MSDS Number : GMS-E113A
Creation Date :Jul. 12,2012
Revision Date :

MATERIAL SAFTY DATA SHEET

1.CHEMICAL PRODUCT AND COMPANY

Product Name	TK672/CuNi30/kov/Ni
Product Code	
Company Name	Tanaka Kikinzoku Kogyo K.K. Hiratsuka Plant
Address	Tokyo Building,7-3 Marunouchi,2-chome,Chiyoda-ku,Tokyo Japan
Department	Quality Control Section,Hiratsuka Plant
Department Address	1-75,Shin-machi,Hiratsuka,Kanagawa,254-0076 Japan
Telephone	0463-32-4701
Emaergency	0463-32-4701

2.HAZARDS IDENTIFICATION

GHS CLASSIFICATION OF THE SUBSTANCE OR MIXTURE

2.1 TK672

PHYSICAL HAZARDS	Not classified
HEALTH HAZARDS	
Serious eye damages/eye irritation	Category 2B
Skin sensitization	Category 1
Specific target organ toxicity;single exposure	Category 1(Respiratory Kidney)
	Category 3(Respiratory tract irritation)
Specific target organ toxicity;repeated exposure	Category 1(Liver eyes lung)
	Category 1(Respiratory)
ENVIRONMENTAL HAZARDS	
Aquatic toxicity(acute)	Not classified
Aquatic toxicity(chronic)	Category 4

SYNBOL

SIGNAL WORD Danger

HAZARD STATEMENT

May cause allergic skin reaction.
Causes serious eye irritation.
May damage to respiratory .
May damage to eye and respiratory through prolonged or repeated exposure.
May cause long lasting harmful effects to aquatic life

2.2 CuNi30

PHYSICAL HAZARDS	Not classified
HEALTH HAZARDS	
Respiratory sensitization	Category 1
Skin sensitization	Category 1
Carcinogenicity	Category 2
Reproductive toxicity	Category 1B
Specific target organ toxicity;single exposure	Category 1(Respiratory Kidney)
	Category 3(Respiratory tract irritation)
Specific target organ toxicity;repeated exposure	Category 1(Respiratory Liver)
	Category 2(Nervous system)
ENVIRONMENTAL HAZARDS	
Aquatic toxicity(acute)	Not classified
Aquatic toxicity(chronic)	Category 4

SYNBOL

SIGNAL WORD Danger

HAZARD STATEMENT

May cause allergic skin reaction.
May cause allergy or asthma symptoms or breathing difficulties if inhaled
May cause respiratory irritation
Suspected of causing genetic defects
May cause long lasting harmful effects to aquatic life

2.3 Kov

PHYSICAL HAZARDS	Not classified
HEALTH HAZARDS	
Respiratory sensitization	Category 1
Skin sensitization	Category 1
Carcinogenicity	Category 2
Reproductive toxicity	Category 2
Specific target organ toxicity;single exposure	Category 1
Specific target organ toxicity;repeated exposure	Category 1
ENVIRONMENTAL HAZARDS	Not classified

SYNBOL

SIGNAL WORD Danger

HAZARD STATEMENT

May cause allergic skin reaction.
May cause allergy or asthma symptoms or breathing difficulties if inhaled
May cause cancer.
May damage to fertility or the unborn child.
May damage to respiratory and kidney.
May damage to respiratory through prolonged or repeated exposure.

2.4 Ni

PHYSICAL HAZARDS	Not classified
HEALTH HAZARDS	
Respiratory sensitization	Category 1
Skin sensitization	Category 1
Carcinogenicity	Category 2
Specific target organ toxicity;repeated exposure	Category 1(Respiratory Kidney)
Specific target organ toxicity;repeated exposure	Category 1(Respiratory)
ENVIRONMENTAL HAZARDS	
Aquatic toxicity(acute)	Not classified
Aquatic toxicity(chronic)	Category 4

SYNBOL

SIGNAL WORD Danger

HAZARD STATEMENT

May cause allergic skin reaction.
Causes eye irritation
May cause allergy or asthma symptoms or breathing difficulties if inhaled
May cause cancer.
May damage to respiratory and kidney.
May damage to respiratory and eye through prolonged or repeated

PRECATIONARY STATEMENTS

PREVENTION	Wash hand thoroghly after handling. Do not eat,drink or smoke when using this product. Use personal protective equipment as required.
RESPONS	if inhaled:Remove victim to fresh air and keep at rest in a position comfortable for breathing. if on skin:Wash with plenty of soap and water. if skin irritation occurs:Get medical advice/attention. if you feel unwell:Call a doctor.
STRAGE	Store locked up.
DISPOSAL	Dispose of contents/container in according with local/regional/national/international regulations(to be specifired).

3.CONPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE/MIXTURE: Article
CHEMICAL NAME: Ag+Cu+Sn/Cu+Ni/Fe+Ni+Co/Ni

	Component	Content(wt.%)	Chemical formula	CAS No.
TK672	Silver	67	AG	7440-22-4
	Copper	29	CU	7440-50-8
	Tin	4	SN	7440-31-5
CuNi	Copper	balance	CU	7440-50-8
	Nickel	29～33	NI	7440-02-0
	Manganese	0～1	MN	7439-96-5
Kov	Iron	54	FE	7439-89-6
	Nickel	29	NI	7440-02-0
	Cobalt	17	Co	7440-48-4
Ni	Nickel	100	NI	7440-02-0

4.FIRST AID MEASURES

IF INHALED	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER.
IF ON SKIN	Wash off soap and water. Take off contaminated clothing and wash before reuse. If skin irritation occurs or feel unwell,get medical advice/attention.
IF IN EYE	Rinse carefully with water for several minutes.Remove contact lenses,if present and easy to do.Continue rinsing. If eye irritation persists,get medical advice/attention.
IF SWALLOWED	Rinse the patient mouth with water. Get medical advice/attention immediately.

