

零件規格承認書

規格書(☐ 1份 ☐ 4份 ☐ 5份 ☐ ____份)附樣品(☐ 1份 ☐ 4份 ☐ 5份 ☐ ____份)

料 號: 27-554-720001

品 名 規 格: WiFi Aux Antenna

製 造 商: 一佳電子

供 應 商: 一佳電子

供應商規格料號 YJW01.139.065.301A

製作日期: 2023.08.14 備註:

發行單位		會簽單位	
Initiator:		☐ EMI/RF/ANT	
Check:		☐ QA	
Approve:		☐ ME	
		☐ EE	
		☐ PE	
		☐ Other(keypart)	
分發單位		發佈日期	
☐ QC	☐ 發行單位		
☐ 廠商	☐ EE		
☐ DCC	☐ ME		
☐ Other(Keypart)	☐ EMI/RF/ANT		



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RoHS

Compatible

CUSTOMER

PART NO

27-554-720001

REV.

DESCRIPTION

DATE

△

首次发行

2023-06-09

△

修改线长、丝印

2023-06-15

△

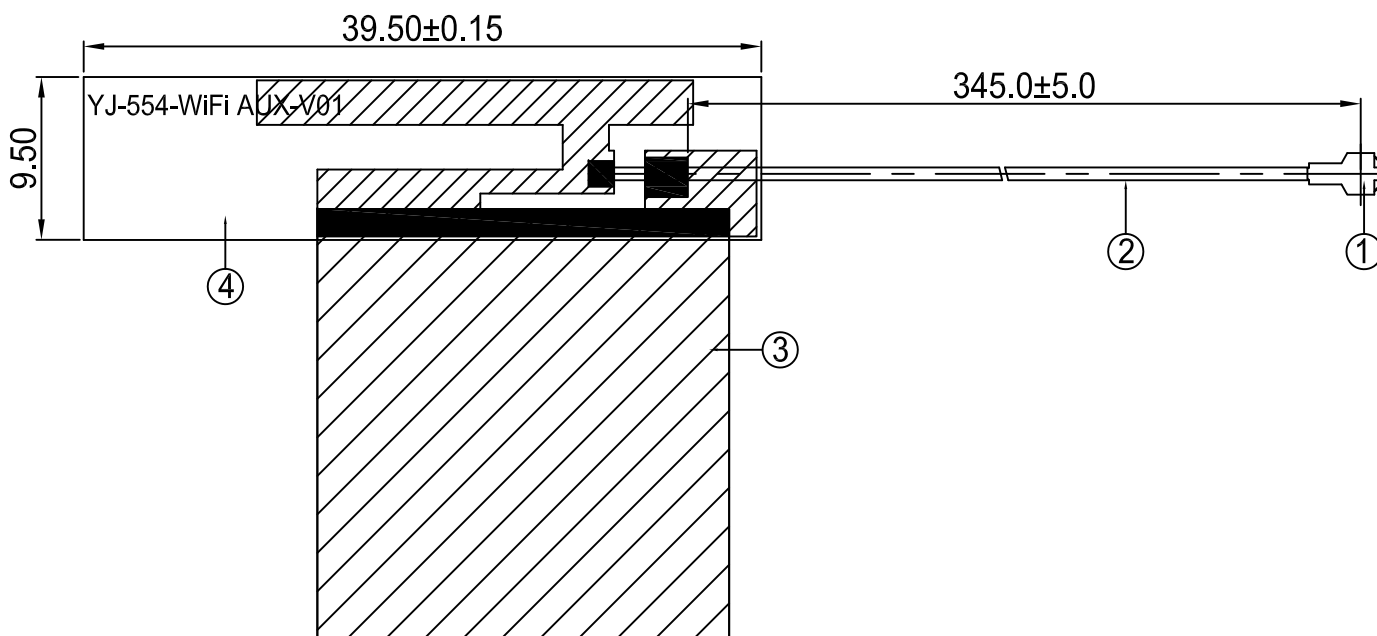
修改PCB外形、取消背胶、修改线长

2023-08-01

△

修改PCB尺寸公差

2023-08-14



4	PCB	39.5*9.5*0.6MM Green	PCB	PCB10XXXXA.P01	1
3	Cu-Foil	25.0*24.0MM	Cu-Foil	CUF10XXXXA.P01	1
2	Coaxial Cable	O.D.1.13 Gray Low Loss	O.D.1.13	COA10001A.P01	1
1	Mini Connector	Au Plated 4L	Cu	TER10009A.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 :0769-82586086 Fax:0769-82586086

PART NAME: WIFI AUX Antenna L=345.0mm MHF

PART NO.: YJW01.139.065.301A

DATE: 2023-08-14

APPROVED BY

CHECKED BY

DESIGNED BY

UNITS: mm

SCALE: 1/1

REVISION: D

王业昕

周颖杰

陈俊

Tolerance

X.X ±0.50

X.XX±0.15

X° ±3°



天线规格

Antenna Specification

Electrical Properties

Frequency	2.4-2.5GHz 5.15-7.0GHz
Impedance	50 Ohm Nominal
V.S.W.R	2.0 Max@2.4-2.5GHz 2.5 Max@5.15-7.0GHz
Gain	2.8 dBi@2.4-2.5GHz 4.1 dBi@5.15-7.0GHz
Radiation	Omni-directional
Polarization	Linear

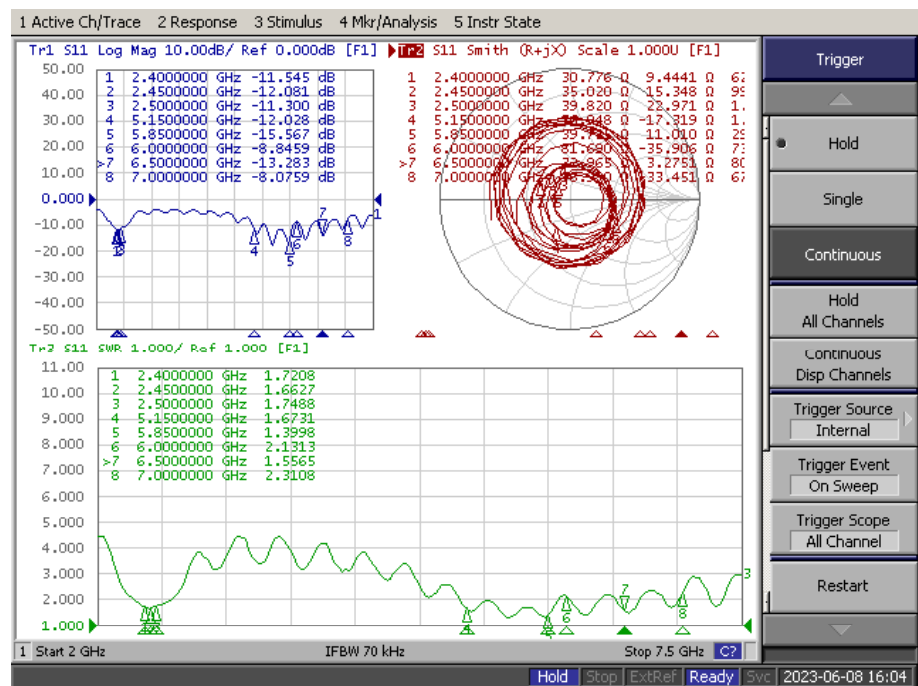
Physical Properties

Connector	4L-IPEX
Cable Type	O.D.1.13mm低损耗
Cable Length	345mm
Cable Color	Gray
Operating Temp.	-40 ~ +85 °C
Storage Temp / Humidity	25±5°C / <70%



