



Dongguan YiJia Electronics Communication Technology Co.,Ltd.

SPECIFICATION FOR APPROVAL

Date 2022/06/21
File No 22062101
Revision 1.0

CUSTOMER: Sveaverken Svea Agri AB

CUSTOMER NO: Smart Neck-Tag

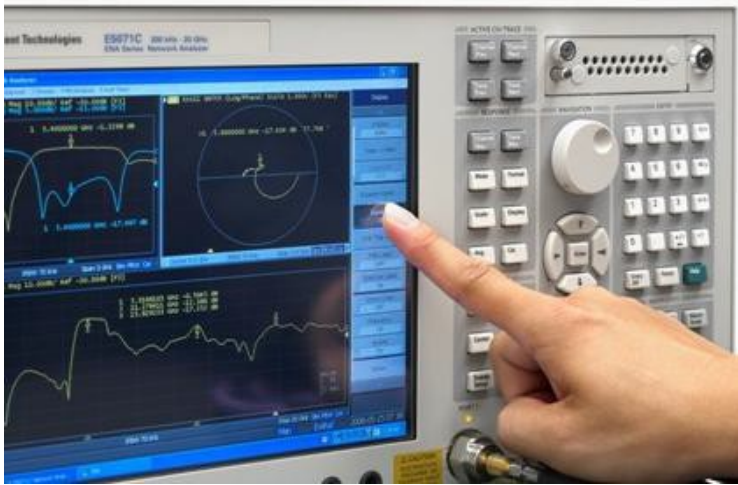
PART NAME: LoRa Antenna L=31mm MHF

SUPPLIER NO: YJF01.085.001.301A

Date: Q “TY:

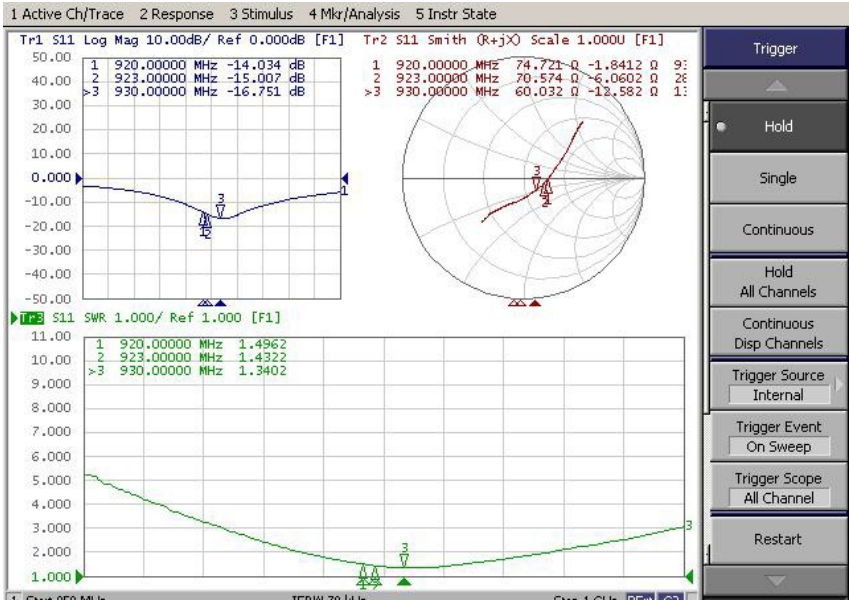
CUSTOMER APPROVED BY		
APPROVAL	CHIEF	SUPERVISOR

