

TO: 翰禹科技股份有限公司

**SPECIFICATION FOR APPROVAL**

DESCRIPTION : 2.4GHz Antenna SMA (白色外罩)  
CUSTOMER DWG. NO. /PART NO : 8603511110010  
KINSUN PROD. NO : 6602108083  
DATE : 2008.04.18



PLEASE RETURN TO US ONE COPY OF “ SPECIFICATION FOR APPROVAL ” WITH YOUR APPROVED SIGNATURES

**APPROVED SIGNATURES**

|  |  |
|--|--|
|  |  |
|--|--|

|             | <b>APPROVED</b>  | <b>CHECKED</b> | <b>PREPARED</b>    |
|-------------|------------------|----------------|--------------------|
| <b>NAME</b> | <b>Yang Alan</b> | <b>Roy Wu</b>  | <b>Stella Wang</b> |

**慶陞工業股份有限公司**



**KINSUN INDUSTRIES INC.**

桃園縣中壢市普忠路 211 巷 20 號

TEL : 886-3-4353551

FAX : 886-3-4353951

<http://www.kinsun.com>

e-mail: roy@kinsun.com



Certificate No.

*TW-HSPM-1056*

Issued:  
Revision:  
Expiration:

March 16, 2007  
N/A  
March 15, 2010

**IECQ Certificate of Hazardous Substance Process Management (HSPM)  
applicable to the European Directive 2002/95/EC ("RoHS") requirements.**

The United States National Authorized Institution (ECCB)  
and the Supervising Inspectorate (SGS Taiwan Ltd.) certify that

**Kinsun Industries Inc.**

No. 20, Lane 211,  
Pu-Chung Road,  
Chung-Li City, Taoyuan Hsien, Taiwan

Has developed and implemented Hazardous Substances Process Management, procedures, and related processes in compliance with the applicable requirements for HSPM organization approval which is in accordance with the Basic Rules IECQ-01 and Rules of Procedure QC 001002-5 "IECQ Hazardous Substance Process Management" of the IEC Quality Assessment System for Electronic Components (IECQ), and with respect to the Specification QC 080000 IECQ HSPM.

**This certification is applicable to all electronic components and related materials and processes for the**

design and manufacture of connector for telecomm & ICT, RF-Antenna, Stamping-parts.

**Issued by Certification Authorities:**



Electronic Component Certification Board

Signed:

Stanley H. Salot Jr. - President, ECCB

ECCB  
PO Box 9041, Midland, Texas 79708  
Tel: (432) 697-9970 Fax: (866) 260-6181  
Web Site: [www.eccb.org](http://www.eccb.org)



SGS Taiwan Ltd.  
136-1, Wu Kung Road,  
Wuku Industrial Zone,  
Taipei County, Taiwan  
Web Site: [www.sgs.com](http://www.sgs.com)

The validity of this certificate is maintained through on-going surveillance inspections.

Note: This certificate is valid only in conjunction with the approval document(s). This approval and this certificate may be suspended or withdrawn in accordance with the Rules of Procedure of the IECQ. This certificate remains the property of the body which granted it.

Certificate TW97/10964QA

The management system of

# KINSUN INDUSTRIES INC.

NO. 20, LANE 211, PU-CHUNG ROAD, CHUNG-LI CITY,  
TAOYUAN HSIEN, TAIWAN



has been assessed and certified as meeting the requirements of

## ISO 9001:2000

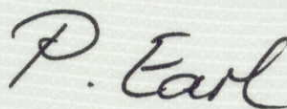
For the following activities

**Design and manufacture of connector for telecomm & ICT,  
RF- Antenna, Stamping- parts.**

Further clarifications regarding the scope of this certificate and the applicability of  
ISO 9001:2000 requirements may be obtained by consulting the organisation

This certificate is valid from 13 October 2006 until 12 October 2009  
Issue 4. Certified since October 1997

Authorised by



005

SGS United Kingdom Ltd Systems & Services Certification  
Rossmore Business Park Ellesmere Port Cheshire CH65 3EN UK  
t +44 (0)151 350-6666 f +44 (0)151 350-6600 www.sgs.com



RoHS COMPLIANT

MECHANICAL

Antenna Cover : TPE

Antenna Base : PC UL 94V-0

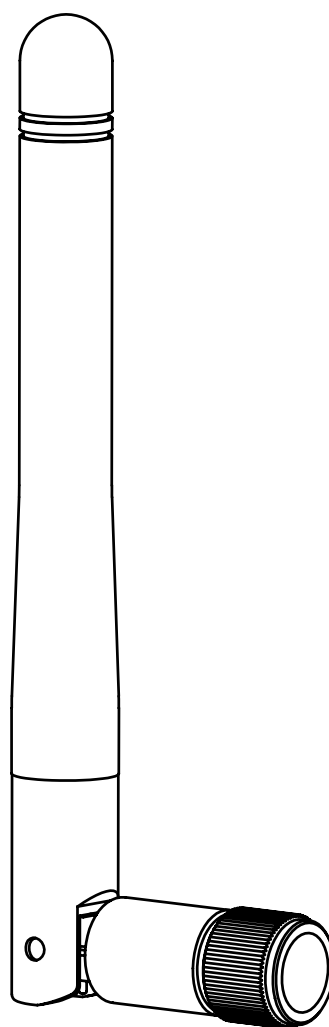
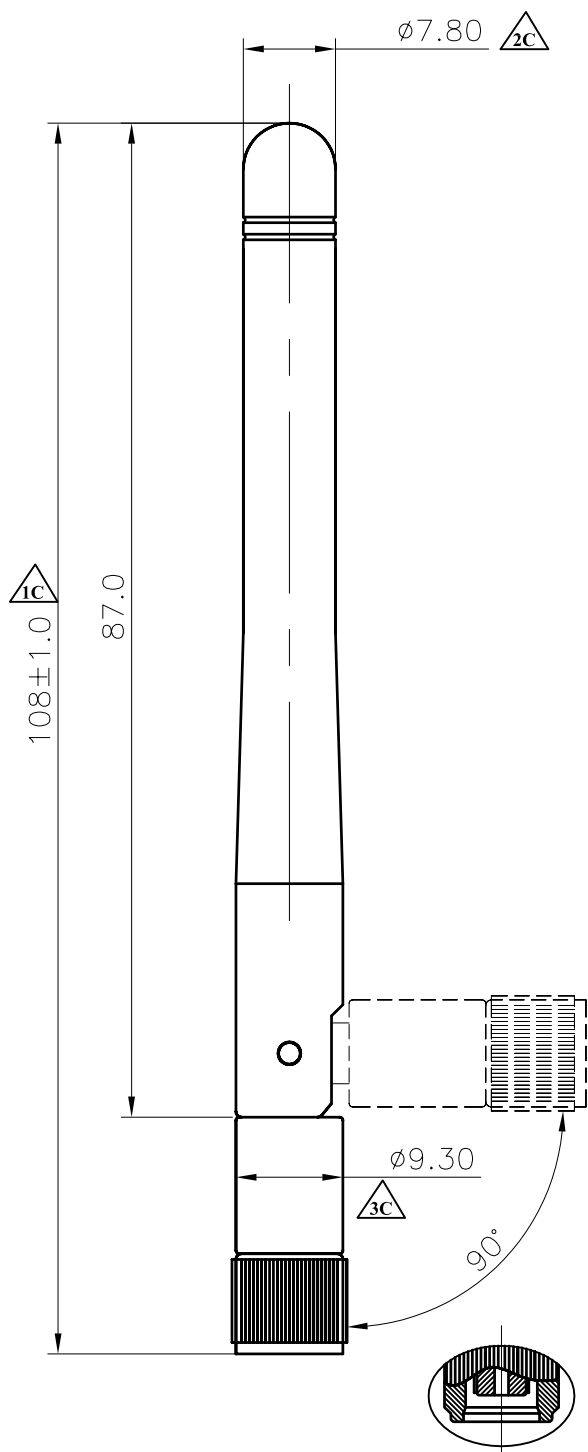
Color : White

