

Measurement of MPE

1. Foreword

In adopt with the Human Exposure IEEE C95.1, and according to the FCC 1.1310. The *Maximum Permissible Exposure (MPE)* is obligated to measure in order to prove the safety of radiation harmfulness to the human body.

The *Gain* of the antenna used is measured in an *Anechoic chamber*. The *maximum total power to the antenna* is to be recorded. By adopting the *Friis Transmission Formula* and the *power gain of the antenna*, we can find the distance right away from the product, where the limit of the MPE is.

2. Description of EUT

EUT	:	Wireless LAN PC Card
Classification	:	Mobile Device
		(i) Under normal use condition, the antenna is at least 20cm away from the user;
		(ii) Warning statement for keeping 20cm separation distance and the prohibition of operating next to the person has been printed in the user's manual
Model No.	:	C125S
Granted FCC ID	:	PB6-02011
Frequency Range	:	2.412 GHz ~ 2.462GHz
Antenna Kit	:	2 sets of 2 external dipole antennas are tested separately (Ant. A: ACON Advance Connector Inc.; and Ant. B: Antenniques Co., Ltd.)
Supported Channel:		11 Channel
Modulation Skill	:	DBPSK, DQPSK, CCK
Power Type	:	Powered by the PCMCIA slot of the client device
Applicant	:	TeLLUS Group Corp. 4/F, No.15, Industry E. Rd. IX, Science-based Industrial Park, Hsinchu 300, Taiwan, R.O.C.

3a. Limits for Maximum Permissible Exposure (MPE) (Antenna A)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	100	6
3.0-30	1842/f	4.89/f	900/f ²	6
30-300	61.4	0.163	1.0	6
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	100	30
1.34-30	824/f	2.19/f	180/f ²	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	f/1500	30
1500-100,000	--	--	1.0	30

[The EUT is tested in transmit and receive modes and in the first, middle and the last channel separately. The following shows only our observation have the greatest emissions.]

According to **OET BULLETIN 56 Fourth Edition/August 1999, Equation for Predicting RF Fields:**

$$\text{Friis Transmission Formula: } S = \frac{PG}{4\pi R^2} = \frac{31.70 \times 1.439}{4\pi(20)^2} = 9.075 \times 10^{-3} \text{ mW/cm}^2$$

Where: S = power density (in appropriate units, e.g. mW/cm²)

P = power input to the antenna (in appropriate units, e.g., mW)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

The Numeric gain G of antenna with a gain specified in dB is determined by:

$$G = \text{Log}^{-1} (\text{dB antenna gain}/10)$$

$$G = \text{Log}^{-1} (1.58 / 10) = 1.439$$

3b. Limits for Maximum Permissible Exposure (MPE) (Antenna B)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	100	6
3.0-30	1842/f	4.89/f	900/f ²	6
30-300	61.4	0.163	1.0	6
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	100	30
1.34-30	824/f	2.19/f	180/f ²	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	f/1500	30
1500-100,000	--	--	1.0	30

[The EUT is tested in transmit and receive modes and in the first, middle and the last channel separately. The following shows only our observation have the greatest emissions.]

According to OET BULLETIN 56 Fourth Edition/August 1999, Equation for Predicting RF Fields:

$$\text{Friis Transmission Formula: } S = \frac{PG}{4\pi R^2} = \frac{31.70 \times 1.585}{4\pi (20)^2} = 9.996 \times 10^{-3} \text{ mW/cm}^2$$

Where: S = power density (in appropriate units, e.g. mW/cm²)

P = power input to the antenna (in appropriate units, e.g., mW)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

The Numeric gain G of antenna with a gain specified in dB is determined by:

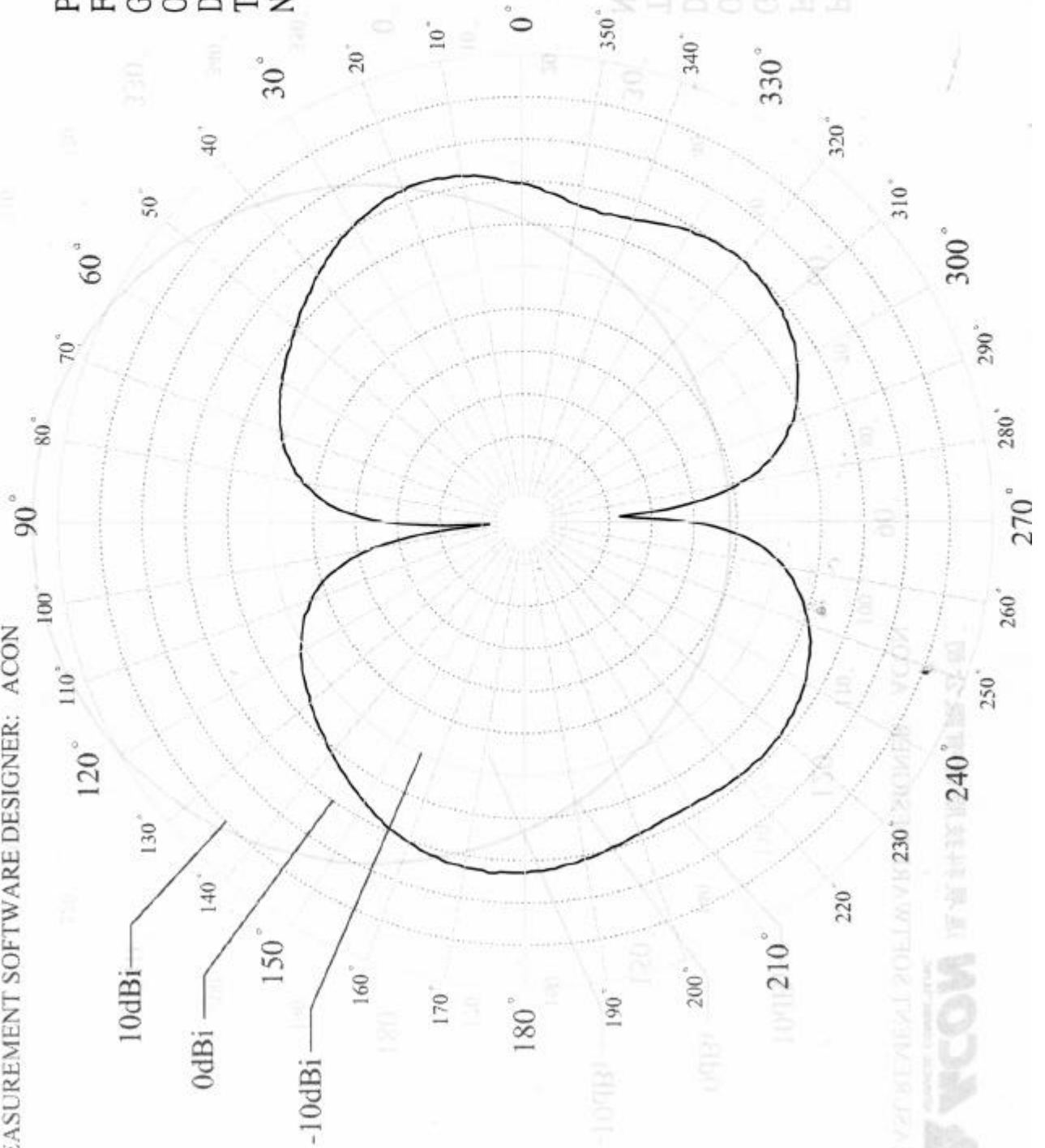
$$G = \text{Log}^{-1} (\text{dB antenna gain}/10)$$

$$G = \text{Log}^{-1} (2.00 / 10) = 1.585$$

)

Antenna A
(ACON Advance Connector Inc.)

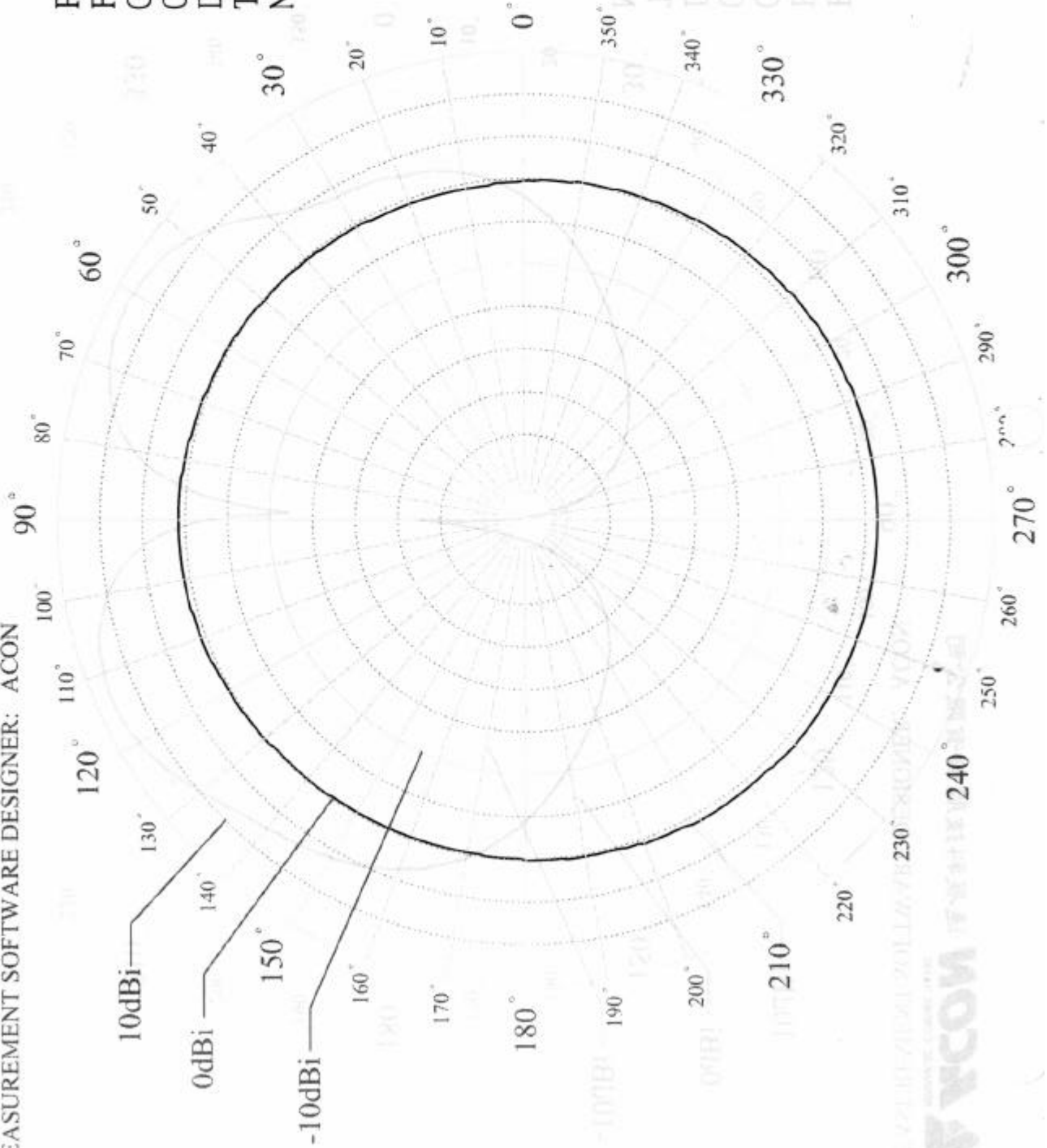
)



Pattern Type : E - Plane
Frequency : 2450 MHz
Gain : 1.58 dBi(14°)
Operator : TOM
Date : 2002/4/29
Time : PM 05:07:51
Note : SMA 90-180 male-mal

NOTE : SMA 90-180 male-mal
TIME : PM 03:33:25
DATE : 2002/4/29
Operator : TOM
Gain : 1.41 dBi(344.)
Frequency : 2420 MHz
Pattern Type : H - Plane

Pattern Type : H - Plane
Frequency : 2450 MHz
Gain : 1.41 dBi(244°)
Operator : TOM
Date : 2002/4/29
Time : PM 03:33:52
Note : SMA 90-180 male-mal



Pattern Type : H - Plane
Frequency : 2450 MHz
Gain : 1.41 dBi(244°)
Operator : TOM
Date : 2002/4/29
Time : PM 03:33:52
Note : SMA 90-180 male-mal

Appearance and Dimensions :

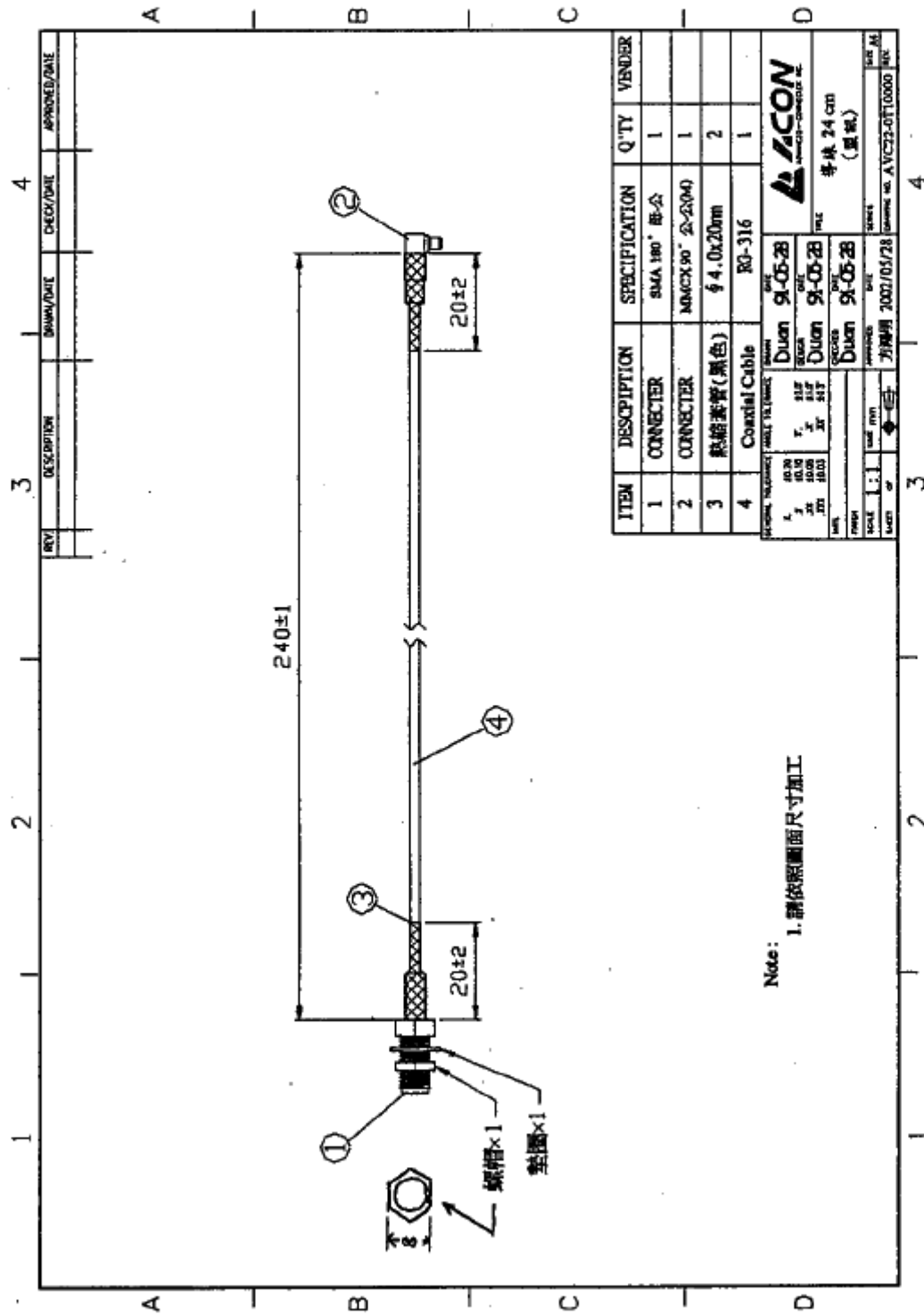


Figure 1



SUMITUBE Characteristics :

SUMITUBE F32

SUMITUBE F32 係軟質、耐燃、耐射交連PE複合物製成之熱收縮套管，同時獲得美國UL實驗室和加拿大CSA認可，符合UL224額定使用溫度125°C、額定使用電壓600V和VW-1耐燃標準，和符合CSA額定使用溫度125°C、額定使用電壓600V和OFT耐燃標準。

SUMITUBE F32性能卓越，適用於有UL和CSA及認可、配線、絕緣、包覆、端末處理、零件包裝、標字、標色等一般用途。

Shrink temperature is 90°C.

