Akzo Nobel Chemicals Inc.
MATERIAL SAFETY DATA SHEET

DATE PRINTED: 06/22/1999 PAGE 1
MSDS NO. 11-065702

Trigonox 29-40B-pd

SECTION 1. CHEMICAL PRODUCT AND COMPANY INFORMATION

PRODUCT NAME
Trigonox 29-40B-pd

SYNONYM
Peroxide, (3,5,5-trimethylcyclohexylidene)-
bis(1,1-dimethylethyl)

MANUFACTURERS NAME
Akzo Nobel Chemicals Inc.

ADDRESS
300 South Riverside Plaza
Chicago, IL 60606

COUNTRY
USA

PRODUCT USE
Polymerization initiator

ISSUE DATE
3/31/1994

REVISION DATE
6/08/1998

SECTION 2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE DESCRIPTION

1,1-Di-(tert-butylperoxy)-3,3,5-trimethylcyclohexane
Synthetic calcium silicates
Calcium carbonate
Silica-crystalline cristobalite
Crystalline silica (Quartz)

PERCENT
** 38.000- 42.000
** 18.800- 26.000
** 30.000- 35.000
0.800- 1.100
0.400- 0.600

CAS#
6731-36-8
1344-95-2
471-34-1
14464-46-1
14808-60-7

** SUBSTANCE IS A COMPOUND AND/OR MIXTURE

SECTION 3. HAZARDS IDENTIFICATION

Appearance & Odor
Off-white powder with a slight odor.

STATEMENT OF HAZARDS
DANGER!
ORGANIC PEROXIDE.
HEAT OR CONTAMINATION MAY CAUSE HAZARDOUS DECOMPOSITION.
CAUSE EYE IRRITATION.
MAY CAUSE SKIN AND RESPIRATORY TRACT IRRITATION.
CONTAINS MATERIAL WHICH CAN CAUSE LUNG DAMAGE.

CANCER HAZARD- CONTAINS MATERIAL WHICH CAN CAUSE CANCER. RISK OF CANCER DEPENDS ON DURATION AND LEVEL OF EXPOSURE.

Fire & Explosion Hazards
 Peroxides and peroxide decomposition products are flammable and can ignite with explosive force if confined.
SECTION 3. HAZARDS IDENTIFICATION

Primary Route of Exposure
Skin and eye contact and inhalation of dust are the principal routes of exposure to this product.

Inhalation Acute Exposure
Inhalation of dust may cause moderate irritation of the nose and throat.

Skin Contact - ACUTE
Prolonged skin contact may cause moderate irritation and redness.

Eye contact - ACUTE
Eye contact may cause severe irritation.

Ingestion - ACUTE
Irritation to the mouth, throat, esophagus and stomach may be caused by ingestion of this material.

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

SECTION 4. FIRST AID MEASURES

Inhalation First Aid
Remove to fresh air. If breathing becomes difficult, oxygen may be given, preferably with a physician's advice. If not breathing, give artificial respiration. Get medical attention.

Skin Contact - First Aid
Remove contaminated clothing and equipment. Wash all affected areas with plenty of soap and water for at least 15 minutes. DO NOT attempt to neutralize with chemical agents. Wash any contaminated clothing before reuse. Obtain medical advice if irritation occurs.

Eye Contact - First Aid
Immediately flush eyes with large quantities of running water for a minimum of 15 minutes. If the victim is wearing contact lenses, remove them. Take care not to contaminate the victim's healthy skin and eyes. Hold the eyelids apart during the flushing to ensure rinsing of the entire surface of the eye and lids. DO NOT let victim rub eye(s). Do not attempt to neutralize with chemical agents. Get medical attention immediately. Oils or ointments should not be used at this time. Continue flushing for an additional 15 minutes if a physician is not immediately available.

Ingestion - First Aid
Immediately give several glasses of water. DO NOT induce vomiting. If vomiting occurs, keep head below hips to reduce the risk of aspiration. Give fluids again. Have a physician determine if condition of patient will permit induction of vomiting or evacuation of stomach. Never give anything by mouth to a person who is unconscious or convulsing.

