



MATERIAL SAFETY DATA SHEET

LIQUIFOS®

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name:	Liquifos®
Chemical Name:	Phosphoric Acid
Chemical Family:	Inorganic acid
Synonyms/Brands:	Phos Acid
Chemical Formula:	H ₃ PO ₄
Primary Use:	Feed Ingredient
Responsible Party:	Mosaic 8831 Highway 41 South Riverview, FL 33569
Non-Emergency Technical Contact:	8:00am - 4:00pm Central Time USA, Mon - Fri: 800-237-2024 or 813-671-6321

EMERGENCY OVERVIEW

24 Hour Emergency Telephone Number:

For Chemical Emergencies:
Spill, Leak, Fire or Accident
Call CHEMTREC

North America: 800-424-9300
Others: 703-527-3887 (collect)

Health Hazards:	Corrosive. Causes nose, throat and lung irritation. Keep container tightly closed. Do not get in eyes, on skin, or on clothing. Do not taste or swallow. Wash thoroughly after handling. Wear appropriate personal protective equipment. Phosphoric acid is generally recognized as safe (GRAS) when used in accordance with good manufacturing practice (21 CFR 182.1073).		
Physical Hazards:	Keep away from heat, sparks, flames, or other sources of ignition (e.g., static electricity, pilot lights, mechanical/electrical equipment). May react with iron or other metals to generate hydrogen gas, which may present an explosion hazard.		
Physical Form:	Liquid		
Appearance:	Brownish, black to green.		
Odor:	Possible fluorine or acid odor.		
NFPA HAZARD CLASS		HMIS HAZARD CLASS	
Health:	3 (High)	Health:	3 (High)
Flammability:	0 (Least)	Flammability:	0 (Slight)
Instability:	0 (Least)	Reactivity:	0 (Least)
Special Hazard:	Acid	PPE:	Section 8

MATERIAL SAFETY DATA SHEET
LIQUIFOS®

2. COMPOSITION/INFORMATION ON INGREDIENTS

Component	% Weight	Exposure Guideline		
		Limits	Agency	Type
Phosphoric Acid CAS No. 7664-38-2	75 - 76	1 mg/m ³ 10,000 mg/m ³	OSHA OSHA	8 hr. TWA IDLH
		1 mg/m ³ 3 mg/m ³	ACGIH ACGIH	8 hr. TWA STEL
		1,000 mg/m ³ 1 mg/m ³ 3 mg/m ³	NIOSH NIOSH NIOSH	IDLH* 8 hr. TWA STEL
Water CAS No. 7732-18-5	16 - 19.5	None	All	Not Applicable
Sulfuric Acid CAS No. 7664-93-9	2 - 3.5	1 mg/m ³	OSHA	8 hr. TWA
		1 mg/m ³ 3 mg/m ³	ACGIH ACGIH	8 hr. TWA STEL
		15 mg/m ³ 1 mg/m ³	NIOSH NIOSH	IDLH* 8 hr. TWA
Iron, aluminum, magnesium, calcium, sodium, and potassium phosphates** CAS No. (various)	0.4 - 1.2	None	All	Not Applicable

MATERIAL SAFETY DATA SHEET

LIQUIFOS®

Page 3 of 13

Notes:

*IDLH = Immediately Dangerous to Life or Health. The IDLH is a condition that poses a threat of exposure to airborne contaminants when that exposure is likely to cause death; immediate or delayed permanent adverse health effects; or prevent escape from such environment. The purpose of establishing an IDLH exposure concentration is to ensure the worker can escape from a given contaminated environment in the event of failure of the respiratory protection equipment. OSHA has not established its own set of IDLH values, but is relying on the 1990 recommended IDLH values listed in the NIOSH Pocket Guide to Chemical Hazards for enforcement purposes.

**Iron is present at less than 1%.

State, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional, or your local agencies for further information.

