

MATERIAL SAFETY DATA SHEET

Date : Dec. 18, 2009

Revised Date of the Latest Version : Sep. 7, 2011

1. Product and Company Identification

«Material Identification»

Product Name : Chukoh Flo[®] Copper-Clad Laminates
Applicable Product Number : CGA-500 series

«Company Identification»

Company Name : CHUKOH CHEMICAL INDUSTRIES, Ltd.
Headquarters' Address : ATT New Tower 10F, 2-11-7, Akasaka, Minato-ku, Tokyo, JAPAN
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2. Hazard Identification

«Classification of the Product» Not applicable

«Hazardousness» Not applicable

«Potential Health Effects»

There is no hazard on normal handling. When PTFE is heated, the thermal decomposition (such as fumes) will be formed. Some stimulation may cause in human's eyes, nose and lungs when the one inhales it.

«Environmental Influence»

See Section 12 Ecological Information

3. Composition/ Information on Ingredients

Substance or Preparation : Preparation

Main composition and contents. :

Component	① Poly-Tetra-Fluoro Ethylene (PTFE)	② Clothes of Aluminous-Borosilicate Glass Fiber (Non-Alkaline)	③ Copper	③ Aluminum Oxide	
Content	34 ~ 46%	21 ~ 35%	14 ~ 26 %	4.5 ~ 5.5 %	
Reference No. in gazetted list in Japan (CSCL Act & ISH Act)	6-939	Not applicable	Not applicable	1-23 1-23	
CAS No.	9002-84-0	65997-17-3	7440-50-8	1344-28-1	
Chemical Formula	-(CF ₂ -CF ₂) _n -	Amorphous Glass Structure	Cu	Al ₂ O ₃	
Notifiable Substance	Industry Safety & Health Act	Not applicable	Not applicable	Applicable	Applicable
	PRTR Act	Not applicable	Not applicable	Not applicable	Not applicable

4. First Aid Measures

Eye Contact : In case of eye contact with its dust, flush eyes immediately with plenty of water. If he/she has an inflamed eye or an itch eye, seek medical attention.

Skin contact : Basically, PTFE has no hazard in case of skin contact, however it is recommended to wash skins after handling it. If the molten polymer gets on skin, cool quickly with cold water, do not peel solidified resin off from one's skin. For thermal burns, seek medical attention.

Inhalation : In case of inhaling particles or dust of the product, gargle sufficiently. If anything unusual occurs, seek medical attention. If the worker inhales fumes produced by heating or burning the resin, move him to the place where there is a fresh air. After that, seek medical attention, if necessary.

Accidental Ingestion: It is non-toxic essentially, however, medical attention is recommended, if any unusual occurs.

5. Fire Fighting Measures

« Extinguishing Method »

PTFE, itself is a fire retarding material. Therefore, on extinguishing the fire, do cut supplying any combustible resource and do fight the fire, though the fire continuing in the atmosphere of over 95% oxygen gas.

« Extinguishing Media »

Water, Foam, Dry Chemical, Carbon Dioxide may be used accordingly.

« Fire Fighting Equipment »

- Wear full protective equipment and self-contained breathing apparatus. Because Hydrogen fluoride fumes emitted during the fire can react with water, such as, human's sweat, to form hydrofluoric acid. And approach to the fire from the windward side to avoid inhaling toxic gas/vapors.
 - Wear neoprene gloves when handling or removing fired refuses of the product.
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6. Accidental Release Measures

Collect the released products as much as possible, and dispose them by following the method shown Section 13, Disposal Considerations. See Section 5,7,8.

7. Handling and Storage

« Handling »

- Smoking is prohibited at the handling area. Avoid contamination in order not to stain a cigarette or a tobacco with the dust of PTFE because the stained PTFE reacts and becomes to the toxic gas/vapors by heating on his smoking.
- Wash hands and face sufficiently after handling the product.
- Pay attention neither to transfer nor to carry the dust of the product resin to another place.
- Do not heat up nor use the products over 260°C. Install a ventilation fan, if it is expected to expose or to use the product at the place over 260°C.

« Storage »

- Store the product on the condition of a room temperature and in a dark place. We recommend to store the product under 25°C and less than 60% humidity condition.
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8. Exposure Controls/ Personal Protection

«Engineering Controls»

Not set up

«Limitation of dust density»

Not set up any allowable limit nor control range.

«Facilities Consideraion»

Install a ventilation fan, if it is expected to expose or to use the product at the place over 260°C.

«Protective Equipment»

No requirement unless necessary for protection from thermal burns. It is recommended to wear mask and glasses against feather or fine particles on processing exposed over 260°C.

9. Physical/ Chemical Properties

«Physical Data»

Appearance	:Brown
Boiling Point	: None
Melting Point	: ①327°C
Vapor Pressure	: None

«Chemical Data»

Solubility	:①、③、④ Insoluble in water	② Almost insoluble in water.
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10. Stability and Reactivity

«Flammable Properties»

Flash Point (°C)	: Not applicable
Ignition Point(°C)	: Not applicable
Combustibility	: ①Flame Retardancy ②、③、④None

①This material is stable in normal handling and condition.

