

Lct

SPECIFICATION FOR APPROVAL

承認書

客戶承認印章	龍呈國際科技有限公司		
	業務	工程	品管

客戶

CUSTOMER: _____

品名

SPECIES: DB B-SMA THIN PADDLE Ant. GEC6200

料號

PART NO: FDE_ACBSMA-BGP

客戶料號

CUSTOMER PART NO: _____

龍呈國際科技有限公司

Long Cheng Tech. Int'l Co., Ltd.

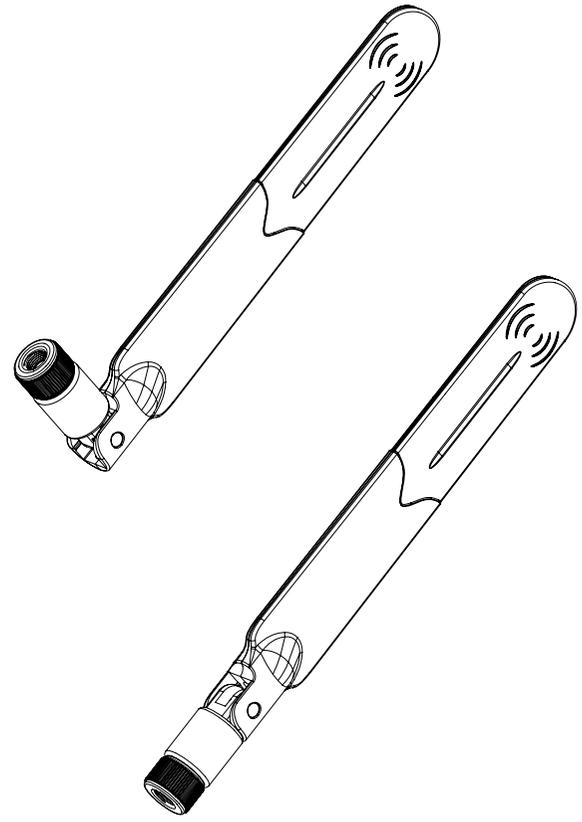
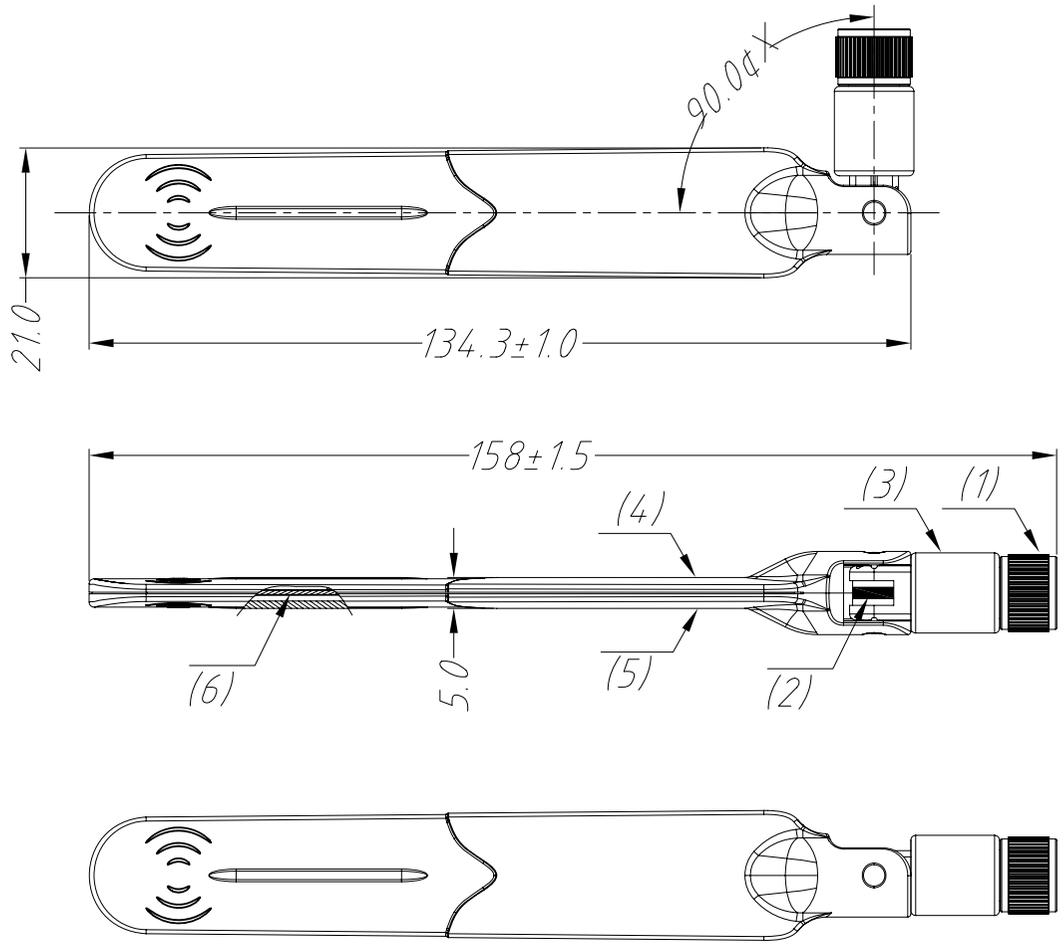
新竹縣竹北市中和街62巷15弄3號3樓

3Floor, No.3, Alley 15, Lane 62, Chung Ho St.,

Chu-Pei City, Hsin Chu, Taiwan, R.O.C

TEL: 03-5541117 FAX: 03-5541065

6		5		4		3		2		1					
LTR	Zone	REVISION RECORD / Description		DWN	CHK	DATE	LTR	Zone	REVISION RECORD / Description		DWN	CHK	DATE	DRAWING NUMBER	
1		New Release				Oct/21/08								FDE_ACBSMA-BGP	
2		Change Connector Vender		CSH		Feb/16/12									



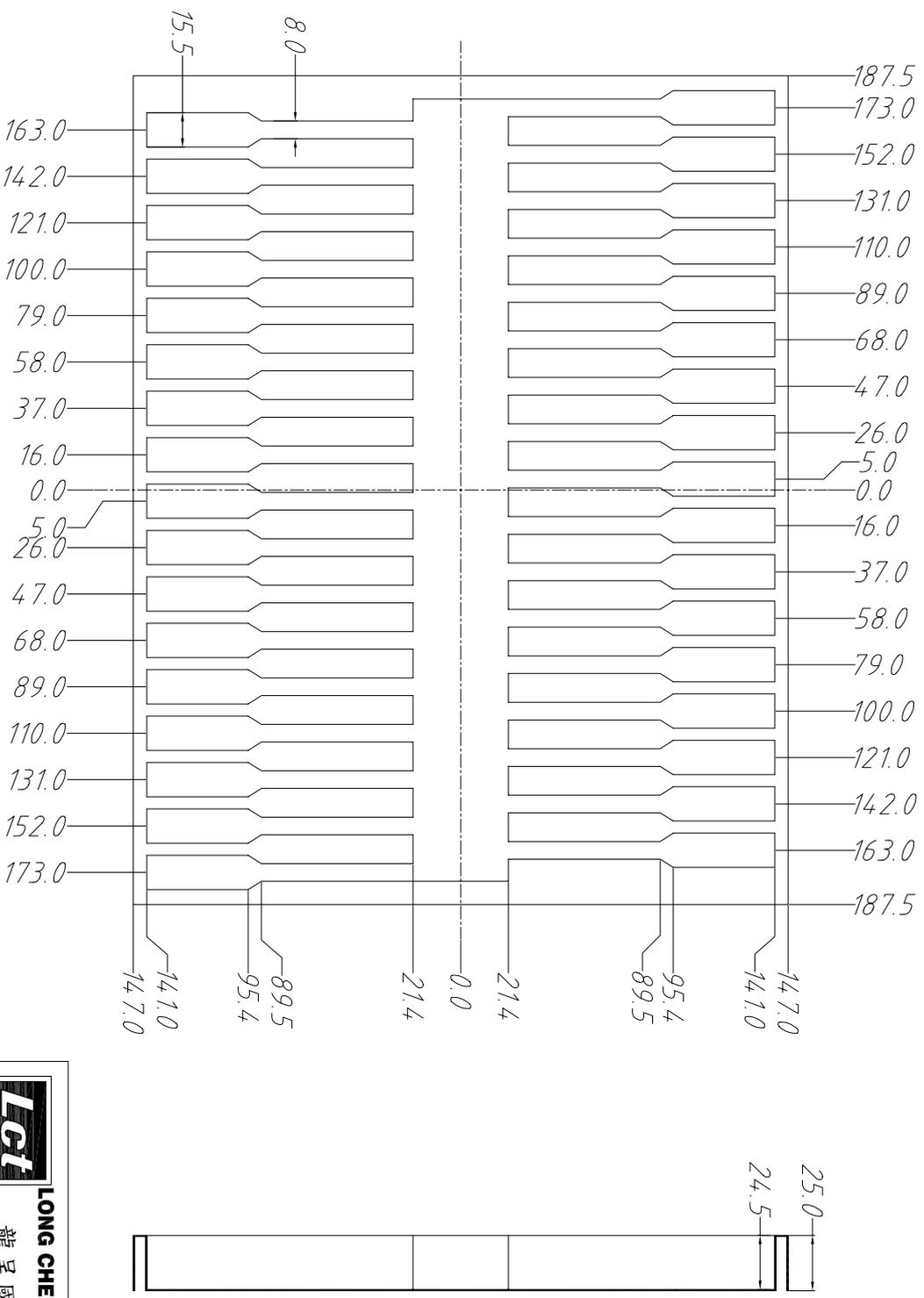
6	PCB :DB FR4 PCB 104*16.05	1		M03-DUBAND-FR4		
5	COVER Base: GE-C6200 (Black)	1	GE6200 ABS+PC	M04-ASGEBL-CO	UNIT	APVD
4	UPPER: GE-C6200 (Black)	1	GE6200 ABS+PC	M04-ASGEBL-UP	mm	
3	PL 3BAND-S LO-HOLD B for SMA	1	PA66	M04-BSMLHB-SPC	MATERIAL	CHK
2	CABLE : ø1.37 Black	1		M02-137HAN-BL	SEE NOTE	
1	RF CN LCT LC RP-B SMA PLUG Black (4P+10R) for Holder	1	BRASS NI PLATED +GE6200 ABS+PC	M01-LCBSMA-BMF	FINISH	DWN
NO	DESCRIPTION	Q'ty	MATERIAL	Part Number	SEE NOTE	CSH