Issue Date: April, 2006

MATERIAL SAFETY DATA SHEET

LIQUIFOS®

3. HAZARDS IDENTIFICATION

POTENTIAL HEALTH EFFECTS

Eye:	Corrosive. Contact may cause severe irritation, eye burns, and permanent eye damage.
Skin:	Corrosive. Contact may cause severe irritation, skin burns, and permanent skin damage. Inadequate information regarding skin absorption, however, corrosivity of material suggests significant skin absorption will occur.
Inhalation (Breathing):	Corrosive and toxic. May be harmful if inhaled. May cause severe irritation and burns of the nose, throat, and respiratory tract. Excessive irritation of the lungs may cause acute pneumonitis and pulmonary edema, which could be fatal. Chemicals pneumonitis and pulmonary edema may result from exposure to the lower respiratory tract and deep lung.
Ingestion (Swallowing):	Corrosive and moderately toxic. Ingestion may cause severe irritation and burns to the gastrointestinal tract.
Signs and Symptoms:	Effects of overexposure may include severe irritation and burns of the mouth, nose, throat, respiratory and digestive tract, headaches, coughing, nausea, vomiting, and breathing difficulties. Production of pulmonary edema (accumulation of fluids in the lungs) is unlikely.
Cancer:	Inadequate data available to evaluate the cancer hazard of this material.
Target Organs:	Inadequate data available to evaluate the target organ effects of this material.
Developmental:	Inadequate data available to evaluate the developmental effects of this material.
Other Comments:	None
Pre-Existing Medical Conditions:	Conditions aggravated by exposure may include skin and respiratory (asthma-like) disorders.

MATERIAL SAFETY DATA SHEET

LIQUIFOS®

4. FIRST AID MEASURES

Eye:	Immediately move victim away from exposure and into fresh air. If irritation or redness develops, flush eyes with clean water and seek immediate medical attention. For direct contact, immediately hold eyelids apart and flush the affected eye(s) with clean water for at least 15 minutes. It is recommended that flushing continue until patient is examined by an ophthalmologist or emergency room physician.
Skin:	Immediately flush affected area(s) with large amounts of water for at least 15 minutes while removing contaminated shoes, clothing, and constrictive jewelry. If skin surface is damaged, apply a clean dressing and seek immediate medical attention. If skin surface is not damaged, cleanse the affected area(s) thoroughly by washing with mild soap and water. If irritation or redness develops, seek immediate medical attention.
Inhalation (Breathing):	PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH POSITIVE PRESSURE SELF-CONTAINED BREATHING APPARATUS. Conscious persons should be assisted to an uncontaminated area and inhale fresh air. Unconscious persons should be moved to an uncontaminated area, and given assisted (artificial) respiration. If breathing is difficult and medical oxygen and appropriately trained personnel are available, administer 100% oxygen to affected person. Keep victim warm and quiet. Monitor breathing and pulse continuously. Assure that mucous or vomited material does not obstruct the airway by positional drainage. Delayed pulmonary edema may occur. Keep patient under medical observation for at least 24 hours.
Ingestion (Swallowing):	If exposed person is conscious, immediately give milk or water (4-8 ounces) to dilute. Do not induce vomiting. If coma develops, assure airway is open and there is adequate oxygenation. Seek medical attention immediately.
Note to Physicians:	Following exposure to high concentrations of phosphoric acid, keep patient under medical observation for at least 24 hours.

MATERIAL SAFETY DATA SHEET

LIQUIFOS®

5. FIRE FIGHTING MEASURES

Flammable Properties:	Liquifos® is non-flammable Flash Point-Not applicable OSHA Flammability Class-Not applicable LEL/UEL (% by volume in air at 1 atm)-Not applicable Autoignition Temperature-Not applicable
Unusual Fire & Explosion Hazards:	Combustion by-products include oxides of phosphorus.
Extinguishing Media:	If material is on fire or involved in a fire, extinguish fire using agent suitable for type of surrounding fire. (Material itself does not burn or burns with difficulty.) Use water in flooding quantities as fog. Cool all containers with flooding quantities of water. Apply water from as far a distance as possible.
Fire Fighting Instructions:	<p>Positive pressure, self-contained breathing apparatus is required for all fire fighting activities involving hazardous materials. Full structural fire fighting (bunker) gear is the minimum acceptable attire. The need for proximity, entry, flashover and/or special chemical protective clothing (see Section 8) needs to be determined for each incident by a competent fire fighting safety professional. Water used for fire suppression and cooling may become contaminated. Discharge to sewer system(s) or the environment may be restricted, requiring containment and proper disposal of water.</p> <p>If tank, railcar, or tank truck is involved in a fire, isolate for 1 mile (1600 m) in all directions. Consider initial evacuation for 1 mile (1600 m) in all directions.</p> <p>Stop spill/release if it can be done with minimal risk. If this cannot be done, allow fire to burn. Move undamaged containers from immediate hazard area if it can be done with minimal risk. Stay away from ends of container. Water spray may be useful in minimizing or dispersing vapors. Cool equipment exposed to fire with water, if it can be done with minimal risk.</p>

6. ACCIDENTAL RELEASE MEASURES

- Evacuate all personnel from affective area.
- Notify persons downwind of spill / release. Keep area isolated until gas has dispersed
- For a small spill, isolate immediate hazard area for at least 100 feet (30 m) in all directions and keep unauthorized personnel out.
- For a large spill, isolate immediate hazard area for at least 300 feet (95 m) in all directions and keep unauthorized personnel out.