ELECTRICAL

Frequency : 2.4GHz

Connector : SMA-Male-RP

(PLATING GOLD)



※凡標註△記號者, 為品管檢驗之尺寸

|                              |                                |                                                                   |           |                             |
|------------------------------|--------------------------------|-------------------------------------------------------------------|-----------|-----------------------------|
| 設計DR.<br>Marco<br>2008/02/21 | 核准APPD.<br>Jerry<br>2008/02/21 | 容許公差<br>.XXX ±0.10<br>.XX ±0.25<br>.X ±0.38<br>X ±0.50<br>ANG ±3° | TOLERANCE | 品名<br>ARTICLE 6602-2.4G-SMA |
| 版本說明 REVISION NOTE           |                                |                                                                   |           | 圖號<br>DWG NO. 6602108083    |
| KINSUN 慶陞                    |                                | 單位 UNIT mm                                                        |           | 比例 SCALE 1.5/1              |
|                              |                                | 張數 SHEET 1/1                                                      |           | 版本 REV. A                   |

## TECHNICAL DATA

### Electrical Properties

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Frequency Range: 2.4~2.5GHz

Impedance: 50 Ohm nominal

VSWR : 1.92Max.

Radiation: Omni

Return loss : -10dB Max.

Electrical Wave : 1/2 wavelength dipole

Gain : 2.0dBi (PEAK)

