MATERIAL SAFETY DATA SHEET

Product Name: FR-1025M
Product ID: 8807
Revision Date: 27/04/2008
Supersedes: 19/06/2007
Revision: 8

Chemical Name: Pentabromobenzyl acrylate
Synonym(s): PBB-MA, Pentabromobenzyl monoacrylate, Propenoic acid, (pentabromophenyl)methyl ester
Chemical Formula: C₁₀H₅Br₅O₂
Chemical Family: Polyhalogenated aromatic acrylate
Molecular weight: 556.7
Type of Product and Use: A flame retardant for engineering plastics
Supplier: ICL-IP America Inc.
         95 MacCorkle Ave. SW, South Charleston, WV 25303-1411, USA
         Tel: (304) 720-3950
         Fax: (304) 746-3101
Emergency Telephone: Chemtrec (800)424-9300

Emergency Overview: White free flowing powder, odourless
May cause internal organ effects (kidney & blood).
May cause sensitization by skin contact.

Potential Health Effects:
- Eye Contact: May cause eye irritation
- Skin Contact: May cause sensitization by skin contact.

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS No.</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pentabromobenzyl acrylate</td>
<td>59447-55-1</td>
<td>98</td>
</tr>
</tbody>
</table>
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Eye contact
Holding the eyelids apart, flush eyes promptly with copious flowing water for at least 20 minutes. Get medical attention immediately.

Skin contact
Remove contaminated clothing. Wash skin thoroughly with mild soap and plenty of water for at least 15 minutes. Wash clothing before re-use. Get medical attention immediately.

Inhalation
In case of dust inhalation or breathing fumes released from heated material, remove person to fresh air. Keep him quiet and warm. Apply artificial respiration if necessary and get medical attention immediately.

Ingestion
If swallowed, wash mouth thoroughly with plenty of water and give water to drink. Get medical attention immediately.

NOTE: Never give an unconscious person anything to drink.

Notes to the physician
Irritant to mucous membranes. No specific antidote. Treat symptomatically and supportively. In case of ingestion DO NOT induce vomiting.

Suitable extinguishing media
Use extinguishing media appropriate to surrounding fire conditions.

Fire fighting procedure
Cool containers with water spray. In closed stores, provide fire-fighters with self-contained breathing apparatus in positive pressure mode.

Unusual fire and explosion hazards
Dust may form a weak explosive mixture with air (class St1). Will decompose from ca. 300°C releasing poisonous and corrosive fumes of HBr.

Personal precautions
Wear respirator, chemical safety goggles, rubber gloves and boots.

Methods for cleaning up
Sweep up, place in a bag and hold for waste disposal or possible re-use. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.
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Handling: When using this substance avoid breathing the substance and use respiratory protection. Keep containers tightly closed. Avoid bodily contact.

Storage: Store in a dry, cool, well-ventilated area away from incompatible materials (see "materials to avoid").

Exposure Limits:

<table>
<thead>
<tr>
<th>Components</th>
<th>ACGIH-TLV Data</th>
<th>OSHA (PEL) Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pentabromobenzyl acrylate</td>
<td>Not determined</td>
<td>Not determined</td>
</tr>
<tr>
<td>59447-55-1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Ventilation requirements: Good high-level ventilation

Personal protective equipment:
- Respiratory protection: NIOSH-approved respirator - Category 19C Type C supplied air respirator operated in pressure demand or continuous flow mode and equipped with a tight-fitting facepiece
- Hand protection: Protective gloves
- Eye protection: Chemical safety goggles
- Skin and body protection: Body covering clothes and boots

Hygiene measures: Do not eat, smoke or drink where material is handled, processed or stored. Wash hands carefully before eating or smoking.

Appearance: White free flowing powder, odourless
Melting point/range: 115-122°C
Boiling point/range: Not applicable
Flash point: None
Flammable/Explosion limits: Not available
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<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
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<tbody>
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<tr>
<td>Supersedes</td>
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</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>Not available</td>
</tr>
<tr>
<td>Vapour pressure</td>
<td>Not applicable under standard conditions</td>
</tr>
<tr>
<td>Vapor density</td>
<td>Not applicable under standard conditions</td>
</tr>
<tr>
<td>Evaporation rate (ether=1)</td>
<td>Not applicable under standard conditions</td>
</tr>
<tr>
<td>Solubility:</td>
<td></td>
</tr>
<tr>
<td>- Solubility in water</td>
<td>&lt;1 mg/100ml</td>
</tr>
<tr>
<td>- Solubility in other solvents</td>
<td>Ethyl acetate: 7.6 g/100ml</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>300°C</td>
</tr>
<tr>
<td>Partition coefficient</td>
<td>Log Kow - 5.11 (20°C)</td>
</tr>
</tbody>
</table>

