

Material Product Data Sheet

Chromium Carbide – 37% Tungsten Carbide – 18% Metal Alloy

Thermal Spray Powder Products:

Woka 7502, Woka 7503, Woka 7505

1 Introduction

Woka™ 7500 series products are spheroidal, agglomerated and sintered powders for thermal spray containing a uniform distribution of 43% chromium carbide and 37% tungsten carbide with medium sized carbide grains as hard phases. The binder metal is 18% metal alloy.

HVOF coatings of these materials are dense, show good bond strength and are more homogeneous than coatings applied using atmospheric plasma spray or combustion powder Thermospray™ coatings. Coatings of Woka 7500 series materials show good hardness, excellent abrasion and cavitation resistance. Their corrosion resistance in harsh environments with complex corrosive media is better than or equal to coatings with chemistries such as WC 10Co 4Cr or Cr₃C₂ 20(Ni 20Cr). These properties make Woka 7500 series products an ideal material for pumps and boiler protection, and as an alternative coating to hard chromium plating.

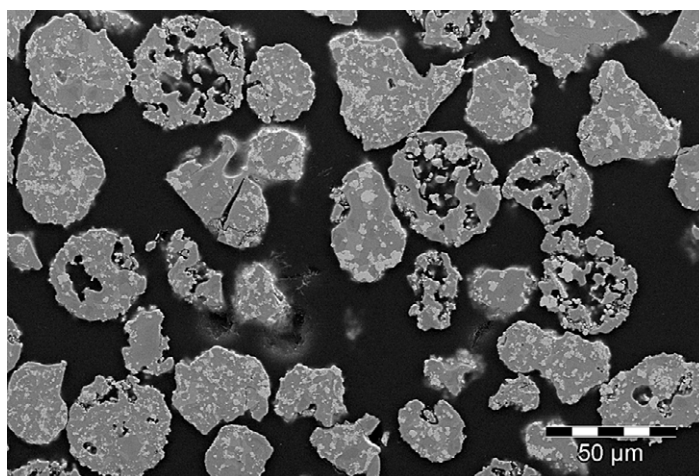
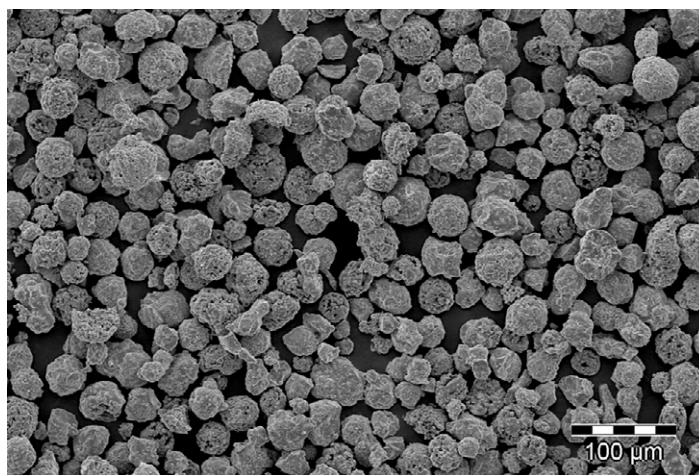
The coatings can be used at service temperatures up to 700 °C (1290 °F). The finer powder particle size distributions produce very tough and dense coatings that can often be used in the “as-sprayed” condition without post-coat finishing.

1.1 Typical Uses and Applications

- Pumps
- Boiler tubes
- Waste incinerator fire walls
- Household pump bearings
- Components for use in chemical processing plants
- Thermal spray alternative for hard chromium plating

Quick Facts

Classification	Carbide, chromium-tungsten-based
Chemistry	Cr ₃ C ₂ 37WC 18Metal Alloy
Manufacture	Agglomerated and sintered
Morphology	Spheroidal
Carbide Size	Medium
Apparent Density	3.1 – 3.8 g/cm ³
Service Temperature	< 700 °C (1290 °F)
Purpose	Wear and corrosion resistance
Process	HVOF