5.FIRE-FIGHTING MEASURES

FIRE AND EXPLOSION HAZARDS	Neigligible fire and explosion hazard in tha puroduct form.Dust/air mixtures may ignite or explode.
EXTINGUISHING MEDIA	Dolomite,dry powder for metal fires,dry sand,graphite,soda ash,sodium chloride. Do not get water directly on material.
FIRE FIGHTING	Keep unnecccessary people away,isolate hazard are and deny entry. Use extinguishing agents appropriate for surounding fire. Avoid inhalation of material or combustion by products.
SPILLAGE MEASURES	The product is solid and spillage measures are not required.

6.ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS	Fobid any person without wearing proper protection equipments into the spilled area. Ventilate the spilled are.
ENVIRONMENTAL PRECAUTIONS	Do not let this chemical enter the environment.
METHOD AND MATERIALS FOR CONTAINMENT AND CLEANING	After recovery,neutralize the spilled are.

7.HANDRING AND STORAGE

HANDLING	Do not contact,inhale and ingest. Wash hands thoroughly after handling. Do not eat,drink or smoke when using this product.
STORAGE	Keep containers tightly closed and storage in well ventirated areas. The storehouse should be locked.

8.EXPOSURE CONTROLS/PERSONAL PROTECTION

EXPOSURE LIMITS	Silver	TWA 0.1mg/m3	ACGIH
	Copper	TWA 0.2mg/m3 (Copper,Fume)	ACGIH
	Nickel	TWA 1.5mg/m3 (I) (as Ni)	ACGIH
	Manganese	TWA 0.2mg/m3 (as Mn)	ACGIH
	Cobalt	TWA 0.02mg/m3 (as Co)	ACGIH
	Tin	TWA 2mg/m3 (as Sn)	ACGIH

ENGINEERING MEASURE	Do not use in area without adequate ventilation and local exhaust ventilation. Make available in the work area with emergency shower and eye washer.

PERSONAL PROTECTION

RESPIRATORY	Industrial canister gas masks.
HAND	Chemical-resistant gloves.
EYE	Safety goggles or face shield.

9.PHYSICAL AND CHEMICAL PROPERTIES

STATE	Solid
MELTING POINT	No data
DENSITY	No data
ODOUR	Not applicable
PH	Not applicable
VAPOR PRESSURE	Not appricable
SOLBILITY	Not soluble in water

10.STABILITY AND REACTIVITY

STABILITY	Stable for normal storage and handling
REACTIVITY	No data available.

11.TOXICOLOGICAL INFORMATION

ECUTE EXPOSURE	ORAL	No data available.
	SKIN	No data available.
	INHALATION	No data available.

12.ECOLOGICAL INFORMATION

BIODEGRABILITY	No data available.
BIOACCUMULATION	No data available.

13.DISPORSAL CONSIDERATIONS

Recommend for recycling by an sxpert company.
Disporsal in accordance with all appricable regulations.

14.TRANSPORT INFORMATION

Follow all regulation on the transport in your country or region.

15.REGULATORY INFORMATION

Regulatory information with regard to this preperration in your contry or region should be examined by your own responsibility.

16.REGARDING THE COMENT

All information included this MSDS is for appropriate use of the product defined above and is not applicable for a deviate use.
This MSDS is not a document for guarantee against safety.

Material Safety Data Sheet

No.SCS-J-1276

IDENTITY SMD PACKAGE for 440

Section I

Manufacturer's Name KYOCERA CORPORATION	Emergency Telephone Number (075)604-3500 Head Office(Japan)
Address 6 Tobadono-CHO, Takeda, Fushimi-KU, Kyoto 612-8501 Japan.	Telephone Number For Information (075)604-3500 Head Office(Japan) Date Prepared Feb. 27, 2012
Contact Point: R. TAKADO Title: SMD PACKAGE DIV.Engineering Manager	R. Takado

Section II - Hazardous Ingredient/Identity Information

Hazardous Components		CAS No.	ACGIH	Wt%
Ceramics				
Aluminum oxide	Al2O3	1344-28-1	TLV:10mg/m3(as powder)	Above 87
Silicon oxide	SiO2	7631-86-9	TLV:0.1mg/m3(as powder)	Below 4
Chromium oxide	Cr2O3	1308-38-9	TLV:0.5mg/m3(as Cr)	Below 4
Titanium oxide	TiO2	13463-67-7	TLV:10mg/m3(as powder)	Below 2
PLATE				
Gold	Au	7440-57-5	None	
Nickel	Ni	7440-02-0	TLV:1mg/m3(as TWA)	
METALLIZING				
Tungsten	W	7440-33-7	TLV:5mg/m3(as TWA)	Above 99

No.SCS-J-1276

Section Ⅲ -Physical/Chemical Characteristics

Boiling Point	Not applicable	Specific Gravity	Not applicable
Vapor Pressure	Not applicable	Melting Point	Not applicable
Vapor Density	Not applicable	Evaporation Rate	Not applicable
Solubility in Water	Insoluble		
Appearance and Odo	Black(CERAMICS),Gold(PLATE) and no smell		

Section Ⅳ -Fire and Explosion Hazard Data

Flash Point(Method Used)	Not applicable	Flammable Limits	Not applicable
Extinguishing Media	Not applicable		
Special Fire Fighting Procedures	None		
Unusual Fire and Explosion	Not combustible.		

