超薄载体铜箔(可剥离铜箔) WW-CCF

Ultra-Thin Carrier Copper Foil

HSMetal

特点/Features

. 超薄
.低粗糙度
. 高抗剥离强度
. 良好的蚀刻性

.Ultra-Thin
.Low profile
.High peel strength
.Excellent etchability

产品适用/Application

. IC封装载板
· 柔性印制线路板（FPC）
. 高密度互连技术板（HDI）

· IC packaging carrier board
. Flexible Printed Circuit
. High density interconnect technology board

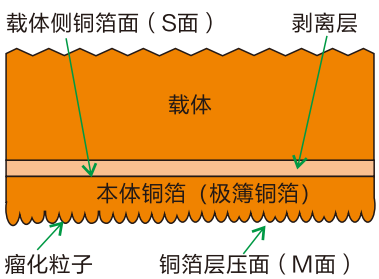
主要参数/Representative characteristic data

产品厚度（本体铜箔） Product thickness(μm)		1.5	3	5
单位面积重量 Mass area ratio (g/m²)		20±2	33±2	51±3
粗糙度 Roughness Rz (μm)	非压合面 S面	≤2.0		
	压合面 M面	≤2.0		
剥离强度 Peel strength (lb/in)	常温 Normality	≥3.5		
	288℃ (浸焊锡10秒3次)	≥3		
剥离层剥离强度（g/cm） Peel strength of stripping layer		3~30 可调控 Controllable		
高温抗氧化 Antioxidation 200℃*60min		无氧化 Non-oxidation		
载体厚度 (μm)		18		

* 以上检测均采用IPC-TM-650执行标准，不作保证值。

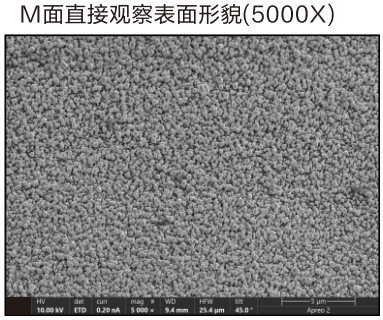
* All the above tests are carried out by IPC-TM-650 standard, and the guaranteed value is not provided.

晶体结构/Crystal structure

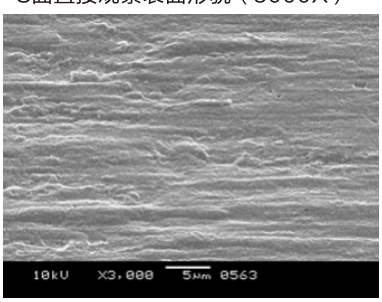


铜箔处理面形貌/Characteristic morphology of copper foil treated surface

M面直接观察表面形貌(5000X)



S面直接观察表面形貌（3000X）



HVLP高频高速极低轮廓铜箔 WW-HVLP

HVLP high frequency and high speed copper

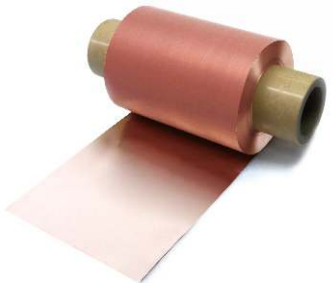
HSMetal

自主研制的添加剂生产的HVLP高频高速铜箔具有：极低轮廓的等轴微细结晶球状层（轮廓高度可定制），同时还具备高强度、高导电性、高延伸率、高耐热性、高温抗氧化性、可浸焊性、铜芽细密、无铜粉转移等特性。

在前端生箔阳极槽对原箔的晶粒结构的控制、瘤化微细颗粒及平坦化处理技术使产品达到极高的一致性；极低的表面轮廓度在制成PCB后有效地降低了信号的损失，使信号在高频波段时依然保证完整；HVLP极低轮廓铜箔产品年产能可达20000吨。

The HVLP produced by the independently developed additive process technology has the following characteristics: an extremely low-profile equiaxed fine crystalline spherical layer (with customizable profile height), high strength, high conductivity, high ductility, high heat resistance, high-temperature oxidation resistance, solderability, fine copper grains, and no copper powder transfer.

