1. Identification of the substance & the company

Chemical name: A mixture
Chemical family: Aryl phosphate
Type of product and use: Flame-retardant plasticizer
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: May cause irritation of the respiratory tract.
May cause cholinesterase inhibition
May cause reproductive effects based on animal data.

NFPA Ratings (Scale 0-4): Health = 1, Fire = 1, Reactivity = 0
HMIS Ratings (Scale 0-4): Health = 1, Fire =1, Reactivity = 0.

3. Composition / information on ingredients

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS No.</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tricresyl phosphate (mixed isomers)</td>
<td>1330-78-5</td>
<td>80-100</td>
</tr>
<tr>
<td>TRICRESYL PHOSPHATE (M-M-M, M-M-P, M-P-P, P-P-P)</td>
<td>78-32-0</td>
<td>2-12</td>
</tr>
<tr>
<td>Tri-ortho-cresyl phosphate</td>
<td>78-30-8</td>
<td>&lt;0.1</td>
</tr>
<tr>
<td>Trixylyl phosphate</td>
<td>25155-23-1</td>
<td>0-20</td>
</tr>
</tbody>
</table>
## 4. First-aid measures

<table>
<thead>
<tr>
<th>Eye contact</th>
<th>Holding the eyelids apart, flush eyes promptly with copious flowing water for at least 20 minutes. Get medical attention immediately.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin contact</td>
<td>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.</td>
</tr>
<tr>
<td>Inhalation</td>
<td>In case of inhalation, remove person to fresh air. Keep him quiet and warm. Apply artificial respiration if necessary and get medical attention immediately.</td>
</tr>
<tr>
<td>Ingestion</td>
<td>If swallowed, wash mouth thoroughly with plenty of water. Get medical attention immediately.</td>
</tr>
</tbody>
</table>

---

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

---

**Notes to the physician**

Treat symptomatically and supportively.

## 5. Fire-fighting measures

<table>
<thead>
<tr>
<th>Suitable extinguishing media</th>
<th>Material is not combustible. Use extinguishing media appropriate to surrounding fire conditions.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire fighting procedure</td>
<td>Fire fighters should wear full protective clothing and self-contained breathing apparatus (SCBA). Contain runoff to prevent entry into water or drainage systems.</td>
</tr>
<tr>
<td>Unusual fire and explosion hazards</td>
<td>When heated to decomposition, may release poisonous and corrosive fumes of Carbon Dioxide, Carbon Monoxide and Phosphorus Oxides.</td>
</tr>
</tbody>
</table>

## 6. Accidental release measures

<table>
<thead>
<tr>
<th>Personal precautions</th>
<th>Wear appropriate safety clothing and eye/face protection (see Section 8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methods for cleaning up</td>
<td>Collect in suitable and properly labeled containers. Soak up with sand or other suitable absorbant and dispose of as solid waste. Ventilate area and wash spill site after material pickup is complete.</td>
</tr>
<tr>
<td>Environmental precautions</td>
<td>Prevent product from entering drains, ditches and rivers.</td>
</tr>
</tbody>
</table>
7. Handling and storage

Handling
Avoid bodily contact.
Keep containers tightly closed.

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

Maximum recommended storage temperature of 65°C (149°F)

Store above 4.4°C (40°F) for improved pumping rates. Temperatures between 27 - 37.8°C (80 - 100°F) provide good flow rates.

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>Tricresyl phosphate (mixed isomers)</td>
<td>Not determined</td>
<td>Not determined</td>
</tr>
<tr>
<td>1330-78-5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TRICRESYL PHOSPHATE (M-M-M,M-M-P,M-P-P,P-P-P)</td>
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<tr>
<td>25155-23-1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Ventilation requirements
Adequate ventilation is recommended to control potential employee exposure.

Personal protective equipment:
- Respiratory protection: In case of insufficient ventilation wear suitable respiratory equipment.
- Hand protection: Neoprene gloves
- Eye protection: Chemical safety goggles
- Skin and body protection: Body covering clothes and boots
MATERIAL SAFETY DATA SHEET

Product Name: LINDOL

9. Physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Clear, colourless to slightly brownish liquid</td>
</tr>
<tr>
<td>Odour</td>
<td>Slight</td>
</tr>
<tr>
<td>Boiling point/range</td>
<td>260°C (500°F) @ 10 mmHg</td>
</tr>
<tr>
<td>Melting point/range</td>
<td>Not determined</td>
</tr>
<tr>
<td>Pour point</td>
<td>-25°C (-13°F)</td>
</tr>
<tr>
<td>Flash point</td>
<td>240.55°C (465°F) (open cup)</td>
</tr>
<tr>
<td>Flammable/Explosion limits</td>
<td>Not explosive/Not flammable</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>Not self-ignitable</td>
</tr>
<tr>
<td>Vapour pressure</td>
<td>0.1 mmHg (155°C)</td>
</tr>
<tr>
<td>Viscosity</td>
<td>34 cps (37.8°C)</td>
</tr>
<tr>
<td>Solubility:</td>
<td>- Solubility in water: 0.2 g/100ml at 25°C</td>
</tr>
<tr>
<td></td>
<td>- Solubility in other solvents: Soluble in common solvents</td>
</tr>
<tr>
<td></td>
<td>Density: 1.162 g/mL (25°C)</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>Materials to avoid</td>
<td>Strong oxidizers, strong acids and strong alkalis.</td>
</tr>
<tr>
<td></td>
<td>It hydrolyzes slowly at normal temperatures in acidic or alkaline aqueous solutions.</td>
</tr>
<tr>
<td>Conditions to avoid</td>
<td>Prolonged storage at elevated temperatures.</td>
</tr>
<tr>
<td>Hazardous decomposition</td>
<td>Carbon dioxide and carbon monoxide</td>
</tr>
<tr>
<td>products</td>
<td>Phosphorus oxides,</td>
</tr>
<tr>
<td>Hazardous polymerization</td>
<td>Not expected to occur</td>
</tr>
</tbody>
</table>

11. Toxicological information

Note: Toxicological data have not been determined specifically for this product. Information given is based on data on the components and the toxicology of similar products.

