



东莞市一佳电子通讯科技有限公司

Dongguan YiJia Electronics Communication Technology Co.,Ltd.

规格承认书

SPECIFICATION FOR APPROVAL

日期 2020/05/25
Date

编号 20052502
File No

版本 1.0
Revision

客 户 成都万创

CUSTOMER: _____

客户料号 VT-SBC-TAB10-APLKN-TP

CUSTOMER NO: _____

品 名 WiFi AUX Antenna

PART NAME: _____

供方料号 YJS01.042.005.302A

SUPPLIER NO: _____

送样日期Date: 送样数量Q “TY:

客户确认CUSTOMER APPROVED BY		
APPROVAL	CHIEF	SUPERVISOR

供方确认 SUPPLIER SIGNATURE		
APPROVAL	CHECK	DESIGN
ChenGuoqiang	WenXue	ChenXingcheng

YJ-RD-F04-A

add: 东莞市长安镇沙头社区木鱼路59号元富工业区 Tel:0769-82586086 Fax:0769-82586086



承认书项目表

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RoHS
Compatible

CUSTOMER
PART NO

REV.

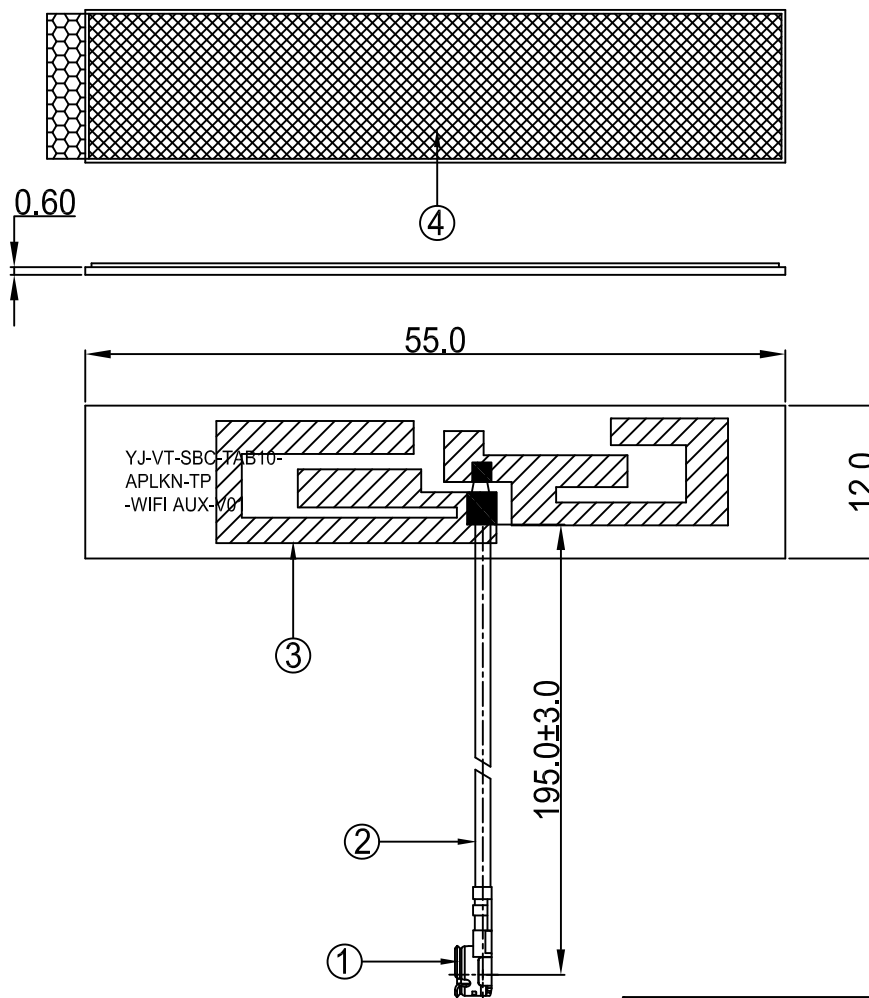


DESCRIPTION

首次发行

DATE

2020-05-11



4	Paste	54.4*11.4MM	3M	PAS1000XA.P01	1
3	PCB Black	55.0*12.0*0.4MM	PCB	PCB1000XA.P01	1
2	Coaxial Cable	O.D.0.81 Black	O.D.0.81	COA1000XA.P01	1
1	Mini Connector	Au Plated 4代	Cu	TER1000XA.P01	1
NO	PART NAME	DESCRIPTION	Material	Part Number	Q.TY



东莞市一佳电子通讯科技有限公司

Dongguan YiJia Electronics Communication Technology Co.,Ltd. Tel :0769-85535057 Fax:0769-81664308

PART NAME: WiFi AUX Antenna

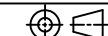
PART NO.: YJS01.042.005.302A

DATE: 2020-05-11

APPROVED BY

CHECKED BY

DESIGNED BY



Tolerance

陈国强

文雪

吕森桦

UNITS: mm

SCALE: 1/1

REVISION: A

X.X ±0.50

X.XX±0.15

X° ±3°



天线规格

Antenna Specification

Electrical Properties

Frequency	2.4-2.5GHz 5.15-5.85GHz
Impedance	50 Ohm Nominal
V.S.W.R	2.0 Max
Gain	0.9dBi@ 2.4-2.5GHz 3.0dBi@5.15-5.85GHz
Radiation	Omni-directional
Polarization	Linear

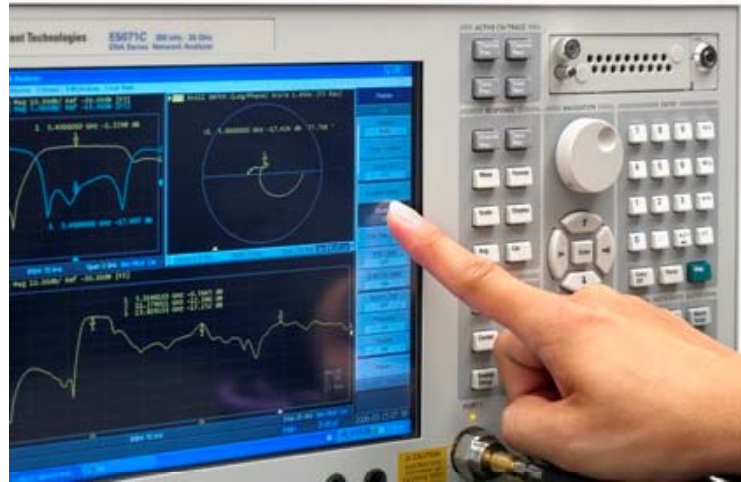
Physical Properties

Connector	4代IPEX
Cable Type	O.D.0.81mm
Cable Length	195mm
Cable Color	Black
Operating Temp.	-40 ~ +85 °C
Storage Temp.	-40~ +85 °C

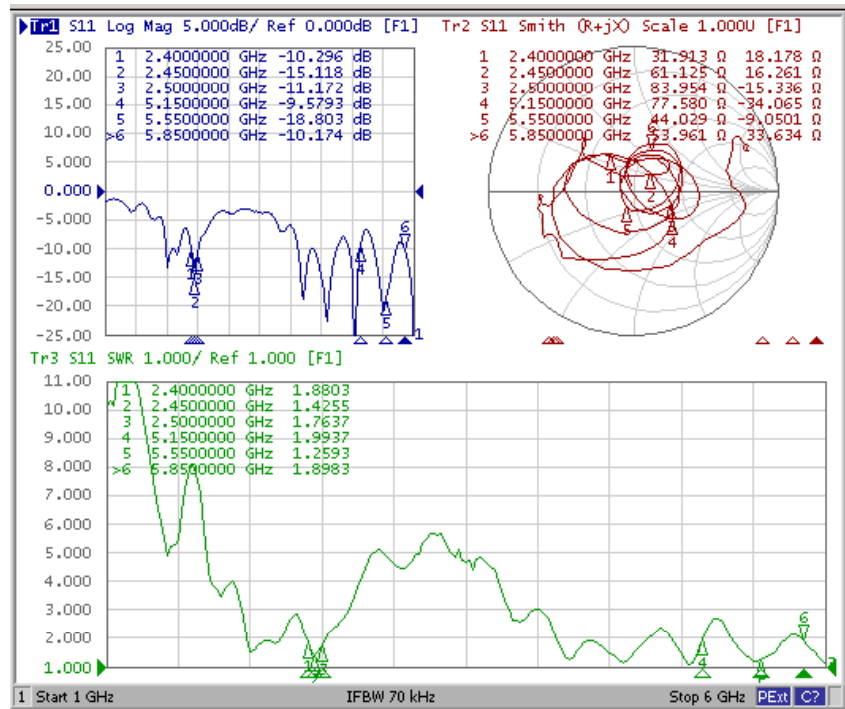


Antenna WiFi AUX Test

**Agilent
E5071B**



**S
Parameter
Test //
WiFi AUX
Antenna**





Antenna WiFi AUX Test

Passive Test For WiFi(2.4G)			
Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)
2400	30.8	-5.1	-0.7
2410	32.3	-4.9	-0.5
2420	33.4	-4.8	-0.2
2430	34.8	-4.6	-0.1
2440	35.4	-4.5	0.1
2450	37.9	-4.2	0.4
2460	36.7	-4.4	0.6
2470	37.5	-4.3	0.8
2480	37.1	-4.3	0.8
2490	36.6	-4.4	0.8
2500	37.2	-4.3	0.9

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Passive Test For WiFi(5.8G)			
Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)
5100	39.6	-4.0	1.4
5150	36.9	-4.3	0.9
5200	36.9	-4.3	1.1
5250	32.0	-5.0	0.2
5300	27.8	-5.6	0.3
5350	28.5	-5.5	0.6
5400	32.4	-4.9	1.5
5450	33.5	-4.8	2.1
5500	33.3	-4.8	1.6
5550	37.0	-4.3	1.8
5600	52.3	-2.8	3.0
5650	48.7	-3.1	2.3
5700	49.3	-3.1	2.0
5750	41.3	-3.8	1.9
5800	37.4	-4.3	1.7



