CNPC POWDERS FOR SINTERING

The process of PM is used to create cost effective near net shape components through several compressed parts. PM can be more economical for producers of complex parts due to the unique capacities PM provides.

CNPC POWDER offers you a variety of powders that we produce specifically for powder metal applications. We value quality and to prove it we proudly hold certifications such as ISO 9001, SGS, and RoHs.

**PRECISION**
Due to the use of moulds a sintered part can maintain very good dimensional precision.

**MACHINING**
Thanks to near net shape and high dimensional precision for a part, very little machining is required to produce a finished part.

**STRENGTH**
As a sintered part arrives to full density it has improved strength over a casted part.

**POROSITY**
By controlling porosity it is possible to infiltrate a part with a variety of other materials, like oil, used for self lubricating bearings and bushings.

HOW OUR POWDERS HELP YOU TO GROW

Industrial PM is the technique of making a finished metal or ceramic part from powdered materials. In this technique, a powder mix is pressed into a desired shape and then sintered. Sintered PM parts offer manufacturers a great deal of flexibility in design and production of parts. CNPC POWDER offers powders that can meet today’s demanding marketplace.

**IRON POWDERS**
We produce both reduced and atomized iron powders by reduction and by atomization. Our powders are produced at mesh sizes designed with PM applications in mind.

**IRON ALLOY POWDERS**
Our Ferro-alloys are made with customization in mind. We produce standard alloys, and we can produce custom alloys to meet the needs of innovative PM applications.

**ULTRA FINE POWDERS**
Our Ultra Fine Powders come in both pure iron and alloyed forms. These powders have enormous possibilities for a wide variety of applications.

WWW.CNPCPOWDER.COM

Stay informed by accessing our website or feel free to contact us via email or phone. All necessary forms can be found at www.cnpcpowder.com

@CNPC POWDER Research & Development Center, December, 2016.
Powder materials used in PM vary from 200 µm down to 20 µm in size. For a size comparison, the average hair is 50 µm in width. Once a raw material is selected, the material is compacted using a press. The pressed part (green part) is quite brittle. The part is then placed in a sintering oven to create a metallic bond and harden the part. The final products will contain spaces within and have lower densities than cast parts.

In PM a variety of metals are able to be used as metal powders. The production of these powders comes in a variety of methods: reduction, atomization, electrolysis, and crushing. Each of these methods produce a different particle shape, and the best method depends on the desired material and application.

• Reduction- in this process the desired metal is reduced through a chemical reaction. This generally produces an irregular highly porous particle.

• Atomization- This can be produced via water or gas atomization. A liquid metal is passed through a stream of pressurized gas or water to produce a particle that is smooth and spherical or irregularly shaped.

• Electrolysis- This process generates a powder that is dendritic in nature. The electrolysis creates small finely shaped crystalline structures.

• Crushing- The crushing process uses a variety of mills to smash particles down to a desired size. This process produces an irregular shaped powder that generally has the same composition as the source material.

FERROUS ALLOYS FOR PM

Within the variety of metals used in PM, a major segment is the Ferrous based alloys. Ferrous based alloys can be made using a number of the previous production processes. Ferro-alloys come in four categories:

• Admixed: This alloy has other elements or ferro-alloys are added to an Iron base.

• Diffusion-alloyed: This process creates an alloy through the use of thermal diffusion to bond an element or alloy to an iron base.

• Prealloyed: This is a mixture of materials that can alloy at a later time. Copper and Tin powders mixed together can be considered a pre-alloy because they can be made into Bronze.

• Hybrid-alloy: This process is the result of adding an element or alloy to diffusion or pre-alloyed materials to create a hybrid.

With Ferrous based components, unalloyed ferrous parts offer the lowest levels of strength, and hardness, while alloyed Ferrous-Copper, Ferrous-Carbon and Ferrous-Carbon-Copper materials offer higher strength and hardness.
In the process of creating a Press Ready Ferrous mix, extra Carbon is added to help reduce damage to the finished part from oxygen. Oxygen bonds with the extra carbon, and leaves the correct amount of Carbon in the finished part. Ferrous based parts are often rapidly cooled (quenched) in oil rather than water, polymer or brine as the presence of pores could entrap salt, water, or other materials which could corrode the part.

The porosity and density of PM parts can be controlled. This control allows for lighter weight parts or high density and impregnated parts to be produced for a variety of applications. Lower density parts can help reduce overall weight of a finished part, and help with part life by impregnation with oil to hep with lubrication. At higher densities, extra pressing and/or secondary sintering are required. As well impregnation of the pores with a secondary element or alloy can contribute to density and hardness.

PM Bearings and bushings are generally referred to as self lubricating bearings and bushings. The reason for this is because of the lubrication impregnating the pores in the bearings, which flows out during activity due to heat. When at rest the lubrication creeps back into the bearings. These bearings and bushings offer a few advantages for users.

- Low installation and maintenance: This advantage is primarily due to self lubrication which allows the bearing to maintain itself over time and smooths the installation process.
- Low Coefficient of Friction: The self lubrication helps to consistently lubricate the bearing and bushing to lower the friction on the mating surfaces. This helps to improve the life of the bearings
- Lower Cost: Due to the ease of maintenance and installation as well as it lower coefficient of friction, and longer life lower the overall cost of the bearings for the end user.

POWDER APPLICATIONS

In Powder Metallurgy the metal powder applications general fall into two categories: Structural parts and bearings and bushings.

Structural parts encompass all PM components that form parts of a larger mechanical structures. These parts generally offer benefits of reducing or eliminating secondary processing. Cast and wrought parts can be upgraded via PM. Structural parts can be created with a higher level of complexity and mechanical properties. Often this comes at little to no added cost for production.

WE CAN BLEND!

If your application requires a blended mix we have the ability to provide you with the powder blends to meet your specifications.

If you have any inquiries or would like information on customized or standardized materials or blends, please do not hesitate to reach out.

CONTACT CNPC POWDER:

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