## Stability
- Stable under normal conditions

## Materials to avoid
- None known

## Conditions to avoid
- Heating above decomposition temperature

## Hazardous decomposition products
- Hydrogen bromide and bromine

## Hazardous polymerization
- Will not occur

## Acute toxicity:
- Rat oral LD50: > 5,000 mg/kg
- Rat dermal LD50: > 5000 mg/kg
- Eye irritation (rabbit): Moderate irritant
- Dermal irritation (rabbit): Mild irritant

## Dermal sensitization
- Sensitiser (Local lymph node assay in the mouse)

## Sub-chronic toxicity:
In the 28-day repeat dose study (rat, oral route) blood effects were noted in the 1000 mg/kg/day dose and renal effects seen in 150 and 1000 mg/kg/day.

## Chronic toxicity
- Not available

## Mutagenicity
- Not clastogenic in Chinese hamster ovary tissue metaphase analysis.
- Not mutagenic by the Ames Test (Salmonella & E. coli)
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Carcinogenicity: Not classified by IARC
Not included in NTP 11th Report on Carcinogens

Aquatic toxicity:
- NOEL, fish: Bigger or equal to 1 mg/l (Oryzias latipes, 48 hours)

Biodegradation: Not biodegradable

Bioaccumulative potential: Not bioaccumulative

Waste disposal: Treat the solid waste and packaging waste via an incinerator equipped with an adequate gas cleaning system or send to a controlled landfill. Observe all federal, state and local environmental regulations when disposing of this material

DOT: Not regulated
IMO: Not regulated
ICAO/IATA: Not regulated

USA: Reported in the EPA TSCA Inventory. This substance is subject to a TSCA 5(e) order. Subject to reporting under SNUR (Significant New Use Rule) -any use, section 40 CFR 721.329

SARA 313: Not listed

EEC No.: 261-767-7

Japan: ENCS. Article 2, Clause 4, Designated Chemical Substances
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<thead>
<tr>
<th>Japanese METI</th>
<th>ENCS:3-4183</th>
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</thead>
<tbody>
<tr>
<td>Australia</td>
<td>Listed in AICS</td>
</tr>
<tr>
<td>China inventory</td>
<td>Listed</td>
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<tr>
<td>Korea</td>
<td>ECL Serial No.: 2000-3-1398</td>
</tr>
</tbody>
</table>

This data sheet contains changes from the previous version in section(s)
5, 7, 8, 9, 13

**Health, Safety & Environment Policy**

We will strive to ensure that our operations and products meet the needs of the present global community without compromising the ability of future generations to meet their needs.

We accept that the success of our business is dependent on the supply of products and services that will benefit society whilst ensuring human safety and protection of the environment and natural resources.

Within the framework of our commitment to the Responsible Care program, we will provide a healthy and safe work environment for employees and will responsibly manage our products at all stages of their life cycle in order to protect human health and the environment whilst maintaining high production standards of operation.

**TO MEET THIS COMMITMENT WE WILL:**

Comply with or exceed applicable national and international regulatory requirements and other requirements to which we subscribe.

Communicate openly and actively encourage dialogue with employees, customers and community concerning our products and operations.

Implement documented management systems consistent with and for promotion of the Responsible Care ethics.

Develop and supply products that can be manufactured, transported, used and disposed of safely whilst best meeting the needs of our customers.

Regularly assess, continually improve and responsibly manage health, safety and environmental risks associated with products and processes throughout their life-cycles.

Share knowledge and expertise with others and seek to learn from and incorporate improved practices into our own operations.

Educate and train employees, contractors and customers to improve their HSE performance.

Communicate up-to-date information to enable our workers, customers and other interested parties to handle our products in a safe and environmentally responsible manner.

Endeavor to work with customers, suppliers, distributors and contractors to foster the safe use, transport and disposal of our chemicals.

Support Product Stewardship programs in cooperation with customers, distributors and transporters.
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In an event of discrepancy between the contents of this MSDS and the English version of it, the English version shall prevail.

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End of safety data sheet