The high-quality and strong consistency of the product are built on the control of the grain structure of the original foil in the anode bath of the raw foil, fine grain tumorization, and smoothing treatment technology, which results in high hardness, smooth roughened surface, good thermal stability, and uniform thickness. The extremely low surface profile effectively reduces signal loss during product application after PCB manufacturing, ensuring signal integrity even at high-frequency bands. The one-time production process technology brings an annual production capacity of up to 20,000 tons.



产品适用/Application

. 高频高速覆铜板
High frequency and high-speed copper clad plate

. IC封装载板
IC packaging carrier board

. 高密度互连技术板（HDI）
High density interconnect technology board

主要参数/Representative characteristic data

产品厚度 Product thickness（μm）			7	9	12	18	35	70
单位面积重量 Mass area ratio（g/m²）			62±2	80±2	107±3	153±4	285±8	610±10
抗拉强度 Tensile strength（MPa）		常温 Normality	≥300					
		180℃	≥190					
延伸率 Extensibility（%）		常温 Normality	≥8	≥10	≥11	≥13	≥16	≥16
		180℃	≥8	≥10	≥11	≥13	≥16	≥16
粗糙度 Roughness Rz（μm）	WW-HVLP-1	处理面（M）	>1.5 and <2.0					
	WW-HVLP-2	处理面（M）	>1.0 and ≤1.5					
剥离强度 peel strength (lb/in)		常温 Normality	≥3.5	≥3.5	≥3.5	≥4	≥4	≥4
		288℃ (浸焊锡10秒3次)	≥3	≥3	≥3	≥3.5	≥3.5	≥3.5
高温抗氧化 Antioxidation 200℃ 60min			无氧化 Non-oxidation					

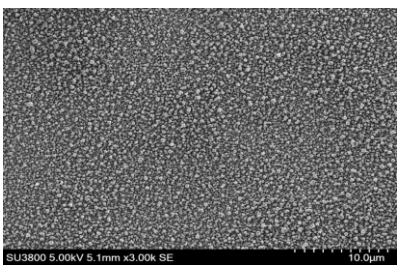
*以上检测均采用IPC-TM-650执行标准，其中剥离强度测试采用南亚M4等级的基板NPG-170D半固化压合典型值，不作保证值。

*All the above tests are carried out by IPC-TM-650 standard, The peel strength test uses the typical value of the semi-cured press of the substrate NPG-170D of the M4 grade of NOUYA, and the guaranteed value is not provided.

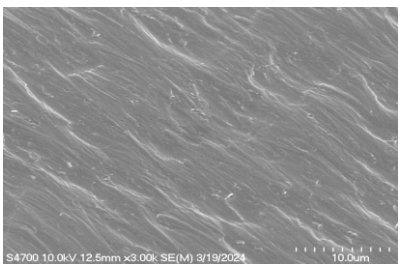
晶体结构/Crystal structure

铜箔处理面形貌/Characteristic morphology of copper foil treated surface

M面直接观察表面形貌（3000X）



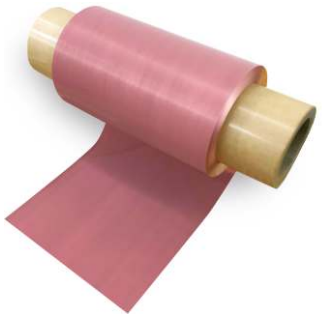
S面直接观察表面形貌（3000X）



RTF反转超低轮廓铜箔　WW-RTF

RTF reverse ultra-low profile copper foil

HSMetal



WW-RTF有低轮廓度、高平整度、尺寸精度高、热稳定性强、双面导电、良好的焊接性及良好的电磁屏蔽效果等特性。

其双面低轮廓有助于降低电子设备内部电路的接触电阻，提高电路连接的稳定性和可靠性；优异双面导电的特性可用于更复杂的电路设计和更高的电路布局效率；良好的焊接性能适合于不同类型的电子组件组装；通过表面涂覆有机物薄膜，使得铜箔内部应力均匀分布，提高了材料的稳定性和可靠性。RTF反转铜箔产品年产能可达20000吨。

WW-RTF reverse low profile copper foil has the characteristics of low profile, high flatness, high dimensional accuracy, strong thermal stability, double-sided conductivity, good weldability and good electromagnetic shielding effect.
The performance advantages of WW-RTF reversed low profile copper foil are as follows: Firstly, double-sided low profile helps to reduce the contact resistance of circuits within electronic devices, improving the stability and reliability of circuit connections. After, excellent double-sided conductivity can be used for more complex circuit design and higher circuit layout efficiency. Then, good welding performance is suitable for assembly of different types of electronic components. Finally, by coating organic film on the surface, the internal stress of copper foil is evenly distributed, and the stability and reliability of the material are improved. The annual production capacity of RTF can reach 20,000 tons.