Admitted power : 1W

Polarization: Vertical

### Mechanical Properties

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Antenna Cover: PU

Antenna Base : PC

Color : WHITE

Operation Temperature:-20°C~+60°C

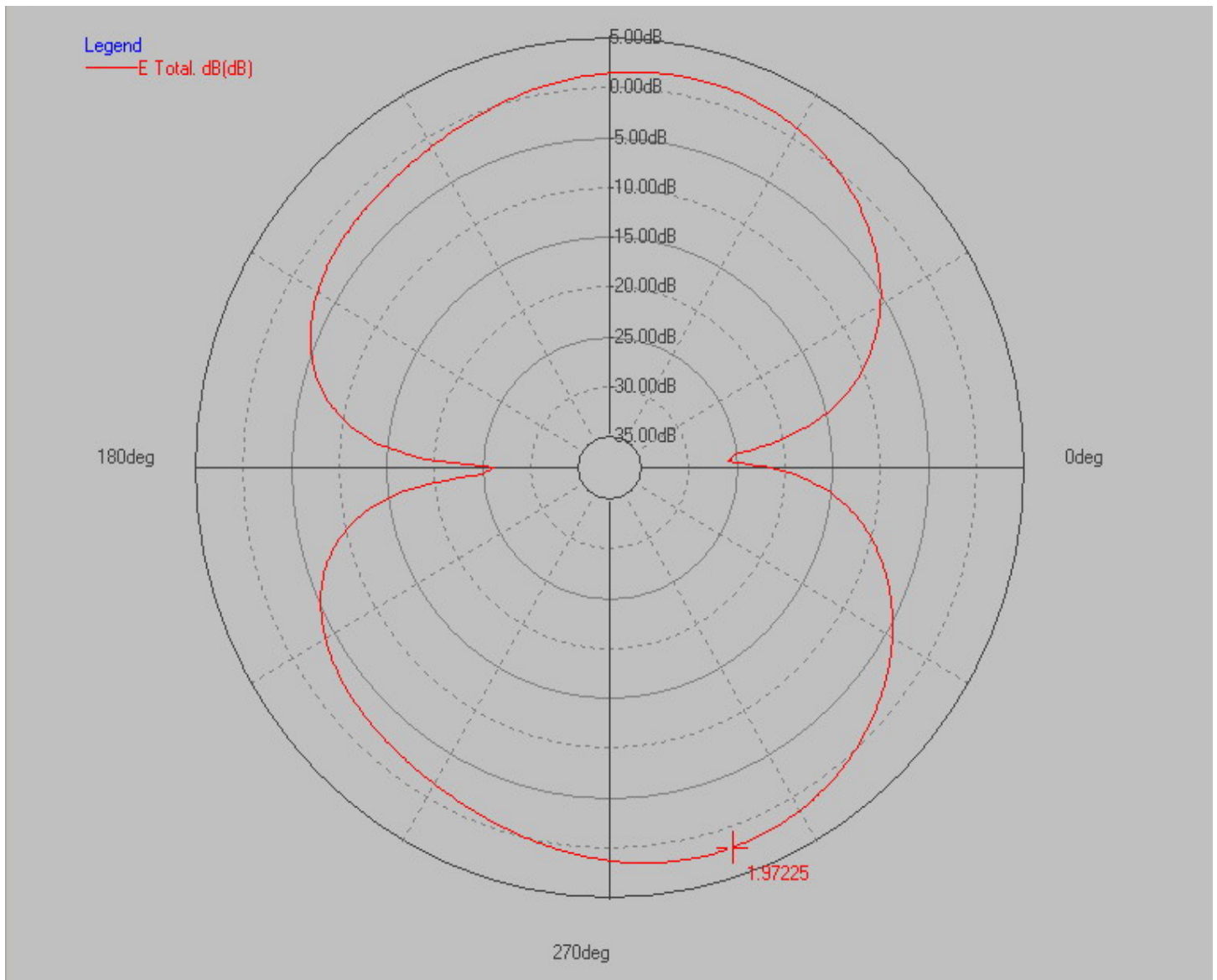
Storage Temperature:-30°C~+75°C

Connector: SMA MALE RP

Brand / Model : 6602108083

Remark : 2450MHz

Tested by : Allen Yu



-- : Max. deg

\*Unit : dBi

Frequency(MHz) : **2450.00**

Pattern Field : **E plane**

Average Gain(dB) : **-2.46dB**

Maximum Gain(dB) : **1.97dB**

Maximum Gain(degree) : **-71.43**

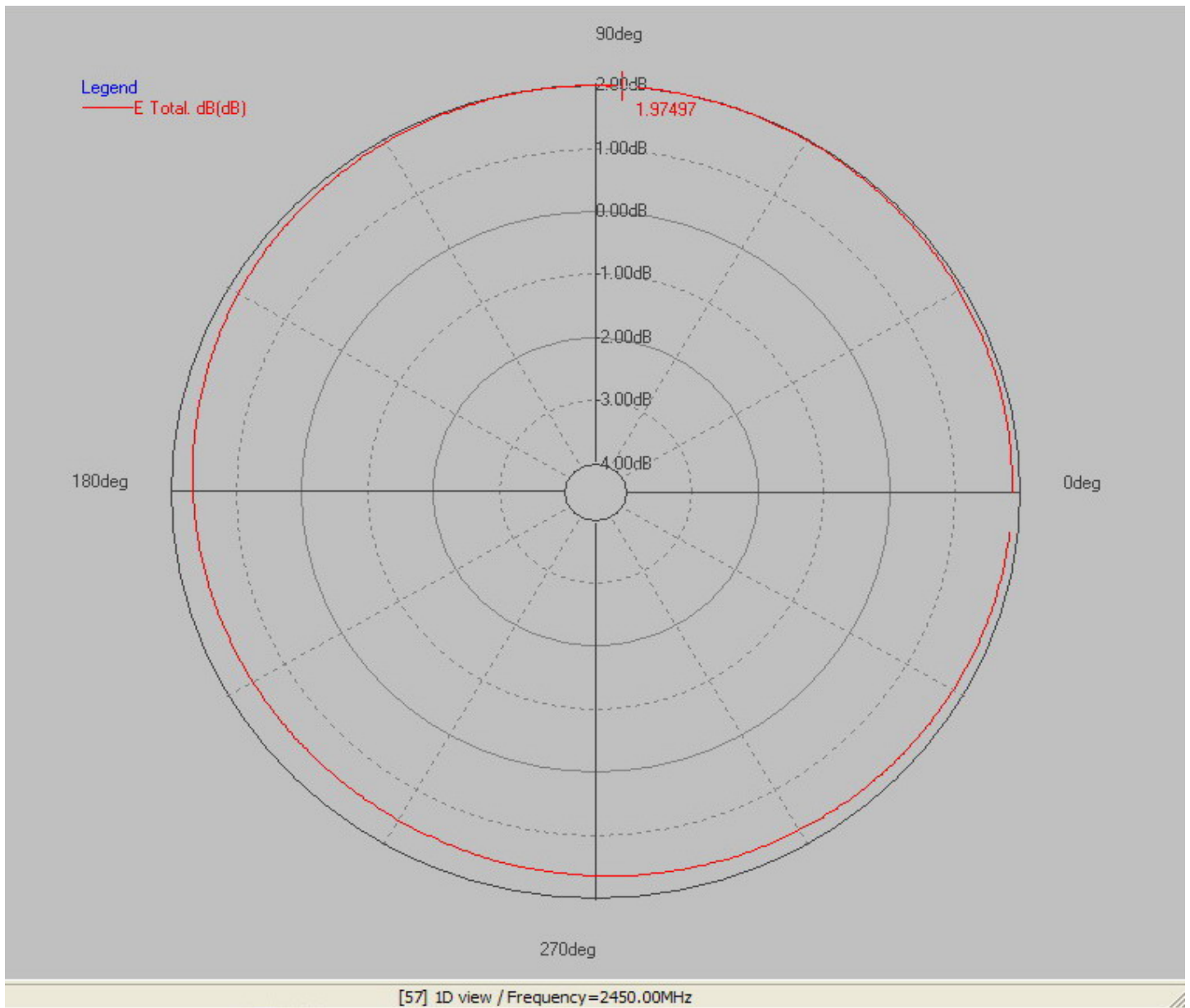
Minimum Gain(dB) : **-26.29dB**

Minimum Gain(degree) : **-180.00**

Brand / Model : 6602108083

Remark : 2450MHz

Tested by : Allen Yu



-- : Max. deg

\*Unit : dBi

Frequency(MHz) : **2450.00**

Pattern Field : **H plane**

Average Gain(dB) : **1.78dB**

Maximum Gain(dB) : **1.97dB**

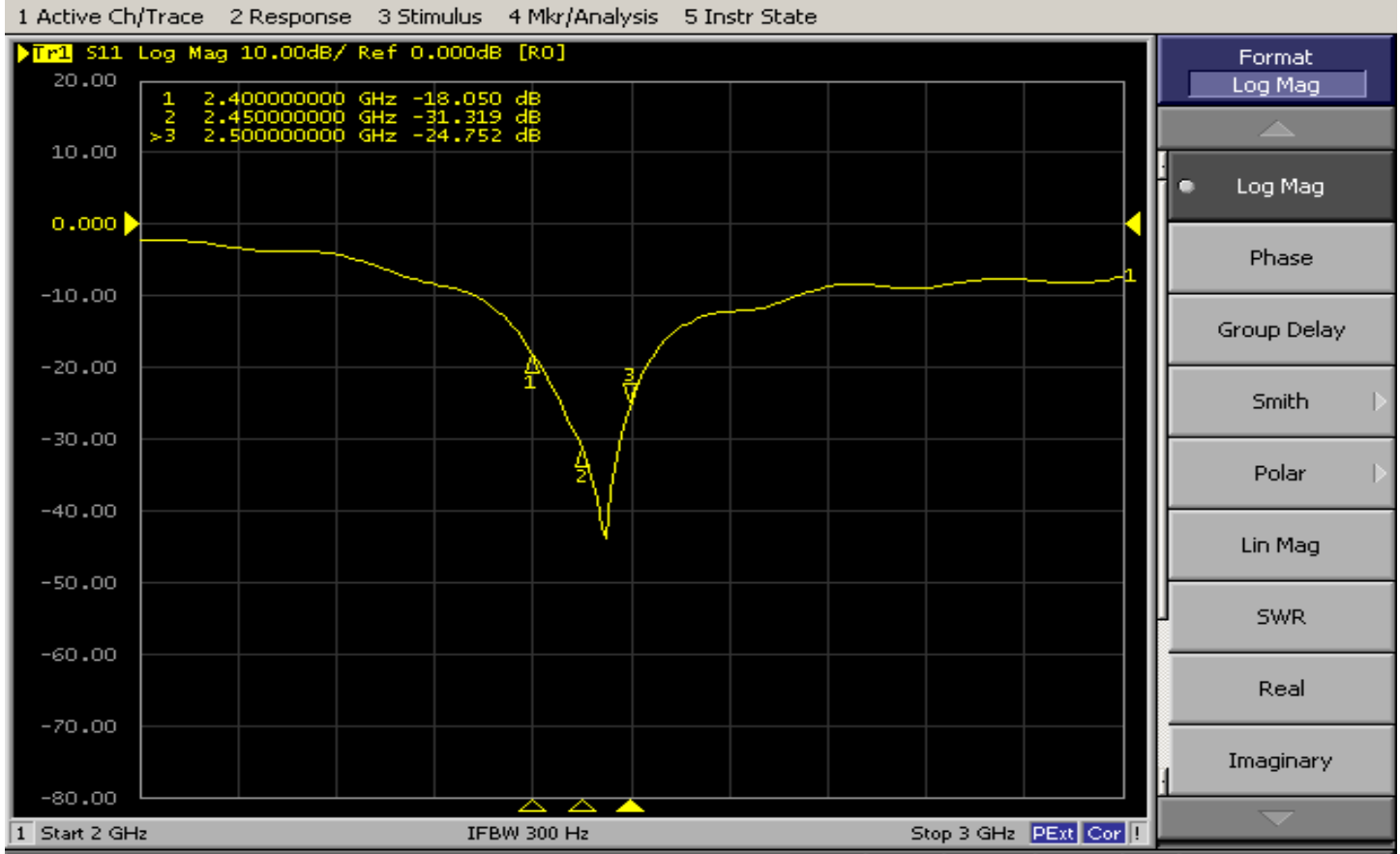
Maximum Gain(degree) : **85.50**

Minimum Gain(dB) : **1.54dB**

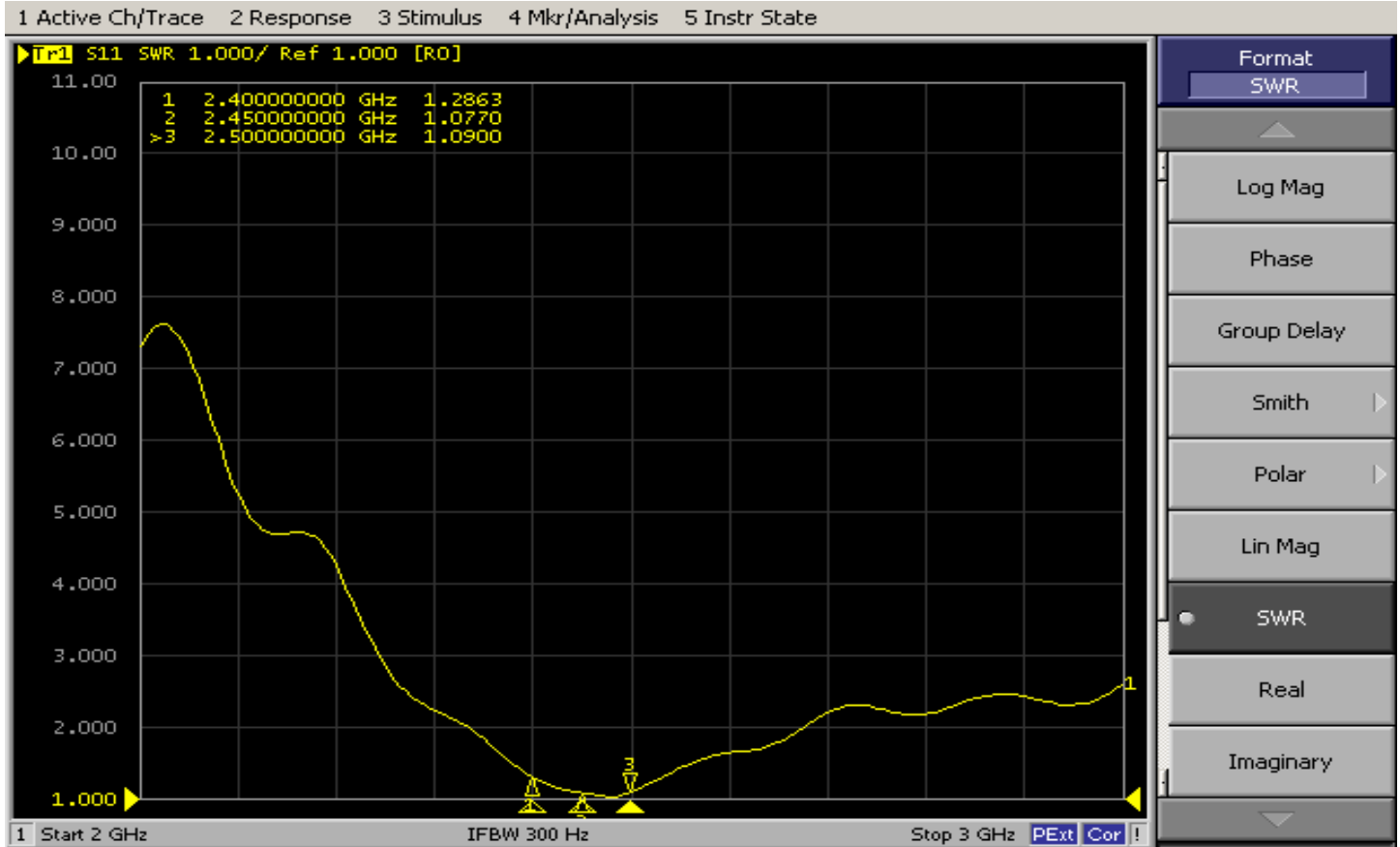
Minimum Gain(degree) : **228.81**

6602108083

S11



VSWR





# Elastollan<sup>®</sup> S Series

## Technical Bulletin

## Polyester Type

Elastollan<sup>®</sup> S series of products are polyester-based thermoplastic polyurethanes that exhibit good hydrolytic stability. They also exhibit good oil, fuel and solvent resistance. These products can be injection molded, blow molded and extruded. All grades should be dried before processing. Elastollan<sup>®</sup> products can be stored for up to 1 year in their original container. Containers should be stored in a cool, dry area.

**Extrusion grades: S90A**

**Injection molding grades: S80A to S60D**

| Physical Properties                    | Units               | ASTM Method                    | S80A <sup>3</sup> | S85A <sup>3</sup> | S90A <sup>3</sup> | S95A <sup>3</sup> | S98A <sup>3</sup> | S60D <sup>3</sup> |
|----------------------------------------|---------------------|--------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Specific gravity                       | gr./cm <sup>3</sup> | D-792                          | 1.21              | 1.22              | 1.23              | 1.23              | 1.24              | 1.25              |
| Hardness                               | Shore A<br>D        | D-2240                         | 80 ± 2            | 85 ± 2            | 92 ± 2            | 96 ± 2            | 98 ± 2            | -                 |