LONG CHENG ELECTRONICS CO. LTD
 龍呈國際科技有限公司

DESCRIPTION:
DB B-SMA THIN PADDLE Ant. GEC6200 Black

DIMENSION: 1 PLC ±0.5 2 PLC ±0.3 3 PLC ±0.2 ANGLES ±5°		PART NUMBER FDE_ACBSMA-BGP		REV 2
SIZE A4	SCALE 1/1	SHEET 1 OF 1		

LTR Zone	REVISION RECORD / Description	DWN / CHK	DATE	LTR Zone	REVISION RECORD / Description	DWN / CHK	DATE	DRAWING NUMBER
1	New Release		Sep/02/08					



注：每盒裝34PCS

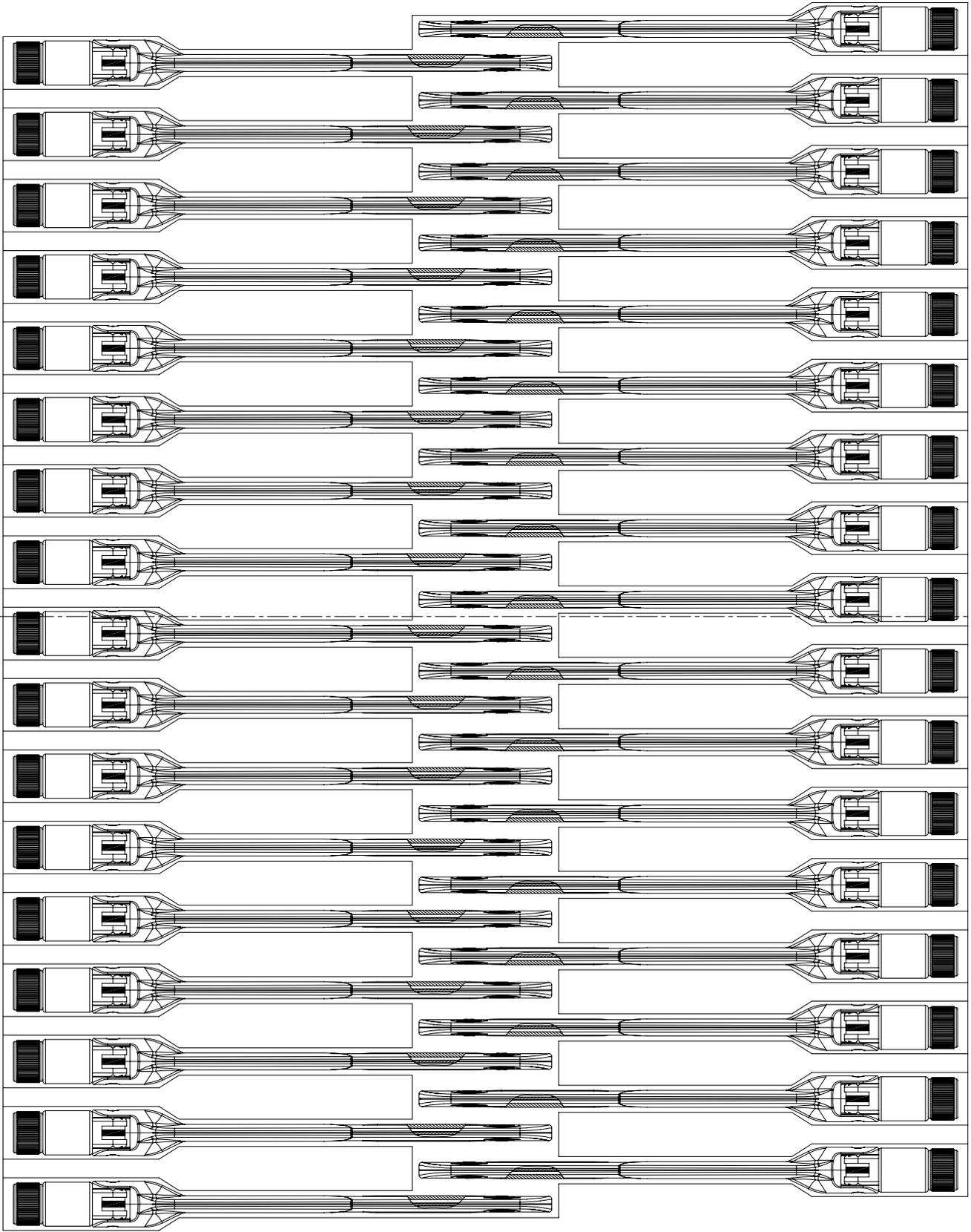
NO	DESCRIPTION	Q'ty	MATERIAL	Part Number	SEE NOTE	UNIT	APVD	DESCRIPTION:	REV
1						mm		FDE_ACBSMA-GG(Package)	1
2									
3									

LCT LONG CHENG ELECTRONICS CO. LTD
 龍呈國際科技有限公司

DIMENSION:		PART NUMBER	
1 PLG ±0.5			
2 PLG ±0.3			
3 PLG ±0.2			
ANGLES ±5°			
SIZE	SCALE	SHEET	REV
A4	1/1	1 OF 1	1

294.0

375.0



機械特性規格

Mechanical Specifications

接頭種類 (Connector Type)	RP-SMA Plug (BSMA) Black
塑膠顏色 (Plastic Color)	Black
同軸線材 (Coaxial Cable Type)	1.37
同軸線材規格 (Coaxial Cable Spec.)	See attached file
天線罩材質 (Radom Material)	ABS+PC GE-C6200
同軸線材顏色 (Coaxial Cable Color)	Black
輻射材料 (Radiator Material)	PCB
工作溫度與溼度 (Working Temperature & Humidity)	65°C 90% @ 25°C
儲存溫度與溼度 (Storage Temperature & Humidity)	65°C 95% @ 25°C
重量 (Weight)	27.5g Max.
扭力 (Torque force)	220-500 gf.cm