If victim is unconscious, monitor pulse, breathing and airway. If breathing stops, begin artificial respiration immediately. If the heart has stopped, give cardiopulmonary resuscitation (CPR). Get medical attention immediately.
SECTION 4. FIRST AID MEASURES
(CONTINUED)

Medical conditions aggravated
Persons with pre-existing skin disease may be at an increased risk if exposed dermally to this material.

Note to Physician
No specific antidote is known. Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical conditions.

SECTION 5. FIRE FIGHTING MEASURES

FLASH POINT  FLASH METHOD
N/D F     N/D C

AUTO IGNITION TEMPERATURE  UPPER EXPLOSION LIMIT
N/D F     N/D C     N/D

LOWER EXPLOSION LIMIT
N/D

Extinquishing Media
Use water fog, dry chemical, carbon dioxide, or foam extinguishing agents.
Extinguish large fires with large amounts of water spray, fog or foam from a safe/protected position.

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
Peroxides and peroxide decomposition products are flammable and can ignite with explosive force if confined.

Other Fire & Explosion Hazards
This product can produce flammable vapors which may travel to a source of ignition and flash back.

Hazardous Products/Combustion
Thermal decomposition produces oxides of carbon and/or hazardous fumes, vapors and/or gasses.

NFPA HEALTH RATING  NFPA FLAMMABILITY RATING
2             1

NFPA REACTIVITY RATING  NFPA OTHER
1
SECTION 6. ACCIDENTAL RELEASE MEASURES

Cleanup
Stop source of spill. Sweep up spilled solid material being careful not to create dust. Place in a chemical waste container for disposal.

SECTION 7. HANDLING AND STORAGE

Handling
Wear protective clothing when handling this product to avoid eye and skin contact. Wash thoroughly after handling.

Electrically grounded tanks and containers should always be used as should non-sparking, electrically grounded hand tools and appliances. Ground or bond to ground all vessels when transferring to prevent the accumulation of static electricity. See National Electric Code.

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

Storage
To insure product quality, storage temperatures should not exceed 86 F (30 C).
To insure against possible exothermic self accelerating decomposition, storage temperatures must not exceed 131 F (55 C). This emergency temperature is derived from the SADT (see Sect. 9).

Keep containers tightly closed. Store away from reducing agents (e.g. amines, acids, alkalis) and heavy metal compounds (e.g. driers metal soaps and accelerators).

MAXIMUM STORAGE TEMPERATURE
86.00 F  30.00 C

General Comments
Containers should not be opened until ready for use. Use clean non-sparking equipment and tools when handling.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Respiratory protection
Use a NIOSH-approved organic vapor respirator with dust, mist and fume filters to reduce potential for inhalation exposure if use conditions generate dust, 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 liquid or its aerosol should be minimized through the use of suitable protective clothing, gloves and footwear selected with regard for use condition exposure potential.

Eye Protection
Because eye contact with this product may cause irritation, chemical goggles and/or a face shield should be worn when handling this product.
SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION
(CONTINUED)

Ventilation protection
Local exhaust ventilation, enclosed system design, continuous monitoring devices, process isolation and remote control are traditional exposure control techniques which may be used to effectively minimize employee exposure.

Other Protection
Safety showers, with quick opening valves which stay open, 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.

APPLICABLE EXPOSURE LIMITS
Available exposure limits applicable to this product are shown below.

<table>
<thead>
<tr>
<th>SUBSTANCE DESCRIPTION</th>
<th>REG. AGCY</th>
<th>PEL</th>
<th>TLV</th>
<th>TWA</th>
<th>STEL</th>
<th>CEIL</th>
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<tr>
<td>1,1-Di-(tert-butylperoxy)3,3,5-trimethylcyclohexane</td>
<td>OSHA</td>
<td>N/D</td>
<td>N/D</td>
<td>N/D</td>
<td>N/D</td>
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<tr>
<td></td>
<td>ACGIH</td>
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<td>N/D</td>
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<td>N/D</td>
<td>N/D</td>
<td>N/D</td>
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<tr>
<td></td>
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<tr>
<td></td>
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<td></td>
<td>ACGIH</td>
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<td>0.0500</td>
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<td>SUPPLIER</td>
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<td>N/D</td>
<td>N/D</td>
<td>N/D</td>
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<tr>
<td>Crystalline silica (Quartz)</td>
<td>OSHA</td>
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<td>N/D</td>
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<td>N/D</td>
<td>N/D</td>
</tr>
</tbody>
</table>