Antenna Active Test



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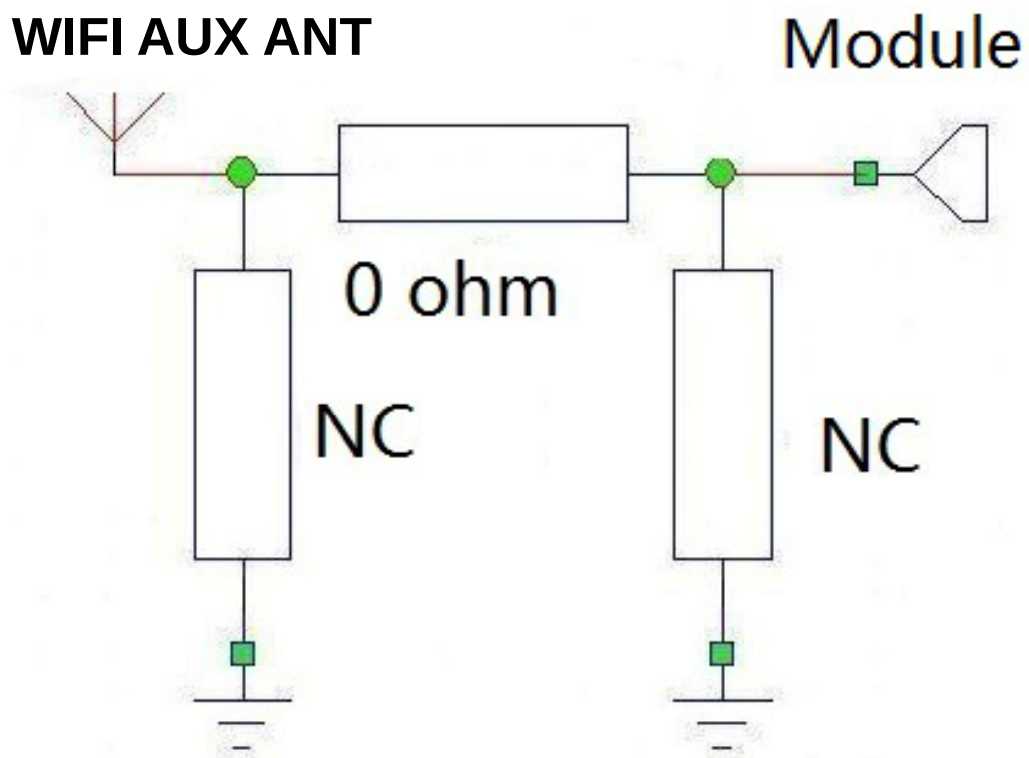


Active Test For 2.4G & 5.8G WIFI				
Band	Channel	Data Rate	TRP	TIS
2.4G WIFI	1	802.11b/11M	10.1	-78.2
	7		10.3	-79.3
	13		11.0	-79.1
5.8G WIFI	36	802.11a/54M	7.2	-65.1
	157		8.1	-65.7
	165		7.8	-65.4



Antenna WiFi AUX Test

Antenna WIFI Matching Circuit





Device



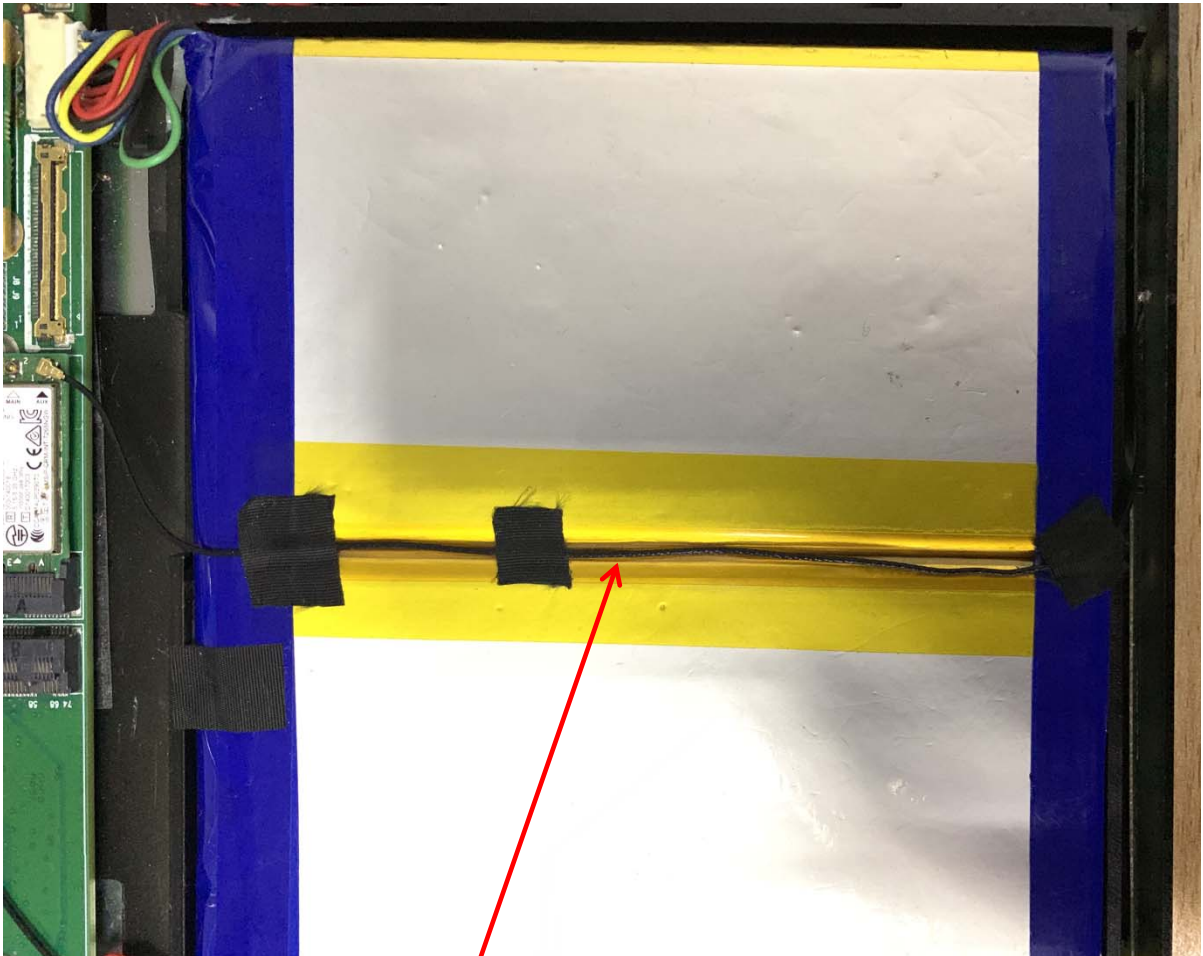


WiFi AUX Antenna





PCB左边和此处筋位对齐



WIFI AUX Cable 线摆放

物质安全资料表 (MSDS)

一、物品與廠商資料

物品名稱：防氧化原液
物品編號：JC-602
供應商名稱：惠州市捷誠科技有限公司
供應商地址：惠州市惠城区马安镇新群村波荡广汕公路 10 号汉水金城工业园 B 区三楼
供應商電話/传真：0752-7212157 / 0752-7212157
緊急聯絡電話/傳真電話：13927331665 / 0752-7212157

二、成分辨識資料

混合物：

化學性質：腐蝕品		
危害物質成分之中英文名稱	濃度或濃度範圍(成分百分比)	CAS NO.
咪唑 Imidazole	≤10%	288-32-4
有机酸 Organic acid	≤10%	64-19-7
铜盐 $\text{Cu}(\text{CH}_3\text{COO})_2$	≤10%	142-71-2
DI 水 Pure water	≥60%	7732-18-5

三、危害辨識資料

最 重 要 危 害 效 應	健康危害效應：对皮肤及呼吸道有刺激性
	環境影響：无
	物理性及化學性危害：有腐蝕性
	特殊危害：无
主要症狀：刺激呼吸道	
物品危害分類：无资料	

四、急救措施

不同暴露途徑之急救方法：
• 吸入：移到新鲜空气处，情况严重者就医
• 皮膚接觸：用大量水清洗
• 眼睛接觸：用大量流动水冲洗，并就医
• 食入：就医
最重要症狀及危害效應：呼吸道刺痛
對急救人員之防護：无需特别防护
對醫師之提示：无

五、滅火措施

適用滅火劑：不适用
滅火時可能遭遇之特殊危害：不适用
特殊滅火程序：不适用
消防人員之特殊防護設備：不适用

六、洩漏處理方法

個人應注意事項： 穿戴合适的防酸碱类劳保用品

環境注意事項： 注意通风，远离易腐蚀品

清理方法： 找到泄露原因及泄露点，用大量清水冲洗，并及时维修

七、安全處置與儲存方法

處置： 避免同易燃、易爆、易腐蚀物品混放

儲存： 阴凉干燥通风良好处

八、暴露預防措施

工程控制： 无

控制參數：

- 八小時日時量平均容許濃度/短時間時量平均容許濃度/最高容許濃度：无
- 生物指標：无

個人防護設備：

- 呼吸防護：戴普通口罩
- 手部防護：戴防酸碱手套
- 眼睛防護：戴防护眼镜
- 皮膚及身體防護：穿戴合适的劳保服

衛生措施： 大量清水冲洗即可

九、物理及化學性質

物質狀態： 液体	形狀： 无
顏色： 淡蓝色	氣味： 有轻微气味
pH 值： 2.6—3.0	沸點/沸點範圍： 无
分解溫度： $\geq 40^{\circ}\text{C}$	閃火點： $^{\circ}\text{F}$ $^{\circ}\text{C}$ 无
	測試方法： 開杯 閉杯 无
自燃溫度： 无	爆炸界限： 不适用
蒸氣壓： 无	蒸氣密度： 不适用
密度： $1.006 \pm 0.005\text{g/cm}^3$	溶解度： 不适用

