oerlikon
metco

Product Data Sheet
Chromium-Free, Iron-Based Alloy

Wire Products: Metco 8201

Patent pending

1 Introduction

Metco™ 8201 produces chromium-free, hard, wear-resistant coatings that are very environmentally friendly to use. In fact, it produces some of the hardest electric arc wire spray coatings available on the market today.

Metco 8201 is a unique product in that it produces wear-resistant electric arc wire spray coatings that do not heavily rely on chromium.

Metco 8201 is an excellent replacement for many electric arc wire spray materials because:

- Wear and corrosion performance are not compromised compared to chromium-bearing alloys
- Coating integrity and spray quality is improved as a result of the reduction of dust generated during spray processing over a wide application window
- Helps applicators reduce chromium emissions into the environment to meet evermore stringent government regulations.

The benefit of environmental friendliness does not come at the cost of performance.

Metco 8201 is designed and tested to apply coatings over a wide spray processing window. This means that the coating quality and performance are maintained over the range of conditions in which the product may be sprayed.

Metco 8201 maintains its bond strength over the range of spray angles (45° to 90°) that might be experienced in the field.

1.1 Typical Applications

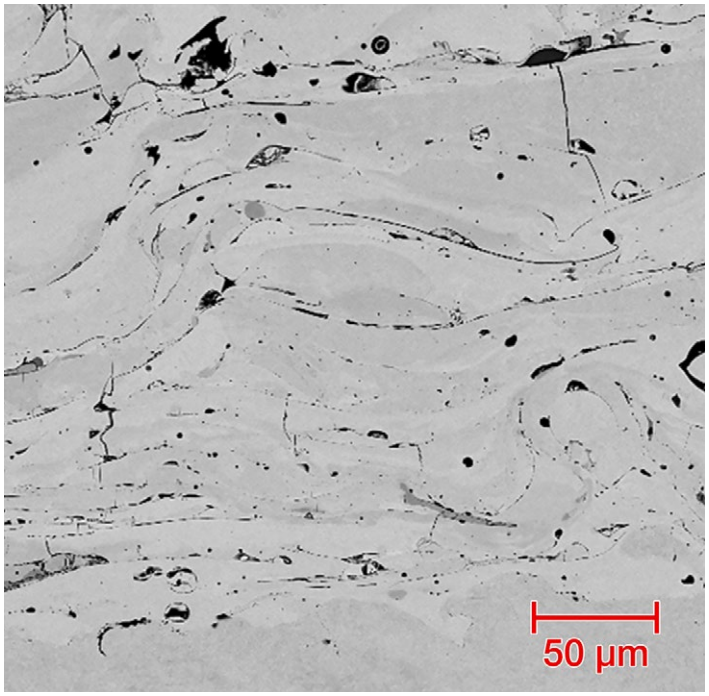
Metco 8201 is suitable for use in any application where hardfacing products are employed, including nanocrystalline and amorphous coatings.

Specific applications include:

- Harvester blades and disks
- Disk harrows
- Agricultural shear bars
- Ground engaging tools for agricultural applications
- Hard chromium plating alternative for wear applications

Quick Facts

Classification	Alloy, Iron-Based
Chemistry	Proprietary
Manufacture	Composite wire
Abrasion Resistance	0.24 g loss (ASTM G65B)
Bond Strength	55 tp 69 MPa (8000 to 10000 psi)
Deposit Efficiency	> 70 %
Maximum Coating Thickness	≤ 1.5 to 2.5 mm (0.06 to 0.10 in)
Microhardness	1000 to 1200 HV300
Macrohardness	> 71 HRC (converted)
Purpose	Abrasion and sliding wear resistance, salvage and restoration
Process	Electric Arc Wire



Typical as-sprayed coating microstructure of Metco 8201.

