



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 2018/09/11
Date

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File No

版本 1.0
Revision

客户 潜行科技

CUSTOMER: _____

客户料号 中继器

CUSTOMER NO: _____

品名 WIFI Antenna L=80mm MHF

PART NAME: _____

供方料号 YJ084L.300001.L01

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

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承认书项目表

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10	N/A	N/A	N/A
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RoHS
Compatible

CUSTOMER
PART NO

REV.

DESCRIPTION

DATE

A

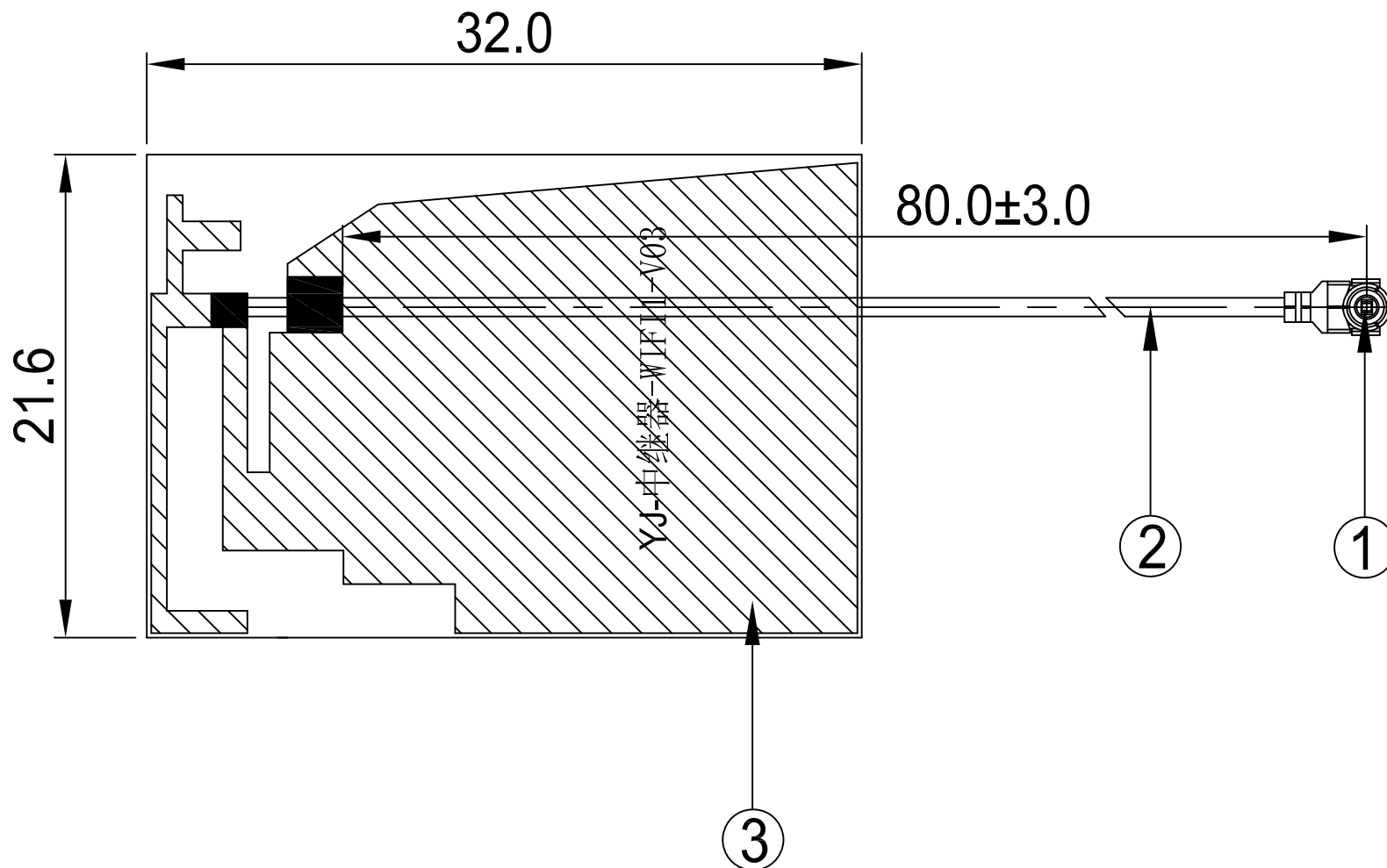
首次发行

2018.09.11

B

更改线长

2018.09.29



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 Antenna L=80mm MHF

PART NO.: YJ084L.300001.L01

DATE: 2018-09-29

APPROVED BY

CHECKED BY

DESIGNED BY



Tolerance
X.X ±0.50
X.XX±0.15
X° ±3°

陈国强

文雪

汪婷

UNITS: mm

SCALE: 1/1

REVISION: A

3	FPCB	32.0*21.6MM	FPCB	FPC100XXA.P01	1
2	Coaxial Cable	O.D.1.13 Black	O.D.1.13	COA100XXA.P01	1
1	Mini Connector	Au Plated 1代	Cu	TER10001A.P01	1
NO	PART NAME	DESCRIPTION	Material	Part Number	Q.TY



