SECTION 1. CHEMICAL PRODUCT AND COMPANY INFORMATION

PRODUCT NAME
SYN-O-AD 8478

CHEMICAL NAME
Butylated triphenyl phosphate

SYNONYM
t-Butylphenyl diphenyl phosphate

CHEMICAL FORMULA
Mixture

CAS #
MIXTURE

CHEMICAL FAMILY
Aryl phosphate

MANUFACTURERS NAME
Akzo Nobel Functional Chemicals LLC

PRODUCT/TECHNICAL INFORMATION
1-800-666-1200

ADDRESS
5 Livingstone Avenue
Dobbs Ferry, NY 10522

MEDICAL/HANDLING EMERGENCY
1-914-693-6946

COUNTRY
USA

TRANSPORTATION EMERGENCY
CHEMTREC 1-800-424-9300

PRODUCT USE
Lubricant additive

REVISION DATE
3/14/2003

ISSUE DATE
3/10/1995

REVISION NO.
013

SECTION 2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE DESCRIPTION	PERCENT	CAS#
t-Butylphenyl diphenyl phosphate	35.000- 40.000	56803-37-3
Bis(t-butylphenyl) phenyl phosphate	23.000- 28.000	65652-41-7
Tri(t-butylphenyl) phosphate	4.000- 8.000	78-33-1
Triphenyl phosphate	27.000- 32.000	115-86-6

SECTION 3. HAZARDS IDENTIFICATION

Appearance & Odor
Clear, transparent liquid; essentially odorless.

STATEMENT OF HAZARDS
May cause mild skin and eye 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).

SECTION 3. HAZARDS IDENTIFICATION (CONTINUED)

Skin Contact - ACUTE
Skin contact may cause mild irritation.

Eye contact - ACUTE
Eye contact may cause mild 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

SECTION 4. FIRST AID MEASURES

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 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.

SECTION 5. FIRE FIGHTING MEASURES

FLASH POINT
437.00 F 225.00 C
greater than

FLASH METHOD
SETA Closed 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

SECTION 6. ACCIDENTAL RELEASE MEASURES

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.

SECTION 7. HANDLING AND STORAGE

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.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

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.

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
t-Butylphenyl diphenyl phosphate						
	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
Bis(t-butylphenyl) phenyl phosphate						
	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
Tri(t-butylphenyl) phosphate						
	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
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

LEGEND:

EXPOSURE LIMIT DESCRIPTIONS
CEIL Ceiling Exposure Limit
PEL Permissible Exposure Limit

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION (CONTINUED)

STEL Short Term Exposure Limit
TLV Threshold Limit Value
TWA Time Weighted Average
N/D = Not Determined

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

VAPOR PRESSURE (mm Hg)
.14 @ 20 C (68 F)

VAPOR DENSITY (Air = 1.0)
N/D

EVAPORATION RATE
N/D

VOLATILE %
N/D

BOILING POINT
- F - C
Decomposes at > 352 C (665 F)

ODOR THRESHOLD (ppm)
N/D

SPECIFIC GRAVITY
1.17 @ 15.6/15.6 C (60/60 F)

BULK DENSITY
. Not Applicable

SOLUBILITY IN WATER
2.7 ug/ml

SOLUBILITY IN OTHER SOLVENTS
Not Determined

COEFFICIENT OF OIL/WATER
N/D

POUR POINT
-10.00 F -23.33 C

MELTING POINT
N/D F N/D C

pH FACTOR
N/D

CLOUD POINT
N/D F N/D C

FLASH POINT
437.00 F 225.00 C
greater than

FLASH METHOD
SETA Closed Cup

UPPER EXPLOSION LIMIT
N/D

LOWER EXPLOSION LIMIT
N/D

AUTO IGNITION TEMPERATURE
N/D F N/D C

Other
Viscosity @ 37.8 C (100 F) = 153 SUS.

SECTION 10. STABILITY AND REACTIVITY

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 to form phenol, substituted phenols, and aryl phosphoric acids.

Vapors may decompose at elevated temperatures to release harmful

SECTION 10. STABILITY AND REACTIVITY (CONTINUED)

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.

SECTION 11. TOXICOLOGICAL INFORMATION

Toxicological - Inhalation
The acute inhalation LC50 (rat) for this material following a 4-hour exposure was > 3.1 mg/l, the highest attainable concentration. No effects were observed at this level.

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 is a mild irritant to rabbit eyes.

Toxicological - Ingestion
Practically non-toxic; the acute oral LD50 (rat) for this material is > 5000 mg/kg.

Ingestion - CHRONIC
Daily ingestion by rats of 100, 400, or 1600 ppm of this material in the diet for three months produced increases in the liver and adrenal gland weights in females and increases in the liver weights of males at the high-dose level. However, no histopathological changes were noted.

CARCINOGENICITY/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 genetic activity was noted in any of these assays.
This product was tested in an in vitro malignant transformation assay using BALB/3T3 cells. It did not induce morphological transformations and thus did not exhibit carcinogenic potential in this assay.

REPRODUCTIVE EFFECTS
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) and feto-toxicity (reduction in fetal body weight at the high-dose) but no indications of teratogenicity were observed.

SECTION 11. TOXICOLOGICAL INFORMATION (CONTINUED)

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.

Other Toxicological Effects
No other toxic effects for this product are known.

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

SECTION 12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION
96-hr. LC50 (Rainbow trout) = > 2 mg/l
96-hr. LC50 (Sheepshead minnow) = > 1 mg/l
96-hr. LC50 (Mysid shrimp) = 0.39 mg/l

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

SECTION 13. DISPOSAL CONSIDERATIONS

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.

SECTION 14. TRANSPORT INFORMATION

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).
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.
(Triphenyl phosphate/tert-butylated triphenyl phosphates mixtures containing 10% to 48% triphenyl phosphates)
9, UN3082, PG III
NORTH AMERICAN EMERGENCY RESPONSE GUIDE NO. 171

REQUIRED LABELS
PRIMARY LABEL: Class 9
SUBSIDIARY RISK LABEL: Marine pollutant

ENVIRON. HAZARDOUS SUBSTANCE
This product contains triphenyl phosphate which is a Marine Pollutant per 49 CFR 172.101, Appendix B.

SECTION 15. REGULATORY INFORMATION

Component t-Butylphenyl diphenyl phosphate is subject to the following

Enviromental List

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

Component Bis(t-butylphenyl) phenyl phosphate is subject to the following

Enviromental List

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

Component Tri(t-butylphenyl) phosphate is subject to the following

Enviromental List

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

SECTION 15. REGULATORY INFORMATION (CONTINUED)

Component Triphenyl phosphate is subject to the following

Enviromental 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

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

SECTION 16. OTHER INFORMATION

OTHER INFORMATION
SYN-O-AD is a registered trademark of Akzo Nobel Chemicals Inc.

Revisions made in Section(s) 2, 8, 15.

CREATED BY
Product Safety 914/674-5000

KEY TO ABBREVIATIONS:

EQ=EQual	LT=Less Than	GT=Greater Than
AP=APproximately	TR=TRace	ND=No Data available