MATERIAL SAFETY DATA SHEET

PHOSPHORIC ACID, 30 - 100 %

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Brenntag Canada Inc.
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WHMIS#: 00060175
Index: GCD1020/08A
Effective Date: 2008 January 16
Date of Revision: 2008 January 16

EMERGENCY TELEPHONE NUMBERS (FOR EMERGENCIES INVOLVING CHEMICAL SPILLS OR RELEASE)

Toronto, ON (416) 226-6117
Montreal, QC (514) 861-1211
Winnipeg, MB (204) 943-8827
Edmonton, AB (780) 424-1754
Calgary, AB (403) 263-8660
Vancouver, BC (604) 685-5036

PRODUCT IDENTIFICATION

Product Name: Phosphoric Acid, 30 - 100 %.

Chemical Name: Orthophosphoric Acid.

Synonyms: Phosphoric Acid; AD Stripper; Phosphoric Acid 52 % Merchant Gr; Phosphoric Acid 65 %; Phosphoric Acid 70 %; Phosphoric Acid 75 %; Phosphoric Acid 75 % Tech; Phosphoric Acid 75 % FG; Phosphoric Acid 75 % ANSI / NSF; Phosphoric Acid 85 % FG; Phosphoric Acid 85 % ANSI / NSF; Phosphoric Acid 93 %; Phosphoric Acid Purified PPA; Cemblend A Phos Acid 75 %


Molecular Formula: H3PO4.


WHMIS Classification / Symbol:
E: Corrosive

READ THE ENTIRE MSDS FOR THE COMPLETE HAZARD EVALUATION OF THIS PRODUCT.

2. COMPOSITION, INFORMATION ON INGREDIENTS (Not Intended As Specifications)

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>CAS#</th>
<th>ACGIH TLV</th>
<th>% Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phosphoric Acid</td>
<td>7664-38-2</td>
<td>1 mg/m³</td>
<td>30 - 100</td>
</tr>
</tbody>
</table>

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Corrosive! Toxic effects are principally related to its corrosive properties. Solutions and mists with a pH of 3 or less are a significant health concern. Toxic effects may be delayed. Causes severe skin and eye burns. Mists or sprays are extremely irritating to eyes and respiratory tract. See Section 11, "Other Studies Relevant to Material". Can decompose at high temperatures forming toxic gases. Reacts with water. Contents may develop pressure on prolonged exposure to heat.

POTENTIAL HEALTH EFFECTS

Inhalation: Corrosive! Product may cause severe irritation of the nose, throat and respiratory tract. Repeated and/or prolonged exposures may cause productive cough, running nose, bronchopneumonia, pulmonary oedema (fluid build-up in lungs), and reduction of pulmonary function. See "Other Health Effects" Section.
4. FIRST AID MEASURES

FIRST AID PROCEDURES

General Guidelines: Prompt removal of the material and obtaining medical attention are essential for all contact. Remove all contaminated clothing and immediately wash the exposed areas with copious amounts of water. Continue the flushing during transportation to the emergency department. Corrosive effects may be delayed (up to 72 hours), and damage may occur without the sensation or onset of pain. Contact local poison control centre for further guidance.

Inhalation: Move victim to fresh air. Give artificial respiration ONLY if breathing has stopped. Give cardiopulmonary resuscitation (CPR) if there is no breathing AND no pulse. Oxygen administration may be beneficial in this situation but should only be administered by personnel trained in its use. Obtain medical attention IMMEDIATELY.

Skin Contact: Prompt removal of the material from the skin is essential. Remove all contaminated clothing and immediately wash the exposed areas with soap and water for a minimum of 30 minutes or up to 60 minutes for critical body areas. Immerse the exposed part immediately in ice water to relieve pain and to prevent swelling and blistering. Place cold packs, ice or wet cloths on the burned area if immersion is not possible. Cover the exposed part with a clean, preferably sterile, lint-free dressing. Obtain medical attention IMMEDIATELY and monitor breathing and treat for shock for severe exposure. See "Note to Physicians" below.

Eye Contact: Immediately flush eyes with running water for a minimum of 30 minutes, preferably up to 60 minutes. Hold eyelids open during flushing. If irritation persists, repeat flushing. Do not transport victim until the recommended flushing period is completed unless flushing can be continued during transport.