十、安定性及反應性

安定性： 正常情况下稳定

特殊狀況下可能之危害反應： 无资料

應避免之狀況： 剧烈撞击

應避免之物質： 易燃、易爆品、易腐蚀品

危害分解物： 无

十一、毒性資料

急毒性：无资料
局部效應：无
致敏感性：对皮肤\呼吸道\眼睛有刺激
慢毒性或長期毒性：无资料
特殊效應：无资料

十二、生態資料

可能之環境影響/環境流佈： 无

十三、廢棄處置方法

廢棄處置方法： 用弱碱液中和即可

十四、運送資料

國際運送規定： 塑料桶包装,常温放置,轻装轻卸
聯合國編號：无
國內運送規定：无
特殊運送方法及注意事項：无

十五、法規資料

適用法規： 经其持有人自行认为废弃物时,依《废弃物清理法》关于有害事业废弃物之规定办理
--

十六、其他資料

參考文獻	无资料		
製表單位	名稱：惠州市捷诚科技有限公司		
	地址/電話：惠州市惠城区马安镇新群村波荡广汕公路 10 号汉水金城工业园 B 区三楼 0752-7212157		
製表日期	2017 年 11 月 10 日	制表部门	品质部

物質安全資料表

一、物品與廠商資料

物品名稱 :KTM-150F WM
其它名稱：
建議用途: 熱硬化型印刷油墨
製造商或供應商名稱：供應商 - 凱耀科技股份有限公司 製造商 - 凱耀科技股份有限公司
製造商或供應商地址：供應商 - 新竹縣竹北市博愛街 646 巷 18 號 工 廠 - 新竹縣竹北市博愛街 646 巷 18 號
緊急聯絡電話：(03)555-1822 傳真電話：(03)553-1338

二、危害辨識資料

物品危害分類：易燃性液體、火警危害 第3類，急性毒性 第5類。
標示內容：易燃性混合溶劑  象 徵 符 號： 警 示 語： 危害警告訊息：易燃性物體，吸入可能有害。 危害防範措施：緊蓋容器；遠離引火源-禁止抽煙；置容器於通風良好的地方；衣服一經污染，立即脫掉；戴眼罩/護面罩；使用時勿吃、喝，避免釋放於環境中
其它危害：--

三、成份辨識資料

危害物質成份之中英文名稱	濃度或濃度範圍(成份百分比)	CAS No.
聚酯樹脂	20~25%	
混合溶劑	20~25 %	106-65-0；1119-40-0；627-93-0
二氧化鈦	30~35%	13463-67-7
填充料	10~15 %	
六亞甲基二異氰酸酯低聚物	5~10 %	
乙酸丁酯	1~5 %	

四、急救措施：

不同暴露途徑之急救方法： 吸入：1.立即將患者移致新鮮空氣處。對人只產生鼻子刺激，可能有害。 皮膚接觸：1.立即水緩和沖洗。 眼睛接觸：1.立即將眼皮撐開，用緩和的水沖洗。 食入：
最重要症狀：
對急救人員之防護：戴防護手套，以避免接觸污染物。
對醫師之提示：。

五、滅火措施

適用滅火劑：乾粉

滅火時可能遭遇之特殊危害：

特殊滅火程序：1. 將容器運離火場並於上風處滅火。

2.在不危及人員安全下，先止漏。

3.若無法止漏且周圍空曠，則任火燒盡。

消防人員之特殊防護設備：消防人員必須配戴空氣呼吸器，消防衣及防護手套。

六、洩漏處理方法

個人應注意事項：1.限制人員進入，直至外溢區完全清乾淨為止。

2.確定是由受過訓之人員負責清理工作。

3.穿戴適當個人防護裝備。

環境注意事項：1.對該區進行通風換氣。

2.撲滅或除去所有發火源。

3.報告政府安全衛生與環保相關單位。

清理方法：1.不要碰觸外洩物。2.避免外洩物流入下水道或其他密閉空間。3.在安全許可狀況下設法阻止或減少溢漏。

4.用砂，泥土或其他不予洩漏物質反應之吸收物質來圍堵著洩漏物。5.少量溢漏時，用不會和外洩物反應之吸收劑吸收。已污染的吸收劑和外洩物具有同樣危害性，須置於加蓋並標示的適當的容器裡。用水沖洗溢漏區域。6.大量溢漏時，連絡消防，緊急處理單位及供應商以尋求協助。

七、安全處置與儲存方法：

無須特殊措施，不屬易燃易爆惡。

儲存：可用沒有腐蝕性容器，沒有反應性，燃火性低，屬非易燃物。

八、暴露預防措施

工程控制：局部排氣裝置或整體換氣裝置。

控制參數：八小時日時量平均容許濃度/短時間時量平均容許濃度/最高容許濃度：

個人防護設備：

呼吸防護：

手部防護：防滲手套，材質建議以丁基橡膠，Teflon、4H、Barricale、Chemrel

眼睛防護：1.護目鏡〔最小 8 英吋〕。2.防濺安全護目鏡。3.勿戴隱形眼鏡。

皮膚及身體防護：化學防護衣。

九、物理及化學性質

物質狀態：粘稠膏狀液體

形狀：膏狀液體

顏色：

氣味：芳香味

pH 值：微酸性

沸點/熔點範圍： °C/---

分解溫度：未測量

閃火點：

測試方法：開杯 閉杯

自燃溫度：

爆炸界限：LEL：UEL：

蒸氣壓：

蒸氣密度：>1(空氣 1)/

比重：1.2~1.4 (25/25°C)

對水溶解度：

十、安定性及反應性

安定性：正常狀況下安定
特殊狀況下可能之危害反應：
應避免之狀況：
應避免物質：酸類。
危害分解物：

十一、毒性資料

暴露途徑：皮膚接觸、眼睛接觸、食入
症狀：眼睛損傷
急毒性：
吸入：
皮膚：引起輕度刺激。
眼睛：引起輕度刺激。
食入：
LD50(測試動物、吸收途徑)
局部效應： ---
致敏感性： ---
慢毒應或長期毒性：
特殊效應：。

十二、生態資料

生態毒性：
持久性及降解性：
生物蓄積性：
土壤中之流動性：
其它不良效應：

十三、廢棄處置方法

廢棄處置方法：
1.依現行法規處理。
2.考慮以衛生掩埋或在合格的溶劑燃燒塔燃燒。

十四、運送資料

聯合國編號：
聯合國運輸名稱：
運輸危害分類：
包裝類別：
海洋污染物(是/否)：
特殊運送方法及注意事項：-

十五、法規資料

適用法規：1.勞工安全衛生設施規則 2. 危險物及有害物通識規則

十六、其他資料

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參考文獻： 無
製表單位： 凱耀科技股份有限公司 / 新竹縣竹北市博愛街 646 巷 18 號 / Tel:03-5551822 / Fax:03-5531338
製表人：謝錦全
製表日期：2014/08/15
備註：上述資料及各項數據僅供參考。使用者請依應用需求，自行判定其可行性。

MATERIAL SAFETY DATA SHEET

物质安全资料表

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION 产品和公司名称

PRODUCT NAME : Copper Clad Laminate (FR-4.0、CEM-3)

产品名称: 覆铜箔板 (FR-4.0、CEM-3)

PRODUCT USE: Substrate for printed circuitry; Multilayer Boards

用途: 用于印制印刷电路板; 制作多层板

NAME OF COMPANY and ADDRESS: SHANGHAI GLOBAL ELECTRONIC
MATERIAL LTD.

NO : 33 BaoSheng Road,Song Jiang Area,Shang
Hai, P.R.China

公司名称及地址: 上海国纪电子材料有限公司

中国上海松江工业区宝胜路 33 号

FOR MORE INFORMATION CALL:

紧急联络电话: 86-21-57747138

Fax: 86-21-57746633

E-mail: ilmsh@china-ilm.com

2. COMPOSITION/INFORMATION ON INGREDIENTS 组成成分资料

INGREDIENT NAME	CAS#	WEIGHT%
成分名称	化学文摘号	重量比
Continuous Filament Fiber Glass	(65997-17-3)	30-40
玻纤布/毡		
Copper	(7440-50-8)	15-25
铜箔		
Epoxy Resin	(26265-08-7)	40-70
溴化环氧树脂		

3. HAZARDS IDENTIFICATION 危害性资料

EMERGENCY OVERVIEW 紧急情况概述:

A nonflammable sheet material , Dust when machined or punched may cause skin or eye irritation .Fumes if decomposed may irritate eyes .nose and throat.

是一种难燃的层压板, 当使用或打孔时可能产生粉末, 可能使皮肤或眼睛感到刺激。当分解时产生的气体会刺激眼睛、鼻和咽喉。

POTENTIAL HEALTH HAZARDS:潜在危害:

SKIN: Dust may cause moderate skin irritation.

皮肤: 粉末将导致中等程度皮肤过敏。

EYES: Dust may cause moderate eye irritation. Fumes may irritation eyes.

眼睛：粉末将导致中等程度眼睛过敏。

INHALATION: Fibrous glass dust may be released from the fiberglass cloth substrate when machined. ACGIH TLV is 10mg/m³ TWA for particles <5microns in diameter.

吸入物：当使用玻璃纤维布时玻璃纤维粉末可能会飞散出。对于直径<5 微米的颗粒 ACGIH TLV 是 10mg/m³。

INGESTION: Not determined.

摄食：没有参考值。

DELAYED EFFECTS: Our product is reinforced with continuous filament fiber glass . Dust generated from the cutting . grinding .machining etc .would not be expected to produce respirable particles . IARC considers continuous filaments as unclassifiable or probably non-carcinogenic.

