SAFETY DATA SHEET

Date Printed : 03 May 2010
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Version : rev 2

1. IDENTIFICATION OF THE SUBSTANCE AND OF THE COMPANY
1.1 Product identifier
  Name of the Product : KEPA1130, KEPA1150

1.2 Relevant identified uses of the substance or mixture and uses advised against
  Relevant identified uses : Parts of automobile, Cables, General industrial parts etc.
  Uses advised against : No information

1.3 Details of the supplier of the Safety Data Sheet
  Company name : KUMHO POLYCHEM CO., LTD.
  Address : #144-6, Weoulha-dong, Yeosu-City, Cheonranam-Do, Korea
  Contact Telephone : +82-61-688-2825
  Fax : +82-61-688-2850
  Email Address : spkjg09@polychem.co.kr

1.4. Emergency Telephone : +82-61-688-2700 (Fax: +82-61-688-2899)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture
  Not classified according to OSHA 29 CFR 1910.1200

2.2 Label elements
  Pictogram and symbol : Not applicable
  Signal word : Not applicable
  Hazard statements : Not applicable
  Precautionary statements
    Precaution : Not applicable
    Treatment : Not applicable
    Storage : Not applicable
    Disposal : Not applicable

2.3 Other hazards : No information available

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Common Name(Synonyms)</th>
<th>CAS number</th>
<th>EC number</th>
<th>Content (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>maleic anhydride</td>
<td>2,5-Furandione</td>
<td>108-31-6</td>
<td>203-571-6</td>
<td>&lt;1.0 %</td>
</tr>
<tr>
<td>ETHYLENE-PROPYLENE COPOLYMER</td>
<td>1-PROPENE, POLYMER WITH ETHYLENE</td>
<td>9010-79-1</td>
<td>618-455-4</td>
<td>50~100 %</td>
</tr>
<tr>
<td>Polypropylene</td>
<td>1-Propene, homopolymer</td>
<td>9003-07-0</td>
<td>618-352-4</td>
<td>0~30 %</td>
</tr>
<tr>
<td>ETHENE OCTENE COPOLYMER</td>
<td>ETHENE-1-OCTENE COPOLYMER</td>
<td>26221-73-8</td>
<td>607-890-5</td>
<td>0~50 %</td>
</tr>
</tbody>
</table>

4. FIRST-AID MEASURES

4.1 Description of first aid measures
  After eye contact : - In case of contact with substance, immediately flush eyes with running water at least 20 minutes.
  After skin contact : - In case of contact with substance, immediately flush skin with running water at least 20 minutes.
  - Remove and isolate contaminated clothing and shoes.
  - Wash contaminated clothing and shoes before reuse.
  - Get immediate medical advice/attention.
  After inhalation : - Specific medical treatment is urgent.
  - Move victim to fresh air.
  - Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.

**After ingestion:**
- Do not let him/her eat anything, if unconscious.
- Get immediate medical advice/attention.

### 4.2 Most important symptoms and effects

**Acute effects**
None known.

**Delayed effects**
None known.

### 4.3 Indication of immediate medical attention and notes for physician

- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

### 5. FIRE-FIGHTING MEASURES

#### 5.1 Extinguishing media

**Suitable Extinguishing Media:**
- Dry sand, dry chemical, alcohol-resistant foam, water spray, regular foam, CO₂

**Unsuitable Extinguishing Media:**
- High pressure water streams

#### 5.2 Special hazards arising from the substance or mixture

- May be ignited by heat, sparks or flames.
- Containers may explode when heated.
- Some of these materials may burn, but none ignite readily.
- Fire will produce irritating and/or toxic gases.
- If inhaled, may be harmful.

#### 5.3 Advice for firefighters

- Dike fire control water for later disposal; do not scatter the material.
- Move containers from fire area if you can do it without risk.
- Fire involving Tanks; Cool containers with flooding quantities of water until well after fire is out.
- Fire involving Tanks; Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- Fire involving Tanks; Always stay away from tanks engulfed in fire.

### 6. ACCIDENTAL RELEASE MEASURES

#### 6.1 Personal precautions, protective equipment and emergency procedures

- Eliminate all ignition sources.
- Stop leak if you can do it without risk.
- Please note that materials and conditions to avoid.
- Ventilate the area.
- Do not touch or walk through spilled material.
- Prevent dust cloud.