Section Ⅴ -Reactive Data

Stability	Unstable		Condition to Avoid
	Stable	×	
Incompatibility	Solder and pins react with strong acids		
Hazardous Decomposition or Byproducts	None		

Hazardous Polymerization	May Occur		Condition to Avoid
	Will Not Occur	×	

Section Ⅵ -Health Hazard Data

Route(s) of Entry	Inhalation?	Skin?	Ingestion?
	Will Not Occur	Will Not Occur	Will Not Occur

Health Hazards(Acute and Chronic)

Not applicable.

Carcinogenicity	NTP?	IARC Monographs?	OSHA Regulated?
	Not applicable	Not applicable	Not applicable

Signs and Symptoms of Exposure Not applicable

Medical Condition Generally Aggravated by Exposure

Not applicable

Emergency and First Procedures

First hold the eyelids open and flush the eyes with plenty of fresh water.

Then take a doctor.

Section Ⅶ -Precautions for Safe Handling and Use

Steps to be Taken in Case Material is Released of Spilled

Collect the material into a container for disposal.

Waste Disposal Method

Waste material can be disposed to bury according to Federal, State and Local Regulations.

Precaution to be Taken in Handling and Storing

Handling:

Do not drop material. Do not knock materials alternately or against hard solids.

Use gloves in case of touching to materials directly. sinn

Storing: Indoor storage in dry condition. Keep apart from strong acids

Section Ⅷ -Control Measure

Respiratory Protection(Specific Type)

Extra personal protection: P2 filter respirator for harmful particles, in case of heating in air

Ventilation	Local Exhaust Maintain levels below ACGIH.	Special Not applicable
	Mechanical(General) Not applicable	Other Not applicable

Protective Gloves Use gloves	Eye Protection Use safety goggles, in case of heating in air.

Other Protective Clothing or Equipment

Unnecessary

Work/Hygienic Practices

Depending on the degree of exposure, periodic medical examination is indicated.

NAME	DRAWING No.
TFX-03	KD-VB0983-C

10-B0416

Safety Data Sheet

1. Product and company identification

Product name	: Synthetic quartz crystal, substrate
Manufacturer	: TOKYO DENPA CO., LTD.
Address	: 020-0854 1-5-10, Kamiiioka, Morioka-shi, Iwate, Japan
Name of Section	: Product development department
Telephone number	: 019-637-8100
FAX number	: 019-637-3432

. Date of issue 14, May, 2012

2. Classification of danger and hazard

Name of classification	: It doesn't correspond to the classification criterion.
Danger	: Igniting and explosion hazard none of this material. Static electricity might be worn when transporting with piping and the container of electro conductive and storing it. Therefore, take the electrification prevention measures when you treat the material of the flammability in surroundings.
Hazard	: The silicosis is caused when sucking with the fine particle.
Environmental effects	: There is no report.

3. Composition/Information on ingredients

Substance/Mixture	: Substance
Chemical name	: Synthetic quartz crystal
Ingredients and composition	: 99.99%
Chemical formula	: SiO_2
Reference Number in Gazetted List in Japan Law Concerning the Examination and Regulation of Manufacture, etc of Chemical Substances Japanese Chemical Substances Control Act	: Off the subject
Occupational Health and Safety Law	: 1-548
CAS No.	: 7631-86-9
UN No.	: There is no correspondence

4. First aid measures

Eye contact : Wash the affected areas under running water at least 15 minutes. It is noted might damage the eyeball with the thing pointed out when washing it. When there

are a pain and congestion, get medical attention.

Skin contact : Wash the body site that comes in contact in using enough of water, soap or the detergent for the skin. When the change is seen in externals or there is a pain, get medical attention.

Inhalation : Remove the victim to fresh Air, and make him blow his nose and gargle. When it is necessary, get medical attention.

Ingestion : The victim makes to the rest and get medical attention at once. The vomiting thing doesn't swallow.

5. Fire fighting measures

Extinction method : Nonflammable

Extinguishing media : There is no specification

6. Accidental release measures

The leakage thing is collected to the container that can be sealed up, and moved to the safe place.
Treat waste based on applicable laws and regulations.
Wear an appropriate protective equipment.

7. Cautions of handling and storage

Handling : To prevent the worker's inhalation, take the following treatment.
1. The generation of dust is prevented as much as possible.
2. Exhaust it locally.
3. The worker correctly wears the dust mask.

Storage : Avoid the place the high temperature and humidity.
Note the damage of the container to prevent the product from dispersing.

8. Exposure preventive measure

Material name : Silicon dioxide

Administrative levels : It doesn't correspond to working environment criterion.

Japan Society for Occupational Health Version in 1998
: TWA 2mg/m^3 (Inhaled dust)

American Conference of Governmental Industrial Hygienists Version in 1997
: TWA 10mg/m^3 (Total dust)
: STEL Unsetting

Occupational Safety and Health Act Version in 1993
: PEL 80mg/m^3/%SiO_2

・Measures : To prevent the worker's inhalation, the following treatment is taken.
1. The generation of dust is prevented as much as possible.
2. Exhaust it locally.
3. The worker correctly wears the dust mask.

