MATERIAL SAFETY DATA SHEET

Product name: FYROLFLEX RDP

1. Identification of the substance & the company

Chemical name: Phosphoric acid, 1,3-phenylene tetraphenyl ester
Synonym(s): Phosphoric trichloride, polymer with 1,3-benzenediol, phenyl ester
Tetraphenyl m-phenylene bis(phosphate)
Chemical formula: C30H24O8P2
Chemical family: Aryl phosphate
Molecular weight: 574.4543
Type of product and use: Flame retardant
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 mild irritation to the eyes. Inhalation of vapor or mist may cause mild respiratory tract irritation.
NFPA Ratings (Scale 0-4): Health = 1, Fire = 1, Reactivity = 0
HMIS Ratings (Scale 0-4): Health = 1, Fire =1, Reactivity = 0.
GHS: Product is not subject to classification according to GHS. No label elements required

3. Composition / information on ingredients

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS No.</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetraphenyl m-phenylene bis(phosphate)</td>
<td>57583-54-7</td>
<td>95-99</td>
</tr>
</tbody>
</table>

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This product can also be described as:
CAS No. 125997-21-9 Phosphoric trichloride, polymer with 1,3-benzenediol, phenyl ester (95-99%)
CAS No. 115-86-6 Triphenyl phosphate (1-5%)

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.

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NOTE: Never give an unconscious person anything to drink.
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**Notes to the physician**
Treat symptomatically and supportively.
No specific antidote.

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, phosphorus oxides and phosphoric acid.
**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").

**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>Tetraphenyl m-phenylene bis(phosphate) 57583-54-7</td>
<td>Not determined</td>
<td>Not determined</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**
  Use protective clothing impervious to this material.
- **Safety shower and eye bath**
  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

Appearance: Colorless to pale yellow viscous liquid
Odour: Slight characteristic
Boiling point/range: >400°C
Melting point/range: -13°C
Pour point: -12.22°C (10 °F)
Flash point: >230°C (>446°F) (closed cup)
Flammable/Explosion limits: Not explosive/Not flammable
Auto-ignition temperature: Not self-ignitable
Vapour pressure: 2.59x10(-3)Pa (20°C)
Viscosity: 600mPas (25°C)
Solubility:
- Solubility in water: 1.05 mg/L
- Bulk density: 10.8 lbs/gal @ 25°C
- Specific gravity: 1.304(25°C)
- Density: 1.30 (25°C)
- Decomposition temperature: >210°C
- Partition coefficient: Log Kow - 4.9
- Oxidising properties: Not oxidising

10. Stability and reactivity

Stability: Stable under normal conditions.
Materials to avoid: Strong oxidizers, strong acids and strong alkalis.
It hydrolyzes slowly at normal temperatures in acidic or alkaline aqueous solutions.
Conditions to avoid: Heating above decomposition temperature. Under wet alkaline or neutral conditions, this product hydrolyzes slowly and nonviolently. Also, hydrolyzes at 150 F (66°C) or above in moist air to form phenol, resorcinol and allyl phosphoric acids.
Prevent moisture condensation in the container
Hazardous decomposition products: Carbon dioxide and carbon monoxide
Phosphorus oxides,
Hazardous polymerization: Not expected to occur

11. Toxicological information

Acute toxicity:
- Rat oral LD50: > 5000 mg/kg
- Rat dermal LD50: > 2000 mg/kg
- Rat inhalation LC50: > 4.14 mg/l (4-hr)
- Eye irritation (rabbit): Not irritant
11. Toxicological information

- Dermal irritation (rabbit)  
  Not irritant

Dermal sensitization  
Not a sensitizer

Sub-acute toxicity:
- NOEL (inhalation, rat)  
  0.1 mg/l/day (28 days)
- NOEL  
  > 5000 mg/kg/day immunological function (4 weeks oral mice)

Chronic toxicity  
No data available

Mutagenicity  
Not mutagenic by the Ames Test
No micronucleus induction was detected in bone marrow erythrocytes of mice
Not clastogenic in chromosome aberration test with Chinese hamster cells.

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

Reproductive toxicity  
Pregnant rabbits were dosed orally with 50, 200 or 1000 mg/kg/day of this product on days 6 through 28 of gestation. There were no maternal toxicity or teratogenicity at any dose level. In a two-generation study in rats, no adverse effects on reproduction were seen at doses up to 20,000 ppm of this product in the diet.

Neurotoxicity  
Not neurotoxic

12. Ecological information

Aquatic toxicity:
- LC50, fish  
  > 100 mg/l (Brachydanio rerio)
- EC50, Daphnia magna  
  > 100 mg/l
- EC50, Freshwater algae  
  > 100 mg/l

Biodegradation  
Readily biodegradable

Germany, water endangering classes (WGK)  
1
13. Disposal considerations

Waste disposal: 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.
- SARA 313: This product does not contain a chemical listed at or above de minimis concentrations.
- Massachusetts right-to-know list: Listed (Triphenyl phosphate)
- New Jersey right-to-know list: Listed (Triphenyl phosphate)
- Pennsylvania right to know list: Listed (Triphenyl phosphate)
- Rhode Island right-to-know list: Listed (Triphenyl phosphate)
- 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).
**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.
MATERIAL SAFETY DATA SHEET

Product name: FYROLFLEX RDP
Product id: 7001
Revision date: 02/05/2011
Supersedes: 03/06/2009

In an event of discrepancy between the contents of this MSDS and the English version of it, the English version shall prevail.