

Product Data Sheet

Thickness Readable, Hard, Thermally Stable Austenitic Steel Alloy

Wire Products: Metco 8294

Patent pending

1 Introduction

When applied as a coating using electric arc wire spray, Metco™ 8294 is the only iron-based material that is readable in the as-sprayed condition and after exposure to high temperatures. 'Readability' indicates that the thickness of the coating can be read accurately using a standard electromagnetic thickness gauge.

In addition to the inherent 'readability', Metco 8294 coatings form a hard wear-resistant layer. The high wear resistance coupled with the coating remaining 'readable' after exposure to high temperatures make Metco 8294 a perfect candidate for power generation applications such as the coating of boiler tubes.

Metco 8294 enables thermal spray applicators to avoid a difficult choice—use a non-readable coating and live with the uncertainty of the product they deliver to the customer, or, struggle with low productivity and deposition rates of readable coatings produced via HVOF or atmospheric plasma spray processes.

Metco 8294 combines the cost-effectiveness of iron-based alloys, the high productivity process benefit of electric arc wire spray, and the application consistency provided by readability. Electric arc wire spray is a very cost effective and fast method to deliver a consistent coating over a large area. Minimizing customer downtime is important, and Metco 8294 is an important step in providing measurable, high-quality coatings quickly and consistently.

1.1 Typical Applications

Metco 8294 is suggested for use in coating applications where high temperature erosion and corrosion resistance is required.

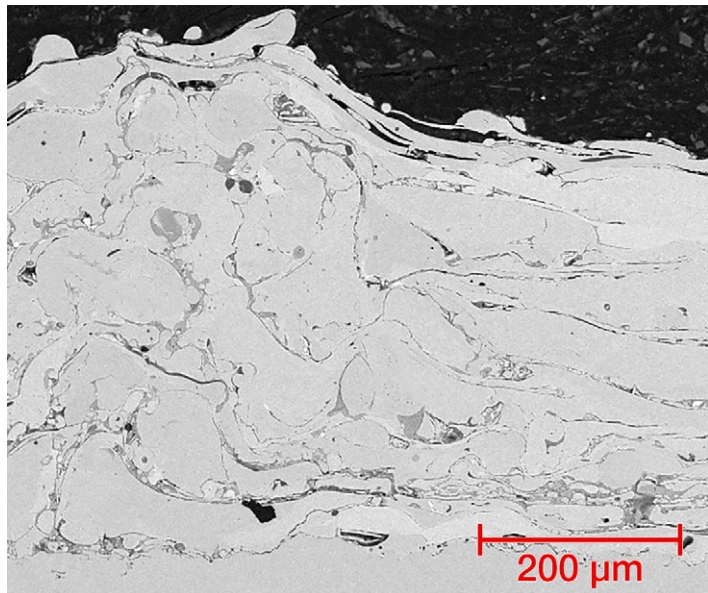
Specific applications include:

- Power generation boiler tubes
- Waste-to-Energy boiler tubes

Quick Facts

Classification	Alloy, Iron-Based
Chemistry	Proprietary
Manufacture	Composite wire
Hot Erosion Resistance ^a	80 mg loss (ASTM G76 @ 600 °C)
Bond Strength	≥ 62 MPa (9000 psi)
Deposit Efficiency	> 70 %
Microhardness	≈ 500 HV300
Macrohardness	≈ 50 HRC (converted)
Service Temperature	≤ 600 °C (1100 °F)
Thickness Readability	✓ As-Sprayed ✓ After 500 °C (930 °F) exposure ✓ After 800 °C (1475 °F) exposure
Purpose	Hot erosion and corrosion resistance
Process	Electric Arc Wire

^a up to 2 times better than equivalent non-readable coatings



Typical as-sprayed coating microstructure of Metco 8294.