SUMITUBE F

SUMITUBE F 係軟質、耐燃耐射交連PE複合物製成之熱收縮套管，獲得美國UL實驗室認可，符合UL224額定使用溫度105°C、額定使用電壓600V和VW-1耐燃標準。收縮溫度90°C。

SUMITUBE F性能卓越，適用於有UL及規或廠商需求之配線絕緣、包覆、端末處理、標色、標印字等一般用途。

SUMITUBE F is a flexible, flame retardant, irradiated crosslinked, heat-shrinkable, modified polyolefin tubing that is recognized by Underwriters Laboratories (UL) under Subject 224, rating voltage 600V, VW-1 at 105°C.

Shrink temperature is 90°C.

SUMITUBE F2

SUMITUBE F2 係軟質、耐燃耐射交連PE複合物製成之熱收縮套管，同時獲得美國UL實驗室和加拿大CSA認可，符合UL224額定使用溫度125°C、額定使用電壓600V和VW-1耐燃標準，和符合CSA額定使用溫度125°C、額定使用電壓600V和OFT耐燃標準。

SUMITUBE F2性能卓越，適用於有UL和CSA認可需求之配線絕緣、包覆、端末處理、標色、標印字等一般用途。

SUMITUBE F2 is a flexible, flame retardant, irradiated crosslinked, heat-shrinkable, modified polyolefin tubing that is recognized by Underwriters Laboratories (UL) under Subject 224, rating voltage 600V, VW-1 at 125°C and by Canadian standards (CSA), rating voltage 600V, OFT at 125°C.

Shrink temperature is 90°C.

規格值 (UL 224 125°C 600V) Specification values (see page 10)

性能	試驗條件	典型值
物理性能		
抗張強度(老化前)(kg/mm ²)	158°C, 168 hrs	最小1.05
抗張強度(老化後)(%)		最少減損70
伸長率(%)		最小200
老化後伸長(%)	124°C, 60 days	最小100
加熱變形(%)	180°C, 1 hr	最大50
熱衝擊	136°C, 1 hr	無龜裂
冷彎	-10°C, 1 hr	無龜裂
電氣性能		
介電強度(KV)		最小AC 2.5
體積固有電阻(Ω-cm)		最小 10 ¹⁴
化學特性		
耐熱性	158°C, 168 hrs	合格
耐安定性(%)	VW-1	最小伸長100
耐燃性		合格

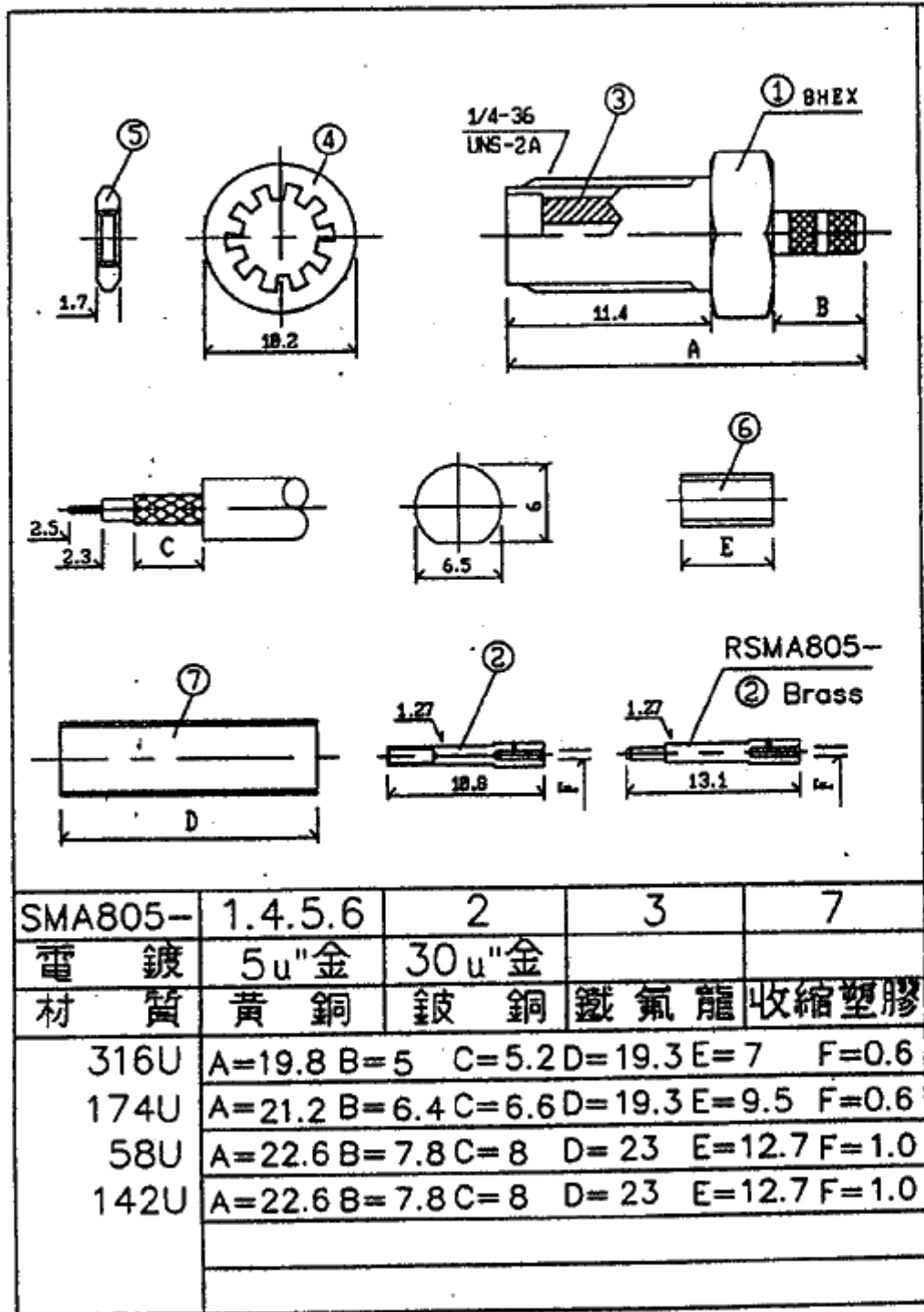
規格值 (UL 224 105°C 600V) Specification values (see page 10)

性能	試驗條件	典型值
物理性能		
抗張強度(kg/mm ²)		最小1.05
伸長率(%)		最小200
老化後抗張強度(%)	136°C 168hrs	最少減損之70
老化後伸長(%)	113°C 60days	最小100
加熱變形(%)	121°C 1hr	最大50
熱衝擊	136°C 1hr	無龜裂
冷彎	-10°C 1hr	無龜裂
電氣性能		
介電強度(KV)		最小2.5
體積固有電阻(Ω-cm)		最小10 ¹⁴
化學特性		
耐熱性	136°C 168hrs	合格
耐安定性(%)	VW-1	最小伸長100
耐燃性		合格

規格值 (UL 224 125°C 600V) Specification values (see page 10)

性能	試驗條件	典型值
物理性能		
抗張強度(kg/mm ²)		最小1.05
伸長率(%)		最小200
老化後抗張強度(%)	158°C 168hrs	最少減損之70
老化後伸長(%)	124°C 60days	最小100
加熱變形(%)	125°C 1hr	最大50
熱衝擊	136°C 1hr	無龜裂
冷彎	-10°C 1hr	無龜裂
電氣性能		
介電強度(KV)		最小2.5
體積固有電阻(Ω-cm)		最小10 ¹⁴
化學特性		
耐熱性	158°C 168hrs	合格
耐安定性(%)	VW-1	最小伸長100
耐燃性		合格

Connector Dimensions :





AVC21-0T10000 承認書

DESCRIPTION :

RG316 SMA 180 Deg Female RP + MMCX 90 Deg Male is useful for antenna. (or depends on user's need.)

SPECIFICATION :

Part Number : AVC21-0T10000	
Appearance & Dimensions :	10 cm (L) (See figure 1)
Weight :	5 \pm 0.5 g
Impedance :	50 Ohms
Connector Type :	SMA Female RP + MMCX Male
Cable Loss :	0.5 dBm

Analysis-%

Lot No.	1AAPE33333	1AAPE33338	1AAPE33339	1AAPE33340	1AAPE33370	1AAPE33371	1AAPE33372	1AAPE33390	AVER
Bundle	35692	35686	35677	35680	38702	38595	38708	38714	
To Bundle	B5695	B3691	B6679	B3685	38713	38701	38713		
Zinc	95.65	95.82	95.77	95.77	95.79	95.79	95.89	95.87	95.1
Aluminium	4.09	4.12	4.17	4.17	4.15	4.15	4.05	4.06	4.
Magnesium	0.045	0.047	0.047	0.045	0.045	0.046	0.050	0.045	0.1
Copper	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.
Lead	0.0027	0.0023	0.0023	0.0022	0.0023	0.0024	0.0024	0.0022	0.1
Cadmium	0.0009	0.0010	0.0010	0.0010	0.0009	0.0009	0.0009	0.0008	0.
Iron	0.0052	0.0029	0.0033	0.0030	0.0024	0.0025	0.0033	0.0176	0.
Tin	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.
Indium	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.
Thallium	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0002	0.0002	0.
Nickel	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.
Silicon	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.

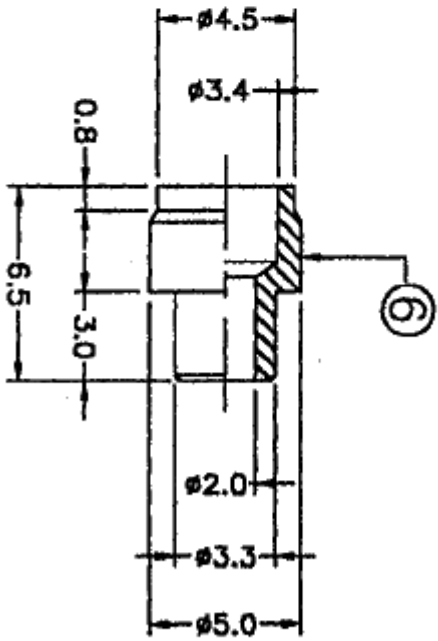
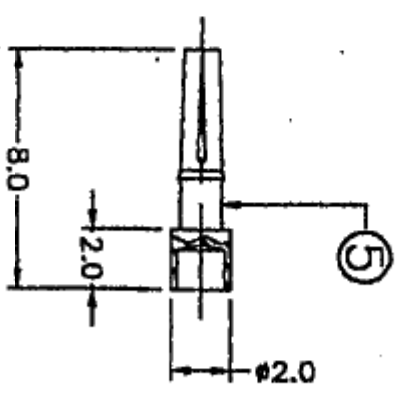
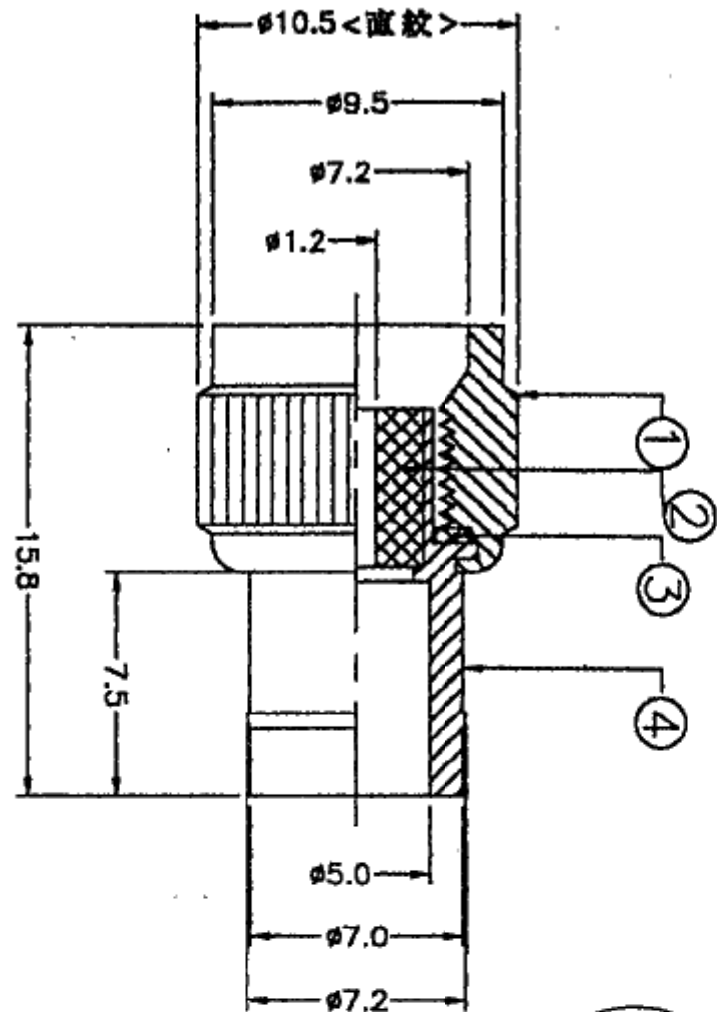
MADE FROM ZINC COMPLYING FULLY WITH

- AS 1681-1986 ALLOY ZN AL 4
- ISO 301-1981 (E) ZN AL 4
- BS 1004 1972 ALLOY A
- ASTM B240-88 ALLOY AG 40A
- SAE 903
- JIS E2201.1957 ALLOY NO.2 (日本規格)



RF CHUNG YAN COMPANY LIMITED

A B C D E F G H



7	1	BRASS	BODY	GOLD	
6	1	BRASS	CONTACT	GOLD	
5	1	BRASS	BODY	BLACK	
4	1	SILICON	O-RING	RED	
3	1	TEFLON	INSULATOR	WHITE	
2	1	BRASS	SHELL	BLACK	
1	1				

THIRD ANGLE PROJECTION

UNLESS OTHERWISE NOTED:
 1) DIMENSIONS ARE IN INCHES [MILLIMETER]
 2) TOLERANCES:
 0-10±0.3mm
 10-20±0.5mm

EMIT CONNECTOR & CABLE ASSEMBLY
 中研有限公司

DRAWN : 12/20/01
 ANDY
 DESIGNER : 12/20/01
 JACK
 SCALE : 4:1
 UNIT : mm
 TITLE : SMA MALE CRIMP TYPE FOR RG-178 COAXIAL CABLE
 EMIT P/N : SAM--C-CR
 EMIT S/N :



AVC22-0T10000 承認書

DESCRIPTION :

RG316 SMA 180 Deg Female RP + MMCX 90 Deg Male is useful for antenna. (or depends on user's need.)

SPECIFICATION :

Part Number : AVC22-0T10000	
Appearance & Dimensions :	24cm (L) (See figure 1)
Weight :	7 \pm 0.5 g
Impedance :	50 Ohms
Connector Type :	SMA Female RP + MMCX Male
Cable Loss :	0.67 dBm

LOCTITE CORPORATION

1001 TROUT BROOK CROSSING
ROCKY HILL, CT 06067-3910
EMERGENCY PHONE: (860) 571-5100

ISSUED 3/27/96
44:38
FAX: (860) 571-5465

MATERIAL SAFETY DATA SHEET

Page 4 of 4

Product Name:
Item No.:

Priam(R) 411 Clear Toughened Instant Adhesive
41145

Supplemen

INFORMATION FOR FIRST AID AND CASUALTY ON TREATMENT FOR ADHESION OF
HUMAN SKIN TO ITSELF IF CAUSED BY CYANOACRYLATE ADHESIVES

Cyanoacrylate adhesive is a very fast setting and strong adhesive. It bonds human tissue including skin in seconds. Experience has shown that accidents due to cyanoacrylates are handled best by passive, nonsurgical first aid. Treatment of specific types of accidents are given below.

SKIN CONTACT

Remove excess adhesive. Soak in warm, soapy water. The adhesive will come loose from the skin in several hours. Cured adhesive does not present a health hazard, even when bonded to the skin.