・Protective equipment

Respiration : Dust mask

Eyes : Safety glasses or goggle

Hands : Gloves that do not infiltrate organic solvent or chemical

9. Physical and chemical properties

- Appearance : Colorless, scentless solid
- Melting point : 1750℃
- Solubility : It dissolves to the fluorinated acid and the strong alkali.
- Volatility : No data

10. Information on danger

- Flash point (℃) : none
- Fire point (℃) : none
- Explosion limit Upper bound (%) : none
  Lower bound (%) : none
- Flammability : none
- Ignition : none
- Oxidation : none
- Self-combustibility : none
- Explosiveness : none
- dust explosiveness : none
- Stability and reactivity : It dissolves to the fluorinated acid and the strong alkali.

11. Toxicological information

- Acute toxicity	: Rat oral	LD50	3160mg/kg
	: Rat intraperitoneal	LDL_0	50 mg/kg
	: Guinea pig intraperitoneal	LDL_0	120 mg/kg
	: Rat vein	LD50	15mg/kg
	: Rat trachea	LDL_0	10 mg/kg
- Carcinogenicity	: JSOH, OSHA, NTP, IARC There is not a description.		
- Mutagenicity	: Unscheduled DNA synthesis Rat trachea 120mg/kg		
	: Rat body fluid 120mg/kg		
- Others	: Oncogenesis Rat inhalation TCL0 50mg/m^3/6h/2 year-I		

12. Ecological information

Degradability : Not available
Accumulation : Not available
Fish toxicity : Not available
Others : Note handling because it might influence the environment when leaking and annulling it.

13. Disposal consideration

Process it in conformity to “Waste Disposal and Public Cleaning Law”.

14. Consideration on transport

10-B0416

- It follows the description of the paragraph of the attention when handling is kept.
- Fire and Disaster Management Act, Occupational Health and Safety Law, Poisonous and Deleterious Substance Control Law, According to transportation method established in each pertinent law.
- According to providing in Ship Safety Act.
- According to providing in Civil Aeronautics Act.

15. Applied law

- Food Sanitation Law

16. Others

About the description
There might be incompleteness in information because it investigates neither the entire material nor the document. Moreover, the change is caused by the announcement of a new finding in the content.
Whether the source is thoroughly examined when using it for the monumental decision is recommended to be confirmed by the examination.
Any guarantee is not done for data and the evaluation of the description.
The description matter is the one intended for usual handling. Please execute the security precaution that is appropriate for the usage newly when you do special handling.

References

* Kagakuhin hourei syuu, The Chemical Daily Co., Ltd. 1991
* DANGEROUS PROPERTIES OF INDUSTRIAL MATERIALS N.IRVING SAX 1991

It is not necessarily enough though this data is due to the finding at the time of making and note handling enough.

GHS Material Safety Data Sheet

MSDS No. : CRE02TAEG

Date Issued: 2009/04/21
Last update: 2010/06/03

Section 1. Identification of the substance or mixture and of the supplier

1.1 Product Information

Product name: Chromium,target

Product number:	—
Purity, Form, Size (mm)	—,target ,Various sizes

1.2 Company Information:

Manufacturer : Kojundo Chemical Laboratory Co., Ltd.
1-28, 5-chome, Chiyoda, Sakado-shi, Saitama Japan 350-0284
Phone: +81-49-284-1511 Fax: +81-49-284-1351

Emergency Phone : +81-49-284-1511

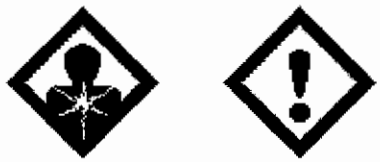
Section 2. Hazards identification

GHS Classification

Health Hazards	Environmental Hazards	Physical Hazards
Respiratory sensitization : Category 1 Skin sensitization : Category 1 Specific target organ toxicity, single exposure : Category 3	No data available	Not classified.

GHS Label: C, W

Pictograms or symbols



Warning word: DANGER	
Hazard information **May cause allergy or asthma symptoms or breathing difficulties if inhaled..** **May cause an allergic skin reaction.** **May cause respiratory irritation.**	**Description of precaution** Wear protective gloves/protective clothing/ eye protection/ respiratory protection / face protection during handling. Avoid breathing dust/fume/mist. Do not eat, drink or smoke when using this product, and wash hands thoroughly after handling. Take off the contaminated clothing and wash before reuse. Contaminated work clothing should not be allowed out of the workplace. Use only outdoors or in well-ventilated area. IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. IF ON SKIN; Remove immediately all contaminated clothing and rinse skin with water/shower. Then wash skin with plenty of soap and water. If skin irritation occurs, get medical advice/attention. Call a POISON CENTER or doctor/physician if you feel unwell. Protect from sunlight. Store in a cool, dry and well ventilated place. Keep container tightly closed. Store locked up. Dispose of contents/ container in accordance with local / national regulations.

Additional hazard information :

Hazards mainly originate in dusting.

With respect to additional hazard information, see Section 11.

