1. Identification of the substance & the company

Chemical name: Isopropylated triphenyl phosphate
Synonym(s): Phenol, isopropylated, phosphate (3:1), IPTPP
Chemical formula: C_{27}H_{33}O_{4}P
Chemical family: Aryl phosphate
Molecular weight: 452.52
Type of product and use: Phosphorus Lubricant Additive
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
Medical: PROSAR 1-888-875-1685 (24HRS)

2. Hazards identification

Emergency overview:
May cause reproductive toxicity.
May cause mild skin irritation.
Inhalation of vapors, mists or aerosols may cause respiratory tract irritation
May cause neurotoxicity.

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>Propylated triphenyl phosphate</td>
<td>68937-41-7</td>
<td>64-72</td>
</tr>
<tr>
<td>Triphenyl phosphate</td>
<td>115-86-6</td>
<td>28-36</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 inhalation, 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**
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**
Fire fighters should wear full protective clothing and self-contained breathing apparatus (SCBA). Contain runoff to prevent entry into water or drainage systems.

**Unusual fire and explosion hazards**
When heated to decomposition, may release poisonous and corrosive fumes of carbon dioxide, carbon monoxide and phosphorus oxides.
6. Accidental release measures

Personal precautions
Wear appropriate safety clothing and eye/face protection (see Section 8)

Methods for cleaning up
Soak up with sand or other suitable absorbant and dispose of as solid waste.
Collect in suitable and properly labeled containers.
Ventilate area and wash spill site after material pickup is complete.

Environmental precautions
Prevent product from entering drains, ditches and rivers.

7. Handling and storage

Handling
Keep containers tightly closed. Avoid bodily contact.

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)
Crystallizes at temperatures below 4.4°C (40°F).

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>Propylated triphenyl phosphate</td>
<td>Not determined</td>
<td>Not determined</td>
</tr>
<tr>
<td>68937-41-7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Triphenyl phosphate</td>
<td>3 mg/m³</td>
<td>3 mg/m³</td>
</tr>
<tr>
<td>115-86-6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

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
### 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

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Clear colorless liquid</td>
</tr>
<tr>
<td>Odour</td>
<td>None</td>
</tr>
<tr>
<td>Boiling point/range</td>
<td>410°C (770°F)</td>
</tr>
<tr>
<td>Melting point/range</td>
<td>&lt; -20°C</td>
</tr>
<tr>
<td>Flash point</td>
<td>&gt;225°C (&gt;437°F) (open cup)</td>
</tr>
<tr>
<td>Flammable/Explosion limits</td>
<td>Not flammable/Not explosive</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>Not self-ignitable</td>
</tr>
<tr>
<td>Vapour pressure</td>
<td>0.45 kPa (20°C)</td>
</tr>
<tr>
<td>Viscosity</td>
<td>96.3 mPa*sec (dynamic) (20°C)</td>
</tr>
<tr>
<td>Solubility:</td>
<td></td>
</tr>
<tr>
<td>- Solubility in water</td>
<td>0.330-0.367 mg/l at 20°C Hydrolyses</td>
</tr>
<tr>
<td>Density</td>
<td>1.168 (20°C)</td>
</tr>
<tr>
<td>Partition coefficient</td>
<td>Log Pow = 4.92-5.17</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>
</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. It hydrolyzes slowly at normal temperatures in acidic or alkaline aqueous solutions.</td>
</tr>
<tr>
<td>Conditions to avoid</td>
<td>Exposure to moisture</td>
</tr>
<tr>
<td>Hazardous decomposition products</td>
<td>Carbon dioxide and carbon monoxide</td>
</tr>
<tr>
<td>Hazardous polymerization</td>
<td>Phosphorus oxides,</td>
</tr>
</tbody>
</table>

### 11. Toxicological information

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute toxicity</td>
<td></td>
</tr>
<tr>
<td>- Rat oral LD50</td>
<td>2530 - 5000 mg/kg</td>
</tr>
<tr>
<td>- Rabbit dermal LD50</td>
<td>&gt; 2000 mg/kg</td>
</tr>
<tr>
<td>- Rat inhalation LC50</td>
<td>200 mg/m³ air</td>
</tr>
<tr>
<td>- Eye irritation (rabbit)</td>
<td>Not irritant</td>
</tr>
</tbody>
</table>
11. Toxicological information

- Dermal irritation (rabbit) Mild irritant.