Ingestion: Do not attempt to give anything by mouth to an unconscious person. IMMEDIATELY contact local Poison Control Centre. If victim is alert and not convulsing, rinse mouth out and give 1 to 2 glasses of milk. Water may be used if milk is not available but it is not as effective. If spontaneous vomiting occurs, have victim lean forward with head down to avoid breathing in of vomitus, rinse mouth and administer more milk or water. IMMEDIATELY transport victim to an emergency facility.
Note to Physicians: Treatment for corrosive chemical contact with skin after initial flushing procedures:

1. Immerse the exposed part immediately in ice water to relieve pain and to prevent swelling and blistering. Place cold packs, ice or wet cloths on the burned area if immersion is not possible.

2. Remove anything that is constrictive, such as rings, bracelets or footwear, before swelling begins.

3. Cover the exposed part with a clean, preferably sterile, lint-free dressing.

4. For severe exposure, immediately seek medical attention and monitor breathing and treat for shock.

Immediate consultation with the local Poison Control Centre should be initiated. Severe and sometimes delayed (up to 72 hours) local and systemic reactions can occur.

Due to the severely irritating or corrosive nature of the material, swallowing may lead to ulceration and inflammation of the upper alimentary tract with hemorrhage and fluid loss. Also, perforation of the esophagus or stomach may occur, leading to mediastinitis or peritonitis and the resultant complications. (3)

Mucosal injury following ingestion of this corrosive material may contraindicate the induction of vomiting in the treatment of possible intoxication. Similarly, if gastric lavage is performed, intubation should be done with great care. If oral burns are present or a corrosive ingestion is suspected by the patient's history, perform esophagoscopy as soon as possible. Scope should not be passed beyond the first burn because of the risk of perforation.

This product contains materials that may cause severe pneumonitis if aspirated. If ingestion has occurred less than 2 hours earlier, carry out careful gastric lavage; use endotracheal cuff if available, to prevent aspiration. Observe patient for respiratory difficulty from aspiration pneumonitis. Give artificial resuscitation and appropriate chemotherapy if respiration is depressed.

Do not attempt to neutralize the acid with weak bases since the exothermic reaction may extend the corrosive injury. Do not use buffering agents (e.g., antacids) they produce significant exothermic reactions without significantly altering the pH. Since reexposure of the mucosa to acid is harmful, be careful to avoid further vomiting and limit fluid to one to two glasses for an adult. (3)

Medical conditions that may be aggravated by exposure to this product include diseases of the skin, eyes or respiratory tract.

## 5. FIRE-FIGHTING MEASURES

<table>
<thead>
<tr>
<th>Flashpoint (°C)</th>
<th>Autoignition Temperature (°C)</th>
<th>Flammability Limits in Air (%):</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>LEL</td>
</tr>
<tr>
<td>Does not flash.</td>
<td>Not applicable.</td>
<td>Not applicable.</td>
</tr>
</tbody>
</table>

Flammability Class (WHMIS): Not regulated.

Hazardous Combustion Products: Thermal decomposition products are toxic and may include Hydrogen, phosphine, oxides of Phosphorus and irritating gases.

Unusual Fire or Explosion Hazards: Avoid direct contact of this product with water as this can cause a violent exothermic reaction. Reacts with most metals to produce hydrogen gas which could make an explosive mixture with air.

Sensitivity to Mechanical Impact: Not expected to be sensitive to mechanical impact.

Rate of Burning: Not available.

Explosive Power: Not available.

Sensitivity to Static Discharge: Not expected to be sensitive to static discharge.

**EXTINGUISHING MEDIA**

Fire Extinguishing Media: Use carbon dioxide or dry chemical media for small fires. If only water is available, use it in the form of a fog. Do not use water.

**FIRE FIGHTING INSTRUCTIONS**

Instructions to the Fire Fighters: Use water spray to cool fire-exposed containers or structures. Use water spray to disperse vapours. Spilled acid may cause floors and contact surfaces to be come slippery.

Fire Fighting Protective Equipment: Use self-contained breathing apparatus and protective clothing. Protective clothing for skin and eye protection should be worn to protect against corrosive materials.
6. ACCIDENTAL RELEASE MEASURES

Information in this section is for responding to spills, leaks or releases in order to prevent or minimize the adverse effects on persons, property and the environment. There may be specific reporting requirements associated with spills, leaks or releases, which change from region to region.

Containment and Clean-Up Procedures: In all cases of leak or spill contact vendor at Emergency Number shown on the front page of this MSDS. See Section 13, “Deactivating Chemicals”. Wear protective clothing. Do not use combustible materials such as sawdust as an absorbent. Recover spilled material on non-combustible absorbents, such as sand or vermiculite, and place in covered containers for disposal. Spilled acid may cause floors and contact surfaces to become slippery. Eliminate all sources of ignition. Collect product for recovery or disposal. For release to land, or storm water runoff, contain discharge by constructing dykes or applying inert absorbent; for release to water, utilize damming and/or water diversion to minimize the spread of contamination. Ventilate enclosed spaces. Notify applicable government authority if release is reportable or could adversely affect the environment.

