Phosphoric acid

sc-215713

Hazard Alert Code Key:

EXTREME HIGH MODERATE LOW

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
Phosphoric acid

STATEMENT OF HAZARDOUS NATURE

NFPA

FLAMMABILITY
HEALTH HAZARD
INSTABILITY

SUPPLIER
Santa Cruz Biotechnology, Inc.
2145 Delaware Avenue
Santa Cruz, California 95060
800.457.3801 or 831.457.3800

EMERGENCY:
ChemWatch
Within the US & Canada: 877-715-9305
Outside the US & Canada: +800 2436 2255
(1-800-CHEMCALL) or call +613 9673 3112

SYNONYMS
H3-P-04, "orthophosphoric acid"

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

<table>
<thead>
<tr>
<th></th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammability</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Toxicity</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Body Contact</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Reactivity</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Chronic</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

CANADIAN WHMIS SYMBOLS

| | | |
| | | |

1 of 10
EMERGENCY OVERVIEW

RISK
Harmful if swallowed.
Causes burns.
Risk of serious damage to eyes.
May cause long-term adverse effects in the environment.
Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED
- Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual.
- The material can produce chemical burns within the oral cavity and gastrointestinal tract following ingestion.
- Ingestion of acidic corrosives may produce burns around and in the mouth, the throat and esophagus.

EYE
- The material can produce chemical burns to the eye following direct contact. Vapors or mists may be extremely irritating.
- Direct eye contact with acid corrosives may produce pain, tears, sensitivity to light and burns. Mild burns of the epithelia generally recover rapidly and completely.

SKIN
- The material can produce chemical burns following direct contact with the skin.
- The material may cause moderate inflammation of the skin either following direct contact or after a delay of some time. Repeated exposure can cause contact dermatitis which is characterized by redness, swelling and blistering.
- Skin contact is not thought to produce harmful health effects (as classified using animal models). Systemic harm, however, has been identified following exposure of animals by at least one other route and the material may still produce health damage following entry through wounds, lesions or abrasions.
- Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.
- Skin contact with acidic corrosives may result in pain and burns; these may be deep with distinct edges and may heal slowly with the formation of scar tissue.

INHALED
- If inhaled, this material can irritate the throat and lungs of some persons.
- Not normally a hazard due to non-volatile nature of product.
- High concentrations cause inflamed airways and watery swelling of the lungs with edema.
- Corrosive acids can cause irritation of the respiratory tract, with coughing, choking and mucous membrane damage. There may be dizziness, headache, nausea and weakness.
- Inhalation of dusts, generated by the material during the course of normal handling, may produce serious damage to the health of the individual.

CHRONIC HEALTH EFFECTS
- Repeated or prolonged exposure to acids may result in the erosion of teeth, swelling and or ulceration of mouth lining. Irritation of airways to lung, with cough, and inflammation of lung tissue often occurs.
- Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.
- Sodium phosphate dibasic can cause stones in the kidney, loss of mineral from the bones and loss of thyroid gland function.
- Repeated or prolonged exposure to corrosives may result in the erosion of teeth, inflammatory and ulcerative changes in the mouth and necrosis (rarely) of the jaw. Bronchial irritation, with cough, and frequent attacks of bronchial pneumonia may ensue.
- The product does not cause phosphorus poisoning.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>NAME</th>
<th>CAS RN</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>phosphoric acid</td>
<td>7664-38-2</td>
<td>&gt;98</td>
</tr>
</tbody>
</table>

Section 4 - FIRST AID MEASURES

SWALLOWED
- For advice, contact a Poisons Information Center or a doctor at once. · Urgent hospital treatment is likely to be needed.

EYE
- If this product comes in contact with the eyes: · Immediately hold eyelids apart and flush the eye continuously with running water. · Ensure
complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.

SKIN
- If skin or hair contact occurs: · Immediately flush body and clothes with large amounts of water, using safety shower if available. · Quickly remove all contaminated clothing, including footwear.

INHALED
- If fumes or combustion products are inhaled remove from contaminated area. · Lay patient down. Keep warm and rested.

NOTES TO PHYSICIAN
- For acute or short term repeated exposures to strong acids:
  · Airway problems may arise from laryngeal edema and inhalation exposure. Treat with 100% oxygen initially.
  · Respiratory distress may require cricothyroidotomy if endotracheal intubation is contraindicated by excessive swelling.

Section 5 - FIRE FIGHTING MEASURES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vapor Pressure (mmHg)</td>
<td>5.625 75% @20C</td>
</tr>
<tr>
<td>Upper Explosive Limit (%)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Specific Gravity (water=1)</td>
<td>1.58@75% 1.65-1.8</td>
</tr>
<tr>
<td>Lower Explosive Limit (%)</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

EXTINGUISHING MEDIA
- Water spray or fog.
- Foam.