Section 3. Composition / information on ingredients

Chemical or common name:	Chromium
Chemical formula:	Cr
Single Substance or Compound:	Single substance
Composition:	100%
CAS #:	7440-47-3
RTECS#:	GB4200000
TSCA inventory :	listed
EINECS:	2311575

Section 4. First aid measures

Eye contact:	Promptly wash eyes with plenty of water while lifting the eye lids. Continue to rinse for at least 15 minutes and get medical attention.
Skin contact:	Promptly flush contaminated skin with soap or mild detergent and water. Contact physician if irritation continues.
Inhalation:	Remove the exposed person immediately and provide fresh air. Get medical attention.
Ingestion:	Rinse mouth and throat with water. Get medical attention immediately.

Section 5. Fire fighting measures

Extinguishing media:	This product cannot catch fire. Use media appropriate for surrounding fire.
Fire fighting:	The product is nonflammable.

Section 6. Accidental release measures

Personal Precautions: Workers should use protective wears to prevent contact with the spilt adhesive and inhalation of its vapor/dusts.

Environmental hazard precautions:

Shut off leak if without risk.

Prevent flow out to river, etc. so as not to badly affect.

Method for containment and cleaning up:

Indoor leakage: Ventilate as much as possible until the cleaning is completed.

Outdoor leakage: Work from the windward and evacuate the leeward crowd.

Gather up, pack in closed container as much as possible.

Carefully collect remnant and move to a safe place.

Section 7. Handling and storage

Precautions to be taken in handling:

Safe handling: Use protective wears and local ventilation equipment, if inhalation or skin contact is foreseen.

Precautions to be taken in storage:

General precautions: Store in a cool, dry place away from incompatible materials.

Section 8. Exposure controls / personal protection

Exposure guideline:

Chemical Name	ACGIH(2008) TLV-TWA mg/m^3	OSHA(2006) PEL-TWA mg/m^3
Chromium Cr	0.5	1

Facility measures: Local ventilation of closed work room or total proper ventilation to prevent inhalation.

Protective ware: Wear appropriate NIOSH/MSHA-approved respirator, safety goggles, face shields, protective gloves.

Section 9. Physical and chemical properties

Color and Form:	Metallic silver solid
Chemical formula:	Cr
Atomic weight:	52.0
Melting point:	1860℃
Boiling point:	2671℃
Density:	7.19 g/cm^3
Water solubility:	insoluble
Flammable:	non-flammable substance
Oxidation:	None

Section 10. Stability and reactivity

Stability: Stable.

Reactvity

Incompatibility: Strong acids, strong oxidizing agents.

Condition to avoid: No data available.

Section 11. Toxicological information

Hazards mainly originate in dusting.

Acute toxicity: GHS ; No data available.

Skin corrosive / irritation: GHS : No data available.

Serious eyes damage / eye irritation: GHS : No data available.

Respiratory sensitization: GHS : Category 1
My cause allergy or asthma symptoms or breathing difficulties if inhaled

Skin sensitization: GHS : Category 1
May cause an allergic skin reaction

Germ cell mutagenicity: GHS : No data available.

Carcinogenicity: GHS ; Not classified.; Falls below the lowest level.

Carcinogenicity:

Chemical Name	ACGIH (2008)	IARC (2009)	NTP (2005)
Chromium	A4	3	−

ACGIH(2008) A4 Not classifiable as a human carcinogen.
IARC(2009) 3 Not classifiable as to its carcinogenic to humans.

Reproductive toxicity: GHS : No data available

Specific target organ toxicity −single exposure: GHS ; Category 3
May cause respiratory irritation

Specific target organ toxicity −repeated exposure: GHS : No data available

Aspiration hazard: GHS ; No data available

Section 12. Ecological information

Ecotoxicity:
Hazards to the aquatic environment−acute toxicity: GHS : No data available
Hazards to the aquatic environment−chronic toxicity: GHS ; No data available

Fish toxicity: No data available

Degradability: No data available

Bioaccumulative potential:

Ingredients Name	Biological half-life (day)	Rate of absorption oral	Rate of absorption respiratory tract
Cr	616	< 0.005	0.25

Ozone layer: No Freon or Halon.

Section 13. Disposal considerations

Disposal method: User of the product should contract with the local government or licensed 'Industrial Waste Haulers' for disposal of waste.

Section 14. Transport information

UN classification:	Non-hazards
UN number:	None
HS code:	8112.29
Marine pollution:	None
Precautions:	Container should be transported in a secure position, in a well-ventilated vehicle.

Section 15. Regulatory information

TSCA inventory : listed.

Please refer to any other local / national measures that may be relevant.

Section 16. Other information

The information described above is believed to be correct. However, Kojundo Chemical Lab. makes no representation, warranty nor guarantee of any kind with respect to the information on this data sheet or any use of the product based upon this information.

Material Safety Data Sheet

COMPANY AND CHEMICAL PRODUCT IDENTIFICATION

COMPANY	:	Tanaka Kikinzoku Kogyo K.K.
PLANT	:	Tomioka Plant
ADDRESS	:	820-1,Ichinomiya Aza-oshidashi, Tomioka,Gunma,370-2452 Japan
SECTION TAKING CHARGE IN	:	Quality Control Section Section chief : Tsuru Shuichi
TELEPHONE NUMBER	:	+81－274－62－5611
EMERGENCY TELEPHONE NUMBER	:	+81－274－62－5611
REVISION DATE	:	29th Aug. 2008 （P001）

MSDS NUMBER : MSDS_0063-P00_Au_4N_E

CHEMICAL PRODUCT IDENTIFICATION, COMPOSITION AND INFORMATION ON INGREDIENTS

CHEMICAL FAMILY	:	Metal
SUBSTANCE	:	Au
COMPONENT	:	Au 99.99%up
ELEMENT AND PERCENTAGE	:	Au
CAS NUMBER	:	Au : 7440－57－5

HAZARDS IDENTIFICATION

HAZARDS RATINGS	:	No rating is suitable for the requirement.
PHYSICAL HAZARDS	:	Negligible fire and explosion hazard in bulk form.
MAJOR HEALTH HAZARDS	:	No significant target effects reported.
ECOLOGICAL HAZARDS	:	No significant target effects reported.