電氣特性規格

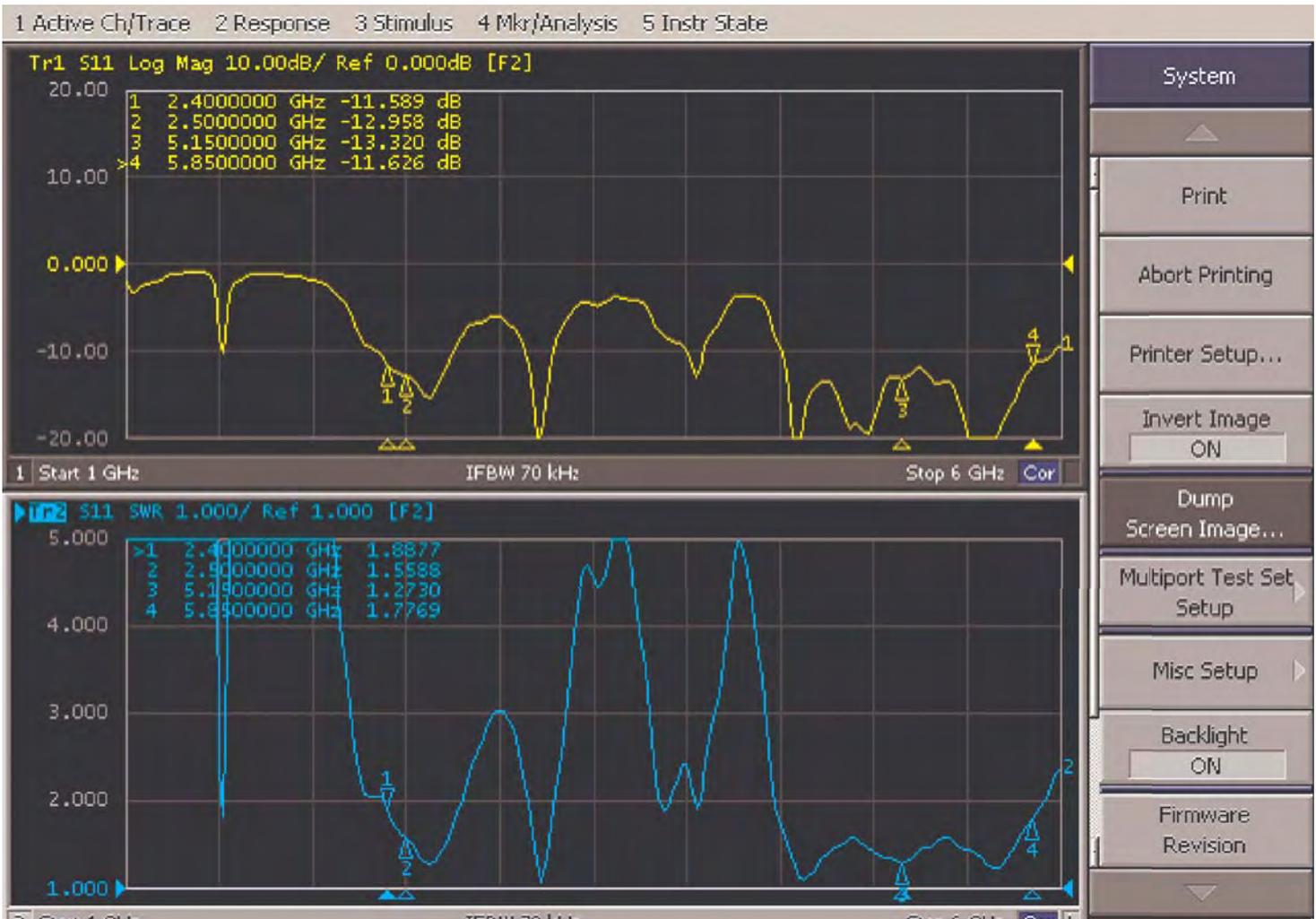
Electrical Specifications

頻率範圍 (Frequency Range)	2.4GHz~2.5GHz/5.15GHz~5.875GHz
增益 (Gain)	2.4~2.5 GHz , Gain = 3dBi 5.15 ~ 5.875 GHz, Gain = 5dBi
電壓駐波比 (VSWR)	VSWR < 2
極化 (Polarzation)	Linear, Vertical
半功率水平波束寬 (HPBW/Horizontal)	360°
半功率垂直波束寬 (HPBW/Vertical)	78°
最大功率 (Max. Power Rating)	2 W (CW)
阻抗匹配 (Impedance)	50 Ohms (typical)

Test Report

Date : 2012/Mar/09

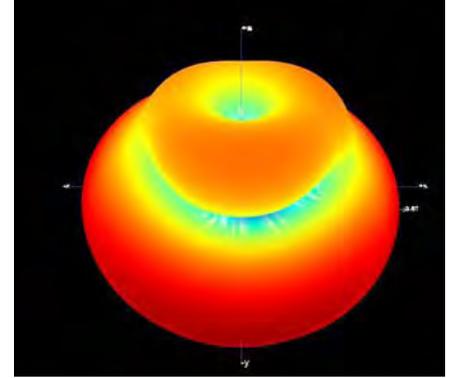
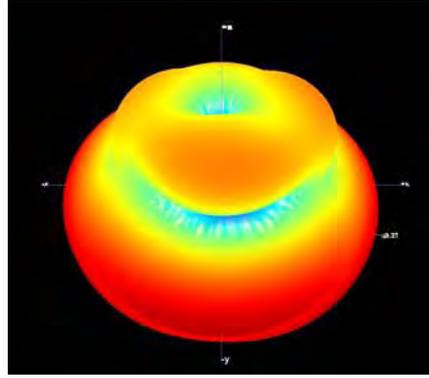
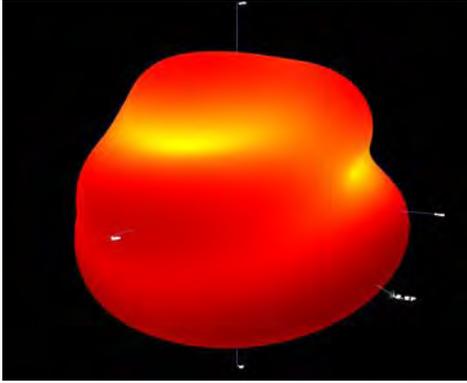
Tester: Fang



2.4

2.45Ghz

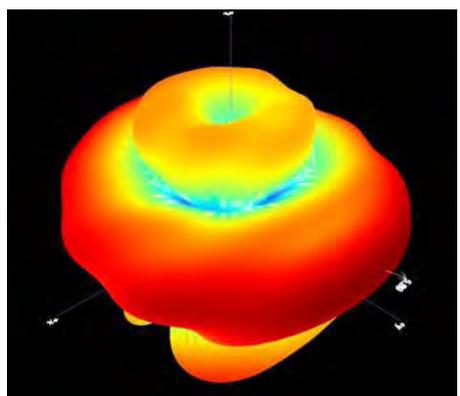
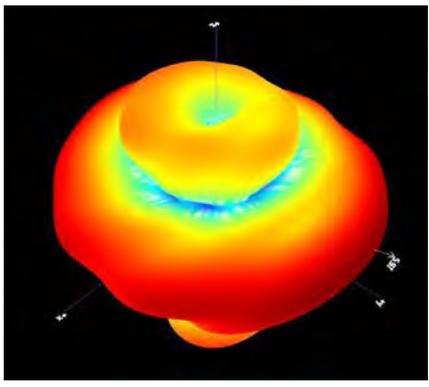
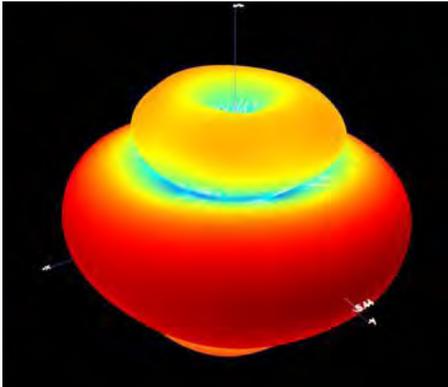
2.5Ghz



5.15GHz

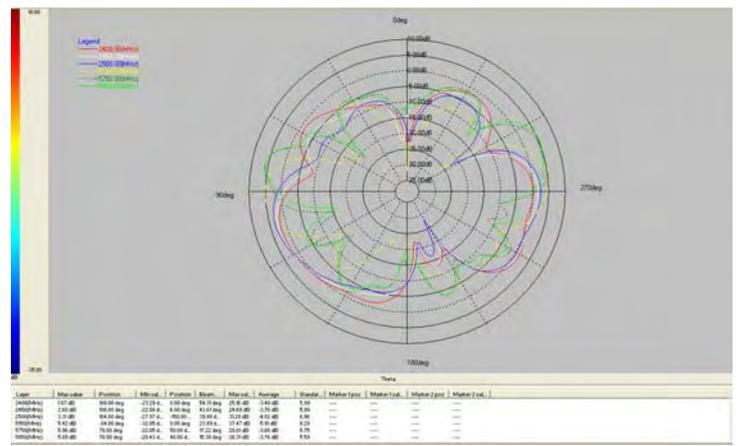
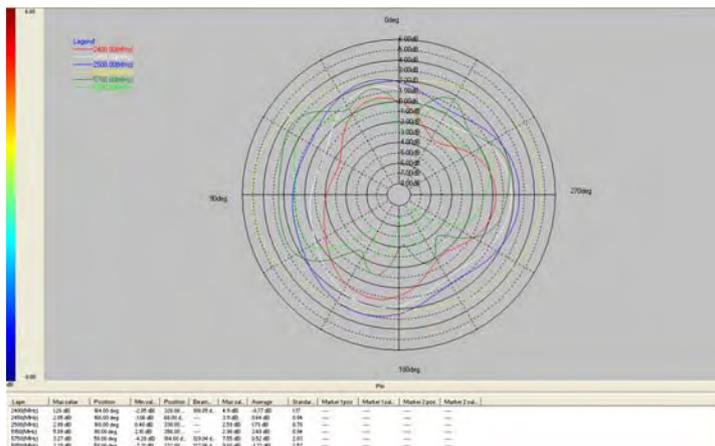
5.75GHZ

