

Material Product Data Sheet

Copper & Copper Alloy (Brass, Bronze) Thermal Spray Wires

Thermal Spray Wire Products: Metco™ Brass, Metco Copper, Sprabronze AA, Sprabronze™ AB, Sprabronze S, Sprabronze TM

1 Introduction

Oerlikon Metco offers a variety of copper and copper-based alloy wires for use as coating feedstock material for the combustion wire Thermospray™ and electric arc wire spray processes.

Pure copper is an excellent conductor of electricity and is suitable for many applications where electrically conductive coatings are required.

Oerlikon Metco's Sprabronze and Metco Brass materials produce harder coatings that can be used for machine element restoration on many bronze or brass components, and can be good choices for many types of bearing surfaces.

These materials are also corrosion resistant in non-oxidizing (copper) to mildly oxidizing (copper alloys) environments; generally providing resistance to neutral atmospheric conditions and sea water environments.

1.1 Typical Uses and Applications

- Metco Brass:
 - Restoration on brass components such as castings
 - Soldered connections for electronics
 - Corrosion resistance in low oxygen, alkaline or caustic solutions
- Metco Copper:
 - Applications where electrical conductance is required such as on carbon brushes, resistors.
 - Placement of copper for brazing applications
 - Decorative coatings
- Sprabronze AA, Sprabronze AB and Sprabronze TM:
 - Hard, dense coatings for machine element restoration
 - For use on components such as pump impellers, armature bushings, motor bearings, air brake valves, valve plugs and plungers
- Sprabronze S:
 - Machine element repair
 - Surfaces where improved sliding wear resistance is desired.

Quick Facts

Classification	Wires, Copper-based
Chemical formula	Various
Manufacture	Drawn wires
Purpose	Electrical conductivity, corrosion resistance, machine element repair
Process	Electric Arc Wire Spray or Combustion Wire Spray



2 Material Information

2.1 Chemical Composition

Product	Nominal Composition	Weight Percent (nominal)						
		Cu	Al	Fe	Mn	Sn	Zn	Other (max)
Metco Brass	Cu 37Zn	Balance	---	---	---	---	37	---
Metco Copper	Cu 99.9+	99.9 (min)	---	---	---	---	---	0.1
Sprabronze AA	Cu 9Al 1Fe	Balance	9	1	---	---	---	0.5
Sprabronze AB	Cu 8Al	Balance	8	---	---	---	---	0.1
Sprabronze S	Cu 6Sn	Balance	---	---	---	6	---	---
Sprabronze TM	Cu 40Zn 1Fe 1Sn	Balance	---	1	---	1	40	0.25

2.2 Other Physical Properties

	Morphology	Recommended Spray Process	Available Wire Diameters	
			1.6 mm (14 ga)	3.2 mm (1/8 in)
Metco Brass	Solid	Electric Arc Spray	●	
Metco Copper	Solid	Electric Arc Spray Combustion Wire Spray	●	●
Sprabronze AA	Solid	Electric Arc Spray Combustion Wire Spray	●	●
Sprabronze AB	Solid	Electric Arc Spray	●	
Sprabronze S	Solid	Electric Arc Spray	●	
Sprabronze TM	Solid	Combustion Wire Spray		●

2.3 Key Selection Criteria

- Metco Brass is recommended for brass substrates, or for coatings that must be resistant to alkaline or caustic solutions. Metco Brass may also be used as a decorative coating.
- Choose Metco Copper for applications where a high electrical conductance is required. This material is a good choice for decorative applications, particularly when a copper patina is desired.
- Sprabronze AA produces dense, moderately wear-resistant coatings that have as much as twice the strength and hardness of other bronzes. It is easily machined and produces excellent surface finishes.
- Sprabronze AA and Sprabronze AB offer very good corrosion resistance because the aluminum contained in these material forms a protective oxide surface.
- Choose Sprabronze S when a more lubricious copper-based coating is desired on bearing surfaces. It is also a good choice in electrical applications where solderability is required.
- Sprabronze TM is a Tobin-type bronze that can be used in naval brass applications, but tends to be more difficult to machine than Sprabronze AA or Sprabronze AB.