产品适用/Application

. 高频高速覆铜板
High frequency and high-speed copper clad plate
. 柔性印制线路板（FPC）
Flexible Printed Circuit
. 高密度互连技术板（HDI）
High density interconnect technology board

主要参数/Representative characteristic data

产品厚度 Product thickness(μm)			7	9	12	18	35	70
单位面积重量 Mass area ratio（g/m²）			62±2	80±2	107±3	153±4	285±8	610±10
抗拉强度 Tensile strength（MPa）	常温 Normality		≥300					
	180℃		≥190					
延伸率 Extensibility（%）	常温 Normality		≥8	≥10	≥11	≥13	≥18	≥18
	180℃		≥8	≥10	≥11	≥13	≥18	≥18
粗糙度 Roughness Rz（μm）	WW-RTF-3	S面	>1.5 and ≤2.0					
		M面	>1.5 and ≤2.0					
	WW-RTF-4	S面	>1.0 and ≤1.5					
		M面	>1.0 and ≤1.5					
剥离强度 Peel strength (lb/in)	常温 Normality		≥3.5	≥3.5	≥3.5	≥4	≥4	≥4
	288℃（浸焊锡10秒3次）		≥3	≥3	≥3	≥3.5	≥3.5	≥3.5
高温抗氧化 Antioxidation 200℃*60min			无氧化 Non-oxidation					

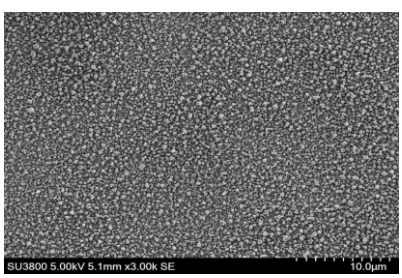
* 以上检测均采用IPC-TM-650执行标准，不作保证值。

* All the above tests are carried out by IPC-TM-650 standard, and the guaranteed value is not provided.

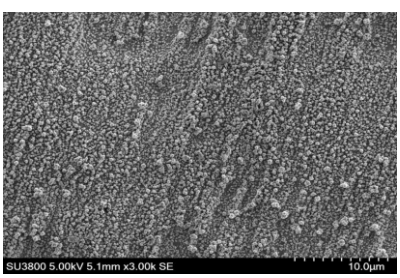
晶体结构/Crystal structure

铜箔处理面形貌/Characteristic morphology of copper foil treated surface

M面直接观察表面形貌（3000X）



S面直接观察表面形貌（3000X）



黑化铜箔 WW-BDF

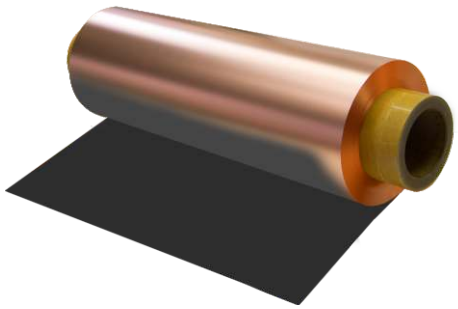
Blackened Copper Foil

HSMetal

特点/Features

.低粗糙度
.高抗剥离强度
.高耐弯曲性
.良好的蚀刻性

.Low profile
.High peel strength
.High MIT
.Excellent etchability



产品适用/Application

. 柔性印制线路板（FPC）
. 高端电磁屏蔽（HDI）

.Flexible Printed Circuit
.High-end Electromagnetic Shielding

主要参数/Representative characteristic data

产品厚度 Product thickness(μm)		18	35	50	70
单位面积重量 Mass area ratio (g/m²)		153±4	285±8	415±9	610±10
抗拉强度 Tensile strength (MPa)	常温 Normality	≥300			
	180℃	≥190			
延伸率 Extensibility (%)	常温 Normality	≥16			
	180℃	≥16			
粗糙度 Roughness Rz (μm)	非压合面 S面	≤2.0			
	压合面 M面	≤2.0			
剥离强度 Peel strength (lb/in)	常温 Normality	≥5	≥5	≥6	≥6
	288℃	≥4.5	≥4.5	≥5.5	≥5.5
高温抗氧化 Antioxidation 200℃*60min		无氧化 Non-oxidation			

