

Akzo Nobel Chemicals Inc.  
MATERIAL SAFETY DATA SHEET

DATE PRINTED: 04/26/1999

PAGE 1  
MSDS NO. 16-084288

PHOSFLEX 21P

SECTION 1. CHEMICAL PRODUCT AND COMPANY INFORMATION

**PRODUCT NAME**  
PHOSFLEX 21P

**CHEMICAL NAME**  
Propylated triphenyl phosphate

**SYNONYM**  
None Available

**CHEMICAL FORMULA**  
Mixture

**CAS #**  
MIXTURE

**CHEMICAL FAMILY**  
Aryl phosphate

**MANUFACTURERS NAME**  
Akzo Nobel Chemicals Inc.

**PRODUCT/TECHNICAL INFORMATION**  
1-800-866-1200

**ADDRESS**  
5 Livingstone Avenue  
Dobbs Ferry, NY 10522

**MEDICAL/HANDLING EMERGENCY**  
1-914-893-6946

**COUNTRY**  
USA

**TRANSPORTATION EMERGENCY**  
CHEMTREC 1-800-424-9300

**PRODUCT USE**  
Flame-retardant plasticizer

**REVISION DATE**  
3/09/1999

**ISSUE DATE**  
3/10/1995

**REVISION NO.**  
005

SECTION 2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE DESCRIPTION	PERCENT	CAS#
Triphenyl phosphate	15.000- 19.000	115-86-6
Propylated triphenyl phosphate mixture	81.000- 85.000	68937-41-7

SECTION 3. HAZARDS IDENTIFICATION

**Appearance & Odor**

Clear, colorless, odorless liquid

**STATEMENT OF HAZARDS**

May cause mild skin irritation.  
Inhalation of vapor or mist may cause respiratory tract irritation.  
Triphenyl phosphate may cause cholinesterase inhibition at levels above the exposure limits.

**Fire & Explosion Hazards**

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

**Primary Route of Exposure**

Skin contact and inhalation are the primary routes of exposure to this product.

**Inhalation Acute Exposure**

Inhalation of vapors or mists may cause respiratory tract irritation. Triphenyl phosphate, a component of this product, may cause cholinesterase inhibition (see Section 4, "Note to Physician," for signs and symptoms of these effects).

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**SECTION 3. HAZARDS IDENTIFICATION**  
(CONTINUED)  
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**Skin Contact - ACUTE**

Skin contact may cause mild irritation.

**Eye contact - ACUTE**

Eye contact is not expected to cause irritation.

**Ingestion - ACUTE**

Ingestion may cause irritation of the gastrointestinal system and diarrhea. Ingestion of triphenyl phosphate, a component of this product, may cause cholinesterase inhibition. See Section 4, "Note to Physician," for signs and symptoms of these effects.

**CARCINOGENICITY**

IARC	....NO	OSHA	....NO
NTP	....NO	ACGIH	....NO

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**SECTION 4. FIRST AID MEASURES**  
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**Inhalation First Aid**

If inhaled, remove victim to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Skin Contact - First Aid**

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.

**Eye Contact - First Aid**

Immediately flush eyes with plenty of running water. If victim is wearing contact lenses, remove them. 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 occurs and persists.

**Ingestion - First Aid**

Get medical attention by calling a physician or a 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.

**Medical conditions aggravated**

Persons with pre-existing neuromuscular disorders may be at an increased risk from exposure to this material.

**Note to Physician**

This product is an organophosphorus mixture containing triphenyl phosphate. Triphenyl phosphate has been reported to be a weak cholinesterase inhibitor in humans. Symptoms of cholinesterase inhibition may include: headache, nausea, sweating, numbness and tingling of the hands and feet, salivation, muscle twitching, tremors, incoordination, blurred vision, tears, abdominal cramps, diarrhea, and chest discomfort. In cases of cholinesterase inhibition, atropine by injection is antidotal. Pralidoxime chloride (2-PAM; Protopam chloride) is also antidotal when administered early and in conjunction with atropine.

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**SECTION 5. FIRE FIGHTING MEASURES**

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**FLASH POINT**  
437.00 F 225.00 C  
Greater than

**FLASH METHOD**  
Cleveland Open Cup

**AUTO IGNITION TEMPERATURE**  
N/D F N/D C

**UPPER EXPLOSION LIMIT**  
N/D

**LOWER EXPLOSION LIMIT**  
N/D

**Extinguishing Media**

Use water fog or spray, dry chemical, foam or carbon dioxide extinguishing agents.