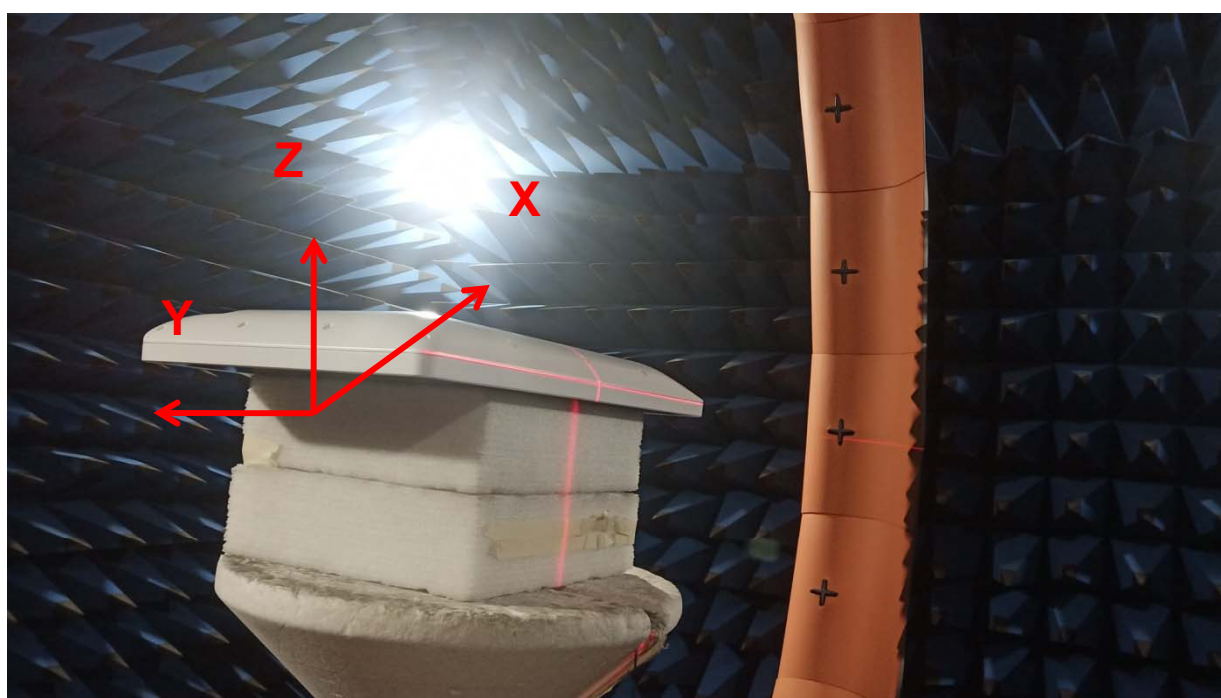
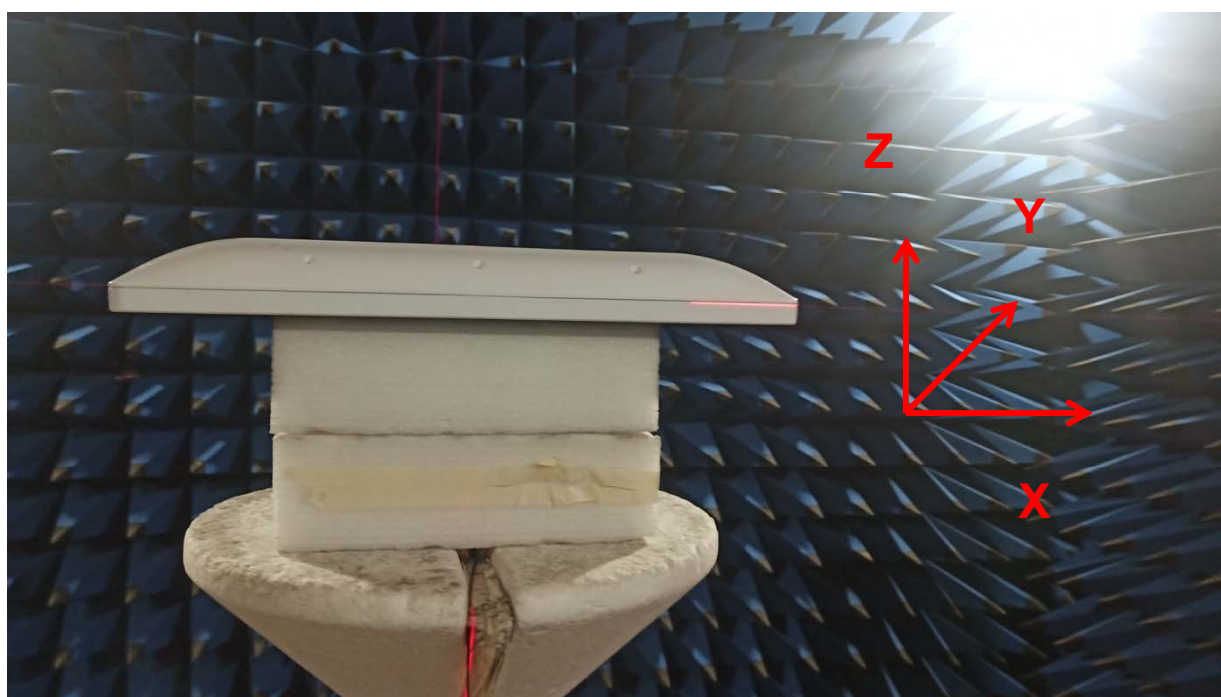
Antenna Performance Test

**Agilent
E5071B
S11
Parameter
Test //
WiFi
Antenna**





Antenna Passive Test





Passive Test For WiFi div Antenna(2.4G)

Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)
2400	57.7	-2.4	2.7
2410	58.6	-2.3	2.4
2420	57.7	-2.4	2.4
2430	56.9	-2.4	2.5
2440	56.1	-2.5	2.7
2450	58.3	-2.3	2.7
2460	56.2	-2.5	2.6
2470	56.5	-2.5	2.7
2480	55.1	-2.6	2.8
2490	55.7	-2.5	2.7
2500	54.5	-2.6	2.3



Passive Test For WiFi div Antenna(5.8G)

Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)
5150	54.5	-3.1	2.6
5200	48.0	-3.2	2.9
5250	46.6	-3.3	2.9
5300	47.6	-3.2	3.1
5350	47.2	-3.3	3.0
5400	46.8	-3.3	3.4
5450	46.3	-3.3	3.0
5500	43.4	-3.6	2.9
5550	45.5	-3.4	3.6
5600	45.5	-3.4	2.4
5650	45.0	-3.5	3.3
5700	43.4	-3.6	3.4
5750	49.5	-3.1	4.1
5800	47.4	-3.2	3.7
5850	47.4	-3.2	3.0