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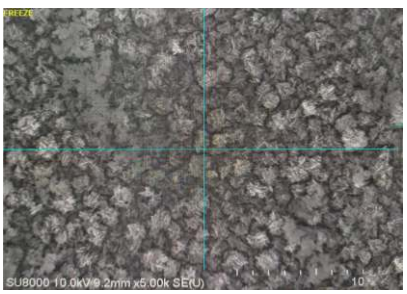
* All the above tests are carried out by IPC-TM-650 standard, and the guaranteed value is not provided.

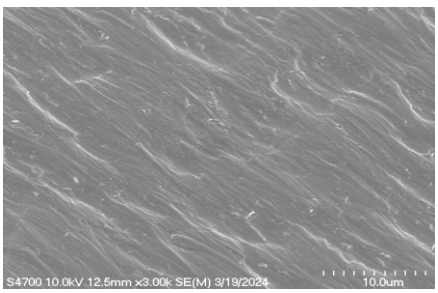
晶体结构/Crystal structure

铜箔处理面形貌/Characteristic morphology of copper foil treated surface

M面直接观察表面形貌(5000X)



S面直接观察表面形貌（3000X）



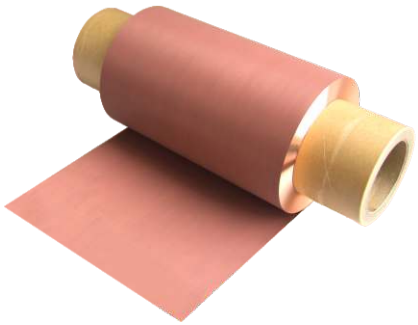
HTE高温高延展铜箔 WW-HTE

High temperature and elongation copper foil

HSMetal

WW-HTE高温高延展性铜箔具较高的高温延伸率，抗底蚀能力强，高耐弯（曲）折，优秀的机械性能，优异的耐腐蚀性，残铜率低，耐高温，可替代压延铜箔（RA）等特性。

WW-HTE高温高延展性铜箔性能优势体现：良好的可塑性和加工性在弯折，冲压，剪切和焊接等加工，适用于复杂形状的制造要求；高抗拉强度的提升有助于确保铜箔在使用过程中的稳定性和可靠性；优异的耐高温可以在高达180℃的温度下保持其物理性质，而不会轻易变形或损坏；强抗底蚀能力能够在覆铜板和PCB多层板制造的长期过程中保持良好的性能。



WW-HTE high-temperature high-ductility copper foil has the characteristics of high temperature elongation, strong bottom corrosion resistance, high bending (bending) resistance, excellent mechanical properties, excellent corrosion resistance, low copper residue rate and high temperature resistance, and can replace rolled copper foil (RA).
The performance advantages of WW- HTE high-temperature and high-ductility copper foil are as follows: Firstly, good plasticity and processability in bending, stamping, shearing and welding, etc, which is suitable for manufacturing requirements of complex shapes. Then, high tensile strength enhancement helps to ensure the stability and reliability of the copper foil in the process of use. After,excellent high-temperature resistance can be used to maintain its physical properties at temperatures of up to 180℃ without being easily deformed or damaged. Finally, strong resistance to bottom corrosion can maintain good performance during the long-term manufacturing process of copper-clad panels and PCB multilayer board.

产品适用/Application

. 高密度互连技术电路板(HDI)
High Density Interconnect
.印制电路板
PCB

主要参数/Representative characteristic data

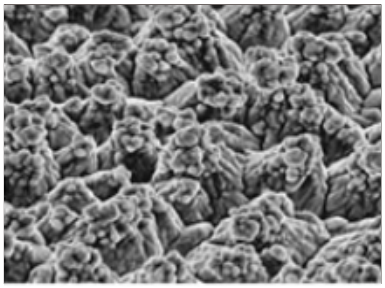
产品厚度 Product thickness(μm)		12	18	35	70
单位面积重量 Mass area ratio (g/m²)		107±3	153±4	285±8	610±10
抗拉强度 Tensile strength (MPa)	常温 Normality	≥300			
	180℃	≥190			
延伸率 Extensibility (%)	常温 Normality	≥5	≥8	≥10	≥15
	180℃	≥5	≥8	≥10	≥15
粗糙度 Roughness Rz (μm)	非压合面 S面	≤2.5	≤2.5	≤2.5	≤2.5
	压合面 M面	≤6.5	≤8	≤10	≤12
剥离强度 Peel strength (lb/in)	常温 Normality	≥7	≥8	≥11	≥16
	288℃	≥6	≥7	≥9	≥12
高温抗氧化 Antioxidation 200℃*60min		无氧化 Non-oxidation			

