oerlikon
metco

Material Product Data Sheet
Nickel Chromium Thermal Spray Wires

Thermal Spray Wire Products:

Solid Wires (alloyed): Metco™ 470 AW, Metco 8276, Metco 8450, Metco 8500, Metco 8622, Metco 8625, Metco 8718, Metcoloy™ 33

Cored Wires (powder-filled): Metco 8443, Metco 8452

Quick Facts	
Classification	Wire, Ni-based alloy or composite
Chemical formula	NiCr (various)
Manufacture	Drawn or powder-filled wire
Purpose	Bond coat, machine element restoration, oxidation-resistance
Process	Electric Arc Wire Spray or Combustion Wire Thermospray™

1 Introduction

Oerlikon Metco's portfolio of nickel chromium pre-alloyed and powder-filled (cored) wires consists of products that are appropriate for general use coatings and additional products for very specific coating applications.

The nickel alloy coatings produced have a high degree of structural integrity, are dense and can tolerate elevated temperatures and oxidizing atmospheres. The addition of chromium, in some cases substantial amounts, enhances their high-temperature corrosion resistance.

In most cases, material selection is dependent on the specific coating environment; however, all of these materials can be use as bond coatings and for machine element restoration.

1.1 Typical Uses and Applications

- Bond Coatings under ceramic top coatings
- Salvage and build-up of machinable carbon steel and corrosion-resistant steels
- Particle erosion resistance at high temperatures
- Select compositions such as Metco 470AW, Metco 8276, Metco 8443, Metco 8718 and Metco 8625 are appropriate for oxidation and hot gas corrosion at elevated temperatures
- Metco 8276, Metco 8625 and Metco 8718 are superalloy compositions that can be used as salvage and restoration materials for nickel-based superalloy components
- Metco 8500 is appropriate for highly oxidation-resistant coatings for boiler applications
- Metco 8622 and Metco 8452 are appropriate for corrosion resistance in oxidizing and reducing environments, such as for use in boilers
- Metco 8622 is recommended for use on digesters

2 Material Information

2.1 Chemical Composition

Product	Nominal Composition	Weight Percent (typical)											
		Ni	Al	Cr	Fe	Mn	Mo	Nb+ Ta	Si	Ti	W	C	Other (max)
Metco 470 AW	Ni 25Fe 15Cr	Bal.	---	15	25	---	---	---	---	---	---	---	NR
Metco 8276	Ni 15Cr 16Mo 6Fe 4W 0.5Mn	Bal.	---	15	6	0.5	16	---	---	---	4	---	0.2
Metco 8450	Ni 20Cr	Bal.	---	20	---	---	---	---	---	---	---	---	NR
Metco 8500	Ni 43Cr 0.6Ti	Bal.	---	43	---	---	---	---	---	0.6	---	---	NR
Metco 8622	Ni 21Cr 14Mo 3W 2.5Fe	Bal.	---	21	2.5	---	14	---	---	---	3	---	0.1
Metco 8625	Ni 21Cr 9Mo 4(Nb+Ta)	Bal.	---	21	---	---	9	4	---	---	---	---	NR
Metco 8718	Ni 20Fe 19Cr 3Mo 5(Nb+Ta) 1Ti	52	0.5 [a]	19	Bal	0.35 [a]	3	5	0.35 [a]	1	---	0.08 [a]	1.5
Metcoloy 33	Ni 22Fe 16Cr	Bal.	---	16	22	---	---	---	1.0	---	---	---	1.0
Metco 8443	Ni 18Cr 6Al 2Mn	Bal.	6	18	---	2.0	---	---	---	---	---	---	NR
Metco 8452	Ni 50Cr	Bal.	---	50	---	---	---	---	---	---	---	---	NR