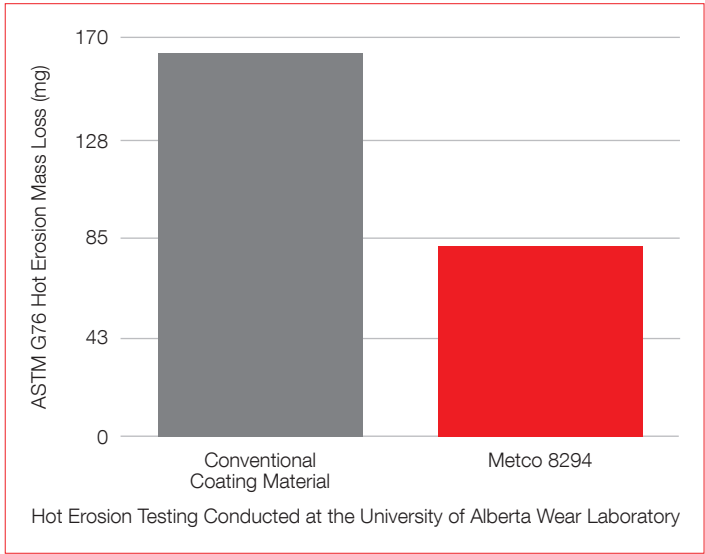
2 Material Information

2.1 Physical Properties and Characteristics

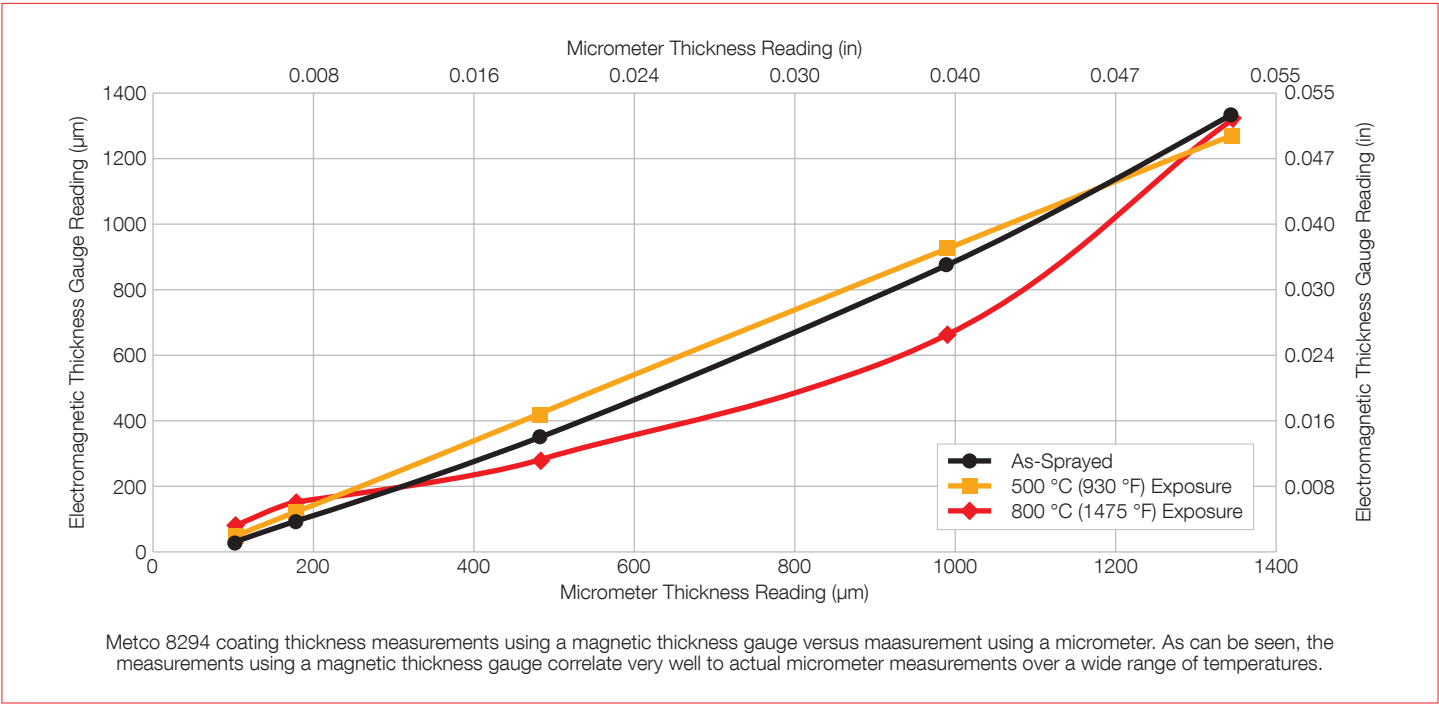
Product	Nominal Chemistry	Product Form	Size	Recommended Process	Previously Sold As
Metco 8294	Proprietary	Composite Wire	1/16 in (1.6 mm)	Electric Arc Wire	Vecalloy Readable