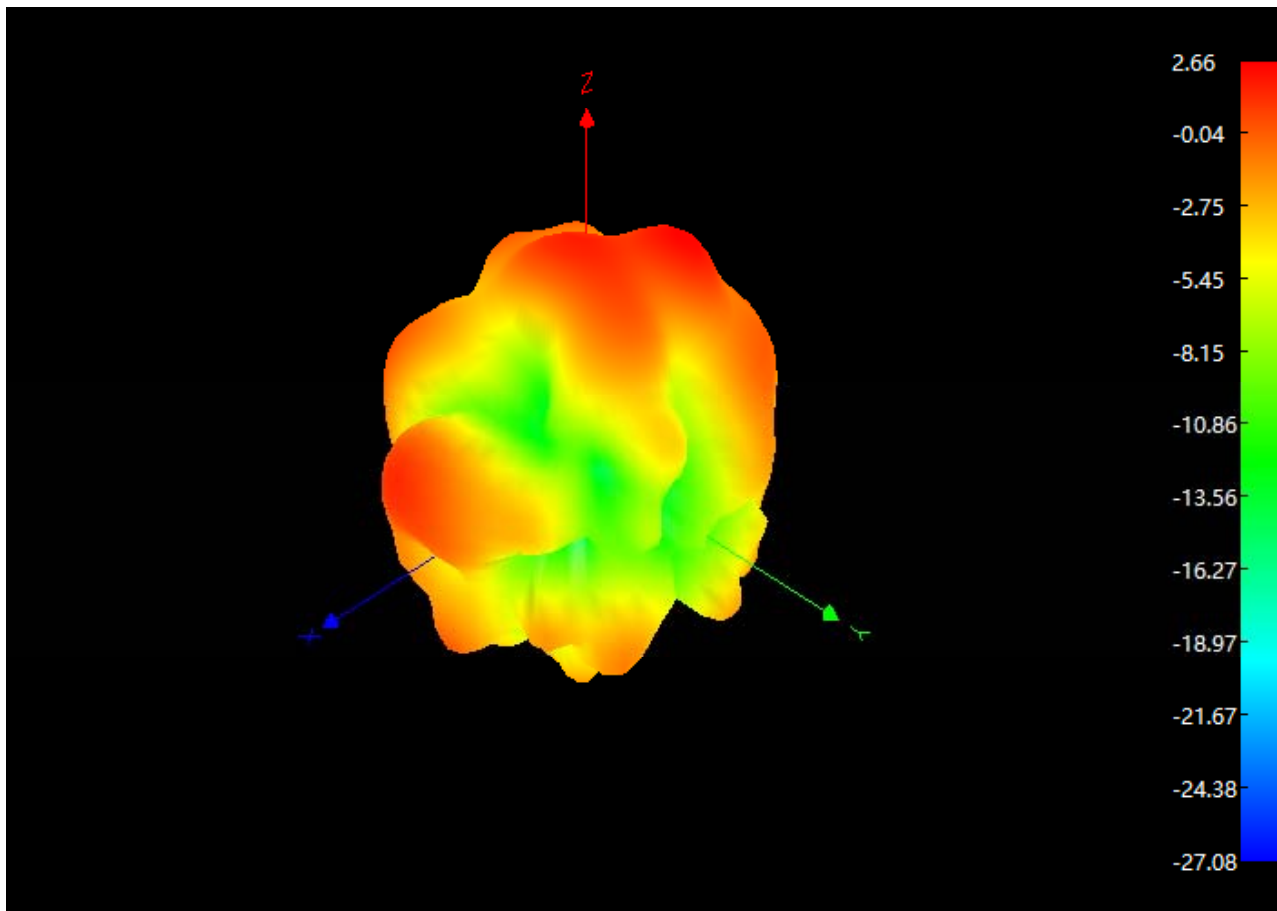


Passive Test For WiFi div Antenna(6G)

Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)
5900	46.3	-3.3	3.1
6000	41.2	-3.9	3.0
6100	42.7	-3.7	3.8
6200	56.9	-2.5	3.5
6300	41.7	-3.8	3.9
6400	48.5	-3.1	3.5
6500	47.7	-3.2	2.8
6600	50.6	-3.0	2.9
6700	47.9	-3.2	3.5
6800	45.8	-3.4	3.3
6900	45.8	-3.4	2.6
7000	45.0	-3.5	2.6

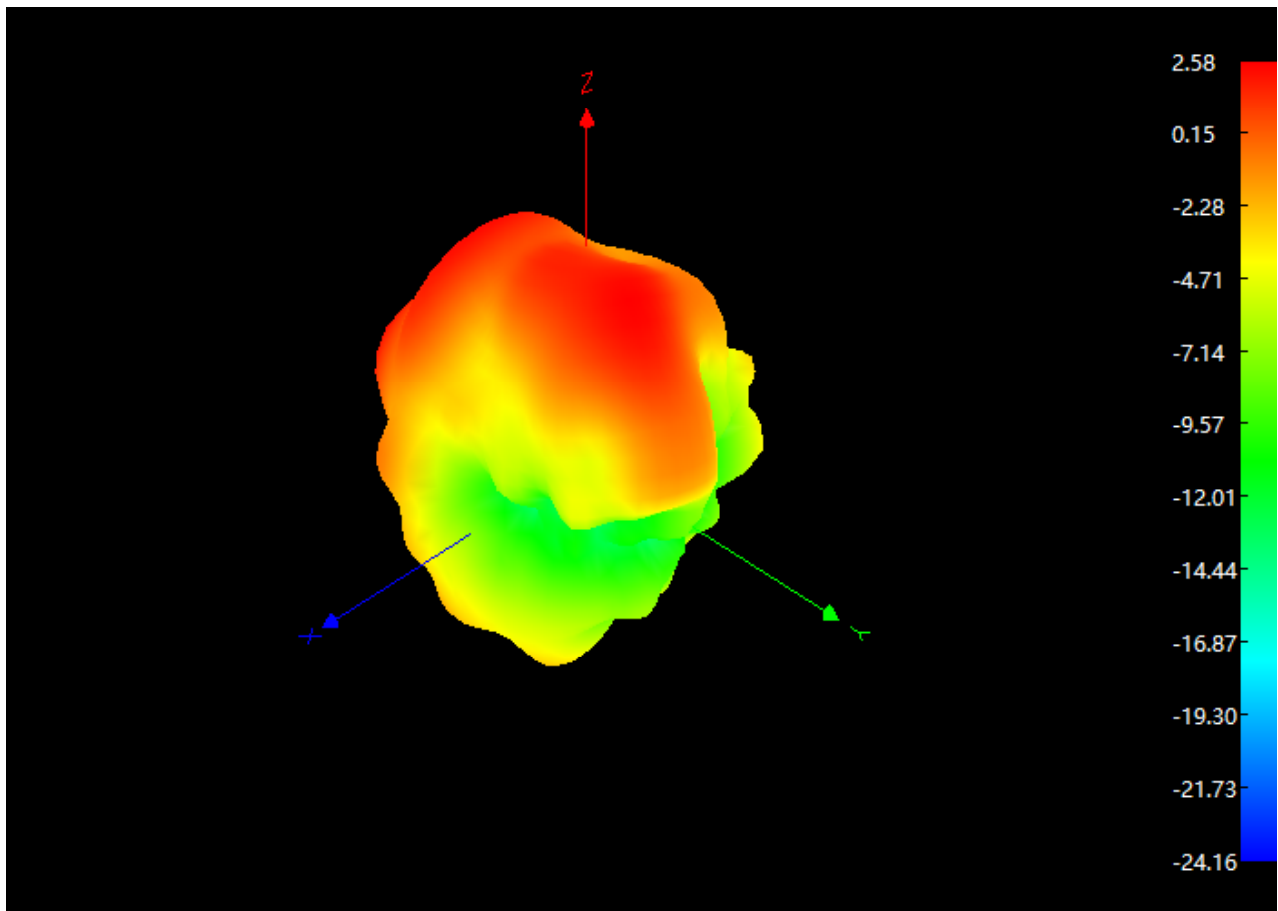


Radiation Pattern For WiFi div Antenna(2450MHz)