7. HANDLING AND STORAGE

HANDLING

Handling Practices: Use normal "good" industrial hygiene and housekeeping practices. When diluting, add this material/product to water in small amounts to avoid spattering. Never add water to this material/product. Add small quantities of this material slowly to large quantities of water, stirring constantly all the while. Constant stirring is necessary to avoid concentration of the product at the bottom of the mix vessel. Such concentration of the product may result in a violent exotherm with boiling of the liquid resulting in splashing, spattering or a violent eruption of a highly corrosive solution if the addition is too rapid or without sufficient stirring.

Ventilation Requirements: See Section 8, “Engineering Controls”.

Other Precautions: Use only with adequate ventilation and avoid breathing aerosols (vapours or mists). Avoid contact with eyes, skin or clothing. Wash thoroughly with soap and water after handling. Wash contaminated clothing thoroughly before re-use. Do not use cutting or welding torches on empty drums that contained this material/product. Corrosive residue is most likely to be deposited at process vents or storage tanks, especially during filling operations. The use of compressed air to force corrosive materials from delivery trucks is of special concern. Scrubbing the exhaust of these vents is highly recommended. Jurisdictional regulations should be consulted to determine required practices.

STORAGE

Storage Temperature (°C): To prevent crystallization of concentrated phosphoric acid solutions, minimum storage temperatures are 27 Degrees Celsius for 85% solutions, 4 Degrees Celsius for 80% solutions and -18 Degrees Celsius for 75% solutions. (3)

Ventilation Requirements: Ventilation should be corrosion proof.

Storage Requirements: Store in a clean, cool well ventilated area, away from organic chemicals, strong bases, strong acids, metal powders, carbides, sulfides, and any readily oxidizable material. Protect from direct sunlight. Protect against physical damage. Storage tanks should be in a contained area to control any spills or leaks. Storage area should be equipped with corrosion-resistant floors, sumps and should have controlled drainage to a recovery tank. Storage area should be equipped with acid-resistant floors, sumps and should have controlled drainage to a recovery tank.

Special Materials to be Used for Packaging or Containers: Materials of construction for storing the product include: stainless steel or plastics. Equipment for storage, handling or transportation should NOT be made of: Aluminum and its alloys, brass, copper, titanium, bronze, mild steel and cast iron. Attacks some types of rubber, plastics and coatings. Confirm suitability of any material before using.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Recommendations listed in this section indicate the type of equipment, which will provide protection against overexposure to this product. Conditions of use, adequacy of engineering or other control measures, and actual exposures will dictate the need for specific protective devices at your workplace.

ENGINEERING CONTROLS
Engineering Controls: Local exhaust ventilation required. Ventilation should be corrosion proof. Make up air should be supplied to balance air that is removed by local or general exhaust ventilation. Ventilate low lying areas such as sumps or pits where dense vapours may collect.

For personnel entry into confined spaces (i.e. bulk storage tanks) a proper procedure must be followed. It must include consideration of, among other things, ventilation, testing of tank atmosphere, provision and maintenance of SCBA, and emergency rescue.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Eye Protection: Safety glasses with side shields are recommended to prevent eye contact. Use full face-shield and chemical safety goggles when there is potential for contact. Contact lenses should not be worn when working with this material.

Skin Protection: Gloves and protective clothing made from butyl rubber, natural rubber, viton, neoprene, nitrile rubber or PVC should be impervious under conditions of use. Do not use gloves or protective clothing made from polyvinyl alcohol (PVA). Attacks some types of rubber, plastics and coatings. Prior to use, user should confirm impermeability.

Respiratory Protection: No specific guidelines available. A NIOSH/MSHA-approved full facepiece air-purifying respirator equipped with acid gas, dust, mist, fume cartridges for concentrations up to 10 mg/m³ Phosphoric Acid. An air-supplied respirator if concentrations are higher or unknown.