Avoid contact with clothes, fabrics, rags, or tissue. Contact with these materials may cause polymerization. The polymerization of large amounts of adhesive will generate heat causing smoke, skin burns, and strong, irritating vapors. Wear nitrile or polyethylene gloves and apron when handling large amounts of adhesive.

SKIN ADHESION

First immerse the bonded surfaces in warm, soapy water. Peel or roll the surfaces apart with the aid of a blunt edge, e.g. a spatula or a teaspoon handle; then remove adhesive from the skin with soap and water. Do not try to pull surfaces apart with a direct opposing action.

EYELID TO EYELID OR EYEBALL ADHESION

In the event that eyelids are stuck together or bonded to the eyeball, wash thoroughly with warm water and apply a gauze patch. The eye will open without further action, typically in 1-4 days. There will be no residual damage. Do not try to open the eyes by manipulation.

ADHESIVE ON THE EYEBALL

Cyanoacrylate introduced into the eyes will attach itself to the eye protein and will disassociate from it over intermittent periods, generally covering several hours. This will cause periods of weeping until clearance is achieved. During the period of contamination, double vision may be experienced together with a lachrymatory effect, and it is important to understand the cause and realize that disassociation will normally occur within a matter of hours, even with gross contamination.

MOUTH

If lips are accidentally stuck together, apply lots of warm water to the lips and encourage maximum wetting and pressure from saliva inside the mouth. Peel or roll lips apart. Do not try to pull the lips with direct opposing action.

It is almost impossible to swallow cyanoacrylate. The adhesive solidifies and adheres in the mouth. Saliva will lift the adhesive in one half to two days. In case a lump forms in the mouth, position the patient to prevent ingestion of the lump when it detaches.

BURNS

Cyanoacrylates give off heat on solidification. In rare cases a large drop will increase in temperature enough to cause a burn. Burns should be treated normally after the lump of cyanoacrylate is released from the tissue as described above.

SURGERY

It should never be necessary to use such a drastic method to separate accidentally bonded skin.

LOCTITE CORPORATION

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ISSUED 3/27/
44:
FAX: (860) 571-54

MATERIAL SAFETY DATA SHEET

Page 3 of

Product Name: Prism(R) 411 Clear Toughened Instant Adhesive
Item No.: 41145

14. TRANSPORT INFORMATION

DOT (49 CFR 172)

Domestic Ground Transport

Proper Shipping Name:

Unrestricted (Not more than 450 liters);
Combustible liquids, n.o.s. (Cyanoacrylate ester)
(More than 450 liters)

Hazard Class or
Division:

Unrestricted (Not more than 450 liters)
Combustible liquid (More than 450 liters)

Identification Number:

None (Not more than 450 liters);
NA 1993 (More than 450 liters)

Marine Pollutant:

None

IATA

Proper Shipping Name:

Unrestricted (Not more than one pint);
Other regulated substances (More than one pint)

Class or Division:

Unrestricted (Not more than one pint);
Class 9 (More than one pint)

UN or ID Number:

None (Not more than one pint)
ID 8027 (More than one pint)

15. REGULATORY INFORMATION

CA Proposition 65: Not available

16. OTHER INFORMATION

Estimated NFPA(R) Code:

Health Hazard: 2
Fire Hazard: 2
Reactivity Hazard: 2
Specific Hazard: No water

Estimated HMIS(R) Code:

Health Hazard: 2
Flammability Hazard: 2
Reactivity Hazards: 2
Personal Protection: See Section 8.

NFPA is a registered
HMIS is a registered

trademark of the National Fire Protection Assn.
trademark of the National Paint and Coatings Assn.

Prepared By:

Stephen Repetto

Title:

Research Chemist, Environmental Health & Safety

Company:

Loctite Corp., 1001 Tr Br Cr, Rocky Hill CT 06067

(24hr.) Phone:

(860) 571-5100

Revision Date:

January 22, 1996

Revision: 0027

LOCTITE CORPORATION

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MATERIAL SAFETY DATA SHEET

Page 2 of 4

Product Name: Prism(R) 411 Clear Toughened Instant Adhesive
Item No.: 41145

4. FIRST AID MEASURES

(continued)

Eye Contact: Flush with water. See supplemental page for emergency procedures.

5. FIRE FIGHTING MEASURES

Flash Point: 150 - 200 °F Method: Tag Closed Cup
Recommended Extinguishing Agents: Carbon dioxide, Foam, Dry Chemical
Hazardous Products formed by Fire or Thermal Decomposition: Irritating organic vapors.
Unusual Fire or Explosion Hazards: None

Explosive Limits:
(% by volume in air) Lower 1.7% Phthalic anhydride
(% by volume in air) Upper 10.5% Phthalic anhydride

6. ACCIDENTAL RELEASE MEASURES

Steps to be taken in case of spill or leak: Flood with water to polymerize. Soak up with an inert absorbent.

7. HANDLING AND STORAGE

Safe Storage: Store at or below 75 deg. F
(Contact Loctite Customer Service 1-800-243-4874 for shelf life information)
Handling: Avoid contact with skin and eyes. Avoid breathing vapor.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

Eyes: Safety glasses or goggles recommended
Skin: Nitrile or polyethylene gloves and aprons.
Do not use cotton.
See supplemental page for additional information.
Ventilation: Positive down-draft exhaust ventilation should be provided to maintain vapor concentration below TLV
See Section 2 for Exposure Limits.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Clear liquid
Odor: Sharp, irritating
Boiling Point: More than 300 °F
pH: Not Applicable
Solubility in Water: Polymerized
Specific Gravity: 1.05 at 75 °F
Volatile Organic Compound (EPA Method 24): 85.6%
Vapor Pressure: Less than 0.2 mm at 75 °F
Vapor Density: Approximately 3
Evaporation Rate (Ether = 1): Not available

10. STABILITY AND REACTIVITY

Stability: Stable
Hazardous Polymerization: Will not occur
Incompatibility: Polymerized by contact with water, alcohols, amines, alkalis.
Hazardous Decomposition Products (non-thermal): None

11. TOXICOLOGICAL INFORMATION

See Section 3.

12. ECOLOGICAL INFORMATION

No data available

13. DISPOSAL CONSIDERATIONS

Recommended methods of disposal: Polymerize as above. Incinerate in accordance with EPA and local regulations.

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Prism(R) 411 Clear Toughened Instant Adhesive
 Item No.: 41145
 Product Type: Cyanoacrylate Ester

2. COMPOSITION, INFORMATION ON INGREDIENTS

Ingredients	CAS No.	%
Ethyl cyanoacrylate	7085-85-0	85-90
Poly (methyl methacrylate)	9011-14-7	10-15
SILICA, AMORPHOUS TREATED	112945-52-5	1-3
PHTHALIC ANHYDRIDE*	85-44-9	0.1-1
HYDROQUINONE	123-31-9	0.1-0.5

* This component is listed as a SARA Section 313 Toxic Chemical.

Ingredients which have exposure limits

Exposure Limits (TWA) Ingredients	ACGIH (TLV)	OSHA (PEL)	OTHER
Ethyl cyanoacrylate	None	None	2 ppm TWA 9.1 mg/m3
SILICA, AMORPHOUS TREATED	10 mg/m3 TWA	6 mg/m3 TWA	3 mg/m3 TWA resp. dust
PHTHALIC ANHYDRIDE	1 ppm TWA 6.1 mg/m3	1 ppm TWA 6 mg/m3	None
HYDROQUINONE	2 mg/m3 TWA	2 mg/m3 TWA	2 mg/m3 TWA 4 mg/m3 STEL

Exposure Limits (STEL) Ingredients	ACGIH (TLV)	OSHA (PEL)
Ethyl cyanoacrylate	(4 ppm) (18 mg/m3)	(4 ppm) (16 mg/m3)

3. HAZARDS IDENTIFICATION

Toxicity: Skin contact may cause burns. Bonds skin rapidly and strongly. Skin and eye irritant. Estimated oral LD50 more than 5000mg/kg. Estimated dermal LD 50 more than 2000 mg/kg.

Primary Routes of Entry: None known

Signs and symptoms of Exposure: Vapor is irritating to eyes and mucous membranes above TLV. Prolonged and repeated overexposure to vapors may produce symptoms of non-allergic asthma in sensitive individuals.

Existing Conditions Aggravated by Exposure: None known

Ingredients	Literature Referenced Target Organ and Other Health Effects	Carcinogen		
		NTP	IARC	OSHA
Ethyl cyanoacrylate	ALG IRR RES	NO	NO	NO
Poly (methyl methacrylate)	IRR	NO	N/A	NO
SILICA, AMORPHOUS TREATED	NUI	NO	N/A	NO
PHTHALIC ANHYDRIDE	ALG COR IRR	NO	NO	NO
HYDROQUINONE	BLO BNM CNS EYE IMM IRR MUT SKI	NO	N/A	NO

Abbreviations

N/A Not Applicable	ALG Allergen
BLO Blood	BNM Bone Marrow
CNS Central nervous system	COR Corrosive
EYE Eyes	IMM Immune system
IRR Irritant	MUT Mutagen
NUI Nuisance dust	RES Respiratory
SKI Skin	

4. FIRST AID MEASURES

Ingestion: Ingestion is not likely. See supplemental page for emergency procedures.

Inhalation: Remove to fresh air. If symptoms persist, obtain medical attention.

Skin Contact:

4. FIRST AID MEASURES

Inhalation:

Remove affected person to fresh air.

Skin Contact:

Wash skin with plenty of soap and water and apply replenishing cream if necessary.

Eye Contact:

Flush eyes immediately with plenty of water for at least 15 minutes. Seek medical attention immediately.

Ingestion:

Rinse mouth with water, then give plenty of water or milk to drink. Do not induce vomiting.

5. FIRE FIGHTING MEASURES

This product is highly flammable having a flash point of -1°C .

Keep unaffected containers cool with water spray.

If product is involved in fire extinguish with dry powder, foam or carbon dioxide.

Aerosol containers may explode when exposed to high temperatures.

6. ACCIDENTAL RELEASE MEASURES

Eliminate sources of ignition.

Ventilate area.

For small spills wipe up with paper towel and place in container for disposal.

For large spills absorb onto inert absorbent material and place in sealed container for disposal.

7. HANDLING & STORAGE

7.1. Handling:

Avoid sources of ignition - no smoking.

Vapours should be extracted to avoid inhalation.

7.2. Storage:

Store in original containers at 5°C - 28°C and do not return residual materials to containers as contamination may reduce the shelf life of the bulk product.

Keep away from sources of ignition.

Store away from heat in a cool, well-ventilated area.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

In circumstances where there is a potential for prolonged or repeated skin contact, the use of polyvinyl alcohol, polyethylene or nitrile rubber gauntlets or equivalent solvent resistant gloves is recommended. (TLV. ACGIH is 400ppm).



This safety data sheet has been prepared in accordance with the requirements of EC Directive 88/379/EEC and 91/155/EEC (and other related directives) and provides information relating to the safe handling and use of the product.

Date: 16/08/93

Issue 1

1. PRODUCT IDENTIFICATION

1.1. Product Name : 770

1.2. Company Name :

Manufacturer : LOCTITE (Ireland) Limited

Local Distributor:

1.3. Emergency Contact (24 Hour Service):

First Call Local Distributor : Tel:-

Contact Name :

Manufacturer: Tel: +353-1-510433 or +353-1-519466, Fax: +353-1-519073

2. COMPOSITIONAL INFORMATION

Nature : Solvent based primer for CA.

<u>Component</u>	<u>% by Wt*</u>	<u>Hazard Class</u>
Heptane	99.9	F, R11
Amide derivative	0.5	C, R20/21/22, 35
Fluorescent pigment	0.02	---
Hydrocarbon propellant	3*	(Aerosol product only)

**(percentages are less than those given.)*

3. HAZARDS IDENTIFICATION

This product is highly flammable. The flash point is -1°C and explosive limits are approximately 1-7%. Solvent will have a defatting action on the skin making it more susceptible to dermatitis and sensitisation. Inhalation of vapours may cause headaches or dizziness.
The aerosol container is under pressure. Do not expose to high temperatures.

台灣工程塑膠公司共聚型聚縮醛樹脂“達鋼”
 TAIWAN ENGINEERING PLASTICS ACETAL COPOLYMER "TEPCON"

“達鋼”共聚型聚縮醛樹脂“TEPCON” ACETAL COPOLYMER

台灣工程塑膠公司

規	格	型	號	特	性	比	伸	彎	衝	熱	成	防
						重	長	曲	擊	變	型	
						g/cm ³	%	kg/cm ³	缺	18.6kg/cm ³	厚	UL94
									口	/cm ³	2m/m	
									kg/cm ³	°C	%	
		M25			高黏度押出厚断面材出	1.41	75	26,000	7.5	110	1.6 ~ 2.2	HB
		M90			標準流動性	1.41	60	26,000	6.5	110	1.6 ~ 2.2	HB
		M130			高流動性	1.41	55	26,000	6.1	110	1.6 ~ 2.2	HB
		M270			高流動性	1.41	45	26,000	5.4	110	1.6 ~ 2.2	HB
		M320			高流動性	1.41	40	26,000	5.1	110	1.6 ~ 2.2	HB
		M450			超高流動性	1.41	35	26,000	4.5	110	1.6 ~ 2.2	HB