**Fire Fighting Procedures**

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.

**Fire & Explosion Hazards**

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

**Other Fire + Explosion Hazards**

No other fire or explosion hazards of this product are known.

**Hazardous Products/Combustion**

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

**NFPA HEALTH RATING**  
1

**NFPA FLAMMABILITY RATING**  
1

**NFPA REACTIVITY RATING**  
0

**NFPA OTHER**  
ND

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**SECTION 6. ACCIDENTAL RELEASE MEASURES**

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**Cleanup**

Isolate spill area and restrict nonessential personnel. All personnel involved in spill cleanup should follow appropriate industrial hygiene practices (see Section 8). Stop source of spill if possible without being injured. Dike area to prevent spill from spreading. 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. CAUTION! Spill area may be slippery. 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 wash water for later disposal. Do not allow contaminated water to enter waterways or sewers.

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## SECTION 7. HANDLING AND STORAGE

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### Handling

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

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. If bulged drums are found, they should be vented in an open area by removing the two-inch bung very slowly. The two-inch bung should not be removed completely until there is no sound of pressure being released. The bung can then be removed, but this should be done slowly and with care.

Emptied container may retain product residues. Follow all warnings and precautions even after container is emptied.

### Storage

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. Exercise due caution to prevent damage to or leakage from the container.

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. Carbon steel is the preferred material of construction for storage containers. The product is normally shipped in unlined tank cars, trucks and drums.

### MAXIMUM STORAGE TEMPERATURE

149.00 F      65.00 C

Higher in absence air/moisture

### General Comments

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 rates of flow.

This product can be stored and transported in equipment constructed of mild steel.

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## SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

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### Respiratory protection

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 area) is not available. Where exposure potential necessitates a higher level of protection, use a NIOSH-approved, positive-pressure, pressure demand, air-supplied respirator. When using respirator cartridges or canisters, they must be changed frequently (following each use or at the end of the workshift) to assure breakthrough exposure does not occur.

### Skin Protection

Skin contact with the liquid or its aerosol should be prevented through the use of suitable protective clothing, gloves, and footwear selected with regard for use condition exposure potential. Combination neoprene over natural latex gloves are recommended.

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**SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION**  
**(CONTINUED)**

**Eye Protection**

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

**Ventilation protection**

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.

**Other 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 freeze-ups in cold weather. Long sleeved clothing may be used to minimize skin contact.

**APPLICABLE EXPOSURE LIMITS**

Other than any exposure limits which may be displayed in Section 8, there are no other known exposure limits applicable to this product or its components.

**EXPOSURE LIMITS/REGULATORY INFORMATION**  
 (IN MG/M3)

SUBSTANCE DESCRIPTION	REG. AGCY	PEL	TLV	TWA	STEL	CEIL
Triphenyl phosphate	OSHA	3.0000	N/D	N/D	N/D	N/D
	ACGIH	N/D	3.0000	N/D	N/D	N/D
	NIOSH	N/D	N/D	3.0000	N/D	N/D
	SUPPLIER	N/D	N/D	N/D	N/D	N/D
Propylated triphenyl phosphate mixture	OSHA	N/D	N/D	N/D	N/D	N/D
	ACGIH	N/D	N/D	N/D	N/D	N/D
	NIOSH	N/D	N/D	N/D	N/D	N/D
	SUPPLIER	N/D	N/D	N/D	N/D	N/D

**LEGEND:**

**EXPOSURE LIMIT DESCRIPTIONS**

- CEIL Ceiling Exposure Limit
- PEL Permissible Exposure Limit
- STEL Short Term Exposure Limit
- TLV Threshold Limit Value
- TWA Time Weighted Average
- N/D = Not Determined

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**SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES**  
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**VAPOR PRESSURE (mm Hg)**  
N/D