1、Device Profile

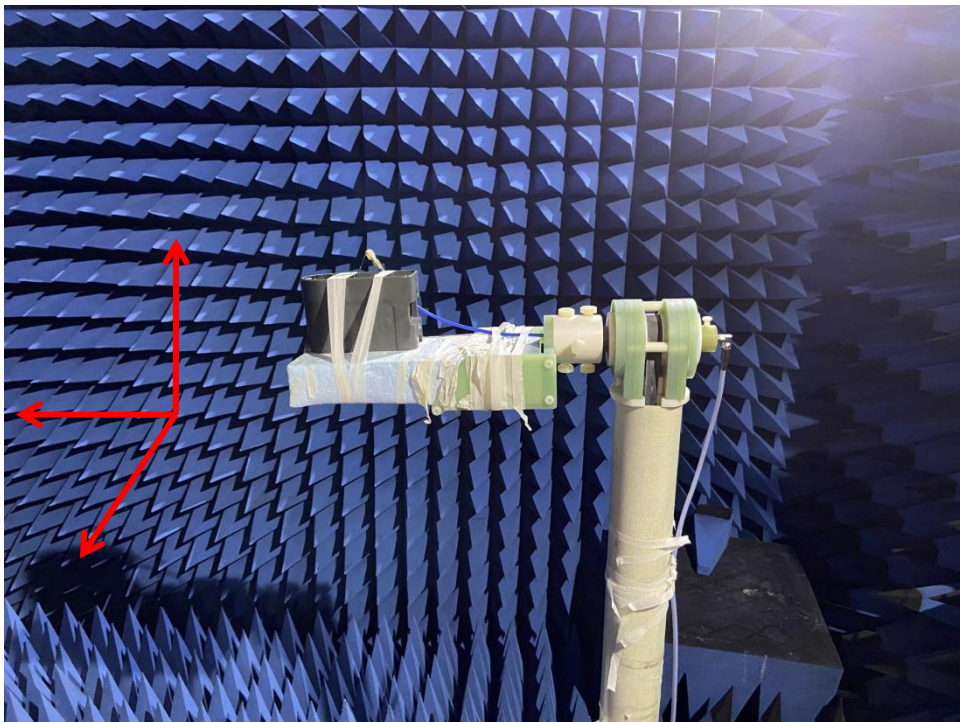
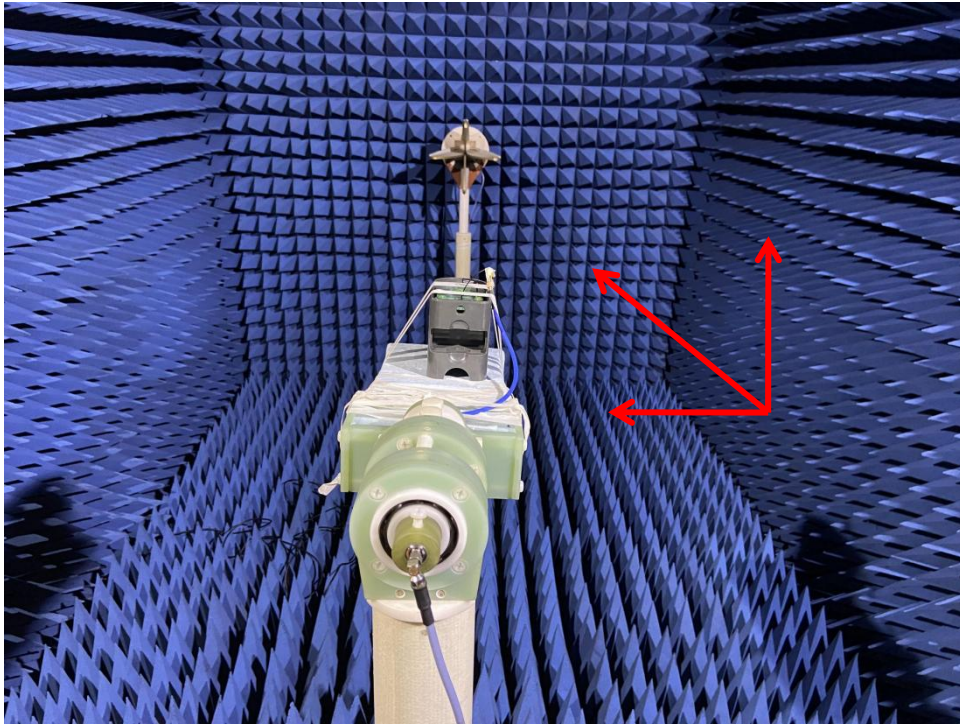


Agilent E5071B

Parameter Test // Lora



2、Antenna Passive Test



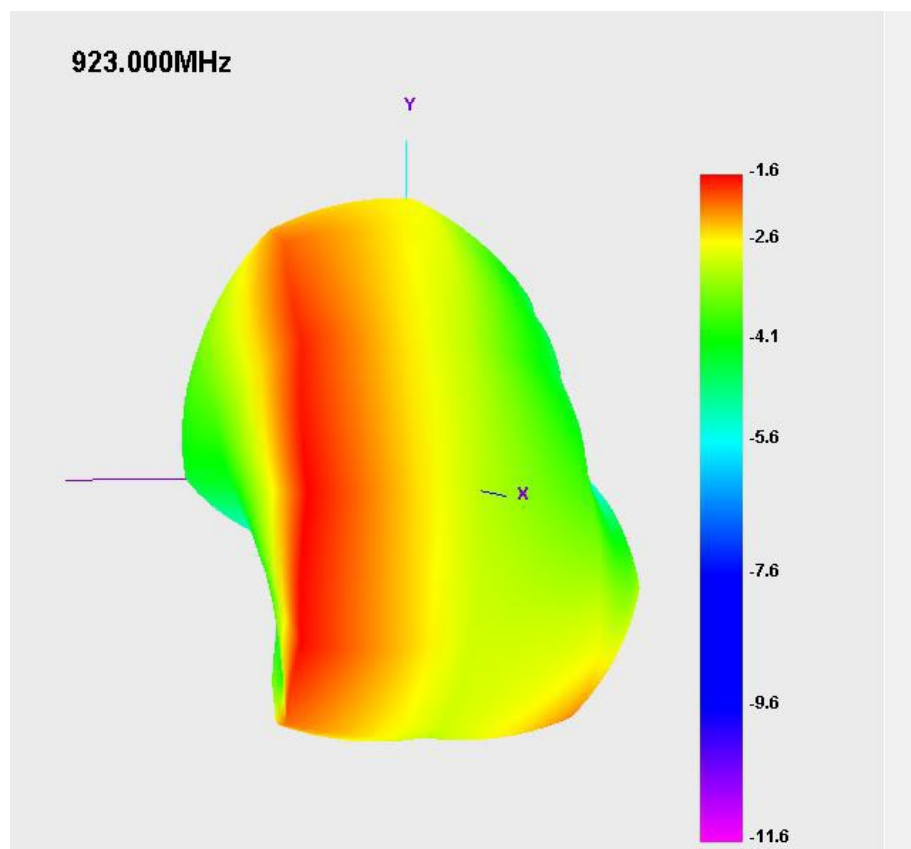
Passive Test For Lora (920-930Mhz) (5.6PF)

