MATERIAL SAFETY DATA SHEET

Product name: FYROL HF-4
Product id: 7014
Revision date: 27/11/2011
Supersedes: 17/12/2008

1. Identification of the substance & the company

Chemical name: Proprietary formulation
Chemical family: Aryl phosphate
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
Medical 1-800-420-9236

2. Hazards identification

Emergency overview: May cause mild skin and eye irritation. 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.

3. Composition / information on ingredients

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS No.</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proprietary Phosphate Ester Blend</td>
<td>Confidential</td>
<td>Confidential</td>
</tr>
<tr>
<td>Proprietary Additive</td>
<td>Confidential</td>
<td>Confidential</td>
</tr>
<tr>
<td>Triphenyl phosphate</td>
<td>115-86-6</td>
<td>40</td>
</tr>
</tbody>
</table>
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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.
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 and phosphorus oxides. The material is not sensitive to ignition from static discharge.
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  
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). 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>Proprietary Phosphate Ester Blend</td>
<td>Not determined</td>
<td>Not determined</td>
</tr>
<tr>
<td>Proprietary Additive</td>
<td>Not determined</td>
<td>Not determined</td>
</tr>
<tr>
<td>Triphenyl phosphate 115-86-6</td>
<td>3 mg/m³</td>
<td>3 mg/m³</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  
  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

Appearance: Clear, transparent liquid
Odour: Little odor
Boiling point/range: >352°C (decomposes)
Melting point/range: Not determined
Pour point: -26.11°C (-15 °F)
Flash point: 246°C (475°F) (closed cup)
Flammable/Explosion limits: Not explosive/Not flammable
Auto-ignition temperature: Not self-ignitable
Vapour pressure: < 0.1 mmHg (37.8°C)
Viscosity: 27 cs @ 37°C (77°F)
Solubility:
- Solubility in water: < 0.1 g/100ml
- Density: 1.182 (20°C)

10. Stability and reactivity

Stability: Stable under normal conditions
Materials to avoid: Strong oxidizers, strong acids and strong alkalis.
Conditions to avoid: Exposure to moisture
Hazardous decomposition products: Phosphorus oxides, Carbon dioxide and carbon monoxide
Hazardous polymerization: Not expected to occur

11. Toxicological information

Acute toxicity:
- Rat oral LD50: > 5000 mg/kg
- Rabbit dermal LD50: > 2000 mg/kg
- Rat inhalation LC50: > 3.1 mg/l
- Eye irritation (rabbit): Mild irritant.
- Dermal irritation (rabbit): Mild irritant.
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Sub-chronic toxicity:
- NOEL: 100 ppm (13 weeks oral rat)

Chronic toxicity:
No data available

Mutagenicity:
Negative in chromosome aberration and sister chromatid exchange tests in mouse lymphoma cells.
Not mutagenic by the Ames Test and by mouse lymphoma assay.

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

Teratogenicity:
Not teratogenic when administered orally up to 1000 mg/kg

Neurotoxicity:
No signs of acute delayed neurotoxicity when administered orally to hens at 23 g/kg

12. Ecological information

Aquatic toxicity:
- 96 Hour-LC50, Fish: 0.8 mg/l (Ictalurus punctatus)
- 48 Hour-EC50, Daphnia magna: 202 µg/L

Persistence and degradability:
- Hydrolysis:
  Hydrolysis rates for triphenyl phosphate, a product component are:
  at pH 9.5: half-life: 0.23 days
  at pH 8.2: half-life: 7.5 days

Biodegradation:
Readily biodegradable

Bioaccumulative potential:
Triaryl phosphate esters, including triphenyl phosphate, exhibit low aqueous solubility, have moderate potential for bioconcentration and readily undergo biodegradation.
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 (Triphenyl 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 triphenyl phosphate which is a Marine Pollutant per 49CFR 172.101 Appendix B)

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

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

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.
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- 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
Non-controlled

EU
Reported in EINECS

Australia
Listed in AICS

China inventory
Listed in IECSC

Korea
Listed in ECL

16. Other information

GHS classification

Signal word
Warning

Hazard statements
H410 - Very toxic to aquatic life with long lasting effects

Precautionary statements
P273 - Avoid release to the environment
P391 - Collect spillage
P501 - Dispose of contents/container in accordance with national and international regulations

This data sheet contains changes from the previous version in section(s)
2,3 & 15 (not ANSI), 16 (ANSI), 12
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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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End of safety data sheet