**VAPOR DENSITY (Air = 1.0)**  
N/D

**EVAPORATION RATE**  
N/D

**VOLATILE %**  
N/D

**BOILING POINT**  
N/D F N/D C

**ODOR THRESHOLD (ppm)**  
N/D

**SPECIFIC GRAVITY**  
1.16 @ 20/20 C (68/68 F)

**BULK DENSITY**  
. Not Applicable

**SOLUBILITY IN WATER**  
N/D

**SOLUBILITY IN OTHER SOLVENTS**  
Not Determined

**COEFFICIENT OF OIL/WATER**  
N/D

**POUR POINT**  
-65.00 F -53.88 C

**MELTING POINT**  
N/D F N/D C

**pH FACTOR**  
N/D

**CLOUD POINT**  
N/D F N/D C  
Greater than

**FLASH POINT**  
437.00 F 225.00 C

**FLASH METHOD**  
Cleveland Open Cup

**UPPER EXPLOSION LIMIT**  
N/D

**LOWER EXPLOSION LIMIT**  
N/D

**AUTO IGNITION TEMPERATURE**  
N/D F N/D C

**Other**

Viscosity @ 25 C (77 F) = 100 cps.

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**SECTION 10. STABILITY AND REACTIVITY**  
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**Stability**

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.

**Incompatibilities**

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

**Polymerization**

Hazardous polymerization is not expected to occur.

**Decomposition**

Under wet acidic or alkaline conditions this product hydrolyzes slowly and nonviolently.

Vapors may decompose at elevated temperatures to release harmful materials.

**Conditions to Avoid**

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

Avoid contact with strong acids, strong bases, and strong oxidizers.

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**SECTION 11. TOXICOLOGICAL INFORMATION**

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**Toxicological - Inhalation**

The acute inhalation LC50 in both male and female rats is greater than 5.2 mg/l (4-hour exposure). No mortalities were observed at this dose level. Inhalation of this product may cause respiratory tract irritation.

**Inhalation Chronic Exposure**

Chronic inhalation exposure effects for this product are not known.

**Toxicological - Dermal**

Practically non-toxic; the acute dermal LD50 (rabbit) for this material is greater than 2000 mg/kg.

This material was found to be a mild skin irritant in rabbits following a 24-hour exposure.

**Skin Contact - CHRONIC**

Chronic dermal exposure effects for this product are not known. However, prolonged and/or repeated contact may cause irritation.

**Toxicological - Eye**

This product did not produce irritation when tested in rabbit eyes.

**Toxicological - Ingestion**

Slightly toxic; the acute oral LD50 (rat) is 2530-5000 mg/kg.

**Ingestion - CHRONIC**

Chronic ingestion effects of this product are not known.

**CARCINOGENICITY/MUTAGENICITY**

The product was examined for mutagenic activity in a series of in vitro microbial assays employing *Salmonella* indicator organisms with and without metabolic activation. Mutagenic activity was not demonstrated in any of the assays conducted.

The product was examined in a forward mutation assay in mouse lymphoma cells with and without metabolic activation. Weak mutagenic activity was demonstrated in the assay with metabolic activation. The product was not mutagenic without metabolic activation.

The product was examined in the in vitro cytogenic assay with and without metabolic activation. It did not induce increases in the frequency of chromosome aberrations with and without metabolic activation.

The product was examined in an in vitro malignant transformation test utilizing BALB/3T3 cells. It induced a significant increase of morphologic transformations in the assay.

**REPRODUCTIVE EFFECTS**

The reproductive toxicity of this product is not known.

**NEUROTOXICITY**

This product was administered orally to hens at a dose of 2000 mg/kg. A significant inhibition of neurotoxic esterase was seen although there were no observed signs of toxicity. In another study, this product administered orally to hens caused a significant inhibition of plasma cholinesterase at doses of 183 mg/kg and above and a significant inhibition of neurotoxic esterase at doses of 370 mg/kg and above. Single doses up to 11.7 g/kg of this product administered to hens 3 weeks apart did not produce delayed neurotoxicity.

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**SECTION 11. TOXICOLOGICAL INFORMATION**  
(CONTINUED)  
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**Other Toxicological Effects**

No other toxic effects for this product are known.

**Target Organs**

Overexposure to this product may affect the skin, respiratory tract, and the central and peripheral nervous system.

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**SECTION 12. ECOLOGICAL INFORMATION**  
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**ECOTOXICOLOGICAL INFORMATION**

Ecotoxicological data are not available for this product. The following data are available for triphenyl phosphate (a product component):

96-hour LC50 Rainbow trout = 0.36 mg/l (literature)

48-hour LC50 Daphnia magna = 1.0 mg/l (literature)

**DISTRIBUTION**

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

**CHEMICAL FATE**

This material is readily biodegradable.