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

N/D = Not Determined

## SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
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<th>Property</th>
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</thead>
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<td>VAPOR PRESSURE (mm Hg)</td>
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<td>EVAPORATION RATE</td>
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<tr>
<td>BOILING POINT</td>
<td>N/D F, N/D C</td>
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<tr>
<td>SPECIFIC GRAVITY</td>
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<tr>
<td>SOLUBILITY IN WATER</td>
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</tr>
<tr>
<td>COEFFICIENT OF OIL/WATER</td>
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</tr>
<tr>
<td>MELTING POINT</td>
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</tr>
<tr>
<td>CLOUD POINT</td>
<td>N/D F, N/D C</td>
</tr>
<tr>
<td>FLASH METHOD</td>
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</tr>
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<td>LOWER EXPLOSION LIMIT</td>
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</tr>
<tr>
<td>VAPOR DENSITY (Air = 1.0)</td>
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<tr>
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<tr>
<td>ODOR THRESHOLD (ppm)</td>
<td>N/D F, N/D C</td>
</tr>
<tr>
<td>BULK DENSITY</td>
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</tr>
<tr>
<td>SOLUBILITY IN OTHER SOLVENTS</td>
<td>N/D Insoluble</td>
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<tr>
<td>POUR POINT</td>
<td>N/D F, N/D C</td>
</tr>
<tr>
<td>pH FACTOR</td>
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</tr>
<tr>
<td>FLASH POINT</td>
<td>N/D F, N/D C</td>
</tr>
<tr>
<td>UPPER EXPLOSION LIMIT</td>
<td>N/D</td>
</tr>
<tr>
<td>AUTO IGNITION TEMPERATURE</td>
<td>N/D F, N/D C</td>
</tr>
</tbody>
</table>

Other

SADT = 140 F (60 C) (See Sect. 10).

## SECTION 10. STABILITY AND REACTIVITY

**Stability**

This product is stable at ambient temperatures but may decompose if exposed to temperatures above 131 F (55 C).

**Incompatibilities**

This product is incompatible with strong acids, strong oxidizers, strong bases, metal salts, reducing agents and accelerators.

**Polymerization**

Hazardous polymerization will not occur.

**Decomposition**

Thermal decomposition will produce oxides of carbon and can produce flammable and/or combustible vapors and gases.

**Conditions to Avoid**

The SADT for this product is 140 F (60 C). The SADT (self accelerating decomposition temperature) is an experimentally derived temperature at which a typical package of the product will undergo self accelerating decomposition. Decomposition can be expected to be hazardous and uncontrollable. Under no circumstances should this product be exposed to temperatures near or above the emergency temperature of 131 F (55 C). Such an exposure could initiate hazardous decomposition.
SECTION 10. STABILITY AND REACTIVITY (CONTINUED)

Contact with incompatible materials such as acids, alkalis, heavy metals and reducing agents will also result in hazardous decomposition.

SECTION 11. TOXICOLOGICAL INFORMATION

Toxicological - Inhalation
Acute toxicity data (LC50) is not available for this product. The LC50 in rats for the peroxide (75% in dibutyl phthalate) is greater than 200 mg/L (4 hour exposure). This product is expected to cause moderate respiratory tract irritation. This product contains crystalline silica which is known to cause silicosis.

Inhalation Chronic Exposure
Chronic inhalation exposure effects of this product are not known. This product is expected to cause moderate respiratory tract irritation. The product contains crystalline silica which is known to cause silicosis.

Toxicological - Dermal
Acute dermal (LD50) is not available for this product. The LD50 of the peroxide (75% in dibutyl phthalate) is greater than 5000 mg/kg. Calcium carbonate is a moderate skin irritant.

Skin Contact - CHRONIC
Chronic dermal effects for this product are not known. This product is expected to be moderately irritating.