慢性影响：我们的产品用的是加强型连续的玻璃纤维丝，当切割、打孔加工时不会产生可吸入的颗粒。IARC 没有把连续玻璃丝列入致癌物目录。

4. FIRST AID MEASURES: 急救措施

SKIN: Wash in flowing water or shower. Remove contaminated clothing.

皮肤：脱下已污染的衣服，用流动水冲洗。

EYE: Irrigate with flowing water for 15 minutes. If irritation persists consult a physician.

眼睛：用流动水冲洗 15 分钟，如过敏现象持续发生，请求助医生。

INHALATION: If overcome by dust or smoke move to fresh air .If not breathing give mouth-to-mouth resuscitation. Call physician.

吸入：如粉末烟尘太多请转移到有新鲜空气的地方，如停止了呼吸，请进行人工呼吸并致电医生。

INGESTION: If large amounts are ingested consult physician.

摄食：如吸入大量，请致电医生。

ADVICE TO PHYSICIAN: Treat symptomatically.

建议医生：处理出现的症状。

5. FIRE FIGHTING MEASURES: 消防措施

FLAMMABLE PROPERTIES: n/a

易燃性：不适用

FLASH POINT: n/a

闪点：不适用

FLASH POINT METHOD: n/a

闪点方式：不适用

UPPER FLAME LIMITE %: n/a

燃烧上限：不适用

LOWER FLAME LIMITE%: n/a

燃烧下限：不适用

OSHA FLAMMABILITY CLASS: n/a

燃烧级别：不适用

EXTINGUISHING MEDIA: Water. CO₂ and dry chemical

灭火介质：水、CO₂ 及干化学品

UNUSUAL FIRE AND EXPLOSION HAZARDS: May give off toxic hydrogen bromide when thermally decomposed.

不正常火灾及爆炸危险：当发生热分解时可能会释放出有毒的液态溴化物。

SPECIAL FIREFIGHTING PRECAUTIONS/INSTRUCTIONS:

Firemen should wear proper protective equipment and positive pressure self-contained breathing apparatus.

特别火灾指导：消防员需身穿保护装置及正压呼吸设施。

6. ACCIDENTAL RELEASE MEASURES: 泄漏应急处理

IN CASE OF SPILL OR OTHER RELEASE (Always wear recommended personal protection equipment)

如有泄漏或其他释放（通常身穿所推荐的保护设施）

Not applicable material is an article.

不适用于固体材料。

Spills and releases may have to be reported to local authorities.

有关泄漏应报告当地政府。

7. HANDLING AND STORAGE: 仓储指南

General Handling 常规处理：

Avoid contact with eye 避免眼睛接触

Keep away from heat and flame and sun-light 远离热源、明火和直射阳光

Wash through after handling 处理完后彻底冲洗

Stored in dark and cool place 避光、阴凉的环境下储存

8. EXPOSURE CONTROLS/PERSONAL PROTECTION 接触控制/个人防护

ENGINEERING CONTROLS: Use local exhaust ventilation to control dust

工程控制：使用当地除尘通风设施

PERSONAL PROTECTIVE EQUIPMENT: 个人防护措施：

SKIN PROTECTION: For brief contact to dust no precautions other than clean body-covering clothing should be needed. Use gloves and aprons when prolonged or frequently repeated contact occurs.

皮肤保护：对于短暂的接触粉尘，需要时清洗身体或衣服，无预防措施。

当需要长时间或经常性的接触须戴手套或防护装置。

EYE PROTECTION: Use appropriate eye protection when machining material.

眼睛保护：当使用有关材料时使用眼睛保护装置。

RESPIRATORY PROTECTION: Atmospheric levels of Fibrous glass and Copper Dust should be maintained below exposure guidelines. When respiratory protection is required for certain operation use a NIOSH-approved dust respirator.

呼吸保护：大气中的玻璃纤维必须低于暴露准则，当进行某种操作时使用规范的粉尘防毒面罩。

ADDITIONAL RECOMMENDATIONS:N/A 其他建议：不适用

EXPOSURE GUIDELINES:暴露准则：

Ingredient Name	CAS#	ACGIH TLV	OSHA PEL	Other Limit
Copper Dust	(7440-50-8)	1 mg/m3	1 mg/m3	N/A
Fibrous Glass Dust	(65997-17-3)	10mg/m3	None	

9. PHYSICAL AND CHEMICAL PROPERTIES 物理化学性能

APPEARANCE: Yellow or white to amber sheets

外观：黄色或白色

PHYSICAL STATE: solid

物理形态：固态

BOILING POINT : n/a

沸点：不适用

FLASH POINT : n/a

闪点：不适用

MELTING POINT: 120-260 F

熔点：120-160F

SPECIFIC GRAVITY : >1.5

比重：>1.5

PERCENT VOLATILE (PREPREG) : <4%

挥发份（半固化片）：<4%挥发

(LAMINATE): <0.5%

层压板：<0.5%

VAPOR DENSITY (Air=1) : n/a

蒸气密度（空气=1）：不适用

VAPOR PRESSURE : n/a

蒸气压力：不适用

ODOR: None unless heated

SOLUBILITY IN WATER: Negligible in water

水溶性：在水中可忽略

10. STABILITY AND REACTIVITY 稳定性及反应性

NORMALLY STABLE: Stable 通常稳定

HAZARDOUS DECOMPOSITION PRODUCTS:CO CO2 HBr Oxides of nitrogen

heated in excess of 300deg.C.Laser

drilling or cutting may result in copper

metal fume.

危险的腐化产品：CO CO2 HBr Nox 当加热超过 300℃时，打孔或切割时会产生铜金属烟尘。

HAZARDOUS POLYMERIZATION? None 危险聚合物？无

11. TOXICOLOGICAL INFORMATION 毒物学的资料

IMMEDIATE (ACUTE) EFFECTS: Dust may cause moderate eye skin and respiratory irritation.

敏感反应：粉尘将导致眼睛、皮肤中度过敏。

DELAYED EFFECTS: Our product is reinforced with continuous filament fiberglass. Dust generated from the cutting grinding machining etc. would not

expected to produce respirable particles. IARC considers continuous glass filaments as unclassifiable or probably non-carcinogenic.

慢性反应：我们的产品是连续的玻璃纤维丝加强产品。当切割、研磨、制造时通常不会产生吸入性颗粒。IARC 组织认为连续型玻璃纤维丝不会致癌。

12. ECOLOGICAL INFORMATION 生态学资料

Date not yet available. 暂无参考数据

13. DISPOSAL CONSIDERATIONS:废弃处理

Disposal must be made in accordance with all applicable local regulations .Copper should be recycled.处置时必须遵循当地的法律法规，铜箔是可以再利用的。

14. TRANSPORT INFORMATION:运输信息

Special transport and attention: None
无须特殊的运输方式。

15. ADDITIONAL REGULATORY INFORMATION:附加法规资料

SHANGHAI GLOBAL ELECTRONIC MATERIAL LTD. Does not use polybromide - biphenyls or polybromide-biphenyloxides as a fire retardant in any of our epoxy resin systems., and meet ROHS requirement.

上海国纪电子材料有限公司在产品的环氧树脂体系当中没有采用多溴联苯或多溴联苯基氧化物作为阻燃剂，符合 ROHS 要求。

16. OTHER INFORMATION:附加信息

Current issue date:1/7/2019 最新修订日期 : 1/7/2019

Previous issue date: 30/12/2018 上一次修订日期: 30/12/2018



Material Safety Data Sheet

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This material safety data sheet (MSDS) is provided as a courtesy in response to a customer request. This product is not regulated under, and a MSDS is not required for this product by the OSHA Hazard Communication Standard (29 CFR 1910.1200) because, when used as recommended or under ordinary conditions, it should not present a health and safety hazard. However, use or processing of the product not in accordance with the product's recommendations or not under ordinary conditions may affect the performance of the product and may present potential health and safety hazards.

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: 3M(TM) Adhesive Transfer Tape 9471LE
MANUFACTURER: 3M
DIVISION: Industrial Adhesives and Tapes Division

ADDRESS: 3M Center
St. Paul, MN 55144-1000

EMERGENCY PHONE: 1-800-364-3577 or (651) 737-6501 (24 hours)

Issue Date: 10/07/2008
Supersedes Date: Initial Issue

Document Group: 25-7074-5

Product Use:

Specific Use: Attachment/Reinforcement
Intended Use: Industrial use

SECTION 2: INGREDIENTS

Ingredient

Acrylate Polymer / Resin Blend
Paper Film, 58# PCK

C.A.S. No.

Trade Secret
Mixture

% by Wt

100
Not Applicable

SECTION 3: HAZARDS IDENTIFICATION

3.1 EMERGENCY OVERVIEW

Specific Physical Form: Roll of Tape

Odor, Color, Grade: Clear Adhesive Transfer Tape, Paper Liner, Sight Acrylate Odor.

General Physical Form: Solid

Immediate health, physical, and environmental hazards:

The environmental properties of this product present a low environmental hazard. This product, when used under reasonable conditions and in accordance with the 3M directions for use, should not present a health hazard. However, use or processing of the product in a manner not in accordance with the product's directions for

use may affect the performance of the product and may present potential health and safety hazards.

3.2 POTENTIAL HEALTH EFFECTS

Eye Contact:

No health effects are expected.

Skin Contact:

No health effects are expected.

Inhalation:

No health effects are expected. This product may have a characteristic odor; however, no adverse health effects are anticipated.

Ingestion:

No health effects are expected.

3.3 POTENTIAL ENVIRONMENTAL EFFECTS

This substance does not leach metals or other RCRA (Resource Conservation and Recovery Act) listed TCLP (Toxic Characteristic Leaching Procedure) hazardous substances at concentrations that would make the product a hazardous waste.