中日龍工程塑膠特性表

項目	ASTM UNITS	中日龍 UHMW-PE	優路鋼 ACETAL	尼龍 6 NYLON 6	尼龍 603 MG 603	MC尼龍 CAST NYLON	聚四氟 PTFE	聚丙錫 PI	聚乙烯 PE	聚氯乙烯 PVC	硬力膠 P.U
比重	D792	0.94	1.41	1.12-1.14	1.13-1.15	1.15-1.17	2.14-2.20	0.902-0.910	0.941-0.963	1.30-1.38	1.05-1.25
抗拉強度 p.s.i.	D438	2500-3500	8800	11800-10000	12000-11000	11000-14000	2000-3000	4300-5500	3100-5500	6000-7500	2000-8400
伸長率 %	D438	300-500	40-75	100-300	60-200	30-320	200.0-400.0	200.0-700.0	20-1200	40-80	100-650
壓縮強度 p.s.i.	D495	2400	12000 (10% defl.)	13000	15000 (yield)	—	1700	5500-8000	2700-3600	8000-13000	20000
斷裂伸长率 1/2X1/2in. notched bar, load test	D234	不破壞	1.0-1.5 (1/2X1/2in. bar)	1.0-3.0	1.0-2.1	0.8-3.0 (1/2X1/2in. bar)	3.0	1.5-2.2 (71°F) (1/4X1/2in. bar)	0.5-20.0	0.4-20.0	不破壞
硬度 洛氏維氏	D785	D670 (Shore)	M70-M80 (Rockwell)	R119-120 (Shore)	R120, M83	R95-R120	D30-D35 (Shore)	R80-110	D70-D70 (Shore)	65-85 (Shore D)	66A-66B (Shore)
抗拉強度 10 ⁴ p.s.i. 173°F	D790	1.50-1.80	3.75	3.9-1.4	4.20-1.85	1.1-4.3 (1.8-1.6)	—	1.7-2.5	1.0-2.6	3-5	0.1-1.3
抗拉強度 10 ⁴ p.s.i.	D638	0.10-1.10	4.1	3.8-1.0	—	3.5-4.5	0.58	1.60-2.25	0.6-1.8	3.5-6.0	0.1-3.5
壓縮係數		0.03 0.08	0.18	0.31	0.35	0.35	0.04	0.3	0.08	0.3	0.4
熱膨脹率 10 ⁻⁴ in./in. °C		11.5-13.0	3.5	3.8	3.8	3.8	10.0	10.0	10.0	10.0	7.4
熱膨脹率 10 ⁻⁴ in./in. °F		2.0	0.5	0.8	0.8	0.8	2.0	2.0	2.0	2.0	1.3
耐熱性 °C		120	80	80	120	120	260	260	120	120	120
耐熱性 °F		250	170	170	250	250	500	500	250	250	250
纖維強度 1/8-in. thick, 50% fiber stress	D64	0.5-1.20	230	—	—	200-425	250	200-250	140-190	135-180	—
纖維強度 1/8-in. thick, 50% fiber stress	D257	>10 ¹⁰	1.0 X 10 ¹⁰	10 ¹⁰ -10 ¹⁰	10 ¹⁰ -10 ¹⁰	—	>10 ¹⁰	>10 ¹⁰	>10 ¹⁰	>10 ¹⁰	2.0-10 ¹⁰ 0.11 X 10 ¹⁰
纖維強度 1/8-in. thickness, volts/mil	D149	710	500 (90 mil)	400	600	300-400	480	500-600	450-500	350-500	330-630
纖維強度 1/8-in. thickness, volts/mil	D149	680	—	350	280	—	430	450-650	440-600	—	530
耐電率 60Hz	D150	2.25-2.35	3.7	3.8	4.3	3.7	<2.1	2.2-2.6	2.30-2.35	3.2-4.0	5.4-7.6
耐電率 1KHz	D150	2.25-2.35	3.7	3.7	3.0-3.3	3.7	<2.1	2.2-2.6	2.30-2.35	3.0-3.8	5.59-7.60
耐電率 1MHz	D150	2.30	3.7	3.4	—	3.7	<2.1	2.2-2.6	2.30-2.35	2.8-3.1	4.21-5.10
耐電率 1GHz	D150	0.0005	—	0.01	0.010	0.020	<0.0002	<0.0005	<0.0005	0.007-0.010	0.015-0.048
耐電率 1 kHz	D150	0.0002	0.0010 (40 mil)	0.02	0.019	0.02	<0.0002	<0.0005 -0.0018	<0.0005	0.007-0.017	0.043-0.060
耐電率 1 MHz	D150	0.0002	0.006	0.03	0.04	0.02	<0.0002	<0.0005 -0.0018	<0.0005	0.006-0.019	0.050-0.100
耐電率 1 GHz	D495	—	240	—	130-140	—	>300	136-185	—	60-80	122
吸水率 24h, 23°C, 2mm厚	D370	<0.01	0.22	1.3-1.9	1.3	0.4-1.1	0.00	<0.01-0.03	0.01	0.04-0.4	0.7-0.9
吸水率 24h, 23°C, 2mm厚	D635	—	1.0-1.1 (2 in.)	—	—	—	—	0.75-0.83	1.00-1.04	—	—
日光影響	—	無顯色影響	無顯色影響	無顯色影響	無顯色影響	無顯色影響	無顯色影響	無顯色影響	無顯色影響	無顯色影響	無顯色影響
機械影響	D543	抗機械性強	因硬而脆	可抗機械	可抗機械	可抗機械	不受影響	不受影響	可抗機械	不受影響	可抗機械
化學影響	D543	受強氧化酸侵蝕	受侵蝕	受侵蝕	受侵蝕	受侵蝕	不受影響	受強氧化酸侵蝕	受強氧化酸侵蝕	不受影響	受侵蝕
油類影響	D343	抗油類性強	不受影響	不受影響	不受影響	不受影響	不受影響	不受影響	抗油類性強	不受影響	抗油類性強
鹽類影響	D343	抗鹽類性強	不受影響	抗鹽類性強	抗鹽類性強	抗鹽類性強	不受影響	抗鹽類性強	抗鹽類性強	不受影響	抗鹽類性強
行線性影響	D543	180°C以下 有線性	一般有機液 均可用	一般有機液 均可用	一般有機液 均可用	一般有機液 均可用	不受影響	180°C以下 有線性	180°C以下 有線性	180°C以下 有線性	可耐大部分 有機液，但 強氧化酸 除外。
透明度	—	不透明 不透明	不透明 不透明	不透明 不透明	不透明 不透明	不透明 不透明	不透明	透明 不透明	透明 不透明	不透明 不透明	透明 不透明

Harbour Industries MIL-C-17 Coaxial Cables

Physical Characteristics

M17 Number	Center Conductor	PTFE Dielectric Diameter	Shield	Jacket	Overall Diameter	Minimum Recommended Bend Radius	Operating Temp. (°C)	Weight (lbs./MFT)	Comment
M17/60-RG142	.037"SCCS	.116"	SPC(2)	FEP	.195"	0.5"	-55 +200	3.0	
M17/93-RG178	.0120*(7/.004")SCCS	.033"	SPC	FEP	.071"	0.4"	-55 +200	6.3	
M17/93-00001	.0120*(7/.004")SCCS	.033"	SPC	PFA	.071"	0.4"	-55 +200	18.3	M17/93-RG178 w/extended temp. range
M17/94-RG179	.0120*(7/.004")SCCS	.063"	SPC	FEP	.100"	0.4"	-55 +200	10.8	
M17/95-RG180	.0120*(7/.004")SCCS	.102"	SPC	FEP	.141"	0.7"	-55 +200	19.8	
M17/110-RG302	.0253"SCCS	.146"	SPC	FEP	.202"	1.0"	-55 +200	40.0	
M17/111-RG303	.037"SCCS	.116"	SPC	FEP	.170"	0.9"	-55 +200	31.0	
M17/112-RG304	.059"SCCS	.185"	SPC(2)	FEP	.280"	1.4"	-55 +200	94.0	
M17/113-RG316	.0201*(7/.0087")SCCS	.060"	SPC	FEP	.098"	0.5"	-55 +200	12.2	
M17/127-RG393	.094*(7/.0312")SCCS	.285"	SPC(2)	FEP	.390"	2.0"	-55 +200	165.0	
M17/128-RG400	.0384*(19/.008")SC	.116"	SPC(2)	FEP	.195"	1.0"	-55 +200	50.0	
M17/131-RG443	.0120*(7/.004")SCCS	.033"	SPC(2)	FEP(2)	.116"	0.6"	-55 +200	15.0	Triaxial M17/93-RG178
M17/152-00001	.0201*(7/.0087")SCCS	.060"	SPC(2)	FEP	.114"	0.6"	-55 +200	18.5	Double shielded M17/113-RG316
M17/158-00001	.037"SCCS	.116"	SPC(2)	FEP	.195"	1.0"	-55 +200	56.0	Unswpt M17/60-RG142
M17/169-00001	.0120*(7/.004")SCCS	.033"	SPC	FEP	.071"	0.4"	-55 +200	6.3	Unswpt M17/93-RG178
M17/170-00001	.037"SCCS	.116"	SPC	FEP	.170"	0.9"	-55 +200	39.0	Unswpt M17/111-RG303
M17/172-00001	.0201*(7/.0087")SCCS	.060"	SPC	FEP	.098"	0.5"	-55 +200	11.5	Unswpt M17/113-RG316
M17/174-00001	.094*(7/.0312")SCCS	.285"	SPC(2)	FEP	.390"	2.0"	-55 +200	175.0	Unswpt M17/127-RG393
M17/175-00001	.0384*(19/.008")SC	.116"	SPC(2)	FEP	.390"	1.0"	-55 +200	50.0	Unswpt M17/128-RG400
M17/176-00002	.0235*(19/.005")SPA(2)	.042"	SPA	PFA	.129"	0.6"	-55 +200	18.0	Controlled impedance twinax
PTFE Jacket									
RG187AU	.0120*(7/.004")SCCS	.033"	SPC	PTFE	.100"	0.5"	-55 +250	10.0	Hebtle 250°C
RG188AU	.0201*(7/.0087")SCCS	.060"	SPC	PTFE	.100"	0.5"	-55 +250	1.0	Hebtle 250°C
RG185AU	.0120*(7/.004")SCCS	.102"	SPC	PTFE	.141"	0.7"	-55 +250	6.0	Hebtle 250°C
RG196AU	.0120*(7/.004")SCCS	.033"	SPC	PTFE	.060"	0.4"	-55 +250	6.0	Hebtle 250°C

Electrical Characteristics

M17 Number	Impedance (ohms)	Capacitance (pF/ft)	Max. Operating Voltage (RMS)	Maximum attenuation (dB/100ft) @					Max Frequency (GHz)
				100 MHz	400 MHz	1 GHz	3 GHz	5 GHz	
M17/60-RG142	50 +/- 2	29.4	1900	5.5	11.7	19.0	35.0	48.0	12.4
M17/93-RG178	50 +/- 2	29.4	1000	16.0	33.0	52.0	94.0	-	3.0
M17/93-00001	50 +/- 2	29.4	1000	16.0	33.0	52.0	94.0	-	3.0
M17/94-RG179	50 +/- 2	29.4	1200	3.9	8.0	15.0	28.0	-	-
M17/95-RG180	50 +/- 2	29.4	1500	2.7	6.4	11.1	22.0	30.0	8.0
M17/110-RG302	50 +/- 2	29.4	2500	11.0	21.0	38.0	58.0	-	3.0
M17/111-RG303	50 +/- 2	29.4	1200	11.5	24.0	40.0	75.0	110.0	170.0
M17/112-RG304	50 +/- 2	29.4	1900	-	8.5	-	-	-	-
M17/113-RG316	50 +/- 2	29.4	1000	-	29.0	-	-	-	-
M17/127-RG393	50 +/- 2	29.4	1200	-	10.5	-	-	-	-
M17/128-RG400	50 +/- 2	29.4	1900	-	-	-	-	-	-
M17/152-00001	50 +/- 2	29.4	1900	-	-	-	-	-	-
M17/158-00001	50 +/- 2	29.4	1000	-	-	-	-	-	-
M17/169-00001	50 +/- 2	29.4	1000	-	-	-	-	-	-
M17/170-00001	50 +/- 2	29.4	1200	-	-	-	-	-	-
M17/172-00001	50 +/- 2	29.4	1500	-	-	-	-	-	-
M17/174-00001	50 +/- 2	29.4	1900	-	-	-	-	-	-
M17/175-00001	50 +/- 2	29.4	1900	-	-	-	-	-	-
M17/176-00002	77 +/- 7	19.0	1000	-	-	-	-	-	-
PTFE Jacket									
RG187AU	50 +/- 2	29.4	1200	-	-	-	-	-	-
RG188AU	50 +/- 2	29.4	1200	11.0	21.0	38.0	58.0	-	-
RG185AU	50 +/- 2	29.4	1500	-	-	-	-	-	-
RG196AU	50 +/- 2	29.4	1000	-	-	-	-	-	-

"Maximum frequencies" are those as referenced on individual slant sheets of the MIL-C-17 specification. No values are given for unswpt constructions & the specification recommends these cables should not be used above 400 MHz. (All figures referenced above are nominal unless otherwise specified.)

富前五金股份有限公司

地址: _____

檢驗報告表

年 月 日

客 戶	中研		
品 名	FREE CUTTING BRASS ROD		
規 格	JIS H3250 C3604		
項 目	檢 驗 標 準	位	備 註
化 學 成 份 分 析	Cu	57.0 - 61.0	
	Pb	1.8 - 3.7	
	Fe	< 0.5	
	Sn+Fe	< 1.2	
	Zn	REMAINDER	
其 他	/		



桃園縣龜山鄉頂湖32號 電話: (03) 3282411-6



Typical :

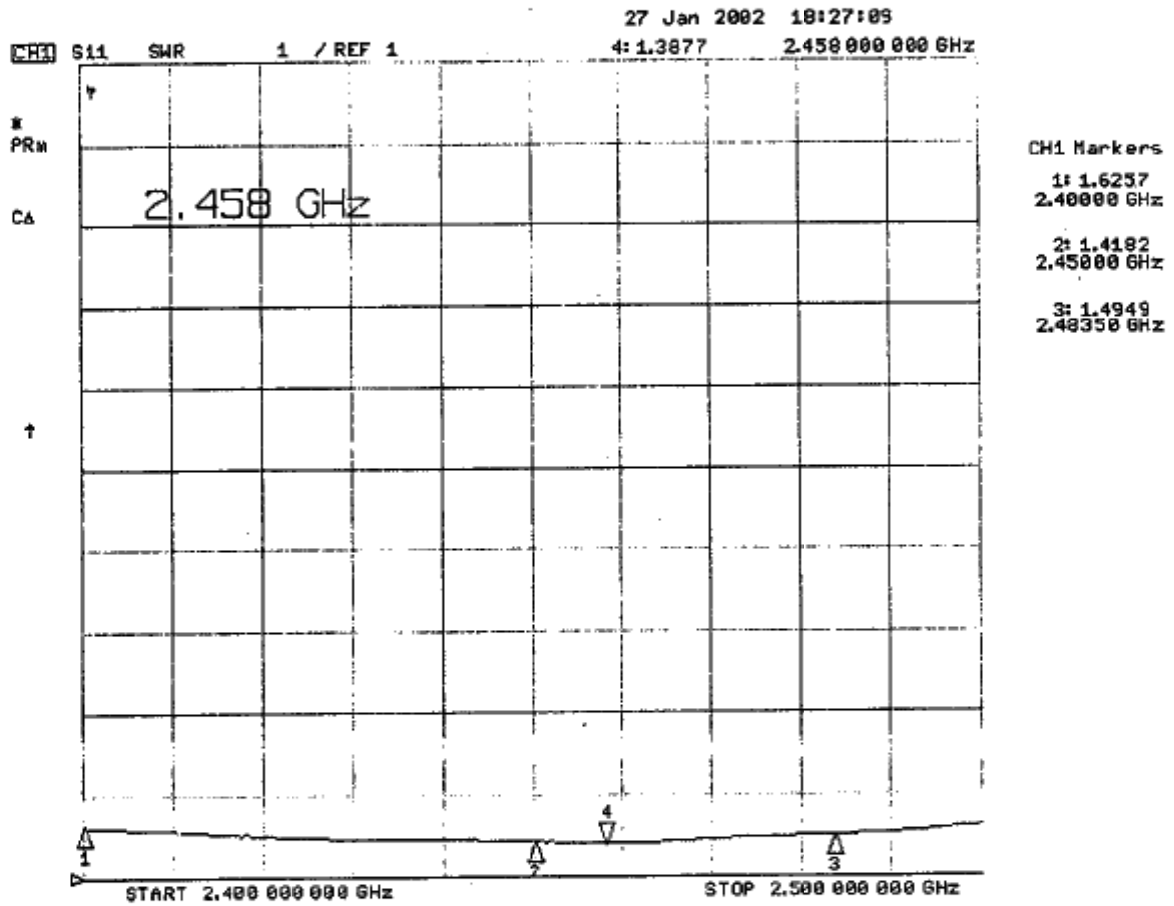
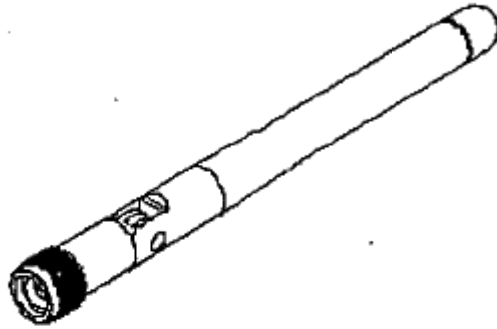


Figure 3



Appearance :



Dimensions : Tolerance 5%

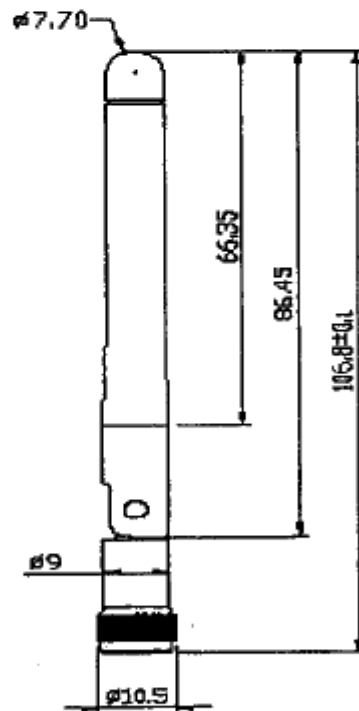


Figure 1

9. PHYSICAL & CHEMICAL PROPERTIES

Appearance: Colourless liquid
Odour: Characteristic pungent
pH: —

(The following properties are to be interpreted within the meaning of Directive 67/548/EEC)

Boiling point: 97-99°C
Flash Point (Closed cup) : -1°C
Specific Gravity : 0.7 approx.g/ml @ 20°C
Solubility in Water : Insoluble
Solubility in Acetone : Soluble
Vapour Pressure : 350mmmmHg @ 20°C
Other Properties : Vapour density: 3.45
Explosive Limit: 1-7%

10. STABILITY & REACTIVITY

The product is relatively stable under normal conditions of use.

11. TOXICOLOGICAL INFORMATION

Inhalation:

Inhalation of vapours may cause headaches or dizziness.

Exposure to the solvent vapour should be minimised and the product should be used where adequate ventilation is available

Skin:

Acute dermal LD50 is estimated to be greater than 2000mg/kg.