Toxicological - Eye
The peroxide (75% in dibutyl phthalate) is mildly irritating to rabbits. Calcium carbonate is a severe eye irritant.

Toxicological - Ingestion
Acute oral toxicity data (LD50) is not available for this product. The oral LD50 in rats for the peroxide (75% in dibutyl phthalate) is greater than 5000 mg/kg (practically nontoxic). The oral LD50 in rats for calcium carbonate is greater than 5000 mg/kg (practically nontoxic).

Ingestion - CHRONIC
Chronic ingestion effects of this product are not known.

CARCINOGENICITY/MUTAGENICITY
The carcinogenic/mutagenic properties of this product are not known. Crystalline silica (cristobalite and quartz) is classified by IARC to be a known carcinogen to humans and by NTP as a substance which may be anticipated to be a carcinogen.

REPRODUCTIVE EFFECTS
The reproductive toxicity of this product is not known.

NEUROTOXICITY
The neurotoxic effects of this product are not known.

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

Target Organs
Overexposure to this product may affect the skin, eyes, upper respiratory tract and lungs.
SECTION 12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION
The ecological toxicity of this product is not known.

DISTRIBUTION
Other ecological information on this product is not known.

CHEMICAL FATE
Chemical fate information on this product is not known.

SECTION 13. DISPOSAL CONSIDERATIONS

Waste Disposal
The characteristic of reactivity per RCRA would be exhibited by unused product if it becomes a waste material.

CONTAINER DISPOSAL
Containers should be drained of residual product before disposal. Empty containers should be disposed of in accordance with all applicable laws and regulations.

SECTION 14. TRANSPORT INFORMATION

SHIPPING DESCRIPTION
ORGANIC PEROXIDE TYPE D, SOLID
1,1-DI-(TERT-BUTYLPEROXY)-3,3,5-TRIMETHYL CYCLOHEXANE, 40%
5.2, UN3106, PG II
NORTH AMERICAN ERG NO: 145

REQUIRED LABELS
ORGANIC PEROXIDE.

ENVIRON. HAZARDOUS SUBSTANCE
This product does not contain an environmentally hazardous substance per 49 CFR 172.101, Appendix A.

SECTION 15. REGULATORY INFORMATION

Component 1,1-Di-(tert-butylperoxy)3,3,5-trimethylcyclohexane is subject to the following

Enviromental List

<table>
<thead>
<tr>
<th>DSL</th>
<th>Domestic Substance List - Canada</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSCA</td>
<td>Toxic Subst. Cont. Act. - listed</td>
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</tbody>
</table>

Component Synthetic calcium silicate is subject to the following

Enviromental List

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<tr>
<th>DSL</th>
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<tr>
<td>MA. LIST</td>
<td>Massachusetts Substance List</td>
</tr>
<tr>
<td>PA. LIST</td>
<td>Penn. Hazardous Substance List</td>
</tr>
</tbody>
</table>
Trigonox 29-40B-pd

SECTION 15. REGULATORY INFORMATION
(CONTINUED)

TSCA       Toxic Subst. Cont. Act -listed

Component Calcium carbonate is subject to the following

Environmental List

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

Component Silica-crystalline cristobalite is subject to the following

Environmental List

DSL        Domestic Substance List - Canada
MA. LIST   Massachusetts Substance List
PA. LIST   Penn. Hazardous Substance List
TSCA       Toxic Subst. Cont. Act -listed

Component Crystalline silica (Quartz) is subject to the following

Environmental List

DSL        Domestic Substance List - Canada
MA. LIST   Massachusetts Substance List
PA. LIST   Penn. Hazardous Substance List
PROP 65    California Proposition 65
TSCA       Toxic Subst. Cont. Act -listed

OTHER REGULATORY INFORMATION

Warning: This product contains chemicals known to the State of California to cause cancer.

WHMIS HAZARD CLASS
F,C, D-2A

HAZARD RATING SOURCE
HMIS

HEALTH
2

REACTIVITY
1

FLAMMABILITY
1

OTHER
SECTION 16. OTHER INFORMATION

OTHER INFORMATION

TRIGONOX is a registered trademark of Akzo Nobel Chemicals Inc.

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

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