

Metal Powder for Additive Manufacturing

Spherical Shape • Low Porosity Content • Excellent Flowability

Metal Powder Optimized for Powder Bed Fusion and Laser Metal Deposition

The performance of your printed components is closely tied to the quality and consistency of the metal powders used. Beyond our expertise in machine manufacturing, we provide premium-grade metal powders designed to deliver exceptional performance across a range of applications.

Materials for Powder Bed Fusion



Maraging Steel

Nickel Based Superalloy, Ni718

Stainless Steel, 316L

Materials for Laser Metal Deposition



Cobalt 6 Commonly known as Stellite® 6

H13 Tool Steel

Nickel Based Superalloy, Ni718

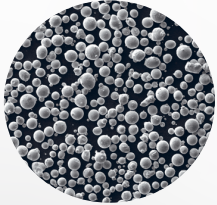
Stainless Steel, 316L

Tungsten Carbide, WC

Additive Manufacturing with Makino Materials and Technology

Our powders are engineered for seamless integration with the Makino Additive Manufacturing ecosystem. They are fully compatible with Makino machines and optimized for precise process settings.

Contact us for our full list of powder materials.

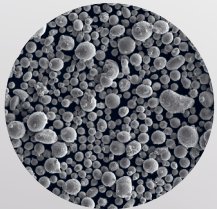


Stainless Steel, 316L

Known for its good hardness with high ductility. Versatile applications where corrosion resistance is important.

Applications:

- Surgical Instruments
- Valve and pump components

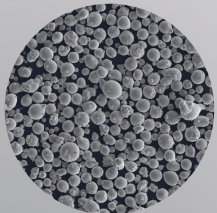


H13 Tool Steel

Characterised by high hardness and ductility. Used in highly stressed components due to its good wear resistance.

Applications:

- Drivetrain components
- Injection Molding Tools

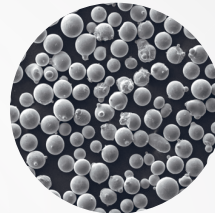


Nickel Based Superalloy, Ni718

Ni718 is a nickel-based alloy combining good corrosion resistance at high temperatures up to 1000°C.

Applications:

- Aircraft engine components
- Power generation components in corrosive environment



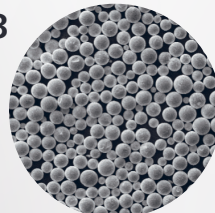
Cobalt 6

Commonly known as Stellite® 6

Wear resistant alloy with excellent corrosion and mechanical properties up to 500°C.

Applications:

- Valve seats and gate components
- Pump shafts and bearings



Tungsten Carbide, WC

Well known in the industry for its superior wear or impact resistance. Resistant to heat and oxidation.

Applications:

- Heat exchanger and tube components
- Downhole drilling tools

Pushing Materials Performance with High Speed Laser Metal Deposition (HS-LMD)

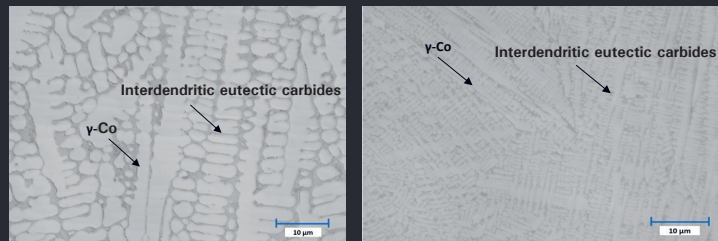
Makino's HS-LMD speeds up the cooling process of materials during printing, resulting in faster solidification and better material properties.



Cobalt 6 Similar to UNS R30016, Stellite® 6

When printing Cobalt 6 with HS-LMD, it undergoes grain refinement due to **increased cooling rates** and **thermal gradients** as compared to LMD.

Increase in hardness from 49HRC to 54HRC was obtained. Wear resistance is further enhanced.

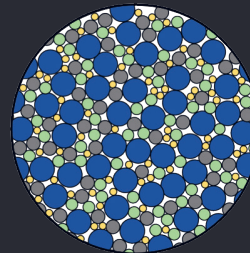


LMD

HS-LMD

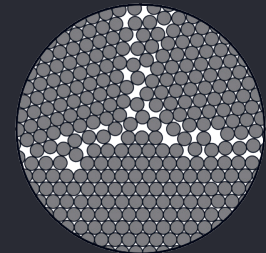
Fe-based Metallic Glass

This material is engineered to deliver extremely **high hardness of up to 1400HV** and **enhanced corrosion resistance**, suitable for marine, oil & gas industries. The tailored composition combined with the rapid cooling rates offered by the HS-LMD process, creates amorphous phases that results in its unique performance features.



Metallic Glass

Disordered atomic structure



Most Alloys

Ordered atomic structure

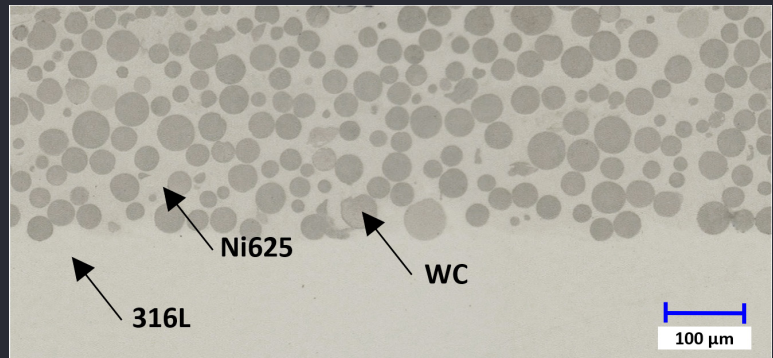
Rapid Alloy Development

Alloys can be effortlessly processed in various compositions to create fully dense test specimens using our LMD powder feed system.

