

Lct

# SPECIFICATION FOR APPROVAL

## 承認書

 客 戶 發 行 認 印 章	龍呈國際科技有限公司		
	 業務	 工程	 審核

客 戶  
CUSTOMER

張淑靜 2014.6.6  
曾俊中  
鄭雅方 2014.6.11  
陳洪烈 2014.6.11  
雍智科技股份有限公司

品 名 2.4GHZ S-SMA M/M Swivel Antenna Black (GP)

SPECIES

料 號

F1B\_003404-MMP

PART NO.

客 戶 料 號 03900-0000000000-0364

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





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

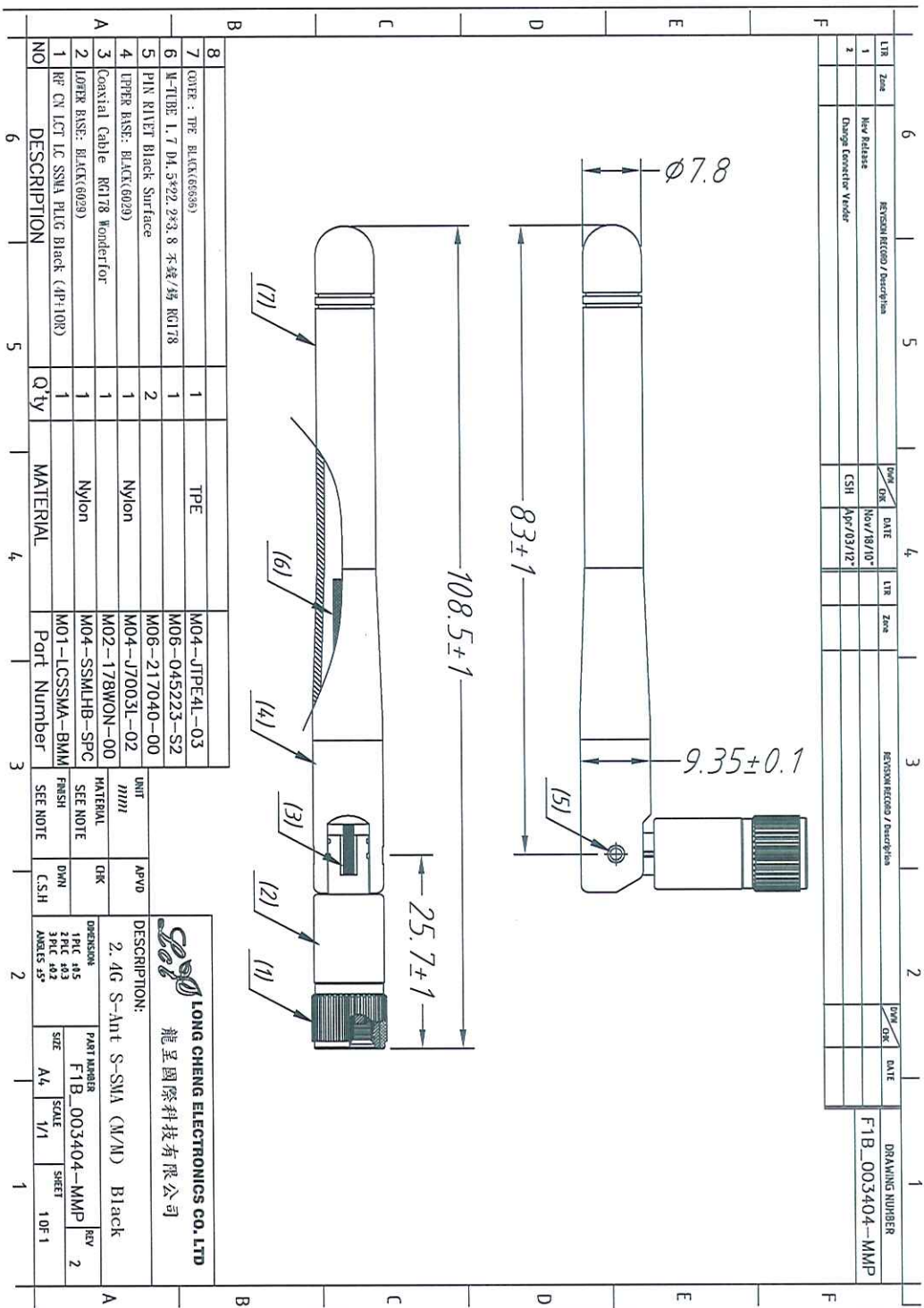
3Floor, No.3, Alley 15, Lane 62, Chung Ho St.,

