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Material Product Data Sheet
Iron Chromium (Cr ≤ 20 %) Stainless Steel Thermal Spray Wires

Thermal Spray Solid Wire Products: Metcoloy 2, Metcoloy 4, Metcoloy 5 Thermal Spray Cored Wire Products: Metco 8238

1 Introduction

Metcoloy™ wires are chromium steel alloys that contain other alloying elements like nickel, manganese and molybdenum, etc., that enhance their excellent corrosion and wear resistance. Wires with additional molybdenum content offer good resistance in hot and cold sulfuric acid, hydrochloric acid, vinegar and sulfur dioxide vapor. These wires are exclusively manufactured for the electric arc wire and combustion wire thermal spray processes.

Metcoloy wires are most suitable for salvage and restoration. They are successfully used on machine elements such as journal surfaces of all kinds, cylinder liners, pistons, valve stems, pump plungers, impellers, hydraulic rams, valve plugs, printing and paper rolls, etc.

Metco™ 8238 is a cored wire that contains an alloy filler material to provide special properties. Metco 8238 produces coatings with high adhesion to the base metal, low oxide content and good protection to friction and erosion. The coatings also offer high thermal shock resistance up to 600 °C (1000 °F).

1.1 Typical Uses and Applications

- Corrosion and wear resistant coatings for salvage and restoration
- Machine parts in low concentrated organic acids including pump sleeves, Pump impellers, shafts, valves and printing rollers
- Typical industrial applications where coatings of these wires are used include agricultural machinery, paper and printing, textile manufacturing, power generation, cement industry and paper mill components

Quick Facts	
Classification	Wire, Fe-based (FeCr steel)
Chemical formula	Various
Manufacture	Drawn or powder filled
Purpose	Corrosion and wear resistance
Process	Electric Arc Spray or Combustion Wire Spray

2 Material Information

2.1 Chemical Composition

Product	Nominal Composition	Weight Percent (nominal)								
		Fe	Cr	Ni	Mn	Mo	C	Ti	Si	Other (max)
Metcoloy 2	Fe 13Cr 0.5Mn 0.5Ni 0.35C 0.25Si	Bal.	13.0	0.5	0.5	–	0.35	–	0.25	0.54
Metcoloy 4	Fe 17Cr 12Ni 2.5Mo 2Mn 1Si 0.08C	Bal.	17.0	12.0	2.0	2.5	0.08	–	1.0	NR
Metcoloy 5	Fe 18Cr 8.5Mn 5Ni 1Si 0.15C	Bal.	18.0	5.0	8.5	–	0.15	–	1.0	NR
Metco 8238	Fe 17Cr 3Ti 1.5Mn 1.3Si	Bal.	17.0	–	1.5	–	–	3.0	1.3	NR

NR = not reported

2.2 Manufacturing Method, Available Wire Sizes and Recommended Spray Processes

Product	Manufacturing Method	Available Wire Diameters				
		1.6 mm (14 ga)	2 mm (0.08 in)	2.3 mm (11 ga)	3.2 mm (1/8 in)	4.8 mm (3/16 in)
Metcoloy 2	●	⚡	⚡	🔥	🔥	🔥
Metcoloy 4	●	⚡			🔥	
Metcoloy 5	●	⚡			🔥	🔥
Metco 8238	○	⚡				

● Solid wire ○ Cored wire ⚡ Electric Arc Wire Spray 🔥 Combustion Wire Spray

2.3 Key Selection Criteria

- Metcoloy 2 is recommended for applications that require a hard coating with good wear resistance and corrosion protection. It is a low shrink material. It is the best choice for coating curved surfaces such as small diameter shafts. Using the combustion wire spray process, Metcoloy 2 can be sprayed very thick, greater than 13 mm (0.5 in), which provides a considerable wear reserve for use in applications such as hydroelectric plants.
- Metcoloy 4 can be used in applications that require resistance or organic and non-oxidizing organic acids at high temperatures. It can also be used in marine environments and is often chosen for resurfacing rolls for paper production.
- Metcoloy 5 is recommended for applications where high corrosion resistance and relatively low wear protection are required. Coatings of Metcoloy 5 exhibit low shrink and are recommend for internal diameters, particularly where thick coatings are needed. Using the combustion wire spray process, Metcoloy 5 coatings can be sprayed thick, but not as thick as Metcoloy 2 coatings. Metcoloy 5 is good for general machine element work including hydraulic rams, rolls and for applications in the food industry.
- Metco 8238 is recommended for applications requiring good protection against friction, erosion and thermal shock protection at temperatures up to 600 °C (1000 °F).