2.4 Related Products

- When higher conductivity is required, or a powder spray process such as atmospheric plasma spray, HVOF or cold gas is preferred, coatings of Metco 55, Metco 445, Metco 51NS, Metco 51F-NS, Diamalloy 1004 or Diamalloy 1007 sprayed to lower oxide levels should be considered.
- If corrosion protection in lye, brine or saltwater at higher temperatures is needed with good bearing properties, consider Metco Monel (Ni 30Cu).
- Sprababbitt A is a good coating choice for high speed and heavy duty bearing surfaces.
- For a corrosion protective material for use in food processing or when a solderable coating is needed, choose Metco Tin.
- An alternative for improved thermal conductivity, but reduced electrical conductivity is Metco Aluminum.
- When a lubricious coating or a coating resistant to galling and scuffing is needed, consider Metco Sprabond, which also bonds well to a variety of substrates.

2.5 Customer Specifications

Product	Customer Specification	Certification When Origin Is:	
		U.S.A.	Germany
Sprabronze AA	American Welding Society (AWS) C2.25/C2.25M W-CuAl	●	●
	Rolls-Royce Corporation EMS 50209A	●	
	Rolls-Royce Corporation PMI 1046	●	
	Rolls-Royce plc MSRR 9507/111		●
	MTU MTS 1136		●
	Snecma DMR 33.055		●
Metco Copper	Rolls-Royce plc MSRR 9507/110		●

3 Coating Information

3.1 Key Thermal Spray Coating Information

Product	Max. Service Temperature ^a		Coating Hardness HRB	Recommended Spray Process		Finishing
				Electric Arc Wire	Combustion Wire	
Metco Brass	750 °C	1380 °F	40 – 45	●		Machine
Metco Copper	750 °C	1380 °F	35 – 40	●	●	Machine
Sprabronze AA	700 °C	1290 °F	90 – 95	●	●	Machine
Sprabronze AB	700 °C	1290 °F	85 – 90	●		Machine
Sprabronze S	700 °C	1290 °F	85 – 90	●		Machine
Sprabronze TM	700 °C	1290 °F	45 – 50		●	Grind

^a Maximum service temperature in normal atmospheres or neutral environments. May be significantly lower in oxidizing or other environments

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 Thermospray™
SmartArc PPG	Metco 16E
Metco LD/Schub 5	Metco 5K
Metco LD/U2	
Tafa (Praxair)	

4 Commercial Information

4.1 Ordering Information and Availability

Product	Order No.	Wire Diameter	Package Size	Package Type	Availability ^a	Dist.	Origin
Metco Brass	1057779	1.6 mm (14 ga)	15 kg (33 lb)	Hasp Spool	Special Order	Europe	Germany
Metco Copper	1000446	1.6 mm (14 ga)	25 lb (11.3 kg)	Dorn Spool	Special Order	Global	U.S.A.
	1002514	1.6 mm (14 ga)	12 kg (26.5 lb)	Wire Basket Reel	Stock	Europe	Germany
	1030420	3.2 mm (1/8 in)	50 lb (22.7 kg)	Coil	Stock	Global	U.S.A.
	1002467	3.2 mm (1/8 in)	25 kg (55 lb)	Coil	Stock	Europe	Germany
Sprabronze AA	1020399	1.6 mm (14 ga)	25 lb (11.3 kg)	Dorn Spool	Stock	Global	U.S.A.
	1002527	1.6 mm (14 ga)	12 kg (26.5 lb)	Wire Basket Reel	Stock	Europe	Germany
	1030426	3.2 mm (1/8 in)	25 lb (11.3 kg)	Coil	Stock	Global	U.S.A.
	1002504	3.2 mm (1/8 in)	12.5 kg (27.5 lb)	Coil	Stock	Europe	Germany
Sprabronze AB	1057795	1.6 mm (14 ga)	15 kg (33 lb)	Dorn Spool	Stock	Europe	Germany
Sprabronze S	1057786	1.6 mm (14 ga)	13 kg (28 lb)	Hasp Spool	Special Order	Europe	Germany
Sprabronze TM	1030512	3.2 mm (1/8 in)	25 lb (11.3 kg)	Coil	Special Order	Global	U.S.A.

^a Minimum order quantities for special order products may apply.

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.
Metco Brass	50-1134
Metco Copper	50-232
Sprabronze AA	50-223
Sprabronze AB	50-1132
Sprabronze S	50-1135
Sprabronze TM	50-239