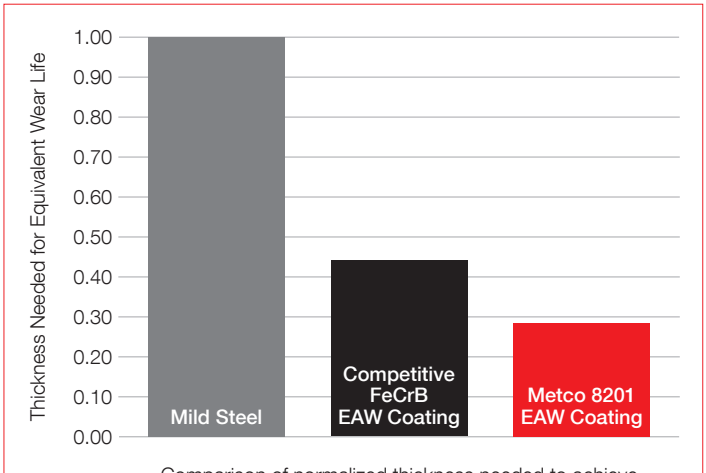
2 Material Information

2.1 Physical Properties and Characteristics

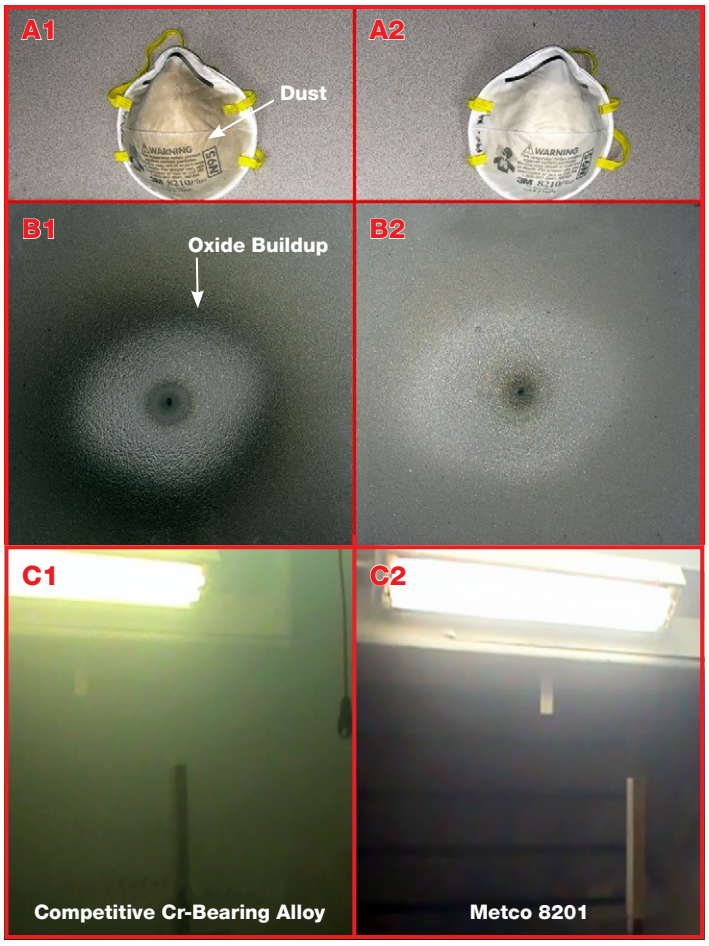
Product	Nominal Chemistry	Product Form	Size	Recommended Process	Previously Sold As
Metco 8201	Proprietary	Composite Wire	1.6 mm (0.063 in)	Electric Arc Wire	Vecalloy Cr-Free 1200

2.2 Key Selection Criteria

- Choose Metco 8201 when an electric arc wire coating having high hardness with very good abrasion and/or sliding resistance with a high bond strength is needed.
- Metco 8201 offers an environmentally-friendly option for electric arc wire coatings in that it is a chromium-free material that produces coatings that rival the performance of iron-based, chromium bearing materials.
- Use Metco 8201 to apply very thick coatings that are not susceptible to cracking.
- Metco 8201 can be applied with significantly less dust than competitive electric arc wire materials, which has multiple benefits including:
  - A safer environment for operators
  - Cleaner, more consistent coating results with enhanced microhardness and abrasion resistance
  - Improved surface finish when machined
- Metco 8201 can be applied using manual spray with excellent results, as it will consistently produce a high quality coating result over a range of spray angles and spray distances.



Comparison of normalized thickness needed to achieve the same service life based on ASTM G65 Testing



Note the less dusty spray environment with Metco 8201.

A1: Breathing mask with competitive spray material. **A2:** Virtually dust free breathing mask with Metco 8201.