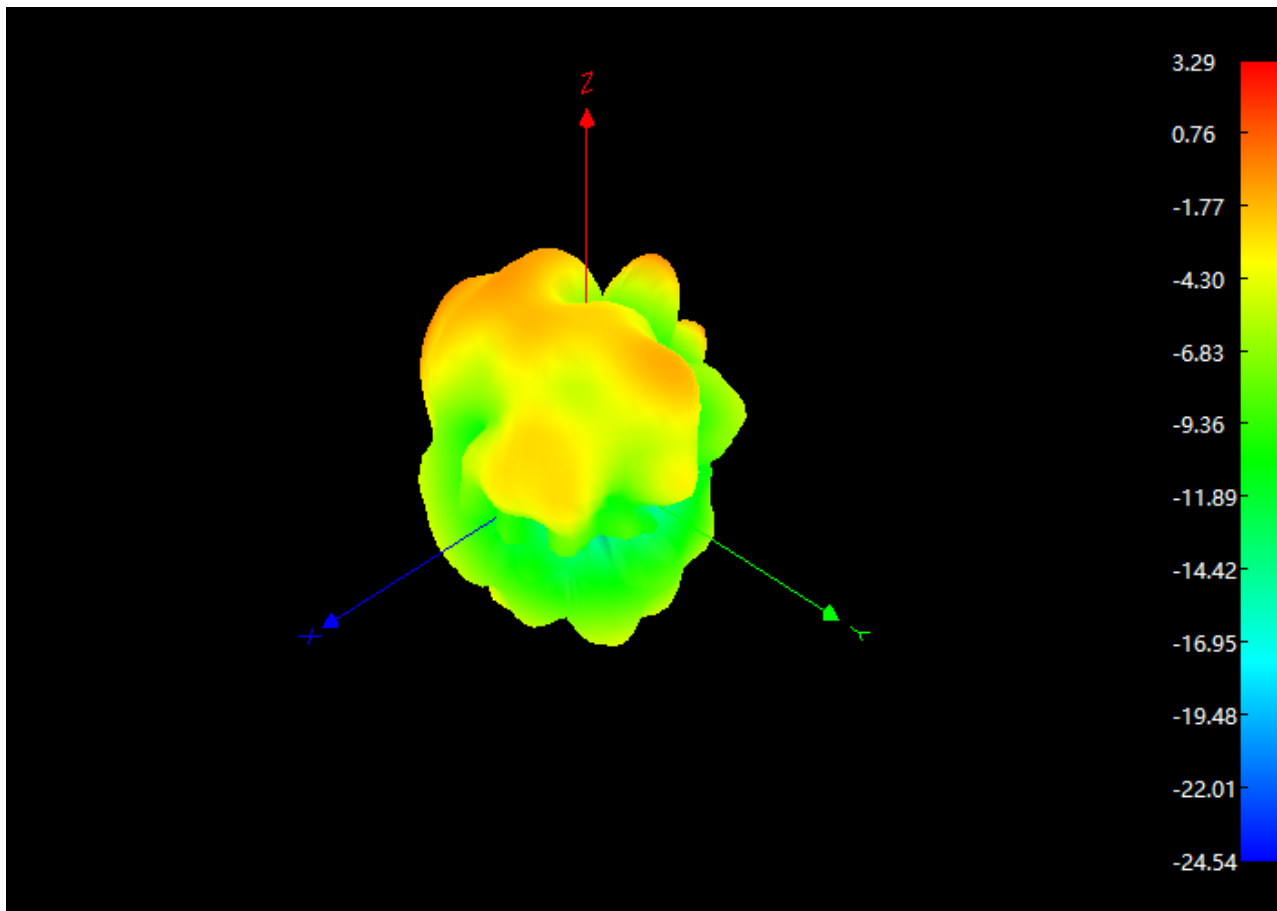


Radiation Pattern For WiFi div Antenna(5150MHz)



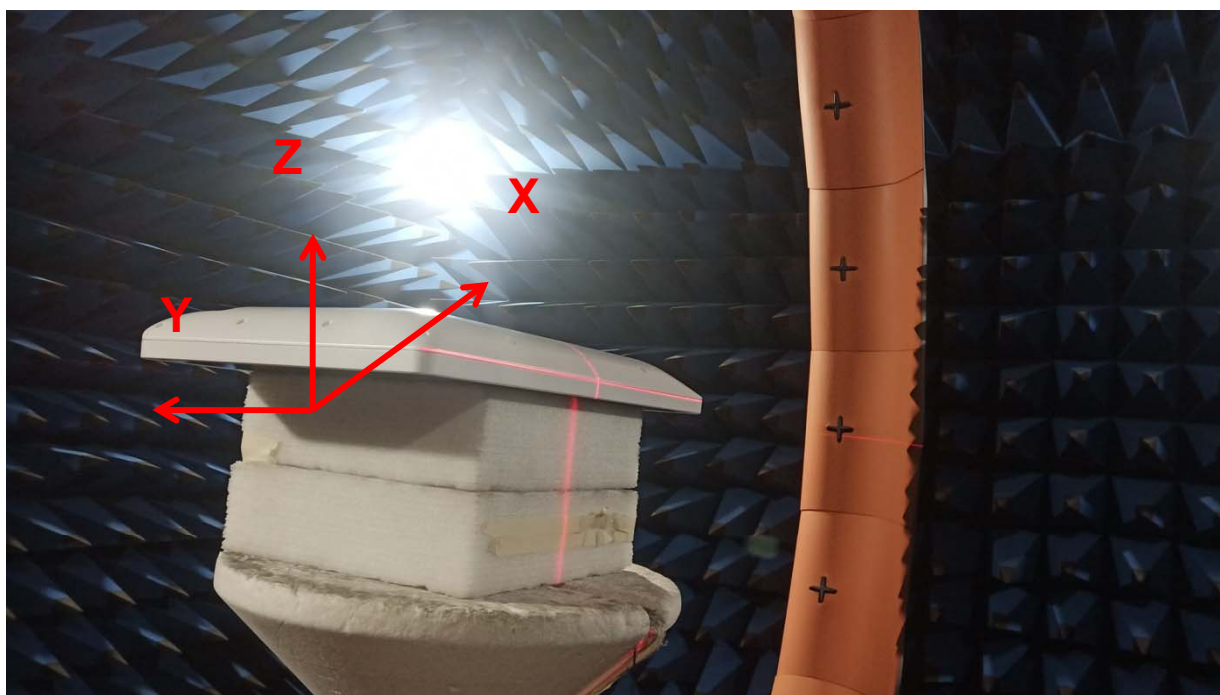
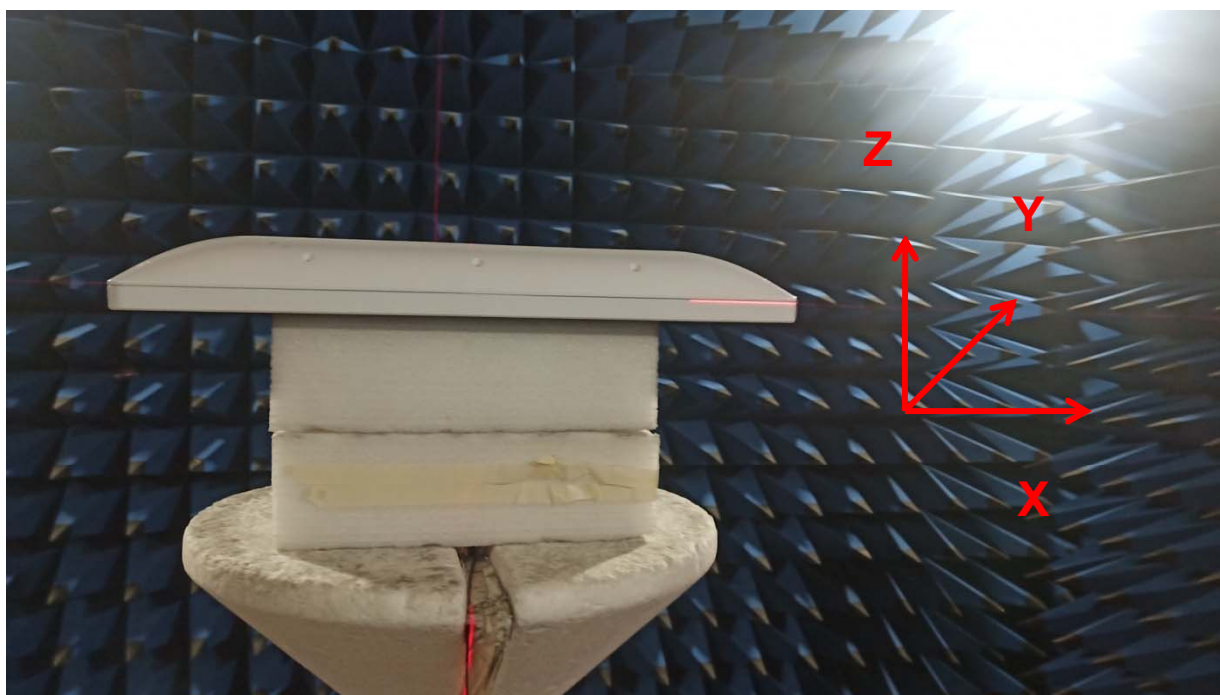


Radiation Pattern For WiFi div Antenna(6800MHz)