* 以上检测均采用IPC-TM-650执行标准，不作保证值。
* All the above tests are carried out by IPC-TM-650 standard, and the guaranteed value is not provided.

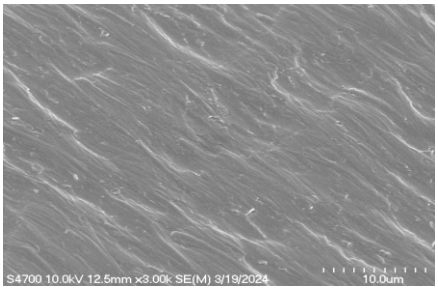
晶体结构/Crystal structure

铜箔处理面形貌/Characteristic morphology of copper foil treated surface

M面直接观察表面形貌(3000X)



S面直接观察表面形貌（3000X）



超薄柔性锂电池铜箔

Ultra-thin flexible lithium copper foil

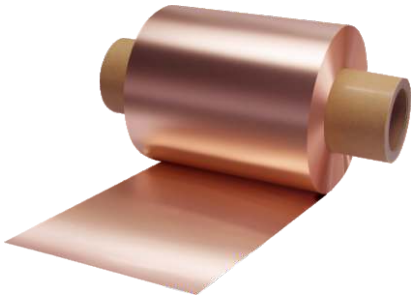
HSMetal

超薄柔性锂电铜箔具有高密度（高金属质感）、高柔性、高防氧化、高抗拉、高延伸、无铜粉无针孔、无断裂等性能。

超薄柔性锂电铜箔性能优势体现：高金属坠感可有效控制铜粉和脆裂；高密度特点带来高柔延展性和高防氧化（高温200度1小时），可有效抑制在覆涂压辊过程中出现的起皱断箔和冷压断带等问题，便于操作的同时提高了涂压效率；同时高密度、高柔性、高防氧化的产品特性可以满足铜箔在高强度、高倍率循环充放电时无龟裂、断裂现象，提升电池使用寿命和安全性，减少出现短路、发热等风险。

Utra-thin flexible lithium foil has the properties of high density (high metallic texture), high flexibility, high oxidation resistance, high tensile strength, high elongation, no copper powder, no pinholes and no fracture.

The performance advantages of WAH WEI ultra-thin flexible lithium copper foil are as follows: high metal drop sensitivity can effectively control copper powder and brittle fracture; High-density features bring high flexibility, ductility and oxidation resistance (high temperature is 200 degrees for 1 hour), which can effectively suppress the problems such as wrinkling, foil breakage and coldpressing belt breakage in the process of coating and pressing rollers, and improve the coating and pressing efficiency at the same time. At the same time, the product characteristics of high density, high flexibility and high oxidation resistance can meet the requirement that copper foil does not crack and break during high strength and high rate cyclic charging and discharging, improve the service life and safety of the battery, and reduce the risks of short circuit and heating.



产品适用/Application

. 锂离子电池负极集流体

/Negative fluid of lithium ion battery

主要参数/Representative characteristic data

产品厚度 Product thickness(μm)	3.5	4	4.5	6	8
单位面积重量 Mass area ratio （g/m²）	31.5±1.5	36±1.5	40.5±1.5	54±1.5	72±2
抗拉强度 Tensile strength （Mpa）	≥300				
延伸率 Extensibility （%）	≥3	≥4	≥5	≥6	≥8
粗糙度 Roughness Rz （μm）	≤2.5				
粗糙度 Roughness Ra （μm）	≤0.5				
高温抗氧化Antioxidation 200℃*60min	无氧化 Non-oxidation				
润湿性（达因笔划线不凝珠不断线） Wettability (Dyne pen strokes without beading or skipping)	能满足42#以及上达因值 Able to meet the 42# as well as the Dyne value				

*以上为代表性数据非保证值。

*The representative data provided is not guaranteed.