Solvent may remove essential oils from the skin making it susceptible to attack from other chemicals.

Eye:

May cause irritation to eyes.

Ingestion:

This product is considered to be of low toxicity having an acute oral LD50 (rat) >2000mg/kg by analogy to other similar products. Ingestion of large quantities may cause liver or kidney damage.

12. ECOLOGICAL INFORMATION

No information available.

Readily bio-degradable.

13. DISPOSAL

Incineration under controlled conditions recommended.

Dispose of in accordance with local and national regulations.

14. TRANSPORT INFORMATION

UN No.: 1993 (1950 for aerosol version)

Air(IATA): Flammable liquid, n.o.s. Class 3, Pkg. Grp. II. (Aerosol, flammable, n.o.s., Class 2.1, flammable gas.)

Sea(IMO): Flammable liquid n.o.s. Class 3.2, Pkg. Grp.II. (Aerosol Class 9 Pkg. Grp.II).

Road/Rail (ADR/RID): Inflammable liquid, Class 3, label No. 3 (Gas, compressed, Class 2, Aerosol).

15. REGULATORY INFORMATION

Hazard Label:



Highly flammable

Contains: Heptane

Risk Phrases: None

Safety Phrases:

S9 Keep container in a well-ventilated place.

S16 Keep away from sources of ignition - No smoking.

S23 Do not inhale vapours/spray.

S29 Do not empty into drains.

S33 Take precautionary measures against static discharges.

Standard aerosol text also required.

16. OTHER INFORMATION

Further information may be obtained from the Health & Regulatory Affairs Department at the following address :-

Loctite (International) NBD
Tallaght Business Park,
Whitestown,
Dublin 24, Ireland.
Tel: +353-1-510433 or +353-1-519466.
Fax: +353-1-519073

Prepared by :

Prabhu Kulkarni

Dr. Prabhu Kulkarni FICl
Health & Regulatory Affairs Officer.

Internal formula ref.: 895 4/92

HRA Ref.: 287-E

Our Ref: PBK/MC

Formerly Development Product: LID-1213
Supersedes Safety Data Sheet No: 287-E

The information in this safety data sheet was obtained from reputable sources and to the best of our knowledge, is accurate and current at the mentioned date. Neither Loctite nor its subsidiary companies accept any liability arising out of the use of the information provided here or the use, application or processing of the product(s) described herein. Attention of users is drawn to the possible hazards from improper use of the product(s).

TRANSPORT INFORMATION

993 (1950 for aerosol version)
: Flammable liquid, n.o.s. Class 3, Pkg. Grp. gas.)
: Flammable liquid n.o.s. Class 3.2, Pkg. Gr
: (ADR/RID): Inflammable liquid, Class 3.

REGULATORY INFORMATION

Label:



Highly flammable

Heptane

Seg: None

Precautions:

Store in a well-ventilated place.
Keep away from sources of ignition - No smoking.
Do not inhale vapours/spray.
Do not empty into drains.
Take appropriate precautionary measures against static discharge.
Additional aerosol text also required.

CONTACT INFORMATION

Information may be obtained from the Health and Safety Commission address :-

International NBD
Business Park,
Dublin,
Ireland.
Tel: +353-1-510433 or +353-1-519466.
Fax: +353-1-519073

Prepared by:

Shan Kulkarni
Shan Kulkarni FICl
Regulatory Affairs Officer.

Formula ref.: 895 4/92
287-E
©BKMC

Formerly
Superseded

Information in this safety data sheet was obtained from the most current data available at the mentioned date. Neither Loctite nor the information provided here or the use, application or storage of the product is drawn to the possible hazards from improper use.

9. PHYSICAL & CHEMICAL PROPERTIES

Appearance: Colourless liquid
Odour: Characteristic pungent
pH: —

(The following properties are to be interpreted within the meaning of DIN 51756)

Boiling point: 97-99°C
Flash Point (Closed cup): -1°C
Specific Gravity: 0.7 approx./ml @ 20°C
Solubility in Water: Insoluble
Solubility in Acetone: Soluble
Vapour Pressure: 350mmmmHg @ 20°C
Other Properties: Vapour density: 3.45
Explosive Limit: 1-7%

10. STABILITY & REACTIVITY

The product is relatively stable under normal conditions of use.

11. TOXICOLOGICAL INFORMATION

Inhalation:

Inhalation of vapours may cause headaches or dizziness.
Exposure to the solvent vapour should be minimised and the product should be used in a well-ventilated area where adequate ventilation is available.

Skin:

Acute dermal LD50 is estimated to be greater than 2000mg/kg.
Solvent may remove essential oils from the skin making it susceptible to attack.

Eye:

May cause irritation to eyes.

Ingestion:

This product is considered to be of low toxicity having an acute oral LD50 (rat) of 5000mg/kg. Ingestion of large quantities may cause liver or kidney damage.

12. ECOLOGICAL INFORMATION

No information available.
Readily bio-degradable.

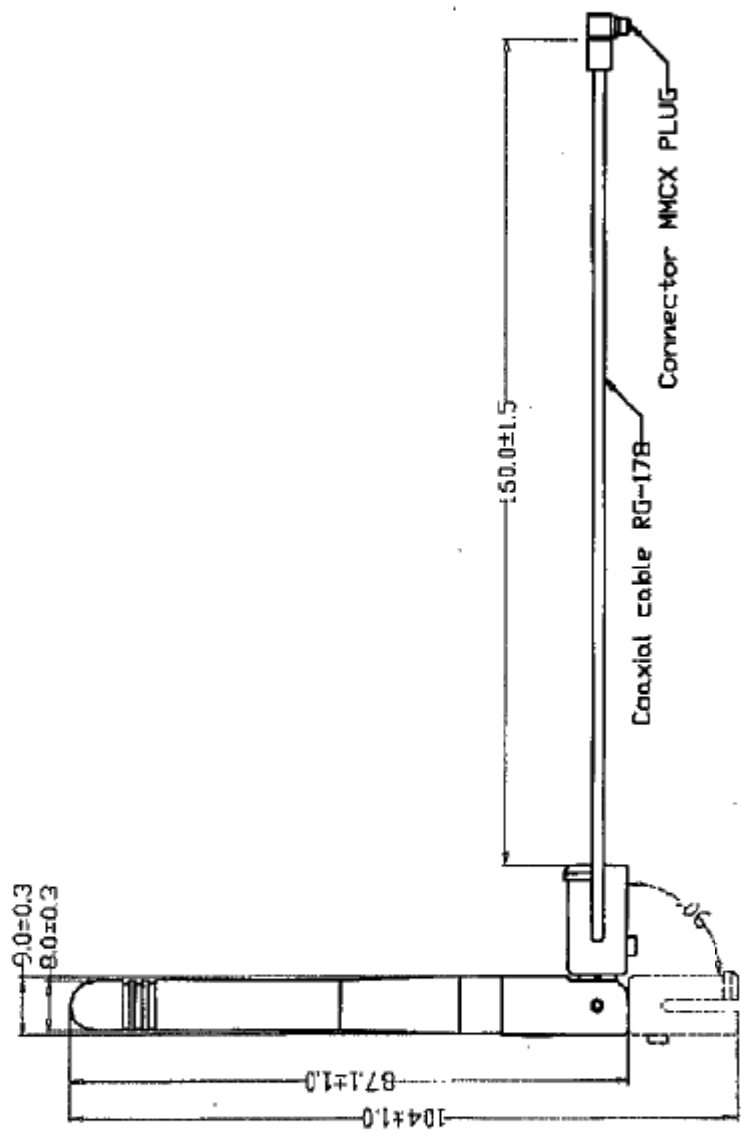
13. DISPOSAL

Incineration under controlled conditions recommended.
Dispose of in accordance with local and national regulations.

Ant. B
(Antenniques Co., Ltd.)

THE COMPANY OR THE CONTRACTOR ASSUMES NO LIABILITY FOR ANY DEFECTS OR OMISSIONS IN THIS DRAWING AND SHALL NOT BE RESPONSIBLE TO OTHERS FOR ANY DEFECTS OR OMISSIONS UNLESS SPECIFICALLY STATED TO THE CONTRARY IN WRITING BY THE COMPANY OR THE CONTRACTOR.

REV	NO	DESCRIPTION	DATE
1			



1	REV	NO	DESCRIPTION

啟格科技股份有限公司
 Antenniques Corp. Ltd.

飛鴻 2.4GHz Dipole Antenna
 Fly Lead MMCX Plug

PART NO. MCF-001-134-01
 DRAWING NO. WR-R-AJ0007-A1

METRIC
 WITH ANGLES TRANSCRYPTED
 1 OF 1
 3 OF 1

TECHNICAL DATA

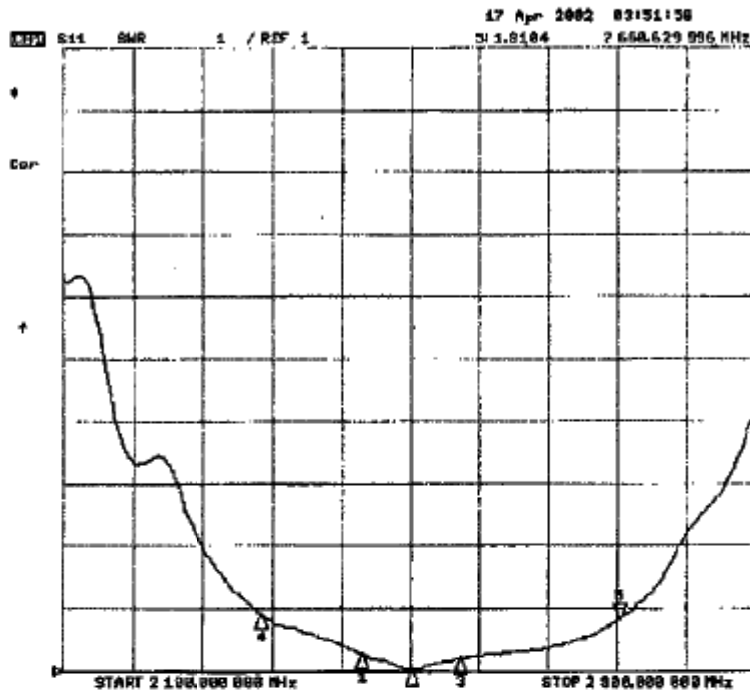
● Electrical Properties

Frequency Range	: 2.4~2.5GHz
Impedance	: 50 Ohm nominal
VSWR	: ≤ 2.0
Gain	: 2dBi
Radiation	: Omni
Polarization	: Vertical
Electrical Wave	: $\lambda/4$ Dipole
Connector	: MMCX Plug

● Mechanical Properties

Antenna Cover	: PU
Color	: Black
Operation Temperature	: $-20^{\circ}\text{C} \sim +60^{\circ}\text{C}$
Storage Temperature	: $-30^{\circ}\text{C} \sim +75^{\circ}\text{C}$

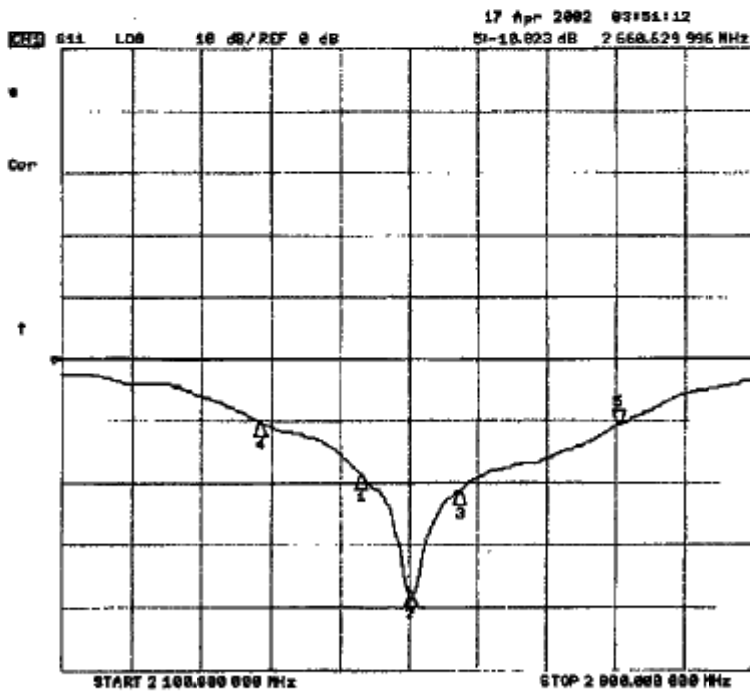
VSWR



CHI Markers

1	2.2598	2.48888 GHz
2	1.0285	2.45888 GHz
3	1.1981	2.50888 GHz
4	1.9895	2.29872 GHz

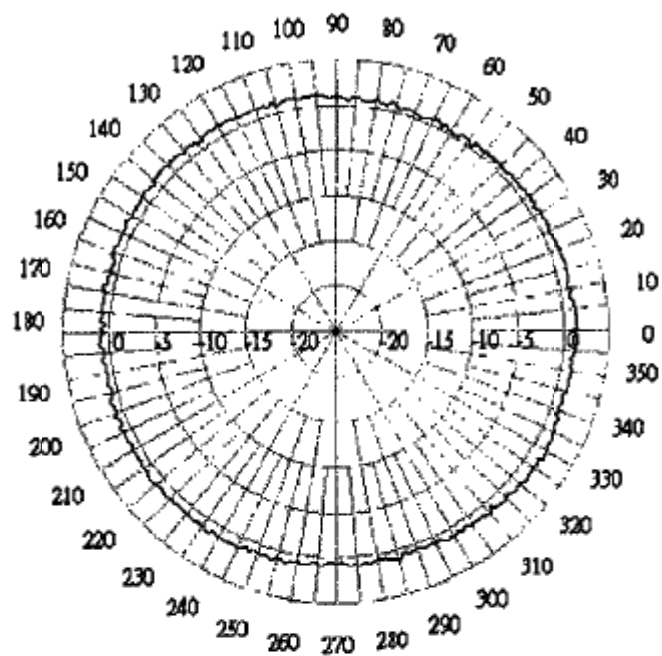
Return Loss



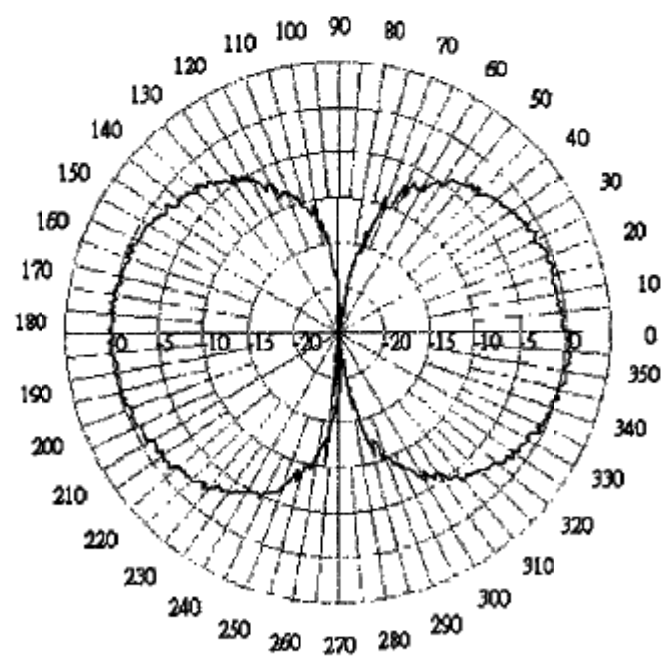
CHI Markers

1	18.824 dB	2.48888 GHz
2	27.464 dB	2.45888 GHz
3	24.171 dB	2.50888 GHz
4	18.129 dB	2.29872 GHz

H-Plane



E-Plane



Antenna Cover Polyurethane



Elastogran GmbH
Geschäftsbereich TPU-Elastomere

Elastogran GmbH - Postfach 1140-48440 Lemförde - Germany
WUJ COMPANY LTD.

P.O. BOX 36 - 431
RC TAOYUAN HSIEN

Date
No.

