metco
joining & cladding

Material Product Data Sheet
Hardfacing Products with Diamond Particles

Powder Products: Metco™ 51151B
Composite Rod Products: Metco 81586

1 Introduction

The inclusion of hard phase comprised of tungsten carbide/diamond within Metco Joining & Cladding products provides enabling technology to protect and extend the life of a part. Utilizing exceptionally high hardness, high elastic modulus and chemically inert particles within a carefully designed composite provides groundbreaking performance for the end-user.

These materials with diamond-containing particles have been designed to be successfully applied to a tool without thermal or chemical degradation. Patented novel advances and precise manufacturing methods provide both an even distribution of diamonds within the coating and a chemical bond to the composite. During wear processes, the ultra-hard particles are consistently and continuously providing a bearing surface to the wearing media. Field applications have seen up to 1000 % improvement in abrasion resistance compared to conventional tungsten carbide-based hardface deposits.

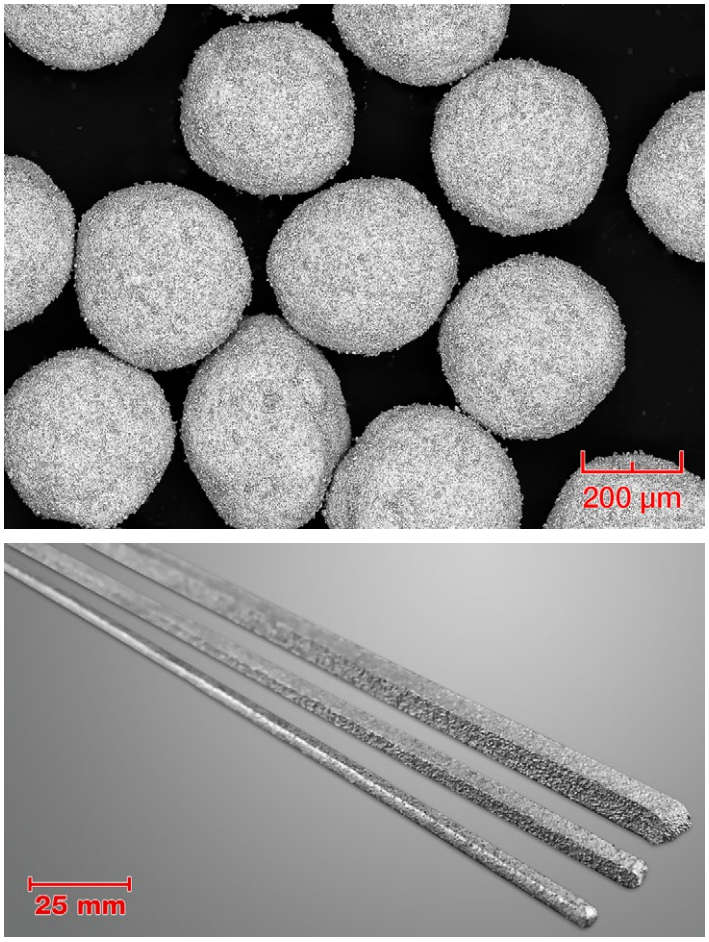
Materials can be applied readily and economically without the need for high capital expenditure equipment. Oxy-acetylene applications both in powder and composite rod form can be successfully achieved using manual applications.

1.1 Typical Uses and Applications:

Typically used and benefits:

- Steel-bodied Polycrystalline Diamond Compact (PDC) drill bits for hydrocarbon (oil / gas) exploration and extraction by enabling further and faster drilling intervals through the prevention of excessive wear. Also for use on the gage or outer diameter of bi-centered steel-bodied PDC bits.
- Reamer shells used for mineral exploration to support and maintain drilling gage and bore diameters, thereby eliminating the need to hand-set diamonds in a liquid-metal infiltration part.
- Rotating Steerable Systems (RSS) through hardfacing of the retractable pads, thereby preventing wear caused by direct contact with the bore wall for longer, more reliable service life.