5.85GHz



6.00 ✓ Format 1.23457e3

Frequency	E Total. dB(dB)
2400MHz	2.67034
2450MHz	3.27301
2500MHz	3.67348
5150MHz	5.43656
5750MHz	5.96923
5850MHz	5.88935



H-plant

E-plant

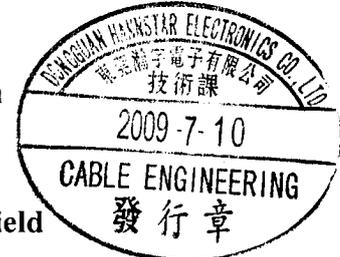
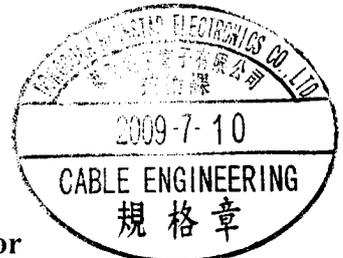
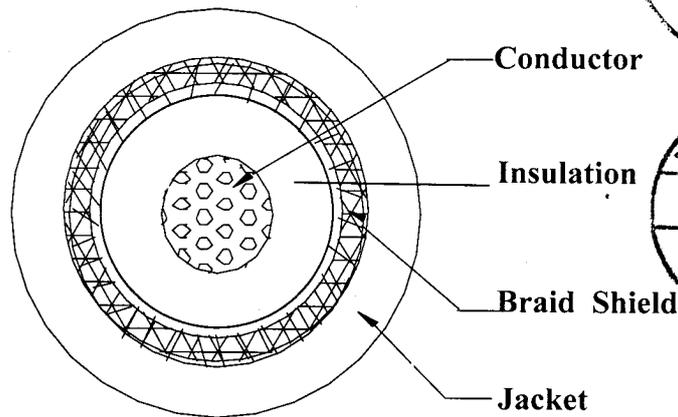


東莞瀚宇電子有限公司
DONGGUAN HANNSTAR ELECTRONICS CO., LTD
CABLE SPECIFICATION(線材規格書)

Customer	東莞龍呈		Sample No.	DGRNE05-099
Description	RF CABLE 50Ω #30(7/0.105)X1C		Rev.	B
Item (項目)	Unit	Specification(規格值)		
Awg(線規)	Awg	#30		
No.of conductor(芯線數)	p,c	1C		
Conductor 導體	Material(材質)	---	Silver Plated Copper Wire(鍍銀軟銅線)	
	Filler(填充)	---	-----	
	Construction(結構)	No./mm	7/0.105±0.008	
	Stranded diameter(絞合外徑)	mm	0.315	
Insulation 絕緣	Material(材質)	---	FEP	
	Nom. Thickness(厚度)	mm	0.29	
	Diameter(線徑)	mm	0.90±0.05	
	Color(顏色)	---	Nature(本色)	
Braid Shield 編織	Material(材質)	---	Tinned Copper Wire(鍍錫軟銅線) 16/5/0.05±0.008	
	Coverage(遮蔽率)	%	90 ↑	
Jacket 外被	Material(材質)	---	FEP(Tube)	
	Nom. Thickness(厚度)	mm	0.10	
	O.D(外徑)	mm	1.37±0.1	
	Color(顏色)	---	black	
Marking 不印字	-----			

Configuration:

(結構圖)



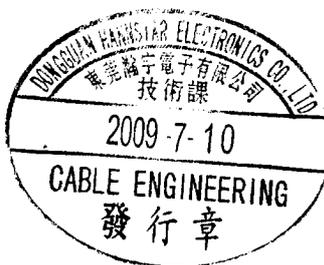
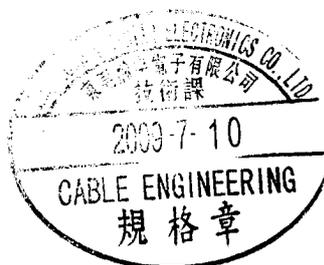


東莞瀚宇電子有限公司
DONGGUAN HANNSTAR ELECTRONICS CO., LTD
CABLE SPECIFICATION(線材規格書)

Customer	東莞龍呈	Sample No.	DGRNE05-099
Description	RF CABLE 50Ω #30(7/0.105)X1C	Rev.	B

Electric Characters:

Testing item(測試項目)	30AWG	
Conductor resistance(導體電阻)	≤354Ω/km	
Impedance(特性阻抗)	50±3Ω (TDR 250PS&500PS)	
Dielectric Strength(耐電壓)	A.C 0.5/1 kv/min	
Insulation resistance(絕緣電阻)	≥1000MΩ·Km (650V D.C)	
Attenuation(衰減)(min.)	Frequency(GHz)	dB/M
	2.4~2.5	-2.5
	6.0	-4.3
VSWR(駐波比)(max.)	Frequency(GHz)	
	2.4~2.5	1.20:1
	4.8~6.0	1.35:1



Approved by	Reviewed by	Prepared by



the standard in safety

Underwriters
Laboratories

NOTICE OF AUTHORIZATION TO APPLY THE UL MARK

07/16/2010

Dongguan Hannstar Electronics Co Ltd
Mr. Yuliang Gong
Xiniupo Administrative Zone
Dalang Town
Dongguan Guangdong 523799, Cn

Our Reference: File E52534, Vol. 2 Project Number 10CA22576
Your Reference: MR. GONG ACCEPTED ON 30 APR 10
Project Scope: USR: AWM Style 1354 Employing FEP and PFA Outer Covering.
CNR: Appliance Wire, Extruded FEP Insulated Single, Rated 150degC, 30V, Group A, B or A/B, Use For Further Processing As Insulated Singles In Jacketed Cable.

Dear Mr. Yuliang Gong:

UL's investigation of your product(s) has been completed under the above Reference Number and the product was determined to comply with the applicable requirements.

This letter temporarily supplements the UL Follow-Up Services Procedure and serves as authorization to apply the UL Mark only at authorized factories under UL's Follow-Up Service Program.

To provide the manufacturer with the intended authorization to use the UL Mark, the addressee must send a copy of this notice to each manufacturing location currently authorized in File E52534, Vol. 2.

This authorization is effective from the date of this Notice and only for products at the indicated manufacturing locations. Records in the Follow-Up Services Procedure covering the product are now being prepared and will be sent in the near future. Until then, this letter authorizes application of the UL Mark for 90 days from the date of this letter.

Products that bear the UL Mark shall be identical to those that were evaluated by UL and found to comply with UL's requirements. If changes in construction are discovered, appropriate action will be taken for products not in conformance with UL's requirements and continued use of the UL Mark may be withdrawn. UL may elect to withdraw use of the UL Mark if the Applicant or Manufacturer fails to comply with UL's requirements including ongoing compliance of the product, under UL's Follow-Up Service.

Any information and documentation provided to you involving UL Mark services are provided on behalf of Underwriters Laboratories Inc. (UL) or any authorized licensee of UL.

The contents of this Letter are intended solely for the use of UL and the Applicant. The opinions and findings of UL represent its judgment given with due consideration to the necessary limitations of practical operation in accordance with UL's objectives and purposes. UL shall not otherwise be responsible for the use of or reliance upon the contents of this letter by anyone. UL shall not incur any obligation or liability for any loss, expense or damages, including incidental, consequential or punitive damages, arising out of or in connection with the use or reliance upon the contents of this letter to anyone other than the Applicant as provided in the agreement between UL and Applicant. Any use or reference to UL's name or certification mark(s) by anyone other than the Applicant in accordance with the agreement is prohibited without the express written approval of UL.