Inspection Certificate EN 10 204-3.1 B (DIN 60040)

Product : ES 35 A 50 000 8 No.: 15002939
Batch : 207672
Basic-Batch 207673

Property	Test method	Unit	Value
Dichte	DIN 53479	g/cm ³	1,26
Shore-Haerte D	DIN 53505	-	50
Zugfestigkeit	DIN 53504	MPa	53
Reissdehnung	DIN 53504	%	550
Abrieb	DIN 53516	mm ³	22

Dichte = Density/Densität, Shore Härte = Shore hardness/Shore Duress, Zugfestigkeit = Tensile strength/Tensile strength
Reißdehnung = Elongation at break/Bruchdehnung, Weissenhofdehnung = Tear strength, Abrieb = Abrasion loss/Abrieb

The stated values are measured from a representative batch (see batch) of every product campaign.

Test pieces are injection moulded from dry granulate with less than 0,05 % water content. Test pieces tempered 20 hrs. at 100 °C, then cooled to 23 °C / 50 % RH before testing. Test specimens cut from test plates.

We hereby certify, that the material described above complies with the terms of the order contract

Höbner Schoote

Works Inspector

The above information is derived from our quality checks, it does not relieve the purchaser from examining the product upon delivery and gives no assurance of suitability of the product for any particular purpose.



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E-mail : antenniques@msa.hinet.net 網站 : www.antenniques.com.tw

Antenna Cover Polyurethane

Elastollan S規格系列

聚酯類Polyester，有良好機械特性，優良的耐用性，高強度，抗拉及撕裂強度用於運動鞋底、溜冰鞋及機械零件等，射出及押出成形

物 性	單位	DIN	S60A	S65A	S68A	S90A	S95A	S98A	S60D	S64D	S74D
用於射出 ▲ 押出 ▽ 吹出 ●			▲	▲	▲	▲	▲	▲	▲	▲	▲
硬度 蕭氏A Hardness	Shore A	53505	81	85	88	93	96				
硬度 蕭氏D Hardness	Shore D	53505			36	41	48	55	60	64	75
密度Density	g/cm ³	53479	1.22	1.23	1.23	1.24	1.24	1.25	1.25	1.26	1.26
抗拉強度Tensile strength *	N/mm ²	S304-S2	50	55	55	55	50	45	45	45	40
斷裂延伸率Elongation at break *	%	S304-S2	750	650	650	600	550	500	500	450	300
20% 抗拉模數 Tensile modulus *	N/mm ²	S304-S2	2	2	3	6	8	13	15	22	25
100% 抗拉模數 Tensile modulus *	N/mm ²	S304-S2	4	5	6	9	11	16	18	23	30
300% 抗拉模數 Tensile modulus *	N/mm ²	S304-S2	8	8	9	13	20	23	34	38	40
彈性模數—模力測試 (測試樣品3mm) Modulus of elasticity	N/mm ²	53497						200	250	410	600
撕裂強度 Tear strength	N/mm	53515	60	70	75	96	120	150	170	200	240
摩擦損耗 Abrasion loss	mm ³	53516	40	35	30	30	30	25	25	25	25
室溫壓縮變形率 Compression set	%	53617	25	25	25	25	25	30	40	45	55
70°C 壓縮變形率 Compression set	%	53617	35	35	35	45	45	45	50	55	60
缺口衝擊強度 +23°C	kJ/m ²	5343	不破裂	不破裂	不破裂	不破裂	不破裂	不破裂	不破裂	不破裂	不破裂
Notched impact strength (Charpy) -30°C			不破裂	不破裂	不破裂	不破裂	5	6	6	4	3

* S2試片在100mm/min的應變速度下測量
 * 厚度2或3mm的射出試片，在100°C回火20小時後測量
 * 上列測試值僅供參考，需因客戶製品設計而變
 * 換算單位：1MPa=10.2kg/cm²=145PSI=1N/mm²
 1kJ/m²=1.02kg.cm/cm²

加工條件
 - 射出成形溫度175-240°C
 - 模溫20-70°C
 - 押出成形溫度175-230°C



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E-mail: antenniques@msa.hinet.net 網站: www.antenniques.com.tw

Antenna Base Polycarbonate

TEIJIN CHEMICALS LTD.

TEIJIN CHEMICALS LTD.
2-2, HIRASAWAICHO 1-CHOME,
CHIYODA-KU, TOKYO, JAPAN

TELEPHONE: TOKYO (8508) 4780
FACSIMILE: TOKYO (8508) 4780

TO WHOM IT MAY CONCERN

CERTIFICATE OF QUALITY

COMMODITY : TEIJIN PANLITE (Polycarbonate Resin)

GRADE NO. : E-12502100
COL. NO. : NATURAL

ITEM	UNIT	TEST METHOD	TEIJIN CHEMICALS QUALITY STANDARD	TEST RESULT
IMPACT STRENGTH (IZOD NOTCHED 5.0mm thick)	kgfcm/cm	ASTM D190	≥30	PASS
FLEXURAL MODULUS	kgf/cm ²	ASTM D790	23,000±1,500	PASS
TENSILE STRENGTH (AT BREAK)	kgf/cm ²	ASTM D638	820±140	PASS

NOTE : ALL FIGURES ENTERED IN THIS TABLE ARE FOR THIS SPECIFIC LOT AND, THEREFORE,
NO GUARANTEE.

TEIJIN CHEMICALS LTD.

M. Kikawa
Y. KIKUCHI
MANAGER
SALES ADMINISTRATION DEPT.



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E-mail : anten.niques@msa.hinet.net 網站 : www.antenniques.com.tw

Antenna Base Polycarbonate

QMFZ2

Component - Plastics

TEIJIN CHEMICALS LTD

							ESC075 (M)				
							(C - cont. from E010 card)				
L-1225LM(d),	All	0.40	94V-2	80	80	80	4	3	2	—	—
L-1225ZL(d)		0.75	94V-2	80	80	80	3	1	2	—	—
		1.5	94V-2	125	115	125	3	1	3	—	—
		2.1	94HB	125	115	125	3	1	3	—	—
		3.0	94HB	125	115	125	2	1	3	5	2
		6.0	94HB	125	115	125	1	1	4	—	—
L-1225LL(d)	All	0.4	94V-2	80	80	80	4	3	2	—	—
		0.75	94V-2	80	80	80	3	1	2	—	—
		1.5	94V-2	125	115	125	3	1	3	—	—
		3.0	94V-2	125	115	125	3	1	3	5	2
		3.3	94HB	125	115	125	2	1	3	—	—
		6.0	94HB	125	115	125	1	1	4	—	—
L-1250H(f2)(d),	All	0.40	94V-2	80	80	80	4	3	2	—	—
L-1250UH(d),		0.84	94V-2	80	80	80	4	—	4	—	—
L-1250VH(d),		1.5	94HB	125	115	125	4	0	3	—	—
L-1250ZH(d)		3.0	94HB	125	115	125	2	0	3	5	2
		6.0	94HB	125	115	125	1	0	4	—	—

Reports: February 10, 1989; February 10, 1989; September 24, 1990.

Replaces E50075C dated November 1, 1994.

499748296

10947

Underwriters Laboratories Inc.®

(Cont. on C005 card)

011/0012918

QMFZ8

Component - Plastics Certified for Canada

TEIJIN CHEMICALS LTD

E50075 (M)

(C - cont. from B card)

(cc) 10 thru 30 incl.

(1) A two digit number (10-15) denoting carbon filler content.

(2) A two digit number (10-40) denoting the total content of carbon fiber and glass fiber.

ww = A two digit number 10 thru 20 denoting content of carbon filler.

Any one or two letters may be suffixed to the grade.

Marking: Company name and material designation, generic polymer identification, color number where appropriate, and batch or lot number or date of manufacture on container, wrapper or molded on finished part.

See General Information Preceding These Recognitions.

Small-scale test data does not pertain to building materials, furnishings and related contents. Small-scale test data is intended solely for determining the flammability of plastic materials used in the components and parts of end-product devices and appliances, where the acceptability of the combination is determined by UL.



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Antenna Base Polycarbonate

Name	Unit	Test Method	Condition	Weather Resistant Grade (IAT approved)		
				L-1225ZL	L-1225Z	L-1225Z2
Specific gravity	—	ASTM D792	—	1.20	1.20	1.20
Water absorption	%	ASTM D670	24hr in 23°C water	0.20	0.20	0.20
Light transmission	%	ASTM D1003	3mm thick	88	88	88
Refractive index	—	ASTM D542	—	1.585	1.585	1.585
Tensile strength	Yield	MPa (kg/cm ²)	ASTM D638	65 (660)	63 (640)	62 (630)
	Break	MPa (kg/cm ²)	ASTM D638	64 (655)	77 (790)	60 (620)
Tensile modulus	MPa (kg/cm ²)	ASTM D638	—	2,190 (22,300)	2,130 (21,700)	2,120 (21,600)
Tensile elongation	Yield	%	ASTM D638	5	6	6
	Break	%	ASTM D638	130	140	140
Flexural strength	MPa (kg/cm ²)	ASTM D790	—	96 (960)	93 (950)	92 (940)
Flexural modulus	MPa (kg/cm ²)	ASTM D790	—	2,330 (23,800)	2,280 (23,000)	2,230 (22,700)
Compressive strength	MPa (kg/cm ²)	ASTM D695	—	77 (790)	76 (780)	76 (770)
Impact strength	1/8" (kg-cm/cm)	ASTM D256	1mm notch 0.3mm thick	100 (10)	80 (85)	80 (90)
	3/16" (kg-cm/cm)	ASTM D256	1mm notch 0.4mm thick	60 (6)	130 (13)	140 (14)
Rockwell hardness	—	ASTM D795	M scale	77	77	77
Mold shrinkage	%	ASTM D885	Flow direction	0.5-0.7	0.5-0.7	0.5-0.7
			Transverse direction	0.5-0.7	0.5-0.7	0.5-0.7
Heat distortion temperature	°C	ASTM D648	Load 0.451 MPa (4.6 kg/cm ²)	138	141	142
			Load 1.813 MPa (18.3 kg/cm ²)	126	131	132
Coefficient of linear expansion	×10 ⁻⁴ cm/cm/°C	ASTM D698	Flow direction	7	7	7
			Transverse direction	7	7	7
Dielectric breakdown strength	kV/mm	ASTM D149	Quick voltage rise method 1.4mm thick	30	30	30
Volume resistivity	×10 ¹² -cm	ASTM D257	—	3	3	3
Dielectric constant	—	ASTM D150	60 Hz	2.85	2.85	2.85
			10%Hz	2.9	2.9	2.9
Dielectric loss tangent	—	ASTM D150	60 Hz	0.0004	0.0004	0.0004
			10%Hz	0.009	0.009	0.009
Arc resistance	sec	ASTM D495	—	100	100	100
Anti-tracking (CTI)	V	IEC 118	—	300	300	300
Flame resistance	—	UL 94	1.47mm thick	94V-2	94V-2	94V-2
			3.85mm thick	94V-2	94V-2	94V-2
Temperature index	°C	UL 788	Electric 1.47mm thick	125	125	125
			Impact 1.47mm thick	115	115	115
			Wire-impact 1.47mm thick	125	125	125

All figures entered in this table are the typical figures and, therefore, no guarantee.



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Antenna Base

Grades of **Panlite**

Grades	Viscosity	Characteristics	Main molding methods	Principal applications
K-1300	High	Standard	Extruding/blow molding/ injection molding	<ul style="list-style-type: none"> • Sheet, film, pipe and other extruded products. • Baffles and other direct blow molded products.
K-1300Y	•	Mold release/ice color	Extruding/blow molding/ injection molding	
K-1300Z	•	Weather resistance/ ice color	Extruding/blow molding/ injection molding	
K-1300W	•	Powder	Extruding/rotational molding	
K-1285	•	Standard	Extruding/blow molding/ injection molding	<ul style="list-style-type: none"> • Large tanks and other rotational molded products.
L-1255	Medium	Standard	Injection molding	
L-1250R	•	Mold release	Injection molding	
L-1250Y	•	Mold release/ice color	Injection molding	
L-1250Z	•	Weather resistance/ ice color	Injection molding	
L-1250J	•	Boiling water resistance	Injection molding	
L-1250T	•	Boiling water resistance/mold release/ice color	Injection molding	
L-1250W	•	Powder	Injection molding/ rotational molding	
L-1225	Low	Standard	Injection molding	
L-1225R	•	Mold release	Injection molding/ injection blow molding	
L-1225Y	•	Mold release/ice color	Injection molding/ injection blow molding	
L-1225Z	•	Weather resistance/ ice color	Injection molding	
L-1225J	•	Boiling water resistance	Injection molding	
L-1225T	•	Boiling water resistance/mold release/ice color	Injection molding/injection blow molding	
L-1225W	•	Powder	Injection molding/ rotational molding	
L-1225L	Ultra low	Mold release/ice color	Injection molding	<ul style="list-style-type: none"> • Ultra-thin wall parts of electric & electronics appliances.
L-1225ZL 100	•	Mold release/ weather resistance/ ice color	Injection molding	<ul style="list-style-type: none"> • Ultra-thin lens lenses.
AD-5503	•	Optical properties/ low contamination	Injection molding	<ul style="list-style-type: none"> • Compact disks, CD-ROM, optical lenses.