#### 6.2 Environmental precautions

- Prevent entry into waterways, sewers, basements or confined areas.

#### 6.3 Methods and material for containment and cleaning up

- Small Spill: Flush area with flooding quantities of water. And take up with sand or other non-combustible absorbent material and place into containers for later disposal.
- Large Spill: Dike far ahead of liquid spill for later disposal.
- With clean shovel place material into clean, dry container and cover loosely; move containers from spill area.

### 7. HANDLING AND STORAGE

#### 7.1 Precautions for safe handling

- Please note that materials and conditions to avoid.
- Wash thoroughly after handling.
- Please work with reference to engineering controls and personal protective equipment.
- Be careful to high temperature.

#### 7.2 Conditions for safe storage, including any incompatibilities

- Store in a closed container.
- Store in cool and dry place.

7.3 Specific end use(s)
- None

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters

Occupational Exposure Limits:

- Korea regulation: maleic anhydride TWA = 0.4 mg/m³
- ACGIH regulation: maleic anhydride TWA 0.01 mg/m³ (inhaled fraction and vapor)
- Biological exposure index: No information available
- OSHA regulation: maleic anhydride: TWA = 0.25 ppm (1 mg/m³)
- NIOSH regulation: maleic anhydride: TWA = 1 mg/m³
- EU regulation: Not applicable

8.2 Exposure controls

Appropriate engineering controls:
- Provide local exhaust ventilation system or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.

Individual protection measures, such as personal protective equipment:

Respiratory protection:
- Wear NIOSH or European Standard EN 149 approved full or half face piece (with goggles) respiratory protective equipment when necessary.
- In case exposed to particulate material, the respiratory protective equipments as follow are recommended: facepiece filtering respirator or air-purifying respirator, high-efficiency particulate air (HEPA) filter media or respirator equipped with powered fan, filter media of use (dust, mist, fume)
- In lack of oxygen (< 19.5%), wear the supplied-air respirator or self-contained breathing apparatus.

Eye protection:
- Wear facepiece with goggles to protect.
- An eye wash unit and safety shower station should be available nearby work place.
- Wear breathable safety goggles to protect from particulate material causing eye irritation or other disorder.

Hand protection:
- Wear chemical resistant gloves.
- Wear appropriate protective gloves by considering physical and chemical properties of chemicals.

Body protection:
- Wear appropriate protective chemical resistant clothing.
- Wear appropriate protective clothing by considering physical and chemical properties of chemicals.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Solid (Pellet)</td>
</tr>
<tr>
<td>Description</td>
<td>Solid (Pellet)</td>
</tr>
<tr>
<td>Color</td>
<td>White</td>
</tr>
<tr>
<td>Odor</td>
<td>Slight Odor</td>
</tr>
<tr>
<td>Odor threshold</td>
<td>Not available</td>
</tr>
<tr>
<td>pH</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Melting point/freezing point</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Initial boiling point and boiling range</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>
Flash point: 250 °C
Evaporation rate: Not applicable
Flammability (solid, gas): Not available
Upper/lower flammability or explosive limits: Not applicable
Vapor pressure: Not applicable
Solubility (ies): Insoluble in water
Vapor density: Not applicable
Specific gravity: 0.86 ~ 0.89
Partition coefficient: n-octanol/water: Not applicable
Auto ignition temperature: Not available
Decomposition temperature: 300 °C
Viscosity: Not applicable
Explosive properties: Not applicable
Oxidizing properties: Not applicable
Molecular weight: 100,000 ~ 600,000

9.2 Other information: No information available

10. STABILITY AND REACTIVITY

10.1 Reactivity/Chemical stability/Possibility of hazardous reactions
- Fire may produce irritating and/or toxic gases.
- If inhaled, may be harmful.

10.2 Conditions to avoid: Heat, sparks or flames

10.3 Incompatible materials: Combustibles

10.4 Hazardous decomposition products: Irritating and/or toxic gases

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicology effects

Acute toxicity:
- Oral: Not classified
  - maleic anhydride: Rat LD_{50} = 400 mg/kg
  - maleic anhydride: Rabbit LD_{50} = 2,620 mg/kg
- Dermal: Not classified
- Inhalation: Rat LD_{50} > 4.35 mg/L/1hr

Skin Corrosion/ Irritation:
- maleic anhydride: In test on skin irritation with rabbits, skin irritations were observed.

