



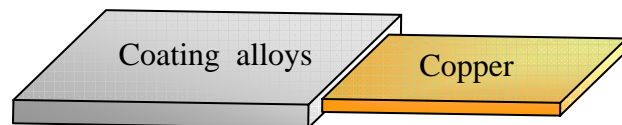
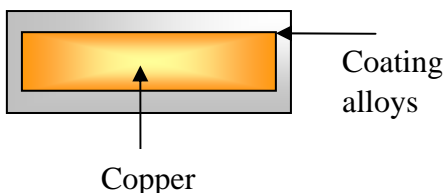
LJ-100 鍍錫銅帶 PV Ribbon Wire Alloy: Sn99.3/Cu0.7

1. Application 適用範圍
- PV Ribbon Wire has been developed for use in the solar module manufacturers .
本產品適用於太陽能光伏作業系統，為光伏產業提供獨特的解決方案。
This standard shall be provided for PV Ribbon Wire manufactured by our company.
The customer also can use it as inspection for buying and receiving the PV Ribbon Wire.
本標準書適用於本公司所生產之鍍錫銅帶，做為買方購買及收貨檢查之依據。

2. Name of Product 產品名稱
- LJ-100 PV Ribbon Wire
LJ-100 無鉛鍍錫銅帶

3. Manufacturing (Country) and Supplier Name 製造地(國)及供應商名稱
- Country of Origin 原產地 China . Taiwan 中國 . 台灣
Manufacturer 製造廠名稱 LIAN JING METAL MATERIAL CO.,LTD 聯景金屬材料（惠州）有限公司

4. Appearance and Dimension (For Reference) 外觀與尺寸 (參考用)



PV Ribbon Material : Cu99.99%
材料：選用GB/T 2059-----2000標準TU1無氧銅帶 ;銅含量 99.99%

Plating thickness : 0.015 ~ 0.03 mm
塗錫厚度 (mm) : 0.015 ≤ 單面 ≤ 0.03

Visual : 1). There shall be no flows.
 外觀 : 2). The surface shall be uniformly lustrous hue.
 3). The surface shall be free from thick
 無刮傷、露銅、焊錫脫落、表面錫粒等現象。

Dimensions: Thickness: 0.08 – 0.60 mm 厚度: 0.08 – 0.60 mm
 尺寸: Width : 1.0 – 10.0 mm 寬度: 1.0 – 10.0 mm

其他標準 : 基體扁銅線厚度公差 : ±0.007mm
 基體扁銅線寬度公差 : ±0.05 mm
 側邊彎曲度(蛇形彎):對於盤狀包裝產品，每1000mm長焊帶自中心處測量不超過6mm
 軸狀包裝產品，每1000mm長焊帶自中心處測量不超過10mm。

5. Characteristics 特性

Coating process: Hot-dip tinning
 鍍塗方式: 熱浸鍍
 Coating alloys: Sn99.3/Cu0.7
 鍍層合金: 錫99.3/銅0.7
 Tensile: Extra soft, < 235 MPa
 抗拉強度: 超軟態, < 235 MPa
 Elongation: > 30 %
 延展率: > 30 %
 焊帶電阻係數: $\leq (2.1\sim 2.5) \times 10^{-2} \Omega \text{mm}^2/\text{m}$

5.1 Chemical Composition 化學成分

Item 項次	Specification 規格										
	Composition 成分 (%)		Impurity 不純物 (%)								
Solder 錫錫	Sn	Cu	Pb	Sb	Zn	Fe	As	Ni	Bi	Cd	Al
		Bal.	0.7 ±0.1	<0.1%	<0.05	<0.002	<0.02	<0.03	<0.01	<0.2	<0.002

5.2 Physical Characteristic 物理特性

Alloy Designation 合金	Melting Point 熔點	Specific Gravity 比重
Sn99.3/Cu0.7	217~227	7.3g/cm ³

5.3 Solderability 鐔錫性

Item 項次	Specification 規格	Test Methods 測試方法
Spread Factor 擴散率	>83%	JIS Z3197-86

備註:熔解溫度 217~227

5.4 Recommended temperature of soldering iron tip : 370~430°C

(According to different thickness, adjust the suitable temperature of soldering)

建議鐔錫工作溫度為 : 370~430°C (依銅帶厚度不同, 調整最適合的工作溫度條件)

5.5 Soldering Test 鐔性試驗

In conducting the soldering test, a test piece of about 15cm long shall be taken and the length of about 3cm taken from this test piece is dipped for 3 seconds in the solder which is held at 235±5°C.

To see whether or not it is uniformly and completely soldered with the use of flux

取約 15cm 長度之鍍錫銅帶, 做成卷曲狀, 置於 235±5°C 之鐔錫爐中浸入 3cm 約 3 秒鐘後取出, 浸漬過的表面必須覆蓋一層光滑明亮的鐔料層, 只允許有少量分布的諸如針孔,

不潤濕或弱潤濕區域之類的缺陷, 其缺陷不應集中一塊, 且缺陷面積小於浸錫面積的 5%

6. Quality 品質

- 6.1 The Flux should be compounded and processed in such a manner as to be uniform in quality and should be free from deleterious material and other details that will after life serviceability or appearance. 助鐔劑應該要複合加工, 在品質上講求一致性並且是屬於無毒物料。其他細節是在生活上可使用或是外觀上可詳見。

6.2 Visual Inspection : 外觀檢驗

The visual inspection is using perception to inspect the PV Ribbon Wire. The important aspect of this inspection is the coated copper must free from:

- 1). Whether or not there is any flaw is checked.
- 2). Whether or not its surface has uniform lustrous hue be inspected.
- 3). Whether or not its surface free from thick.

