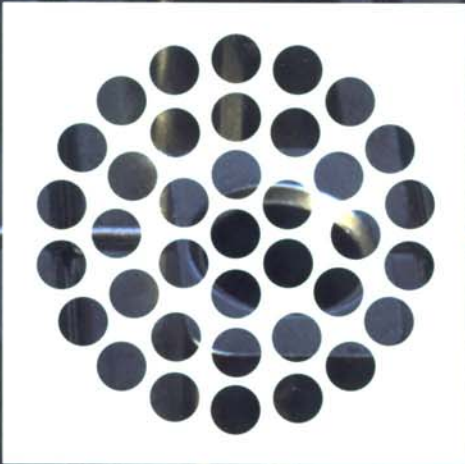


FMS

Powder Metal Takes Shape



Creative Service



The Perfect Blend



FMS Corporation has provided exceptional powder metal manufacturing services to its customers for nearly 40 years. FMS offers clients customized services in the areas of parts design, alloy development, production, and assembly. In addition, through its in-house EDM and CNC machining capabilities, FMS specializes in quick turn-around for custom tooling and prototyping.

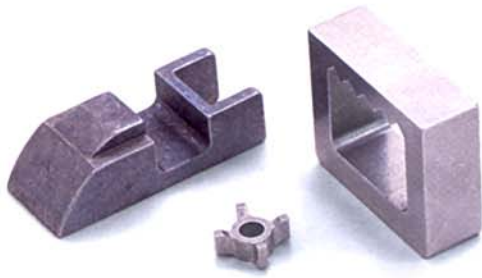
FMS works with a wide variety of materials including low-alloy steels, stainless steels, brass, bronze, soft-magnetic materials, exotic alloys, and others. Currently serving the medical, computer, farm equipment, fluid transport, office, and industrial equipment industries, among others, FMS

is your single source for powder metal production from design concept through service in your application and beyond.

Our Mission...

FMS Corporation will be the premier manufacturer of low to medium volume powder metal parts. In the markets we serve, FMS will provide the best combination of:

- technical service
- speed-to-market
- quality
- delivery
- cost



Customized Services



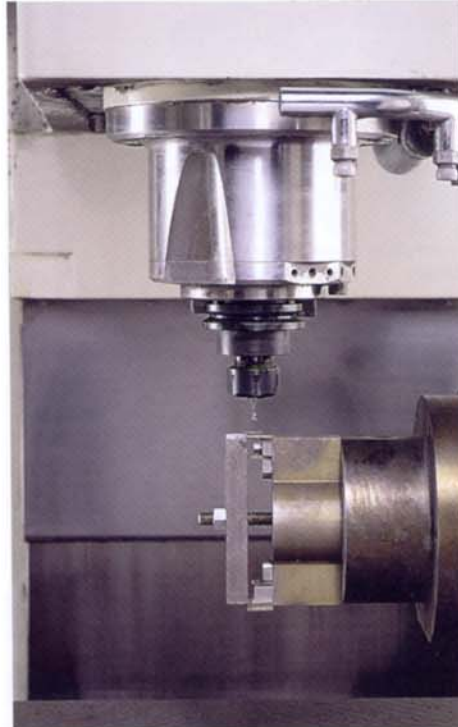
FMS provides custom component design, custom alloy design, and custom production manufacturing. These three facets of FMS's service strategy work together in helping our clients move quickly and efficiently from design concept to cost-effective component.

FMS has the engineering capabilities to custom design a component to satisfy the shape and tolerance requirements of your specified application. We pride ourselves on transforming a "can't-be-done" concept into a workable design.

The powder metal process allows FMS to create a wide variety of custom metal alloys, each designed to meet the specific physical and metallurgical requirements of each application. Many alloys we use are unattainable using traditional metal-forming methods.



Fast Track Tooling and Prototyping



In today's business environment, many companies find themselves on a "compressed" time-to-market schedule for new products. To meet this demand, FMS offers its Fast Track rapid prototyping and tooling service. Designed to provide prototype tooling or 10 prototype pieces in as little as two weeks, this service can greatly enhance new product development or component modification efforts.

FMS Fast Track can also be used to expedite production tooling. For companies wishing to shorten lead times for final manufacturing of established, high volume products, FMS Fast Track can expedite production of specialized tooling to meet your scheduling demands.



