

**RADCOLUBE® FR457 HYDRAULIC FLUID**  
**MATERIAL DATA SAFETY SHEET**

**Radco Industries, Inc.**  
**Emergency Phone: (630) 232.7966**  
PO Box 305 /39W930 Midan Drive  
LaFox Illinois 60147 USA  
ISO 9001:2000 Certification Number: C2006-00264

**CAGE# 1RVC4**  
**www.Xceltherm.com**  
**Effective Date: 08/01/06**

---

**Section I PRODUCT IDENTIFICATION**

**Product Name: RADCOLUBE® FR457 HYDRAULIC FLUID, FIRE RESISTANT**

Note: Meets Military Specification MIL-H-19457D (SH)

NSN's: 9150-01-113-2045, 9150-01-113-2046, 9150-113-2047

---

**Section II COMPONENTS**

	<u>CAS#</u>	<u>% by Wt.</u>
t-Butylphenyl diphenyl phosphate	56803-37-3	30-35%
Bis(t-butylphenyl) phenyl phosphate	65652-41-7	30-35%
Tri(t-butylphenyl) phosphate	78-33-1	10-15%
Triphenyl phosphate	115-86-6	15-25%

---

**Section III HAZARDS IDENTIFICATION**

**Emergency Overview:** Inhalation of oil mist or vapors at elevated temperatures may cause respiratory irritation. Harmful if aspirated into the lungs.

**Potential Health Effects:**

Eye Contact:	No significant irritation expected.
Skin Contact:	No significant irritation expected.
Inhalation:	Inhalation of oil mist or vapors at elevated temperatures may cause respiratory irritation.
Ingestion:	Significant adverse health effects are not expected if small amounts (less than a mouthful) are swallowed.

**HMIS Code:** (Health: 1) (Flammability: 1) (Reactivity: 0)

**NFPA Code:** (Health: 1) (Flammability: 1) (Reactivity: 0)

---

**Section IV FIRST AID MEASURES**

**Eye:** Immediately flush eyes with plenty of running water. Hold the eyelids apart during the flushing to ensure rinsing of the entire surface of the eye and lids with water. Get medical attention if irritation persists.

**Section IV FIRST AID MEASURES (CONT)**

- Skin:** Immediately remove contaminated clothing and equipment. Thoroughly wash all affected areas with soap and plenty of water. Get medical attention if irritation persists. Wash contaminated clothing before reuse. Thoroughly clean or destroy contaminated shoes.
- Inhalation:** If inhaled, removed victim to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.
- Ingestion:** Get medical attention by calling a physician or poison control center immediately. Do NOT induce vomiting unless directed to do so by medical personnel. If vomiting occurs, keep head below hips to reduce the risk of aspiration. Never give anything by mouth to an unconscious person.

---

**Section V FIRE FIGHTING MEASURES / FIRE DATA**

**Flashpoint:** >225°C (>437°F) (Seta cc)  
**Fire Point:** 665°F min  
**Auto ignition Temperature:** 1030°F min  
**UEL:** Not Determined  
**LEL:** Not Determined

**Flammability Classification:** Not Flammable

**Extinguishing Media:** Agents approved for Class B hazards (e.g., dry chemical, carbon dioxide, foam, steam) or water fog.

**Special hazards caused by the material, its products of combustion or resulting gases:**

Decomposition of this product under fire conditions can produce carbon monoxide, phosphorus oxides and organic decomposition products.

**Fire Fighting Equipment:** As in any fire, prevent human exposure to fire, smoke, fumes or products of combustion. Evacuate non-essential personnel from the fire area. Firefighters should wear full-face, self contained breathing apparatus and impervious protective clothing. If possible, move containers from the fire area. If not leaking, keep fire exposed containers cool with a water fog or spray to prevent rupture due to excessive heat. High pressure water may spread product from broken containers increasing contamination or fire hazard. Dike fire control water for later disposal. Do NOT allow contaminated water to enter waterways.

**Additional Information:** This product is not defined as flammable or combustible. It is self-extinguishing once the source of ignition is removed. The material is not sensitive to

---

---

**Section V FIRE FIGHTING MEASURES / FIRE DATA CONT.**

static discharge or physical impact. It may decompose under fire conditions.