Quick Facts		
Classification		Carbide-diamond-matrix blend
Chemistry		60(WC C) 40(NiCrBSi)
Manufacture	Powder: Rod:	Atomized and agglomerated Liquid metal infiltration
Morphology	Powder:	Spheroidal
Purpose		High abrasion resistance
Process	Powder:	OAW (oxy-acetylene welding). SF (Spray and Fuse Powder Welding)



Top: SEM photomicrographs of Metco 51151B, showing morphology that is typical for these products. Bottom: Metco 81586 welding rods.

2 Material Information

2.1 Chemical Composition, Product Form and Size

Product	Chemical Composition (wt. %)		Product Form	Nominal Particle Size Distribution or Rod Size
	Hardphase (WC and Diamond)	Matrix (NiCrBSi)		
Metco 51151B	55	45	Spherical Powder	–420 +50 µm
Metco 81586	48	52	Solid Rod	2.38 x 457 mm (3/32 x 18 in)
				3.18 x 457 mm (1/8 x 18 in)
				4.76 x 457 mm (3/16 x 18 in)

Powder particle size measured by sieve analysis

2.2 Other Properties

Product	Manufacturing Method	Color	Previously Sold As
Metco 51151B	Atomization and Agglomeration	Grey	DiaClad™ Xtreme Elite™
Metco 81586	Liquid Metal Infiltration	Silver	

2.3 Key Selection Criteria

- These products are optimally used in low to medium stress applications that exhibit rubbing or sliding, with predominately two-body contact and where durability and repair are key considerations.

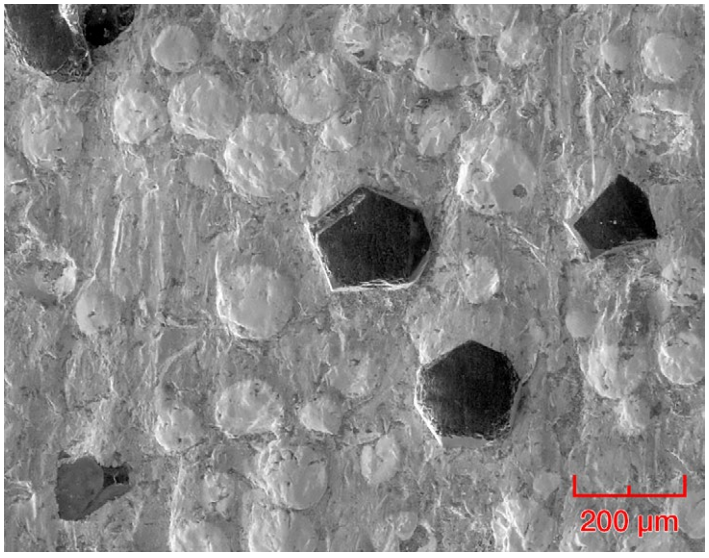
2.4 Related Products

- In circumstances where slurry erosion predominates use Metco 81022 rod or Metco 51019A powder (both formally sold as DiaClad Enduro Elite +™), using one of the spray-fuse torches that we offer.
- For value propositions where repair and durability are not a concern, consider Metco 81025 rod (formally sold as DiaClad Enduro Extend™).

3 Coating Information

3.1 Hardfacing Parameters

Please contact your Metco Joining & Cladding Account Representative for parameter availability. For specific coating application requirements, the services of our Coating Solution Centers are available.



Worn surface of a Metco 81586 weld hardface.

4 Commercial Information

4.1 Ordering Information and Availability

Product	Order No.	Rod Size	Package Size	Availability	Distribution
Metco 51151B	1306925	---	1 lb (approx. 0.45 kg)	Stock	Global
Metco 81586	1306921	2.38 x 457 mm (3/32 x 18 in)	25 lb (approx. 11.3 kg)	Stock	Global
	1306922	3.18 x 457 mm (1/8 x 18 in)	25 lb (approx. 11.3 kg)	Stock	Global
	1306923	4.76 x 457 mm (3/16 x 18 in)	25 lb (approx. 11.3 kg)	Stock	Global

4.2 Handling Recommendations

- Store in the original container in a dry location.
- Open containers of powder should be stored in a drying oven at temperatures below 38 °C (100 °F) to prevent moisture pickup.
- For powder products, tumble contents prior to use to prevent segregation.

4.3 Safety Recommendations

See the 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.
Metco 51151B	50-2374
Metco 81586	50-2410