

Material Product Data Sheet

Super Ferritic Stainless Steel Powders for Brake Disc Coatings

Powder Products: MetcoBrake 9501A

1 Introduction

MetcoBrake 9501A is a revolutionary new proprietary ferritic stainless steel powder with a composition similar to a 400 series stainless steel. Developed using the Scoperta™ Computational Design Process, it has been optimized for higher wear resistance, while maintaining a similar level of corrosion resistance to a type 431 stainless steel.

The MetcoBrake 9501A was designed for laser cladding processes to produce an overlay that combines good wear and corrosion resistance, especially where a crack-free coating is necessary. It is recommended for applications where the corrosion resistance of a type 431 stainless steel is sufficient, but better wear resistance is required.

The stable ferritic structure of the MetcoBrake 9501A is less susceptible to performance variations that could result from varied processing conditions and cooling rates than typical martensitic steels. While the ferrite structure of MetcoBrake 9501A deposits does yield lower hardness than martensitic steels, the wear resistance is actually higher than martensitic steels resulting from the formation of hard precipitates during the cladding process.

These materials can be clad in multiple layers crack-free, allowing for the overlay to be utilized for rebuild or salvage of under-sized parts. The overlay can be ground to a very good finish using silicon carbide wheels.

1.1 Typical Uses and Applications

Over the past decades, the automotive industry has worked quite successfully to reduce pollution from combustion engines. Now they face the next challenge — fine dust from vehicle braking systems.

Globally, road traffic increases every year with more and more vehicles on the roads. In many areas, this also means more traffic congestion; leading to increased on-and-off braking. As a result, fine dust from brake discs now accounts for some 21%* of vehicle pollution.

As this pollution poses a severe health risk, many regulators have imposed new mandatory goals for the automotive industry to significantly reduce these emissions. *Dan Wakeling,

Quick Facts

Classification	Alloy, iron-based
Chemistry	Proprietary
Manufacture	Gas atomized
Morphology	Spheroidal
Overlay hardness	35 HRC (approx.)
Wear resistance ^a	90 to 95 mm ³ (per ASTM G65-A)
Purpose	Corrosion and Wear Resistance
Process	Laser Cladding, EHLA

^a Abrasion resistance is better than 431 stainless steel despite lower hardness



DiscCover Beam coating application

"The Contribution of Brake Wear Emissions to Particulate Matter in Ambient Air"
(Eurobrake 2018 presentation)

Our Solution

Using high-speed laser cladding, in combination with dedicated materials we developed and produced in-house, Metco Joining & Cladding has developed solutions that meet upcoming regulation goals today. In fact, Metco Joining & Cladding was the first to develop and offer dedicated coating powders and application technology for brake discs implemented in serial production.

DiscCover™ Beam: A Breakthrough Solution to Combat Fine Dust from Braking

DiscCover Beam uses high-speed laser cladding and our Metco™ Brake dedicated powders to drastically reduce fine dust from vehicle braking. DiscCover Beam solutions are already successfully tested by OEMs and proven to reduce fine dust emissions while maintaining brake performance.

Quick facts / Discover Beam Solution Process Highlights

- Metco™ Brake powders with encapsulated hardphases are easy to process with no need for blending => include only once we have a final decision on the dual layer materials
- Single-layer solution with no need for a bond coat reducing processing time and powder consumption
- Multi-layer solutions with dedicated powders for car lines with higher performance requirements
- Corrosion-resistant, crack-free coating solution
- Fast coating processing time of less than 1 min per disc
- Adjustable coating thickness (100 to 300 µm in one layer) helps to optimize cost and lifetime
- Real-time, in-situ process monitoring reduces post-coat quality requirements and rework
- Post-coat grinding with minimal material removal and lower-cost grinding tools
- Nickel-, Cobalt- and Copper-free coating meets current and future regulation requirements (REACH)
- Whether prototyping, ramp-up or pre-serial production, customers can benefit from our expert consulting and processing services