Serious Eye Damage/ Irritation:
- maleic anhydride: In test on eyes irritation with rabbits, eyes irritations were observed. (GLP)

Respiratory sensitization:
- maleic anhydride: In test on Respiratory sensitization with rats, respiratory sensitizations were observed.

Skin Sensitization:
- maleic anhydride: In test on Skin sensitization with mice, skin sensitizations were observed.

Carcinogenicity:
- IARC: Polypropylene: Group 3
  - maleic anhydride: A4
- ACGIH: maleic anhydride: In test on carcinogenicity with rats, carcinogenicity was not observed. (OECD TG 451)

Mutagenicity:
- maleic anhydride: In the ames test, the result of the assay was negative.
Reproductive toxicity; Not classified
- **maleic anhydride**: In the toxicity to reproduction test using rat, there were no effects on clinical signs, mortality (OECD TG 416, GLP)

Specific target organ toxicity (single exposure); Not classified
- **maleic anhydride**: In the acute oral toxicity using rat, there were no effects on clinical signs, systemic toxicity (OECD TG 401)

Specific target organ toxicity (repeat exposure); Not classified
- **maleic anhydride**: In the repeated Dose 30-Day inhalation toxicity test using rat, respiratory system irritation were observed. (LOAEC = 0.01mg/L air)(OECD TG 412)

Aspiration Hazard; Not available

### 12. ECOLOGICAL INFORMATION

#### 12.1 Toxicity

<table>
<thead>
<tr>
<th>Type</th>
<th>Substance</th>
<th>Test Details</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute toxicity</td>
<td>Fish</td>
<td>- <strong>maleic anhydride</strong>: 96hr-LC₅₀ (<em>Salmo gairdneri</em>) = 75 mg/L</td>
<td>Not classified</td>
</tr>
<tr>
<td>Chronic toxicity</td>
<td>Fish</td>
<td>- <strong>maleic anhydride</strong>: Acute toxicity is not classified because of poor solubility (water solubility &lt; 1 mg/L) and predicted L(E)C₅₀ exceeding water solubility.</td>
<td>Not classified</td>
</tr>
<tr>
<td>Acute toxicity</td>
<td>crustacean</td>
<td>- <strong>maleic anhydride</strong>: 48hr-LC₅₀ (<em>Daphnia magna</em>) = 330 mg/L, 21d-NOEC (<em>Daphnia magna</em>) = 10 mg/L</td>
<td>Not classified</td>
</tr>
<tr>
<td>Chronic toxicity</td>
<td>crustacean</td>
<td>- <strong>maleic anhydride</strong>: Acute toxicity is not classified because of poor solubility (water solubility &lt; 1 mg/L) and predicted L(E)C₅₀ exceeding water solubility.</td>
<td>Not classified</td>
</tr>
<tr>
<td>Acute toxicity</td>
<td>Algae</td>
<td>- <strong>maleic anhydride</strong>: 72hr-EC₅₀ (<em>Selenastrum capricornutum</em>) &gt; 150 mg/L, 72hr-NOEC (<em>Selenastrum capricornutum</em>) = 150 mg/L (OECD TG 201, GLP)</td>
<td>Not classified</td>
</tr>
<tr>
<td>Chronic toxicity</td>
<td>Algae</td>
<td>- <strong>maleic anhydride</strong>: As well biodegraded, it is expected to have low accumulation potential in living organisms (= 93% biodegradation was observed after 11 days) (OECD TG 301B, GLP)</td>
<td>Not classified</td>
</tr>
</tbody>
</table>

#### 12.2 Persistence and degradability

<table>
<thead>
<tr>
<th>Type</th>
<th>Substance</th>
<th>Test Details</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persistence</td>
<td>Polypropylene</td>
<td>- High persistency (log Kow is more than 4 estimated.) (Log Kow = 17.21) (estimated)</td>
<td>Not available</td>
</tr>
<tr>
<td>Degradability</td>
<td>Polypropylene</td>
<td>- High potency of mobility to soil. (Koc = 42)</td>
<td>Not available</td>
</tr>
</tbody>
</table>