天线规格

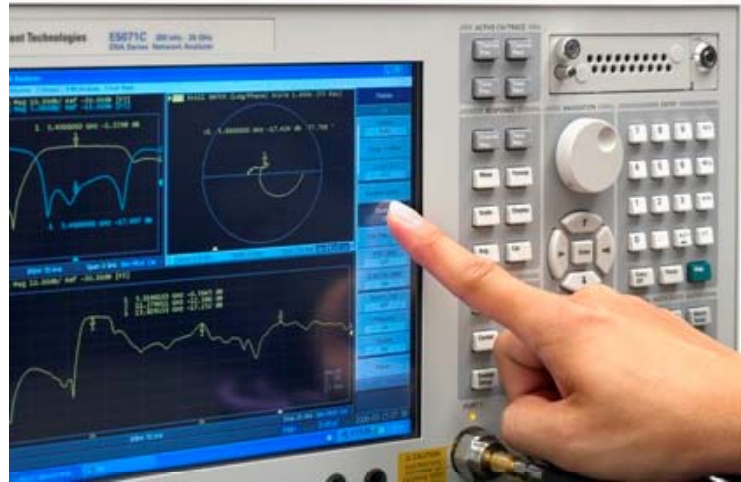
Antenna Specification

Electrical Properties	
Frequency	2.4-2.5GHz 5.15-5.85GHz
Impedance	50 Ohm Nominal
V.S.W.R	See Page 5
Return Loss	See Page 5
Radiation	Omni-directional
Gain (Peak)	See Page 7 ~ 8
Polarization	Linear
Connector	1代IPEX
Physical Properties	
Antenna Material	FPC
Cable Type	O.D.1.13mm//L=80mm
Operating Temp.	-10 ~ +60 °C
Storage Temp.	-10 ~ +70 °C
Cable Color	Black

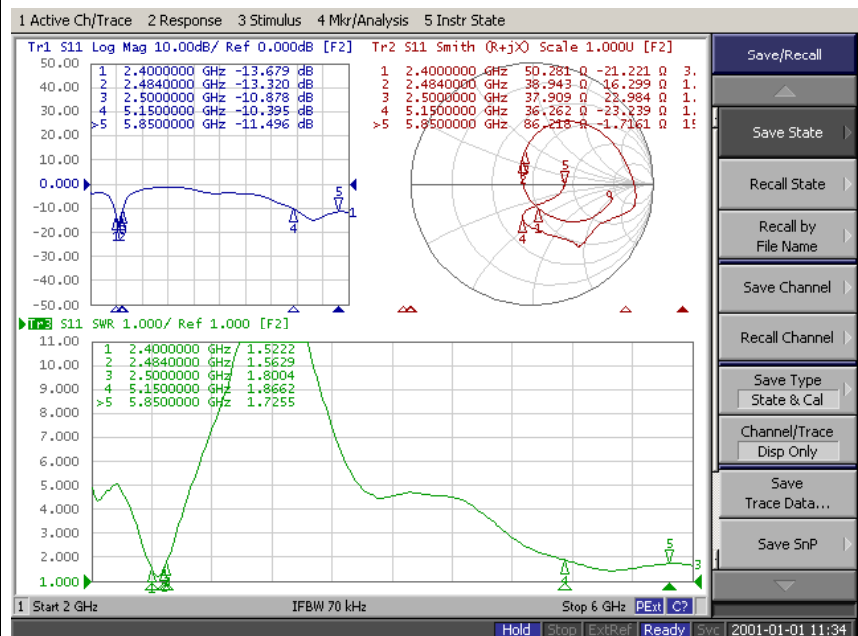


Antenna Performance Test

**Agilent
E5071B**



**S
Parameter
Test //
WiFi 1**





Antenna Passive Test





Passive Test For WiFi1 (2.4G)

Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)
2400	45.0	-3.5	0.6
2410	45.6	-3.4	0.5
2420	46.1	-3.4	0.5
2430	47.5	-3.2	0.6
2440	48.3	-3.2	0.8
2450	50.2	-3.0	0.9
2460	50.5	-3.0	1.1
2470	51.9	-2.9	1.4
2480	53.3	-2.7	1.6
2490	54.1	-2.7	1.7
2500	53.5	-2.7	1.8



Passive Test For WiFi1 (5.8G)

Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)
5150	53.8	-2.7	5.9
5200	54.5	-2.6	5.8
5250	49.0	-3.1	5.2
5300	47.6	-3.2	5.1
5350	48.2	-3.2	5.3
5400	50.5	-3.0	5.7
5450	46.8	-3.3	5.8
5500	41.7	-3.8	5.2
5550	41.7	-3.8	5.1
5600	41.6	-3.8	4.7
5650	42.0	-3.8	4.6
5700	37.7	-4.2	3.8
5750	40.0	-4.0	3.8
5800	44.4	-3.5	4.4
5850	47.5	-3.2	4.8

4. MSDS

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：KB113 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/镀银铜线 Cu-silver plated/镀锡线 TINNED COPPER

同义名称：FEP/SC/TX

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℃	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	2011/11/3

物質安全資料表

一、物品與廠商資料

物品名稱 :KTM-303F BKM1/HD-303F-B

其它名稱：

建議用途: 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：



易燃液體第 3 級、皮膚腐蝕/刺激、造成嚴重眼睛損傷、可能造成皮膚過敏、吸入性危害物質第 1 級、特定標的器官系統毒性物質－重複暴露第 2 級長期或重複暴露可能對器官造成傷害、危害水生環境

標示內容：乙基二乙二醇乙酸酯、甲基二丙二醇醚、

象 徵 符 號：易燃液體、健康危害

警 示 語：危險

危害警告訊息：易燃液體和蒸氣；長期或重複暴露可能會對器官造成傷害； 對水生生物有害

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

KTM-303F BKM1 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.
環氧樹脂	32 %	未公開
填充料	38 %	13463-67-7
黑色顏料	15 %	1333-86-4
添加劑	5 %	未公開
甲基二丙二醇醚	10 %	34590-94-8
合計	100%	
HD-303F-B 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.
壓克力樹脂	52 %	未公開
添加劑	6 %	未公開

乙基乙二醇乙酸酯	24%	112-15-2
甲基二丙二醇醚	18%	34590-94-8
合計	100%	

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。2.若呼吸停止施予人工呼吸，若心跳停止，則施予心肺復甦術。
3.立即就醫。

皮膚接觸：1.立即用溫水緩和沖洗 10 分鐘以上。 2.在沖水中脫掉污染衣物，鞋子及皮飾品〔如：錶帶、皮帶〕。
3.若有刺激感反覆沖洗。

眼睛接觸：1.立即將眼皮撐開，用緩和的溫水沖洗。 2.勿讓沖洗過的污水污染其他部位。 3.立即就醫。

食入：1.若患已喪失意識或痙攣，勿餵食。 2.用水徹底清洗口腔，勿催吐。3.給患者喝 240~300ML 水以稀釋胃中物質。4.若患者自發性嘔吐，令其漱口並反覆給水。5.立即就醫。

最重要症狀：會抑制神經系統、頭痛、嘔心，甚至失去意識。

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：患者吞食時，考慮洗胃及通便。

五、滅火措施

適用滅火劑：

二氧化碳，化學乾粉，乾砂泡沫材料。

滅火時可能遭遇之特殊危害：

1.易燃，室溫下易引燃。2.蒸氣比空氣重，會傳播致遠處，遇火源可能造成回火。3.火場中可能釋出毒性氣體。4.可能蓄積於密閉空間，造成毒性及易燃性的危害。5.濃的水溶液亦可燃。6.密閉容器加熱可能劇烈爆炸。

特殊滅火程序：

1. 將容器運離火場並於上風處滅火。2.在不為及人員安全下，先止漏，因其蒸氣可與空氣混合而在引燃。
3.若無法止漏且周圍空曠，責任火燒盡。4.不宜用水霧滅火，但可噴水霧以冷卻暴露於火焰之容器外側，並驅散或稀釋其蒸氣。5.物料儲存區發生大火，應使用無人控制之水帶控制架或自動搖擺消防水瞄以水灌救。

