1. Identification of the substance & the company

Chemical name: Tetrabromobisphenol A (TBBA)

Synonym(s):
- Phenol,4,4’-(1-methylethylidene)bis[2,6-dibromo] ; 2,2’,6,6 tetrabromo-4,4’-isopropylidenediphenol ; 2,2-Bis(3,5-dibromo-4-hydroxyphenyl)propane ; 3,3’,5,5’-Tetrabromobisphenol A

Chemical formula: C₁₅H₁₂Br₄O₂

Chemical family: Brominated bisphenol A

Molecular weight: 543.7

Type of product and use: A flame retardant used in the manufacture of epoxides, polycarbonate, ABS and phenolics.

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 crystalline powder

Potential Health Effects:
- Eye Contact: Not irritant
- Skin contact: Not irritant
- Inhalation: No toxic effects observed
- Ingestion: No toxic effects observed

Potential environmental effects: Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
3. Composition / information on ingredients

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS No.</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetrabromobisphenol A</td>
<td>79-94-7</td>
<td>99</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 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
Material with low toxicity.
No specific antidote. Treat symptomatically and supportively.
5. Fire - fighting measures

Suitable extinguishing media
Material is not combustible. 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
Will decompose from ca. 284°C releasing poisonous and corrosive fumes of HBr.

6. Accidental release measures

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

Methods for cleaning up
Shovel into intact packaging 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
Avoid bodily contact. Keep containers tightly closed.

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

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>Tetrabromobisphenol A 79-94-7</td>
<td>Not determined</td>
<td>Not determined</td>
</tr>
</tbody>
</table>
MATERIAL SAFETY DATA SHEET

Product Name: FR-1524  
Product id: 8353  
Revision date: 10/11/2010  
Supersedes: 14/12/2009

Ventilation requirements
Ventilation must be sufficient to maintain TLV-TWA below 3 mg/m³, respirable particles, and 10 mg/m³, inhalable particles (ACGIH recommendation for Particles (Insoluble or poorly soluble) Not Otherwise Specified (PNOS)).

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
Safety shower and eye bath should be provided. Do not eat, smoke or drink where material is handled, processed or stored. Wash hands carefully before eating or smoking.

9. Physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>White crystalline powder</td>
</tr>
<tr>
<td>Boiling point/range</td>
<td>316°C (decomposes)</td>
</tr>
<tr>
<td>Melting point/range</td>
<td>181°C</td>
</tr>
<tr>
<td>Flash point</td>
<td>None</td>
</tr>
<tr>
<td>Flammable/Explosion limits</td>
<td>Not flammable</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>Not available</td>
</tr>
<tr>
<td>Vapour pressure</td>
<td>&lt; 1.19x10E-5 Pa (20°C)</td>
</tr>
<tr>
<td>Evaporation rate (ether=1)</td>
<td>Not applicable under standard conditions</td>
</tr>
<tr>
<td>Vapor density</td>
<td>Not applicable under standard conditions</td>
</tr>
<tr>
<td>Viscosity</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Solubility:</td>
<td></td>
</tr>
<tr>
<td>- Solubility in water</td>
<td>1.26 mg/l (pH =7) @ 25°C</td>
</tr>
<tr>
<td></td>
<td>2.34 mg/l (pH=9) @ 25°C</td>
</tr>
<tr>
<td>- Solubility in other solvents</td>
<td>Acetone: 240 g/100g at 25°C</td>
</tr>
<tr>
<td></td>
<td>Methanol: 92 g/100g at 25°C</td>
</tr>
<tr>
<td>Specific gravity</td>
<td>2.17</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>ca.284°C</td>
</tr>
<tr>
<td>Partition coefficient</td>
<td>Log Kow - 5.903</td>
</tr>
<tr>
<td>(n-octanol/water)</td>
<td></td>
</tr>
<tr>
<td>Explosive properties</td>
<td>There are no chemical groups associated with explosive properties present in the molecule</td>
</tr>
<tr>
<td>Oxidising properties</td>
<td>The structure indicates non oxidizing properties</td>
</tr>
<tr>
<td>Particle size:</td>
<td>Mass Median Aerodynamic Diameter (MMAD) of approximately 42 µm</td>
</tr>
</tbody>
</table>
10. Stability and reactivity

Stability
Stable under normal conditions.

