

Product Data Sheet

Iron-Chromium Amorphous Alloy (Vecalloy B)

Wire Products: Metco 8280

US patent protected with additional patents pending
Previously sold as Vecalloy B

Product Overview

Metco™ 8280 coatings are specifically designed to perform in aggressive environments possessing abrasive and erosive wear at ambient and elevated temperatures. Metco 8280 is the cleanest, most applicator-friendly electric arc wire spray material available that consistently produces high performance, high quality coatings.

Metco 8280 was computationally designed to create coatings that form a combination of extremely hard amorphous particles and crystalline glue particles. Metco 8280 can be used to combat metal-to-metal wear, low stress abrasion and high stress abrasion.

Typical Applications

Metco 8280 is excellent for machine element applications as it does not require a bond coat. Metco 8280 coatings exhibit low oxide content and a highly amorphous microstructure that result in excellent advantages for coating applicators are easy to apply, produce minimal dust and have a large processing window that helps to eliminate rework.

Oil and gas applications:

- Mud motors
- Stabilizers
- Centralizers
- Stop collars
- Fractionating pump sleeves
- Fractionating pump impellers
- Fractionating blender pumps

Machine element applications:

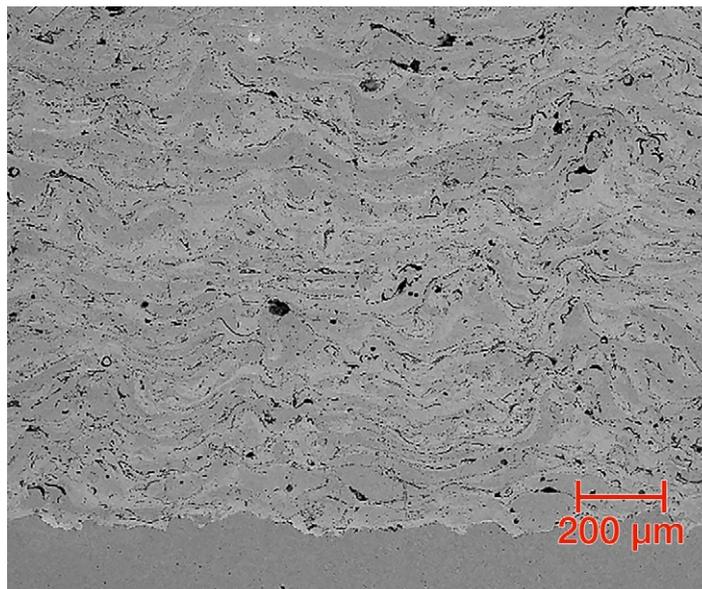
- Shaft journals
- Paper rolls
- Gear boxes
- Drive rollers
- Impellers

Steel Processing:

- Cold rolling mill
- Hot rolling mill
- Galvanizing lines
- Continuous pickling lines

Performance Data

| | |
|---------------------------|----------------------|
| Abrasion (ASTM G65B) | 0.2 g loss |
| Bond Strength | ≥ 69 MPa (10000 psi) |
| Deposit Efficiency | > 70% |
| Maximum Coating Thickness | Unlimited |
| Vickers Hardness | > 1000 HV300 |
| Rockwell Hardness | > 66 HRC (converted) |



Typical as-sprayed coating microstructure of Metco 8280.

Power Generation:

- Augers
- Bag houses
- Ducts
- Chutes and troughs
- Fan inner diameter
- Coal pipeworks

Construction:

- Cement chutes
- Cement pipeworks
- Bag houses

Why Metco 8280 is Different Than Other Amorphous Materials

The cleanliness of Metco 8280 coatings can be seen with the naked eye. Coatings are lighter and more metallic than other 'amorphous' coatings which are generally darker as a result of higher levels of oxidation. The cleanliness of Metco 8280 coatings produces very high bond strengths; therefore, no bond coat if needed.

In fact, Metco 8280 produce coatings with the highest bond strength of any amorphous, electric arc wire material available. It produces a very clean spray with less dust than com-

parable products, which is critical to coating quality in confined spaces.

Metco 8280 can be sprayed to an unlimited thickness; 25 mm (1 in) thick coatings have successfully been sprayed by hand. The advanced material properties of Metco 8280 lead to several additional coating benefits, including lower oxide content, minimized crack susceptibility, larger splat size and more homogeneous splat size distribution.

Metco 8280 Outperforms Other Electric Arc Wire Spray Coatings

Coatings of Metco 8280 have the highest abrasion resistance among electric arc wire spray coatings. The high abrasion resistance is the result of:

- amorphous structure that provides high coating hardness
- spray cleanliness that provides high bond strength