|                                        |                     |                                |                   | -                 | 41 ± 2            | 48 ± 2            | 54 ± 2            | 60 ± 2            |
| Tensile strength                       | MPa<br>psi          | D-412                          | 27.5              | 34                | 39                | 42                | 42                | 43                |
|                                        |                     |                                | 4000              | 4900              | 5600              | 6100              | 6100              | 6200              |
| Tensile stress<br>@100 %<br>elongation | MPa<br>psi          | D-412                          | 5.5               | 6.9               | 11                | 14                | 19                | 22                |
|                                        |                     |                                | 800               | 1000              | 1550              | 2000              | 2700              | 3200              |
| @300 %<br>elongation                   | MPa<br>psi          |                                | 9.6               | 14                | 20                | 26                | 32                | 37                |
|                                        |                     |                                | 1400              | 1980              | 2900              | 3800              | 4700              | 5300              |
| Elongation @brk.                       | %                   | D-412                          | 650               | 690               | 540               | 510               | 425               | 450               |
| Tensile set @brk.                      | %                   | D-412                          | 45                | 35                | 55                | 70                | 80                | 110               |
| Tear strength                          | N/mm<br>lb./in.     | D-624<br>DIE C                 |                   | 104               | 128               | 154               | 185               | 195               |
|                                        |                     |                                |                   | 590               | 730               | 875               | 1050              | 1150              |
| Abrasion resistance                    | mg<br>(Loss)        | D-1044 <sup>2</sup><br>(Taber) | 25                | 25                | 25                | 30                | 50                | 50                |