FIRE FIGHTING
- Alert Emergency Responders and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS
- Non combustible.
- Not considered to be a significant fire risk.
  Decomposition may produce toxic fumes of: phosphorus oxides (POx).

FIRE INCOMPATIBILITY
- None known.

PERSONAL PROTECTION
- Glasses: Chemical goggles.
- Full face- shield.
- Gloves: 1. NAT+NEOPR+NITRILE 2. NITRILE
- Respirator: Type B-P Filter of sufficient capacity

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS
- Environmental hazard - contain spillage.
  · Clean up all spills immediately.
  · Avoid breathing vapors and contact with skin and eyes.

MAJOR SPILLS
- Environmental hazard - contain spillage.
  · Clear area of personnel and move upwind.
  · Alert Emergency Responders and tell them location and nature of hazard.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING
- DO NOT allow clothing wet with material to stay in contact with skin.
- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.

RECOMMENDED STORAGE METHODS
- DO NOT use aluminum or galvanized containers.
- Glass container.
  · Lined metal can, Lined metal pail/drum
  · Plastic pail.

STORAGE REQUIREMENTS
- Store in original containers.
· Keep containers securely sealed.

## Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

### EXPOSURE CONTROLS

<table>
<thead>
<tr>
<th>Source</th>
<th>Material</th>
<th>TWA ppm</th>
<th>TWA mg/m³</th>
<th>STEL ppm</th>
<th>STEL mg/m³</th>
<th>Peak ppm</th>
<th>Peak mg/m³</th>
<th>TWA F/CC</th>
<th>Notes</th>
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<tbody>
<tr>
<td>Canada - Alberta Occupational Exposure Limits</td>
<td>phosphoric acid, solid (Phosphoric acid)</td>
<td>1</td>
<td>3</td>
<td></td>
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<td></td>
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<td>US - Minnesota Permissible Exposure Limits (PELs)</td>
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<td>1</td>
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<tr>
<td>US OSHA Permissible Exposure Levels (PELs) - Table Z1</td>
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<tr>
<td>US ACGIH Threshold Limit Values (TLV)</td>
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<td></td>
<td>TLV Basis: upper respiratory tract, eye &amp; skin irritation</td>
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<tr>
<td>US NIOSH Recommended Exposure Limits (RELs)</td>
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<td>US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants</td>
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<tr>
<td>US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants</td>
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<tr>
<td>US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants</td>
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<td>US - Idaho - Limits for Air Contaminants</td>
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<td>US - Hawaii Air Contaminant Limits</td>
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<td>3</td>
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<tr>
<td>Region</td>
<td>Substance</td>
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<td>Limit 3</td>
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<td>US - Alaska Limits for Air Contaminants</td>
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<td>US - Michigan Exposure Limits for Air Contaminants</td>
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<tr>
<td>Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances</td>
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<td>1</td>
<td>- 3</td>
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<td>US - Washington Permissible exposure limits of air contaminants</td>
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<tr>
<td>Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits</td>
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<td>Canada - Prince Edward Island Occupational Exposure Limits</td>
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<td>US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants</td>
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<td>Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)</td>
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<tr>
<td>Canada - Northwest Territories Occupational Exposure Limits (English)</td>
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<tr>
<td>Canada - Nova Scotia Occupational Exposure Limits</td>
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<td>3</td>
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</tr>
</tbody>
</table>

TLV Basis: upper respiratory tract, eye & skin irritation

PERSONAL PROTECTION

![Personal Protection Equipment Image]
RESPIRATOR
Type B-P Filter of sufficient capacity
Consult your EHS staff for recommendations

EYE
· Chemical goggles.
· Full face shield.

HANDS/FEET
■ Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include: such as:
· frequency and duration of contact,
· chemical resistance of glove material,
· glove thickness and
· dexterity
Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739).
· When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374) is recommended.
· When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374) is recommended.
· Contaminated gloves should be replaced.
Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.
· When handling corrosive liquids, wear trousers or overalls outside of boots, to avoid spills entering boots.

ENGINEERING CONTROLS
■ General exhaust is adequate under normal operating conditions. Local exhaust ventilation may be required in special circumstances.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES
Mixes with water.
Corrosive.
Acid.
Toxic or noxious vapours/gas.