Freq (MHz)	Eff i (%)	Eff i (dB)	Gain (dBi)
920	38.3	-4.2	-1.6
921	38.3	-4.2	-1.6
922	38.3	-4.2	-1.6
923	38.3	-4.2	-1.6
924	38.3	-4.2	-1.6
925	38.2	-4.2	-1.7
926	38.0	-4.2	-1.7
927	37.7	-4.2	-1.8
928	37.4	-4.3	-1.9
929	37.0	-4.3	-1.9
930	36.6	-4.4	-2.0

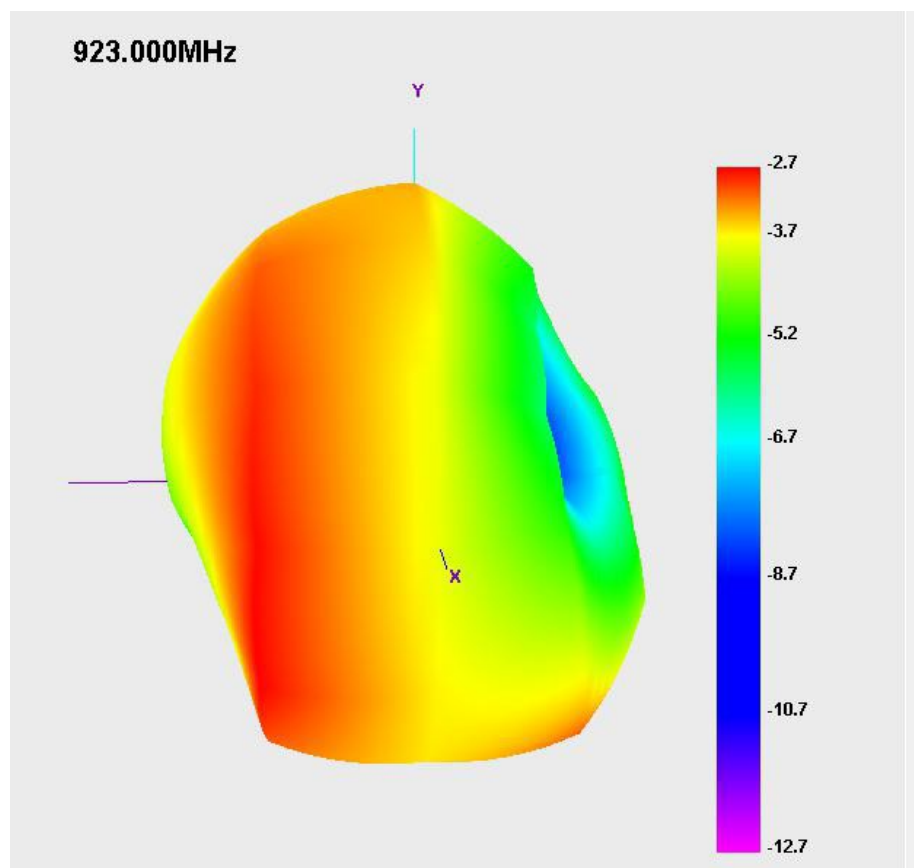
Passive Test For Lora (920–930Mhz) (0ohms)

Freq (MHz)	Eff i (%)	Eff i (dB)	Gain (dBi)
920	31.4	−5.0	−2.6
921	31.5	−5.0	−2.7
922	31.5	−5.0	−2.7
923	31.5	−5.0	−2.7
924	31.4	−5.0	−2.7
925	31.3	−5.1	−2.7
926	31.0	−5.1	−2.7
927	30.7	−5.1	−2.7
928	30.3	−5.2	−2.7
929	29.9	−5.2	−2.8
930	29.6	−5.3	−2.8

Radiation Pattern For Lora Antenna(923MHz) (5.6PF)



Radiation Pattern For Lora Antenna(923MHz) (0 ohms)



3、 Antenna Test

Electrical Properties	
ANT Peak Gain	4 dBi
LNA Gain	$16\pm2\text{dB}$
Noise Figure	1.5 dB Max
Out Band Rejection	$\geq 20\text{dB}$ ($f_0\pm 50\text{MHz}$) , $\geq 40\text{dB}$ ($f_0\pm 100\text{MHz}$)
Physical Properties	
Cable Type/Length	O. D. 1.13 _{Black} / $31\pm0.3\text{mm}$
Connector	1 IPEX
Operating Temp.	$-40\sim +85\text{ }^{\circ}\text{C}$
Storage Temp./Humidity	$25\pm5^{\circ}\text{C}$ / <70%

Material Safety Data Sheet

ITEM : PSM-800@ /SMH-800

Identity (Trade Name As Used On Label)

SECTION 1 IDENTIFICATION

Manufacturer

UNIRES CHEMICAL INDUSTRIAL CO., LTD.