SEM Photomicrographs showing the morphology (top) and the microstructure (bottom) of Woka 7500-series powder

2 Material Information

2.1 Chemical Composition (all products)

Product	Weight Percent (nominal)					
	W	Cr	Ni	Co	C	Fe
Woka 7500 Series	Balance	38.5 – 43.5	10.0 – 13.0	2.9 – 4.1	7.7 – 8.5	< 0.5

2.2 Particle Size Distribution

	Nominal Range μm	D95 μm	D5 μm
Woka 7502	-45 +15	45	15
Woka 7503	-45 +11	45	11
Woka 7505	-38 +10	38	10

Size analysis below 20 μm using laser diffraction (Microtrac), Size analysis 20 μm and above using sieve. Other particle size distributions are available on request.

2.3 Key Selection Criteria

Main selection criteria for choosing a Woka 7500 series material are:

- Particle size distributions are optimized for a variety of HVOF guns on the market today. See Section 2.5 for recommendations.
- Desired as-sprayed surface roughness. For the smoothest possible surface, choose a product with the lowest particle size distribution appropriate for the spray process and spray gun to be used. In addition, finer carbides results in smoother as-sprayed coatings.
- For applications at service temperatures below 500 °C (930 °F) where a higher hardness, better wear resistance or resistance to acidic salt environments is required choose a tungsten carbide materials with a cobalt-chromium matrix such as Woka 365x series products or Woka 360x series products.
- For better corrosion resistance in alkaline (NaOH) solutions, choose a chromium carbide material with no tungsten carbide, such as Woka 71xx, Woka 72xx or Woka 73xx series products.
- Diamalloy 3007 is a clad material [Cr_3C_2 20(Ni 20Cr)]. Coatings of Diamalloy 3007 show outstanding properties in applications with erosion, cavitation, heavy abrasion or substantial friction wear at service temperatures between 540 °C – 870 °C (1000 °F – 1600 °F).
- Within Oerlikon Metco's portfolio are various chromium carbide blends such as Diamalloy 3004 and Metco 5255, as well as specialty products such as Amdry 5241.

2.4 Related Products

- For use in service temperatures higher than 700 °C (1290 °F) but below 870 °C (1600 °F), choose a chromium carbide material with no tungsten carbide. Product include Woka 71xx, Woka 72xx or Woka 73xx series products.

2.5 Recommended Spray Guns

	Diamond Jet	WokaJet / WokaStar / JP5000	K2	Jet Kote	Top Gun / HV2000	CJS
Woka 7502	●	●	●	●		
Woka 7503	●				●	
Woka 7505	●				●	

3 Coating Information

3.1 Key Thermal Spray Coating Information

Characteristic	Typical Data ^a	
Recommended Process	HVOF	
Microhardness	HV0.3	1050 – 1250
Macrohardness	HR15N	> 92
Wear Rate	ASTM G65 B	< 4.0 mm ³ < 0.00061 in ³
Porosity	< 1 %	
Corrosion Resistance	Excellent in 1 M NaOH and 1 M NaCl, very good in 0.5 M H ₂ SO ₄	
Maximum Service Temperature	700 °C	1290 °F
Deposition Efficiency	45 – 55 %	

^a Depending on the HVOF spray gun used, parameter used and coating thickness applied.

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.

Recommended HVOF Spray Guns

DiamondJet series

WokaJet series

WokaStar series

4 Commercial Information

4.1 Ordering Information and Availability

	Order No.	Package Size	Availability	Distribution
Woka 7502	1041173	5 kg (approx. 11 lb)	Stock	Global
Woka 7503	1059865	5 kg (approx. 11 lb)	Special Order	Global
Woka 7505	1041153	5 kg (approx. 11 lb)	Special Order	Global

4.2 Handling Recommendations

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

4.3 Safety Recommendations

See SDS 50-888 (Safety Data Sheet) in the version localized for 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).

Information is subject to change without prior notice.