Antenna Active Test

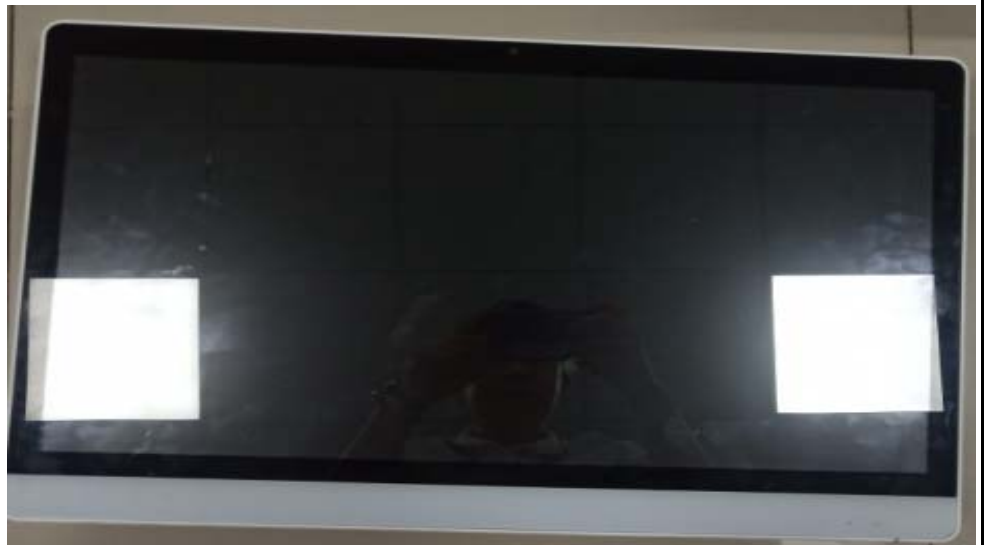




Active Test For WiFi Antenna					
Band	Channel	Data Rate	TRP	Data Rate	TIS
WIFI 2.4G 802.11b	1	11Mbps	12.2	11Mbps	-76.8
	6		12.4		-75.4
	11		12.2		-75.5
WIFI 5.8G 802.11a	36	6Mbps	13.4	54Mbps	-73.4
	100		13.2		-73.0
	165		13.1		-72.7



Device





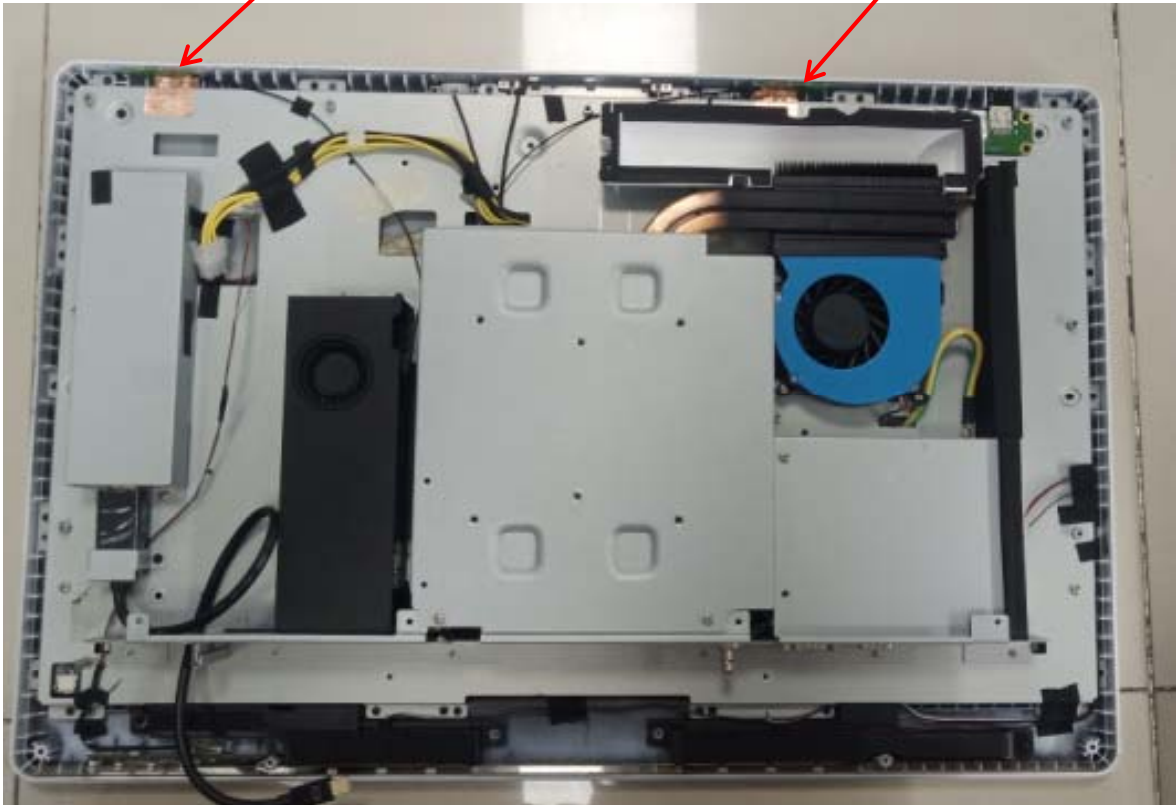
***WiFi
div
Antenna***





WiFi main Antenna

WiFi div Antenna



肇庆粤阳电子科技有限公司

化学品安全技术说明书MSDS

第一部分、化学品物品及企业标识Part 1 Identifications of chemicals and Manufacturer

化学品物品名称Chemical name:	液态感光阻焊油墨YSR-900系列 Liquid photosensitive solder mask YSR-900 series
生效日期Effective date:	2020. 6. 19
企业名称Manufacturer name:	肇庆粤阳电子科技有限公司 Zhaoqing Yevo Electronic tech Co.,Ltd
地址Address:	肇庆市高要市蚬岗镇蚬岗工业区 Xian' gang Industrial Zone, Xian' gang Town,
电话Tel:	0758-8384062
传真Fax:	0758-8384063
email	zqyevo@163.com
应急咨询电话Emergency call:	0758-8384062
推荐用途Recommendations on usage:	用于PCB制作PCB Manufacturing
限制用途Restrictions on usage:	仅限工业用Industrial use only

第二部分、危险性概述Part 2 Summary of danger

GHS危险性类别Risk classification:

急性毒性-经口 类别5 Acute toxicity-Oral type5

呼吸或皮肤过敏 类别1 Respiratory or skin irritation type1

对水环境的急性危害 类别3 Acute hazard to the water environment type3

对水环境的慢性危害 类别3 Chronic harm to the water environment type3

GHS标签要素:



信号词: 警告Signal: Warning

危险说明: Hazard statement:

最重要的危害效应 Most dangerous hazard	刺激性(皮肤、粘膜), 麻醉作用、肾脏障害, 经皮肤侵入人体 Irritation (skin, mucous membrane), anesthesia, kidney damage, invading the body through the skin
环境影响Environmental	有机溶剂蒸发Organic solvent evaporation
物理性及化学性危害 Physical & Chemical	其蒸气比空气轻, 易传播至远处。 Its vapor is lighter than air and easily spread to distant places.

特殊危害 Special Hazard	吸入性伤害及口、鼻、黏膜等接触性伤害Inhalation injury and contact injury such as mouth, nose and mucous membrane
主要症状 Main symptoms	口、鼻、粘膜等发生刺激感、吸入过量导致晕眩感Irritation in the mouth, nose, mucous membranes, etc.