SECTION 4: FIRST AID MEASURES

4.1 FIRST AID PROCEDURES

The following first aid recommendations are based on an assumption that appropriate personal and industrial hygiene practices are followed.

Eye Contact: No need for first aid is anticipated.

Skin Contact: No need for first aid is anticipated.

Inhalation: No need for first aid is anticipated.

If Swallowed: No need for first aid is anticipated.

SECTION 5: FIRE FIGHTING MEASURES

5.1 FLAMMABLE PROPERTIES

Autoignition temperature	<i>Not Applicable</i>
Flash Point	<i>Not Applicable</i>
Flammable Limits - LEL	<i>Not Applicable</i>
Flammable Limits - UEL	<i>Not Applicable</i>

5.2 EXTINGUISHING MEDIA

Use fire extinguishers with class B extinguishing agents (e.g., dry chemical, carbon dioxide).

5.3 PROTECTION OF FIRE FIGHTERS

Special Fire Fighting Procedures: Wear full protective equipment (Bunker Gear) and a self-contained breathing apparatus (SCBA).

Unusual Fire and Explosion Hazards: No unusual fire or explosion hazards are anticipated.

Note: See STABILITY AND REACTIVITY (SECTION 10) for hazardous combustion and thermal decomposition information.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Accidental Release Measures: Not applicable.

SECTION 7: HANDLING AND STORAGE

7.1 HANDLING

This product is considered to be an article which does not release or otherwise result in exposure to a hazardous chemical under normal use conditions.

7.2 STORAGE

Not applicable.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 ENGINEERING CONTROLS

Not applicable.

8.2 PERSONAL PROTECTIVE EQUIPMENT (PPE)

8.2.1 Eye/Face Protection

Avoid eye contact.

8.2.2 Skin Protection

Gloves not normally required. Avoid prolonged or repeated skin contact.

8.2.3 Respiratory Protection

Under normal use conditions, airborne exposures are not expected to be significant enough to require respiratory protection.

8.2.4 Prevention of Swallowing

Not an expected route of exposure.

8.3 EXPOSURE GUIDELINES

None Established

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Specific Physical Form:

Roll of Tape

Odor, Color, Grade:

Clear Adhesive Transfer Tape, Paper Liner, Sight Acrylate Odor.

General Physical Form:	Solid
Autoignition temperature	Not Applicable
Flash Point	Not Applicable
Flammable Limits - LEL	Not Applicable
Flammable Limits - UEL	Not Applicable
Boiling point	Not Applicable
Density	Not Applicable
Vapor Density	Not Applicable
Vapor Pressure	Not Applicable
Specific Gravity	Not Applicable
pH	Not Applicable
Melting point	Not Applicable
Solubility in Water	Nil
Evaporation rate	Not Applicable
Volatile Organic Compounds	Not Applicable
Percent volatile	Not Applicable
VOC Less H2O & Exempt Solvents	Not Applicable
Viscosity	Not Applicable

SECTION 10: STABILITY AND REACTIVITY

Stability: Stable.

Materials and Conditions to Avoid: None known

Hazardous Polymerization: Hazardous polymerization will not occur.

Hazardous Decomposition or By-Products

<u>Substance</u>	<u>Condition</u>
Hydrocarbons	At Elevated Temperatures
Carbon monoxide	At Elevated Temperatures
Carbon dioxide	At Elevated Temperatures

Hazardous Decomposition: Under recommended usage conditions, hazardous decomposition products are not expected. Hazardous decomposition products may occur as a result of oxidation, heating, or reaction with another material.

SECTION 11: TOXICOLOGICAL INFORMATION

Please contact the address listed on the first page of the MSDS for Toxicological Information on this material and/or its components.

SECTION 12: ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION

Not determined.

CHEMICAL FATE INFORMATION

Not determined.

SECTION 13: DISPOSAL CONSIDERATIONS

Waste Disposal Method: Reclaim if feasible. If product can't be reclaimed, dispose of waste product in a sanitary landfill. Alternatively, incinerate the waste product in an industrial, commercial, or municipal incinerator.

Since regulations vary, consult applicable regulations or authorities before disposal.

SECTION 14: TRANSPORT INFORMATION

ID Number(s):

70-0062-4688-1, 70-0062-4689-9, 70-0062-4690-7, 70-0062-4691-5, 70-0062-8757-0, 70-0063-5709-2, 70-0064-3016-2, 70-0064-3077-4, 70-0064-3078-2, 70-0064-3153-3, 70-0064-3300-0, 70-0064-4874-3, 70-0160-9708-4, CT-0607-9919-5, DT-9999-3769-1, FT-5100-6305-8, FT-5100-6306-6, FT-5100-6307-4, GT-5000-1071-2, GT-5000-4209-5, PB-0062-1895-1, RB-0038-6144-7, RT-0008-4157-2, RT-0009-5509-1, WT-6009-0093-8, WT-6009-0098-7, WT-6009-0100-1, WT-6009-0103-5, XA-0020-0316-9, XA-0020-1221-0, XF-0050-0005-4, XI-0038-2312-1, XI-0038-7309-2, XI-0050-0027-2, XN-0050-0240-9, XN-0050-0273-0, XT-0004-6113-4, XT-0005-1815-6, XT-0005-1856-0, XT-0005-1982-4, XT-0005-3452-6, XT-0005-3488-0, XT-0005-3497-1, XT-0005-3775-0, XT-0006-2662-9, XT-0006-2885-6, XT-0006-2886-4, XT-0006-2948-2, XT-0006-2956-5, XT-0011-8930-4, XT-0015-9481-8, XT-0015-9482-6, XT-0016-2000-1, XT-0016-4115-5, XT-0016-4150-2, XT-0016-4151-0, XT-0016-4278-1, XT-0016-4287-2, XT-0016-4575-0, XT-0020-6337-5, XT-0020-6541-2, XT-0020-6892-9, XT-0023-0007-4, XT-0055-1306-1, XT-0055-1794-8, XT-0055-3233-5, XT-0056-1120-4, XT-0062-0617-8, XT-0063-1743-9, XT-0063-2940-0, XT-0063-3177-8, XT-0063-4009-2, XT-0615-1413-6, XT-0615-2076-0, XT-0615-2077-8, XT-0615-2161-0, XT-0615-2193-3, XT-0615-2286-5, XT-0615-2287-3, XT-0615-2397-0, XT-0615-2427-5, XT-0615-2794-8, XT-0615-3044-7, XT-0615-3333-4, XT-0615-3442-3, XT-0615-3537-0, XT-0615-3550-3, XT-0615-3726-9, XT-0615-3737-6, XT-0615-3759-0, XT-0615-4495-0, XT-0615-4536-1, XT-0615-4537-9, XT-0615-4538-7, XT-0615-4654-2, XT-0615-4678-1, XT-0615-4679-9, XT-0615-4680-7, XT-0615-4741-7, XT-0615-4746-6, XT-0615-4747-4, XT-0615-4780-5, XT-0615-4791-2, XT-0615-4906-6, XT-0615-4949-6, XT-0615-4954-6, XT-0615-4961-1, XT-0615-4962-9, XT-0615-4966-0, XT-0615-4970-2, XT-0615-4998-3, XT-0615-5198-9, XT-0615-5199-7, XT-0615-5508-9, XT-0615-5515-4, XT-0615-5516-2, XT-0615-5600-4, XT-0615-5816-6, XT-0615-5838-0, XT-0615-5912-3, XT-0615-6284-6, XT-0615-6415-6, XT-0615-6416-4, XT-0615-6417-2, XT-0615-6501-3, XT-0615-7077-3, XT-0615-7137-5, XT-0615-7558-2, XT-8015-1323-2, XT-8015-1471-9, XT-8015-1512-0, XT-8015-1770-4, XT-8015-1771-2, XT-8015-1775-3, XT-8015-1781-1

Please contact the emergency numbers listed on the first page of the MSDS for Transportation Information for this material.

SECTION 15: REGULATORY INFORMATION

US FEDERAL REGULATIONS

Contact 3M for more information.

311/312 Hazard Categories:

Fire Hazard - No Pressure Hazard - No Reactivity Hazard - No Immediate Hazard - No Delayed Hazard - No

STATE REGULATIONS

Contact 3M for more information.

CHEMICAL INVENTORIES

This product is an article as defined by TSCA regulations, and is exempt from TSCA Inventory listing requirements.

Contact 3M for more information.

INTERNATIONAL REGULATIONS

Contact 3M for more information.

This MSDS has been prepared to meet the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200.

SECTION 16: OTHER INFORMATION

NFPA Hazard Classification

Health: 0 **Flammability:** 1 **Reactivity:** 0 **Special Hazards:** None

National Fire Protection Association (NFPA) hazard ratings are designed for use by emergency response personnel to address the hazards that are presented by short-term, acute exposure to a material under conditions of fire, spill, or similar emergencies. Hazard ratings are primarily based on the inherent physical and toxic properties of the material but also include the toxic properties of combustion or decomposition products that are known to be generated in significant quantities.

Reason for Reissue: The MSDS has been revised because 3M has adopted the 16-section ANSI/ISO format. The potential hazards of the product have not changed. We encourage you to reread the MSDS and review the information.

No revision information is available.

DISCLAIMER: The information in this Material Safety Data Sheet (MSDS) is believed to be correct as of the date issued. 3M MAKES NO WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR COURSE OF PERFORMANCE OR USAGE OF TRADE. User is responsible for determining whether the 3M product is fit for a particular purpose and suitable for user's method of use or application. Given the variety of factors that can affect the use and application of a 3M product, some of which are uniquely within the user's knowledge and control, it is essential that the user evaluate the 3M product to determine whether it is fit for a particular purpose and suitable for user's method of use or application.