*Test samples were cured 20 hours @ 100 °C before testing.*

**NOTE:** <sup>1</sup> These products can only be ordered in minimum quantities. Please contact your sales representative for details.

<sup>2</sup> H-18 wheel, 1000 gm weight and 1000 cycles.

<sup>3</sup> Products with an N designation do not contain hydrolytic stabilizers. Contact Elastollan Technical Service Rep for further information

**Caution:** Contact with product dusts from regrinding operations may cause temporary irritation of the eyes and the respiratory tract. Use with local exhaust. Under hot melt processing conditions (170-230 °C), wear personal protective equipment to prevent thermal burns.

**First aid:** *Eyes*-Flush eyes with flowing water at least 15 minutes. If irritation develops, consult a physician. *Skin*-Skin contact with hot melt may cause thermal burns. Call a physician immediately. *Inhalation*-If vapors generated from the hot melt process are inhaled, move to fresh air. Aid in breathing. If breathing difficulties develop, see a physician immediately.

**In case of fire:** Use water fog, foam, CO<sub>2</sub>, or dry chemical extinguishing media. Firefighters should be equipped with self-contained breathing apparatus and turnout gear.

**Disposal:** Waste material, unused contents and empty containers must be disposed of in accordance with applicable local, state or federal regulations. Refer to our Material Safety Data Sheet for specific disposal instructions.

**In case of chemical emergency:** Call CHEMTREC day or night for assistance and information concerning spilled material, fire, exposure and other chemical accidents. 800-424-9300

**Attention:** This product is sold solely for use by industrial institutions. Refer to our Material Safety Data Sheet regarding safety, usage, applications, hazards, procedures and disposal of this product. Consult your supervisor for additional information.

No warranties of any kind, either express or implied, including warranties of merchantability or fitness for a particular purpose, are made regarding products described or designs, data or information set forth or that the products designs, data or information may be used without infringing the intellectual property rights of others in no case shall the descriptions information, data or designs provided be considered a part of our terms and conditions of sale. Further, you expressly understand and agree that the descriptions, designs, data and information furnished by BASF hereunder are provided gratis and BASF assumes no obligation or liability for the description, designs data and information given or results obtained, all such being given and accepted at your risk.

BASF Corporation, 1609 Biddle Avenue, Wyandotte, Michigan 48192 (800) 892-3111 x21, [www.basf.com/elastollan](http://www.basf.com/elastollan)

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# BASF

4/6

2005年10月13日

台灣帝人化成(股)有限公司

パンライト試験成績表

拝啓 貴社ますますご清祥の事と、お慶び申し上げます。  
 平素は、パンライトをお引き立て賜り厚く御礼申し上げます。  
 さて、標記の件につきまして、下記の通りご報告いたします。

記

G R A D E : LN - 1250GCOLOR NO. : NAT項目：分子量測定

| LOT NO.  | Q'TY(KGS) | 規格値         | 測定値    | 合否判定 |
|----------|-----------|-------------|--------|------|
| H4605928 | 9,750     | 21,600±1000 | 21,630 | OK   |

MFR測定

| LOT NO.  | Q'TY(KGS) | 規格値       | 測定値  | 合否判定 |
|----------|-----------|-----------|------|------|
| H4605928 | 9,750     | 10.0±3.0% | 11.5 | OK   |



⊗ ⊗



# 藍菱電子科技有限公司

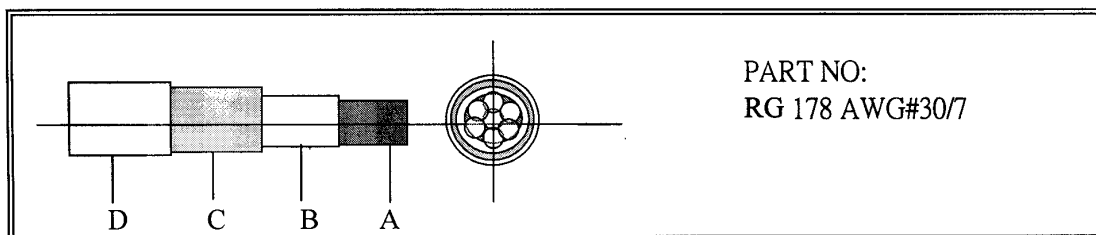
LEOFLON ELECTRONICS INDUSTRIAL CO., LTD.

TEL:886-2-2903-8223 FAX:886-2-2908-1221

台北縣新莊市中正路649-3號10樓

## 鐵氟龍高頻同軸電纜線

FEP TEFLON Coaxial Cable



PART NO:  
RG 178 AWG#30/7

### SPECIFICATION

#### **A: CONDUCTOR**

|           |                      |
|-----------|----------------------|
| Material  | Silver Plated Copper |
| Stranding | 7x0.102mm            |
| Diameter  | 0.3mm                |

#### **B: INSULATION**

|           |        |
|-----------|--------|
| Material  | FEP    |
| Thickness | 0.28mm |
| Diameter  | 0.86mm |

#### **C: SHIELD**

|             |                      |
|-------------|----------------------|
| Shield Type | Braid                |
| Material    | Silver Plated Copper |
| Coverage    | 95%                  |
| Diameter    | 1.3mm                |

#### **D: JACKET**

|                  |        |
|------------------|--------|
| Material         | FEP    |
| Thickness        | 0.25mm |
| Overall Diameter | 1.8mm  |

### MECHANICAL CHARACTERISTICS

|                             |               |
|-----------------------------|---------------|
| Operating Temperature Range | -70°C ~ 200°C |
| Voltage                     | 30V           |
| Flame Test                  | UL-94         |



# 藍菱電子科技有限公司

LEOFLON ELECTRONICS INDUSTRIAL CO., LTD.