2.4 Related Products

- Metcoloy 33 is a nickel-based steel wire that can be used when high heat resistance is required.
- Metco 8295 is a iron-based wire that can be used when coatings harder than Metcoloy 2 are required.
- Metco 42C is a stainless steel powder that can be applied using the combustion powder Thermospray™ or atmospheric plasma spray processes. This materials is used primarily for repair and wear applications.
- For corrosive wear applications below 650 °C (1200 °F), Diamalloy 1008 is a stainless steel powder that can be applied using the HVOF spray process.
- For low temperature applications requiring erosion or cavitation resistance, Diamalloy 1003 is premium grade nickel-chromium stainless steel thermal spray powder applied using the HVOF spray process.
- Metco 41C is a thermal spray powder that is similar in chemistry and use to Diamalloy 1003, but sized for application by atmospheric plasma spray or combustion powder Thermospray™.
- Metco 450P is a combustion powder spray material for oxidation resistant bond coats up to 800 °C (1470 °F).

2.5 Customer Specifications

Product	Customer Specifications
Metcoloy 2	American Welding Society (AWS) C2.25/C2.25M W-FeCrNi-9 Honeywell FP 5045, Type V Rolls-Royce OMAT 3/45 Rolls-Royce OMAT 3/277A Rolls-Royce plc MSRR 9507/103 Rolls-Royce RRMS40034 Rev. A Turbine Airfoil Coating and Repair MS 525A
Metcoloy 5	American Welding Society (AWS) C2.25/C2.25M W-FeCrNi-3

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.
- When properly applied, these coatings are designed to achieve the surface hardness necessary for good wear resistance appropriate for the applications discussed in Section 1.1.
- These coatings are corrosion resistant for various environments, as defined in Section 2.3.
- In general, deposit efficiencies of ≥ 70 % can be achieved, when correctly sprayed.
- Coatings are readily machined for dimensional control and fair surface finishes are achievable.
- See Section 2.3 for additional coating selection criteria.

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 Spray Guns	
Electric Arc Wire	**Combustion Wire**
SmartArc PPG	Metco 16E series
LD/Schub 5	
LD/U2	

4 Commercial Information

4.1 Ordering Information and Availability

Product	Order No.	Wire Diameter	Package Size	Package Type	Availability	Distribution	Origin
Metcoloy 2	1031589	1.6 mm (14 ga)	25 lb (11.3 kg)	Dorn Spool	Stock	Global	U.S.A.
	1002524	1.6 mm (14 ga)	15 kg (33 lb)	Wire Basket	Stock	Europe	Germany
	1050524	1.6 mm (14 ga) [a]	15 kg (33 lb)	Wire Basket	Stock	Europe	Germany
	1002477	1.6 mm (14 ga) [b]	250 kg (551 lb)	Spool (Special)	Special Order	Europe	Germany
	1041093	1.6 mm (14 ga) [b]	15 kg (33 lb)	Hasp Spool	Stock	Europe	Germany
	1002475	1.6 mm (14 ga) [b]	15 kg (33 lb)	Wire Basket	Stock	Europe	Germany
	1030415	3.2 mm (1/8 in)	50 lb (22.7 kg)	Coil	Stock	Global	U.S.A.
	1002463	3.2 mm (1/8 in)	25 kg (55 lb)	Coil	Stock	Europe	Germany
	1059388	3.2 mm (1/8 in) [a]	25 kg (55 lb)	Coil	Stock	Europe	Germany
	1030416	4.8 mm (3/16 in)	50 lb (22.7 kg)	Coil	Stock	Global	U.S.A.
Metcoloy 4	1002448	1.6 mm (14 ga)	15 kg (33 lb)	Wire Basket	Stock	Europe	Germany
	1030454	3.2 mm (1/8 in)	50 lb (22.7 kg)	Coil	Stock	Global	U.S.A.
	1002478	3.2 mm (1/8 in)	25 kg (55 lb)	Coil	Stock	Europe	Germany
Metcoloy 5	1031590	1.6 mm (14 ga)	25 lb (11.3 kg)	Dorn Spool	Stock	Global	U.S.A
	1002525	1.6 mm (14 ga)	15 kg (33 lb)	Wire Basket	Stock	Europe	Germany
	1000051	3.2 mm (1/8 in)	50 lb (22.7 kg)	Coil	Stock	Global	U.S.A
	1002499	3.2 mm (1/8 in)	25 kg (55 lb)	Coil	Stock	Europe	Germany
	1030514	4.8 mm (3/16 in)	50 lb (22.7 kg)	Coil	Stock	Global	U.S.A.
Metco 8238	1057868	1.6 mm (14 ga)	13 kg (28.7 lb)	Dorn Spool	Special Order	Europe	Germany

[a] CE (DIN) compliant
[b] Copper-coated

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 the material will be used. SDS are available from the Oerlikon web site at www.oerlikon.com/metco (Resources – Safety Data Sheets).

Product	SDS No.
Metcoloy 2	50-241
Metcoloy 4	50-242
Metcoloy 5	50-220
Metco 8238	50-1138

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