Remark : It may cause on fire or explosion by reacting to the metal powder, such as, aluminum or magnesium, or to the oxidizer, such as fluorine gas(F₂) or chlorine tri-fluoride(ClF₃).

②This is stable chemically.

③Stable. The product occur very sensitive compounds about collision from acetylene compound and azide compound.

When the product is heated, harmful metal fume will be formed.

It may cause patina by contacting of CO₂, SO₂ in humid Atmosphere.

Not dissolve in HCl and diluted H₂SO₄, but gradually dissolve by means of containing of O₂.

On the other hand, HNO₃ and heat concentrated H₂SO₄ can erode the product.

Dissolve in ammonium water and KCN solution in the presence of O₂.

④Dissolve in Acids and Alkalis

11. Toxicological Information

①

《Acute Toxicity》

LD₅₀ in mouse : 12,500mg/kg

《Animal Data》

It has no stimulatibility by a skin contact.

It shows that no fatal toxicity was found by frequent ingestion.

There is no report about genetic toxicity in a test on animals and in a test on germ culture.

《Carcinogenic Data》

There is no specified report for the product from OSHA, NTP.

The product is nominated Group 3 of IARC Classification.

《In the Case of Thermal Decomposition of PTFE》

Influence to Human Health : If the man inhales the fume produced from PTFE by combustion, there is a fear that he catches a temporary polymer fume fever similar to influenza, sometimes for a day or two. There is neither report about the sensibility nor concerning absorbing from his skin.

Influence of Hydrogen Fluoride : If the man inhales a low density Hydrogen Fluoride gas, he may feel some difficulty in breathing. Then he coughs, and catches inflamed eyes, nose, and throat. He reaches finally to Dyspnea, Cyanosis, or Edema of the lungs.

Influence of Carbonyl Fluoride :

Skin : Suffering from a discomfort or an eruption

Eyes : Suffering from an ulcer of corneas or conjunctivas

Respiratory Organs : Suffering from an stimulation

Lungs : Suffering from temporary inflammations, such as, cough, discomfort, dyspnea, or difficulty in breathing. (If the person is a patient of a lung disease, he/she tends to be suffered from above disease easily.)

②、③、④Hazardous Case to a man(including epidemiological information)

Skin inflammability : ④It may cause rough dry skin when you contact directly for long times.

Stimulativity<Skin or eyes> : ③Stimulation of eye. If the man inhale the vapor, there is a fear that he catches a metal fume fever and follows cough and sore throat.

④Stimulation of eye mucos membrane and superior air-passages.

Sensitization : ③If the man contact to skin in repeating and long term use, there is a fear that he catches inflammation of skin.

Acute Toxicity(including LD₅₀) : ③TDL 120 μg/kg (RTECS) in human.

Suffering from stomachache, diarrhea, nausea.

④Oral -Dose Rat >5,000mg/kg

Sub acute Toxicity	: No data
Chronic Toxicity	: ③Suffering from changing of color against hear and skin. If the man inhale the high concentration vapor, there is a fear that he catches a inflammation of lung. ④Inhalation—Mouse LCL ₀ 357mg/m ³
Carcinogenicity	: No data
Mutagenicity (including microbe & chromosome aberration)	: No data
Reproductive Toxicity	: No data
Deformability	: No data
other (including substance which emit hazardous gas on reacting with water)	: None

12. Ecological Information

Decomposability	: No Data
Biological Condensability	: No Data
Toxicity of fish	: No Data

13. Disposal Considerations

The waste product and the packing material stuck the resin must be isolated from other kind wastes with some exclusive can or container. Preferred options for disposal is a disposal in a landfill, which is permitted, licensed or registered by a government to manage industrial incombustible waste.

These disposals must be committed in accordance with applicable federal, state/provincial, and local regulations.

14. Transport Information

Take care not to treat a product container violently, such as, impingement, falling, tumbles, and also, take care not to impinge, fall, or tumble the packing on loading.

UN. Number of Transportation : Not applicable

15. Regulatory Information

See Item 3.

16. Miscellaneous

«MSDS Status»

This English MSDS is revised conforming to International Standard ISO11014-1: Material Safety Data Sheet for Chemical Product.

《 Caution 》

The product described here is neither the product for implant nor the equipment, which is contact with the body fluid or living organizations. Therefore, it is strictly recommended that you should consult to us in advance, if it is expected to use or to install the product in some medical field.

References

- (1) " Fluoro-plastics handbook": Japan fluoro-polymers Industry Association issued in '08.
- (2) " Fluoro-plastics Treating Handbook": Japan fluoro-polymers Industry Association issued in '08
- (3) "Thermal Decomposition of a Product of Fluoro-plastics"
: State Labor Safety & Health Laboratories in U.S.A issued in'82.
- (4) Model sheet of MSDS made by Japan fluoro-polymers Industry Association.
- (5) MSDSs made by other material manufacturers.

Chukoh Chemical Industries, Ltd. believes that the information contained herein is accurate as of the date hereof. However, it is not described all of the information about the chemical product, and it will be revised by new discovery or information without notice.

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End of MSDS