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

處置：

1. 此物質是易燃性液體，處置時工程控制應運轉及善用個人防護設備；工作人員應受適當有關物質之危險性及安全使用法之訓練。
- 2.除去所有發火源並遠離熱及不相容物。
- 3.工作區應有"禁止抽煙"標誌。
- 4.液體會累積電荷，考慮額外之設計以增加電導性。如所有桶槽、轉裝容器和管線都要接地，接地時必須接觸到裸金屬，輸送操作中，應降低流速，增加液體留在管線中之時間或低溫操作。
- 5.當調配之操作不是在密閉系統進行時，確保調配的容器和接收的輸送設備和容器要等電位連接。
- 6.空的桶槽、容器和管線可能仍具危害性的殘留物，未清理前不得從事任何焊接、切割、鑽孔或其他熱的工作進行。
- 7.桶槽或儲存容器可填充惰性氣體以減少火災和爆炸的危險。
- 8.作業場所使用不產生火花的通風系統，設備應為防暴型。
- 9.保持走道和出口暢通無阻。
- 10.儲存區和大量操作的區域，考慮安裝溢漏和火災偵測系統及適當的自動消防系統或足夠的緊急處理裝備。
- 11.作業避免產生霧滴或蒸氣，在通風良好的指定區內操作並採最小使用量，操作區與儲存區分開。
- 12.必要時穿戴適當的個人防護設備以避免與此化學品或受污染的設備接觸。
- 13.不要與相容物一起使用〔如強氧化劑〕以免增加火災和爆炸的危險。
- 14.使用相容物質製成的儲存容器，分裝時小心不要噴灑出來。
- 15.不要以空氣或惰性氣體將液體自容器中加壓而輸送出來。
- 16.除非調配區以耐火結構隔離，否則不要在儲存區進行調配工作。
- 17.使用經認可的易燃性液體儲存容器和調配設備。
- 18.不要將受污染的液體倒回原儲存容器。
- 19.容器要標示，不使用時保持緊密並避免受損。
- 20.儲存在陰涼、乾燥、通風良好以及陽光無法直接照射的地方，遠離熱源，發火源及不相容物。
- 21.儲存設備以耐火材料構築。
- 22.地板應以不滲透性材料構築以免自地板吸收。
- 23.門口設斜坡或門檻或挖溝槽使洩漏物可排放至安全的地方

儲存：

- 1.儲區應標示清楚，無障礙物並允許指定或受過訓人員進入。2.儲存區與工作區應分開；遠離升降機，房間出口或主要通道儲存。3.儲存區附近應有適當的滅火劑和清理溢漏設備。4.定期檢查儲存容器是否破損或溢漏。5.檢查所有新進容器是否適當標示並無破損。6.限量儲存。7.以相容物質製成的儲存容器裝溢漏物。8.儲桶接地與其他設備

等電位連接。

9.儲存易燃液體的所有桶子應安裝釋放壓閥和真空釋放閥。10.依化學品製造商或供應商所建議之儲存溫度儲存，必要時可安裝偵溫警報器，以竟是溫度是否過高或過低。11.避免大量儲存於室內，盡可能儲存於隔離的防火建築。12.儲槽之排氣管應加裝火焰防止裝置。13.儲槽須為地面儲槽，底部整個區域應封住以防滲漏，周圍須有能圍堵整個容量之防溢堤。

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： 100mg/m³

個人防護設備：

呼吸防護：600PPm 以下：供氣式呼吸防護具

不知濃度：正壓全面型供氣式呼吸防護具輔以正壓自攜式呼吸防護具。

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。

衛生措施：

- 1.工作後儘速脫掉污染之物，洗淨後才可再穿戴或丟棄且須告知洗衣人員污染物之無害性。
- 2.工作場所嚴禁抽煙或飲食。3.處理此物後，需徹底洗手。4.維持作業場所清潔

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： 黑	氣味：芳香味
pH 值：可能為微酸性	沸點/熔點範圍：
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℃)	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：

1. 正常狀況下安定，但因其可行成過氧化物，在長期暴露於空氣或受熱下，則可能爆炸，故應避開火焰、火花、靜電、熱及其他引火源。2.氧化劑〔如過氧化物，硝酸鹽，過氯酸鹽〕：增加火災、爆炸的危險。

應避免之狀況：

1. 正常狀況下安定。
2. 避免強氧化劑與之接觸易起火或爆炸。

應避免物質：
強氧化劑、氟、氯、二氧化氮。
危害分解物：
二氧化碳

十一、毒性資料

暴露途徑：皮膚接觸、眼睛接觸、食入
症狀：皮膚紅腫、眼睛損傷
急毒性： 吸入：1.會引起頭痛、噁心、頭昏眼花。 2.及高濃度則可能導致意識喪失、甚至死亡。 皮膚：引起輕度刺激。 眼睛：蒸氣與吸入同。 食入：影響與吸入同。 LD50(測試動物、吸收途徑)>2000mg/kg(大鼠，吞食) 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：無
生物蓄積性：無
土壤中之流動性：無
其它不良效應：無

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： 1210
聯合國運輸名稱：可燃液體
運輸危害分類：第三類易燃液體

包裝類別：Ⅲ

特殊運送方法及注意事項：- NONE

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

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
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製表人：研發部經理 徐盛耀

製表日期：2013/05/18

修正日期：2013/08/26

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 (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 : $\{ \text{--} \text{C}_6\text{H}_4 \text{--} \text{C}(=\text{O}) \text{--} (\text{C}_2\text{H}_4)_2 \text{--} \text{C}(=\text{O}) \text{--} \}_n$
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 ?
		N/A	N/A
			Ingestion ?
			N/A
Health Hazardous (Acute and Chronic)			
N/A			
Carcinogenicity :		NTP ?	IARC Monographs ?
		N/A	N/A
			OSHA Regulated ?
			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

- —