<table>
<thead>
<tr>
<th>State</th>
<th>Divided Solid</th>
<th>Molecular Weight</th>
<th>98.00 (100%).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melting Range (°F)</td>
<td>69.8(85%)-71.5 75%</td>
<td>Viscosity</td>
<td>Not Available</td>
</tr>
<tr>
<td>Boiling Range (°F)</td>
<td>309.2(85%)135(75%)</td>
<td>Solubility in water (g/L)</td>
<td>Miscible</td>
</tr>
<tr>
<td>Flash Point (°F)</td>
<td>Not available</td>
<td>pH (1% solution)</td>
<td>2.12 Step 1 0.1N</td>
</tr>
<tr>
<td>Decomposition Temp (°F)</td>
<td>Not Available</td>
<td>pH (as supplied)</td>
<td>Not available</td>
</tr>
<tr>
<td>Autoignition Temp (°F)</td>
<td>Not applicable</td>
<td>Vapor Pressure (mmHg)</td>
<td>5.625 75% @20C</td>
</tr>
<tr>
<td>Upper Explosive Limit (%)</td>
<td>Not applicable</td>
<td>Specific Gravity (water=1)</td>
<td>1.58@75%1.65-1.8</td>
</tr>
<tr>
<td>Lower Explosive Limit (%)</td>
<td>Not applicable</td>
<td>Relative Vapor Density (air=1)</td>
<td>Not available</td>
</tr>
<tr>
<td>Volatile Component (%vol)</td>
<td>15-25 (water)</td>
<td>Evaporation Rate</td>
<td>Very Slow</td>
</tr>
</tbody>
</table>

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY
· Contact with alkaline material liberates heat.
· Presence of incompatible materials.
· Product is considered stable.

STORAGE INCOMPATIBILITY
· Reacts vigorously with alkalis.
· Reacts with mild steel, galvanized steel / zinc producing hydrogen gas which may form an explosive mixture with air.
· Avoid strong bases.
· Inorganic acids are generally soluble in water with the release of hydrogen ions. The resulting solutions have pH's of less than 7.0.
· Inorganic acids neutralize chemical bases (for example: amines and inorganic hydroxides) to form salts.
· Phosphates are incompatible with oxidizing and reducing agents.
· Phosphates are susceptible to formation of highly toxic and flammable phosphine gas in the presence of strong reducing agents such as hydrides.

For incompatible materials - refer to Section 7 - Handling and Storage.
Section 11 - TOXICOLOGICAL INFORMATION

PHOSPHORIC ACID, SOLID

TOXICITY AND IRRITATION
- Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production.
- The material may cause severe skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin. Repeated exposures may produce severe ulceration.

The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

PHOSPHORIC ACID, SOLID:

<table>
<thead>
<tr>
<th>TOXICITY</th>
<th>IRRITATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unreported (human) LDLo: 220 mg/kg Skin (rabbit):595 mg/24h - SEVERE</td>
<td></td>
</tr>
<tr>
<td>Oral (rat) LD50: 1530 mg/kg Eye (rabbit): 119 mg - SEVERE</td>
<td></td>
</tr>
<tr>
<td>Oral (rat) LD50: 3500 mg/kg* [Monsanto]*</td>
<td></td>
</tr>
<tr>
<td>Dermal (rabbit) LD50: &gt;1260 mg/kg* phosphoric acid (85%)</td>
<td></td>
</tr>
</tbody>
</table>

PHOSPHORIC ACID:

<table>
<thead>
<tr>
<th>TOXICITY</th>
<th>IRRITATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unreported (human) LDLo: 220 mg/kg</td>
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</tr>
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<td>Oral (rat) LD50: 1530 mg/kg</td>
<td></td>
</tr>
<tr>
<td>Oral (rat) LD50: 3500 mg/kg* [Monsanto]*</td>
<td></td>
</tr>
<tr>
<td>Dermal (rabbit) LD50: 1260 mg/kg*</td>
<td></td>
</tr>
<tr>
<td>Inhalation (Rat) LC50: 25.5 mg/m³/4h</td>
<td></td>
</tr>
<tr>
<td>Inhalation (Mouse) LC50: 25.5 mg/m³/4h</td>
<td></td>
</tr>
<tr>
<td>phosphoric acid (85%)</td>
<td></td>
</tr>
</tbody>
</table>

Section 12 - ECOLOGICAL INFORMATION

May cause long-term adverse effects in the environment.
Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
This material and its container must be disposed of as hazardous waste.
Avoid release to the environment.
Refer to special instructions/ safety data sheets.