Very truly yours,

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Project Engineer
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+822 2009 9360
Section Manager II
DaeSung.Lim@kr.ul.com

GUZ9F8F-87B54D





CYCOLOY C6200-111

Print Date: 08-24-2000

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GE Plastics

Revision Date: 08/24/00

Material Safety Data Sheet

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

General Electric Co.
One Plastics Ave.
Pittsfield, MA 01201

GE Plastics Canada, Ltd.
2300 Meadowvale Blvd.
Mississauga, ONT L5N 5P2

Visit GE Plastics on the Web at WWW.GEPLASTICS.COM

PHONE NUMBERS

Emergency Medical (24 HOUR)	800/447-4545
Emergency Transportation/CHEMTREC (24 HOUR)	800/424-9300
Other Emergency Information (24 HOUR)	812/831-7701
Non-Emergency Information	800/845-0600

PRODUCT IDENTIFICATION

PRODUCT IDENTIFIER: CYCOLOY C6200-111 Acrylonitrile Butadiene Styrene Polymer and Poly (bisphenol-A carbonate) Blend

PRODUCT DESCRIPTION: Synthetic thermoplastic polymer

PRODUCT USE: May be used to produce molded or extruded articles or as a component of other industrial products.

SECTION 2: COMPOSITION/INFORMATION ON INGREDIENTS

Components listed below are physical or health hazards as defined in the Hazard Communication Standard. The quantities represent typical or average values for the materials shown. Additional compositional data are provided in Section 15, REGULATORY INFORMATION, subject to supplier notification requirements.

<u>Component Name</u>	<u>%</u>	<u>CAS Number</u>	<u>OSHA PEL</u>	<u>ACGIH TWA</u>	<u>GE Recommended Exp. Limits</u>
This product does not contain any reportable hazardous materials.					

SECTION 3: HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

- Pellets with slight or no odor.
- Spilled material may create slipping hazard.

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GE Plastics

CYCOLOY C6200-111

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- Can burn in a fire creating dense toxic smoke.
- Molten plastic can cause severe thermal burns.
- Fumes produced during melt processing may cause eye, skin, and respiratory tract irritation. Severe over-exposure may result in nausea, headache, chills, and fever.
- Secondary operations, such as grinding, sanding, or sawing can produce dust which may present an explosion or respiratory hazard.

HMIS Ratings: Health = 0; Flammability = 1; Reactivity = 0; PPE = B

POTENTIAL HEALTH EFFECTS

INGESTION: No hazard in normal industrial use.
SKIN ABSORPTION: No absorption hazard in normal industrial use.
EYE CONTACT: Can cause mechanical irritation if dusts are generated.
SKIN CONTACT: Unlikely to cause irritation even on repeated contact.

CHRONIC / CARCINOGENICITY

NTP: Not Tested.
OSHA: Not Regulated.
IARC: Not Listed.

Processing fumes may cause irritation to the eyes, skin, and respiratory tract. In cases of severe exposure, nausea and headache can also occur.

Grease-like processing fume condensates on ventilation ductwork, molds, and other surfaces can cause irritation and injury to skin.

MEDICAL RESTRICTIONS: There are no known human health effects aggravated by exposure to this product. However, certain sensitive individuals and individuals with respiratory impairments may be affected by exposure to components in the processing vapors.

SECTION 4: FIRST AID MEASURES

EYES: Immediately flush eyes with plenty of water. Get medical attention, if irritation persists. After initial flushing, remove any contact lenses.

SKIN: Wash with soap and water. Get medical attention if irritation develops or persists. For hot product, immediately immerse in or flush affected area with large amounts of cold water to dissipate heat. Cover with clean cotton sheeting or gauze and get prompt medical attention.

INGESTION: No hazard in normal industrial use. Do not induce vomiting. Seek medical attention if symptoms develop.

INHALATION: No specific treatment is necessary since this material is not likely to be hazardous by inhalation.

PROCESSING FUMES: Processing fumes inhalation may be irritating to the respiratory tract. If symptoms are experienced remove victim from the source of contamination or move victim to fresh air and obtain medical advice.

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SECTION 5: FIRE FIGHTING MEASURES

FIRE FIGHTING:	Do not enter fire area without proper protection including self-contained breathing apparatus and full protective equipment. Fight fire from a safe distance and a protected location due to the potential of hazardous vapors and decomposition products. Minimum ignition energy of polycarbonate powder is 1,000,000 millijoules.
EXTINGUISHING MEDIA:	Foam
FLASH POINT:	Not applicable
LOWER FLAMMABILITY LIMIT:	Not established
UPPER FLAMMABILITY LIMIT:	Not established
CONDITIONS OF FLAMMABILITY:	Requires a continuous flame source to ignite.
AUTOIGNITION TEMPERATURE:	630 C (1166 F), estimated
EXPLOSION DATA:	Material not sensitive to mechanical impact but is sensitive to static discharge under dust cloud conditions.
HAZARDOUS COMBUSTION PRODUCTS:	Intense heat, smoke, carbon dioxide, carbon monoxide, hydrocarbon fragments. Hydrogen cyanide

SECTION 6: ACCIDENTAL RELEASE MEASURES

GENERAL:	Gather and store in a closed container pending a waste disposal evaluation. Allow molten material to solidify before disposal.
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SECTION 7: HANDLING AND STORAGE

HANDLING:	Follow recommendations on label and in processing guide. Prevent contact with skin and eyes. Use good industrial hygiene practices. Provide adequate ventilation. Secondary operations such as grinding, sanding, or sawing may produce a dust explosion hazard. Use aggressive housekeeping activities to prevent dust accumulation: employ bonding, grounding, venting, and explosion relief provisions in accordance with accepted engineering practices.
STORAGE:	Store in a cool dry place. Avoid excessive heat and ignition sources.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS:	A continuous supply of fresh air to the workplace together with removal of processing fumes through exhaust systems is recommended. Processing fume condensate may be a fire hazard and toxic; remove periodically from exhaust hoods, duct work, and other surfaces using appropriate personal protection. Local ventilation requirements must be determined to limit exposure to processing fumes in the workplace.
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PERSONAL PROTECTION

EYE/FACE:	Wear safety glasses with side shields or chemical goggles. In addition, use full face shield when cleaning processing fume condensates from hoods, ducts,
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and other surfaces.

SKIN: When handling pellets or powder, avoid prolonged or repeated contact with skin. Wear long pants, long sleeves, well insulated gloves, and a face shield during melt processing. Appropriate clothing - including chemical resistant gloves - should be worn to prevent contact with processing fumes condensate.

RESPIRATORY: When using this product at elevated temperatures, implement engineering systems, administrative controls, or a respiratory protection program (including a respirator approved for protection from organic vapors, acid gases, and particulate matter) if processing fumes are not adequately controlled or operators experience symptoms of overexposure. If dust or powder are produced from secondary operations such as sawing or grinding, use a respirator approved for protection from dust.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: Solid
ODOR AND APPEARANCE: Plastic pellet with slight odor.
MELTING POINT: This product does not exhibit a sharp melting point but softens gradually over a wide range of temperatures.
VAPOR PRESSURE (mmHg): Negligible.
SPECIFIC GRAVITY (WATER = 1): >1
WATER SOLUBILITY: Insoluble.
% VOLATILES: Negligible
EVAPORATION RATE: Negligible.
OCTANOL/WATER PARTITION COEFFICIENT: Not established

SECTION 10: STABILITY AND REACTIVITY

STABILITY: Stable
REACTIVITY: Not reactive under recommended conditions of handling, storage, processing, and use.
CONDITIONS TO AVOID: Do not exceed melt temperature recommendations in product literature. In order to avoid autoignition/hazardous decomposition of hot thick masses of plastic, purgings should be collected in small, flat, shapes or thin strands to allow for rapid cooling. Quench in water. Do not allow product to remain in barrel at elevated temperatures for extended periods of time: purge with a general purpose resin. (See Section 8 for respiratory protection advice.)
HAZARDOUS DECOMPOSITION PRODUCTS: Processing fumes evolved at recommended processing conditions may include trace levels of the following materials: phenols, alkylphenols, diarylcarbonate, styrene, acrylonitrile, ethylbenzene, acrolein, acetaldehyde, acetophenone, cumene, 4-vinylcyclohexene, triarylphosphate esters, cyclopentanone, toluene

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SECTION 11: TOXICOLOGICAL INFORMATION

ACUTE HEALTH HAZARDS

ACUTE ORAL:

Oral LD50 Rat >5 g/kg

EYE CONTACT:

Product not considered primary eye irritant. When similar products, in finely divided form, were placed into the eyes of rabbits, slight transient redness or discharge occurred. This is consistent with the expected slightly abrasive nature of the resin particles.

SKIN CONTACT:

Product not considered primary skin irritant. Draize Skin Primary Irritation Score (rabbit) for similar products, in finely divided form, for a 24-hour exposure is 0. Not expected to be a skin sensitizer based on results of Modified Buehler Guinea Pig Sensitization Test from similar products. Dermal LD50 (rabbit) > 2g/kg, estimated.