TEL:886-2-2903-8223 FAX:886-2-2908-1221

台北縣新莊市中正路649-3號10樓

Tensile Strength

Insulation 2479PSI

Jacket: 2867PSI

Elongation

Insulation 310%

Jacket: 310%

## ELECTRONICAL CHARACTERISTICS

Nom. Impedance

50Ohms

Nom. Capacitance

29.0pF/ft

Nom. Velocity of Propagation

69%

Dielectric Strength

6KV 0.5mA/Minute

Spark Test

6KV

VSWR (0~6GHz)

Less 1.3

Attenuation (dB/M)

| Frequency(GHz) | Attenuation(dB/M) |
|----------------|-------------------|
| 1GHz           | 1.84              |
| 2GHz           | 2.82              |
| 3GHz           | 3.42              |
| 4GHz           | 4.10              |
| 5GHz           | 4.75              |
| 6GHz           | 5.35              |

銅管材質證明

東莞信泰隆五金制品有限公司  
SHIN TAY LONG FIVEMETAL PRODUCT CO.,LTD.

產品質量證明書



|      |               |              |        |           |        |
|------|---------------|--------------|--------|-----------|--------|
| 客戶:  | 豐茂材料公司        |              | 日期:    | 2007.8.12 |        |
| 品名   | 規格            | 狀態           | 製造方法   | 數量        |        |
| H65  |               | H            |        |           |        |
| 化學成份 | 銅(Cu)         | 鐵(Fe)        | 鉛(pb)  | 鋅(Zn)     | 雜質     |
|      | 64.878%       | 0.012%       | 0.014% | 35.093%   | 0.003% |
| 機械性能 | 抗拉強度<br>(不少於) | 延伸率<br>(不少於) | 直徑公差   |           |        |
|      |               |              |        |           |        |

主管: 胡偉才

化驗員: 李國強



# SMA Specifications

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## 1. Description:

The Connector is Reverse SMA join on the Antenna

## 2. Electrical Properties

|                                          |                                                                             |
|------------------------------------------|-----------------------------------------------------------------------------|
| 2-1 Impedance.....                       | 50 Ohms                                                                     |
| 2-2 Frequency Range.....                 | 0~8 Ghz                                                                     |
| 2-3 SWR.....                             | 1.1 (Max.)                                                                  |
| 2-4 Working Voltage.....                 | ≤250 Vrms                                                                   |
| 2-5 Dielectric Withstanding Voltage..... | ≤750 Vrms                                                                   |
| 2-6 Insulation Resistance.....           | ≥2000 Megohms                                                               |
| 2-7 Contact Resistance.....              | Center contact: 3.0 Milliohms (Max.)<br>Outer contact: 2.5 Milliohms (Max.) |
| 2-8 Insertion Loss.....                  | 0.2 dB                                                                      |

## 3. Mechanical Properties :

- 3-1 Recommended coupling nut torque.. 4.0 in.lbs.~8.8 in.lbs.
- 3-2 Coupling nut retention force..... ≥50 lbs.
- 3-3 Contact captivation axial..... ≥5 lbs.

## 4. Environmental Ratings

- 4-1 Operating Temperature..... -65°C ~ +165°C
- 4-2 Thermal Shock..... MIL-STD-202, Method 107, Condition B
- 4-3 Corrosion..... MIL-STD-202, Method 101, Condition B
- 4-4 Shock..... MIL-STD-202, Method 213, Condition I
- 4-5 Vibration..... MIL-STD-202, Method 204, Condition D
- 4-6 Moisture Resistance..... MIL-STD-202, Method 106

## 5. Material Specifications

- 5-1 Body..... Brass Per JIS H3250 C3604 BD, Gold Plated  
Per MIL-G-45204
- 5-2 Contact..... Beryllium Copper Per QQ-C-530, Gold Plated  
Per MIL-G-45204
- 5-3 Insulator..... PTFE Fluorocarbon Per ASTMD 1710



慶陞工業股份有限公司

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FAX : 886-3-4353951

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e-mail: [infoa@kinsun.com](mailto:infoa@kinsun.com)

# SMA Test Report

Name: Ping

Date: 2004/5/3

|      |                  |                   |
|------|------------------|-------------------|
| N= 1 | Au= 7.09 $\mu$ " | Ni= 186.2 $\mu$ " |
| N= 2 | Au= 6.95 $\mu$ " | Ni= 131.5 $\mu$ " |
| N= 3 | Au= 7.01 $\mu$ " | Ni= 117.6 $\mu$ " |
| N= 4 | Au= 6.92 $\mu$ " | Ni= 177.8 $\mu$ " |
| N= 5 | Au= 7.50 $\mu$ " | Ni= 209.6 $\mu$ " |

## BLOCK RESULT

Product : Au / Ni / Cu

|                        | Au            | Ni            |
|------------------------|---------------|---------------|
| Mean Value.....X :     | 7.10 $\mu$ "  | 164.4 $\mu$ " |
| Meas. Time..... :      | 10 s          |               |
| Standard Dev. ....S :  | 0.241 $\mu$ " | 38.7 $\mu$ "  |
| C. O. V. [G].....V :   | 3.39 %        | 23.51 %       |
| No of Readings.....n : | 5             | 5             |
| Range.....R :          | 0.60 $\mu$ "  | 92.1 $\mu$ "  |
| Min. Readings..... :   | 6.90 $\mu$ "  | 117.4 $\mu$ " |
| Max. Readings..... :   | 7.51 $\mu$ "  | 209.6 $\mu$ " |

Check : BEN

Test: jaff



慶陞工業股份有限公司

KINSUN INDUSTRIES INC.



桃園縣中壢市普忠路 211 巷 20 號

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<http://www.kinsun.com>

e-mail: [info@kinsun.com](mailto:info@kinsun.com)

Name: Body

Date: 2001/12/13

|      |                  |                   |
|------|------------------|-------------------|
| N= 1 | Au= 7.03 $\mu$ " | Ni= 164.5 $\mu$ " |
| N= 2 | Au= 7.70 $\mu$ " | Ni= 208.8 $\mu$ " |
| N= 3 | Au= 8.04 $\mu$ " | Ni= 210.8 $\mu$ " |
| N= 4 | Au= 7.75 $\mu$ " | Ni= 204.6 $\mu$ " |
| N= 5 | Au= 7.36 $\mu$ " | Ni= 210.4 $\mu$ " |

BLOCK RESULT

Product : Au / Ni / Cu

|                        | <u>Au</u>     | <u>Ni</u>     |
|------------------------|---------------|---------------|
| Mean Value.....X :     | 7.61 $\mu$ "  | 199.7 $\mu$ " |
| Meas. Time..... :      | 10 s          |               |
| Standard Dev. ....S :  | 0.332 $\mu$ " | 19.9 $\mu$ "  |
| C. O. V. [G].....V :   | 4.36 %        | 9.96 %        |
| No of Readings.....n : | 5             | 5             |
| Range.....R :          | 0.82 $\mu$ "  | 46.4 $\mu$ "  |
| Min. Readings..... :   | 7.20 $\mu$ "  | 164.5 $\mu$ " |
| Max. Readings..... :   | 8.02 $\mu$ "  | 210.9 $\mu$ " |

Check :

Test :



慶陞工業股份有限公司

KINSUN INDUSTRIES INC.