Address

22CHING CHIAN 4thRD.KUANYIN INDUSTRIAL

DISTRICT TAOYUAN HSIEN TAIWAN

Phone Number (For Information)

886-3-4836651 (fax)886-3-4837487

Emergency Phone Number

Telex * **886-3-4836651**

MSDS Number* **20110701AAA**

CAS Number*

07/01/2011

Data Prepared

HUANG CHIN HUAI

Prepared By*

Note: Blank spaces are not permitted. If any item is not applicable, or no information is available, the space must be marked to indicate that.

SECTION 2 COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENTS	CAS No.	CONTENTS(%)	OSHA (PEL)	ACGIH (TLV)
Heavy aromtic naphtha(petroleum)	64742-94-5	<12%	N.D.	N.D.
Epoxy-Acrylic derivative	Trade secret	<48%	N.D.	N.D.
Barium sulfate	7727-43-7	<20%	dust 15mg/m3	10mg/m3
Silica, amorphous, fused	7631-86-9	<8%	N.D.	dustTLV10mg/m3
Dipropylene glycol methyl ether	34590-94-8	<12%	100ppm	200ppm

SECTION 3 HAZARDS IDENTIFICATION

INHALATION : Highly concentrated vapor irritates nose, throat ant and lungs. May cause headache and dizziness.

EYE CONTACT : Slight irritation

SKIN CONTACT : Slight irritation

INGESTION : Harmful, if swallowed.

SECTION 4 FIRST AID MEASURES

SKIN CONTACT : Wash with plenty of water using a soap. Do not use organic solvents.

EYE CONTACT : Rinse immediately with clean water for at least 15 minutes. If irritation persists, seek medical attention

INHALATION : Immediately carry the victim to a place where fresh air is available. If irritation persists, treat with oxygen and seek medical attention.

INGESTION :obtain medical advice immediately. It is not recommended that vomiting be induced except on medical advice

SECTION 5	FIRE-FIGHTING MEASURES
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SUITABLE EXTINGUISHING MEDIA	: Carbon dioxide, foam, powder.
UNSUITABLE EXTINGUISHING MEDIA	: water spray and water jet.
EXPOSURE HAZARDS	: Burning may release oxides of carbon, nitrogen, sulfur and other toxic gases or vapors. Do not release chemically contaminated water into drains or surface waters, and soil according to local regulations.
PROTECTIVE EQUIPMENT	: Use full protective clothing and self-contained breathing apparatus.
FIR FIREFIGHTERS MEASURES	: promptly move transferable containers to another safety area .Check the speed of fire. Extinguish the fire with suitable extinguisher from the windward side

SECTION 6	ACCTDENTAL RELEASE MEASURES
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PERSONAL PRECAUTION	: Avoid ignition sources. Avoid contact with skin, eyes and clothing. Avoid inhaling vapor.
ENVIRINMENTAL PRECAUTIONS	: Prevent contamination of soil, drains and surface waters
METHODS FOR CLEANING	: Scoop up or absorb into combustible material, wipe out a stain in use organic solvents. Dispose in accordance with local regulations.

SECTION 7	HANDLING AND STORAGE
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HANDLTNG	: Handle with care. Avoid ignition sources. Ensure good ventilation and local exhaust. Do not smoke at the workplace
STORAGE	: Store in the original sealed container at less than 20°C .Avoid direct exposure to UV and sunlights.

SECTION 8	EXPOSURE CONTROLS/PERSINAL PROTECTION
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People who know they are chemically sensitive, should avoid contact with this product.

TECHNICAL PROTECTIVE MEASURES	: No special safety measures required.
EXPOSURE CONTROL LIMITS	: (see PEL and TLV values shown in shown in section 2)
RESPIRATORY PROTECTION	: Wear suitable mask to avoid inhalation of vapor.
HAND PROTECTION	: wear chemical resistant gloves.
EYE PROTECTION	: wear safety glasses.
SKIN PROTECTION	: wear suitable protective working cloths.

SECTION 9	PHYSICAL AND CHEMICAL PROPERTIES
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BOILING	: *156°C(760mmHg)	COLOR	: black
FLASH	: 75.0°C	FORM	: Paste
VAPOR PRESSURE	: * 2.00mmHg(40°C)	VAPOR DENSITY	: *6.08(Air=1)
SOLUBILITY IN WATER	: * <10.7wt%	ODOR	: Mild odor
		SPECIFIC GRAVITY	: 1.18

*Data of the organic solvents or monomers contained in this product is product is quoted.