If while wearing a respiratory protection, you can smell, taste or otherwise detect anything unusual, or in the case of a full facepiece respirator you experience eye irritation, leave the area immediately. Check to make sure the respirator to face seal is still good. If it is, replace the filter, cartridge or canister. If the seal is no longer good, you may need a new respirator. (4)

Immediately Dangerous to Life and Health (IDLH) value: 1,000 mg/m³. The purpose of establishing an IDLH value is to ensure that the worker can escape from a given contaminated environment in the event of failure of the most protective respiratory equipment. In the event of failure of respiratory protective equipment, every effort should be made to exit immediately. (4)

EXPOSURE GUIDELINES

<table>
<thead>
<tr>
<th>SUBSTANCE</th>
<th>ACGIH TLV (STEL)</th>
<th>OSHA PEL (TWA)</th>
<th>NIOSH REL (STEL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phosphoric Acid</td>
<td>3 mg/m³</td>
<td>1 mg/m³</td>
<td>1 mg/m³</td>
</tr>
</tbody>
</table>

9. PHYSICAL AND CHEMICAL PROPERTIES (Not intended as Specifications)

<table>
<thead>
<tr>
<th>Physical State:</th>
<th>Liquid.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance:</td>
<td>Clear, colourless liquid.</td>
</tr>
<tr>
<td>Odour:</td>
<td>Odourless. At elevated temperatures: Strong, pungent odour.</td>
</tr>
<tr>
<td>Odour Threshold (ppm):</td>
<td>Not available.</td>
</tr>
<tr>
<td>Boiling Range (°C):</td>
<td>121 (65 %) - 171 (93 %). (3)</td>
</tr>
<tr>
<td>Melting/Freezing Point (°C):</td>
<td>-18 (75 %) - 27 (93 %). (3)</td>
</tr>
<tr>
<td>Vapour Pressure (mm Hg at 20° C):</td>
<td>6.8 (75 %); 2.2 (85 %).</td>
</tr>
<tr>
<td>Vapour Density (Air = 1.0):</td>
<td>Not available.</td>
</tr>
<tr>
<td>Relative Density (g/cc):</td>
<td>1.574 - 1.791. (3)</td>
</tr>
<tr>
<td>Bulk Density:</td>
<td>1 574 - 1 791 kg/m³.</td>
</tr>
<tr>
<td>Viscosity:</td>
<td>12 - 72 cp. (3)</td>
</tr>
<tr>
<td>Evaporation Rate (Butyl Acetate = 1.0):</td>
<td>Not available.</td>
</tr>
<tr>
<td>Solubility:</td>
<td>Soluble in water.</td>
</tr>
<tr>
<td>% Volatile by Volume:</td>
<td>Not available.</td>
</tr>
<tr>
<td>pH:</td>
<td>1.0 - 1.5 (1 - 10 g/L). (3)</td>
</tr>
<tr>
<td>Coefficient of Water/Oil Distribution:</td>
<td>Not available.</td>
</tr>
<tr>
<td>Volatile Organic Compounds (VOC):</td>
<td>&lt; 1. (3)</td>
</tr>
</tbody>
</table>

10. STABILITY AND REACTIVITY
11. TOXICOLOGICAL INFORMATION

**TOXICOLOGICAL DATA:**

<table>
<thead>
<tr>
<th>SUBSTANCE</th>
<th>LD50 (Oral, Rat)</th>
<th>LD50 (Dermal, Rabbit)</th>
<th>LC50 (Inhalation, Rat, 4h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phosphoric Acid</td>
<td>1 530 mg/m³ (1)</td>
<td>2 740 mg/m³ (1)</td>
<td>---</td>
</tr>
</tbody>
</table>

Carcinogenicity Data: The ingredient(s) of this product is (are) not classed as carcinogenic by ACGIH, IARC, OSHA or NTP. See "Other Studies Relevant to Material".

Reproductive Data: No adverse reproductive effects are anticipated.

Mutagenicity Data: No adverse mutagenic effects are anticipated.

Teratogenicity Data: No adverse teratogenic effects are anticipated.

Respiratory / Skin Sensitization Data: None known.

Synergistic Materials: None known.

Other Studies Relevant to Material:

Application of 0.1 mL of 75 - 85% Phosphoric Acid produced corrosive eye injury. In another study, application of a 17% solution produced mild eye irritation. Application of 0.5 mL of 75 - 85% Phosphoric Acid to the skin for 24 hours, under semi-occlusive cover, produced corrosion. Application of 85% Phosphoric for 4 hours under semi-occlusive cover, was also corrosive, while the 75 or 80% were not. (4)

Application of 631 to 7,940 mg/Kg of 75 - 85% aqueous solution of Phosphoric Acid to the intact skin if rabbits, under semi-occlusive cover, for 24 hours produced reduced appetite and activity, increasing weakness, collapse and death. (4)

12. ECOLOGICAL INFORMATION

Ecotoxicity: Harmful to aquatic life at low concentrations. Toxicity is primarily associated with pH. Acidic soil conditions can develop with product present. Higher than normal toxic heavy metal concentrations can then occur in ground and surface waters.

