**MATERIAL SAFETY DATA SHEET**

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

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### 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  

**Company** ICL-IP Terneuzen BV  
P.O. Box 318, 4530 AH Terneuzen,  
The Netherlands,  
Tel. (+31) 115 689000  
e-mail:msdsinfo@icl-ip.com

**Emergency telephone number:**  
- For Europe  
  (+31) 115 689000  
- For UK and Ireland  
  +44 (0) 1270 502891 (24 Hours)  
- For USA  
  Chemtrec (800) 424-9300  
- For Asia - Pacific  
  ALERT-SGS  
  24 hr Toll Free Number: +800 ALERTSGS (+800-2537-8747)  
  24 hr Singapore Exchange Number: +65 6542-9595  
- For Japan  
  Tel: 03-3552-1611  
  Fax: 03-3552-1616

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### 2. Hazards identification

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

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### 3. Composition / information on ingredients

<table>
<thead>
<tr>
<th>Components</th>
<th>Weight %</th>
<th>Index No.</th>
<th>EC No.</th>
<th>EU Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tris(3-Bromo-2,2(Bromomethyl)Propyl)Phosphate 19186-97-1</td>
<td>98</td>
<td>Listed in ELINCS</td>
<td>None</td>
<td></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)]
MATERIAL SAFETY DATA SHEET

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>
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<tr>
<th>Components</th>
<th>ACGIH-TLV Data</th>
<th>OSHA (PEL) Data</th>
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<td>Not determined</td>
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</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
MATERIAL SAFETY DATA SHEET

Product name: FR-370/FR-372  
Product id: 9144  
Revision date: 10/01/2012  
Supersedes: 12/10/2008  
Revision: 5

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

Specific gravity: 2.3
Decomposition temperature: 309°C
Partition coefficient (n-octanol/water): Log Pow = 4.87

Explosive properties: Not explosive
Does not contain functional groups that are considered to be reactive

Oxidising properties: 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: Hydrogen bromide Phosphorus oxides,

Hazardous polymerization: Not likely to occur

11. Toxicological information

Acute toxicity:
- Rat oral LD50: >5000 mg/kg
- Rabbit dermal LD50: >2000 mg/kg
11. Toxicological information

- Rat inhalation LC50 >1.81 mg/l/4 hour
- Dermal irritation (rabbit) Not irritant
- Eye irritation (rabbit) Minimal 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)

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
MATERIAL SAFETY DATA SHEET

Product name: FR-370/FR-372
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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. Dispose of in a safe manner in accordance with local/national regulations.

14. Transportation information

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

15. Regulatory information

EU: European List of Notified Chemicals Substances (ELINCS) number 4130601
USA: Reported in the EPA TSCA Inventory.
Australia: Listed in AICS
Canada: Listed in DSL
China inventory: Listed in IECSC
Japanese METI: ENCS No.2-1941X
Korea: ECL Serial No.: 97-3-169
New Zealand Inventory: Listed in NZIoC
Philippines: Listed in PICCS

16. Other information
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.

Prepared by
HERA Division in ISRAEL
telephone: +/972-8-6297835
telefax: +/972-8-6297832
www.icl-ip.com
e-mail: msdsinfo@icl-ip.com

End of safety data sheet