FIRST AID MEASURES

EYE CONTACT	:	Flush eyes with plenty of water, then get immediate medical attention.
SKIN CONTACT	:	Wash skin with soap and water while removing contaminated clothing. Get medical attention, if needed.
INHALATION	:	If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. Get immediate medical attention.
INGESTION	:	If a large amount is swallowed, get immediate medical attention.

FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARDS	:	Negligible fire and explosion hazard in the product form. Fine powder/particle may ignite or explode.
EXTINGUISHING MEDIA	:	dolomite, dry powder for metal fires, dry sand, soda ash, sodium chloride
FIRE FIGHTING	:	Keep unnecessary people away, isolate hazard are and deny entry. Use extinguishing agents appropriate for surrounding fire. Avoid inhalation of material or combustion byproducts.
SPILLAGE MEASURES	:	The product is solid and spillage measures are not required. Fine powder/particle have to be recovered and kept in an inert gas atmosphere. Keep the fine powder/particle away from hydrocarbons.

HANDLING AND STORAGE

HANDLING : Wear appropriate chemical resistance clothing and gloves for preventing discoloration.
Pay heed to scratching and deformation by strike or impact.
Do not change product shape by heating, lathing, polishing and other ways.

STORAGE : Vacuum packed and keep at room temperature.
Store and handle in accordance with all current regulations and standards. Keep separate from incompatible substance.

EXPOSURE CONTROLS AND PERSONAL PROTECTION

EXPOSURE LIMIT : No occupational exposure limits established.

VENTILATION : Provide local exhaust or process enclosure ventilation system.

PERSONAL PROTECTION

EYE PROTECTION : Wear splash resistant safety goggles. Provide an emergency eye wash fountain and quick drench shower.

GLOVES : Wear appropriate chemical resistant gloves.

CLOTHING : Wear appropriate chemical resistant clothing.

RESPIRATOR : Under conditions of frequent use or heavy exposure,respiratory protection may be needed.

Respiratory Protection is ranked in order from minimun to maxmum.Consider warning properties before

Any dust,mist,and fume respirator.

Any air-purifying respirator with high-effciency particulate filter.

Any powdered,air-purifying respirator with a high-effciency particlate filter.

PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	:	Solid
PHYSICAL FORM	:	Solid Plate
BOILING POINT	:	2967℃
MELTING POINT	:	1063℃
WATER SOLUBILITY	:	insoluble
COLOR	:	yellow
ODOR	:	Not available
VAPOR PRESSURE	:	Not applicable
SPECIFIC GRAVITY	:	19.3 (water=1)

STABILITY AND REACTIVITY INFORMATION

REACTIVITY : Stable at normal temperature and pressure in the product form.

CONDITIONS TO AVOID : Avoid generating dust. Avoid heat, flames, sparks and other sources of ignition.

INCOMPATIBILITIES : Combustible materials, bases, halocarbons, halogens, peroxides, acids, oxidizing materials.

IGNITABILITY : Negligible hazard in the product form. Fine powder/particle may ignite or explode.

OXIDATION HAZARD : Negligible hazard in the product form. Fine powder/particle may ignite or explode.

SELF-REACTIVITY : Negligible self-reactivity in the product form.

SELF-EXPLOSIVITY : Negligible explosion hazard in the product form. Fine powder/particle may ignite or explode.

OTHER HAZARDS : Fine powder/particle may behave as an oxidation catalyst and accelerate reaction between hydrocarbon and oxygen in the air resulting explosion and fire.

TOXICOLOGICAL INFORMATION

SKIN CONTACT	:	Chronic exposure may cause localized argyria.
ACUTE EXPOSURE	:	Impregnation of the mucous membranes by fine particle may cause localized argyria.
CHRONIC EXPOSURE	:	Chronic exposure to dust of the alloy may cause a permanent localized discoloration of the
TUMORIGENIC DATA	:	No data available.
GENITAL TOXICICITY	:	
DEFORMITY DATA	:	
OTHERS	:	

ECOLOGICAL INFORMATION

DECOMPOSITION	:	No data available.
ACCUMULATION	:	
FISH TOXICITY	:	
OTHER TOXICITY	:	

DISPOSAL CONSIDERATION

Recommend for recycling by an expert company.
Disposal in accordance with all applicable regulations.

TRANSPORT INFORMATION

No classification assigned.

Pay heed to packing in order to prevent from scratching and deformation of the product.

REGULATORY INFORMATION

PRTR CLASSIFICATION : No classification assinged.

REGARDING THE CONTENT :

Contents of this MSDS are not obtained from all available materials and literatures therefore lack of information may exist. In addition to this, the information is revised and updated based on new discoveries/theories. For that reason, in case the information is used for an important matter, referring to further materials/literatures and confirming by experiments are highly recommended. All information included this MSDS is for appropriate use of the product defined above and is not applicable for a deviate use. This MSDS is not a document for guarantee against safety.