Skin corrosion/irritation Mild irritant

Chronic toxicity No data available

Mutagenicity Weak mutagenic activity in cell forward mutagen assay in mouse lymphoma with metabolic activation.

Not mutagenic by the Ames Test

Tests on mammalian cell cultures with and without metabolic activation did not show mutagenic effects.

Carcinogenicity Not classified by IARC

Not included in NTP 12th Report on Carcinogens

Not classified as a carcinogen by USA OSHA

Reproductive toxicity In a reproductive toxicity study, rats received daily oral doses of 25, 100 or 400 mg/kg/day for two weeks. The animals were mated and their reproductive organs were microscopically examined. Decreased fertility was observed in the mid and high dose animals. Adverse effects on the reproductive organs were observed at all dose levels. The results of this study indicated that isopropylated triphenylphosphate is a reproductive toxin.

Neurotoxicity May cause neurotoxicity after acute and repeated exposure.

12. Ecological information

Aquatic toxicity :

- 96 Hour-LC50, Fish 0.36 mg/l (Rainbow Trout)

> 1.3 mg/l (Sheepshead minnow)

- LC50, Crustacea > 1 mg/l (Mysis shrimp)

- 48 Hour-LC50, Daphnia magna 1.0 mg/l

Bioaccumulative potential May bioaccumulate

Note: Not considered to be PBT or vPvB

13. Disposal considerations

Waste disposal Observe all federal, state and local environmental regulations when disposing of this material
MATERIAL SAFETY DATA SHEET

Product name: PHOSFLEX 31L
Product id: 7017
Supersedes: 23/11/2010
Revision date: 07/02/2012
Revision: 3

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 (contains triphenyl phosphate & triaryl phosphates, isopropylated)
Class: 9 - Miscellaneous Hazardous Material
Label: 9
Packing Group: III
Not regulated for surface and air transport in non-bulk (<119 gallons) packagings.
(contains triphenyl phosphate & isopropylated triaryl phosphates which are Marine Pollutants per 49CFR 172.101 Appendix B)

IMO
Proper shipping name: Environmentally hazardous substance, liquid, n.o.s (contains triphenyl phosphate & triaryl phosphates, isopropylated)
Class: 9 - Miscellaneous Dangerous Substances and Articles
Label: 9
Packing Group: III
Mark: MARINE POLLUTANT

ICAO/IATA
Proper shipping name: Environmentally hazardous substance, liquid, n.o.s (contains triphenyl phosphate & triaryl phosphates, isopropylated)
Class: 9
Hazard label(s): Miscellaneous
Packing group: III
Marking: Environmentally hazardous substance

15. Regulatory information

USA
- SARA 313
This product does not contain a chemical listed at or above de minimis concentrations.

- 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.
MATERIAL SAFETY DATA SHEET

<table>
<thead>
<tr>
<th>Product name</th>
<th>PHOSFLEX 31L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product id</td>
<td>7017</td>
</tr>
<tr>
<td>Supersedes</td>
<td>23/11/2010</td>
</tr>
<tr>
<td>Revision date</td>
<td>07/02/2012</td>
</tr>
<tr>
<td>Revision:</td>
<td>3</td>
</tr>
</tbody>
</table>

- 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 in IECSC
  - Korea
    Listed in ECL
  - Philippines
    Listed in PICCS

**16. Other information**

GHS classification

- Signal word: Warning

Hazard statements

- H361fd  Suspected of damaging fertility. Suspected of damaging the unborn child.
- H373 - May cause damage to organs through prolonged or repeated exposure
- H411 - Toxic to aquatic life with long lasting effects
MATERIAL SAFETY DATA SHEET

Product name: PHOSFLEX 31L
Product id: 7017
Revision date: 07/02/2012
Supersedes: 23/11/2010

Precautionary statements:
P202 - Do not handle until all safety precautions have been read and understood.
P260 - Do not breathe fume/gas/mist/vapours/spray
P273 - Avoid release to the environment
P281 - Use personal protective equipment as required.
P308 + P313 - IF exposed or concerned: Get medical advice/attention.
P391 - Collect spillage
P405 - Store locked up.
P501 - Dispose of contents/container in accordance with national and international regulations

This data sheet contains changes from the previous version in section(s)
1, 2, 3, 11, 16 (ANSI)

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 working 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

Product name: PHOSFLEX 31L
Product id: 7017
Revision date: 07/02/2012
Supersedes: 23/11/2010

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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.

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 telefax: +/972-8-6297832
 www.icl-ip.com

End of safety data sheet