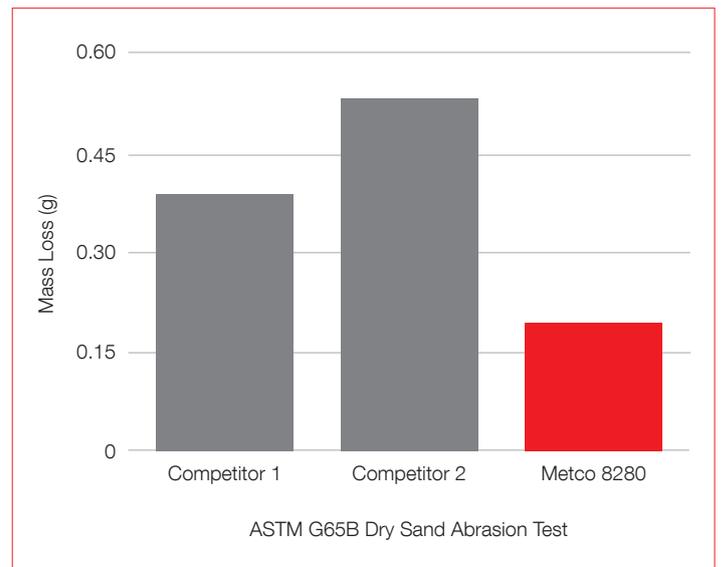
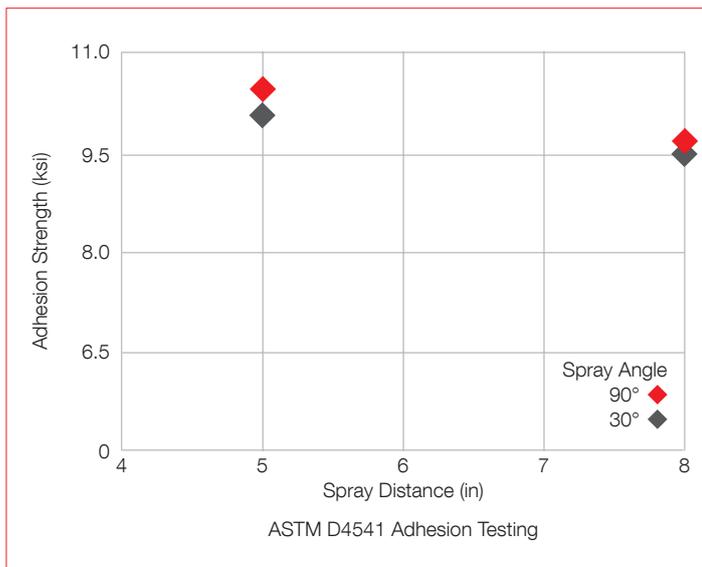
Coatings of Metco 8280 retain their high bond strength even when sprayed at non-ideal spray angles and spray distances. The consistent quality of Metco 8280 coatings makes it a very applicator-friendly product.

Only when a coating has a high bond strength and inner adhesive strength can the hardness of the spray particles be utilized fully. When a coating has a high particle hardness but

poor adhesion, the wear mechanism results in particle pull-out. When a coating exhibits good inter-particle adhesion, the wear mechanism transitions to grinding of the particles. It is much more difficult to grind high hardness, amorphous particles than it is to pull them from a coating with poor inter-particle adhesion. The excellent inter-particle adhesion of Metco 8280 coatings is evident in ASTM dry sand abrasion testing.

The unique combination of high hardness and high inter-particle adhesive strength allows Metco 8280 to be sprayed:

- with a 69 MPa (10 000 psi bond strength)
- without a bond coat
- to unlimited thickness
- with greatly reduced dust contamination



How Metco 8280 Outperforms Other Electric Arc Wire Spray Coatings

Metco 8280 forms a much more metallic coating than other electric arc wire spray coating materials. Coatings of conventional materials quickly react with air to form oxides during spray processing that can drastically reduce performance.

The in-flight oxidation resistance of Metco 8280 enables a clean, high-performance coating to be deposited consistently.

This difference is clear to the naked eye as the color of a Metco 8280 coating is light gray — the color of metal. In contrast, the color of conventional electric arc wire spray coatings are much darker and blacker, which is indicative of oxides in the coating.



A thick coating of Metco 8280 hand-sprayed at a distance of 200 mm (8 in). Notice the light gray, metallic appearance of the coating.

Using Metco 8280

Metco 8280 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) | > 900 HV300 |
| Expected adhesion | > 69 MPa (10000 psi) |

Using Metco 8280 in Co-Spray Applications

To produce a coating that can be machined to a superior surface finish, Metco 8280 can be co-sprayed in combination with Metco 8293 (e.g., on an electric arc wire system, use one wire of Metco 8280 and one wire of Metco 8293).

The coating produced will be an advanced, composite structure with semi-amorphous characteristics. It combines the superfinishing capabilities of a hard, tungsten carbide HVOF-

applied coating with the high throughput and coating processing ease of electric arc wire spray.

The resulting coating will also perform well in abrasive and erosive environments over a relatively wide range of operating temperatures. However, please note that some of the performance characteristics of standard Metco 8280 coatings will be lost.

Ordering Information

To order, please contact your Oerlikon Metco sales representative or sales office.

| Product | Order No. | Form | Size | Package Size | Availability |
|------------|-----------|------|------------------|---------------------|--------------|
| Metco 8280 | 1300505 | Wire | 1/16 in (1.6 mm) | 25 lb (11 kg) spool | Global |

Advanced Technology Solutions and Services

Perfect solutions through optimum materials and innovative technologies

Oerlikon Metco is a global leader in surface engineering solutions and services offering:

- A broad range of thermal spray, laser cladding and other advanced surface technology equipment
- Integrated systems and materials
- Specialized coating and surface enhancement services
- Manufactured components for the turbine, automotive and other industries
- Customer support services

Oerlikon Metco provides a comprehensive manufacturing, distribution and service network, catering to aviation, power generation, automotive and other strategic growth industries.

To take control of your surface engineering challenges, contact your Oerlikon Metco sales office, visit our web site at www.oerlikon.com/metco or e-mail us at info.metco@oerlikon.com.

The Oerlikon Metco Difference:

Metco 8280 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.