TANAKA KIKINZOKU KOGYO K.K. Tomioka Plant Quality Control Section

Safety Data Sheet

Issued Date: January 25, 2011
Revised Date: May 20, 2011

1. IDENTIFICATION

PRODUCT NAME	ThreeBond 3303Y
ISSUED NUMBER	kenkyukanri 2878-3
NAME OF MANUFACTURER	Three Bond Co., Ltd.
ADDRESS	1456, Hazama-cho, Hachioji-shi, Tokyo, Japan
NAME OF SECTION	Administration Department Research Division
TEL / FAX NUMBER	+81-42-661-1367 / +81-42-669-7235
EMERGENCY TEL NUMBER	+81-42-661-1367
RECOMMENDED USE AND RESTRICTION ON USE	Adhesive and sealant

2. HAZARDS IDENTIFICATION

GHS CLASSIFICATION

PHYSICAL HAZARDS	Flammable liquids	Not classified	
HEALTH HAZARDS	Serious eye damage/Eye irritation	Category 2B	
	Skin sensitization	Category 1	
	Germ cell mutagenicity	Category 1B	
	Specific target organ toxicity after repeated exposure	Category 1	(Eye)
ENVIRONMENTAL HAZARDS	Acute hazards to the aquatic environment	Category 2	
	Chronic hazards to the aquatic environment	Category 2	

*Not above mentioned hazard classification items; Not classified or Not classifiable.

LABEL ELEMENTS

SYMBOL

SIGNAL WORD: Danger

HAZARD STATEMENT

H320	Causes eye irritation
H317	May cause an allergic skin reaction
H340	May cause genetic defects
H372	Causes damage to organs (Eye) through prolonged or repeated exposure
H401	Toxic to aquatic life
H411	Toxic to aquatic life with long lasting effects

NOTICE

SAFETY MEASURE	Use personal protection and ventilation equipment to avoid exposure, if necessary. Wear appropriate chemical protectors; gloves, and/or glasses when handling Avoid release to the environment.
FIRST AID MEASURE	If you feel unwell, remove victim to fresh air and keep at rest in a position comfortable for breathing. If on skin: Wash with plenty of soap and water. Remove contaminated clothing. If skin irritation or rash occurs: Get medical advice, attention. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical advice, attention.
STORAGE	Keep container tightly closed. Protect from direct sunlight. Store the product at moderate temperature.
DISPOSAL	Solicit waste disposal management experts.

GHS Hazard Communication is mentioned in accordance with Japanese Law.

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3. COMPOSITION / INFORMATION ON INGREDIENTS

SUBSTANCE/MIXTURE: Mixture

CHEMICAL COMPOSITION

INGREDIENTS	Wt%	Formula	CAS Number
Silver powder	74	Ag	7440-22-4
Silicone resin, Epoxy resin	5 — 15	—	—
Silica	5 — 15	SiO_2	—
Mineral spirit	1 — 10	—	—
Ethanol	< 1	CH_3CH_2OH	64-17-5

IMPURITIES AND STABILIZING ADDITIVES WHICH ARE THEMSELVES CLASSIFIED AND WHICH CONTRIBUTE TO THE CLASSIFICATION OF THE SUBSTANCE: No information

4. FIRST-AID MEASURES

IF INHALED: In case of poisoning, remove victim to fresh air, calm down, keep warm then get medical advice, attention.

IF ON SKIN: Wash soap and water. Remove contaminated clothing.
If skin irritation or rush occurs, get medical advice, attention.

IF IN EYES: Rinse cautiously with water for several minutes.
Remove contact lenses, if present and easy to do. Continue rinsing, then get medical advice, attention.

IF SWALLOWED: Rinse mouth.
Get medical advice, attention.

5. FIRE-FIGHTING MEASURES

EXTINGUISHING MEDIA: Dry powder, alcohol-resistant foam and carbon dioxide extinguisher, dry sand, water spray

SPECIFIC HAZARDS ARISING FROM THE CHEMICAL: May produce poisonous and irritated gasses upon a fire.

SPECIFIC FIRE FIGHTING MEASURES: Workers should wear appropriate protectors (glasses, cloths, mask for poisonous gasses, etc.),then extinguish should be performed up wind.

6. ACCIDENTAL RELEASE

PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT AND EMERGENCY PROCEDURES
Wear appropriate protective equipment (refer to 8. Exposure Control/Personal Protection) to avoid contact to eyes, skin and inhalation.

ENVIRONMENTAL PRECAUTIONS, RECOVERY/NEUTRALIZATION
Take precaution to prevent product to flow into rivers and effect environment.

METHODS AND MATERIALS FOR CONTAINMENT AND CLEANING UP
In case of a small spill, absorb with dry sand, soil, sawdust, cloth, etc., then place in a sealable container.
In case of large spills, dike and prevent overflow. Guide to a safe place then dispose properly.

SECONDARY ACCIDENT PREVENTION MEASURE
All ignition sources should be quickly removed. (No smoking in vicinity, prohibit sparks or fire sources)

7. HANDLING AND STORAGE

HANDLING

ENGINEERING MEASURES: Wear protective equipment. Perform engineering measures in accordance with「8. Exposure Control / Personal Protection」.