#### 12.3 Bioaccumulative potential

<table>
<thead>
<tr>
<th>Type</th>
<th>Substance</th>
<th>Test Details</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bioaccumulation</td>
<td>maleic anhydride</td>
<td>- Bioaccumulation is expected to be low according to the BCF &lt; 500 (BCF = 5)</td>
<td>Not available</td>
</tr>
<tr>
<td>Biodegradation</td>
<td>maleic anhydride</td>
<td>- As well biodegraded, it is expected to have low accumulation potential in living organisms (= 93% biodegradation was observed after 11 days) (OECD TG 301B, GLP)</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

#### 12.4 Mobility in soil

<table>
<thead>
<tr>
<th>Type</th>
<th>Substance</th>
<th>Test Details</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polypropylene</td>
<td>- High potency of mobility to soil. (Koc = 8.633e+014) (estimated)</td>
<td>Not applicable</td>
<td></td>
</tr>
</tbody>
</table>

#### 12.5 Results of PBT and vPvB assessment

- No information available

#### 12.6 Other adverse effects

- No information available

#### 12.7 Hazardous to the ozone layer

- Not applicable

### 13. DISPOSAL CONSIDERATIONS

#### 13.1 Waste treatment methods

**Disposal Methods**
- Waste must be disposed of in accordance with federal, state and local environmental control regulations.

**Precautions for disposal**
- Consider the required attentions in accordance with waste treatment management regulation.

### 14. TRANSPORT INFORMATION

- **14.1 UN number** : Not applicable to the criteria for classification
- **14.2 UN proper shipping name** : Not applicable to the criteria for classification
- **14.3 Transport hazard class** : Not applicable to the criteria for classification
- **14.4 Packing group** : Not applicable to the criteria for classification
- **14.5 Environmental hazards** : Not applicable to the criteria for classification
- **14.6 Special precautions for user**
  - *in case of fire* : Not applicable
  - *in case of leakage* : Not applicable
- **14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code**: Not applicable

### 15. REGULATORY INFORMATION

- **15.1 Internal Regulatory information**
  - **U.S.A management information (Section 8(b) Inventory (TSCA)**
  - **U.S.A management information (OSHA Regulation)**
  - **U.S.A management information (CERCLA Regulation)**
  - **U.S.A management information (EPCRA 302 Regulation)**
  - **U.S.A management information (EPCRA 304 Regulation)**
  - **U.S.A management information (EPCRA 313 Regulation)**
  - **maleic anhydride** : Present
  - **ETHYLENE-PROPYLENE COPOLYMER**: Present[XU]
  - **Polypropylene**: Present[XU]
  - **ETHENE OCTENE COPOLYMER**: Present[XU]
  - Not regulated
- **15.2 Foreign Regulatory Information**
  - **KOREA Regulatory information**
    - **Occupational Safety and Health Regulation**
    - **Chemical Control Act**
    - **Dangerous Material Safety Management Regulation**
    - **External information**
      - **Substance of Roterdame Protocol**
      - **Substance of Stockholme Protocol**
      - **Substance of Montreal Protocol**
      - **maleic anhydride**: Work environment monitoring listed (6 months)
      - **maleic anhydride**: Administration subject listed
      - **maleic anhydride**: Health examination agent (12 months)
      - **maleic anhydride**: Non-dangerous goods
      - Not regulated

### 16. OTHER INFORMATION

- **16.1 Information source and references**
  - EPISUITE v4.1; http://www.epa.gov/opt/exposure/pubs/episuiteld.htm
  - Korea Occupational Health & Safety Agency; http://www.kosha.net
  - Eastman Chemical Company SDS
16.2 Issuing date : 03 May 2010

16.3 Revision number and date

revision number : (2)

date of the latest revision : 20 April 2017

16.4. Other

•This SDS is authored in pursuant to the OSHA 29 CFR 1910.1200.
•The content is based on the latest information and knowledge that we currently possess.
•This SDS was authored to aid buyer, processor or any other third person who handles the chemical of subject in the SDS; additionally, it does not warrant suitability of the chemical for special purposes or the commercial use of statements that approves the use of it in combination with other chemicals as well as technical or legal liabilities.
•The content of the SDS may vary depending on the country or the region and may not coincide with the actual regulations. Therefore, the buyer or the processor of the chemical is responsible for observing responsible government’s or the region’s regulations.