B1: Spray area of competitive material exhibits oxide build up adjacent to a spray area. **B2:** Metco 8201 shows no oxide build up indicating a cleaner, more consistent coating result.

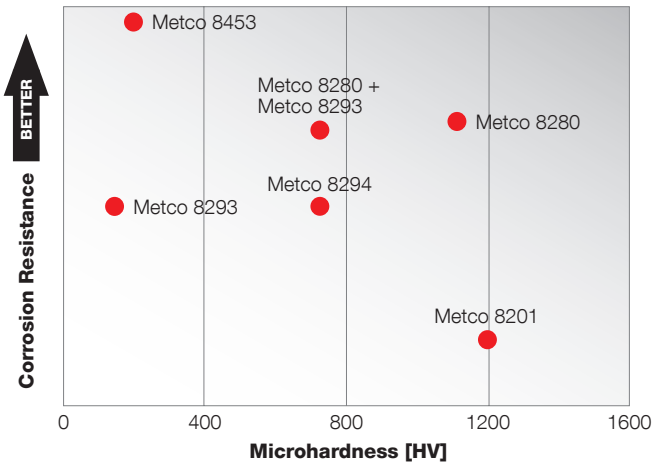
C1: Dusty spray booth environment applying a competitive material. **C2:** Significantly less dusty environment applying Metco 8201 in the same spray booth.

Test Property	Metco 8201	Competitive Chromium-Bearing Alloy
Abrasion (ASTM G65B - dry sand)	0.24 g lost	0.37 g lost
Sliding Wear (ASTM G77 - metal-to-metal)	0.1 mm^3	0.1 mm^3
Bond Strength	55 to 69 MPa (8000 to 10000 psi)	55 MPa (8000 psi)
Microhardness	1000 to 1200 HV300	900 HV300
Macrohardness	71 HRC	71 HRC
Surface Roughness (machined)	1.7 µm (67 µin) Ra	3.6 µm (142 µin) Ra

Comparison of coatings applied using Metco 8201 versus a competitive chromium-bearing alloy. Note the microhardness and abrasion resistance of Metco 8201 coatings are enhanced compared to the competitive material. Metco 8201 coatings also machine to a better surface finish.

2.3 Related Products

- Choose Metco 8280 when better corrosion resistance is needed. Metco 8280 is not chromium free and does not offer the hardness of Metco 8201, although both materials offer similar abrasion resistance per ASTM G65B testing.
- Oerlikon Metco produces a wide range of wear-resistant materials in wire and powder form that can be used for different coating processes and service conditions. In addition, Oerlikon Metco offers a complete portfolio of stainless steel powders and wires. Please contact your Oerlikon Metco Account Manager for more information.



Corrosion and hardness comparison for electric arc wire coating materials

3 Key Coating Information

3.1 Using Metco 8201

Metco 8201 is currently available in 1/16 in (1.6 mm) cored wire. It can be used with most electric arc spray systems that can use that wire diameter and type. Partial starting point parameters are provided here.

Coating thickness per pass	0.05 to 0.08 mm (0.002 to 0.003 in)
Spray rate per 100 amps	76 g/min (10 lb/h)
Coverage	0.96 kg/m^2/0.1 mm (0.05 lb/ft^2/0.001 in)
Microhardness (average)	≈ 1100 HV300
Bond strength	55 to 69 MPa (8000 to 10000 psi)
Mass loss (ASTM G65B)	0.24 g

3.2 Coating Parameter Availability

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.

4 Commercial Information

4.1 Ordering Information and Availability

Product	Order No.	Form	Size	Package Size	Availability	Distribution
Metco 8201	1501849	Wire	1.6 mm (0.063 in)	12.5 kg (27.5 lb) plastic spool	Stock	Global

4.2 Handling Recommendations

- Store in the original container in a dry location.

4.3 Safety Recommendations

See SDS 50-2271 (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 (Resources – Safety Data Sheets).

The Oerlikon Metco Difference:

Metco 8201 was developed using our patented and proprietary **Scoperta™** high throughput computational metallurgical process to evaluate millions of candidate alloy compositions. Potential candidates are then experimentally evaluated using an advanced screening process where both properties and alloy microstructure are measured.

The combined **Scoperta** computational and experimental approach allows Oerlikon Metco to rapidly design the final material with a much better accuracy than conventional empirically-based methodologies.

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