SECTION 10	STABILITY AND REACTIVITY
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STABILITY : Stable
CONDITIONS TO AVOID : Heat and sunlight.
MATERIALS TO AVOID : Strong acids, strong bases, peroxides and strong oxidizing agents.
HAZARDOUS DECOMPOSITION PRODUCTS : Burning may release oxides of carbon, nitrogen, sulfur and other toxic gases or vapors.

SECTION 11	TOXICOLGICAL INFORMATION
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PRIMARY ROUTE(S) OF ENTRY
☒ DERMAL ☒ INHALATION ☐ INGESTION

TOXICITY STUDIES : Toxicity studies have not been carried out in this product. Toxicity information available for the ingredients listed in section 2 is given below.

HEALTH HAZARDS
ACUTE INGESTION TOXICITY : N.E.
ACUTE SKIN IRRITATION : Slightly irritant
MUTAGENICITY : NONE

CARCINOGENICITY
☐ NTP ☐ IARC ☐ OSHA ☒ NOT LISTED

SYMPTOMS OF OVER EXPOSURE
INHALATION : Slight irritation to respiratory tract. Highly concentrated vapor may cause headaches, and nausea.
EYES : Slight irritation
SKIN : Slight irritation
INGESTION : Expected to have a low order of toxicity.

SEVTION 12	ECOLOGICAL INFORMATION
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ACUTE FISH TOXICITY : Ecological data are not available
BIODEGRADABILTY : No data available.

SEVTION 13	DISPOSAL CONSIDERATIONS
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Incineration or landfill in accordance with local regulations.

SEVTION 14	TRANSPORT INFORMATION
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ADR : Inflammable liquid
IMDG-CODE : Free
IATA : Free
US DOT : Combustible liquid

UN : Free
FLASH POINT : 75.0°C

SECTION 15	REGULATORY INFORMATION
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EEC LABELING : Harmful

RISK PHRASES : Harmful : may cause lung damage if swallowed. Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

SAFETY PHRASES : Avoid contact with skin.
: Do not breathe vapor.
: If swallowed, do not induce vomiting : seek medical advice immediately and show this container or label.
: Avoid release to the environment. Refer to special instructions/Safety data sheets.

SECTION 16	OTHER INFORMATION
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This product should be stored, handled and used in accordance with good industrial hygiene practices and in conformity with any legal regulation. The information contained herein is based on the present state of our knowledge and is intended to describe our products from the point of view of safety requirements. It should not therefore be construed as guaranteeing specific properties.

It may not be valid for this material, if used in combination with any other materials.

Material safety data sheet

Article and manufacturer informatio

Item name : KTM-150F WM
Ohter name: NONE
Recommended use: heat hardening printing ink
Name of manufacturer or supplier: supplier - keyway Technology Co., Ltd Manufacturer - kaiyao Technology Co., Ltd
Address of manufacturer or supplier: supplier - No.18, Lane 646, Boai street, Zhubei City, Xinzhu County Factory - No.18, Lane 646, Boai street, Zhubei City, Xinzhu County
Emergency contact: (03) 555-1822 Fax: (03) 553-1338

Hazard identification data

Hazard classification: flammable liquid, fire hazard Category 3, acute toxicity category 5.
Label content: flammable mixed solvent 
Symbols: warning:
Hazard warning message: flammable substances, may be harmful if inhaled.
Hazard prevention measures: tightly cover the container; keep away from the ignition source - no smoking; place the container in a well ventilated place; take off the clothes as soon as they are polluted; wear eye mask / face shield; do not eat or drink when using, and avoid release to the environment
Other hazards:

Component identification data

INGREDIENTS	% by Wt	CAS No.
Polyester resin (polymer)	20~25%	28064-14-4
Mixed solvent	20~25%	106-65-0; 1119-40-0; 627-93-0
Titanium dioxide	30~35%	13463-67-7
Filler	10~15%	14807-96-6
Hexamethylene diisocyanate refers to oligomer	5~10 %	21093-51-6
Butyl acetate	1~5%	627-93-0

First aid measures

First aid methods of different exposure routes:
Inhalation: 1. remove the patient to fresh air immediately. It can only cause nose irritation and may be harmful to people. Skin contact: 1. Immediately wash with water.
Eye contact: 1. Immediately open the eyelids and wash them with mild water.
Ingestion:
Most important symptoms:
Protection for first aid personnel: wear protective gloves to avoid contact with pollutants.
Tips for doctors:.

Fire fighting measures

Suitable extinguishing agent: dry powder

Special hazards that may be encountered during fire fighting:

Special fire fighting procedures: 1. Remove the container from the fire site and put out the fire in the upwind.

2. Stop leakage without endangering personnel safety.

3. If the leakage cannot be stopped and the surrounding area is empty, the fire will burn out.

Special protective equipment for firefighters: Firefighters must wear air breathing apparatus, fire clothing and protective gloves.