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3M MSDSs are available at www.3M.com

江苏广信感光新材料股份有限公司

物质安全资料表(MSDS)

一、物品与厂商资料表

物品名称	KSM-S6189BK31
同义名称	液态感光阻焊油墨
制造商或供应商名称	江苏广信感光新材料股份有限公司
制造商或供应商地址	江阴市青阳镇华澄路 18 号
咨询者姓名	谢志明
紧急联络电话	0510-86590186
传真电话	0510-86915301

二、 分辨识资料

物料主要成分明细：

主要成分名称	CAS.NO	浓度或浓度范围 (成分百分比)
半酯化丙烯酸改性环氧树脂	9003-36-5	40%-60%
光引发剂 ITX	5495-84-1	<10%
高沸点溶剂 (DBE)	95481-62-2	<10%
颜料(炭黑)	1333-86-4	<10%
硫酸钡	7727-43-7	20%-40%
表面助剂 (聚二甲基硅氧烷)	9016-00-6	<10%
无机填料 (二氧化硅)	14464-46-1	<10%
三聚氰胺	108-78-1	<10%
DPM	34590-94-8	<10%
四甲基苯	64742-94-5	<10%
光引发剂 907	71868-10-5	<10%

三、危害辨识资料

最重要的危害效应	会抑制中枢神经系统，吞食或呕吐时可能倒吸肺部。高浓度暴露可能导致意识丧失。
健康危害效应	蒸气释放至大气中会与氢气自由作用而快速分解掉。
环境影响	其蒸气比空气轻，易传播至远处。

物理性及化学性危害	其蒸气比空气轻，易传播至远处。
特殊危害	
主要症状	头痛、呕吐、晕眩、疲劳、食欲不振、皮肤干裂且灼热、红肿、角膜灼热、心率不整、呼吸困难、头晕眼花。

四、紧急措施

不同暴露途径之急救方法：
吸入：1、移除污染源或将患者移至新鲜空气处。 2、立即就医。
皮肤接触：1、以水及肥皂冲洗受污染部位 5 分钟，以上直到污染物除去。
眼睛接触：1、尽快擦掉或吸掉多余的化学品。 2、立即将眼皮撑开，用流动的温水缓和冲洗 15 分钟以上，直到污染物除去。
食入：1、患者即将丧失意识或已无意识或昏迷时，不可喂食任何东西。 2、给患者喝下 240-300 毫升的水以稀释胃中的化合物。 3、若患者有自发性的呕吐时，应使患者身体向前倾以减低吸入的危险，并让其漱口以及反复给水。 4、立即就医。
最重要的症状及危害效应：蒸气会刺激眼睛、粘膜和皮肤；高浓度会引起麻醉。
对急救人员之防护：应穿着 C 级防护装备在安全区实施急救。
对医师之提示：

五、灭火措施

适用灭火剂：化学干粉、高效环保灭火器、水。
灭火时可能遭遇之特殊危害：灭火前先停止泄露，否则空气中有毒气体过高容易危害人体。
特殊灭火程式：退至上风处安全距离地点进行灭火程式。
消防人员之特殊防护设备：空气呼吸器、消防衣、防护手套。

六、泄露处理方法

个人应注意事项：
1、限制人员出入，直至外溢区完全清理干净为止。
2、由受过训练之人员负责清理干净。
3、穿戴适当的个人防护装备。
环境注意事项：将火源存放区隔离，并对泄露区通风换气，立即通知政府职业安全卫生及环保相关单位。
清理方法：

1、不要碰撞触外泄物。 2、避免泄漏物进入下水道或狭窄的空间内。 3、在安全许可的情形下，设法组织或减少溢漏。 4、少量泄露时，用不会和外泄物反应的泥土、沙和类似稳定且不可燃的物质围住泄物。 5、大量泄漏时，联络消防紧急处理单位以及供应商寻求帮助。
--

七、暴露预防措施

处置： 1、使用时注意勿有外力寻致倾斜泄漏。 2、在通风良好的指定场所最小量使用。 3、须备有处理泄漏的紧急应变装置。
储存： 储存于阴凉、干燥、通风良好的地方,低于 25℃存放，远离火源及不相容物质。

八、物理及化学性质

工程控制： 1、使用时，以不产生火花及接地的通风系统并与一般排气系统分开。 2、废气直接排到户外并对不幸保护采取适当措施。 3、在量操作时，使用局部排气和密闭制程。 4、提供充分新鲜空气以补充系统排除之空气。			
控制参数			
八小时时量平均 允许浓度	短时间时量平均 容许浓度	最高容许浓度	生物指标
25ppm（DEAC）	700ppm 以下（DEAC）	50ppm（DEAC）	
个人防护设备： 呼吸防护：700ppm 以下含有机滤毒之呼吸防护具。 未知浓度：正式自揣式呼吸防护具。 手部防护：防渗手套、优质聚乙烯醇、VITON、4H、BARRICADE 为佳。 眼睛防护：防护面罩、化学安全护目镜。 皮肤及身体防护：上述塑胶材质防护衣、连身工作服、工作靴。			
卫生措施： 1、工作后尽快脱掉污染之物，洗净后才可再穿戴或丢弃，且须告知洗衣人员污染物之危害性。 2、工作场所严禁抽烟或饮食。 3、处理此物后彻底洗手。 4、维持作业场所清洁。			

九、物理及化学性质

物质状态：液态	形状：粘稠流体
颜色：黑色	气味：含芳香味
PH 值：6~7	闪火点：130℃；测试方法：开杯
分解温度：300℃；测试方法：开杯	爆炸界限
自燃温度：不自燃	蒸气密度：0.9g/cm ³
蒸气压：0.4mmHg/25℃	溶解度：不溶于水
密度：1.3~1.4(水=1)	粘度(25℃)：170~230PS

十、安定性及反应性

安定性：正常状态下安定
特殊下可能之危害反应：过氧化物、强还原剂、剧烈反应、增加反应剧烈物质。
应避免之状况：泄露、火灾和其他火源。
应避免之物质：1、强氧化剂 2、强还原剂 3、酸卤化合物 4、与水反应剧烈物质。
危害分解物：热分解产生 CO、CO ₂ 、NO、CH ₂ O ₃

十一、毒性资料

急毒性：液体、蒸汽会刺激眼睛物、粘膜和皮肤。
吸入：1、短暂的暴露于 200ppm 浓度会刺激喉咙。 2、暴露于 700ppm 浓会引起恶心呕吐。 3、暴露于高浓度（大约 1000ppm）会引起动作不协调、失去意识、呼吸衰竭甚至死亡。 4、暴露于高浓度会引起肝脏和肾脏损害。
皮肤：1、接触会引起红斑、干燥和脱脂，长期接触引起皮肤炎。 2、蒸汽会刺激皮肤。
眼睛：1、蒸气会造成刺激。 2、其液体对眼睛具且严重刺激。
食入：1、刺激咽食道和胃。 2、大量食入之症状与吸入症状类似。 3、若吸入肺部会引起致命的肺部伤害。
局部效应：500mm/24H（兔子皮肤）造成轻微刺激。 57mm/24H（兔子皮肤）造成中度刺激。
致敏感性：
慢性毒或长期毒生：1、反复或长期暴露可能引起皮肤炎（干燥、龟裂）。 2、肝脏和肾脏损害。
特殊反应：

十二：生态资料

可能之环境影响/环境流布

- 1、释放至大气中会与氢气自由反应而快速分解掉。
- 2、释放至水中最主要由蒸汽作用排除掉。
- 3、释放至土壤中会挥发及渗入地下。

十三、废气处置方法

废气处置方法：

- 1、参考相关法规处理。
- 2、依照仓储条件待处理的废弃物。
- 3、可采用特定的化学物品掩埋法处理。

十四、运送资料

国际运送规定：

联合国编号：

国内运送规定：1、道路交通安全规则第 84 条
2、船舶危险品装载规则
3、铁路局危险品装卸运输实施细则

特殊运送方法及注意事项：

十五、法规资料

通用法规：

劳工安全卫生设施原则。

有机溶剂中毒预防规则。

道路交通安全规则。

危险及有害物通识规则。

劳工作业环境空气中有害物质容许浓度标准。

事业废弃物贮存处理方法设施标准。

十六、其他资料

生效日期：2017 年 09 月 22 日

修订部门：品质部

变更 MSDS 原因：重新修订是由于相关的要求所致。

江阴凯博通信科技有限公司
JIANGYIN KAIBO COMMUNICATION TECHNOLOGY CO., LTD.
Material Safety Data Sheet (物质安全资料表)

一、 物品与厂商资料

物品名称：同轴高频线

物品编号：RF081 系列

制造商或供货商名称、地址：江阴市凯博通信科技有限公司/江苏省江阴市澄江镇梅园大街 391 号

紧急联络电话/传真电话：0510-86070001/86070020

二、 成分辨识资料

纯物质：

中英文名称：聚全氟乙丙烯 FLUORINATED PROPYLENE ETHYLENE/镀锡线 TINNED COPPER/镀银铜线
Cu-silver plated 同义名称：FEP/TX/SC

危害物质成分(成分百分比)：无

危害物质：

危害物质	浓度或浓度范围（单位：ppm）	
铅及其化合物 Pb	≤90	
镉及其化合物 Cd	≤75	
汞及其化合物 Hg	≤1000	
六价铬及化合物	≤1000	
卤素	氯 Cl≤900	氯 Cl+溴 Br≤1500
	溴 Br≤900	
SVHC15 种物质	禁止使用	

三、 危害辨识数据

最 重 要 危 害 效 应	健康危害效应：在 260℃ 以上，可能会有吸入分解气体的危险. 一定要安装排气装置.
	环境影响：要按废弃物处理及清扫法律法规处理, 绝对不可燃烧.
	物理性及化学性危害：物理化学性能及其稳定, 不易降解, 不得擅自填埋 .
	特殊危害： 无
主要症状： 对人的神经系统产生损害	
物品危害分类：大气和水源	

四、 急救措施

不同暴露途径之急救方法：
· 吸入：到空气流通处换气.
· 皮肤接触：无
· 眼睛接触：无
· 食入： 不消化, 排出.
最重要症状及危害效应：无

对急救人员之防护：对流换气
对医师之提示：吸氧

五、灭火措施

适用灭火剂：通用
灭火时可能遭遇之特殊危害：避免分解气体吸入
特殊灭火程序：无
消防人员之特殊防护设备：防毒面罩

六、泄漏处理方法

个人应注意事项：粉状树脂
环境注意事项：不可填埋
清理方法：要按废弃物处理及清扫法律法规处理, 绝对不可燃烧.