TEL:+886-3-5541117

FAX:+886-3-5541065

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

## Index

[illegible]





## 電氣特性規格 Electrical Specifications

頻率範圍 (Frequency Range)	2400GHZ - 2500GHZ
增益 (Gain)	2 dBi (Nominal)
電壓駐波比 (VSWR)	< 2 : 1
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°(typical)
最大功率 (Max. Power Rating)	2 W (CW)
阻抗匹配 (Impedance)	50 Ohms (typical)

## 電氣特性測試 Electrical Specifications Test

### 1. 輻射場型測試 (Radiation Pattern Test):

測試儀器 (Test Instrument):

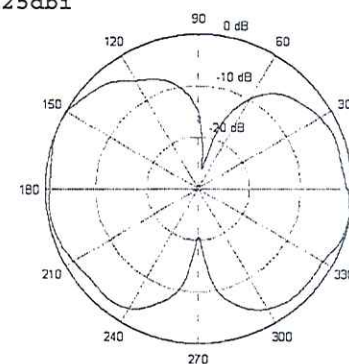
Ancom 6 ft Near-field antenna test system

測試資料 (Test Result):

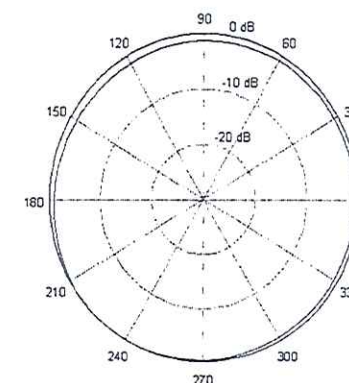
頻率 (Frequency): 2.45GHz

Max. gain : 2.0 dBi

Avg. gain : 1.25dBi



Horizontal Pattern



Vertical Pattern

# 電氣特性測試

## Electrical Specifications Test

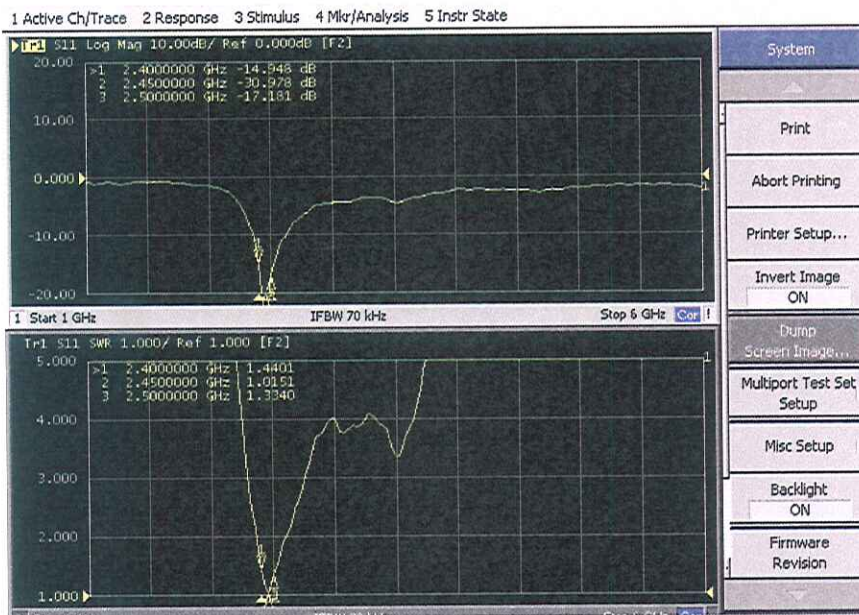
電壓駐波比測試  
(VSWR Test)

