1. PRODUCT AND COMPANY IDENTIFICATION

Product name: Phosphazane base P2-t-Bu solution ~2.0 M
Product Number: 79416
Brand: Sigma-Aldrich
Supplier: Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA
Telephone: +1 855-335-5832
Fax: +1 855-335-5932
Emergency Phone # (For both supplier and manufacturer): (314) 778-6555
Preparation Information: Sigma-Aldrich Corporation
Product Safety - Americas Region
1-800-521-8888

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Flammable liquid, Target Organ Effect, Harmful by ingestion., Corrosive, Carcinogen

Target Organs
Central nervous system, Liver, Kidney

GHS Classification
Flammable liquids (Category 2)
Skin corrosion (Category 1B)
Serious eye damage (Category 1)
Specific target organ toxicity - single exposure (Category 3)

GHS Label elements, including precautionary statements

Signal word: Danger

Hazard statement(s)
H225 Highly flammable liquid and vapour.
H335 + H336 May cause respiratory irritation, and drowsiness or dizziness.

Precautionary statement(s)
P201 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P261 Do not breathe dusts or fumes.
P262 Avoid contact with skin and eyes.
P263 Do not get in eyes, on skin or on clothing.
P281 Keep container closed when not in use.
P282 Avoid release to the environment. Collect spillage.
P310 Immediately call a POISON CENTER or doctor/physician.

Other hazards

May form explosive peroxides.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms: 1-tert-Butyl-2,2,4,4,4-pentakly(dimethylamino)-2A,5,4'A<SP>5'-
catenadi(phosphazene)

Formula: C14H37NO7P2
Molecular Weight: 367.45 g/mol

<table>
<thead>
<tr>
<th>Component</th>
<th>Classification</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phosphazane base P2-(tert-butyl)</td>
<td>Skin Corr. 1B; H314</td>
<td>70 - 90 %</td>
</tr>
<tr>
<td>Tetrahydrofuran</td>
<td>Flammable, Eye Irrit. 2; Carc. 2; STOT SE 3; H225, H319, H335, H351, EUH119</td>
<td>30 - 50 %</td>
</tr>
</tbody>
</table>

For the full text of the H-Statements and R-Phrases mentioned in this Section, see Section 16

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Take off contaminated clothing and shoes immediately. Wash with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician. Continue rinsing eyes during transport to hospital.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIREFIGHTING MEASURES

Conditions of flammability
Flammable in the presence of a source of ignition when the temperature is above the flash point. Keep away from heat/sparks/open flame/hot surface. No smoking.
Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for firefighters
Wear self-contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products
Hazardous decomposition products formed under all conditions: Carbon oxides, nitrogen oxides (NOx), Oxides of phosphorus

Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist. Use explosion-proof equipment. Keep away from sources of ignition. No smoking. Take measures to prevent the build up of electrostatic charge.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Test for peroxy formation periodically and before distillation. Dry residue is explosive. Store under inert gas.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Value</th>
<th>Control parameters</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetrachloroethylene</td>
<td>106-99-9</td>
<td>TWA</td>
<td>50 ppm</td>
<td>USA, ACGIH Threshold Limit Values (TLV)</td>
</tr>
<tr>
<td>Remarks</td>
<td>Central Nervous System impairment Upper Respiratory Tract irritation Kidney damage Acute Inhalation</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Remarks | Central Nervous System impairment Upper Respiratory Tract irritation Kidney damage Acute Inhalation |
| STEL | 100 ppm | USA, ACGIH Threshold Limit Values (TLV) |

| STEL | 250 ppm | USA, ACGIH Threshold Limit Values (TLV) |
| STEL | 735 mg/m³ | USA, ACGIH - TABLE Z-1 Limits for Air Contaminants - 1910.1000 |
| TWA | 250 ppm | USA, Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants |
| The value in mg/m³ is approximate. |
| TWA | 200 ppm | USA, NIOSH Recommended Exposure Limits |

Personal protective equipment

Respiratory protection
Where risks assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 406) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Splash contact
Material: butyl-rubber
Minimum layer thickness: 0.3 mm
Break through time: 10 min
Material tested Subjected to: KCl 95% / Aldrich 76776647, Szs M

Data source: KCL GmbH, D-36124 Friederichs, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374 if used in solution, or mixed with other substances, and under conditions which differ from EN374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Eye protection
Tightly fitting safety goggles. Face shield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166 (EU).