Total Production Capabilities



Whether you require a single, simple molded component or a complex, plated, and machined assembly, FMS's qualified, knowledgeable staff strives to completely meet your unique production needs.

FMS design engineers utilize our unique CAD/CAM/CIM system, directly integrated with tooling design, tooling fabrication, and production machining. The latest tooling production processes, including in-house wire and conventional EDM, allow FMS to strictly control tooling quality.

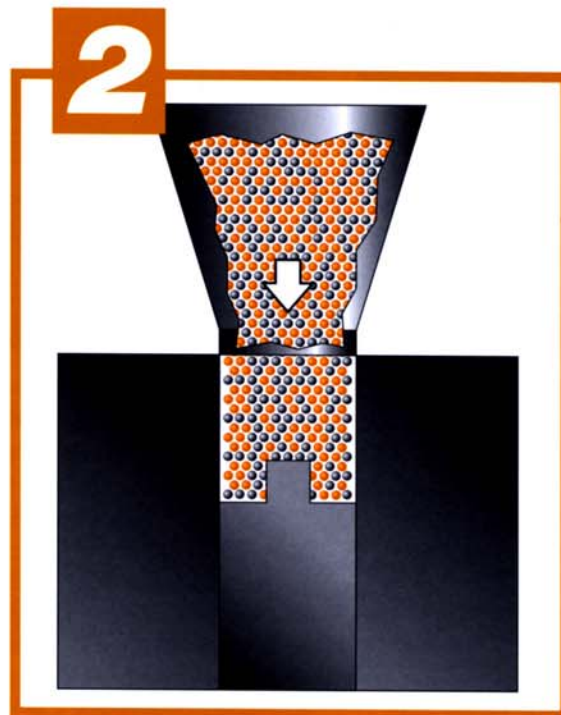
During production, various secondary operations are available in-house, including conventional and CNC machining, grinding, grit-blast deburring, resin and oil impregnation, and assembly. Does your part require plating or heat treatment? FMS also has a well-established network of reliable vendors whom we trust to help us supply high quality, complete components, directly to your assembly line.

The Powder Metal Process



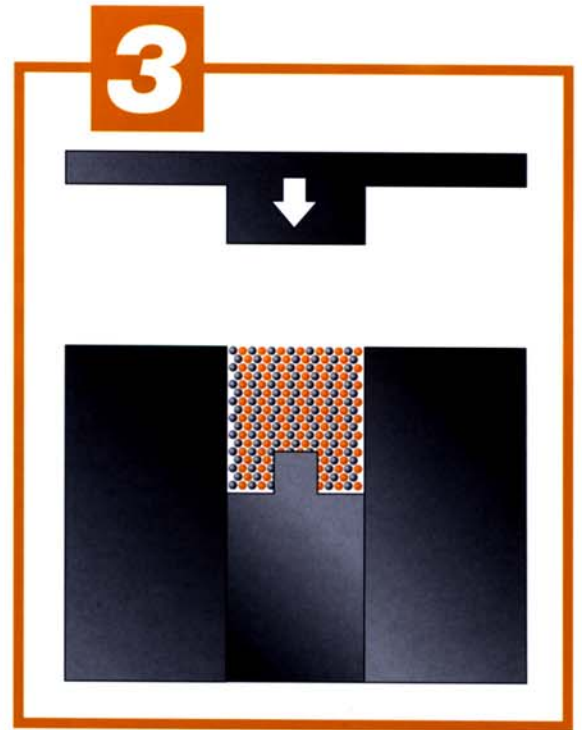
Blending

The base metal or alloy, any additional alloying elements, and a powdered lubricant are fed into a blender. These materials are then blended into a homogeneous mix. Common base materials could be iron, brass, stainless steel, etc. Common alloying elements could be nickel, copper, graphite, etc.



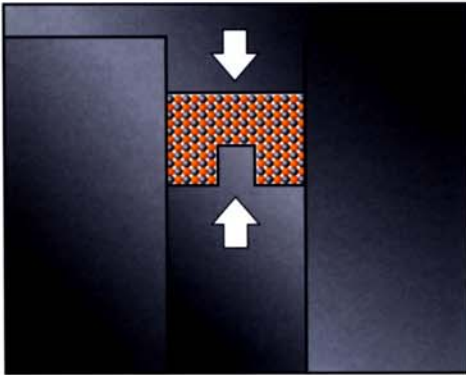
Charging

The homogeneous, blended material is gravity-fed into the open powder metal die.