測試使用儀器  
(Test Instrument)

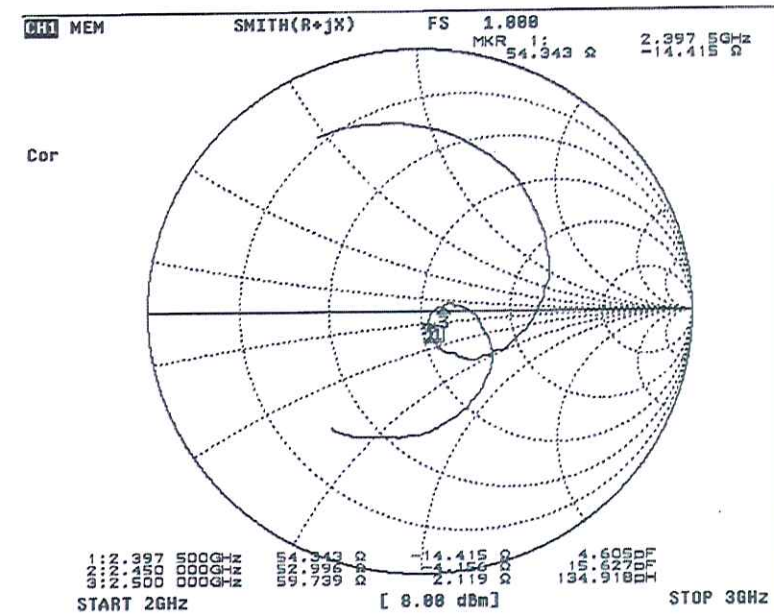
ADVANTEST R3767CG Network analyzer System

測試資料  
(Test Result)

如下



### 2.3 Smith Chart :



# SPECIFICATION FOR APPROVAL

DOCUMENT: A30178B001

STYLE : 105°C 30V  
RG-178B/U

SIZE: 7/0.102 SCCS

RECOGNIZED: UL 1979



WONDERFUL HI-TECH CO.,LTD

OFFICE : 72 WU KONG 6TH ROAD,  
WU KU IND. DISTRICT  
TAIPEI HSIEN, TAIWAN

FACTORY : 17 PEI YUAN ROAD,  
CHUNG-LI IND. PARK  
TAIWAN, R.O.C.

TEL : (02)22988033  
FAX : (02)22988031-2

TEL : (03)4527777  
FAX : (03)4517214

## WONDERFUL HI-TECH CO., LTD SPECIFICATION

STYLE	105°C 30V UL1979	DOCUMENT NO : A30178B001
SIZE	RG-178B/U	ESTABLISHED DATE: 2004/03/22
STANDARD : MIL-C-17		
Conductor	Size	AWG 30
	Material	---- Silver-Coated Copper Clad Steel
	Conductors No.	---- 7
	Conductors Size	mm 0.102
Insulation	O.D.	mm 0.30
	Average Thickness	mm 0.28
	Diameter	mm 0.86 ±0.03
	Material	---- FEP
Braid	Color	---- Clear
	Material	---- Silver-Coated Copper
	Construction	mm 16 / 3 / 0.10
	Coverage	% 95
Jacket	Average Thickness	mm 0.25
	Diameter	mm 1.80 ±0.05
	Material	---- FEP
	Color	---- Brown
Marking		
Drawing		