---

**Section VI ACCIDENTAL RELEASE MEASURES**

**Personnel-related safety precautions:** Isolate spill area and restrict nonessential personnel. All personnel involved in spill cleanup should follow appropriate industrial hygiene practices. Particular danger of slipping on leaked/spilled product.

**Measures for environmental protection:** Stop source of spill if possible. Dike area to prevent spill from spreading.

**Measures for cleaning/collecting:** Soak up liquid with a suitable absorbent such as clay, sawdust, or kitty litter. Sweep up absorbed material and place in a chemical waste container for disposal. Cover spill area with a slurry of powdered household detergent and water. Use stiff brush to work slurry into cracks and crevices. Allow to stand for 2-3 minutes, then flush with water. Dike water for later disposal. Do NOT allow contaminated water to enter waterways or sewers.

---

**Section VII HANDLING AND STORAGE****Handling:**

Information for safe handling: Empty containers may retain product residues. Follow all warnings and precautions even after container is empty. Containers should be located in an area where they can be rotated regularly (first in, first out) and visually inspected for dents and bulging on a weekly basis.

Wear protective clothing including chemical goggles and rubber gloves when handling this product to avoid eye and skin contact. Handle in a well ventilated areas. Avoid inhalation of vapor or mist. Wash thoroughly after handling.

**Storage:**

**Suggested Storage Conditions:** Store away from foodstuffs and animal feed. Containers should be stored in a cool, dry, well-ventilated area away from flammable or oxidizing materials and sources of heat or flame.

**Information about storage in one common storage facility:**

Prolonged storage at elevated temperatures under wet alkaline or acidic conditions should be avoided to assure product integrity. Care should be taken to prevent moisture condensation in the container. The product is normally shipped in unlined tank cars, trucks and drums.

**Further information about storage conditions:**

The maximum storage temperature is 149 F or 65 C (Higher in absence of air/moisture).

**Section VII HANDLING AND STORAGE CONT.**

At temperatures below 4.4 C (40 F), the viscosity characteristics are such that improved pumping rates may be achieved by warming. Temperatures from 27-37.8 C (80-100 F) provide good flow rates. This product can be stored and transported in equipment constructed of mild steel.

---

**Section VIII EXPOSURE CONTROLS/PERSONAL PROTECTION****Additional information about design of technical systems:**

At elevated processing temperatures or in the event that use conditions generate airborne vapor, aerosol or mist, the material should be handled in a well-ventilated area.

Where adequate ventilation is not available, respiratory protection should be used.

**Additional Occupational Exposure Limit Values for possible hazards during processing:**

<u>Component</u>	<u>CAS #</u>	<u>Exposure Limits</u>
Triphenyl Phosphate	115-86-6	15-25%

PEL 3 mg/m<sup>3</sup> (OSHA)

TLV 3 mg/m<sup>3</sup> (ACGIH)

TWA 3 mg/m<sup>3</sup> (NIOSH)

**Personal protective equipment:****General protective and hygienic measures:**

The primary routes of exposure to this product are skin contact and inhalation.

**Breathing equipment:**

Use a NIOSH-approved organic vapor/acid gas respirator (OVAG) with dust, mist and fume filters to reduce potential for inhalation exposure if use conditions generate vapor, mist or aerosol and adequate ventilation (e.g., outdoor or well ventilated areas) is not available. Where exposure necessitates a higher level of protection use a NIOSH-approved, positive pressure, pressure demand, air-supplied respirator.

**Protection of hands:**

Skin contact with liquid or aerosol should be prevented through the use of chemical safety goggles and/or a face shield selected with regard for use condition exposure potential.

**Body protection:**

Safety showers, with quick opening valves which stay open and eye wash fountains or other means of washing the eyes with a gentle flow of cool to tepid tap water should be readily available in all areas where this material is handled or stored. Water should be supplied through insulated and heat-traced lines to prevent freezeups in cold weather. Long sleeved clothing may be used to minimize skin contact.