第三部分、成分/组成信息Part 3 Information of ingredients

物料主要成分明细: Details of main components of materials:

主要成分名称Main ingredient name	CAS NO.	主要成分百分含量 Percentage
环氧树脂Epoxy resin	61788-97-4	35-40
二丙二醇甲醚DPM	34590-94-8	20-26
硫酸钡Barium sulfate	7727-43-7	20-30
二氧化硅Silica	10279-57-9	3-5
三羟甲基丙烷三丙烯酸酯 Trimethylolpropane triacrylate	15625-89-5	6-8

第四部分、急救措施Part 4 Emergency measures

不同暴露途径之急救方法: (主要为溶剂性伤害, 应于第一时间主动告知医师)First aid methods for different exposure routes: (mainly for solvent injuries, you should take the initiative to inform the physician immediately)
吸入: 1、若有头痛、头晕, 应把患者立即移至新鲜空气处Breathe in: 1、If you have headache or dizziness, move the patient to fresh air immediately
2、并接受医师诊治See your doctor.
皮肤接触: 1、用纱布擦拭, 再用中性肥皂彻底冲洗。如果发炎, 则应立即就医Skin touch: 1Wipe with gauze and rinse thoroughly with neutral soap. If irritation occurs, seek medical attention immediately
眼睛接触: 立即以大量流水冲洗15分钟以上, 再接受专科医师的诊治Eyes touch: Immediately rinse with plenty of running water for more than 15 minutes, and then receive the diagnosis and treatment of a specialist
食入: 1、患者即将丧失意识或已无意识时, 不可喂食任何东西。Eat: 1、When the patient is about to lose consciousness or is unconscious, do not feed anything.
2、给患者喝下240-300毫升的水以行释胃中的化合物。Give the patient 240-300 ml of water to release the compound in the stomach.
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。If the patient has spontaneous vomiting, the patient should be leaned forward to reduce the risk of inhalation, and they should be rinsed and given water repeatedly.
4、立即就医。See your doctor.

最重要的症状及危害效应：刺激感及晕眩感The most important symptoms and harmful effects: irritation and dizziness
对急救人员之防护：勿直接破触产品Protection of first-aid personnel: Do not directly touch the product
对医师之提示：溶剂类伤害Tips for physicians: solvent damage

第五部分、消防措施Part 5 Fire protection

粉末、二氧化碳、泡沫Powder, carbon dioxide, foam
灭火时可能遭遇之特殊危害：有机溶剂气体之吸入Special hazards that may be encountered when extinguishing fires: inhalation of organic solvent gases
特殊减火程序：依据有机溶剂火灾时的灭火程序Special fire-fighting procedures: according to the fire-fighting procedures for organic solvent fires
消防人员之特殊防护设备：应戴防毒面罩Special protective equipment for firefighters: gas masks should be worn

第六部分、泄露应急处理Part 6 Emergency measures against leak

个人应注意事项：Individuals should pay attention to:
1. 限制人员出入, 直至外溢区完全清理干净为止. 1. Restrict personnel access until the overflow area is completely cleaned up.
2. 穿戴适当的个人防护装备. 2. Wear appropriate personal protective equipment.
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. Environmental precautions: Isolate the fire source storage area and ventilate the leaked area, immediately notify the government occupational safety and health and environmental protection units.
清理方法: Cleaning method:
1. 不要碰触外泄物。 Do not touch the leakage.
2. 避免处泄进入下水道或狭的空间内。 Avoid venting into sewers or narrow spaces.
3. 在安全许可的情形下, 设法组织或减少溢漏。 In the case of security clearance, try to organize or reduce spills.
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堵处泄物。 When a small amount of leakage occurs, use dirt, sand and similar stable and non-combustible materials that will not react with the spilled material to dispose of the spilled material.
5. 大量泄漏时, 联络消防、紧急处理单位以及供应商寻求协助。 In case of a large amount of leakage, contact the fire department, emergency handling unit and supplier for assistance.

第七部分、操作处置与储存Part 7 Operation and storage

操作注意事项: Operating Caution:
1. 严禁烟火 Fireworks are strictly prohibited

2. 在通风良好的指定场所最小量使用。Use in a minimum amount in a well-ventilated designated place.
3. 操作中请穿戴有机溶剂防护手套，并着合格之工作服Please wear organic solvent protective gloves and qualified working clothes during operation
存储注意事项: Storage considerations:
1. 严禁烟火Fireworks are strictly prohibited
2. 密封保管于通风良好的冷暗处，储存温度不可超过 25℃Sealed and stored in a cool and dark place with good ventilation, the storage temperature should not exceed 25℃

第八部分、接触控制和个体防护Part 8 Contact control and individual protection

工程控制: engineering control:
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。When using, use a ventilation system that does not generate sparks and ground and separate from the general exhaust system.
2. 废气直接排到户外并对不幸保护采取适当措施。Exhaust air is discharged directly to the outdoors and appropriate measures are taken to protect the unfortunate.
3. 在量操作时，使用局部排气和密闭制程。3. During volume operation, use local exhaust and closed process.
4. 提供充分新鲜空气以补充系统排除之空气。4. Provide sufficient fresh air to supplement the air exhausted by the system.
控制参数: 依各厂区空间及排气设备调整Control parameters: adjusted according to the space and exhaust equipment of each plant
八小时日时量平均容许浓度 / 短时间量平均容许浓度 / 最高容许浓度: 100ppm(TKJ建议值) Average allowable concentration for 8 hours per day/average allowable concentration for short time/Maximum allowable concentration: 100ppm
个人防护设备: Personal protective equipment:
呼吸防护: 有机溶剂用防毒面罩。Respiratory protection: gas masks for organic solvents.
手部防护: 橡胶制防护手套Hand protection: rubber protective gloves
眼睛防护: 有机溶剂护目镜Eye protection: organic solvent goggles
皮肤及身体防护: 上述塑胶材质防护衣、连身工作服、工作靴。Skin and body protection: the above-mentioned plastic protective clothing, coveralls, work boots.
卫生措施: Hygienic measures:
1. 工作后尽速脱掉污染之衣物、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。Take off contaminated clothing as soon as possible after work, wash it before wearing or discarding it, and inform the laundry staff of the danger of contaminants.
2. 工作场所严禁抽烟或饮食。Smoking or eating is strictly prohibited in the workplace.
3. 处理此物后彻底洗手。Remove the hands and wash your hands after handling this object.

4. 维持作业场所清洁。Maintain clean working place.

第九部分、理化特性Part 9 Physicochemical property

物质状态：半固态Material state: semi-solid	密度：约1.3(25℃)Density: about 1.3 (25℃)
颜色：绿、黄、白、黑、红、蓝色 Color: green, yellow, white, black, red, blue	挥发性：含芳香味Volatile: aromatic
PH值：6~7PH value: 6~7	闪火点：130° C； 测试方法：开杯 Flash point: 130° C; Test method: open cup
分解温度：360° C Decomposition temperature: 360° C	爆炸界限：上限 20% 下限 0.7% Explosion limit: upperlimit 20% lowerlimit 0.7%
自燃温度：不自然 Auto-ignition temperature: unnatural	蒸气密度：0.9G/CM ³ Vapor density: 0.9G/CM ³
蒸气压：约0.5kPa(25℃) Vapor Pressure: about 0.5kPa(25℃)	溶解度：不溶于水Solubility: insoluble in water

第十部分、稳定性及反应活性Part 10 Stability and reactivity

安定性：正常状态下安定。Stability: Stable under normal conditions.
特殊条件下可能之危害反应：过氧化物、强还原剂、剧烈反应、增加反就剧烈物质。Potential hazardous reactions under special conditions: over-oxidation, strong reducing agents, violent reactions, and increased violent substances.
应避免之状况泄露、火灾和其他火源。Conditions to avoid leakage, fire and other sources of fire.
应避免之物质：1. 强氧化剂；2. 强还原剂；3. 酸卤化合物；4. 与水反就剧烈物质。Substances to be avoided: 1. Strong gasification agent; 2. Strong reducing agent; 3. Acid halide compound; 4. Violent substance against water.
危害分解物：热分解产生 CO、CO ₂ 、NO、CH ₂ O ₃ 。Hazardous decomposition products: thermal decomposition produces CO、CO ₂ 、NO、CH ₂ O ₃

第十一部分、毒理学信息

急性毒性：异常状况下，过量溶剂吸入性伤害Acute toxicity: under abnormal conditions, excessive solvent inhalation injury
局部效应：刺激感Local effects: Irritation
致敏感性：对皮肤、眼睛有刺激性Sensitization: Irritating to skin and eyes
慢毒性或长期毒性：未依安全操作建议导致化学物质累积至人体，造成皮肤异常及毒素累积
至体内Slow toxicity or long-term toxicity: Failure to follow safe operation recommendations leads to accumulation of chemical substances into the human body, causing skin abnormalities and toxin accumulation.
特殊效应：无.Special effects: None.