桃園縣中壢市普忠路 211 巷 20 號

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<http://www.kinsun.com>

e-mail: [info@kinsun.com](mailto:info@kinsun.com)



# SMA Test Report

## 鹽水噴霧試驗記錄表

試驗日期：  
試驗號碼：  
試驗時間：08:00 ~ 18:00 共計10小時

### 試驗項目及內容

- 1 氯化鈉品質..... 工業用一般用鹽
- 2 蒸餾水品質..... 純水
- 3 外觀要求程度..... 10 (小時)
- 4 噴霧採取器：
  - 4.1 噴霧量..... 15.6 (ml/80cm/h)
  - 4.2 收集溶液在室的比重或濃度..... 1.0321
  - 4.3 酸鹼濃度..... 6.7
- 5 試樣:
  - 5.1 種類..... 銅材
  - 5.2 形狀..... N/A
  - 5.3 尺度..... N/A
  - 5.4 數目..... 5 pcs
- 6 壓縮空氣壓力..... 1.00 kg f/cm
- 7 試驗室相對濕度..... 90 %
- 8 試驗室溫度..... 35±1 °C
- 9 壓力桶溫度..... 47±1 °C
- 10 鹽水桶溫度..... 35±1 °C
- 11 其它..... 2~3 μ(Ni) ; 1.2 μ" (Au)

### 判定

- 1. 依據標準判定..... 符合 RN 8 級↑
- 2. 依其它方法判定..... N/A



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<http://www.kinsun.com>

e-mail: [infoa@kinsun.com](mailto:infoa@kinsun.com)

# SMA Brass

## 檢驗報告表

編號:

|                       |                        |             |     |
|-----------------------|------------------------|-------------|-----|
| 客 戶                   | 工業股份有限公司               |             |     |
| 品 名                   | FREE CUTTING BRASS ROD | 丸 5.0 m/m   |     |
| 規 格                   | JIS H3250 C3604 BD     |             |     |
| 數 據<br>項 目            | 標 準 值                  | 實 測 值       | 備 註 |
| 化<br>學<br>成<br>份<br>% | Cu                     | 57.0 - 61.0 |     |
|                       | Pb                     | 1.8 - 3.7   |     |
|                       | Fe                     | < 0.5       |     |
|                       | Sn+Fe                  | < 1.2       |     |
|                       | Zn                     | REMAINDER   |     |
| 其<br>它                |                        |             |     |
|                       |                        |             |     |
|                       |                        |             |     |



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# SMA Beryllium Copper

## 线

线是种类最多的铍铜产品，没有任何产品在应用上有线这样广泛。

圆线之使用包括：

- 长行程螺旋弹簧
- 小型机电插座
- 冷锻钉头紧固件
- 弹簧负载测试探针
- 轻量耐疲劳线缆
- BANDOLIERED 连接器接点
- 编织屏蔽布
- 防腐及防生物恶臭海上线及筛网结构
- 眼镜框

线拉直切成一定长度称为杆 (ROD)。

线之断面也可以不是圆形，“异形”线在特殊的应用中担任了重要的角色，如扁线用于可收缩天线及电报电缆，扁线也可用于代替窄带，虽然有宽度对厚度的比，如果超过此比就不可行，但在许多情形下可达到节约。扁线可减少剪裁毛边。

方线用于电子接点，特别是线的包封需要尖锐的角时，可以达到可靠的接触。偶尔，方形及长方形的线，需要斜角以定向。这些需求及其他较不普遍的形状的铍铜线均可以达到。

本公司所供应之线直径自12.7mm至1.3mm，其公差如表所示。较细的线可以向本公司定单或从本公司之许多再制造商获得。

线可以退火态 (A) 或四分之一硬 (1/4H)、半硬 (1/2H) 或全硬 (H) 供应。但在特别情况下也供应预硬化 (亦称“预处理”) 线，本产品适用于各种强度与耐久性的产品，可达到柔软而严格的成型要求。

| 技术规格        |           |                                                                         |
|-------------|-----------|-------------------------------------------------------------------------|
| BRUSH<br>合金 | UNS<br>编号 | 线材                                                                      |
| 25          | C17200    | ASTM B 197<br>QQ-C-530<br>AMS 4725<br>SAE J 461, SAE J 463<br>JIS H3270 |
| M25         | C17300    | ASTM B 197<br>QQ-C-530                                                  |
| 3           | C17510    | *                                                                       |
| 10          | C17500    | *                                                                       |

ASTM 美国材料试验学会  
 QQ 联邦规格  
 SAE 机动车辆工程师学会  
 AMS 太空材料规格 (SAE 刊载)  
 JIS 日本工业规格  
 DIN 德国工业规格

注：除另有规定外，材料均依 ASTM 标准制造。  
 \* 可获得此产品，技术规格在制定中。

| 公差<br>(毫米) |      |                                |       |
|------------|------|--------------------------------|-------|
| 线直径        |      | BRUSH WELLMAN<br>标准公差<br>(+或-) |       |
| 以上         | 以下   | 冷拉                             | 退火    |
| 1.27       | — 2  | 0.008                          | 0.025 |
| 2          | — 3  | 0.01                           | 0.05  |
| 3          | — 6  | 0.015                          | 0.05  |
| 6          | — 8  | 0.02                           | 0.05  |
| 8          | — 10 | 0.025                          | 0.05  |
| 10         | — 12 | 0.025                          | 0.05  |

注：非圆形之公差为直径公差的一半。



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# SMA Beryllium Copper

鍍銅線之機械及電學性質

| 合金<br>Alloy                        | 狀態<br>(* )      | 熱處理             | 線直徑<br>mm | 抗拉強度<br>kg/mm <sup>2</sup> | 屈服強度<br>kg/mm <sup>2</sup> | 伸長百分比 | 導電百分比<br>IACS |
|------------------------------------|-----------------|-----------------|-----------|----------------------------|----------------------------|-------|---------------|
| 25<br>C17200<br>和<br>M25<br>C17300 | A<br>(TB00)     | —               | 1.3-12.7  | 42-55                      | 14-22                      | 30-60 | 15-19         |
|                                    | 1/4H<br>(TD01)  | —               | 1.3-12.7  | 63-81                      | 52-74                      | 3-25  | 15-19         |
|                                    | 1/2H<br>(TD02)  | —               | 1.3-12.7  | 77-95                      | 63-88                      | 2-15  | 15-19         |
|                                    | 3/4H<br>(TD03)  | —               | 1.3-2.0   | 91-109                     | 80-106                     | 2-8   | 15-19         |
|                                    | H<br>(TD04)     | —               | 1.3-2.0   | 98-117                     | 91-113                     | 1-6   | 15-19         |
|                                    | AT<br>(TF00)    | 3hr 315-330°C   | 1.3-12.7  | 112-141                    | 101-127                    | 3 以上  | 22-28         |
|                                    | 1/4HT<br>(TH01) | 2hr 315-330°C   | 1.3-12.7  | 123-148                    | 116-141                    | 2 以上  | 22-28         |
|                                    | 1/2HT<br>(TH02) | 1.5hr 315-330°C | 1.3-12.7  | 130-152                    | 119-148                    | 2 以上  | 22-28         |
|                                    | 3/4HT<br>(TH03) | 1hr 315-330°C   | 1.3-2.0   | 133-162                    | 123-155                    | 2 以上  | 22-28         |
|                                    | HT<br>(TH04)    | 1hr 315-330°C   | 1.3-2.0   | 137-162                    | 126-155                    | 1 以上  | 22-28         |
| 3<br>C17510<br>和<br>10<br>C17500   | A<br>(TB00)     | —               | 1.3-12.7  | 24-39                      | 7-22                       | 20-60 | 20-30         |
|                                    | H<br>(TD04)     | —               | 1.3-12.7  | 45-57                      | 38-53                      | 2-20  | 20-30         |
|                                    | AT<br>(TF00)    | 3hr 480-495°C   | 1.3-12.7  | 70-92                      | 56-78                      | 10 以上 | 45-60         |
|                                    | HT<br>(TH04)    | 3hr 480-495°C   | 1.3-12.7  | 77-99                      | 66-88                      | 10 以上 | 48-60         |