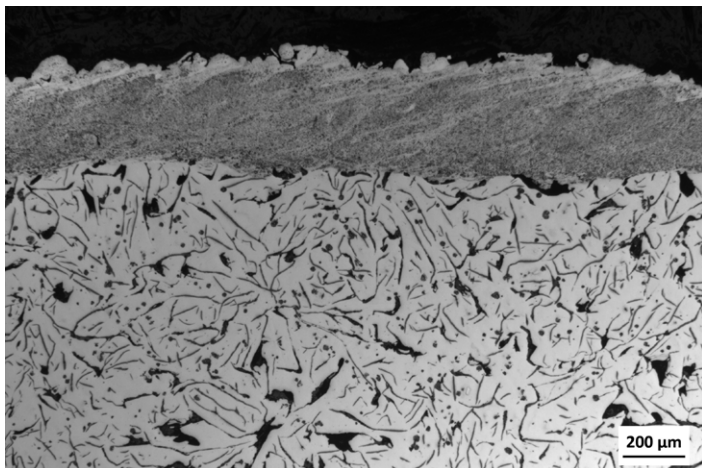
2 Material Information

2.1 Properties and Characteristics

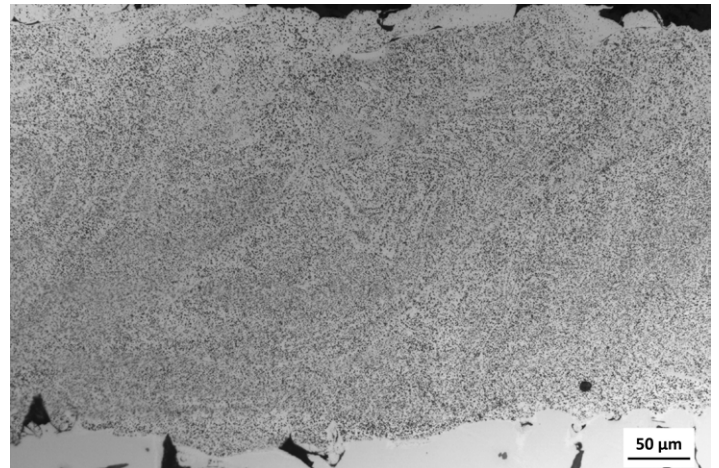
Product	Tribology AK master (nominal µ)	Tribology AK master (minimum µ)	Wear reduction	Corrosion resistance	Fine dust emission
DiscCover Beam Coated Disc	0.4 to 0.44	0.3 to 0.35	> 10x vs. uncoated grey cast iron	> 1000 h salt spray	< 3 mg/km/vehicle

3 Key Coating Information

3.1 High speed laser cladding / High speed, high power laser cladding parameters



Cross section MetcoBrake 9501A



3.2 Process parameters/ results table

Process	High-speed laser cladding
Layer	single (no bond coat)
Thickness	150 - 350 µm
Porosity	≤ 0.5%
Average microhardness	350 HV
Deposition efficiency	> 90%

3.2 Continuing Development

We are continuing to develop brake disc solutions with goals toward improved wear resistance, faster processing and cost efficiency. Metco Joining & Cladding offers and develops

brake disc solutions for passenger cars, commercial vehicles, trucks and rail vehicles. Contact us for more information about these solutions and how we can tailor solutions to your specific requirements.

4 Commercial Information

4.1 Ordering Information and Availability

Product	Order No.	Form	Size	Package Size	Availability	Distribution
MetcoBrake 9501A	2271496	Powder	-53+20 µm	5 kg (approx. 11 lb)	Stock	Global

4.2 Handling Recommendations

- Store in the original container in a dry location
- For powders, tumble contents prior to use to prevent segregation
- Open containers of powder should be stored in a drying oven to prevent moisture pickup

4.3 Safety Recommendations

See SDS (Safety Data Sheet) in the localized version applicable to the country where the material will be used. SDS are available from the Metco Joining & Cladding web site at www.metcojoiningcladding.com (Resources – Safety Data Sheets).

Product	SDS Index No.
MetcoBrake 9501A	50-2787

Information is subject to change without prior notice.