---

**Section IX CHEMICAL AND PHYSICAL PROPERTIES**

Appearance and Odor:	Liquid. Clear, blue. Nearly odorless.
pH:	Not Determined
Vapor Pressure:	0.023 mm Hg at 20 C.
Vapor Density:	1.150 at 15.6 C
Boiling Point:	Not Determined
Melting Point:	Not Determined
Solubility In Water:	1.5 ug/ml at 20 C
Specific Gravity:	0.84 at 15.6 C
Viscosity:	215 SUS at 38 C
Pour Point:	-17.77 C (0 F)

---

**Section X STABILITY AND REACTIVITY****Thermal decomposition/ conditions to be avoided:**

This product is stable at ambient temperatures and atmospheric pressure. It is not self reactive and is not sensitive to static discharge or physical impact.

Prolonged storage at elevated temperatures (above 65.6 C; 150 F) should be avoided.

**Materials to be avoided:** This product is incompatible with strong oxidizers, strong acids and strong alkalis. It hydrolyzes slowly at ambient temperatures in acidic or alkaline aqueous solutions.

**Hazardous Decomposition:** Vapors may decompose at elevated temperatures to release harmful materials. Under wet acidic or alkaline conditions this product hydrolyzes slowly and nonviolently to form phenol, substituted phenols and aryl phosphoric acids.

**Hazardous Polymerization:** Will not occur.

---

**Section XI TOXICOLOGICAL INFORMATION****ACUTE TOXICITY DATA:**

Dermal LD50:	>2000 mg/kg (rabbit). Practically non toxic
Oral LD50:	>5000 mg/kg (rat). Practically non toxic.
Inhalation LD50/4h:	>3.1 mg/l (rat) No effect observed at highest attainable concentration.

**Primary irritant effect:**

**On the skin:** This material was found to be a mild irritant in rabbits following a 24 hour exposure.

**Section XI TOXICOLOGICAL INFORMATION CONT.**

**On the eye:** This product was a mild irritant when tested on rabbits.

**Sensitization:** No sensitizing effects known.

**Sub chronic to chronic toxicity:** Daily ingestion by rats of 100, 400, or 1600 ppm of this material in the diet for 3 months produced increases in the liver and adrenal gland weights in females and increases of the liver weights in males at high-dose level. Since not histopathological changes were seen in the organs, the organ weight increases were considered adaptive responses and not a sign of target organ toxicity.

**Mutagenicity:** This product was examined for mutagenic and clastogenic activity in a series of in vitro assays. The assays included: Ames tests, the mouse lymphoma and chromosome aberration tests. No evidence of genotoxic or mutagenic activity was noted in any of these assays.

**Carcinogenicity:** This product was tested in a vitro malignant transformation assay using BALB/3T3 cells. It did not induce morphological transformations and thus did not exhibit carcinogenic potential in this assay.

**Neurotoxicity:** When this material was administered orally to hens at a cumulative oral dose of 23 g/kg, no signs of acute delayed neurotoxicity were noted.

**Reproductive effects:** IN a developmental toxicity test, daily administration of this material at 100, 400 or 1000 mg/kg to rats on days 6 through 20 of gestation demonstrated maternal toxicity (increased liver weights and reduced food consumption at the high dose) but no indications of teratogenicity were observed.

In a rat reproduction study, male and female animals received either 50, 250 or 1000 mg/kg/day for several weeks after which they mated. There was no reproductive toxicity observed at any dose level. Diagnostic pathology confirmed no alterations to the reproductive organs. There was no effect on mating index, litter size, survival of the offspring or on any other measure parameter. This product did not demonstrate reproductive toxicity.

---

**Section XII ECOLOGICAL INFORMATION**

**Information about elimination (persistence and degradability):** Easily biodegradable

**Behavior in environmental systems:**

**Components:**

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

**Mobility and bioaccumulation potential:**

Triaryl phosphate esters, including triphenyl phosphate, exhibit low aqueous solubility, have moderate potential for bioconcentration and readily undergo biodegradation.

**Aquatic toxicity:**

LC50 (96-hr)	0.39 mg/l (Mysid shrimp)
	2 mg/l (Rainbow trout)

**Section XII ECOLOGICAL INFORMATION CONT.**

1 mg/l (Sheepshead minnow)

---

**Section XIII DISPOSAL INFORMATION****Product:****Recommendation:**

Material that cannot be used or chemically reprocessed should be disposed of in accordance with all applicable federal, state and local regulations.