This significantly streamlines the development process by enabling rapid production of multiple test specimens within a matter of hours.



In-Process Mixing of Tungsten Carbide and Nickel Alloy

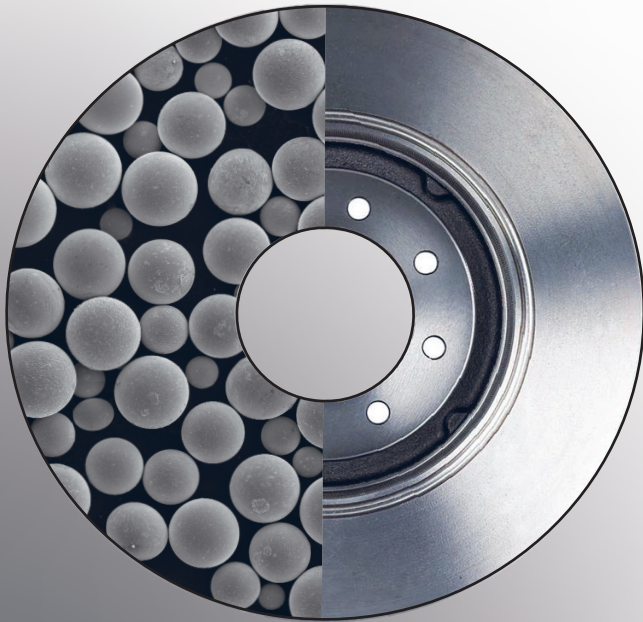


Tungsten Carbide and Nickel Alloy Ni625 are mixed during the printing process. Thanks to the lower heat input from HS-LMD, we were able to create a high WC% content in a Ni-based superalloy matrix.

This combination yields exceptional material properties from both materials, including **high wear** and **corrosion resistance**, making it an ideal choice for industries such as Marine, Oil & Gas etc.

Alloy services

Encountering difficulties in locating off-the-shelf powders that align with your specific application needs? Consider leveraging on Makino's custom material design services, tailored to help you find the optimal material solution for your requirements.



Looking forward to printing with your own innovative material composition?

1

New Materials Design Service

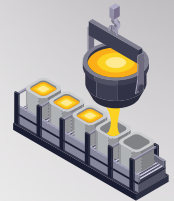
Match the physical properties of your parts by combining the appropriate chemical composition.



2

Small Batch Production of Alloy Powder

Atomise powder of different compositions in batches of 5kg.



3

Process Parameters Optimization

Test the printability of materials using either Powder Bed Fusion technology or Laser Metal Deposition.



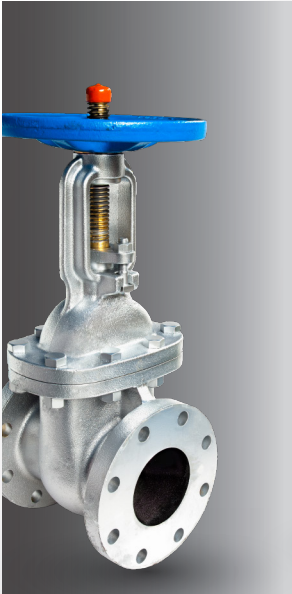
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Manufacture Parts

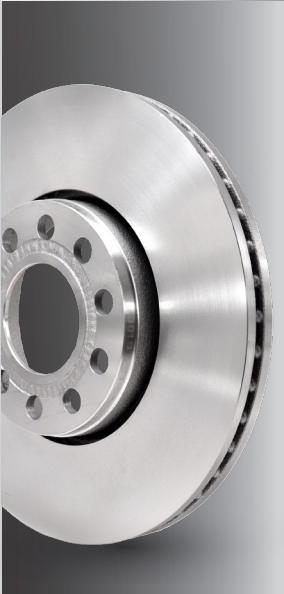
Print using Makino metal technologies for proof of concept.



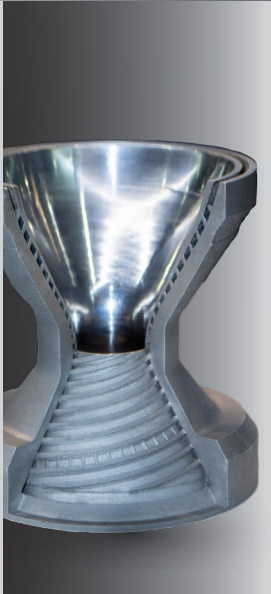
Applications



Pump and Valve



Brake Disc



Heat Exchanger



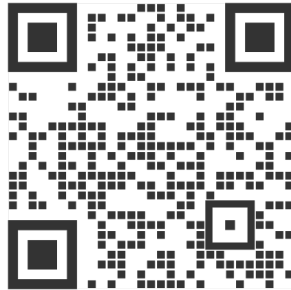
Fan Blades



Mold Inserts



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