七、安全处置与储存方法

处置：避免与高温和火源接触.
储存：通风干燥处.

八、暴露预防措施

工程控制：无
控制参数： · 八小时日时量平均容许浓度/短时间时量平均容许浓度/最高容许浓度： · 生物指标：
个人防护设备： · 呼吸防护：安装排气装置 · 手部防护：无 · 眼睛防护：无 · 皮肤及身体防护：无
卫生措施：应将衣服上附着的灰尘抖落, 手脸洗净, 不要让其附着于香烟上.

九、物理及化学性质

物质状态：固体	形状：透明颗粒
颜色：透明	气味：无
pH 值：7	沸点/沸点范围：/
分解温度：360°C	闪火点：/
自燃温度：/	爆炸界限：/
蒸气压：/	蒸气密度：/
密度：2.2	溶解度：/

十、安定性及反应性

安定性：很稳定
特殊状况下可能之危害反应：高温或燃烧分解气体对人体神经系统的损害.
应避免之状况：绝对不可燃烧.
应避免之物质：金属钠及其强酸的混合物 .

危害分解物： 气体及粉尘.

十一、毒性资料

急毒性： /
局部效应： /
致敏感性： /
慢毒性或长期毒性： /
特殊效应： /

十二、生态资料

可能之环境影响/环境流布： 不降解, 禁填埋

十三、废弃处置方法

废弃处置方法： 按废弃物处理及清扫法律法规要求送专业资质处理公司处置.

十四、运送资料

国际运送规定： /
联合国编号： /
国内运送规定： 无
特殊运送方法及注意事项： 无

十五、法规资料

适用法规： 遵循欧盟 REACH 法规相关要求。

十六、其它数据

参考文献	杜邦产品说明/SONY 限用物资标准
制窗体位	名称： 江阴凯博通信科技有限公司
	地址/电话： 江阴市澄江街道梅园大街 391 号/0510-86070017
制 表 人	姓名(签章)： 庄科洁
制表日期	2012/11/12

MATERIAL SAFETY DATA SHEET (MSDS)

Issued: Dec 20, 2007
Revised: Dec 20, 2007

File No. 2302

1. CHEMICAL PRODUCT & COMPANY IDENTIFICATION

CHEMICAL PRODUCT NAME : DURANEX XFR4840
NAME OF COMPANY : WinTech Polymer Ltd.
SECTION IN CHARGE : Quality Assurance Dept.
ADDRESS : 2-18-1 Konan, Minato-ku, Tokyo, 108-8280 Japan
TELEPHONE NUMBER : 03-6711-8605
FACSIMILE NUMBER : 03-6711-8616

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE/PREPARATION : Preparation
COMMON CHEMICAL NAME : Polybutyleneterephthalate
SYNONYMS : Polybutyleneterephthalate(PBT)
INGREDIENTS AND COMPOSITION : PBT $\geq 80\%$, Phosphorus Flame retardant and others $\leq 20\%$
CHEMICAL FORMULA : $\{ \text{C}_6\text{H}_4 - \text{C}(=\text{O}) - \text{O} - \text{C}_4\text{H}_8 - \text{O} - \text{C}(=\text{O}) - \text{C}_6\text{H}_4 - \text{C}(=\text{O}) - \text{O} \}_n$
SERIAL No IN OFFICIAL GAZETTE : 7-1039 (base resin)
(Law Concerning Examination and Regulation of Manufacture, etc., of Chemical Substances)
CAS No : 2 4 9 6 8 - 1 2 - 5 (base resin)

3. HAZARDS IDENTIFICATION

PHYSICAL AND CHEMICAL HAZARDS : Not applicable
HUMAN HEALTH EFFECTS : Not applicable
ENVIRONMENTAL EFFECTS : Not applicable
PHYSICAL AND CHEMICAL HAZARDS : It is inflammable substance and combustible if an igniting source is existent. Neither dangerous reaction, fire nor explosion can be caused under normal conditions.
THE CLASSIFICATION : Not applicable

4. FIRST-AID MEASURES

INGESTION : Help to vomit as much as possible. If sick feeling continues, ask a physician for advice.
INHALATION : When a gas generated from the molten polymer, especially fume generated during combustion or heat, has been inhaled, remove fresh air without delay and wait until the victim is recovered. If sick feeling continues, ask a physician for advice.
SKIN CONTACT : Cool the contacted skin with clean water without delay, if a contact with the polymer in a molten form. Do not force to remove the solid resin on the skin. If any burns are observed on the skin, ask a physician for advice.

EYE CONTACT : Cool and rinse the eye with clean water for at least 15 minutes when the eyes had contact with molten polymer. In case of wearing contact lenses,remove the lenses as soon as possible,and ask a physician for advice. When the eye had contact with the polymer in an ordinary solid form,rinse the eye with clean water without delay. If the discomfort persists,ask a physician for advice.

5. FIRE-FIGHTING MEASURES

EXTINGUISHING MEDIA : Water,form fire-extinguishing agent,powder fire-extinguishing agent,and carbon dioxide gas.

SPECIFIC METHODS : Extinguish the fire with water. A method of extinguishing an ordinary fire may be applied. Do not apply water directly to processing machines.

SPECIFIC HAZARDS : Incomplete combustion leads to generation of toxic gases such as carbon monoxide or tetrahydrofuran,in addition to carbonic acid gas and water.

SPECIAL EQUIPMENT FOR THE PROTECTION OF FIREFIGHTERS : In case the fire gained force,use a gas mask or other protective equipment.

6. ACCIDENTAL LEAKAGE MEASURES

PERSONAL PRECAUTIONS : When pellets were spilled on the road or floor,wipe them off with a besom or cleaner not to cause slipping.

ENVIRONMENTAL PRECAUTION : Handle the spillage in accordance with provisions given in the "Resin pellet spillage preventive manual",in order to prevent intakes by marine animals and birds.

7. HANDLING AND STORAGE

HANDLING : This resin in a pellet form will neither ignite nor explode at room temperatures.

HANDLING 2 : For molding work,effective means for local exhaust are required to discharge gases generated by melt processing.

HANDLING 3 : Avoid inhaling of gases generated in moulding work. Do not directly touch resin of high temperature.

HANDLING 4 : Avoid retaining hot resin in the processing machines for many hours.

HANDLING 5 : This pellets spilled on the floor are likely to cause slipping. Remove such spillage at any times.

STORAGE : Keep the substance away from any fire or heat sources for the sake of safe storage.

RECOMMENDED PACKAGING MATERIALS : No information.

8. EXPOSURE CONTROL / PERSONAL PROTECTION

CONTROL CONCENTRATION : None at present

PERMISSIBLE CONCENTRATION : OSHA PEL/1985
Max. permissible concentration of inactive powder 15mg/m³
- ditto - (Aspiration) 5 mg/m³
ACGIH TLV/1992 1993
Exposure limit of the powder TWA 10 mg/m³

ENGINEERING MEASURE : When handling dust: Use totally enclosed containers resisting dust explosion.
When heat melted in molding: Effective local ventilation must be provided.

PERSONAL PROTECTIVE EQUIPMENT	:	
RESPIRATORY PROTECTION	:	Wear a dust-proof mask.
EYE PROTECTION	:	Wear protective glasses or goggles.
HAND PROTECTION	:	Wear heat-resisting gloves against burns, when handling molten polymer.
SKIN & BODY PROTECTION	:	Wear long sleeve clothes against burns, when handling molten polymer.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE etc.	:	Pellet
BOILING POINT	:	Not applicable
VAPOUR PRESSURE	:	Not applicable
VOLATILITY	:	Not applicable
SUBLIMATION	:	None
MELTING POINT	:	228°C
DENSITY	:	1.32g/cm ³
SOLUBILITY	:	Insoluble in water
FLASH POINT	:	300°C or higher
IGNITION POINT	:	300°C or higher
EXPLOSION PROPERTY	:	Not applicable
INFLAMMABILITY	:	None
REACTIVITY WITH WATER	:	None
OXIDIZABILITY	:	None
SELF-REACTIVITY	:	None
DUST EXPLOSIVENESS	:	Upper explosion limit : Not applicable. Lower explosion limit : 35g/m ³

10. STABILITY AND REACTIVITY

STABILITY AND REACTIVITY	:	Stable for normal storage or handling.
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11. TOXICOLOGICAL INFORMATION

SKIN CORROSIVE PROPERTIES	:	No finding.
SENSITIZING & IRRITANT EFFECTS	:	Gas generated in drying or melting is irritating eyes and skins.
ACUTE TOXICITY(INCLUDING LD50)	:	No finding.
SUBACUTE TOXICITY	:	No finding.
CHRONIC TOXICITY	:	No finding.

CARCINOGENECITY : No finding.

MUTAGENECITY(Microorganisms,chromosomal aberration) : No finding.

REPRODUCTIVE TOXICITY : No finding.

TERATOGENICITY : No finding.

OTHERS(Including generation of hazardous gases by reaction with water,for example) : No finding in this report means that there will be no hazard in general,but no proving data available at the time of reporting.

OTHER CAUTIONS : With regard to dust,the maximum permissible concentration and limits are fixed by OSHA and ACGIH.

12. ECOLOGICAL INFORMATION

BIODEGRADABILITY : No finding.