AK001/210X297/1.0

PAGE : 1

EDITION : 1.2

MAKER : C.Y.CHEN

CONFIRM : S.N.WONG

APPROVAL : W.J.WANG



**WONDERFUL HI-TECH CO., LTD.**  
**SPECIFICATION**

Electrical & Physical Properties							
Item				RG-178B/U			
Rating Temp Voltage				105°C 30V			
Conductor Resistance				838 OHM/KM/20°C MAX.			
Insulation Resistance				3000 MEGA OHM/KM MIN.			
Dielectric Strength				AC 500V/Minute			
Spark Test				2.5 KV			
Insulation	Unaged	Tensile Strength		2500 PSI MIN.( 1.76 Kg / m m <sup>2</sup> )			
		Elongation		200% MIN.			
	Aged	Tensile Strength		UNAGED MIN 75%(168HRS×232°C)			
		Elongation		UNAGED MIN 75%(168HRS×232°C)			
Jacket	Unaged	Tensile Strength		2500 PSI MIN.( 1.76 Kg / m m <sup>2</sup> )			
		Elongation		200% MIN.			
	Aged	Tensile Strength		UNAGED MIN.75%(168HRS×232°C)			
		Elongation		UNAGED MIN.75%(168HRS×232°C)			
Nom. Impedance				50 Ohms			
Nom. Capacitance				95.8 pF/m			
Nom. Vel. of Prop.				69.5%			
VSWR (0 – 6 GHZ)				UNDER 1.3			
Attenuation (dB/100m)	100MHz	1GHz	1.8GHz	2.4GHz	5.2GHz	6GHz	
	46	155	295	340	505	550	

AK001/210X297/1.0

PAGE : 2

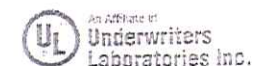
EDITION : 1.2

MAKER : C.Y.CHEN

CONFIRM : S.N.WONG

APPROVAL : W.J.WANG

UL International Services Ltd.- Taiwan Branch  
4th Floor  
No. 260 Da-Yeh Road  
Pei Toi, Taipei, Taiwan 112  
Telephone: 886-2-2896-7790  
Fax: 886-2-2891-7644  
Email: ul.tw@tw.ul.com



MR. S. N. WONG  
WONDERFUL HI-TECH CO. LTD.  
CHUNG LI INDUSTRIAL PARK  
17 PEI YUAN RD  
CHUNG-LI, FU SHING LEE  
TAICHUNG HSIEN, TAIWAN

Date: 2003/09/22  
Subscriber: 698947002  
File No: E77981  
Project No: 03CAG1293  
PD No: 03015304  
Type: L  
PC Number: S WONG

Subject: Procedure And/Or Report Material

The following material resulting from the investigation under the above numbers is enclosed.

Issue	Date	Vol	Sec	Pages	Revised Date
	1981/04/09	1	1	Revised Table of Authorized Styles II, C	2003/09/22
	1981/04/09	1	1	New Facing Pages 1745, 1579	2003/09/22

Inspections at your plant will be conducted under the supervision of Mr. Hank Su, Field Supervisor, 4th Fl., 260 Da-Yeh Road, Pei Toi District, Taipei 112, Taiwan, PHONE: 886 2 28968008 ext. 108, FAX: 886 2 28978628.

Marks as needed may be obtained from: UL International Service Ltd., 4th Fl., 260 Da-Yeh Road, Beitou, Taipei City, Taiwan 112, PHONE: 886 2 28967790, FAX: 886 2 28917644, ATTN: Iris Tseng.

Please file revised pages and illustrations in place of material of like identity. New material should be filed in its proper numerical order.

NOTE: Follow-Up Service Procedure revisions DO NOT include Cover Pages, Test Records and Conclusion Pages. Report revisions DO NOT include Authorization Pages, Indices, Section General Pages and Appendixes.

Please review this material and report any inaccuracies to LAURA CHUNG (886-2-2896-7790), referring to the above Project and/or PD Numbers.

c: TPI File

UL INSPECTION CENTER 408

UNDERWRITERS LABORATORIES INC.  
File E77981 Section 1  
Vol. 1

FACTORY INSPECTION PROCEDURE  
Page H Issued: 1981-04-09  
Revised: 2003-09-18

TABLE OF AUTHORIZED STYLES  
SINGLE-CONDUCTOR THERMOPLASTIC-INSULATED WIRE

(File at Front of Section 1)

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File E77981 Section 1  
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FACTORY INSPECTION PROCEDURE  
Page J Issued: 1981-04-09  
Revised: 2003-09-18