SUBCHRONIC HEALTH HAZARDS

SUBCHRONIC TOXICITY: No data available.

CHRONIC HEALTH HAZARDS

CARCINOGENIC PROPERTIES

NTP:

Not Tested.

OSHA:

Not Regulated.

IARC:

Not Listed.

SECTION 12: ECOLOGICAL INFORMATION

GENERAL:

This material is not expected to be harmful to the ecology.

SECTION 13: DISPOSAL INFORMATION

WASTE DISPOSAL:

Recycling is encouraged. Landfill or incinerate in accordance with federal, state and local requirements. Collected processing fume condensates and incinerator ash should be tested to determine waste classification.

POSSIBLE EPA WASTE CODES: No data.

SECTION 14: TRANSPORTATION INFORMATION

REGULATORY STATUS:

Not Regulated.

SECTION 15: REGULATORY INFORMATION

TOXIC SUBSTANCES CONTROL ACT (TSCA): This product is in compliance with all rules and orders of TSCA.

WHMIS PRODUCT CLASSIFICATION:

D2

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GE Plastics

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If any components in this product are SARA 313 listed as reportable, they are shown below. The quantities listed for elements represent typical or average values for compounds containing the element.

Component	CAS Number	%
No SARA 313-listed chemicals in this product.		

If any components in this product are known to the State of California to cause cancer and/or are reproductive hazards, they are listed below:

Component	Reason Listed	CAS Number	%
Acrylonitrile	carcinogen - initial date 7/1/87	107-13-1	<10ppm
4-Vinylcyclohexene	carcinogen - initial date 5/1/96	100-40-3	<10ppm

SECTION 16: OTHER INFORMATION

Prepared by: Product Stewardship

® Cyclocac, Cycloy, Enduran, Gelon, Gelay, Gemax, Lexan, Noryl, Ultem, Valox and Xenoy are registered trademarks of the General Electric Co.

DISCLAIMER: This Material Safety Data Sheet [MSDS] information is provided based on the Hazard Communication Regulations for your region or country and for the use of the persons required to receive this information under those regulations. The information is neither designed nor recommended for any other use or for use by any other person, including for compliance with other laws. GE does not warrant the suitability for use of this MSDS for any other material or product not specifically identified herein. GE does not warrant the accuracy or authenticity of this MSDS unless it has been obtained directly from GE, or posted or viewed on a GE website. Modification of this MSDS, unless specifically authorized by GE, is strictly prohibited. This MSDS is based on information which is believed to be reliable, but may be subject to change as new information becomes available. Because it is not possible to anticipate all conditions of use, additional safety precautions may be required. Since the use of this material is not under General Electric Company's control, each user is responsible for making its own determination as to the safe and proper handling of this material in its own particular use of this material. GENERAL ELECTRIC COMPANY MAKES NO REPRESENTATION OR WARRANTY, EITHER EXPRESS OR IMPLIED, INCLUDING AS TO MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Each user should read and understand this information and incorporate it into individual site safety programs as required by applicable hazard communication standards and regulations.

ABBREVIATIONS: ACGIH: American Conference of Governmental Industrial Hygienists
CAS: Chemical Abstracts Service
CFR: Code of Federal Regulations
CPR: Cardiopulmonary Resuscitation
EPA: Environmental Protection Agency
HMIS: Hazardous Material Identification System (National Paint and Coatings Association)
IARC: International Agency for Research on Cancer
OSHA: Occupational Health and Safety Administration (U.S.)
NTP: National Toxicology Program
PEL: Permissible Exposure Limit
PPE: Personal Protective Equipment

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CYCOLOY C6200-111

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GE Plastics

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SARA 313: Superfund Amendments and Reauthorization Act, Section 313

TLV: Threshold Limit Value

TSCA: Toxic Substance Control Act

WHMIS: Workplace Hazardous Materials Information System (Canada)



GE PLASTICS KOREA LTD

231-8 NONHYUN-DONG KANGNAM KU SEOUL KR

Material Designation: **C6200(GG)**

Product Description: Polycarbonate/Acrylonitrile Butadiene Styrene (PC/ABS), designated "Cycoloy" furnished as pellets.

Color	Min. Thick. (mm)	Flame Class	HWI	HAI	RTI Elec	RTI Imp	RTI Str	IEC GWIT	IEC GWFI
GY, BK	0.7	HB	-	-	60	60	60	-	-
ALL	1.2	V-1	-	-	60	60	60	-	-
	1.5	V-0	3	0	85	75	85	-	-
	2	V-0, 5VB	-	-	85	75	85	-	-
	3	V-0, 5VB	2	0	85	85	85	-	-
	3.4	V-0, 5VA	-	-	85	85	85	-	-

CTI: 2 **IEC CTI:** **HVTR: 3** **D495: 6** **IEC Ball Pressure (°C):**
Dielectric Strength (kV/mm): 26 **Volume Resistivity** (10^xohm-cm): 16 **Dimensional Stability(%)**: 0
ISO Tensile Strength (MPa): - **ISO Flexural Strength** (MPa): - **ISO Heat Deflection (°C)**: -
ISO Tensile Impact (kJ/m²): - **ISO Izod Impact** (kJ/m²): - **ISO Charpy Impact** (kJ/m²): -

(GG) Denotes a global grade as covered in Recognized Component File E161759.

NOTE Material designations may be followed by any combination of numbers or letters.

Report Date: 7/17/1995 Underwriters Laboratories Inc®

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VYDYNE 21SP

尼龙 6·6 树脂

VYDYNE** 21SP 添加了脱模剂和表面润滑剂以增强其加工性能。VYDYNE 21SP 是针对注塑应用而开发，具有均衡的机械性能，例如高强度、高韧性、耐磨性和耐化学腐蚀。

标准颜色：原色和黑色

性能 ⁽¹⁾	测试方法	DAM ⁽²⁾	2.5%含水量	单位
物理性能				
比重	ASTM D 792	1.14	—	
模具收缩率	ASTM D 955	0.015 - 0.020	—	mm/mm/°C
24 小时吸水率 @23°C	ASTM D 570	1.3	—	%
平衡吸水量	ASTM D 570	8.0	—	%
机械性能				
拉伸屈服强度 @-40°C	ASTM D 638	107	104	MPa
@23°C	ASTM D 638	83	62	MPa
@77°C	ASTM D 638	62	41	MPa
屈服伸长率 @-40°C	ASTM D 638	5	6	%
@23°C	ASTM D 638	10	20	%
@77°C	ASTM D 638	30	30	%
拉伸断裂伸长率 @-40°C	ASTM D 638	20	20	%
@23°C	ASTM D 638	70	200	%
@77°C	ASTM D 638	300	300	%
拉伸模量 @23°C	ASTM D 638	2,960	1,310	MPa
弯曲强度 @23°C	ASTM D 790	90	41	MPa
弯曲模量 @23°C	ASTM D 790	3,030	1,310	MPa
缺口冲击强度 @-40°C	ASTM D 256	32	27	J/m
@23°C	ASTM D 256	53	159	J/m
洛氏硬度	ASTM D 785	85	60	M 标度
耐热性能				
热变形温度 (DTUL) 未退火 @0.45 MPa	ASTM D 648	232	221	°C
未退火 @1.82 MPa	ASTM D 648	80	70	°C
熔点	ASTM D 789	260	—	°C
电性能				
介电强度 短期	ASTM D 149	23	22	kV/mm
递加	ASTM D 149	22	19	kV/mm
介电常数 @100 Hz	ASTM D 150	3.7	6.0	
@10 ³ Hz	ASTM D 150	3.6	6.0	
@10 ⁶ Hz	ASTM D 150	3.1	3.5	
介质损耗因子 @100 Hz	ASTM D 150	0.02	0.04	
@10 ³ Hz	ASTM D 150	0.02	0.04	
@10 ⁶ Hz	ASTM D 150	0.02	0.08	
体积电阻率 @23°C	ASTM D 257	6.0 x 10 ¹⁵	2.0 x 10 ¹³	Ω-cm
阻燃等级⁽³⁾				
UL-94@0.71 mm		V-2	V-2	
RTI - 机械	UL-746	85	—	°C
- 机械和冲击	UL-746	75	—	°C
- 电气	UL-746	130	—	°C
需氧系数	ASTM D 2863	30	31	%