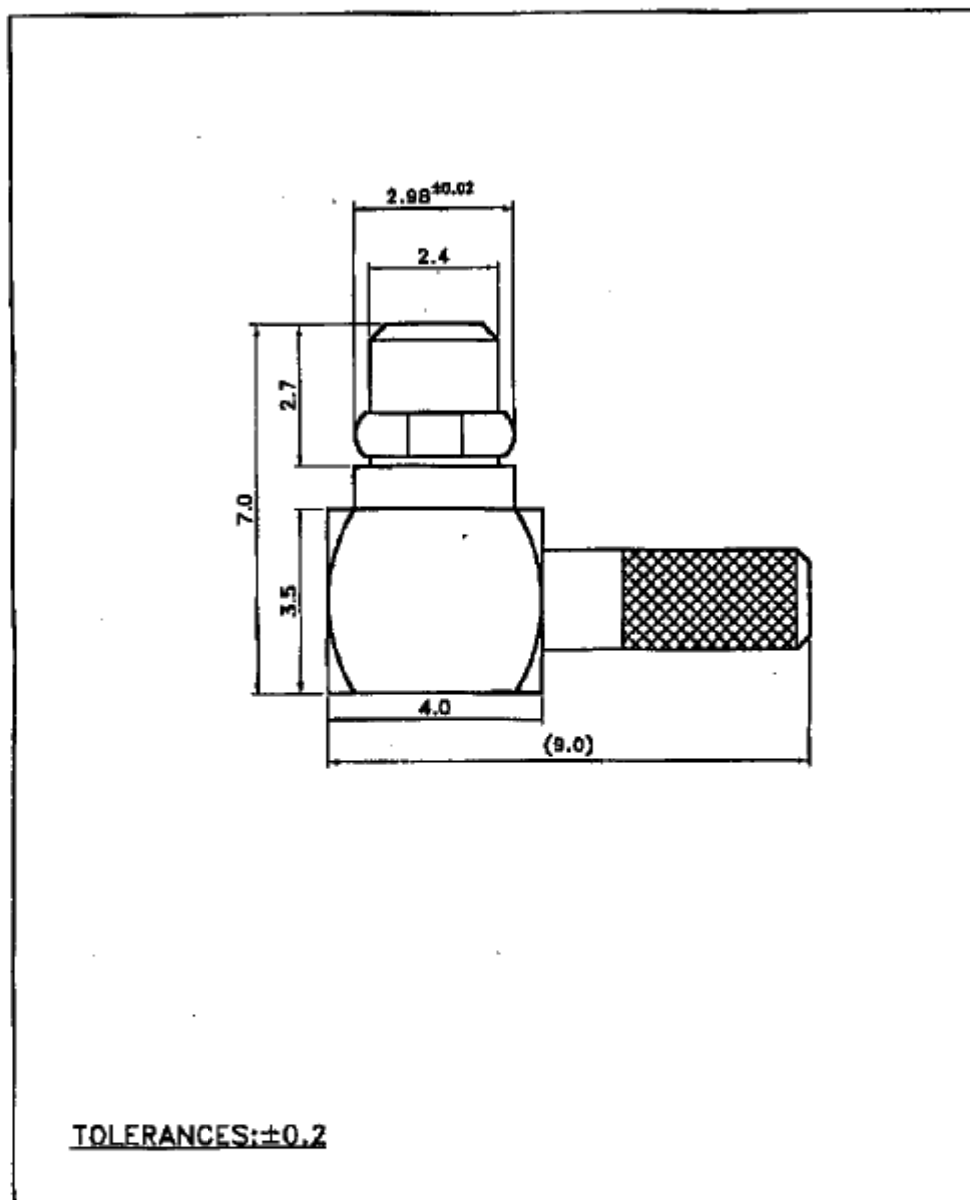


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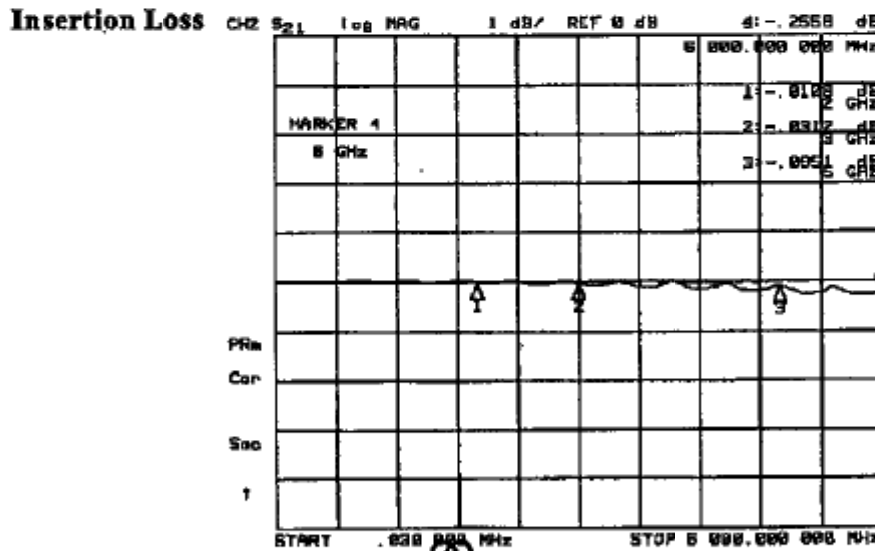
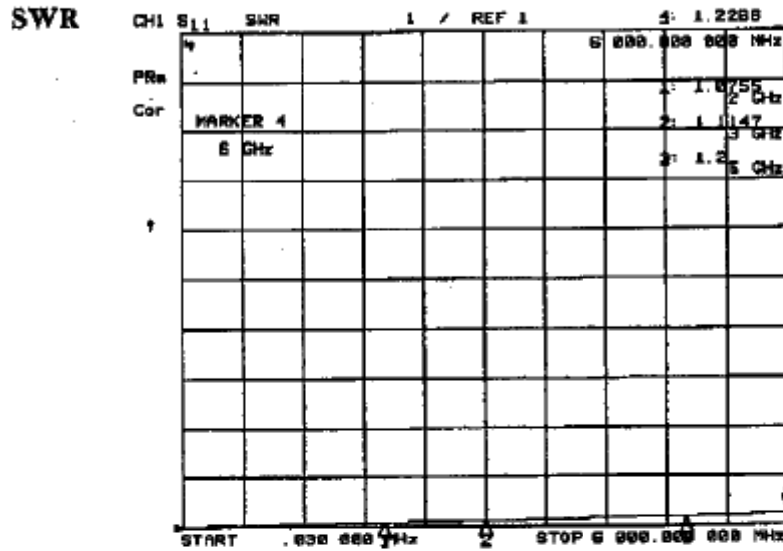
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Test Report



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MMCX Test Report

Name: Ping

Date: 2002/04/20

N= 1	Au= 7.09 μ "	Ni= 186.2 μ "
N= 2	Au= 6.95 μ "	Ni= 131.5 μ "
N= 3	Au= 7.01 μ "	Ni= 117.6 μ "
N= 4	Au= 6.92 μ "	Ni= 177.8 μ "
N= 5	Au= 7.50 μ "	Ni= 209.6 μ "

BLOCK RESULT

Product : Au/Ni/Cu

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

CHECK BY: ELO



欣格科技股份有限公司 Antenniques Co.,Ltd

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Test Report

Name: Body

N= 1	Au= 7.03 μ "	Ni= 164.5 μ "
N= 2	Au= 7.70 μ "	Ni= 208.8 μ "
N= 3	Au= 8.04 μ "	Ni= 210.8 μ "
N= 4	Au= 7.75 μ "	Ni= 204.6 μ "
N= 5	Au= 7.36 μ "	Ni= 210.4 μ "

Product : Au/Ni/Cu

	Au	Ni
Mean Value.....X	7.61 μ "	199.7 μ "
Meas. Time.....	10 "	
Standard Dev.S	0.332 μ "	19.9 μ "
C. O. V. [G].....V	4.36 %	9.96 %
No of Readings.....n	5	5
Range.....R	0.82 μ "	46.4 μ "
Min. Readings.....	7.20 μ "	164.5 μ "
Max. Readings.....	8.02 μ "	210.9 μ "



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MMCX Engage / Disengage Testing

NO	For the first time		After 21		After 101		After 501	
	Engage Force (lbs)	Disengage Force (lbs)	Engage Force (lbs)	Disengage Force (lbs)	Engage Force (lbs)	Disengage Force (lbs)	Engage Force (lbs)	Disengage Force (lbs)
01	7.10	4.68	6.81	3.52	6.40	3.01	2.68	2.02
02	6.88	4.23	6.46	3.25	6.21	2.92	2.80	2.25
03	7.20	4.05	6.68	3.21	6.29	3.11	2.61	2.20
04	7.19	3.79	6.83	3.11	6.41	3.15	2.81	2.05
05	5.71	5.51	5.55	3.31	5.40	3.11	2.65	1.71
06	6.20	3.58	6.20	3.40	5.81	3.20	2.67	1.75
07	5.80	4.61	5.50	3.51	5.35	3.15	2.69	2.12
08	6.01	3.33	5.36	3.28	5.16	3.23	2.68	2.15
09	7.25	4.20	6.22	3.15	6.16	2.97	2.81	2.61
10	7.31	4.68	5.80	3.20	5.60	2.99	3.32	2.42
11	7.11	5.51	6.40	3.50	6.31	3.10	2.82	2.14
12	6.22	3.78	5.31	3.21	5.09	2.97	2.78	2.10
13	7.31	3.33	5.40	3.33	5.10	2.93	2.84	2.12
14	7.33	3.78	6.22	3.15	6.08	3.10	2.65	2.20
15	6.22	4.89	5.84	3.19	5.55	3.08	2.46	2.28
16	6.44	3.33	5.39	3.11	5.06	2.98	2.68	2.48
17	7.31	4.01	5.51	3.23	5.41	2.90	2.85	2.20
18	7.33	3.56	5.33	3.34	5.20	3.02	2.88	2.11
19	7.25	3.33	6.28	3.45	5.82	2.91	2.84	2.30
20	6.44	4.00	6.47	3.54	6.10	3.38	2.81	2.10

CHECK : 陳建明



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MMCX Test Report

鹽水噴霧試驗記錄表

試驗日期：2002/04/20
試驗號碼：2002042001
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..... 16.3 (ml/80cm/h)
 - 4.2 收集溶液在室的比重或濃度..... 1.0411
 - 4.3 酸鹼濃度..... 6.9
- 5 試樣：
 - 5.1 種類..... 鋼材
 - 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..... 88 %
- 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



試驗員：羅珮菁

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MMCX Brass

檢驗報告表

2002/04/25

編號:

客 戶	欣格科技股份有限公司		
品 名	FREE CUTTING BRASS ROD	丸 5.0mm	
規 格	JIS H3250 C3604 RD		
數 據 項 目	標 準 值	實 測 值	備 註
化 學 成 份 %	Cu	57.0 - 61.0	
	Pb	1.8 - 3.7	
	Fe	<0.5	
	Sn+Fe	<1.2	
	Zn	REMAINDER	
其 它			



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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
- 轻量化疲劳试验器
- BANDOLIÈRE 连接器触点
- 编织屏帆布
- 防腐及防生物恶臭海上线及微网结构
- 限流器

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缆电缆，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。

方线用于电子触点，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寻常的形状的铍铜线均可以达到。

本公司所供应之线直径自 2.7mm 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控制商获得。

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“预处硬”) 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 合金	UNS 编号	线材
28	C17200	ASTM B 167 QQ-C-530 AMS 4725 SAE J 461, SAE J 463 JIS H3270
M35	C17300	ASTM B 167 QQ-C-530
3	C17510	*
10	C17500	*

ASTM 美国材料试验学会
DIN 德国标准
SAE 国际汽车工程师学会
AMS 美国材料试验学会 (SAE 材料)
JIS 日本工业标准
DIN 德国工业标准

注：除可在此外，材料符合 ASTM 标准。
* 可获此产品，但不在本目录中。

公差 (毫米)			
线直径		BRUSH WELLMAN 标准公差 (+或-)	
以上	以下	冷拉	退火
1.27	- 2	0.008	0.025
2	- 3	0.01	0.05
3	- 5	0.015	0.05
5	- 8	0.02	0.05
8	- 10	0.025	0.05
10	- 12	0.025	0.05

注：冷拉之公差为退火公差的一半。



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MMCX Beryllium Copper

鍍銅線之機械及電學性質							
合金 Alloy	狀態 (°)	熱處理	線直徑 mm	抗拉強度 kg/mm ²	屈服強度 kg/mm ²	伸長百分比	導電百分比 IACS
25 C17200 和 M25 C17300	A (TB00)	-	1.3-12.7	42-55	14-22	30-60	15-19
	1/4H (TD01)	-	1.3-12.7	53-61	52-74	9-25	15-19
	1/2H (TD02)	-	1.3-12.7	77-95	63-88	2-15	15-19
	3/4H (TD03)	-	1.3-2.0	91-109	80-106	2-6	15-19
	H (TD04)	-	1.3-2.0	98-117	91-113	1-6	15-19
	AT (TF00)	3hr 315-330°C	1.3-12.7	112-141	101-127	3 以上	22-28
	1/4HT (TH01)	2hr 315-330°C	1.3-12.7	123-148	118-141	2 以上	22-28
	1/2HT (TH02)	1.5hr 315-330°C	1.3-12.7	130-152	119-148	2 以上	22-28
	3/4HT (TH03)	1hr 315-330°C	1.3-2.0	133-162	123-155	2 以上	22-28
	HT (TH04)	1hr 315-330°C	1.3-2.0	137-162	126-155	1 以上	22-28
3 C17510 和 10 C17500	A (TB00)	-	1.3-12.7	24-39	7-22	20-50	20-30
	H (TD04)	-	1.3-12.7	45-57	38-53	2-20	20-30
	AT (TF00)	3hr 480-495°C	1.3-12.7	70-92	69-78	10 以上	45-60
	HT (TH04)	3hr 480-495°C	1.3-12.7	77-99	66-88	10 以上	48-60



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MMCX 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 6989 (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 kg/cm ²
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 1 KHz	D150	Less than 0.0005
7	Dielectric constant 1 KHz	D150	2.0 - 2.1
8	Volume resistivity	D257	> 10 ¹⁶
9	Surface resistivity	D257	10 ¹⁷
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. 30C to 80C, 10 ⁻⁵ C	D696	12.3 to 11.6



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MMCX PTFE

PROPERTY

Item	UNIT	TEST METHOD (ASTM)	PTFE (NATURE)
Apparent density	g/it	D-1457	260
Specific Gravity	g/cm ³	D-792	2.18
Tensile Strength	kg/cm ²	D-638	315
Elongation	%	D-638	400
Deformation (Total) MD	%	D-621 (23°C 140 kg/cm ²)	—
60min. CD			—
24Hrs. CD			14.3
			16.7
Permanent Deformation MD			7.9
Deformation CD			8.4
Deformation MD		150°C	51.8
60min. CD		200 kg/cm ²	—
Flexural Strength (0.2% offset) CD	kg/cm ²	D-790	57
Flexural Modulus CD			3,500 ~ 6,300
Compressive Strength (0.2% offset) MD	kg/cm ²	D-695	77
CD			—
Compressive Modulus MD			4,200
CD			—
Hardness	Durometer "D"	D-2240	55
Impact Strength	kg-cm/cm	D-256	15.8
Coefficient of Thermal Conductivity	Kcal/m.hr.°C	Conco Fitch	0.21
Coefficient of Linear Thermal Expansion	0.01m/°C	D-696	25-90°C MD
25-90°C CD			—
25-150°C MD			12.2
25-150°C CD			—
25-200°C MD			12.6
25-200°C CD			—
25-260°C MD			13.7
25-260°C CD			—
Water Adsorption	%	D-570	0
Coefficient of Friction(Dynamic)		P=7 kg/cm ² V=0.5 m/sec	—
Coefficient of Friction(Static)		P=35 kg/cm ²	0.05-0.08




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Cable M17/93-RG178

	Rev	Changes	Date								
											
<p>Construction:</p> <p>A) Center Conductor: 30 T/38 SPCW ØØ .012" ± .001"</p> <p>B) Dielectric: Extruded PTFE ØØ .033" ± .002"</p> <p>C) Shield: 38 AMS SPC ØØ .051" Nom.</p> <p>D) Jacket: FEP - Brown Tint ØØ .071" ± .004" Surface Printed "8017814P HARBOUR INDUSTRIES 27478"</p>	<p>Electricals:</p> <p>Impedance: 50 ± 2 Ohms Capacitance: 32 pF/ft Max. Velocity of Prop.: 79% Nom. Cut off Frequency: 115 GHz</p> <p>Physical Properties:</p> <p>Weight per 1000 ft: 6.3 lbs Max. Minimum Bend Radius: .35" Operating Temperature Range: -55°C to 200°C</p>	<p>Attenuation:</p> <p>1.0 GHz 45.0 dB/100ft. 2.0 GHz 54.4 dB/100ft. 3.0 GHz 79.7 dB/100ft. 4.0 GHz 93.7 dB/100ft. 5.0 GHz 104.3 dB/100ft. 6.0 GHz 115.0 dB/100ft.</p>									
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2" style="text-align: center;">Harbour Industries</td> </tr> <tr> <td>Date: 12/11/01</td> <td>Drawn By: M/DP/eng</td> </tr> <tr> <td>Drawing Name: M17/93</td> <td>Rev: (Sheet 1 of 1)</td> </tr> <tr> <td>Part Number: 128</td> <td>Drawing Number: 12792_3</td> </tr> </table>				Harbour Industries		Date: 12/11/01	Drawn By: M/DP/eng	Drawing Name: M17/93	Rev: (Sheet 1 of 1)	Part Number: 128	Drawing Number: 12792_3
Harbour Industries											
Date: 12/11/01	Drawn By: M/DP/eng										
Drawing Name: M17/93	Rev: (Sheet 1 of 1)										
Part Number: 128	Drawing Number: 12792_3										



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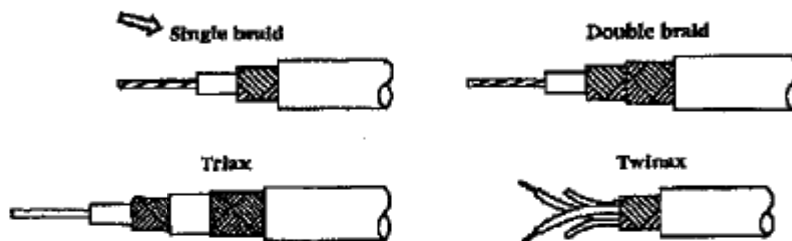
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Cable M17/93-RG178

MIL-C-17 Coax Cable – QPL Approved



Harbour supplies a complete line of high temperature, high performance QPL approved MIL-C-17 coax cables for the military, commercial and industrial markets. The specific M17 constructions referenced are manufactured in accordance with the most recent revision of the MIL-C-17 specification to ensure a quality product. The MIL-C-17 specification defines complete physical and electrical characteristics for each M17 part number, including diameter parameters, dielectric materials, braid coverage, maximum attenuation, and VSWR levels.

VSWR Sweep Testing

When selecting a 50 ohm coaxial cable, constructions with VSWR requirements are recommended. Manufacturing and sweep testing cables with concern for VSWR ensures a quality cable free of spikes over the referenced frequency range. (View the test frequencies specified in the electrical characteristics section.)

Precision PTFE Dielectrics

All of the high temperature, high performance coax cables listed have PTFE dielectrics with high dielectric strength and low capacitance in proportion to the dielectric constant. All PTFE dielectrics are manufactured with tolerances tighter than the MIL-C-17 specification to ensure uniformity of electrical characteristics, especially impedance, attenuation and VSWR.