[a] maximum value

2.2 Morphology and Available Wire Sizes

Product	Morphology	Similar To	Recommended Spray Process	Available Wire Diameters	
				1.6 mm (14 ga / 0.063 in)	3.2 mm (1/8 in)
Metco 470 AW	●	---	⚡	✓	
Metco 8276	●	Hastelloy C-276	⚡	✓	
Metco 8450	●	---	⚡	✓	
Metco 8500	●	---	⚡	✓	
Metco 8622	●	Inconel 622	⚡	✓	
Metco 8625	●	Inconel 625	⚡	✓	
Metco 8718	●	Inconel 718	⚡	✓	
Metcoloy 33	●	---	🔥		✓
Metco 8443	○	---	⚡	✓	
Metco 8452	○	---	⚡	✓	

● Solid wire ○ Cored wire ⚡ Electric Arc Wire Spray

2.3 Key Selection Criteria

- Choose the wire product that meets customer specifications, when required.
- Metco 470 AW is used as a bond coat or dimensional restoration coating on hardened steels, aluminum alloys, cast iron, nickel alloys, titanium alloys and alloys containing columbium or tantalum.
- Metco 8276, which is similar in composition to Hastelloy C-276, is very resistant to strong chemical oxidizers such as ferric and cupric chlorides, chlorine, formic acid and acetic acids. It has excellent resistance to chloride-ion attack, can used in saline environments and is resistant to erosion at high temperatures.
- Metco 8450 is a good candidate for bond coats under ceramic coatings in high temperature or chemically aggressive environments.
- Metco 8452 is recommended for waterwalls and superheaters in boilers. It can also be used as a bond coat in alkaline conditions.
- Metco 8443 provides high temperature oxidation and hot gas corrosion resistance at temperatures up to 980 °C (1800 °F).
- Metco 8622, similar to Inconel 622, is recommended for corrosion resistance in low oxygen or high sulfur environments.
- Metco 8625 is similar in composition to Inconel 625 and can be used for dimensional restoration of Inconel 625 or other similar nickel-based superalloys. Coatings of Metco 8625 exhibit high bond strength and provide very good erosion, oxidation and corrosion resistance at temperatures up to 870 °C (1600 °F).
- Metco 8718 is similar to and can be used for dimensional restoration of Inconel 718. It resists oxidation and corrosive attack at temperatures up to 704 °C (1300 °F).
- Metco 8500 is an excellent material to protect substrates from high-temperature corrosive and sulfidation attack up to 950 °C (1740 °F). It is recommended for boiler and chemical process applications.

2.4 Related Products

- Metco 443NS and Amdry 960 are powder materials for atmospheric plasma spray or combustion powder spray chemically similar to Metco 8443.
- Metco 4548 and Metco 43 C-NS are powder products suitable for high temperature corrosion protection.
- Metco 461NS and Metco 442 provide self bonding type coatings with good oxidation and corrosion resistance.
- Metco 8622 is also offered as a welding wire suitable for TIG or MIG processing. Please see datasheet DSMW-0016.
- Amdry 1718, Amdry 718, Amdry 718 CL.B and Diamalloy 1006 are powder materials for atmospheric plasma spray or HVOF spray that are chemically similar to Metco 8718.
- Oerlikon Metco offers super alloy composition powder products for application using atmospheric plasma spray or HVOF spray technique. Examples of these products include Amdry 713C, Amdry 718, Amdry 1718, Diamalloy 1006 and Diamalloy 4004.

2.5 Customer Specifications

Product	Customer Specification	Certification When Origin Is:	
		U.S.A.	Germany
Metco 8443	Chromalloy BZ-003 Type 31	●	
	GE B50TF119	●	●
	GE Standard Practice Task 70-49-39-340-038 C07-043	●	●
	GKN Aerospace PM 819-71	●	●
	MTU MTS 1578	●	●
	Pratt & Whitney PWA 36947		●
	Rolls Royce OMAT 3/271A		

3 Coating Information

3.1 Key Thermal Spray Coating Information

- Coating properties can vary significantly as they are dependant on the chosen equipment, gun hardware, coating parameters and coating thickness.
- Coatings have good bond strength, generally appropriate in bond coat applications.
- When particle erosion at high temperatures is required, please see Section 2.3 for appropriate candidate materials.
- These coatings are resistant to ionic corrosion. Please see Section 2.3 for additional information.
- When oxidation resistance at elevated temperatures is required, please review information in Section 2.3.
- In general, deposit efficiencies of ≥ 65 % can be achieved, when correctly sprayed.
- These coatings can be machined and/or ground when dimensional control or a smooth surface finish is required.

