



Lead-free Compatible

[Reflow Tin Plated Copper Wire]



Reflow Tin Plated Copper Wire

Brass Bare Wire

Phosphor Bronze Bare Wire

Advanced Development Power and Excellent Production Technology
Fulfilling Customer Expectations

 **SAN-ETSU METAL Co., Ltd.**
www.sanetu.co.jp

I Recommend San-Etsu Metal's Reflow Tin Plated Copper Wires



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Doctor of Engineering
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Nagoya University

I believe that it is of the greatest importance for society and business enterprises to deal with environmental issues in the 21st century.

The reflow tin plated copper wires produced by San-Etsu Metal Co., Ltd. are completely lead-free and cadmium-free products that conform to environmental standards. They display excellent properties in terms of the features required for the plated wires that are used, for example, for connectors: close adhesion, processing, corrosion resistance, and soldering. In addition, they are manufactured by plating copper and copper alloy wires with tin after underplating and providing them with a reflow process to add stress relief that effectively prevents tin whiskers.

The conventional types of solders often used in the field of electronics contain a large quantity of harmful lead, even the so-called '9/1 solder', which is an alloy consisting of 90% tin and 10% lead. But 'totally lead-free' is becoming an absolute necessity in Europe as a result of the restrictions on the use of lead in the manufacture of electrical and electronic equipment that will come into force on 1st July 2006 based on RoHS, a European Union (EU) Directive.

Due to such global environmental regulations, a rapid shift is now in progress from solder plating to tin plating or tin-type lead-free alloys. But this is more than just a shift from solder plating to tin plating of plated wires. It is difficult to provide uniform tin plating during manufacturing when plating is carried out after the processing of bare wires—in other words, 'post-plating'. For this reason, there is a rapidly growing trend towards the reconsideration of the overall manufacturing process and a shift from 'post-plating' to 'pre-plating' using tin plated wires. Because of this, the demand for reflow tin plated copper wires has continued to rise and the expectations for the potential of high quality reflow tin plated copper wires are growing all the time.

As a leading Japanese manufacturer of copper alloy wires, San-Etsu Metal Co., Ltd. uses integrated production methods to manufacture a wide variety of alloys, including brass, pure copper, red brass, phosphor bronze (an ultra-high strength material suitable for connectors) and copper containing iron (Alloy 194), which features excellent thermal resistance with high conductivity.

San-Etsu Metal has established an original technical process for its reflow tin plated copper wire production line in order to stabilize plating quality, reduce lead time, and realize homogenization of small-lot production of a wide variety of products in terms of material quality, shape, dimensions and specifications for plating thickness. It has introduced rewinding technology to make the best use of the successful Traverse winding system for wiredrawing machines and so avoid any troubles during unwinding when the line is in operation. And by preventing vibration and shocks during transportation, surface scratching and abnormal packing are effectively avoided.

I sincerely believe that San-Etsu Metal's reflow tin plated copper wires are the products that will lead the field into the future. I strongly recommend them as products of considerable value and potential.

San-Etsu Metal's Reflow Tin Plated Copper Wire

As a result of integrated production from melting and casting through to final plating, San-Etsu Metal is able to provide its customers with reflow tin plated copper wire that is stable and superior in terms of quality, delivery date and cost.

Reflow Tin Plated Copper Wire

San-Etsu Metal's reflow tin plated copper wire is manufactured by using a reflow process to plate tin on to copper and copper alloy wire after underplating with copper or nickel.

Reflow Process

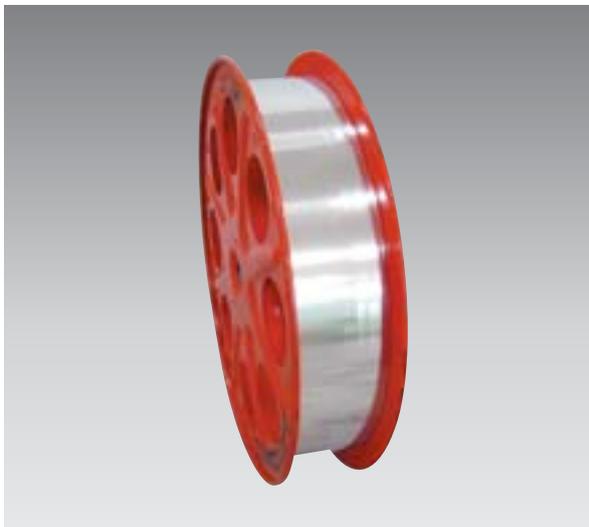
In the reflow process, powder particles are melted in the tinning area and finished by means of solidifying to create a plated surface that is glossy, smooth and solid.