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

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**SECTION 13. DISPOSAL CONSIDERATIONS**  
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**Waste Disposal**

Material that cannot be used or chemically reprocessed should be disposed of in accordance with all applicable regulations.

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

NOTE! State and local regulations may be more stringent than federal.

This product, if unused, does not meet the EPA's RCRA criteria as either a listed or a characteristic hazardous waste. Generators of wastes are required to evaluate their materials for compliance with RCRA and local disposal procedures and regulations.

**CONTAINER DISPOSAL**

Emptied containers may retain residues of this material. Follow all warnings and precautions even after the container is emptied.

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

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**SECTION 14. TRANSPORT INFORMATION**  
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**SHIPPING DESCRIPTION**

FOLLOWING SHIPMENTS ARE NOT REGULATED FOR TRANSPORT:

Surface transport within North America (U.S.A., Canada, Mexico) in packages of 119 gallons or less (non-bulk).

Air transport within North America (U.S.A., Canada, Mexico).

FOLLOWING SHIPMENTS ARE REGULATED FOR TRANSPORT (SHIPPING DESCRIPTION FOLLOWS):

Bulk surface shipments within North America (> 119 gallons).

Water transport within North America (U.S.A., Canada, Mexico).



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**SECTION 14. TRANSPORT INFORMATION**  
**(CONTINUED)**  
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Export shipments (excluding non-bulk shipments to Canada and Mexico and shipments via air transport to Canada and Mexico).

**ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.**

(Contains Triphenyl Phosphate/Isopropylated Triaryl Phosphates)

CLASS 9, UN 3082

PACKING GROUP III

NORTH AMERICAN EMERGENCY GUIDE NO. 171

**REQUIRED LABELS**

PRIMARY LABEL: Class 9

SUBSIDIARY RISK LABEL: Marine pollutant

**ENVIRON. HAZARDOUS SUBSTANCE**

This product contains triphenyl phosphate and isopropylated triaryl phosphates which are Marine Pollutants per 49 CFR, 172.101, Appendix B.

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**SECTION 15. REGULATORY INFORMATION**  
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Component Triphenyl phosphate is subject to the following

**Environmental List**

DSL Domestic Substance List-Canada  
MA. LIST Massachusetts Substance List  
NJ R-T-K New Jersey R-T-K Hazard. Sub.  
PA. LIST Penn. Hazardous Substance List  
TSCA Toxic Subst. Cont. Act -listed

Component Propylated triphenyl phosphate mixture is subject to the following

**Environmental List**

DSL Domestic Substance List-Canada  
TSCA Toxic Subst. Cont. Act -listed

**OTHER REGULATORY INFORMATION**

No other regulatory information is available on this product.

**WHMIS HAZARD CLASS**  
NOT CONTROLLED

**HAZARD RATING SOURCE**  
HMIS

**HEALTH**  
1

**REACTIVITY**  
0

**FLAMMABILITY**  
1

**OTHER**

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**SECTION 16. OTHER INFORMATION**  
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**OTHER INFORMATION**

PHOSFLEX is a registered trademark of Akzo Nobel Chemicals Inc.

**CREATED BY**

PRODUCT SAFETY 914/674-5000

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**KEY TO ABBREVIATIONS:**

EQ=Equal

LT=Less Than

GT=Greater Than

AP=Approximately

TR=Trace

ND=No Data available

All information concerning this product and/or suggestions for handling and use contained herein are offered in good faith and are believed to be reliable. Akzo Nobel Chemicals Inc. however makes no warranty as to the accuracy of and/or sufficiency of such information and/or suggestions, as to the product's merchantability or fitness for any particular purpose, or the any suggested use will not infringe any patent. Nothing contained herein shall be construed as granting or extending any license under any patent. Buyer must determine for himself, by preliminary tests or otherwise, the suitability of this product for his purposes. The information contained herein supersedes all previously issued bulletins on the subject matter covered.

MARKETED BY

**HARWICK STANDARD  
DISTRIBUTION CORPORATION**

60 S. Seiberling Street - Akron, Ohio 44305