\* ASTM之字母及數碼表示的產品狀態



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# SMA PTFE

## APPENDIX

LEO ME PTFE rod is manufactured with virgin PTFE powder by ram extrusion or compression molding and is conformed to meet the requirement of ASTM 1710 (Standard Specification for TFE FLUOROCARBON ROD) described in following table and JIS K 6889 ( JAPANESE INDUSTRIAL STANDARD POLYTETRAFLUOROETHYLENE RODS) .

TABLE 1 Detail Specification for PTFE Rod

| ITEM | PROPERTY                                                                          | ASTM TEST METHOD | VALUE                         |
|------|-----------------------------------------------------------------------------------|------------------|-------------------------------|
| 1    | Specific gravity                                                                  | D792             | 2.15-2.2                      |
| 2    | Tensile strength                                                                  | D638             | 280-350<br>kg/cm <sup>2</sup> |
| 3    | Elongation                                                                        | D638             | 200-400%                      |
| 4    | Dielectric strength                                                               | D149             | 30kV/mm                       |
| 5    | Deformation under load. 6.9Mpa, 50C, %                                            | D621             | 3.5 - 6                       |
| 6    | Dissipation factor<br>1 KHz                                                       | D150             | Less than<br>0.0005           |
| 7    | Dielectric constant<br>1 KHz                                                      | D150             | 2.0 - 2.1                     |
| 8    | Volume resistivity                                                                | D257             | > 10 <sup>16</sup>            |
| 9    | Surface resistivity                                                               | D257             | 10 <sup>17</sup>              |
| 10   | Flexural modulus                                                                  | D790             | 430-500Mpa                    |
| 11   | Compressibility                                                                   | D1147            | 16-20%                        |
| 12   | Hardness, durometer                                                               | D2240            | D53 - D60                     |
| 13   | Impact strength                                                                   | D256             | 16kg-cm/cm                    |
| 14   | Coefficient of linear thermal expansion, per C.<br>30C to 80C, 10 <sup>-5</sup> C | D696             | 12.3<br>to<br>11.6            |



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# SMA PTFE

## PROPERTY

| Item                                                 | UNIT<br>wt%                        | TEST METHOD<br>(ASTM)                 | PTFE<br>(NATURE) |
|------------------------------------------------------|------------------------------------|---------------------------------------|------------------|
| Apparent density                                     | g/lit                              | D-1457                                | 260              |
| Specific Gravity                                     | g/cm <sup>3</sup>                  | D-792                                 | 2.18             |
| Tensile Strength                                     | kg/cm <sup>2</sup>                 | D-638                                 | 315              |
| Elongation                                           | %                                  | D-638                                 | 400              |
| Deformation<br>(Total) MD                            | % (23°C<br>140 kg/m <sup>2</sup> ) | D-621                                 | —                |
| 60min. CD                                            |                                    |                                       | —                |
| 24Hrs. CD                                            |                                    |                                       | 14.3             |
|                                                      |                                    |                                       | 16.7             |
| Permanent Deformation MD<br>CD                       |                                    |                                       | 7.9              |
| Deformation MD<br>60min. CD                          | 150°C<br>200 kg/cm <sup>2</sup>    | D-790                                 | 51.8             |
| Flexural Strength (0.2% offset) CD                   |                                    |                                       | —                |
| Flexural Modulus CD                                  | kg/cm <sup>2</sup>                 | D-790                                 | 3,500 ~ 6,300    |
| Compressive Strength (0.2% offset) MD<br>CD          |                                    |                                       | 77               |
| Compressive Modulus MD<br>CD                         | kg/cm <sup>2</sup>                 | D-695                                 | 4,200            |
| Hardness                                             |                                    |                                       | 55               |
| Impact Strength                                      | kg-cm/cm                           | D-256                                 | 15.8             |
| Coefficient of Thermal Conductivity                  | Kcal/m.hr.°C                       | Cenco Fitch                           | 0.21             |
| Coefficient of Linear Thermal Expansio<br>25~90°C MD | 0.01m/°C                           | D-696                                 | —                |
| 25~150°C CD                                          |                                    |                                       | 12.2             |
| 25~200°C MD                                          |                                    |                                       | —                |
| 25~200°C CD                                          |                                    |                                       | 12.6             |
| 25~260°C MD                                          |                                    |                                       | —                |
| 25~260°C CD                                          |                                    |                                       | 13.7             |
| Water Adsorpuon                                      | %                                  | D-570                                 | 0                |
| Coefficient of Friction(Dynamic)                     |                                    | P=7 kg/cm <sup>2</sup><br>V=0.5 m/sec | —                |
| Coefficient of Friction(Static)                      |                                    | P=35 kg/cm <sup>2</sup>               | 0.05~0.08        |



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# SMA PTFE

## QUALITY CONTROL REPORT

We hereby state that the following material is in accordance with our specifications.

Date : November 6, 2001  
Product : ICI PTFE G201  
Lot No : FPIHRI 9001  
  
Contents : 25kg \* 35  
Ref No : HGKE - 01 - 1554

| Inspection Item           | Unit  | Data  | Test Method  |
|---------------------------|-------|-------|--------------|
| Bulk density              | g/L   | 465   | ASTM D 4895  |
| Standard specific gravity |       | 2.174 | ASTM D 4895  |
| Particle size(Avg.)       | µm    | 500   | ASTM D 4895  |
| Melting point             | °C    | 329   | ASTM D 4895  |
| Extrusion pressure        | MPa   | 69.7  | Asahi method |
| Water content             | mas % | 0.001 | ASTM D 4895  |

ASAHI GLASS FLUOROPOLYMERS CO., LTD.

*Tatsuya Higuchi*

Production Engineering Group  
Polymer Production Department  
Chemical Division



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