

# Material Product Data Sheet

## Chromium Carbide – Nickel Chromium Alloy Powder Blend

### Thermal Spray Powder Products: Metco 5241

#### 1 Introduction

Metco™ 5241 is a gas-atomized chromium carbide – nickel chromium alloy blended powder developed specifically for application using high velocity oxy fuel (HVOF) spray equipment. The coatings produced are greater than 98 % dense and have shown excellent room temperature and high temperature erosion and wear resistance.

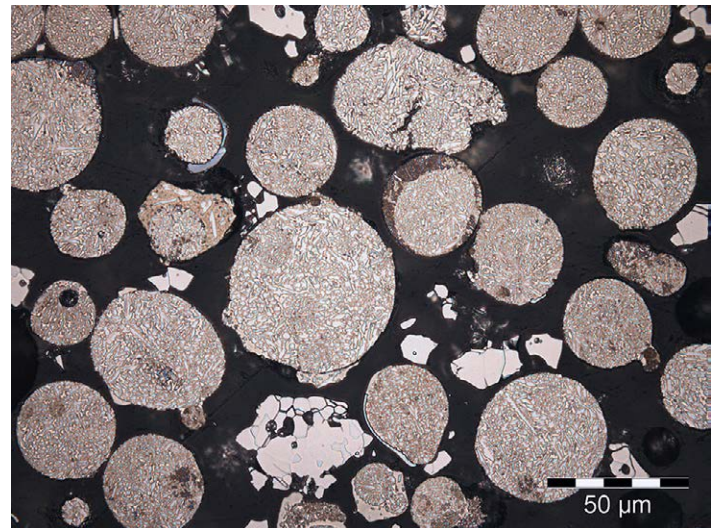
Most notable is the high deposition efficiency and excellent surface finish that can be obtained using this material. Metco 5241 exhibits low carbon loss and low oxygen pickup during the spray process. This indicates low oxide formation and minimum decarburization of the chromium carbide, which can produce a coating with a fine surface finish, along with superb coating corrosion and oxidation resistance. The carbide size of Metco 5241 is engineered for optimum coating performance.

#### 1.1 Typical Uses and Applications

- HVOF-applied alternative to hard chromium plating
- Steam turbine blades
- Cold and hot working forging tools
- Turbine exhaust valve seats
- Turbine air seal rings
- Turbine exhaust valve seats
- Boiler tubes
- Hydraulic rods
- Textile rolls
- Heavy duty piston rings

#### Quick Facts

Classification	Carbide, chromium-based
Chemistry	Cr 34Ni 7.5C
Manufacture	Special blend
Morphology	Spheroidal / irregular
Purpose	High temperature wear resistance
Service Temperature	≤ 870 °C (1600 °F)
Process	HVOF



Cross-sectional morphology of Metco 5241

## 2 Material Information

### 2.1 Chemical Composition

Product	Chemical Composition (wt. %)		
	Cr	Ni	C
Metco 5241	Balance	34	7.5

### 2.2 Particle Size Distribution

Product	Nominal Size Distribution (µm)	D90	D50	D10
Metco 5241	-45 +15	40 – 55	20 – 30	5 – 15

Nominal particle size distribution determined by laser diffraction (Microtrac).

### 2.3 Key Selection Criteria

Choose Metco 5241 when the following coating properties are desired:

- High deposit efficiency
  - Greater percentage of fine carbides in the coating resulting in an improved finish after grinding
  - Low levels of decarburization
  - Low coating stress for high thickness limits
  - Higher performance compared to less expensive materials
  - Excellent low and high angle erosion resistance
  - Excellent high temperature solid particle erosion resistance
- Blends (see Datasheet DSMTS-0042)
  - Agglomerated and sintered Cr<sub>3</sub>C<sub>2</sub> 20(Ni 20Cr) (see Datasheet DSMTS-0027)
  - Agglomerated and sintered Cr<sub>3</sub>C<sub>2</sub> 25(Ni 20Cr) (see Datasheet DSMTS-0031)
  - Agglomerated and densified Cr<sub>3</sub>C<sub>2</sub> 25(Ni 20Cr) (see Datasheet DSMTS-0058)
  - For even higher abrasion and erosion resistance or higher coating hardness than obtainable with Metco 5241 and for applications at service temperatures lower than 500 °C (930 °F) choose an agglomerated and sintered tungsten carbide – cobalt material such as:
    - WC 12Co materials (see Datasheet DSMTS-0044)
    - WC 17Co materials (see Datasheet DSMTS-0030)
  - For better corrosion resistance in sulfuric acid (H<sub>2</sub>SO<sub>4</sub>) or saline environments (NaCl) at service temperatures up to 700 °C (1290 °F), choose a material that contains both chromium carbide and tungsten carbide, such as WOKA 75XX series (see Datasheet DSMTS-0056) or WOKA 37XX series (see Datasheet DSMTS-0059).
  - For better resistance to acidic salt environments choose a tungsten carbide material with a cobalt-chromium matrix such as Woka 365X series products (see Datasheet DSMTS-0025) or WOKA 36XX series (see Datasheet DSMTS-0051).

### 2.4 Related Products

- For high resistance to erosion, cavitation, heavy abrasion or substantial frictional wear at service temperatures between 540 °C to 870 °C (1000 °F to 1600 °F), consider Diamalloy 3007 (see Datasheet DSMTS-0022).
- For higher abrasion and erosion resistance than achievable with Metco 5241 or applications where a coarser chromium carbide primary grain size is desired, choose a chromium carbide – nickel chromium material. These include:

## 3 Coating Information

### 3.1 Key Thermal Spray Coating Information

Specification	Typical Data (depending on spray process and gun chosen)
Recommended Spray Process	HVOF
Finishing Recommendations	Use as-sprayed or wet grind (silicon carbide or diamond wheel)
Maximum Service Temperature	870 °C 1600 °F

### 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
Metco 5241	1001603	10 lb (approx. 4.5 kg)	Special Order	Global

### 4.2 Handling Recommendations

- Store in the original container in a dry location.
- Tumble contents gently 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 50-707 (Safety Data Sheet) 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](http://www.oerlikon.com/metco) (Resources – Safety Data Sheets).

Metco 5241 is protected under U.S. patents 6,254,704B2 and 6,071,324.

Information is subject to change without prior notice.