Skin and body protection
Complete suit protecting against chemicals. Flame retardant antistatic protective clothing. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance
Form: clear, liquid
Colour: brown

Safety data
pH: no data available
Melting point/freezing point: no data available
Boiling point: no data available
Flash point: -17 °C (1 °F) - closed cup
Ignition temperature: no data available
Auto-ignition temperature: no data available
Lower explosion limit: no data available
Upper explosion limit: no data available
Vapour pressure: no data available
Density: 0.970 g/cm³
Water solubility: no data available
Partition coefficient: n-octanol/water: no data available
Relative vapour density: no data available
Occlud: no data available
Occlud Threshold: no data available
Evaporation rate: no data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions
Vapours may form explosive mixture with air.

Conditions to avoid
Heat, flames and sparks. Extremes of temperature and direct sunlight.

Materials to avoid
Oxidizing agents, Oxygen

Hazardous decomposition products
Hazardous decomposition products may form under fire conditions. - Carbon oxides, nitrogen oxides (NOx), Oxides of phosphorus
Other decomposition products: no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity
Oral LD₅₀: no data available
Inhalation LC₅₀: no data available
Dermal LD₅₀: no data available
Other information on acute toxicity: no data available

Skin corrosion/irritation: no data available
Serious eye damage/eye irritation: Eyes: no data available
Respiratory or skin sensitisation: no data available
Germ cell mutagenicity: no data available

Carcinogenicity
IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
no data available

Teratogenicity
no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)
no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
no data available

Aspiration hazard
no data available

Potential health effects
- Inhalation: May be harmful if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract. Vapours may cause drowsiness and dizziness.
- Ingestion: Harmful if swallowed.
- Skin: Harmful if absorbed through skin. Causes skin burns.
- Eyes: Causes eye burns.

Signs and Symptoms of Exposure
Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin. spasm, inflammation and edema of the larynx, spasms, inflammation and edema of the bronchi, pneumonia, pulmonary edema, burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea

Synergistic effects
no data available

Additional information
RTECS: Not available

12. ECOLOGICAL INFORMATION

Toxicity
no data available

Persistence and degradability
no data available

Bioaccumulative potential
no data available

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects
no data available

13. DISPOSAL CONSIDERATIONS
Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 2920 Class: 8 (3) Packing group: I
Proper shipping name: Corrosive liquids, flammable, n.o.s. (Phosphazene base P(2)-tert-buty, Tetrahydrofuran)
Reportable Quantity (RQ): 3333 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN number: 2920 Class: 8 (3) Packing group: I
Proper shipping name: CORROSIVE LIQUID, FLAMMABLE, N.O.S. (Tetrahydrofuran, Phosphazene base P(2)-tert-buty)
Marine pollutant: No

IATA
UN number: 2920 Class: 8 (3) Packing group: I
Proper shipping name: Corrosive liquid, flammable, n.o.s. (Tetrahydrofuran, Phosphazene base P(2)-tert-buty)

Further Information
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15. REGULATORY INFORMATION

OSHA Hazards
Flammable liquid, Target Organ Effect, Harmful by inhalation., Corrosive, Carcinogenic

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

<table>
<thead>
<tr>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>109-99-9</td>
<td>2007-03-01</td>
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Pennsylvania Right To Know Components

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<th>Revision Date</th>
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<tbody>
<tr>
<td>109-00-0</td>
<td>2007-03-01</td>
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New Jersey Right To Know Components

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<th>Revision Date</th>
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</thead>
<tbody>
<tr>
<td>109-99-9</td>
<td>2007-03-01</td>
</tr>
</tbody>
</table>

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Text of H-phrase(s) and R-phrase(s) mentioned in Section 3

<table>
<thead>
<tr>
<th>H-phrase(s)</th>
<th>R-phrase(s)</th>
</tr>
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<tbody>
<tr>
<td>Carc</td>
<td>Carcinogenicity</td>
</tr>
<tr>
<td>E</td>
<td>May form explosive peroxides.</td>
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<td>Eye irrit.</td>
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