Phosphoric Acid: Fish toxicity: 24-hour TLm = 138 ppm (Mosquito Fish, Fresh water). (4)

Environmental Fate: Can be dangerous if allowed to enter drinking water intakes. Do not contaminate domestic or irrigation water supplies, lakes, streams, ponds, or rivers. Inorganic phosphates in contact with the soil, subsurface or surface waters may be taken up by plants and utilized as essential nutrients. Phosphates may also form precipitates usually with calcium or magnesium. The resultant compounds are insoluble in water and become a part of the soil or sediment. The term biodegradability, as such, is not applicable to inorganic compounds. (3)

Although a principal problem of phosphates in the environment is not directly related to human health, there is considerable concern about the effects of phosphorous from various sources on water quality. Phosphate is a major cause of the eutrophication process in lakes and ponds.

Eutrophication is a process where an ecosystem, rich in nutrients and therefore supporting a dense plant population, kills animal life by depriving it of oxygen.
13. DISPOSAL CONSIDERATIONS

Deactivating Chemicals: Neutralize carefully with soda ash or sodium bicarbonate to a pH of 6 to 9. Lime is the preferred neutralizing agent because of the low solubility of the calcium phosphate formed. The residue (calcium phosphate) can be shoveled into containers for disposal. (4) Neutralization is expected to be exothermic. Vigorous effervescence results. Confirm pH using pH paper.

Waste Disposal Methods: This information applies to the material as manufactured. Reevaluation of the product may be required by the user at the time of disposal since the product uses, transformations, mixtures and processes may influence waste classification. Dispose of waste material at an approved (hazardous) waste treatment/disposal facility in accordance with applicable local, provincial and federal regulations. Do not dispose of waste with normal garbage, or to sewer systems.


Disposal of Packaging: Empty containers retain product residue (liquid and/or vapour) and can be dangerous. Empty drums should be completely drained, properly bunged and promptly returned to a drum reconditioner. Do not dispose of package until thoroughly washed out. Dispose of waste material at an approved (hazardous) waste treatment/disposal facility in accordance with applicable local, provincial and federal regulations.

14. TRANSPORTATION INFORMATION

CANADIAN TDG ACT SHIPPING DESCRIPTION:
PHOSPHORIC ACID, LIQUID, Class 8, UN1805, PG III.
Label(s): Corrosives.
Placard: Corrosives.
ERAP Index: -----. Exemptions: None known.

US DOT CLASSIFICATION (49CFR 172.101, 172.102):
PHOSPHORIC ACID, LIQUID, Class 8, UN1805, PG III.
Label(s): Corrosive.
Placard: Corrosive.
CERCLA-RQ: 5 000 lbs / 2 270 kg.
Exemptions: Not available.

15. REGULATORY INFORMATION

CANADA
CEPA - NSNR: This material is included on the DSL under the CEPA.
CEPA - NPRI: Not included.
Controlled Products Regulations Classification (WHMIS):
E: Corrosive

USA
Environmental Protection Act: This material is included on the TSCA Inventory.
NFPA: 3 Health, 0 Fire, 0 Reactivity (3)
HMIS: 3 Health, 0 Fire, 0 Reactivity (3)

INTERNATIONAL
Not available.

16. OTHER INFORMATION

REFERENCES
1. RTECS-Registry of Toxic Effects of Chemical Substances, Canadian Centre for Occupational Health and Safety RTECS database.
3. Supplier's Material Safety Data Sheet(s).
4. CHEMINFO, through "CCINFOdisc", Canadian Centre for Occupational Health and Safety, Hamilton, Ontario, Canada.
6. Regulatory Affairs Group, Brenntag Canada Inc.

The information contained herein is offered only as a guide to the handling of this specific material and has been prepared in good faith by technically knowledgeable personnel. It is not intended to be all-inclusive and the manner and conditions of use and handling may involve other and additional considerations. No warranty of any kind is given or implied and Brenntag Canada Inc. will not be liable for any damages, losses, injuries or consequential damages which may result from the use of or reliance on any information contained herein. This Material Safety Data Sheet is valid for three years.

To obtain revised copies of this or other Material Safety Data Sheets, contact your nearest Brenntag Canada Regional office.

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