Acute toxicity:
- Rat oral LD50: > 4640 mg/kg
- Rabbit dermal LD50: > 4640 mg/kg
MATERIAL SAFETY DATA SHEET

Product Name: LINDOL
Product id: 7034
Revision date: 14/04/2011
Supersedes: 05/01/2009
Revision: 2

- Eye irritation (rabbit): Not irritant
- Dermal irritation (rabbit): Not irritant

Sub-chronic toxicity:
Rats that received daily oral doses of 200 mg/kg/day or 1000 mg/kg/day of trixylenyl phosphate for three or more weeks showed a reduction in plasma cholinesterase activity. Neurotoxicity tests conducted during this subchronic toxicity study, including a functional observation battery and motor activity assessment did not show any signs of neurotoxicity.

Chronic toxicity
In two-year feeding studies in rats and mice, tricresyl phosphate showed no evidence of carcinogenic activity. The NOELs (no observable effect levels) in rats and mice were 300 ppm and 250 ppm, respectively.

Mutagenicity
Not mutagenic in several in vitro assays.

Carcinogenicity
Not classified by IARC
Not included in NTP 11th Report on Carcinogens
Not classified as a carcinogen by USA OSHA

Reproductive toxicity
The ortho isomer of TCP (tricresyl phosphate) has been shown to cause reproductive toxicity in male rats. A metabolite of TOCP (tri ortho-cresyl phosphate) apparently causes a reversible adverse effect on spermatogenesis, which results in decreased male fertility. The meta and para isomers of TCP do not adversely affect the male reproductive system.
In a reproductive toxicity test, male and female rats received daily oral doses of trixylenyl phosphate for two weeks after which they were mated. Although mating was successful, there was a treatment-related decrease in the pregnancies in the mid and high dose animals. While there were no pregnancies in the high dose animals, when the previously treated animals were maintained without treatment for four weeks and then mated, all the females became pregnant. This antifertility effect is fully reversible.

Neurotoxicity
A single oral dose of 2000 mg/kg of tricresyl phosphate to hens resulted in no effects in neurotoxic esterase activity and no clinical signs of neurotoxicity. Five consecutive daily oral doses of 2000 mg/kg of this product to hens resulted in a slight decrease in neurotoxic esterase activity but no clinical signs of neurotoxicity. In a recently conducted neurotoxicity test, this product did not express neurotoxic activity. Trixylenyl phosphate can cause acute delayed neurotoxicity when administered orally to hens at > 1000 mg/kg.
MATERIAL SAFETY DATA SHEET

---

Product Name: LINDOL
Product id: 7034
Revision date: 14/04/2011
Supersedes: 05/01/2009

---

12. Ecological information

Information on ecological effects

Tricresyl phosphate is classified by IMO and DOT as a Marine Pollutant.

Germany, water endangering classes (WGK)

2

13. Disposal considerations

Waste disposal

Observe all federal, state and local environmental regulations when disposing of this material

Disposal of Packaging

Dispose of in a safe manner in accordance with local/national regulations.

14. Transportation information

UN No.

3082

DOT

Proper shipping name: Environmentally hazardous substances, liquid, n.o.s (Tricresyl phosphate { < 1% ortho isomer}, Trixylenyl phosphate)
Class: 9 - Miscellaneous Hazardous Material
Label: 9
Packing Group: III

Not regulated for surface and air transport in non-bulk (<119 gallons) packagings. (contains tricresyl phosphate (mixed isomer) and trixylenyl phosphate which are Marine Pollutants per 49CFR 172.101 Appendix B)

IMO

Proper shipping name: Environmentally hazardous substance, liquid, n.o.s (Tricresyl phosphate (mixed isomers), trixylyl phosphate)
Class: 9 - Miscellaneous Dangerous Substances and articles
Label: 9
Packing Group: III
Mark: MARINE POLLUTANT
MATERIAL SAFETY DATA SHEET

Product Name: LINDOL
Product id: 7034
Revision date: 14/04/2011
Supersedes: 05/01/2009

ICAO/IATA
Proper shipping name: Environmentally hazardous substance, liquid, n.o.s (Tricresyl phosphate (mixed isomers), trixylyl phosphate)
Class: 9
Hazard label(s): Miscellaneous
Packing group: III

15. Regulatory information

USA
- SARA 313
  Reported in the EPA TSCA Inventory.
  This product does not contain a chemical listed at or above de minimis concentrations.

- New Jersey right-to-know list
  Listed

- California-Prop 65
  This product does not contain any ingredient known to the State of California to cause cancer or reproductive toxicity as listed under the State drinking Water and Toxic Enforcement Act of 1986.

- Waste Classifications
  This material does not meet RCRA’s characteristic definition of ignitability, corrosivity, or reactivity, and is not listed in 40CFR 261.33.

- Workplace Classification
  This product is considered hazardous under the OSHA Hazard Communication Standard (29CFR 1910.1200).

Canada
Listed in DSL

-WHMIS hazard class
D2A very toxic materials

EU
Reported in EINECS

Japan
Listed in ENCS

Australia
Listed in AICS

New Zealand Inventory
Listed in NZIoC

China inventory
Listed

Korea
Listed in ECL

Philippines
Listed in PICCS
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.
**MATERIAL SAFETY DATA SHEET**

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<thead>
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</table>

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www.icl-ip.com

End of safety data sheet