Tape wrapped PTFE Constructions

Harbour also manufactures PTFE tape wrapped cables to a previous revision of the MIL-C-17 specification. These constructions can withstand operating temperatures up to 250° C, versus 200° C, for FEP jacketed cables. Also, PTFE tape wrapped cables are generally more flexible than their FEP jacketed counterparts.

UL Approvals

All of Harbour's M17 part numbers manufactured to the MIL-C-17 specification may be ordered with UL 1971 and FT4/FT6 approvals.



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Cable M17/93-RG178

Harbour Industries MIL-C-17 Coaxial Cables

Physical Characteristics

M17 Number	Center Conductor	PTFE Dielectric Diameter	Shield	Jacket	Overall Diameter	Minimum Recommended Bend Radius	Operating Temp. (°C)	Weight (lbs./MT)	Comments
M17/90-RG142	.037" SCS	.118"	SPC(2)	FEP	.185"	1.0"	-55 +200	43.0	
M17/93-RG178	.0125"(7/604")SCS	.033"	SPC	PEP	.071"	0.6"	-55 +200	6.3	
M17/93-0001	.0125"(7/604")SCS	.033"	SPC	PFA	.071"	0.6"	-55 +200	6.3	M17/93-RG178 technical temp. range
M17/94-RG179	.0125"(7/604")SCS	.063"	SPC	FEP	.100"	0.4"	-55 +200	10.0	
M17/95-RG180	.0125"(7/604")SCS	.102"	SPC	FEP	.141"	0.7"	-55 +200	19.8	
M17/110-RG302	.025" SCS	.146"	SPC	FEP	.202"	1.0"	-55 +200	40.0	
M17/111-RG303	.037" SCS	.185"	SPC	FEP	.270"	0.9"	-55 +200	31.0	
M17/112-RG304	.063" SCS	.185"	SPC(2)	FEP	.280"	1.4"	-55 +200	34.0	
M17/113-RG315	.0201"(7/0067")SCS	.050"	SPC	FEP	.098"	0.5"	-55 +200	12.2	
M17/127-RG383	.063"(7/0012")SC	.265"	SPC(2)	FEP	.390"	2.0"	-55 +200	115.0	
M17/128-RG400	.064"(8/0008")SC	.118"	SPC(2)	FEP	.195"	1.0"	-55 +200	30.0	
M17/131-RG408	.0162"(7/004")SCS	.030"	SPC(2)	FEP(2)	.118"	0.6"	-55 +200	15.0	Reuse M17/93-RG178
M17/152-0001	.0201"(7/0067")SCS	.060"	SPC(2)	FEP	.114"	0.6"	-55 +200	18.5	Flexible shielded M17/113-RG315.
M17/158-0001	.037" SCS	.115"	SPC(2)	FEP	.190"	1.0"	-55 +200	35.0	Unwrap M17/90-RG142
M17/168-0001	.0125"(7/604")SCS	.053"	SPC	FEP	.071"	0.4"	-55 +200	6.3	Unwrap M17/93-RG178
M17/170-0001	.037" SCS	.118"	SPC	FEP	.170"	0.9"	-55 +200	29.0	Unwrap M17/111-RG303
M17/172-0001	.0201"(7/0067")SCS	.060"	SPC	FEP	.098"	0.5"	-55 +200	11.5	Unwrap M17/113-RG315
M17/174-0001	.064"(7/0008")SCS	.265"	SPC(2)	FEP	.390"	2.0"	-55 +200	115.0	Unwrap M17/127-RG383
M17/175-0001	.064"(8/0008")SC	.118"	SPC(2)	FEP	.390"	1.0"	-55 +200	30.0	Unwrap M17/128-RG400
M17/176-0002	.025"(8/0005")SPAC	.042"	SPA	PFA	.129"	0.6"	-55 +200	18.0	Control impedance tolerance
PTFE Tape Wrap Shielded RG Cables									
RG 168 AU	.0125"(7/604")SCS	.060"	SPC	PTFE	.190"	0.6"	-55 +200	18.0	Flexible, 200° C. used
RG 168 AU	.0201"(7/0067")SCS	.060"	SPC	PTFE	.190"	0.5"	-55 +200	11.0	Flexible, 250° C. used
RG 198 AU	.0125"(7/604")SCS	.102"	SPC	PTFE	.141"	0.7"	-55 +200	19.0	Flexible, 200° C. used
RG 198 AU	.0125"(7/604")SCS	.030"	SPC	PTFE	.060"	0.6"	-55 +200	6.0	Flexible, 200° C. used



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Heat Shrink Tube Sumitube F32

1. SCOPE

THIS SPECIFICATION COVERS NEW SUMITUBE F32 .

2. FEATURE

NEW SUMITUBE F32 IS AN IRRADIATED CROSSLINKED , THERMALLY-STABILIZED , FLAME-RETARDANT FLEXIBLE POLYOLEFIN HEAT SHRINKABLE TUBING .
UNLIKE OTHER TYPICAL FLAME-RETARDANT TUBING , NEW SUMITUBE F32 IS FREE OF POLYBROMINATED BIPHENYL OXIDES (PBBOs) , POLYBROMINATED BIPHENYL ETHERS (PBBEs) , POLYBROMINATED BIPHENYLS (PBBs) AS FLAME-RETARDED CHEMICALS .

3. RECOGNITION

NEW SUMITUBE F32 IS UL-RECOGNIZED AND CSA-CERTIFIED AT 125 DEG. C , 600 V WITH UL VW-1 AND CSA OPT FLAME-RETARDANCY RATING .

	UL 224	CSA
VOLTAGE RATING	600V	600V
TEMPERATURE RATING	125 DEG. C	125 DEG. C
CATALO NO.	SUMITUBE F32	SUMITUBE F31
FILE NO.	E-48762	LR84766

4. COLOR

STANDARDS COLORS ; BLACK , WHITE , BROWN , RED , ORANGE , BLUE , GREEN , YELLOW , VIOLET , GRAY .

5. MARKING

FOLLOWING LETTERS SHOULD BE PRINTED ON THE SURFACE OF THE PRODUCTS
.9U VW-1 SUMI-PAC CSA HS X PO TUBING SUMITUBE F32 125 C OPT -F- (Size) ®

6. STANDARD SIZES

STANDARD SIZES SHALL BE SPECIFIED IN TABLE

7. PROPERTIES.

PROPERTIES SHALL BE AS SPECIFIED WITH TABLE

8. METHOD OF MEASURING SIZES AND TESTING PROPERTIES

1.) INSIDE DIAMETER

INSIDE DIAMETER SHALL BE MEASURED BY A METAL GAGE ROD OR A METAL TAPE GAGE WHICH HAS INTERVAL OR GRADUATION .



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IN CASE OF USING A GAGE ROD : READ THE VALUE OF THE MAXIMUM GAGE ROD WHICH SHALL PASS FREELY INTO THE TUBING WITHOUT EXPANDING THE TUBING .

IN CASE OF USING A TAPER GAGE : READ THE VALUE ON THE GAGE WHEN THE TUBING ISN'T EXPANDED BY INSERTION AND THERE IS NO VISIBLE SPACE BETWEEN THE TUBING AND THE TAPER GAGE .

2.) WALL THICKNESS

WALL THICKNESS SHALL BE MEASURED BY A PIN-DIAL GAGE OR A MICROMETER AT SEVERAL POINTS .

3.) SHRINKABLE CONDITION AND LONGITUDINAL CHANGE

SHRINKABLE CONDITION : UNRESTRICTED SHRINKAGE SHALL BE PLACED AT 150 DEG. C IN A CIRCULATING AIR OVEN FOR 5 MINUTES .

LONGITUDINAL SHRINKAGE : THE TUBING SHALL BE CUT IN ABOUT 100 MM AND MEASURED THE LENGTH . AFTER UNRESTRICTED SHRINKAGE (AFTER RECOVERED), THE LENGTH IS TO BE RE-MEASURED AND THE LONGITUDINAL SHRINKAGE SHALL BE CALCULATED FROM THE FOLLOWING FORMULA .

$$\text{LONGITUDINAL CHANGE} = \frac{\text{LENGTH AS SUPPLIED} - \text{LENGTH AFTER RECOVERED}}{\text{LENGTH AS SUPPLIED}} * 100 \%$$

4.) PROPERTIES SHALL BE TESTED IN ACCORDANCE WITH UL224 & CSA 22.2 NO. 198 TEST METHOD



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Heat Shrink Tube Sumitube F32



Canadian Standards Association
Association canadienne de normalisation

CERTIFICATION RECORD

The company named below has been authorized by Canadian Standards Association to represent the products listed in this record as "CSA Certified" and to affix the CSA Mark to these products according to the terms and conditions of the CSA Service Agreement.

NUMBER 084766X0000 March 25, 1994 (Replaces July 10, 1990)

CLASS 9032 01 (Re-examination Service)

SUMI-PAC ELECTRO-CHEMICAL CORP.
4th Fl., Pacific Commercial Bldg.
285, Chung Hsiao E. Rd., Sec 4
Taipei, Taiwan
FACTORY
No. 15, Industrial 5th Rd.
Hsin-Chu, Enlarged Industrial Park
6th Lin, Feng-Shan Chun
Hukao Hsiang, Hsin-Chu Hsien
Taiwan

INSULATING DEVICES AND MATERIALS - Insulating Tubing and Sleeving

- Max temperature rating: 125C
 - Max voltage rating: 600V
 - "SUMITUBE F2" and "SUMITUBE F32", flexible heat-shrinkable irradiated cross-linked polyolefin tubing (Class I), in trade sizes 3/64 in to 1 in and 1.0mm to 26mm, OPT.
 - Max temperature rating: 125C.
 - Max voltage rating: 150V.
 - "SUMITUBE F4", flexible heat-shrinkable irradiated cross-linked polyolefin tubing (Class I), in trade sizes 3/64 in to 1 in and 1.0mm to 26mm, OPT.
- Note: Above tubing approved in all colours except clear and transparent.



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Heat Shrink Tube Sumitube F32

YDFU2 November 4, 1994
 Component - Extruded Tubing, Electrical

SUMITOMO ELECTRIC INDUSTRIES LTD
IRRADIATED PRODUCTS DIV

E48782 (S)
 (C-cont. from B card)

Irradiated flexible heat shrinkable polyolefin.							
↗ Sumitube F32	600	125	I	+	—	Yes	
828 or	600	125	I	+	—	Yes	
Sumitube B2							
Sumitube F5	600	125	I	+	—	Yes	
939 or	600	105	I or II	+	—	Yes	
Sumitube F(2)							
B40 or	600	125	I	+	—	Yes	
Sumitube F2(2)							
942 or	300	125	I	+	—	Yes	
Sumitube F4(2)							
958 or SM12	600	125	I	+	—	Yes	
883 or SM23	600	125	I	+	—	Yes	
938 or	600	105	II	+	—	Yes	
Sumitube F(T2)							

Report: February 18, 1973.

Replaces E48762C dated July 20, 1994.
 390139001 N3228 Underwriters Laboratories Inc.*

(Cont. on D card)
 01V0910143



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Heat Shrink Tube Sumitube F32

ABS Characteristics

POLYLAC[®]

特 性 Typical Properties	試 驗 法 ASTM Test	單 位 Units	一 般 級 (General Purpose)					
			PA-707	PA-757	PA-717C	PA-727	PA-747	PA-709
引 張 強 度 Tensile Strength	D-638	kg/cm ² (lb/in ²)	500 (7,050)	480 (6,800)	450 (6,380)	485 (6,870)	385 (5,470)	400 (5,670)
延 伸 率 Tensile Elongation	D-638	%	15	20	23	20	30	40
彎 曲 強 度 Flexural Modulus	D-790	10 ⁹ kg/cm ² (10 ⁹ lb/in ²)	2.9 (4.1)	2.7 (3.8)	2.5 (3.5)	2.7 (3.8)	2.2 (3.1)	2.3 (3.2)
彎 曲 強 度 Flexural Strength	D-790	kg/cm ² (lb/in ²)	860 (12,200)	790 (11,200)	720 (10,200)	780 (11,000)	620 (8,800)	640 (9,070)
洛 氏 硬 度 Rockwell-Hardness	D-785		R-116	R-116	R-115	R-110	R-108	R-102
IZOD 耐 擊 破 強 度 IZOD Impact Strength (Notched)	D-256	1/8"	14 (2.0)	20 (3.7)	28 (5.2)	26 (4.8)	41 (7.5)	45 (8.4)
		1/4"	14 (2.0)	18 (3.3)	25 (4.0)	23 (4.2)	36 (6.6)	40 (7.4)
軟 化 點 Vicat Softening Temp.	D-1525	°C (°F)	103 (221)	105 (221)	104 (219)	105 (221)	103 (217)	105 (221)
熱 變 形 溫 度 Heat Distortion Temp.	D-648 (annealed) (unannealed)	°C (°F)	99(210) 88(190)	99(210) 80(190)	98(208) 87(189)	99(210) 87(190)	99(207) 86(187)	99(208) 88(190)
比 重 Specific Gravity	D-792	23/23 °C	1.06	1.05	1.04	1.04	1.03	1.03
熔 融 係 數 Melt Flow Index	D-1238	200 °C x 5g g/10min (Cond.G)	1.9	1.8	1.4	1.8	1.3	0.5
	ISO-1133*	230 °C x 10kg g/10min	20	22	14	19	13	5
燃 燒 性 Flammability	File No. E96079 UL & C-UL		1/16"HB	1/16"HB	1/16"HB	1/16"HB	1/16"HB	1/16"HB
材 料 特 性			高 光 澤 性 高 剛 性	高 剛 性 高 光 澤 性	一 般 射 出 成 型 用	電 鍍 膜	超 高 強 度 射 出 成 型 用	超 高 耐 擊 破 強 度 沖 擊 用
Product Description			High Gloss High Rigid	High Gloss Medium Impact	Medium Impact	Electro-Plating	High Impact	Super Impact

以上特性和值係 A B T M 標準為據其詳請參閱說明書。僅供參考用。* ISO 試驗方法



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Heat Shrink Tube Sumitube F32



TABLE 1. STANDARD SIZE

TRADE SIZE (METRIC)	AS SUPPLIED (MM)		AFTER RECOVERED (MM)		STANDARDS LENGTH	
	INSIDE DIAMETER D	NOML WALL THICKNESS	INSIDE DIAMETER d (MAX)	WALL THICKNESS W (MIN)	CUT(M)	SPOOL(M)
1*0.2	1.30±0.30	0.2	0.50	0.33	1	200
1.5*0.2	2.00±0.30	0.2	0.75	0.36	1	200
2*0.2	2.50±0.30	0.2	1.00	0.44	1	200
2.5*0.25	3.00±0.40	0.25	1.25	0.44	1	200
3*0.25	3.80±0.30	0.25	1.50	0.44	1	200
3.5*0.25	4.00±0.30	0.25	1.75	0.44	1	200
4*0.25	4.50±0.30	0.25	2.00	0.44	1	200
5*0.25	5.40±0.30	0.25	2.50	0.56	1	100
6*0.25	6.40±0.40	0.25	3.00	0.56	1	100
7*0.25	7.40±0.40	0.25	3.50	0.56	1	50
8*0.25	8.40±0.40	0.25	4.00	0.56	1	50
9*0.25	9.40±0.40	0.25	4.50	0.56	1	50
10*0.25	10.4±0.40	0.25	5.00	0.56	1	50
11*0.25	11.4±0.40	0.25	5.50	0.56	1	50
12*0.25	12.4±0.40	0.25	6.00	0.56	1	50
13*0.30	13.4±0.40	0.30	6.50	0.69	1	50
14*0.30	14.5±0.40	0.30	7.00	0.69	1	50
15*0.30	15.5±0.40	0.30	7.50	0.69	1	50
16*0.30	16.8±0.50	0.30	8.00	0.69	1	50
18*0.35	18.7±0.50	0.35	9.00	0.77	1	50
20*0.35	21.2±0.60	0.35	10.00	0.77	1	50
22*0.40	23.2±0.60	0.40	11.00	0.77	1	50
25*0.40	26.1±0.80	0.40	12.50	0.87	1	50
28*0.50	29.0±1.00	0.50	14.00	0.87	1	50
30*0.50	32.0±1.00	0.50	15.00	0.87	1	50

*LONGITUDINAL CHANGE (±5%)



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