3.2 Coating Parameters

Coating parameters for the following spray guns are available to Oerlikon Metco customers. Please contact your local Oerlikon Metco Account Representative. Please note that parameters may not be available for all guns listed for each material. For specific application requirements, Oerlikon Metco Application Support Services are available.

When electric arc wire coatings with the lowest possible oxides are required, the SmartArc PPG gun is recommended because of its ability to use other types of atomizing gases, such as nitrogen.

Recommended Spray Guns	
Electric Arc Wire	**Combustion Wire**
SmartArc PPG	Metco 16E series
Metco LD/Schub 5	
Metco LD/U2	
Metco LD/U3	
Tafa (Praxair) Arc Spray Guns	

4 Commercial Information

4.1 Ordering Information and Availability

Product	Order No.	Wire Diameter	Package Size	Package Type	Availability	Dist.	Origin
Metco 470 AW	1002528	1.6 mm (14 ga)	12.5 kg (27.5 lb)	Dorn Spool	Special Order	Global	Germany
Metco 8276	1001584	1.6 mm (14 ga)	25 lb (11.3 kg)	Dorn Spool	Stock	Global	U.S.A.
	1092444	1.6 mm (14 ga)	12.5 kg (27.5 lb)	Dorn Spool	Stock	Global	Germany
Metco 8450	1057815	1.6 mm (14 ga)	15 kg (33 lb)	Dorn Spool	Special Order	Global	Germany
Metco 8500	1020932	1.6 mm (14 ga)	25 lb (11.3 kg)	Dorn Spool	Special Order	Global	U.S.A.
Metco 8622	1077224	1.6 mm (14 ga / 0.063 in)	60 lb (27.4 kg)	Dorn Spool	Stock	Global	U.S.A.
Metco 8625	1001594	1.6 mm (14 ga / 0.063 in)	25 lb (11.3 kg)	Dorn Spool	Stock	Global	U.S.A.
	1083493	1.6 mm (14 ga / 0.063 in)	60 lb (27.4 kg)	Dorn Spool	Stock	Global	U.S.A.
Metco 8718	1020242	1.6 mm (14 ga)	30 lb (13.6 kg)	Dorn Spool	Special Order	Global	U.S.A.
Metcoloy 33	1002465	3.2 mm (1/8 in)	25 kg (55.1 lb)	Coil	Stock	Global	Germany
Metco 8443	1001599	1.6 mm (14 ga)	25 lb (11.3 kg)	Dorn Spool	Stock	Global	U.S.A.
Metco 8452	1057887	1.6 mm (14 ga)	12.5 kg (27.5 lb)	Dorn Spool	Special Order	Global	Germany

Note: Minimum order quantities may apply on special order products

4.2 Handling Recommendations

- Store in the original, closed container in a dry location.

4.3 Safety Recommendations

See the correct SDS (Safety Data Sheet) for the product of interest localized for the country where SDS are available from the Oerlikon web site at www.oerlikon.com/metco (Resources – Safety Data Sheets).

Product	SDS No.
Metco 470 AW	50-216
Metco 8276	50-577
Metco 8450	50-1146
Metco 8500	50-944
Metco 8622	50-1553

Product	SDS No.
Metco 8625	50-708
Metco 8718	50-1850
Metcoloy 33	50-243
Metco 8443	50-571
Metco 8452	50-1145

www.oerlikon.com/metco
info.metco@oerlikon.com