Leakage treatment method

Personal precautions: 1. Restrict personnel access until the overflow area is completely clean.

2. It is determined that the trained personnel are responsible for the cleaning work.

3. Wear appropriate personal protective equipment.

Environmental precautions:

1. Ventilate the area.

2. Extinguish or remove all sources of ignition.

3. Report to relevant units of safety, health and environmental protection of the government.

Cleaning method: 1. Do not touch the leakage. 2. Avoid discharging into sewer or other confined space. 3. Try to prevent or reduce the leakage under the condition of safety permission. 4. Use sand, soil or other absorbing substances that do not react with leakage substances to enclose the leakage. 5. In case of a small amount of leakage, absorb it with absorbent that will not react with the leakage. Contaminated absorbents and spills are equally hazardous and should be placed in properly capped and labeled containers. Flush the spill area with water. 6. In case of a large number of spills, contact the fire department, emergency treatment unit and supplier for assistance.

Safe handling and storage methods:

Without special measures, it is not inflammable and explosive.

Storage: no corrosive container, no reactivity, low flammability, non flammable.

Exposure precautions

Engineering control: local exhaust device or integral air exchange device.

Control parameters: eight hour daily average allowable concentration / short time

average allowable concentration / maximum allowable concentration:

Personal protective equipment: respiratory protection:

Hand protection: impervious gloves, butyl rubber recommended, Teflon, 4h, barricale, chemrel

Eye protection: 1. Goggles (minimum 8 inches). 2. splash proof safety goggles. 3. Do not wear contact lenses. Skin and body protection: chemical protective clothing.

Physical and chemical properties

Material state: viscous paste liquid shape: paste liquid

Color: smell: Fragrance

PH value: slightly acidic boiling point / melting point range: OC /---

Decomposition temperature: flash point not measured:

Test method: open cup and close cup

Autoignition temperature: explosion limit: LEL: uel:

Vapor pressure: vapor density: > 1 (air 1)/

Specific gravity: 1.2 ~ 1.4 (25 / 25 °C) for water solubility:

Stability and reactivity

Stability: under normal conditions
Possible hazardous reactions under special conditions:
Conditions to avoid:
Substances to be avoided: acids.
Hazardous decomposition:

Toxicity data

Exposure route: skin contact, eye contact, ingestion
Symptoms: eye damage
Acute toxicity: inhalation:
Skin: causes mild irritation. Eyes: cause mild irritation. Ingestion:
LD50 (test animal, absorption pathway) local effect:---
Sensitization:---
Chronic toxicity or long-term toxicity:
Special effect:.

Ecological data

Ecotoxicity:
Durability and degradability:
Bioaccumulation:
Mobility in soil:
Other adverse effects:

Waste disposal method

Waste disposal method:
1. Handle according to the current laws and regulations.
Consider sanitary burying or burning in a qualified solvent burning tower.

Delivery information

UN No:
UN transport Name:
Transportation hazard classification:
Packing category:
Marine pollutants (yes / no):
Special delivery methods and precautions:-

Other information

References: None
Prepared by: kaiyao Technology Co., Ltd. / No.18, Lane 646, Boai street, Zhubei City, Xinzhu County/ Tel:03-5551822 / Fax:03-5531338
Prepared by: Xie Jinqun
Prepared on: August 15, 2014
Note: the above information and data are for reference only. The user shall determine the feasibility of the application according to the application requirements.

MATERIAL SAFETY DATA SHEET

Section1 Preparation Identification and Company

Preparation Identification : Antioxidant stock solution DX-808HT

Manufacturers Name: Shenzhen Oriental Star Chemical Technology Co., Ltd.

Manufacturers Address: Dabandi Industrial Zone, Daning Village, Humen Town, Dongguan City, Guangdong Province

Emergency Telephone Number: 0769-85015502

Emergency Tex Number: 0769-85015500

Postal code: 523900

Section 2 Composition information on Ingredients

(Chemical Name)	(CASNO)	(Concentration)
Benzimidazole	95-14-7	1%
Formic acid	64-18-6	3%
Additives	-----	0.05%
DI water	7732-18-5	95.95%

Section 3 Hazards Identification

Safety and

Risk: DX-808HT contain formic acid which may cause severe burns.

Section 4 First Aid Measures

Eyes: flush with plenty of clean, cool water for 15 minutes and get immediate medical attention

Skin: flush with plenty of clean, cool water for 15 minutes

Ingestion: get immediate medical attention

Section 5 Fire Fighting Measures

Section 6 Accidental Release Measures

Personal Precautions: wears protective clothing, chemical safety goggles, respirator, face shield and rubber gloves

Clean-up Procedure: flush with plenty of clean, cool water

Section 7 Handling and Storage

Ventilation: Store indoors in a cool dry area

Temperature: Store indoors in a cool dry area

Containers : Keep containers tightly closed 。 Loosen closure cautiously when opening.

Incompatible Materials: alkalis and oxidizers

Pot Life: six months

Section8 Exposure Controls /Personal Protection

Ventilation: Exhaust ventilation is recommended

Respiration: respirator. Avoid breathing vapors or mist.