TABLE OF AUTHORIZED STYLES  
SINGLE-CONDUCTOR THERMOPLASTIC-INSULATED WIRE

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1902		1927		1952		1977	
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1907		1932		1957		1982	
1908		1933		1958		1983	
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1910		1935		1960		1985	
1911		1936		1961		1986	
1912		1937		1962		1987	
1913		1938		1963		1988	
1914		1939		1964		1989	
1915		1940		1965		1990	
1916		1941		1966		1991	
1917		1942		1967		1992	
1918		1943		1968		1993	
1919		1944		1969		1994	
1920		1945		1970		1995	
1921		1946		1971		1996	
1922		1947		1972		1997	
1923		1948		1973		1998	
1924		1949		1974		1999	
1925		1950		1975		2000	



項目 / Items	物質安全資料表 / MSDS(Material Safety Data System)
產品與廠商資訊 / Product and Supplier Information	產品名稱 / Product name: 電線電纜 / Wire&Cable
	產品編號 / Product NO.:
	供應商名稱 / Supplier: 萬泰科技股份有限公司 / WONDERFUL HI-TECH CO., LTD.
	供應商地址 / Address: 台灣省桃園縣中壢市中華工業區北園路17號 / No.17,Pei-yuan Road.,Chung-Li Ind. Park, Taoyuan Taiwan, R.O.C.
	供應商電話 / Telephone: + 886 - 3 - 4527777
成分與組成資訊 / Composition and Information on Ingredients	郵政 / Zip code: 320
	導體 / Conductor
	絕緣及外被及其它輔助材料 / Insulation&Jacket and other materials
	名稱 銅 / NAME Cu
	名稱 聚氯乙烯 / NAME PVC resin
危害資訊 / Hazard Identification	健康危害 / Harm to health: 不可食用 / Not to be eatable
	環境影響 / Harm to environment: 環保產品，低鉛低鎘(Pb<90ppm,依錄 EPA3050B,Cd<5ppm,依錄 UN1122)其它重金屬含量<10ppm(鎘、鉍、鉛、鎘、汞、鎘、依錄 EN71) / Environmental protection products with low lead&low cadmium(Pb<90ppm,Reference to EPA3050B,Cd<5ppm,Reference to UN1122), Other heavy metals <10ppm(Sb,As,Br,Cr,I,lg,Se,Ref)
	物理及化學危害 / Physical&chemical hazards: 受熱分解或者燃燒發出有毒性氣體 / Dangerous vapor emission with heat decomposition or flaming
	主要症狀 / Symptoms: 誤食後引發嘔吐，腹瀉或中毒現象 / Vomiting, stomachic irritating or other symptoms after swallowing
	救治措施 / First-aid measures: 立即到醫院就醫 / Visiting a doctor in no time
防火措施 / Fire-fighting measures	適用滅火劑 / Suitable extinguishing agents: 水、二氧化碳、干粉 / Water, carbon dioxide, powder
	滅火時造成的危害 / Particular danger through extinguishing: 燃燒後產生的氣體會造成空氣污染 / Polluting the air after flaming
	儲存要求 / Storage regulations: -20℃——+60℃保持產品原包裝形式，保持存放地點通風 / Ensure good ventilation at the workplace and not breaking package on the conditions of -20℃——+60℃
	搬運要求 / Transport regulations: 運輸過程中不能有碰撞及擠壓 / Ensure not be collided&crushed during transporting
	特殊狀況下可能產生的危害反應 / latent danger on particular conditions: 外被絕緣脆化，絕緣性能下降，漏電 / Insulation&jacket embrittling, insulation performance degraded or electricity leak
安全資訊 / Safety and health information	避免接觸之物質 / Substance to avoid: 避免類似化學物質長期緊密接觸，不可在高於產品所示溫度環境內長期放置及使用，非特種產品不可與油類，有機類三態物質長期接觸 / Ensure not be in close touch with that kind of chemical substance and not work or be stored in above rated temperature environment for a long term, and products without such purpose not to b
	廢棄物處理 / Disposal handling regulations: 出售 / Sales
	核准: 王文瑞 RATIFIED:W.J
	審核: 林國傑 CHECKED:Alex
	制表: 李瑞麟 MAKER:Lee
	制定日期: 2007.01.23