BIOACCUMULATION : No finding.

FISH TOXICITY : No finding.

13. DISPOSAL CONSIDERATION

WASTE FROM RESIDUES : This is designated as waste plastics among industrial wastes by the Wastes Disposal Law. Disposal waste pellets through licensed wastes handlers or local autonomous bodies if they are handling wastes disposal.

WASTE FROM RESIDUES 2 : When disposed by incineration,use the well controlled incinerators in accordance with the Wastes Disposal Law,Air Pollution Control Law and Water Pollution Prevention Law.

14. TRANSPORT CONSIDERATION

UN CLASSIFICATION NUMBER : Not applicable

OTHER CAUTIONS : Handle with care so as not to give damages to containers or not to be subjected to wetting.

OTHER CAUTIONS 2 : Secure the containers firmly so as not to cause collapsing.

15. REGULATORY INFORMATION

WASTE DISPOSAL LAW : Waste plastics among industrial wastes.

16. OTHER INFORMATION

HANDLING OF THE DETAILS GIVEN ABOVE : This MSDS is the English version translated from the Japanese MSDS which is prepared for domestic use.
Details given above are based on references, information and data available at this moment, but no warranty can be made on exactness of these details. They are also prepared on the assumption that the product will be handled in a normal way. For special handling, adequate safety and environmental measures should be taken in respect to its applications. Our products are not specifically intended for implants for medical and dental applications, and therefore they are not recommended for such applications.
"No finding" in this report means that there will be no hazard in general, but no proving data is available at the time of reporting.

WHERE TO CALL : WinTech Polymer Ltd. Quality Assurance Dept.
FOR FURTHER Tel. No 03-6711-8605
INFORMATION

MATERIAL SAFETY DATA SHEET

MSDS FILE No. (KURAMI WORKS) : 05-1225

(based on Form OSHA-174)

IDENTITY (AS Used on Label and List)

Product Class : Phosphor Bronze Strip
 Trade Name : JIS H3130 C5210R (Equivalent to ASTM B103 C52100)
 CAS No. : Copper: 7440-50-8, Tin: 7440-31-5, Phosphor: 7723-14-0
 Chemical Composition

	Content (wt-%)	CAS No.
Tin (Sn)	7. 0~9. 0	7440-31-5
Phosphor (P)	0. 03~0. 35	7723-14-0
Copper (Cu)	Balance	7440-50-8
Sn+P+Cu	99. 7 ≤	-

Section I

Manufacturer's Name NIKKO METAL MANUFACTURING CO., LTD. KURAMI WORKS	Date Prepared May 24th, 2005
Address 3 Kurami Samukawa-cho Kouza-gun Kanagawa prefecture 253-0101 JAPAN	Signature of Person in Charge <i>Chihiro Izumi</i> IZUMI, Chihiro Senior Technical Supervisor, Quality Assurance
Telephone Number for Information (Quality Assurance) +81-467-75-7285	Signature of Person Responsible <i>Hiroaki Watanabe</i> WATANABE, Hiroaki Manager, Quality Assurance Section
Facsimile Number for Information (Quality Assurance) +81-467-74-6971	

Section II Hazardous Ingredients / Identity Information

Hazardous Components (Specific Chemical Identity : Names OSHA PeI ACGIH TLV)

Nothing for ordinary service condition

Section III Physical / Chemical Characteristics

Boiling Point	2630 °C for Copper 2275 °C for Tin	Specific Gravity (H2O = 1) 8.80
Vapor Pressure (mmHg)	N/A	Melting Point 1025 deg. centi. for C5210 Phosphor Bronze
Vapor Density (Air = 1)	N/A	Evaporation Rate (Butyl Acetate = 1) N/A
Solubility in Water	N/A	
Appearance and Odor	Brown - Red (solid) : Odor - None	

Section IV Fire and Explosion Hazard Data

Flash Point (Method Used) N/A	Flammable Limits N/A	LEL N/A	UEL N/A
Extinguishing Media N/A (stable , nonflammable substance)			
Special Fire Fighting Procedures Not specified			
Unusual Fire and Explosion Hazards Metal products do not present fire or explosion hazards under normal conditions.			

Section V Reactivity Data			
Stability	Unstable		Conditions to Avoid
	Stable	X	
Incompatibility (Materials to Avoid)			
Nothing			
Hazardous Decomposition or Byproducts			
Nothing			
Hazardous Polymerization	May Occur		Conditions to Avoid
	Will Not Occur	X	
Section VI Health Hazard Data			
Route(s) of Entry :	Inhalation ?	Skin ?	Ingestion ?
	N/A	N/A	N/A
Health Hazardous (Acute and Chronic)			
N/A			
Carcinogenicity :	NTP ?	IARC Monographs ?	OSHA Regulated ?
	N/A	N/A	N/A
Signs and Symptoms of Exposure			
N/A			
Medical Conditions			
Generally Aggravated by Exposure N/A			
Emergency and First Aid Procedures			
N/A			
Section VII Precautions for State Handling and Use			
Steps to Be Taken in Case Material Is Released or Spilled			
N/A			
Waste Disposal Method			
Collect scrap for remelting.			
Precautions to Be Taken in Handling and storing			
<u>For Handling</u>			
- Put safety gloves on to protect your hands from edges of coils which might cut your hands. - Wear safety glasses when metal powders or chips are expected to be generated in the work. - Put safety shoes on when handling heavy coils.			
<u>For Storing</u>			
The environment of stocking area should be free from acid, alkali, chloride, sulfide and other corrosive chemicals to prevent from rusting or corrosion.			
Other Precautions			
No special requirements			
Section VIII Control Measures			
Respiratory Protection (Specify Type)			
Wearing a mask be recommended in the work such as abrasion and buffing which generates metal powders or chips.			
Ventilation	Local Exhaust	Special	
	None	None	
	Mechanical (General)	Other	
	None	None	
Protective Gloves			
Put safety gloves on to protect your hands from edges of coils which might cut your hands.			
Eye Protection			
Wear safety glasses when metal powder is expected to be generated in the work.			
Other Protective Clothing or Equipment			
Put safety shoes on when handling heavy coils.			
Work / Hygienic Practices			
None			
Influence to environments	Fish on toxicity : TLm 48 hr. on CuSO4 Salmogairdeneri : 0.038 ~ 0.8 ppm Oryzias Latipes : 2.1 ~ 24ppm		

Material Safety Data Sheet

1. Manufacturer

- Company HARADA Metal Industry Co., Ltd.
- Address 10-18 Sasamekitamati, Toda, Saitama 335-0033, Japan
TEL 048-422-1588
FAX 048-449-6303
- Counter The domestic business department business primary and second section
TEL 048-441-5115
FAX 048-444-9104
The domestic business department OSAKA service office
TEL 06-531-8094
FAX 06-531-8096
The domestic business department NAGOYA service office
TEL 052-821-9778
FAX 052-822-7500
The overseas business department export section
TEL 048-441-5115
FAX 048-444-9104
- Urgent place to contact
The quality assurance department
TEL 048-422-1588
FAX 048-449-6303

2. Products

- Phosphor bronze plates and strips for springs
- Phosphor bronze plates and strips

3. Specification of the material

- The division of mixture or single product : Single product
- The chemical name : Copper alloy
- Chemical composition and content rate(wt.%)

Element	Percent					CAS No.
	C5210	C5212	C5191	C5102	C5111	
Copper	rem.	rem.	rem.	rem.	rem.	7440-50-8
Tin	7.0~9.0	7.0~9.0	5.5~7.0	4.5~5.5	3.5~4.5	7440-31-5
Phosphorus	0.03~0.35	0.03~0.35	0.03~0.35	0.03~0.35	0.03~0.35	7723-14-0
Lead	0.05 max	0.05 max	0.05 max	0.05 max	0.05 max	7439-92-1
Iron	0.1 max	0.1 max	0.1 max	0.1 max	0.1 max	7439-89-6
Zinc	0.2 max	0.2 max	0.2 max	0.2 max	0.2 max	7440-66-6

4. Classification of harmfulness

- The name of classification : Not classified into the dangerous harmfulness material.
- The danger : No knowledge
- The harmfulness : No knowledge
- The effect for the environment : No knowledge

5. First aid

- Eyes : Flush the water. Consult the doctor, when the simulation of the eye continues.
- Skin : Flush the water.
- Inhalation : Consult the doctor, when it was large inhaled.

6. The treatment in the fire

- Nonflammable.

7. Leakage

- Not applied (because of solid)

8. Attention in handling and storage

- Stored at the ordinary—temperature and usual humidity.
- Prohibition of the rapid temperature and humidity change.

9. Treatment on the exposure prevention

- Standard control concentration : Not regulated.
- Allowable temperature : Not regulated.
- Facility countermeasure : The whole ventilation is desirable.
- Protector : For lung ,the wear of protection mask is desirable for the power handling.
For hand ,the wear of protective glove is desirable.
For eyes ,the wear of safety goggles is desirable for the power handling.
For body , the wear of protective clothing is desirable.

10. Physical and chemical characteristic

- Appearance and smell : The solid with the metallic luster. Odoless.
- Boiling point : The indistinctness.
- Solubility : Dissolves in the inorganic acid.

	C5210	C5212	C5191	C5102	C5111
Specific gravity	8.82	8.82	8.85	8.88	8.90
Melting point	1020°C	1020°C	1045°C	1050°C	1060°C

11. Information for danger

- Fire point : The indistinctness.
- Stability : Show the stability at room temperature and in the air.
- The situation to be avoided : —

12. Information for harmfulness

- The powder stimulates eyes , skin and bronchi.
- Produce the ulcer and the hepatic disorder rarely.

13. Information for environment

- No knowledge.

14. Attention for scrapping

- Possible to deal with ,as an industrial waste.

15. Attention for transportation

- No damage transportation is desirable.

16. Applying act

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