1. Identification of the substance & the company

Chemical name: Tris (3-Bromo-2,2(Bromomethyl)Propyl)Phosphate
Chemical formula: C_{15}H_{24}O_4PBr_9
Chemical family: Halogenated phosphate ester
Molecular weight: 1018.0
Type of product and use: Flame retardant for polymers
Supplier: ICL-IP America Inc.
622 Emerson Road - Suite 500
St Louis, Missouri 63141, USA
Tel:(314)983-7884 Fax:(314)983-7607
Emergency Telephone: Chemtrec (800)424-9300

2. Hazards identification

Emergency overview: White free flowing powder with slightly sweet /musty odour which is not hazardous.

3. Composition / information on ingredients

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS No.</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tris(3-Bromo-2,2(Bromomethyl)Propyl) Phosphate</td>
<td>19186-97-1</td>
<td>98</td>
</tr>
</tbody>
</table>
4. First-aid measures

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 if irritation occurs.

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
In case of ingestion induce vomiting in alert patient. Treat symptomatically and supportively. No specific antidote.

5. Fire - fighting measures

Suitable extinguishing media
Water spray, carbon dioxide, dry chemical powder, alcohol foam or polymer foam.

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
When heated to decomposition, may release poisonous and corrosive fumes of HBr and oxides of phosphorus. Dust may form a weak explosive mixture with air (class St1) at elevated temperature (>101°C). [Kst = 90 bar.m.s(-1)]
6. Accidental release measures

Personal precautions
Wear self-contained breathing apparatus, rubber boots and heavy rubber gloves.

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. Avoid access to streams, lakes or ponds.

7. Handling and storage

Handling
Keep containers tightly closed. Avoid bodily contact.

Storage
Store in a dry, cool, well-ventilated area

8. Exposure controls / personal protection

Exposure Limits:

<table>
<thead>
<tr>
<th>Components</th>
<th>ACGIH-TLV Data</th>
<th>OSHA (PEL) Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tris(3-Bromo-2,2-(Bromomethyl)Propyl) Phosphate 19186-97-1</td>
<td>Not determined</td>
<td>Not determined</td>
</tr>
</tbody>
</table>

Ventilation requirements
FR-370 can form trace amounts of pentaerythritol tetrabromide during elevated temperature polymer processing activities. Adequate ventilation is recommended to control potential employee exposure. Based on small scale studies, it is unlikely that irritation will occur under normal injection moulding or extrusion processing conditions.

Personal protective equipment:
- Respiratory protection: Dust respirator
- 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. Safety shower and eye bath should be provided.

9. Physical and chemical properties

Appearance
White free flowing powder with slightly sweet/musty odour.

Boiling point/range
Not applicable (decomposes)

Melting point/range
182-184°C

Flash point
>180°C

Flammable/Explosion limits
Not available

Auto-ignition temperature
640°C

Vapour pressure
7x10^{-16} mmHg (20°C)

Evaporation rate (ether=1)
Not available

Vapor density
Not available

Viscosity
Not applicable

Solubility:
- Solubility in water
Practically insoluble
0.0156 mg/l at 20°C

Specific gravity
2.3

Decomposition temperature
309°C

Partition coefficient
Log Pow = 4.87

(n-octanol/water)

Explosive properties
Not explosive

Oxidising properties
Does not contain functional groups that are considered to be reactive

Contain no functional groups that are characterized as oxidants

10. Stability and reactivity

Stability
Stable under normal conditions

Materials to avoid
None known

Conditions to avoid
None known

Hazardous decomposition products
Phosphorus oxides, Hydrogen bromide

Hazardous polymerization
Not likely to occur
MATERIAL SAFETY DATA SHEET

Product name: FR-370/FR-372
Product id: 9144
Revision date: 10/01/2012
Supersedes: 12/10/2008

11. Toxicological information

Acute toxicity:
- Rat oral LD50: >5000 mg/kg
- Rabbit dermal LD50: >2000 mg/kg
- Rat inhalation LC50: >1.81 mg/l/4 hour
- Eye irritation (rabbit): Minimal irritant
- Dermal irritation (rabbit): Not irritant

Dermal sensitization: Not a sensitizer

Sub-acute toxicity:
- NOEL: 20,000 ppm (4 weeks oral rat)

Sub-chronic toxicity:
- NOAEL: 1358 mg/kg/day (91 days, oral, rat)

Chronic toxicity: Not available

Mutagenicity: Not mutagenic by the Ames Test and by mouse lymphoma assay.
Not clastogenic in chromosome aberration test with Chinese hamster cells.

Carcinogenicity: Not classified by IARC
Not included in NTP 12th Report on Carcinogens

Reproductive toxicity:
NOAEL: 3040 mg/kg/day

Developmental toxicity:
NOAEL: 1000 mg/kg/day

12. Ecological information

Environmental fate: The adsorption-coefficient value on soil is estimated to be log Koc >>5.63 indicating the potential for strong absorption to the soil.

Aquatic toxicity:
- 96 Hour-LC50, Fish: >100 mg/l (Rainbow Trout)
- 48 Hour-EC50, Daphnia magna: >100 mg/l
- 72 Hour-EC50, Freshwater algae: >100 mg/l (Selenastrum Capricornutum)
Material Safety Data Sheet

Product name FR-370/FR-372
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Supersedes 12/10/2008

Chronic toxicity
The No Observed Effect Concentration (NOEC) in Daphnia magna after exposure of 16 day is 3200 ug ai/L.

Biodegradation
Not readily biodegradable
Evidence of inherent biodegradability

Bioaccumulative potential
The Bioconcentration factor (BCF) is 200, indicating that the substance is unlikely to bioaccumulate in aquatic organisms.

13. Disposal considerations

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.

14. Transportation information

DOT Not regulated
IMO Not regulated
ICAO/IATA Not regulated

15. Regulatory information

USA Reported in the EPA TSCA Inventory.
Canada Listed in DSL
EU European List of Notified Chemicals Substances (ELINCS) number 4130601
Japanese METI ENCS No.2-1941X
Australia Listed in AICS
New Zealand Inventory Listed in NZIoC
China inventory Listed in IECSC
Korea ECL Serial No.: 97-3-169
Product name: FR-370/FR-372
Product ID: 9144
Revision date: 10/01/2012
Supercedes: 12/10/2008
Revision: 5

Philippines: Listed in PICCS

16. Other information

Product is not subject to classification according to GHS. No label elements required.

This data sheet contains changes from the previous version in section(s)
2, 11, 12

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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End of safety data sheet