## 產品資料



## VYDYNE 21SP

### 尼龍 6.6 樹脂

VYDYNE® 21SP 添加了脫模劑和表面潤滑劑以增強其加工性能。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、耐久性和耐化学腐蚀。

标准颜色：原色和黑色

性能 <sup>(1)</sup>	测试方法	DAM <sup>(2)</sup>	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	—	%
平衡吸水率	ASTM D 570 <sup>3</sup>	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
弯曲模量 @23°C	ASTM D 790	90	41	MPa
弯曲强度 @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 硬度
耐熱性能				
热变形温度 (311) 未退火 @0.45 MPa	ASTM D 648	232	221	°C
未退火 @1.82 MPa	ASTM D 648	80	70	°C
热点	ASTM D 789	260	—	°C
电性能				
介电强度 短期	ASTM D 149	23	22	kV/mm
长期	ASTM D 149	22	19	kV/mm
介电常数 @100 Hz	ASTM D 150	3.7	6.0	—
@10 <sup>3</sup> Hz	ASTM D 150	3.6	6.0	—
@10 <sup>6</sup> Hz	ASTM D 150	3.1	3.5	—
介电损耗因子 @100 Hz	ASTM D 150	0.02	0.04	—
@10 <sup>3</sup> Hz	ASTM D 150	0.02	0.04	—
@10 <sup>6</sup> Hz	ASTM D 150	0.01	0.06	—
体积电阻率 @23°C	ASTM D 257	6.0 x 10 <sup>15</sup>	2.0 x 10 <sup>13</sup>	Ω-cm
阻燃等级 <sup>(3)</sup>				
UL-94 @0.74 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
氧指数	ASTM D 2863	30	34	%

(1) 典型性能，不可作为产品质量。

(2) 和模塑时的性能值一致，含水量低于 0.2%。

(3) 此数字表示的是阻燃性能，并非表示这种材料在实际火灾条件下的阻燃性能。

• 杜邦化学公司商标

• 索尔公司(Solutia Inc.)商标，索尔化学公司获授权使用

杜邦塑料(Dow Plastics)是索尔化学公司及其附属公司的注册商标。

## SOLUTIONA INC

3000 OLD CHEMSTRAND RD CANTONMENT FL 32533

Material Designation: 20NSP(a), 21(a), 21X(a), 21SP(a), 21SPC(a), 21SPF(a), 21SPG(a), 24NSL(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

Volume Resistivity (1.0' ohm-cm): -

Dimensional Stability(%): 1.6

ISO Tensile Strength (MPa): -

ISO Flexural Strength (MPa): -

ISO Heat Deflection (°C): -

ISO Tensile Impact (kJ/m<sup>2</sup>): -ISO Izod Impact (kJ/m<sup>2</sup>): -ISO Charpy Impact (kJ/m<sup>2</sup>): -

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

Report Date: 5/24/1979

Underwriters Laboratories Inc@

UL94 small-scale test data does not pertain to building materials, furnishings and related contents. UL 94 small-scale test data is intended solely for determining the flammability of plastic materials used in components and parts of end-product devices and appliances, where the acceptability of the combination is determined by UL.

## 深圳市华塑工程塑料厂

电话/传真: 0755-27265356/27265087

地址: 深圳市沙井镇东环路276号

## TPEE物性指标

物理物性	试验方法	高性能级 (35-700)							
邵氏硬度HD度	GB2411	35	40	45	50	55	60	64	70
收缩率 %	ASTMD955	1.10	1.05	1.03	1.01	1.01	0.98	0.98	0.95
拉伸强度≥Mpa	GB/T1040	12	14	15	20	25	25	30	32
断裂伸长率≥%	GB/T1040	500	500	450	450	400	400	350	350
弯曲模量Mpa	GB/T9431	40	60	80	110	203	240	350	600
撕裂强度≥KN. m <sup>-1</sup>	GB/T529	80	80	105	115	125	135	155	200
熔体流动指数 230°C. 216Ksg/10min	GB/T3682	6	6	6	6	6	8	8	8
熔点°C	GB4608	165	165	194	203	210	212	217	219
相对密度°C	GB1033	1.1	1.12	1.15	1.18	1.2	1.2	1.22	1.25
脆化点△°C	GB5470	-70	-70	-70	-70	-70	-60	-55	-40
维卡软化点≥°C	GB5470	80	100	135	160	170	180	190	200





CYCOLOY C6200-701

Print Date: 08-24-2000

Page 1 of 7

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](http://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 C6200-701 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.