第十二部分、生态学信息Part 12 Ecological Information

可能之环境影响/环境流布:Possible environmental impact/environmental distribution:
1. 释放至大气中会与氢气自由反应而快速分解掉. Released into the atmosphere will react freely with hydrogen and decompose quickly.
2. 释放至水中最主要由蒸汽作用排除掉。 Mostly released into water is mainly eliminated by steam.
3. 释放至土壤中会挥发及渗入地下. Released into the soil will evaporate and penetrate into the ground.

第十三部分、废弃处置Part 13 Waste disposal

废气处置方法: Waste gas treatment method:
1. 参考相关法规处理. Refer to relevant laws and regulations.
2. 依照仓储条件待处理的废弃物. Waste to be treated in accordance with storage conditions.
3. 可采用特定的变化呀衍生掩埋法处理. Specific changes can be adopted to deal with the landfill method.

第十四部分、运输资料Part 14 Transportation informations

国际运送规定: 本产品系属混合性惰性化学物质, 未单独列管于国际运送规定。 International Shipping Regulations: This product is a mixed inert chemical substance and is not separately listed in the international shipping regulations.
联合国编号: 运送之注意事项请参考”国内运送规定UN number: Please refer to “Domestic Shipping Regulations”
国内运送规定: 1. 严禁烟火Domestic delivery regulations: 1. Fireworks are strictly prohibited
2. 备妥灭火器Prepare fire extinguisher
3. 备妥各类防护具Prepare all kinds of protective equipment
特殊运送方法及注意事项: 储存及运送温度控制 (25℃以下), 高温下虽无运送安全等问题,

但严重影响产品之使用质量。 Special transportation methods and precautions: storage and transportation temperature control (below 25℃), although there is no transportation safety problem at high temperature, But it seriously affects the quality of the products.

第十五部分、法规资料Part 15 Regulatory information

通用法规Applicable laws and regulations:
劳工安全卫生设施规则。 Labor safety and health facilities rules.
有机溶剂中毒预防规则。 Organic solvent poisoning prevention rules.

道路交通安全规则。Road traffic safety rules.	
危险及有害物通识规则。General rules of danger and harmful substances.	
劳工作业环境空气中有害物质容许浓度标准。Standards for allowable concentration of hazardous substances in the air of labor operations.	
第十六部分、其他信息Part 16 Other information	
无	

制表人Lister :李烨

上述数据已力求正确，但错误恐仍难免，各项数据与数据仅供参考，用户请依应用需求，自行判断其可用性本公司不负任何责任。

The above data has been tried to be correct, but errors may still be inevitable. The various data and data are for reference only, users please follow the application requirements,The company assumes no responsibility for its own judgment of availability.



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化学品安全技术说明书 (MSDS)

第一项：产品和制造商信息

产品名称：FT-HT1060 耐高温抗氧化剂
批号：
公司名称：深圳市泰达富化学材料有限公司
地址：深圳市光明新区马田街道将石社区油麻岗工业区 4 号韶华勉工业区 4 栋 5 楼 B 区
紧急联系人：何俊
紧急联络电话：13923749798
电话：0755-29627109
传真：0755-29627110
邮政编码：
邮箱：tdfosp@163.com

第二项：组成信息

产品名称：FT-HT1060 耐高温抗氧化剂

成分/组成	CAS No.	EC 号码/EC 索引/EINECS	成分 (重量百分比%)
苯并咪唑	51-17-2	200-081-4	0.5%
甲酸	64-18-6	200-001-8	3%
乙酸	64-19-7	--	1.5%
氯化铜	10125-13-0	231-210-2	0.1%
乙酸锌	5970-45-6	--	0.1%
水	7732-18-5	--	94.8%



服务热线：0769-85584050

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第三项：危害信息

最重要危害与效应：不易燃。

健康危害效应：对眼睛和皮肤有刺激作用，有严重伤害眼睛的危险，与皮肤接触可能导致过敏，对呼吸系统有刺激性。

环境危害：污染水源，可能对海洋生物有害和长期影响。

特殊危害：N/A

物品危害类别说明或图示：N/A

第四项：急救措施

不同暴露途径的急救方法：

眼睛接触：采用大量清水冲洗至少 15 分钟，将眼睑保持分开，就医。

皮肤接触：清水冲洗。

吸入：将病人移至新鲜空气处，如呼吸不正常或停止，应进行人工呼吸。如失去知觉应立即就医。

吞食：送医诊治。

最重要症状及危害效应：N/A

对急救人员的防护：不需要

对医师的提示：告知医师有关患者的症状。

第五项：消防措施

危险特征：不可燃。

灭火剂：无资料。

灭火防护：无资料。

灭火器具：无资料。

灭火危害：无资料。

火灾闪火点：无资料。

注意事项：无资料。



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第六项：泄露应急处理

处理方法：

在密闭场所发生大范围溢出，应撤离该区域人员，检查蒸汽浓度应低于爆炸下限浓度。应使溢出区域保持通风状态并避免人体吸收蒸汽。

采用非易燃性材料，例如：沙土阻止并吸附溢出物，将其放入室外密闭容器并按照废物处理规定进行处置。溢出物不得进入下水道或者河流。

第七项：操作处置与储存

操作注意事项：工作区域通风良好。

储存注意事项：存储位置必须凉爽、干燥、通风不可直接照射；避免储存于靠近火源、热源处所；储存设备必须接地预防静电累积；储存区作业避免粉尘累积；储存相应品种和数量。

第八项：暴露预防措施

工程控制：提供合适的通风，建议佩戴口罩或者合适的呼吸保护装置。

眼睑防护：宜戴护目镜。

手部防护：佩戴合适材料制成的手套。

皮肤防护：穿工作服，工作期间皮肤不应暴露。

第九项：理化特性

物理性质：

外表：液体

颜色：天蓝色

形状：液体

气味：无资料

化学特性：

沸点/范围：无资料

熔点/范围：无资料

闪点：无资料

分解温度（℃）：无资料

自燃温度（℃）：无资料

爆炸上限%：无资料

爆炸下限%：无资料



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分子量：无资料

粘性：无资料

水中溶解度 (g/l)：无资料

pH (1%溶液)：无资料

pH (按供应)：无资料

蒸气压 (kPa)：无资料

比重 (水=1)：无资料

相对蒸汽密度：(空气=1)：无资料

第十项：稳定性和反应活性

稳定性：常温状况下稳定。

分解活动性：为了避免可能发生的放热反应，应远离氧化剂，强碱和强酸。

第十一项：毒理学信息

急性毒性：N/A。

刺激性：N/A。

致敏性：N/A。

致畸性：N/A。

致癌性：N/A。

第十二项：生态学信息

环境影响：污染水源和土壤，产品不得私自排放至下水道，河流和土壤。

第十三项：废弃处置

废弃处置方法：处理前参照国家和地方相关法规；可采用安全焚化。

废弃注意事项：无资料。

第十四项：运输信息

包装标示：无资料。

危险货物编号：无资料。



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UN 编 号：无资料。

包 装 类 别：桶装。

运 输 方 式：公路。

运输注意事项：防止重压变形；起运时包装要完整，装载应稳妥；运输过程中要确保容器不涉漏、不倒塌、不坠落、不损坏；运输途中应防暴晒、防高温。

第十五项：法规信息

“化学危险物品安全管理条例”

“化学危险品安全管理条例实施细则”

“工作场所安全使用化学品”

第十六项：其他信息

其 他 信 息：以上信息基于数据准确的基础上，因为此信息可能在我们无法控制的情况下被应用，或者被修改，对此我们不承担任何责任，此信息在收件人决定对材料的专有目的的情况下而配置。



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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)

产品名称: 覆铜箔板 (FR-4)

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: Goldenmax International Technology(zhuhai) Ltd.