Eyes and Face: chemical safety goggles and face shield

Hands and Skin: rubber gloves

Clothing : protective clothing

Section 9 Physical and Chemical Properties

Appearance: light blue liquid

Odour: Light acetic acid

PH: 2.7 ± 0.3

Section 10: Stability and Reactivity

Chemical Stability:

Incompatible Materials: alkalis and oxidizers Section 11 Toxicological Information
NDA

Section 12 Disposal Consideration

Dispose of material in approved sites

Section 13 ecological information

Ecotoxicity: none

Biodegradability: No Non-biodegradability:

No Other Harmful Effects: No

Section 14 Regulatory Information General

Regulations:

Labor Safety and Hygiene Regulations

Specific Chemical Prevention Standards

Section 15 Shipping Information

Domestic transportation regulations: in
accordance with Article 84 Section 16 of
the Road Traffic Safety Regulations Other
information

Watchmaking unit: Shenzhen Dongfangxing
Chemical Technology Co., Ltd. Watchmaking
address: Watchmaking department of
Dabandi Industrial Zone, Daning Village,
Humen Town, Dongguan City: Quality
Department

Date of Tabulation: January 2017

3M™ 300LSE Adhesive Transfer Tapes: 8132LE, 8153LE, 9453FL, 9453LE, 9471FL, 9471LE, 9472FL, 9472LE, 9472LEU, 9653LE, 9671LE, 9672LE and 9698LE



Article Information Sheet

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This product is defined as an article based on the definition of an Article under China New Chemical Environmental Management Method MEP Decree No. 7, and does not require a Safety Data Sheet under Dangerous Chemical Safety Management Regulatory China State Council Decree No. 591 and China GB/T16483-2008 Safety Data Sheet for Chemical

Products Content and Order of Sections. This article information sheet (AIS) is provided as a courtesy in response to a customer request. When used as recommended or under ordinary conditions, the product 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.

Document Group: 07-7168-3
Issue Date: 2015/05/19

Version Number: 1.00
Supersedes Date: Initial Issue

SECTION 1: Identification

1.1. Product identifier

3M™ 300LSE Adhesive Transfer Tapes: 8132LE, 8153LE, 9453FL, 9453LE, 9471FL, 9471LE, 9472FL, 9472LE, 9472LEU, 9653LE, 9671LE, 9672LE and 9698LE

Other means of identification

1.2. Recommended use and restrictions on use

Recommended use

Bonding & Attachment, Industrial use

1.3. Supplier's details

Company: 3M Company
Division: Industrial Adhesives and Tapes Division
ADDRESS: 3M Center, St. Paul, MN 55144, USA
Phone: 021-22105335
FAX: 021-22105036
E Mail: Tox.cn@mmm.com
Website: www.3m.com.cn

1.4. Emergency telephone number

021-22105335

SECTION 2: Hazard identification

2.1. Classification of the substance or mixture

This product is considered to be an article and is exempt from GHS classification.

Document Group: 07-7168-3
Issue Date: 2015/05/19

Page 1 of 4

3M™ 300LSE Adhesive Transfer Tapes: 8132LE, 8153LE, 9453FL, 9453LE, 9471FL, 9471LE, 9472FL, 9472LE, 9472LEU, 9653LE, 9671LE, 9672LE and 9698LE

SECTION 3: Composition/information on ingredients

This material is a mixture.

Ingredient	C.A.S. No.	% by Wt
Paper or Film Liner	Mixture	Not Applicable
Acrylic Polymer Adhesive	Trade Secret	100

SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation:

No need for first aid is anticipated.

Skin Contact:

No need for first aid is anticipated.

Eye Contact:

No need for first aid is anticipated.

If Swallowed:

No need for first aid is anticipated.

SECTION 5: Fire-fighting measures

In case of fire: Use a fire fighting agent suitable for ordinary combustible material such as water or foam.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Not applicable.

6.2. Environmental precautions

Not applicable.

6.3. Methods and material for containment and cleaning up

Not applicable.

SECTION 7: Handling and storage

7.1. Precautions for safe 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. Conditions for safe storage including any incompatibilities

No special storage requirements.

SECTION 8: Exposure controls/personal protection

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. No engineering controls or personal protective equipment (PPE) are necessary.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	Solid
Specific Physical Form:	Roll of Tape
Appearance/Odor	Translucent adhesive, slight acrylate odor, paper or film quick release liner
Odor threshold	Not Applicable
pH	Not Applicable
Melting point/Freezing point	No Data Available
Boiling point/Initial boiling point/Boiling range	Not Applicable
Flash Point	Not Applicable
Evaporation rate	Not Applicable
Flammability (solid, gas)	Not Classified
Flammable Limits(LEL)	Not Applicable
Flammable Limits(UEL)	Not Applicable
Vapor Pressure	Not Applicable
Vapor Density	Not Applicable
Density	Not Applicable
Relative Density	Not Applicable
Water solubility	Nil
Solubility- non-water	Not Applicable
Autoignition temperature	Not Applicable
Decomposition temperature	Not Applicable
Viscosity	Not Applicable
Volatile Organic Compounds	Not Applicable
Percent volatile	Not Applicable
VOC Less H ₂ O & Exempt Solvents	Not Applicable

SECTION 10: Stability and reactivity

This material is considered to be non reactive under normal use conditions.