2.2 Key Selection Criteria

- Metco 8294 Versus Conventional Boiler Coating Materials:** Conventional electric arc wire spray coatings used for boiler applications are not thickness readable. In addition, Metco 8294 has better coating adhesion and high temperature erosion resistance while comparing favorably in corrosion resistance. Also note that the as-sprayed hardness of conventional alloys is not maintained after prolonged exposure to the high temperature of the boiler.
- Readability Effectiveness:** When using Metco 8294, calibrate the thickness gauge once and read:
 - As-sprayed coatings
 - Coatings exposed up to 800 °C (1475 °F)
 - Coatings of varied thickness from 0 to 1500 µm (0 to 0.060 in), which is the typical range of an electromagnetic thickness gauge
- Importance of Readability:** A thickness readable coating ensures that sufficient coating has been applied and there are no deficient areas. In addition, the thickness can be read during service intervals thereby determining the best time to recoat the boiler. High wear areas are

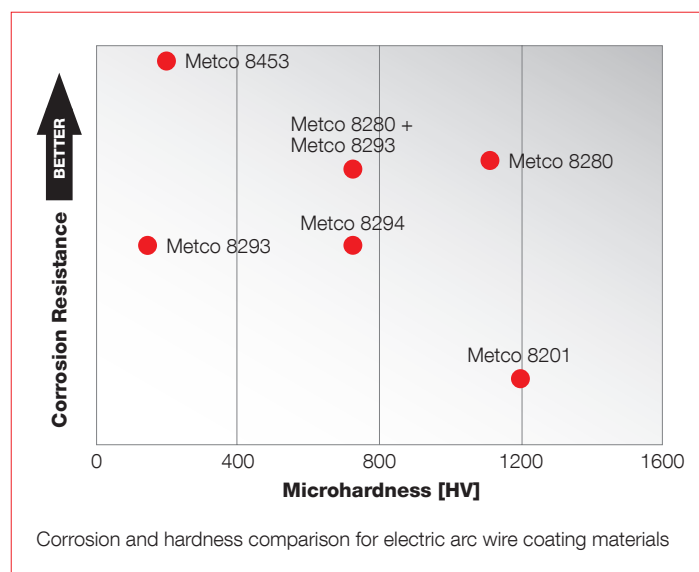


identified easily and repaired while low wear areas can be left for later service. As such, the applicator can better control material usage, reduce application time and improve quality control, saving time and money while enhancing performance and maintenance.



2.3 Related Products

- For boiler applications, Oerlikon Metco offers a range of iron-based materials for electric arc wire spray that are designed for different service conditions and surface mechanisms, such as:
 - Metco 8295 produces hard, dense, highly erosion-resistant coatings that have a 30 % – 60 % amorphous structure that improves corrosion resistance, particularly in chloride-ion environments.
 - Metco 8236 is recommended in applications where high temperature oxidation or nitration is a concern.
- Nickel-based materials choices for boiler applications include:
 - Metco 8452 produces high-strength coatings that are recommended for application on waterwalls and superheaters to provide corrosion protection in oxidizing and reducing environments.
 - Metco 8622 has good resistance to corrosion, erosion and thermal cycling, with excellent resistance to sulfur ion corrosion attack and in low-oxygen environments. It is also recommended as a coating material on digesters.
 - Metco 8625 is an economical material choice that offers good resistance to corrosion, ion and thermal cycling. It is appropriate for sulfur-free environments.



3 Key Coating Information

3.1 Using Metco 8294

Metco 8294 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)	500 HV300
Expected adhesion	≥ 62 MPa (9000 psi)

3.2 Coating Development

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

4 Commercial Information

4.1 Ordering Information and Availability

Product	Order No.	Form	Size	Package Size	Availability	Distribution
Metco 8294	1300506	Wire	1/16 in (1.6 mm)	25 lb (11 kg) plastic spool	Stock	Global

4.2 Handling Recommendations

- Store in the original container in a dry location.

4.3 Safety Recommendations

See SDS 50-2206 (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 8294 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.

Information is subject to change without prior notice.