(1) 典型性能，不可视为产品规格。

(2) 和成型时的干燥情况一样，含水份低于 0.2%。

(3) 此数字表示的易燃率并非用来反映这种或任何其它物料在实际火警条件下的危险性。

* 陶氏化学公司商标

** 首诺公司 (Solutia Inc.) 商标，陶氏化学公司获特使用

陶氏塑料 (Dow Plastics) 是陶氏化学公司及其附属公司的业务之一



Solutia Inc.
 575 Maryville Centre Drive
 St. Louis, MO 63166-6760
 USA

首諾公司材質證明

品名: VYDYNE 尼龍 66 工程塑料
 規格: 21SPC
 外觀: 切片狀
 是否切片: 是

成份含量:
 尼龍 66: $\geq 98\%$
 水份: $\leq 2\%$
 密度: 1.133(ASTM D792-91)
 熔點: 261°C



SOLUTIA INC
3000 OLD CHEMSTRAND RD CANTONMENT FL 32533

Material Designation: **20NSP(a), 21(a), 21X(a), 21SP(a), 21SPC(a), 21SPF(a), 21SPG(a), 21SPH(a), 21SPJ(a), 21SPK(a), 21SPM(a), 21SPN(a), 21SPQ(a), 21SPR(a), 21SPS(a), 21SPV(a), 21SPW(a), 21SPX(a), 21SPY(a), 21SPZ(a), 21TSP(a), 21TSPC(a), 21TSPF(a), 21TSPG(a), 21TSPH(a), 21TSPJ(a), 21TSPK(a), 21TSPM(a), 21TSPN(a), 21TSPQ(a), 21TSPR(a), 21TSPS(a), 21TSPV(a), 21TSPW(a), 21TSPX(a), 21TSPY(a), 21TSPZ(a), 21VSP(a), 21VSPC(a), 21VSPF(a), 21VSPG(a), 21VSPH(a), 21VSPJ(a), 21VSPK(a), 21VSPM(a), 21VSPN(a), 21VSPQ(a), 21VSPR(a), 21VSPS(a), 21VSPV(a), 21VSPW(a), 21VSPX(a), 21VSPY(a), 21VSPZ(a), 21WSP(a), 21WSPC(a), 21WSPF(a), 21WSPG(a), 21WSPH(a), 21WSPJ(a), 21WSPK(a), 21WSPM(a), 21WSPN(a), 21WSPQ(a), 21WSPR(a), 21WSPS(a), 21WSPV(a), 21WSPW(a), 21WSPX(a), 21WSPY(a), 21WSPZ(a), 21XSP(a), 21XSPC(a), 21XSPF(a), 21XSPG(a), 21XSPH(a), 21XSPJ(a), 21XSPK(a), 21XSPM(a), 21XSPN(a), 21XSPQ(a), 21XSPR(a), 21XSPS(a), 21XSPV(a), 21XSPW(a), 21XSPX(a), 21XSPY(a), 21XSPZ(a), 21YSP(a), 21YSPC(a), 21YSPF(a), 21YSPG(a), 21YSPH(a), 21YSPJ(a), 21YSPK(a), 21YSPM(a), 21YSPN(a), 21YSPQ(a), 21YSPR(a), 21YSPS(a), 21YSPV(a), 21YSPW(a), 21YSPX(a), 21YSPY(a), 21YSPZ(a), 21ZSP(a), 21ZSPC(a), 21ZSPF(a), 21ZSPG(a), 21ZSPH(a), 21ZSPJ(a), 21ZSPK(a), 21ZSPM(a), 21ZSPN(a), 21ZSPQ(a), 21ZSPR(a), 21ZSPS(a), 21ZSPV(a), 21ZSPW(a), 21ZSPX(a), 21ZSPY(a), 21ZSPZ(a), 21NSP(a), 21(a), 21X(a), 21SP(a), 21SPC(a), 21SPF(a), 21SPG(a), 21NSL(a), 50BW(a), 50BWFS(a), 21SPM(a)**

Product Description: Polyamide 66 (PA66), designated "VYDYNE" furnished as pellets.

Color	Min. Thick. (mm)	Flame Class	HWI	HAI	RTI Elec	RTI Imp	RTI Str	IEC GWIT	IEC GWFI
ALL	0.40	V-2	-	-	65	65	65	-	-
	0.71	V-2	4	0	130	75	85	700	800
	1.5	V-2	3	0	130	75	85	700	800
	3.0	V-2	3	0	130	75	85	700	930

CTI: 0 IEC CTI (V): - HVTR: 0 D495: 5 IEC Ball Pressure (°C): -

Dielectric Strength (kV/mm): 26

ISO Tensile Strength (MPa): -

ISO Tensile Impact (kJ/m²): -

Volume Resistivity (10⁹ ohm-cm): -

ISO Flexural Strength (MPa): -

ISO Izod Impact (kJ/m²): -

Dimensional Stability (%): 1.6

ISO Heat Deflection (°C): -

ISO Charpy Impact (kJ/m²): -

(a) Virgin and regrind up to 50% by weight have the same basic material characteristics.

Underwriters Laboratories Inc@

Report Date: 5/24/1979

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物質安全資料表

Material Safety Data Sheet

一、物品與廠商資料

2010年6月7日

物品名稱	快削黃銅棒		
製造商 名稱：	富前五金股份有限公司		
地址：	桃園縣龜山鄉 333 頂湖一街二十四號		
電話：	TEL: (03) 328-3068		
傳真：	FAX: (03) 328-2515		



二、成分辨識資料

快削黃銅棒成分分析

元素	化學文摘社登記號碼 (CAS No.)	重量百分比 Wt(%)
Cu (銅)	7440-50-8	57.0~61.0
Pb (鉛)	7439-92-1	1.8~3.7
Fe (鐵)	7439-89-6	0.5 MAX
Fe+Sn (鐵+錫)	Sn: 7440-31-5	1.2 MAX
Zn (鋅)	7440-66-6	Rem

危害物質成分百分比: 0%

三、危害辨識資料

最 重 要 危 害 效 應	健康危害效應	不含有害人體之化學成分, 但長時間接觸皮膚會有輕微過敏反應. 塊體或棒材無危害性, 唯粉末粒子對眼鼻、上呼吸道及皮膚具刺激性. 吞食或大量吸入可能導致噁心及腸胃不適.
	環境影響	-
	物理及化學性危害	細粉末可燃
	特殊危害	-
	物品危害分類	非危害物

四、急救措施

不同暴露途徑之急救方法:	<p>吸入: 若吸入大量粉末, 立刻將患者移至乾淨空氣流通的場所並就醫.</p> <p>皮膚接觸: 用大量清水沖洗, 或用肥皂清洗患部. 若未改善需就醫.</p> <p>眼睛接觸: 立刻以大量清水沖洗眼睛15分鐘以上, 若異物感未減緩或有其他不適則就醫.</p> <p>食入: 若誤食且患者意識清醒, 則立刻給予大量飲水並就醫. 若意識模糊則須立刻送醫.</p>
對醫師之提示:	對不慎食入之患者, 考慮洗胃及提供氧氣.

五、滅火措施

適用滅火劑: 本產品無自燃性, 不可燃, 無爆發性, 火災時使用任何適於撲滅週遭火源之滅火器滅火。

滅火時可能遭遇之特殊危害: 注意其細粉遇火源可燃。

特殊滅火程序: -

消防人員之特殊防護設備: -

六、洩漏處理方法

個人應注意事項: 棒狀、線材、塊體不會溢漏。

環境注意事項: -

清理方法: 小心將粉末或顆粒掃起, 集中裝入適當容器內。

七、安全處置與儲存方法

處置: 避免產生粉塵。操作時應穿戴適當之防護衣具, 避免眼睛及口鼻直接接觸粉塵。

搬運時應將棒材線材適當固定, 並注意機具及包裝荷重, 避免掉落。

儲存: 非危害性物質, 應放置於牢固之場所, 避免堆疊滑落。

八、暴露預防措施

工程控制: 操作處保持通風, 或加裝整體換氣裝置。

控制參數:

成分	最高容許濃度 OSHA PEL mg/m ³	國內規範容許濃度 mg/m ³
Cu	1.0 (粉塵)	1.0(粉塵)
Pb	0.05	-
Fe	5.0	-
Sn	2.0	2.0
Zn	15	5.0(氧化鋅)

個人防護設備:

呼吸防護: 一般狀況下不需要。當濃度超過最高容許濃度時建議使用覆蓋全面之呼吸防護具。

手部防護: 手套, 或防割之橡膠手套

眼睛防護: 安全眼鏡或安全護目鏡

皮膚及身體防護: 工作鞋, 圍裙

衛生措施: 操作此產品時勿飲食

九、物理及化學性質

物質狀態: 固體 形狀: 黃色無味金屬光澤固體

顏色: 黃色金屬光澤 氣味: 無味

pH值: - 沸點/沸點範圍: -

分解溫度: - 閃火點: -

熔點: 875 ~1010 °C

自燃溫度: - 爆炸界限: -

蒸氣壓: - 蒸氣密度: -

密度: 8.4~8.9 g/cc. 溶解度: -

十、安定性及反應性

安定性: 常溫常壓下安定

特殊狀況下可能之危害反應: 無

應避免之狀況: 避免產生粉塵

應避免之物質: 乙炔、氫、強酸等強力氧化劑

危害分解物: 與上述物質化學反應產生之氣體

十一、毒性資料

急毒性: -

局部效應: -

致敏感性: -

慢毒性或長期毒性: 長期接觸或攝入高劑量的鉛可導致腎、血液、或神經系統受損. 但本產品的鉛含量與存在形式目前無證據顯示具毒性.