This product, if unused, does not meet the EPA's criteria as either a listed or characteristic Hazardous waste under the Resource Conservations and Recovery Act (RCRA) as published in 40 CFR 261.

**Uncleaned packagings:****Recommendation:**

Containers should be drained of residual material before disposal. Emptied containers should be disposed of in accordance with all applicable laws and regulations.

Product containers designed for single use should be thoroughly emptied before disposal.

---

**Section XIV TRANSPORTATION INFORMATION****DOT regulations:**

Hazard Class:	9
Identification Number:	UN 3082
Packing Group:	III
Proper Shipping Name (Technical Name):	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (triphenyl phosphate, tert-butylate truphenyl phosphate mixtures containing 10% to 48% triphenyl phosphates)
Label:	9, Marine Pollutant
Remarks:	Not regulated for surface and air transport in non- bulk (< 119 gallons) packagings. This product contains triphenyl phosphate which is a Marine Pollutant per 49 CFR 172.101, Appendix B.

**Maririme transport IMDG:**

IMDG Class:	9
UN Number:	UN 3082
Label:	9, Marine Pollutant
Packaging Group:	III

**Section XIV TRANSPORTATION INFORMATION CONT.**

Marine Pollutant: Yes (PP)  
 Proper Shipping Name: ENVIORNMENTALLY HAZARDOUS  
 SUBSTANCE, LIQUID, N.O.S. (triphenyl  
 phosphate, tert-butylate truphenyl phosphate mixtures  
 containing 10% to 48% triphenyl phosphates)

**Section XV REGULATORY INFORMATION**

**Sections 355 (extremely hazardous substances)**

<u>Component</u>	<u>CAS #</u>	<u>Exposure Limits</u>
Phenol	108-95-2	.05%

**Section 313 (Specific toxic chemical listings):**

This product does not contain a toxic chemical subject to the reporting requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR part 372 (annual Toxic Chemical Release Reporting).

**SARA Title III: Section 304- CERCLA:**

This product does not contain a hazardous substance regulated under section 304 for emergency release notification (CERCLA List).

**TSCA (Toxic Substances Control Act):** Substance is listed.

**TSCA Section 12 (b)- Export Notification:** This product does not contain any chemicals subject to Section 12(b) export notification.

**Proposition 65**

**Chemicals known to cause cancer:** NONE  
**Chemicals known to cause reproductive toxicity for females:** NONE  
**Chemicals known to cause reproductive toxicity for males:** NONE  
**Chemicals known to cause developmental toxicity:** NONE

**OSHA status:**

This product is considered to be a hazardous chemical under the OSHA Hazard Communication Standard (29 CER 1910.1200)

**Resource Conservation and Recover Act (RCRA):**

This product is not considered to be a hazardous waste under RCRD (40 CFR 261).

**Canadian WHMIS Classification(s):** Not controlled

**Section XV REGULATORY INFORMATION CONT.****State Regulations:****State Right-to-Know:**

<u>Component</u>	<u>CAS #</u>	<u>Exposure Limits</u>
t-Butylphenyl diphenyl phosphate	56803-37-3	30-35%
Bis(t-butylphenyl) phenyl phosphate	65652-41-7	30-35%
Tri(t-butylphenyl) phosphate	78-33-1	10-15%
Triphenyl phosphate	115-86-6	15-25%

**Section XVI OTHER INFORMATION**

This product, to the best of our knowledge, does not contain and is not manufactured with any Class I or II Ozone Depleting Chemicals. (ODCs).

This product does not contain chemicals listed by the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65) as causing cancer or reproductive toxicity.

This material safety data sheet and the information it contains is offered in good faith as accurate. We have reviewed all information contained in this data sheet which we received from sources outside our company. We believe that information to be correct but cannot guarantee its accuracy or completeness. Health and safety precautions in this data sheet may not be adequate for all individuals and/or situations. It is the user's obligation to evaluate and use this product safely and to comply with all applicable laws and regulations. No statement made in this data sheet shall be construed as a permission or recommendation for the use of any product in a manner that might infringe existing patents. No warranty is made, either expressed or implied.

® Indicates a registered trademark of **Radco Industries, Inc.**