SECTION 11: Toxicological information

Inhalation:

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

Skin Contact:

No health effects are expected

Eye Contact:

No health effects are expected

Ingestion:

No health effects are expected

Additional Information:

This product, when used under reasonable conditions and in accordance with the 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

3M™ 300LSE Adhesive Transfer Tapes: 8132LE, 8153LE, 9453FL, 9453LE, 9471FL, 9471LE, 9472FL, 9472LE, 9472LE, 9472LE, 9653LE, 9671LE, 9672LE and 9698LE	
may affect the performance of the product and may present potential health and safety hazards.	(except as required by law). The information may
SECTION 12: Ecological information	
This article is expected to present a low environmental risk either because use and disposal are unlikely to result in a significant release of components to the environment or because those components that may be released are expected to have insignificant environmental impact.	not be valid for any use not referred to in this Information Sheet or use of
SECTION 13: Disposal considerations	
Dispose of contents/container in accordance with the local/regional/national/international regulations.	the product in combinat
SECTION 14: Transport Information	
Not hazardous for transportation.	ion with other
SECTION 15: Regulatory information	
15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture This product is an article and is exempted from Measures on Environmental Management of New Chemical Substances and from IECSC inventory listing requirements.	materials. For these reasons, it is important that customer s carry out their
SECTION 16: Other information	
References United Nations 'Recommendations on the Transport of Dangerous Goods - Model Regulations ' United Nations 'Globally Harmonized System of Classification and Labelling of Chemicals (GHS)'. Revision information: Conversion to AIS. DISCLAIMER: The information on this Article Information Sheet is based on our experience and is correct to the best of our knowledge at the date of publication, but we do not accept any liability for any loss, damage or injury resulting from its use	own test to satisfy themself es as to the suitability of the product for their own intended applications. 3M People's Republic of China AISs are available at www.3m.com.cn

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
RATION
COMMON CHEMICAL NAME : Polybutyleneterephthalate
SYNONYMS : Polybutyleneterephthalate(PBT)
INGREDIENTS AND COMPOSITION : PBT $\geq$ 80%, Phosphorus Flame retardant and others $\leq$ 20%
CHEMICAL FORMULA : $\text{C}_{10}\text{H}_{16}\text{O}_4$ (C₁₀H₁₆O₄)
SERIAL No IN OFFICIAL GAZETTE : 7-1039 (base resin)
(Law Concerning Examination and Regulation of Manufacture, etc., of Chemical Substances)
CAS No : 24968-12-5 (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/
- ditto - (Aspiration) 5 mg/
ACGIH TLV/1992 1993
Exposure limit of the powder TWA 10 mg/

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/

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)
 GAS No. : Copper: 7440-50-8, Tin: 7440-31-5, Phosphor: 7723-14-0
 Chemi

	Content(wt-%)	GAS No.
Tin(Sn)	7. 0~9. 0	7440-31-5
Phosohor(P)	0. 03~0. 35	7723-14-0
Coooor(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

Signature of Person in Charge

IZUMI, Chihiro

Address

3 Kurami Samukawa-cho
 Kouza-gun Kanagawa prefecture
 253-0101 JAPAN

Senior Technical Supervisor, Quality Assurance

Signature of Person Responsible

WATANABE, Hiroaki

Manager, Quality Assurance Section

Telephone Number for Information (Quality Assurance)

+81-467-75-7285

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

x

Section VI Health Hazard Data

Route(s) of Entry: Inhalation ?

Skin?

Ingestion ?

Health Hazardous (Acute and Chronic)

Carcinogenicity :

NTP?

!ARC Monographs?

OSHA Regulated ?

N/A

Signs and Symptoms of Exposure

Medical Conditions

Generally Aggravated by Exposure

Emergency and First Aid Procedures

Section VII Precautions for State Handlin_g_ and Use

Steps to Be Taken in Case Material Is Released or Spilled

Waste Disposal Method

Precautions to Be Taken in Handling and storing

For Handling

- 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.

For Storing

- The environment of stocking area should be free from acid, alkali, chloride, sulfide and other corrosive chemicals to or corrosion.

Other Precautions

Control Measures

Section VIII

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 Work / Hygienic Practices

Material Safety Data Sheet

1. Manufacturer

- Company HARADA Metal Industry Co.,Ltd.
- Address 10-18 Sasamekitamati, Toda, Saitama 335-0033, Japan
TEL 0 鈕 – 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					GAS No.
	C5210	C5212	C5191	C5102	05111	
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	74 𧀻 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	05111
Specific gravity	8.82	8.82	8.85	8.88	8.90
Meltingpoint	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