特殊效應: -

十二、生態資料

可能之環境影響: -

十三、廢棄處置方法

廢棄處置方法: 本產品成爲廢棄物時, 未被歸類爲有害事業廢棄物, 其處置依當地廢棄物處理法規辦理. 且屬於可回收之廢棄物, 可交由廢棄物回收處理業者回收.

十四、運送資料

國際運送規定: 無特殊規定

聯合國編號: 無

國內運送規定: 無特殊規定, 依一般道路交通安全規則辦理.

特殊運送方法及注意事項: 無

十五、法規資料

適用法規: 勞工安全衛生設施準則

勞工作業環境空氣中有害物容許濃度標準

事業廢棄物儲存清除處理方法及設施標準

十六、其他資料

本表爲收集目前相關資料編寫而成, 其內容僅適用於本產品. 在製作時已力求完美及正確, 但錯誤恐仍難免. 使用者請依應用需求, 自行負責判斷其可用性, 本公司不負任何責任.

13-1

Typical Properties: 25N/25FR				
Property	Test Method	Condition	25N	25FR
Dielectric Constant @10GHz	IPC TM-650 2.5.5.5	C23/50	3.38	3.58
Dissipation Factor @10 GHz	IPC TM-650 2.5.5.5	C23/50	0.0025	0.0035
Thermal Coefficient of Er (ppm/°C)	IPC TM-650 2.5.5.5 Adapted	-10°C to +140°C	-87	50
Peel Strength (lbs./in)	IPC TM-650 2.4.8	After Thermal Stress	5	5
Volume Resistivity (MΩ-cm)	IPC TM-650 2.5.17.1	A	1.98 x 10 ⁹	4.17 x 10 ⁹ (12 mil)
Surface Resistivity (MΩ)	IPC TM-650 2.5.17.1	A	4.42 E8	8.9 x 10 ⁸ (12 mil)
Tensile Strength (kpsi)	ASTM D-882	A, 23°C	16.1	14
Flexural Strength (psi)	ASTM D-790	A, 23°C	30195	35024
Density (g/cm ³)	ASTM D-792 Method A	A, 23°C	1.7	1.8
Water Absorption (%)	IPC TM-650 2.6.2.1	E1/105 + D24/23	0.09	0.09
Coefficient of Thermal Expansion (ppm/°C) X Axis Y Axis Z Axis	IPC TM-650 2.4.24	Before Tg	15 15 52	16 18 59
Thermal Conductivity	ASTM E-1225	100°C	0.45	0.45
Outgassing Total Mass Loss (%) Collected Volatile Condensable Material (%) Water Vapor Recovered (%) Visible Condensate (±)	ASTM E-595-90 Maximum 1.00% Maximum 0.10%	125°C, ≤10 ⁻⁶ torr	0.17 0.01 0.02	0.24 0.00 0.07
Flammability UL File E 80166	UL 94 Vertical Burn IPC TM-650 2.3.10	C48/23/50, E24/125	N/A	UL94-V0

Material Availability:

25N and 25FR materials are available in rigid or thin copper-clad laminates or B-stage bonding plies (prepregs), making them ideal for single- and double-sided PWBs and complex multilayer circuits, including dual offset strip line circuitry. Laminates are supplied with 1/2, 1, or 2 ounce H.T.E. electrodeposited copper on both sides. Contact customer service about other laminate options.

Prepregs are available in rolls or precut panels. The table on the right lists available prepreg styles and typical thicknesses.

Prepreg Thickness (inches)		
Glass Style	25N	25FR
1080	0.0039	0.0039
2112	0.0058	0.0058
2313	0.0067	0.0067

Results listed above are typical properties; they are not to be used as specification limits. The above information creates no expressed or implied warranties. The properties of Arlon laminates may vary, depending on the design and application.

Property	Typical Value		Direction	Units	Condition	Test Method
	RO4003C™	RO4350B™				
Dielectric Constant, ϵ_r (Process specification)	3.38 ± 0.05	3.48 ± 0.05 ⁽¹⁾	Z	-	10 GHz/23°C	IPC-TM-650 2.5.5.5 Clamped Stripline
Dielectric Constant, ϵ_r (Recommended for use in circuit design)	3.55 ± 0.05	3.66 ± 0.05	Z	-	FSR/23°C	IPC-TM-650 2.5.5.6 Full Sheet Resonance
Dissipation Factor Tan, δ	0.0027 0.0021	0.0037 0.0031	Z	-	10 GHz/23°C 2.5 GHz/23°C	IPC-TM-650 2.5.5.5
Thermal Coefficient of ϵ_r	+40	+50	Z	ppm/°C	-100°C to 250°C	IPC-TM-650 2.5.5.6
Volume Resistivity	1.7 X 10 ¹⁶	1.2 X 10 ¹⁶		MΩ-cm	COND A	IPC-TM-650 2.5.17.1
Surface Resistivity	4.2 X 10 ⁹	5.7 X 10 ⁹		MΩ	COND A	IPC-TM-650 2.5.17.1
Electrical Strength	31.2 (780)	31.2 (780)	Z	KV/mm (V/mil)	0.51mm (0.020")	IPC-TM-650 2.5.6.2
Tensile Modulus	26,889 (3900)	11,473 (1664)	Y	MPa (kpsi)	RT	ASTM D638
Tensile Strength	141 (20.4)	175 (25.4)	Y	MPa (kpsi)	RT	ASTM D638
Flexural Strength	276 (40)	255 (37)		MPa (kpsi)		IPC-TM-650 2.4.4
Dimensional Stability	<0.3	<0.5	X,Y	mm/m (mils/inch)	after etch +E2/150°C	IPC-TM-650 2.4.39A
Coefficient of Thermal Expansion	11	14	X	ppm/°C	-65 to 288°C	IPC-TM-650 2.1.41
	14	16	Y			
	46	60	Z			
Tg	>280	>280		°C DSC	A	IPC-TM-650 2.4.24
Td	425	390		°C TGA		ASTM D3850
Thermal Conductivity	0.64	0.62		W/m ² /K	100°C	ASTM F433
Moisture Absorption	0.04	0.04		%	48 hr Immersion 0.060" sample Temperature 50°C	ASTM D570
Density	1.79	1.86		gm/cm ³	23°C	ASTM D792
Copper Peel Strength	1.05 (6.0)	0.88 (5.0)		N/mm (pli)	after solder float 1 oz. EDC Foil	IPC-TM-650 2.4.8
Flammability	N/A	94V-0				UL
Lead-free Process Compatible	Yes	Yes				

STANDARD THICKNESS:	STANDARD PANEL SIZE:	STANDARD COPPER CLADDING:
RO4003C: 0.008" (0.203mm), 0.012 (0.305mm), 0.016" (0.406mm), 0.020" (0.508mm) 0.032" (0.813mm), 0.060" (1.524mm)	12" X 18" (305 X 457 mm) 24" X 18" (610 X 457 mm) 24" X 36" (610 X 915 mm) 48" X 36" (1,224 m X 915 mm)	½ oz. (17µm), 1 oz. (35µm) and 2 oz. (70µm) electrodeposited copper foil.
RO4350B: *0.004" (0.101mm), 0.0066" (0.168mm) 0.010" (0.254mm), 0.0133 (0.338mm), 0.0166 (0.422mm), 0.020" (0.508mm) 0.030" (0.762mm), 0.060" (1.524mm)	*0.004" material is not available in panel sizes larger than 24"x18" (610 X 457mm).	

(1) Dielectric constant typical value does not apply to 0.004 (0.101mm) laminates. Dielectric constant specification value for 0.004 RO4350B material is 3.36 ± 0.06

The information in this data sheet is intended to assist you in designing with Rogers' circuit material laminates. It is not intended to and does not create any warranties express or implied, including any warranty of merchantability or fitness for a particular purpose or that the results shown on this data sheet will be achieved by a user for a particular purpose. The user should determine the suitability of Rogers' circuit material laminates for each application.