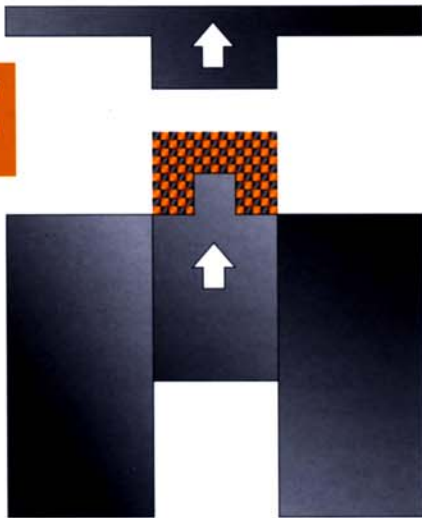
Leveling

The excess powder above the die is removed, leaving a specific, consistent mass of powder within the tool.

4

Compacting

The upper punch enters the die cavity, preventing any material from escaping out the top of the die. Then, both the upper and lower punches move together, compacting the material to the desired shape and density. Compaction pressures range from 20 to 60 tons per square inch.

5

Ejecting

The upper punch retracts from the die cavity. The lower punch then ejects the part above the top of the die for removal from the press. This unsintered or “green” compact is then carefully transported to the sintering furnace.

6

Sintering

The “green” compacts are then heated (or sintered) in a protective atmosphere furnace. During sintering, the part is heated to a temperature below the melting point of the base metal, but hot enough to cause metallurgical bonding of the metal particles. Although a belt furnace is represented above, several furnace designs may be used in the production of powder metal parts, each with its own advantages.

7

Finishing

After sintering, a powder metal part may be complete and ready for shipment. However, many secondary operations are available to fit each customer’s specific tolerance, shape, appearance, corrosion resistance, or other requirements. Secondary operations may include machining, sizing, plating, deburring, or heat treatment, among others.

Beyond Casting, Machining and Stamping



	<i>Design Flexibility</i>	<i>Materials Versatility</i>	<i>Dimensionally Accurate</i>	<i>Volume Adaptable</i>	<i>Reliability and Repeatability</i>	<i>Minimal Waste</i>	<i>Economical</i>
Casting							
Machining							
Stamping							
FMS Powder Metal							

Design Flexibility

FMS's powder metal techniques produce intricate shapes that would be difficult to achieve using traditional metal forming methods. Irregularly shaped parts such as gears, cams, or parts requiring keyways can be manufactured economically and consistently using FMS's powder metal process.



Volume Adaptable

The powder metal process is well suited for economical, high-volume production. However, FMS prides itself on being particularly volume-flexible. Our specialty is low to medium volume (1K-100K pcs.) parts that would be difficult to produce using traditional metal-forming methods.



Dimensionally Accurate

FMS's powder metal production process maintains close dimensional tolerances over extended runs. Depending on the material used, achievable tolerances are approximately 0.002 in./in. for dimensions perpendicular to the pressing direction and 0.010 in./in. for length dimensions. FMS

also sizes or restrikes components after sintering, reducing achievable tolerances down to 0.001.



Reliability and Repeatability

Through strict adherence to process control procedures, FMS produces parts with very consistent chemical, metallurgical, and physical properties. Our production methods assure that the first part is as good as the last, whether the production run is 10 or 10 million.

Materials Versatility

After understanding the details of the customer's application, FMS recommends a specific metal alloy. Literally hundreds of materials are available, such as low-alloy steels, stainless steels, copper, brass, bronze, and nickel-alloys, among others. Then, by strict adherence to process control standards, FMS controls the chemical, metallurgical and physical properties necessary to meet the customer's specifications.



Minimal Waste

Proper design of components for manufacture via the P/M process can minimize or eliminate the need for secondary machining. By being directly involved during component design, FMS helps its clients take full advantage of P/M's "net" or "near-net" shape capability, creating efficiencies in both material and labor costs.

FMS customers have found our design, engineering and manufacturing expertise to be second to none in the powder metal industry. To discuss your application, call an FMS engineer today at 800-959-0681. Or, visit us on the Internet at: <http://www.fmscorporation.com>



Powder Metal Seminar

If you are interested in learning more about the powder metal process, FMS offers a seminar on the powder metal process. Call 800-959-0681 for more information.

Also, visit us on the Internet at: <http://www.fmscorporation.com>

