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metco

Material Product Data Sheet
Chromium Carbide / [Tungsten Carbide] – Nickel Copper Powders

Products:
Metco 5580A

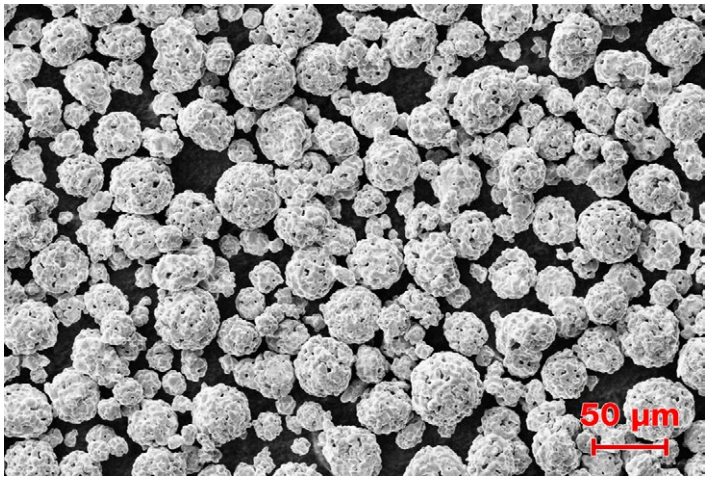
Quick Facts	
Classification	Carbide - Chromium-based
Chemical formula	Metco 5580A: 70(WC/Cr_3C_2) 21Ni 9Cu
Manufacture	Agglomerated and sintered
Morphology	Spheroidal
Purpose	Wear and corrosion protection
Flowability	Free-flowing powder
Service temperature	≤ 500 °C (930 °F)
Process	HVOF

1 Introduction

Metco 5580A is a spheroidal, agglomerated and sintered powder for thermal spraying containing 70 % chromium carbide or a combination of tungsten carbide and chromium carbide as the hard phase constituent and a 30 % nickel-copper alloy as the binder material.

Metco 5580A has been designed to produce coatings that combine excellent corrosion resistance in seawater and other high salinity environments while providing better wear resistance than hard chromium plating. The product is particularly suitable for applications where both wear and corrosion resistance are required. The nickel - copper matrix provides exceptional corrosion resistance and its higher content improves ductility and impact resistance. The carbide content is selected to provide wear resistance that is positioned in between that of tungsten carbide-cobalt based materials and hard chromium plating.

Thermal sprayed coatings of this material is sn excellent alternatives to hard chromium plating. The coating can be ground and superfinished to surface finishes that are similar to chromium plating. As Metco 5580A is cobalt-free, it can be used in nuclear applications. HVOF coating of Metco 5580A are dense and show good bond strength. Coatings made from Metco 5580A are not recommended for temperatures above 500 °C (930 °F)



SEM of Metco 5580A show typical morphology of these powders

1.1 Typical Use and Applications

These Oerlikon Metco materials are used for coating in wear applications in aqueous corrosive media at service temperatures below 500 °C (930 °F). Typical applications include:

- Mud motor rotors [a]
- Progressive cavity pumps
- Hydraulic rods
- Plungers
- Ball valves/ seats
- Gate valves
- Pump seals
- Alternative to hard chromium plating

[a] For mud motor rotor applications, sale of these materials are restricted in the United States and Canada by license agreement until the end of 2021.

2 Material Information

2.1 Chemical Composition

Product	Weight Percent			
	WC	Cr_3C_2	Ni	Cu
Metco 5580A	49	21	21	9

2.2 Particle Size Distribution and Other Properties

Product	Nominal Range	
	Micrometers (µm)	Manufacturing Method
Metco 5580A	–45 +15	Agglomerated and Sintered

Size analysis via laser diffraction (Microtrac).
Other particle size distributions may be available on request. Please contact your Oerlikon Metco Account Manager..

2.3 Key Selection Criteria

- Metco 5580A has been designed to provide corrosion and wear resistance in sea water and other aqueous solutions containing a high concentration of chlorides.
- Especially suitable for downhole drilling applications using drilling brines with a chlorides content up to 30 %.
- Metco 5580A should be used in applications requiring good wear resistance.
- The 30 % matrix content provides improved coating ductility and impact resistance compared to carbide based coatings with a lower matrix content.
- Unlike tungsten carbide – cobalt chromium, Metco 5580A can be locally repaired by respraying. The repair can be done by removing the damaged area by grit blasting, respraying and finishing the same way as the original coating.

2.4 Related Products

- Woka 3600 and Woka 3650 series products, which are spheroidal, agglomerated and sintered tungsten carbide in a cobalt-chromium matrix, can be used in similar applications where higher abrasion resistance or hardness is required.
- For applications where service temperatures are greater than 500 °C (930 °F), but less than 700 °C (1290 °F), choose a material that contains both chromium carbide and tungsten carbide with nickel-cobalt or nickel matrix, such as Woka 75xx or Woka 37xx series products, respectively.
- When service temperatures exceed 700 °C (1290 °F), choose a chromium carbide material with a nickel-chromium matrix such as Woka 71xx, Woka 72xx or Woka 73xx series products.

3 Key Thermal Spray Coating Information

3.1 Key Processing Information

		Metco 5580A
Recommended Spray Process		HVOF
Microhardness	HV0.3	≈ 850 ± 50
Wear Rate (ASTM G65A)	mm^3	≈ 11
Porosity	%	< 1
Bond Strength	MPa (psi)	> 82.7 (> 12000)

Note that some variation is to be expected depending on HVOF hardware and parameters used.

3.2 Coating Parameters

Please contact your Oerlikon Metco Account Representative for parameter availability. For specific coating application requirements, the services of Oerlikon Metco's Coating Solution Centers are available.

Parameters are available for:

- Oerlikon Metco WokaJet 410 series spray guns
- Praxair JP-5000

3.3 Recommended Spray Guns

For thermal spray application, the following spray guns are recommended:

Process	Spray Gun
HVOF-LF	WokaStar series WokaJet series Praxair / Tafa JP5000

4 Commercial Information

4.1 Ordering Information and Availability

Product	Order No.	Package Size	Availability	Distribution
Metco 5580A	1535244	5 kg (approx. 11 lb)	Special Order	Global

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4.2 Handling Recommendations

- Store powder in the original, closed container in a dry location.
- Open containers should be stored in a drying oven to prevent moisture pickup.
- Tumble contents prior to use to prevent segregation.

4.3 Safety Recommendations

See the SDS (Safety Data Sheet) for the product form and in the localized version applicable to the country where the material will be used. SDS are available from the Oerlikon web site at www.oerlikon.com/metco (Resources – Safety Data Sheets).

Product	SDS No.
Metco 5580A	50-2679

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