Component Name	%	CAS Number	OSHA PEL	ACGIH TWA	GE Recommended Exp. Limits
CARBON BLACK	0.1 - 1	1333-86-4	3.5 mg/m3 TWA	3.5 mg/m3 TWA	Not established

### SECTION 3: HAZARDS IDENTIFICATION

#### EMERGENCY OVERVIEW:

- Pellets with slight or no odor.
- Spilled material may create slipping hazard.
- Can burn in a fire creating dense toxic smoke.



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- 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. No hazard in normal industrial use. Do not induce vomiting. Seek medical attention if symptoms develop.  
INGESTION: No specific treatment is necessary since this material is not likely to be hazardous by inhalation.  
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.

### SECTION 5: FIRE FIGHTING MEASURES



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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.
EXTINGUISHING MEDIA:	Water spray and foam. Carbon dioxide and dry chemical are not recommended because their lack of cooling capacity may permit re-ignition.
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, 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
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RESPIRATORY:	during melt processing. Appropriate clothing - including chemical resistant gloves - should be worn to prevent contact with processing fumes condensate. 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.
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**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

**SECTION 11: TOXICOLOGICAL INFORMATION****ACUTE HEALTH HAZARDS**

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**ACUTE ORAL:** Oral LD50 Rat >5 g/kg Oral toxicity is estimated from tests on similar materials.

**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

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	%
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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

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**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  
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 "Cyclooy" 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	-	-
<b>CTI: 2</b>		<b>IEC CTI:</b>		<b>HVTR: 3</b>		<b>D495: 6</b>		<b>IEC Ball Pressure (°C):</b>	
<b>Dielectric Strength</b>		<b>Volume Resistivity (10<sup>9</sup>ohm-cm): 16</b>		<b>Dimensional</b>		<b>Stability(%): 0</b>		<b>ISO Heat Deflection (°C): -</b>	
<b>(kV/mm): 26</b>		<b>ISO Tensile Strength</b>		<b>ISO Flexural Strength (MPa): -</b>		<b>ISO Charpy Impact</b>		<b>(kJ/m²): -</b>	
<b>(MPa): -</b>		<b>ISO Tensile Impact</b>		<b>ISO Izod Impact (kJ/m²): -</b>					
<b>(kJ/m²): -</b>									
<b>(GG)</b>									

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®

UL94 small-scale test data does not pertain to building materials, furnishings and related contents. UL 94 small-scale test data is intended solely for determining the flammability of plastic materials used in components and parts of end-product devices and appliances, where the acceptability of the combination is determined by ULI.



# 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	快創黃銅棒
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

#### 快創黃銅棒成分分析

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	1.3~3.7
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	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	-
物理及化學性危害	特殊危害	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:
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。
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。
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。
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。
對醫師之提示: 對不備食入之患者,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適源之火源之滅火器滅火。
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、塊體不會滲漏。
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 <sup>3</sup>	國內規範容許濃度 mg/m <sup>3</sup>
Cu	1.0 (粉塵)	1.0 (粉塵)
Pb	0.05	-
Fe	5.0	-
Sn	2.0	2.0
Zn	15	5.0 (氯化鋅)
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	自然溫度: -
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: -
致敏性: -
慢性或長期毒性: 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: -
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#### 十三、廢棄處理方法

廢棄處理方法: 本產品成為廢棄物時, 未被歸類為有害事業廢棄物, 其處理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。
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#### 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毒物質容許濃度標準 事業廢棄物儲存清除處理方法及設施標準
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#### 十六、其他資料

本表為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。