

# Material Product Data Sheet

## Nickel-Copper (Monel) Thermal Spray Wire

### Thermal Spray Solid Wire Products: Metco NiCu

#### 1 Introduction

Metco™ NiCu is a Monel type thermal spray wire with a high-strength composition of nickel and copper alloy. Coatings of Metco NiCu are highly resistant to seawater, atmospheric corrosion, various acids and alkaline solutions.

These coatings are very beneficial for marine and chemical equipment applications. The addition of copper to the alloy increases the resistance of Metco NiCu in reducing conditions compared to coatings of pure nickel. Coatings are low shrink and machinable.

Under oxidizing conditions, streaming seawater and non-ventilated sulfuric acid environments, Metco NiCu is more resistant than coatings of pure copper.

Neutral and alkaline high temperature salt solutions with high air content do not attack this material.

#### 1.1 Typical Uses and Applications

- Protection against sulfuric acid environments at temperatures up to 600 °C (1100 °F) for applications such as industrial chemical crystallizers, dryers and vaporizers.
- Corrosion protection for machine elements such as steam valves, pumps, seal rings and plungers.
- Resists saltwater corrosion for components such as vaporizers and petrochemical crude oil distillation towers.
- Protects immersed machine elements from saltwater corrosion, particularly for applications where a surface harder than typical galvanic coatings is required.
- Corrosion protection for chemical and desalination plants.

#### Quick Facts

Classification	Wire, Ni-based
Chemical formula	Ni 30Cu
Manufacture	Drawn wire
Density	8.8 g/cm <sup>3</sup>
Melting Point	1310 °C (2390 °F)
Service Temperature	600 °C (1100 °F)
Purpose	Corrosion protection
Process	Electric Arc Wire Spray or Combustion Wire Spray





## 2 Material Information

### 2.1 Chemical Composition

Product	Weight Percent (nominal)					
	Ni	Cu	Fe	Mn	Si	Other
Metco NiCu	70	26.5	1.5	1.0	0.5	0.5 (max)

### 2.2 Morphology and Available Wire Sizes

Product	Morphology	Recommended Spray Process	Available Wire Diameters	
			1.6 mm (14 ga)	3.2 mm (1/8 in)
Metco NiCu	Solid		●	
Metco NiCu	Solid			●

 Electric Arc Wire Spray

 Combustion Wire Spray

### 2.3 Key Selection Criteria

- Choose Metco NiCu for coatings that:
  - Provide high resistance to sulfuric acid solutions at temperatures up to 600 °C (1100 °F)
  - Resist corrosion under reducing and oxidizing environments
  - Resist reducing and oxidizing environments
  - Provide good resistance to corrosion in saltwater environments

### 2.4 Related Products

- Metcoloy 33 is recommended for hot corrosion protection.
- When sacrificial corrosion protection is desired, coatings of Metco Aluminum, Metco Zinc, Metco AlMg or Metco ZnAl are recommended. Please see the appropriate Materials Product Datasheet for more details.
- Coatings of Metco Brass offer better resistance to alcohols than Metco NiCu.
- While wire coatings are generally very cost-effective to apply, consider coatings applied using atmospheric

plasma spray when additional corrosion protection is required. Coatings applied using HVOF spray can also be considered. HVOF coatings have generally higher density for better corrosion resistance.

- Certain ceramic powders applied using atmospheric plasma spray, provide superior protection against acidic and alkaline solutions, particularly when sealed. However, caution should be exercised in applications where mechanical fatigue may be a factor. Such products include Metco 101, Metco 6200, Metco 6203, Amdry 187 and Amdry 6208.
- Coatings having hot corrosion resistance in sulfuric gas environments, along with fretting and erosion resistance, can be achieved using Metco 81NS and Metco 81VF-NS when applied using atmospheric plasma spray.
- For high corrosion resistance, achieved by the application of denser coatings, use the HVOF process to apply a chromium carbide such as one of the Woka 72xx series products.

## 3 Coating Information

### 3.1 Key Thermal Spray Coating Information

Characteristic	Typical Data	
Deposit Efficiency	65 – 75 %	
Bond Strength	27.5 – 34.5 MPa	4000 – 5000 psi
Hardness	75 – 85 HRB	
Maximum Service Temperature	600 °C	1100 °F
Finishing	Machine / Grind	

Values shown below may vary from actual achieved values depending on the coating process, equipment, gun hardware, parameters used and the thickness of the applied coating.

### 3.3 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
Metco LD/U2	Metco 16E
	Metco 14E

## 4 Commercial Information

### 4.1 Ordering Information and Availability

Product	Order No.	Wire Diameter	Package Size	Package Type	Availability	Dist.	Origin
Metco NiCu	1002468	3.2 mm (1/8 in)	12.5 kg (27.5 lb)	Coil	Stock	Europe	Germany
Metco NiCu	1057810	1.6 mm (14 ga)	15 kg (33 lb)	Dorn Spool	Special Order	Europe	Germany

### 4.2 Handling Recommendations

Store in the original container in a dry location.

### 4.3 Safety Recommendations

See the SDS 50-234 (Safety Data Sheet) for the localized for the country where the material will be used. SDS are available from the Oerlikon web site at [www.oerlikon.com/metco](http://www.oerlikon.com/metco) (Resources – Safety Data Sheets).

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