NO .8 QinShi Road, Sanzao Town, Zhuhai City

Guangdong, China

公司名称及地址: 金安国纪科技(珠海)有限公司

中国广东珠海三灶科技工业园琴石路 8 号

FOR MORE INFORMATION CALL:

紧急联络电话: 86-0756-7638610

Fax: 86-0756-7762356

E-mail: GDMZHQA @163.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)	30-65
玻纤布		
Copper	(7440-50-8)	9-30
铜箔		
Epoxy Resin	(26265-08-7)	35-70
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

FLAME PROPAGATION RATE(solids) : UL94 V-0

燃烧等级：UL94 V-0

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: 个人保护措施:

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/m ³	1 mg/m ³	N/A
Fibrous Glass Dust	(65997-17-3)	10mg/m ³	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

DISPOSITE POINT (5% LOSS) :

热分解点: 310°C(5%LOSS)

THE GLASS TRANSITION TEMPERATURE:

Tg: 110-150°C

ODOR: None, unless heated

气味: 无味, 除非加热

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? : 稳定

HAZARDOUS POLYMERIZATION? None

危险聚合物? : 无

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°C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

Not Biodegradable

非生物降解。

13、DISPOSAL CONSIDERATIONS:

处置问题

Is the unused product a hazardous waste substances list of country hazardous waste if discarded?

No

列入国家危险废物名录的危险废物不能够再利用时是否被丢弃？ 不

OTHER DISPOSAL CONSIDERATIONS: Disposal must be made in accordance with all applicable Local regulations. Copper should be recycled.

其它处置问题：处置必须遵循当地的法律法规。铜箔是可以再利用的。

Suggestion method after products will be discarded:

产品报废之后有以下几种处置方法：

1. Separate reuse method: crush products into powder then separate the valued copper, recycling left plastic powder as a filler.

分离法，将产品粉碎，将铜箔回收利用，剩余物可作填充料。

2. Incineration method: incinerate the unused products, this method may produce some brominated compound gas.

焚烧法，焚烧过程中可能产生有毒的溴化物气体。

3. Bury into deep earth.

填埋法。

14、TRANSPORT INFORMATION:

运输资料

1. Special transport and attention: None

无须特殊的运输方式。

2. For additional information on shipping regulations affecting this material, contact the information number found on the first page.

附带资料是当运输规则影响到物料时，请和第一页所提供的联系方式联系。

15、ADDITIONAL REGULATORY INFORMATION:

附加法规资料

1. **HAZARDOUS WASTE SUBSTANCES LIST OF COUNTRY:** 国家危险废物名录

The resin system components listed in the hazardous waste substances list of country (HW13) .

环氧化合物类被列入国家危险废物名录当中 (HW13) 。

2 . Goldenmax International Technology(zhuhai) Ltd.. Does not use polybromide -biphenyls or polybromide-biphenyloxides as a fire retardant in any of our epoxy resin systems., and meet ROHS requirement.

金安国纪科技（珠海）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:5/8/2015 最新修订日期：5/8/2015

Previous issue date:***** 上一次修订日期：*****

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-388W
同义名称	热固化标记油墨
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	江苏省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)
邻甲阶酚醛环氧树脂	29690-82-2	10%-30%
双酚 A 环氧树脂	25068-38-6	10%-30%
高沸点溶剂(DBE)	95481-62-2	10%-30%
无机填料 (SiO ₂)	14464-46-1	<10%
颜料	13463-67-7	20%-40%
固化促进剂	461-58-5	<10%
表面助剂	63148-62-9	<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，或直到污染物除去。

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，或直到污染物除去。

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：应空着 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

适应灭火剂：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、大量操作时，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：糊状物	形状：粘稠糊状物
颜色：白色	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℃	爆炸界限
自燃温度：不自燃	蒸气密度：0.9g/cm ³
蒸气压：04mmHg/25℃	溶解度：不溶于水
密度：1.35(水=1)	粘度(25℃)：240~320PS

十、安定性及反应性

安定性：正常状态下安定
特殊状态下可能之危害反应：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 浓度会引起恶心呕吐。 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、蒸汽会造成刺激。 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、可采用特定的变化呀衍生掩埋法处理。

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。
事业诚尽弃物储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。

物质安全数据表 (MSDS)

一.物品名称与厂商资料

物品名称：同轴电缆
物品编号：RF113 单银低损耗线
制造商或供货商名称地址及电话：深圳微波通线缆有限公司 深圳市光明新区公明街道马山头第四工业区 78C 三楼
紧急联络电话及传真： TEL:0755-29886180 , FAX:0755-29886850

二.成分解析资料

纯物质：

中文名称	同义名称	组成百分比 (%)	化学文摘社登记号码(CAS No.)
镀银铜线	SC	11.80	Cu:7440-50-8,Ag:7440-22-4
聚全氟乙丙烯	FEP	22.0	FEP:25067-11-2
铜箔	Copper Foil	3.0	Cu:7440-50-8,PET:25038-59-9
镀锡铜线	TC	32.10	Cu:7440-50-8,Sn:7440-31-5
聚全氟乙丙烯	FEP	31.20	FEP:25067-11-2

危害物质：

危害物质		浓度或浓度范围 (ppm)	
铅及其化合物 Pb		<1000	
镉及其化合物 Cd		<100	
汞及其化合物 Hg		<1000	
六价铬及其化合物 Cr ⁶⁺		<1000	
卤素	氯 Cl	<900	氯 Cl+溴 Br<1500
	溴 Br	<900	
SVHC161 种物质		禁止使用	

三.危害辨识数据

最重要危害与效应	健康危害效应：260℃以上可能分解，需安装排气装置。
	环境影响：按照废弃物处理及清扫法规处理，不可燃烧。
	物理性及化学性危害：无
	特殊危害：无
主要症状：对人的神经系统产生损害。	
危害物质分类：大气和水源。	

四.急救措施：

不同暴露途径之急救方法
吸入：若吸入熔融树脂释放的气体，将患者移至通风处
皮肤接触：被熔融树脂碰触皮肤，需即可以大量清水冷却后，依照烫伤之临床方式处理

眼睛接触：大量清水冲洗。

食入：用清水漱口。

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：水，化学干粉，二氧化碳，泡沫。

灭火时可能遇到之特殊危害：避免气体吸入。

特殊灭火程序：移除可燃物。

消防人员之特殊防护设备：防毒面具。

六．泄露处理方法

个人注意事项：粉状和颗粒状树脂。

环境注意事项：不可填埋。

清理方法：按照废弃物处理及清扫法规处理，不可燃烧。

七．安全处置与储存方法

处置：避免高温和火源接触。

存储：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：未定

生物指标：未定

个人防护措施：

呼吸防护：安装排气装置

手部防护：佩戴手套

眼睛防护：不需要

皮肤及身体防护：不需要

卫生措施：不需要

九．物理及化学性质

物质状态：固体

形状：白色粉末/透明颗粒

颜色：白色/透明

气味：无

PH 值：7

沸点/沸点范围：-

分解温度：380°C/360°C

闪火点：-

自燃温度：-	爆炸界限：-
蒸汽压：-	蒸汽密度：-
密度：2.05/2.15g/cm ³	溶解度：-

十．安定性及反应性

安全性：常温下及其安定且具化学惰性

特殊情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有损害。

应避免之状况：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：无

局部效应：无

致敏效应：无

慢毒性或长期毒性：无

特殊效应：无

十二．生态资料

可能之环境影响/环境流布：此项产品无法被生物分解，但可经适当之方式予以回收利用，不含铅，汞，镉，铬等添加物或复合物。

十三．废弃处置方法

废弃处置方法：按照废弃物处理及清扫法规要求送专业资质公司处置

十四．运送资料

国际运送规定：此物质无危险性。

联合国编号：无

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．其他资料

参考文献：-

制表单位：深圳微波通线缆有限公司

地址：深圳市光明新区公明街道马山头第四工业区 78C 三楼

电话：0755-29886180

制表人：职称：工程经理

姓名：范强

制表日期：2014-12-01



深圳微波通线缆有限公司

ShenZhen WBT Cable Co., Ltd

地址：深圳市光明新区公明镇马山头村第四工业区 78C 三楼

电话：0755-29886180

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Http://www.WBTcable.com

邮编：518106

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 : $\{ \text{C}_6\text{H}_4\text{O} \text{---} \text{C}_6\text{H}_4\text{O} \text{---} (\text{C}_2\text{H}_4)_2 \text{O} \}_n$
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.

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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