Our reflow tin plated copper wire...

- ①...is excellent for close adhesion.
- ②...is excellent for processing.
- ③...is excellent for corrosion resistance.
- ④...is excellent for soldering.
- ⑤...is lead-free compatible.
- ⑥...is effective in preventing tin whiskers.

As a result of these characteristics, it is widely used in the field of connectors.

Reflow Tin Plated Copper Wire Products



φ800 Bobbin Roll
(Product weight: 50kg)



M-7 Bobbin Roll
(Product weight: 25kg)

Reflow Tinning Line & Plating Testing Equipment

Tinning Line



Tinning Line

The length of the straight section of the tinning line is an important factor for the stable manufacture of high quality plated copper wire. The total length of our tinning line is 70 meters.



Unwinding Machine



Degreasing Tank



Plating Tank



Rewinding Machine

High productivity is achieved with a maximum plating speed of 30 meters per minute.

Plating Testing Equipment



Electrolytic Coating Thickness Measuring Instrument



X-ray Fluorescence Coating Thickness Measuring Instrument



Precision Thermostat
(Thermal Resistance Testing Device)



Hull Cell Testing Device
(Plating Bath Density Measurement)



ICP Spectrometer
(Trace Element Precision Ingredient Analysis)



Salt Water Atomizing Testing Apparatus
(Corrosion-Resistance Testing Device)

Specifications of Reflow Tin Plated Copper Wire

Basic Materials for Processing

[Chemical Composition]

Symbol	Chemical Composition								Standard
	Cu	Pb	Fe	Sn	Zn	Ni	P	Cu+Sn+P	
C5071W	Remainder	—	—	1.7~2.3	—	0.10~0.40	~0.15	—	ASTM C50710
C5191W	—	—	—	5.5~7.0	—	—	0.03~0.35	99.5~	JIS H 3270
C2600W	68.5~71.5	~0.05	~0.05	—	Remainder	—	—	—	JIS H 3260
C2700W	63.0~67.0	~0.05	~0.05	—	Remainder	—	—	—	JIS H 3260

[Mechanical Properties, Manufacturing Dimensions]

Symbol	Quality	Mechanical Properties		Dimensions	
		Tensile Strength (N/mm ²)	Elongation (%)	Round Shape	Square, Deformed Shape 2R
C5071W	1/4H	390~510	5~	0.5~1.2	0.5~1.2
	1/2H	490~610	—	0.5~1.2	0.5~1.2
	3/4H	590~705	—	0.5~1.2	0.64~1.2
	H	685~805	—	0.5~1.2	—
C5191W	1/4H	535~685	—	0.5~1.2	0.5~1.2
	1/2H	635~785	—	0.5~1.2	0.5~1.2
	3/4H	735~885	—	0.5~1.2	0.64~1.2
	H	835~	—	0.5~1.2	—
C2600W	1/4H	390~510	5~	0.5~1.2	0.5~1.2
	1/2H	490~610	—	0.5~1.2	0.5~1.2
	3/4H	590~705	—	0.5~1.2	0.5~1.2
	H	685~805	—	0.5~1.2	—
C2700W	1/4H	390~510	5~	0.5~1.2	0.5~1.2
	1/2H	490~610	—	0.5~1.2	0.5~1.2
	3/4H	590~705	—	0.5~1.2	0.5~1.2
	H	685~805	—	0.5~1.2	—

Plating Specifications

	Plating Type	Plating Thickness (μm)
Underplating	Cu	~1.5
Final Plating	Reflow Sn	0.5~2.5

Product Packing Types

Bobbin	Bobbin Dimensions (mm)					Bobbin	MAX Products
Type	Flange Diameter (D)	Barrel Diameter (d)	Interior Width (W)	Axis Diameter (h)	Flange Thickness (a)	Weight (kg)	Unit Weight (kg)
φ800	800	700	150	45	10	32	50
M-7	440	300	190	52	15	4	30
12.5K	285	210	89	52	7	0.6	15
Square Wire Reel	450	400	65	30	5	2.1	8

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●This pamphlet was printed using 'waterless printing', 'vegetable soy-bean oil ink' and 'recycled paper with 100% wastepaper content.'

●The contents of this catalogue are accurate as of April 2005. Product specifications may be altered without notice.