Ecotoxicity

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Persistence: Water/Soil</th>
<th>Persistence: Air</th>
<th>Bioaccumulation</th>
<th>Mobility</th>
</tr>
</thead>
<tbody>
<tr>
<td>phosphoric acid, solid</td>
<td>HIGH</td>
<td>LOW</td>
<td>HIGH</td>
<td></td>
</tr>
<tr>
<td>phosphoric acid</td>
<td>HIGH</td>
<td>LOW</td>
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</tbody>
</table>

GESAMP/EHS COMPOSITE LIST - GESAMP Hazard Profiles

<table>
<thead>
<tr>
<th>Name / EHS TRN</th>
<th>A1a</th>
<th>A1b</th>
<th>A2</th>
<th>B1</th>
<th>C1</th>
<th>C2</th>
<th>C3</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>E1</th>
<th>E2</th>
<th>E3</th>
<th>Cas No / RTECS No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phosphoric acid</td>
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<td>567</td>
<td>0</td>
<td>NI</td>
<td>0</td>
<td>Ino</td>
<td>1</td>
<td>NI</td>
<td>3</td>
<td>(3)</td>
<td>3</td>
<td>3</td>
<td>D</td>
<td>3 c acid / 8 rg CAS:7664- 38- 2 / TB6300000</td>
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</tbody>
</table>

Legend: EHS=EHS Number (EHS=GESAMP Working Group on the Evaluation of the Hazards of Harmful Substances Carried by Ships) NRT=Net Register Tonnage, A1a=Bioaccumulation log Pow, A1b=Bioaccumulation BCF, A1=Bioaccumulation, A2=Biodegradation, B1=Acuteaquatic toxicity LC50/EC50 (mg/l), B2=Chronic aquatic toxicity NOEC (mg/l), C1=Acute mammalian oral toxicity LD50 (mg/kg), C2=Acute mammalian dermal toxicity LD50 (mg/kg), C3=Acute mammalian inhalation toxicity LC50 (mg/kg), D1=Skin irritation & corrosion,
D2=Eye irritation & corrosion, D3=Long-term health effects, E1=Tainting, E2=Physical effects on wildlife & benthic habitats, E3=Interference with coastal amenities. For column A2: R=Readily biodegradable, NR=Not readily biodegradable. For column D3: C=Carcinogen, M=Mutagenic, R=Reprotoxic, S=Sensitising, A=Aspiration hazard, T=Target organ systemic toxicity, L=Lung injury, N=Neurotoxic, I=Immunotoxic. For column E1: NT=Not tainting (tested), T=Tainting test positive. For column E2: Fp=Persistent floater, F=Floater, S=Sinking substances. The numerical scales start from 0 (no hazard), while higher numbers reflect increasing hazard. (GESAMP/EHS Composite List of Hazard Profiles - Hazard evaluation of substances transported by ships)

Section 13 - DISPOSAL CONSIDERATIONS

US EPA Waste Number & Descriptions
A. General Product Information
Corrosivity characteristic: use EPA hazardous waste number D002 (waste code C)

Disposal Instructions
All waste must be handled in accordance with local, state and federal regulations.
· Recycle wherever possible.
· Consult manufacturer for recycling options or consult Waste Management Authority for disposal if no suitable treatment or disposal facility can be identified.
Puncture containers to prevent re-use and bury at an authorized landfill.

Section 14 - TRANSPORTATION INFORMATION

DOT:
Symbols: None Hazard class or Division: 8
Identification Numbers: UN3453 PG: III
Label Codes: 8 Special provisions: IB6, IP3, T1, TP33
Packaging: Exceptions: 154 Packaging: Non-bulk: 213
Packaging: Exceptions: 154 Quantity limitations: 25 kg
Passenger aircraft/rail:
Quantity Limitations: Cargo 100 kg Vessel stowage: Location: A aircraft only:
Vessel stowage: Other: None
Hazardous materials descriptions and proper shipping names:
Phosphoric acid, solid

Air Transport IATA:
ICAO/IATA Class: 8 ICAO/IATA Subrisk: None
UN/ID Number: 3453 Packing Group: III
Special provisions: None
Cargo Only
Packing Instructions: 826 Maximum Qty/Pack: 100 kg
Passenger and Cargo Passenger and Cargo
Packing Instructions: 825 Maximum Qty/Pack: 25 kg
Passenger and Cargo Limited Quantity Passenger and Cargo Limited Quantity
Packing Instructions: Y825 Maximum Qty/Pack: 5 kg
Shipping Name: PHOSPHORIC ACID, SOLID

Maritime Transport IMDG:
IMDG Class: 8 IMDG Subrisk: None
UN Number: 3453 Packing Group: III
EMS Number: F-A, S-B Special provisions: None
Limited Quantities: 5 kg Marine Pollutant: Yes
Shipping Name: PHOSPHORIC ACID, SOLID

Section 15 - REGULATORY INFORMATION

phosphoric acid, solid (CAS: 7664-38-2) is found on the following regulatory lists;

8 of 10
Ingredients with multiple CAS Nos

Ingredient Name CAS phosphoric acid 7664-38-2, 16271-20-8

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For additional technical information please call our toxicology department on +800 CHEMCALL.

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references. A list of reference resources used to assist the committee may be found at:

www.chemwatch.net/references.

The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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