

MATERIAL SAFETY DATA SHEET (MSDS)

File No. 4052-1

Prepared on

Sep. 1, 2001

1. CHEMICAL PRODUCT & COMPANY IDENTIFICATION

CHEMICAL PRODUCT NAME : Vectra E130i
NAME OF COMPANY : Polyplastics Co., Ltd.
SECTION IN CHARGE : Quality Assurance Department
ADDRESS : 3-2-5 Kasumigaseki, Chiyoda-ku, Tokyo
TELEPHONE NUMBER : 03-3593-2181
FACSIMILE NUMBER : 03-3593-2189

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE/MIXTURE : Mixture
CHEMICAL NAME : not open
SYNONYM(S) : Aromatic Liquid Crystal Polymer(LCP)
CAS REGISTRY NUMBER : not open
INGREDIENTS AND COMPOSITION : LCP 70%, Glass fiber 30%
CHEMICAL FORMULA : not open
File No. in Official gazette : not open
(Japanese Chemical Substances Control Law)
UN CLASS : Not applicable
UN NUMBER : Not applicable

3. HAZARDS IDENTIFICATION

CLASS OF HAZARDOUS CHEMICALS FOR MSDS IN JAPAN : Not applicable
PHYSICAL AND CHEMICAL HAZARDS: Neither dangerous reaction, fire nor explosion
can be caused under normal conditions .

4. FIRST-AID MEASURES

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.

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.

INHALATION

When a gas generated from the molten polymer has been inhaled, remove fresh air without delay and wait until the victim is recovered.

If sick feeling continues, ask a physician for advice.

INGESTION

Help to vomit as much as possible. If sick feeling continues, and ask a physician for advice.

5. FIRE-FIGHTING MEASURES

FIRE-EXTINGUISHING MEASURES:

Extinguish the fire with water. A method of extinguishing an ordinary fire may be applied.

(Caution) 1) Incomplete combustion leads to generation of toxic gases such as carbon monoxide , in addition to carbonic acid gas and water.

2) In case the fire gained force, use a gas mask or other protective equipment.

3) Do not apply water directly to processing machines.

FIRE-EXTINGUISHING AGENTS:

Water, foam fire-extinguishing agent, powder fire-extinguishing agent, and carbon dioxide gas.

6. ACCIDENTAL LEAKAGE MEASURES

When pellets were spilled on the road or floor, wipe them off with a broom or cleaner. 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: 1) LCP resin in a pellet form will neither ignite nor explode at room temperatures.

2) LCP resin pellets spilled on the floor are likely to cause slipping. Remove such spillage at any times.

- 3) For molding work, effective means for local exhaust are required to discharge gases generated by melt processing.
- 4) Avoid inhaling of gases generated in moulding work.
Do not directly touch resin of high temperature.
- 5) Avoid retaining hot resin in the processing machines for many hours.
- 6) Glass fibers are not generally exposed in a single substance under normal processing and handling conditions as they are compounded in pellets. However, the following measures will be necessary to minimize the exposure to glass fibers or dusts containing glass fibers, when pellets or molded parts containing glass fibers are cut, ground or burnt, depending on environmental and operational conditions.

Handling

- Those who are sensitive in skin to glass fiber should wear suitable(protective) clothes to minimize the exposure of their skin.
- Wash working clothes apart from other laundry, so that the latter will not cause contamination with glass fibers.
- Provide the workshop with partitions to prevent diffusion of glass fiber dusts.
- Pay precautions not to rub face, neck or arms with hands. Wash hands and gargle after working without fail.
- Keep dust sources totally enclosed.
- Provide local air exhausters and implement periodical inspections and adjustments at least once a year.
- Reduce cutting and grinding processes to the possible minimum, and devise working procedures to minimize dust generation.
- Provide dust-preventive masks, protective glasses and gloves for personal hygiene.
- Determine the operational environment at indoor working places and confirm the effects of environmental improvement.

Note) Glass fibers are, like road dusts, told to be least hazardous to human bodies, but proper measures are required to avoid useless inhaling.

- STORAGE :
- 1) Keep the substance away from any fire or heat sources for the sake of safe storage.
 - 2) LCP resin should be handled in accordance with municipal rules and regulations.

