MATERIAL SAFETY DATA SHEET

Product Name       FR-513
Product id         8324US
Revision date      11/02/2008
Supersedes         31/01/2005

1. Identification of the substance & the company

   Chemical name       Tribromoneopentyl alcohol
   Synonym(s)          TBNPA, 2,2-Bis(bromomethyl)-3-bromo-1-propanol, 3-Bromo-2,2-bis(bromomethyl)-1-propanol
   Chemical formula    C₅H₉Br₃O
   Chemical family     Brominated neopentyl alcohol
   Molecular weight    324.84
   Type of product and use A reactive flame retardant

   Supplier            Ameribrom, 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

2. Hazards identification

   Emergency overview  White to off-white flakes
                        Causes eye irritation

   Potential Health Effects:
   - Eye Contact       Severe irritant.
   - Skin contact      Not irritant
   - Inhalation        May cause irritation to mucous membranes and upper respiratory tract.
   - Ingestion         May cause irritation to mucous membrane
3. Composition / information on ingredients

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS No.</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tribromoneopentyl alcohol</td>
<td>36483-57-5</td>
<td>97</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. Get medical attention immediately.

*NOTE: Never give an unconscious person anything to drink.*

**Notes to the physician**
No specific antidote. Treat symptomatically and supportively. In case of ingestion induce vomiting in alert patient.

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.
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Unusual fire and explosion hazards
Dust may form a weak explosive mixture with air (class St1).
When heated to decomposition, may release poisonous 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.
Avoid access to streams, lakes or ponds. Observe all federal, state and local environmental regulations.

7. Handling and storage

Handling
Keep containers tightly closed.
Avoid producing or diffusing dust into the air.
Avoid bodily contact.

Storage
Store in a dry, cool, 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>Tribromoneopentyl alcohol 36483-57-5</td>
<td>Not determined</td>
<td>Not determined</td>
</tr>
</tbody>
</table>

Manufacturer's recommendation: 0.1 mg/m³

Ventilation requirements
Ventilation must be sufficient to maintain atmospheric concentration below exposure limit.

Personal protective equipment:
- Respiratory protection: NIOSH approved 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.

9. Physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>White to off-white flakes</td>
</tr>
<tr>
<td>Melting point/range</td>
<td>65°C</td>
</tr>
<tr>
<td>Boiling point/range</td>
<td>145°C (3mbar)</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 applicable</td>
</tr>
<tr>
<td>Vapour pressure</td>
<td>Not determined</td>
</tr>
<tr>
<td>Vapor density</td>
<td>Not determined</td>
</tr>
<tr>
<td>Evaporation rate (ether=1)</td>
<td>Not determined</td>
</tr>
<tr>
<td>Solubility:</td>
<td></td>
</tr>
<tr>
<td>- Solubility in water</td>
<td>1.93 g/l @ 20°C</td>
</tr>
<tr>
<td>- Solubility in other solvents</td>
<td>Methanol: 270 g/100g at 18°C</td>
</tr>
<tr>
<td></td>
<td>Ethanol: 199 g/100g at 18°C</td>
</tr>
<tr>
<td></td>
<td>Toluene: 44 g /100g at 18°C</td>
</tr>
<tr>
<td>Specific gravity</td>
<td>2.28</td>
</tr>
<tr>
<td>Partition coefficient (n-octanol/water)</td>
<td>Log Pow - 2.63</td>
</tr>
</tbody>
</table>

10. Stability and reactivity

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stability</td>
<td>Stable under normal conditions</td>
</tr>
<tr>
<td></td>
<td>Weight loss of 5% occurs at temperature above 180°C</td>
</tr>
<tr>
<td>Materials to avoid</td>
<td>Avoid contact with strong bases</td>
</tr>
<tr>
<td>Conditions to avoid</td>
<td>None known</td>
</tr>
<tr>
<td>Hazardous decomposition products</td>
<td>HBr</td>
</tr>
<tr>
<td>Hazardous polymerization</td>
<td>Will not occur</td>
</tr>
</tbody>
</table>

11. Toxicological information

Acute toxicity:
- Rat oral LD50               >2000 mg/kg
- Rat dermal LD50             >2000 mg/kg
- Eye irritation (rabbit)     Severe irritant
- Dermal irritation (rabbit)  Not irritant

Dermal sensitization          Not a sensitizer
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Chronic toxicity
Mutagenicity
No information available
Negative results were obtained in an Ames Test without metabolic activation or with rat metabolic activation, positive results were obtained with hamster metabolic activation.
Mutagenic in the mouse lymphoma L5178Y test system. The mutagenicity was confined only to incubations in the presence of metabolic activation.
FR-513 was also evaluated for its ability to induce chromosome aberrations in cultured peripheral human lymphocytes. It was found to be clastogenic in the presence of rat metabolic activation and at the highest test substance concentration in the absence of rat metabolic activation.
Non genotoxic in an in-vivo in micronucleous test in mice
Non genotoxic in an in-vivo liver unscheduled DNA synthesis (USD) assay

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

12. Ecological information

Aquatic toxicity:
- 96 Hour-LC50, Fish: 32 mg/l (Carp)
- 48 Hour-EC50, Daphnia magna: 64 mg/l
- 72 Hour-EC50, Freshwater algae: Growth rate reduction - >100 mg/l
  Cell growth inhibition - 28 mg/l

Biodegradation
Not readily biodegradable
Inherently biodegradable

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 Reported in EINECS
Japanese METI ENCS No:(2)-2002
ISHL No: (2)-2002
Australia Listed in AICS
New Zealand Inventory Listed in NZIoC
China inventory Listed
Korea ECL Serial No.: 2000-3-1576
Philippines Not listed
Switzerland Submitted

16. Other information

This data sheet contains changes from the previous version in section(s)
1, 5, 9, 11, 13, 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
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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