LOCAL VENTILATION /GENERAL VENTILATION: Perform local and general ventilation in accordance with「8. Exposure Control/Personal Protection」.

SAFETY HANDLING PRECAUTIONS: Take precautions against fire

STORAGE

ENGINEERING MEASURES: Keep container tightly closed. Protect from direct sunlight. Store the product at moderate temperature.
Refer to the technical data, specifications, and a product label about handling range of temperature.

CONTAINER AND PACKAGING MATERIALS: Keep only in original container. Do not transfer the product to another container.

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8. EXPOSURE CONTROL / PERSONAL PROTECTION

CONTROL PARAMETERS

	ACGIH TLV	OSHA PEL
Silver powder	0.1 mg/m^3	0.01 mg/m^3(as Ag)
Silica	Not established	Not established
Mineral spirits	Not established	Not established
Ethanol	1000 ppm	1000 ppm

ENGINEERING MEASURES: If handling this product indoors, seal off sources or use a local mechanical ventilation system, etc.
Place a safety shower, hand washing sink and an eye bath near work area and clearly marked.

PERSONAL PROTECTION EQUIPMENT

- RESPIRATORY PROTECTION: Wear mask to prevent organic gas poisoning, if necessary.
- HAND PROTECTION: Wear appropriate protective gloves (Polyethylene, rubber, etc., solvent impervious materials).
- EYE PROTECTION: Use eye protection. (preferably goggles)
- SKIN AND BODY PROTECTION: Wear personal protection apron, boots, if necessary. Do not work with short sleeve shirts.
- SANITARY MEASURES: Wash hands thoroughly after handling. Do not eat, drink or smoke when using this product.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE

- APPEARANCE: Paste
- COLOR: Silver
- ODOR: Distinctive odor
- FLASHPOINT: Non-flammable
- SOLUBILITY: Slightly soluble in water
- VISCOSITY: 40 Pa･s

PHYSICAL STATE as Silver

- MELTING POINT/FREEZING POINT: 960.5 ℃(in Vacuum), 950℃(Equilibrium to oxygen)
- BOILING POINT (INITIAL AND RANGE): 1980℃
- SPECIFIC GRAVITY (DENSITY): 10.49(20℃), 9.4(961℃, liquid)

PHYSICAL STATE as Silica

- MELTING POINT/FREEZING POINT: 1710 ℃, 1600-1750 ℃(Sublimation at 1750 ℃)
- BOILING POINT (INITIAL AND RANGE): 2230℃
- SPECIFIC GRAVITY (DENSITY): 2.65(20℃)
- SOLUBILITY: Water: 0.2g(100ml, 3N Ammonia water, 18 ℃)
  Slightly soluble in water

PHYSICAL STATE as Mineral spirits

- FLASHPOINT: >30℃

PHYSICAL STATE as Ethanol

- MELTING POINT/FREEZING POINT: Still no freeze at -117.3 ℃, -100 ℃
- BOILING POINT (INITIAL AND RANGE): 78.3℃
- FLASHPOINT: 13℃
- EXPLOSION LIMIT: 3.3% - 19.0%
- VAPOR PRESSURE: 5.33 kPa(20 ℃)
- VAPOR DENSITY: 1.6(Air =1)

10. STABILITY AND REACTIVITY

STABILITY: Reacts upon high temperature.

POSSIBLY HAZARDOUS REACTION: Suddenly reacts with strong oxidizers, strong inorganic bases.
When hardening in large quantity, product may generate a great deal of heat.
During sudden hardening a harmful gas is produced; may cause carbonization or decomposition.

CONDITION TO AVOID: High temperature during storage.

INCOMPATIBLE MATERIALS: Oxidizer, inorganic bases.

HAZARDOUS DECOMPOSITION: Incineration may produce poisonous gasses (Carbon monoxide, Metal fume, etc.) upon condition.

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11. TOXICOLOGICAL INFORMATION

HEALTH HAZARDS

ACUTE TOXICITY	No data as product
SKIN CORROSION/IRRITATION	No data as product

Information on GHS Hazard Communication is in accordance with Japanese Law

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL HAZARDS

HAZARDS TO THE AQUATIC ENVIRONMENT	No data as product
ECOTOXICITY	No data

Information on GHS Hazard Communication is in accordance with Japanese Law

13. DISPOSAL CONSIDERATIONS

METHOD OF DISPOSAL	To dispose product, solicit waste disposal management experts. Prohibited that to dispose the waste or waste liquid containing the product in the river, etc., to reclaim, to dump the product as it is.
CONTAMINATED CONTAINERS AND PACKAGING	Handle in used container and cloth same as above.

14. TRANSPORT INFORMATION

INTERNATIONAL REGULATION

SEA TRANSPORTATION	Not applicable
UN number	Not applicable
AIR TRANSPORTATION	Not applicable
UN number	Not applicable

15. REGULATORY INFORMATION

Handle in accordance with applicable laws and regulations.

16. OTHER INFORMATION

Portions of the above evaluation of dangerous and harmful effects may be insufficient, please perform adequate investigation.
The content in this report is based on information which was available as of the Effective date.
But Three Bond Co., Ltd. and its affiliates are not responsible for guaranteeing the above data and evaluations.
The above data assumes usage under normal working conditions.
In case of special handling is required, please handle with suitable safety measures according to the application and usage.
The content in this report may change due to new evaluation and tests, etc.
In case there are differences in the translation, the Japanese language version takes precedence.