8. EXPOSURE CONTROL / PERSONAL PROTECTION

CONTROL CONCENTRATION : None at present

PERMISSIBLE EXPOSURE CONCENTRATION:

OSHA PEL (nuisance/inert dust)

total 15 mg/m³

respirable 5 mg/m³

ACGIH TLV (nuisance particulates)

total 10 mg/m³

respirable 3 mg/m³

Japan Industrial Hygienists Society/1992 Class 3 dust

total 8 mg/m³

respirable 2 mg/m³

ENGINEERING MEASURES:

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 : Pellet

DENSITY : 1.61 g/cm³

BOILING POINT : Not applicable

MELTING POINT : 335°C~345°C

VAPOR PRESSURE : Not applicable

VOLATILITY : Not applicable

SUBLIMATION : None

SOLUBILITY IN WATER : Insoluble

10. PHYSICAL HAZARD (STABILITY AND REACTIVITY)

FLASH POINT :

IGNITION POINT : 540°C or higher

DUST EXPLOSIVENESS

UPPER EXPLOSION LIMIT : Not applicable

LOWER EXPLOSION LIMIT : 35 g/cm³

| | |
|----------------------------|---|
| INFLAMMABILITY | : Self-extinguishing |
| SPONTANEOUS COMBUSTIBILITY | : None |
| REACTIVITY WITH WATER | : None |
| OXIDIZABILITY | : None |
| SELF-REACTIVITY | : None |
| STABILITY | : Stable for normal storage or handling |
| OTHERS | : None |

11. TOXICOLOGICAL INFORMATION

| | |
|---|--|
| ACUTE TOXICITY (INCLUDING LD ₅₀) | : No finding |
| SUBACUTE TOXICITY | : No finding |
| CHRONIC TOXICITY | : No finding |
| SKIN CORROSIVE PROPERTIES | : No finding |
| SENSITIZING & IRRITANT EFFECTS | : Gas generated in drying or melting is irritating eyes and skins. |
| CARCINOGENECITY | : No finding |
| MUTAGENECITY (Micro organisms, 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 |
| (Remarks) "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. | |

OTHER CAUTIONS:

- 1) With regard to dust, the maximum permissible concentration and limits are fixed by OSHA, ACGIH and Japan Industrial Hygienists Society.
- 2) Information on hazards of glass fibers as filler.

Effects on Human Bodies

(1) Effects on the skin

Stimulation to the skin with glass fibers may be caused when glass fibers diameter is larger than 4.5~5 μ m. They give mechanical stimulation followed by itchiness to the skin, but further continuous exposure reportedly results in extinction of stimulation. It may sometimes leads to irritable dermatitis complicated with urticaria or eczema-like reaction. It is, however reported that such dermatitis is not so serious in general and does not last too long. Therefore, skin stimulation can be prevented by proper use of glass fibers.

(2) Effects on Tumor

Investigations made on glass fibers till today reveal that there is neither increase in mortality of glass fiber production workers due to lung cancer or mesothelioma nor such cases reported.

Animal Test Report

It is suggested that carcinogenicity of mineral fibers is dependent on their shapes rather than on their constituents. According to a report on experiments using 17 kinds of artificial mineral fibers in various sizes prepared by Dr. Stanton of National Cancer Institute, in USA, statistical studies on correlations between the diameter and length of fibers and the coincidence of mesothelioma have revealed that mineral fibers having a diameter smaller than $0.25\ \mu\text{m}$ and a length larger than $8\ \mu\text{m}$ are closely related to the coincidence of cancers. Since these experiments were performed by artificially dosing the subject animals with a large quantity of glass fibers and consequently they are quite different from the actual exposures to human bodies, it is told to be problematic to make a conclusion that mineral fibers are hazardous to human health, basing on the results obtained from these experiments. Upto the present time, there is no result obtainable to demonstrate a mechanism of glass fibers causing lung cancers in spite of experiment by long exposure to glass fibers with high concentration.

12. ECOLOGICAL INFORMATION

| | |
|------------------|--------------|
| BIODEGRADABILITY | : No finding |
| BIOACCUMULATION | : No finding |
| FISH TOXICITY | : No finding |
| OTHERS | : |

13. DISPOSAL CONSIDERATION

- (1) This is designated as waste plastics among industrial wastes by the Wastes Disposal Law. Dispose waste Vectra through licensed wastes handlers or local autonomous bodies if they are handling wastes disposal.
- (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

- (1) Handle with care so as not to give damages to containers or not to be subjected to wetting.

(2) Secure the containers firmly so as not to cause collapsing.

15. REGULATORY INFORMATION

(1) Wastes Disposal Law designates it as 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.

Please contact Quality Assurance Department of Polyplastics Co., Ltd. for further information.

(Telephone Number 03-3593-2181).