以目視對完成品表面進行觀察, 看其表面有無露銅、刮傷、鐔錫脫落、表面錫粒現象。

6.3 Coating Thickness Test : 鍍層試驗

The measurement to PV Ribbon Wire is using the external micrometer (0.001mm) or its equivalents.

The test piece of about 10cm long shall be taken and the OD of the wire shall be measured at 3 points. Each point shall be measured 2 times

用校驗合且精確度為 0.001mm 的螺旋測微器進行三點檢測, 所測得之平均值則為被測成品之厚度。

6.3.1 Thickness Of Solder Coated Wire : 塗層厚度

After the 3 points of wire be measured, dip the test piece into nitric acid for about 5 minutes, the diameter of core wire shall be measured. One half of the two measurements will give the thickness of solder coated wire.

將鍍錫銅帶放在剝錫劑中浸泡, 在看見銅露出時取, 擦乾之後在錫被除去之導體線上測量

6.4 Test Of Tensile Strength And Elongation : 拉伸強度、伸長率試驗

In the tensile test, the tensile strength and elongation shall be measured by using the schopper's tensile strength tester as follows:

用原標距為 25cm 拉力試驗機做下列各項試驗.

6.4.1 The guage length of the test piece shall be 25cm.If the test piece cut inside of guage point, thus indicating as a failure to meet the requirements.The test regarded as unsatisfaction.

試驗時線材以標點 25cm 做試驗段，若在 25cm 以外拉斷，則此試驗無效.

6.4.2 If the test piece cut at supporting points during the tensile strength test,such the test is regarded as a failure.

試驗時以標點 25cm 做試驗段，若在兩端的支撐點拉斷，則此試驗無效

6.4.3 Calculation For Tensile Strength : 抗張強度之計算公式

$$\text{抗張強度(Tensile strength)(Kg)} = \frac{\text{抗張力 (Tensile reading) (Kg)}}{W \times L (\text{mm}^2)}$$

6.4.4 Calculation For Elongation Is As Folllow : 伸長率計算公式

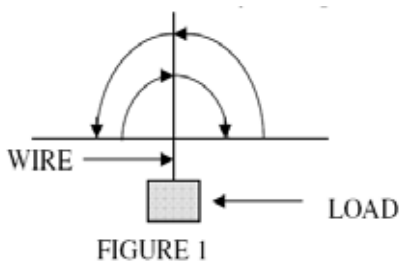
$$\text{伸長率 (Elongation)(\%)} = \frac{\text{拉伸後長度(Length A elongation)} - \text{拉伸前長度(Length B elongation)}}{\text{拉伸前長度 (Length B elongation)}} \times 100\%$$

6.4.5 Bend Test : 彎折試驗

In conducting the repeated bending test , 20cm long test piece will be taken place on

repeated bendingtester shown in figure 1. With one of the test piece immovably held,the test piece shall be repeated bent 90° to right and left alternately at the point where it held the load listed in table 2.

取約 20cm 長度之鍍錫銅帶，(如圖一所示) 將一端固定於彎折試驗機，另一端依據 表2 規定加荷重。將固定於試驗機之鍍錫銅帶，做左右90度之往返彎折，至斷線為止，計算斷線時之彎折次數，次數之計算方法是以左右往復一回為一次，如圖一所示



厚度 (THICKNESS)	荷重 (LOAD)
0.20mm down	250g/3times
0.20mm(include) up	500g/3times

TABLE 2

6.4.6 Heating Proof Test : 耐熱試驗

Take part of the PV Ribbon Wire and test it in the thermostat according to table 3.

The above inspection item can be negotiated by the buyers and manufacturers, increase or decrease the inspection planning item according to MIL-STD-105E, S-4 grade, AQL=1.5.

取部分鍍錫銅帶，置於烤箱內依表3所示進行烘烤，再取出進行外觀檢查

以上之檢驗項目，可依據購買者及製造者雙方協議，增加或減少檢驗項目，其抽樣依MIL-STD-105E 檢驗水準S-4 級 AQL=1.5 進行抽樣

Heating Proof Test	耐熱性
1) 95% TIN heating proof test : 170±5°C/4H good	95%錫耐熱 170±5°C/4H 無明顯變色現象
2) Pure TIN heating proof test : 190±5°C/0.5H good	純錫耐熱 190±5°C/0.5H 無明顯變色現象
3) 63/37 TIN heating proof test : 175±5°C/2H good	焊錫耐熱 175±5°C/2H 無明顯變色現象

TABLE 3

7. Marking and Packing 標示與包裝

PV Ribbon Wire should be coiled to the axle and package with the specified method with 10 axles in one package. Each box shall be indicated following items on the side of axle in and on the package.

鍍錫銅帶包裝是盤狀、捲軸包裝、切斷包裝，每一個包裝都應標示，如下所示

- 7.1 Manufacturer's name or trademark 製造商名稱或商標
- 7.2 Production date or code (including production lot number) 生產日期或型號(包括生產料號)
- 7.3 Designation, symbol and trade name of the product 產品名稱，符號，及產品交易名稱
- 7.4 Weight 重量
- 7.5 Guaranteed shelve life 產品保固期限

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