Materials to avoid
Oxidizing agents

Conditions to avoid
Heating above decomposition temperature

Hazardous decomposition products
HBr

Hazardous polymerization
Will not occur

11. Toxicological information

Acute toxicity:
- Rat oral LD50: > 5,000 mg/kg
- Rabbit dermal LD50: > 2,000 mg/kg
- Rat inhalation LC50: >2550 mg/m³/2 hour
- Eye irritation (rabbit): Not irritant
- Dermal irritation (rabbit): Not irritant
- Dermal sensitization: Not a sensitizer

Sub-acute toxicity:
- NOEL: >18 mg/l/4 hour (2 weeks, inhalation, rat)
  >1000 ppm (4 weeks oral rat)
  >2500 mg/kg (3 weeks, dermal, rabbit)

Sub-chronic toxicity:
- NOAEL: 1000 mg/kg/day (13 weeks oral, rat)

Chronic toxicity
No adverse health effects in humans are known

Mutagenicity
Not mutagenic by the Ames Test
Negative for induction of structural and numerical chromosome aberrations in the non-activated and S9 activated test systems

Carcinogenicity
Not classified by IARC
Not included in NTP 11th Report on Carcinogens

Reproductive toxicity
In a 2-generation reproduction study in rats the NOEL (No Observable Effect Level) for parental toxicity was 100 mg/kg/day. The NOEL for reproduction performance and pup toxicity was 1000 mg/kg/day, the highest dose level evaluated.
[12. Ecological information]

Information on ecological effects
This product has been analyzed for contamination of polybrominated dibenzo-para-dioxins/dibenzofurans under USA EPA Test Rule section 4 of TSCA. The results, which were accepted by the EPA, show that no polybrominated dibenzo-para-dioxins/dibenzofurans were detected in this product above the level of quantitation (LOQ).

Aquatic toxicity:
- 96 Hour-LC50, Fish 1.1 mg a.i./L (Rainbow Trout, flow-through)
  0.4 mg/L (Rainbow Trout, static)
- 48 Hour-EC50, Daphnia magna >1.8 mg a.i./L (pH 8.1-8.2)
- 48 Hour-LC50, Daphnia magna 0.96 mg/l (pH 7.8-8.2)

Biodegradation
Not readily biodegradable

Bioaccumulative potential
BCF values ranging from 372 to 1200 suggest that bioconcentration in aquatic organisms is generally moderate to high.

Germany, water endangering classes (WGK)
1

[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. Avoid access to streams, lakes or ponds.

Disposal of Packaging
The bags should be opened and shaken to remove as much of remaining material as possible. After emptying they should be either sent to landfill or for incineration in accordance with local regulations.
14. Transportation information

UN No. 3077

DOT
- Proper shipping name: Environmentally hazardous substance, solid, n.o.s (Tetrabromobisphenol A)
- Class: 9 - Miscellaneous Hazardous Material
- Label: 9
- Packing Group: III
- Marking: Marine Pollutant

IMO
- Proper shipping name: Environmentally hazardous substance, solid, n.o.s (Tetrabromobisphenol A)
- Class: 9 - Miscellaneous Dangerous Substances and articles
- Label: 9
- Packing Group: III
- Mark: MARINE POLLUTANT

ICAO/IATA
- Proper shipping name: Environmentally hazardous substance, solid, n.o.s (Tetrabromobisphenol A)
- Class: 9
- Hazard label(s): Miscellaneous
- Packing group: III
- Marking: Environmentally hazardous substance

15. Regulatory information

USA
- Reported in the EPA TSCA Inventory.

- SARA 313
- This substance is subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 and of 40 CFR 372.

Canada
- Listed in DSL

EU
- Reported in EINECS

Japan
- ENCS no. 4-205
- ISHL no. 4-205
- Type II Monitoring Chemical Substances.

Australia
- Listed in AICS
MATERIAL SAFETY DATA SHEET

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Revision date: 10/11/2010
Supersedes: 14/12/2009

New Zealand Inventory: Listed in NZIoC
China inventory: Listed
Korea: Listed in ECL (KE-23971)
Philippines: Listed in PICCS

[16. Other information]

This data sheet contains changes from the previous version in section(s)
2 & 3 (not ANSI), 9, 12, 15

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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e-mail:msdsinfo@icl-ip.com

End of safety data sheet