MATERIAL SAFETY DATA SHEET

LIQUIFOS®

- Stay upwind and away from spill / release.
- Avoid skin contact and do not inhale gas.
- Stop spill/release if it can be done with minimal risk. Wear appropriate protective equipment, including respiratory protection, as conditions warrant (see Section 8).
- Apply water spray or mist to knock down vapors. Vapor knockdown water is corrosive and/or toxic and should be diked for containment. Dike surface flow using soil, sand bags, foamed polyurethane, or foamed concrete. Absorb bulk liquid with fly ash or cement powder. Neutralize with agricultural lime, crushed limestone, or sodium bicarbonate.
- For a water spill, neutralize with agricultural lime (slaked lime), crushed limestone, or sodium bicarbonate. Adjust pH to neutral (pH-7). Use mechanical dredges or lifts to remove immobilized masses of pollutants and precipitates.
- Prevent spilled material from entering sewers, storm drains, other unauthorized confined treatment drainage systems. Dike far ahead of spill for later recovery or disposal.
- Notify fire authorities and appropriate federal, state, and local agencies (see Section 15).
- If spill / release in excess of the U.S. EPA Reportable Quantity is made into the environment, immediately notify the National Response Center (phone number 800-424-8802).

7. HANDLING AND STORAGE

Handling:	Store in cool, dry, well-ventilated location. Separate from alkalies and most metals. Stable under normal conditions.
Storage:	Store in suitable facilities. Materials in storage should be segregated by the hazards they pose.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls:	If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits (see Section 2), additional ventilation or exhaust systems may be required. Emergency flushing facilities, such as safety eyewashes and showers, which meet the requirements of ANSI Z358.1 (latest edition) and supplied with potable water, should be provided in the immediate work area.
-----------------------	--

MATERIAL SAFETY DATA SHEET

LIQUIFOS®

Personal Protective Equipment (PPE)	
Respiratory:	A NIOSH approved air-purifying respirator with HEPA filter cartridges may be used under conditions where airborne concentrations are expected to exceed exposure limits (see Section 2). Use a positive pressure air-supplied respirator if there is potential for an uncontrolled release, exposure levels are not known, or any other circumstances where air purifying respirators may not provide adequate protection. A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator's use.
Skin:	Wear appropriate gloves with low permeability to the specific material being handled to prevent skin contact, possible irritation and absorption. Wear a full impervious PVC suite, butyl rubber gloves, and rubber boots. Consult manufacturer's literature for information on actual permeation rates. Depending on conditions of use, an apron and/or arm covers may be necessary.
Eye/Face:	Wear splash goggles while handling sealed cylinders. Wear a face mask that provides both splash and impact protection for face and eyes when using respiratory protection described above
Other PPE:	A source of clean water should be available in the work area for flushing eyes and skin. Appropriate chemical protective clothing should be worn as needed. Wear appropriate protective footwear, such as steel-toed safety shoes, when moving cylinders.

9. PHYSICAL AND CHEMICAL PROPERTIES

Note: Unless otherwise stated, values are determined at 20°C (68°F) and 760 mm Hg (1 atm).

Flash Point:	Not applicable
Flammable/ Explosive Limits (% by volume in air):	Not applicable
Autoignition Temperature:	Not applicable
Appearance:	Brownish, black to green
Physical State:	Liquid
Odor:	Odorless
Molecular Weight of Pure Material:	98
pH:	2
Vapor Pressure (torr):	0.0285 @ 68°F/20°C

MATERIAL SAFETY DATA SHEET

LIQUIFOS®

Vapor Density (air=1):	3.4
Boiling Point:	415.4°F /213°C
Melting Point:	108.23°F/42.5°C
Solubility in Water:	Very soluble in hot water; 548 grams soluble in 100 ml cold water
Specific Gravity:	1.834 @ 18°C (64.4°F)
Volatility:	100% volatile
Corrosivity:	Corrosive to ferrous metals and alloys
Bulk Density:	14 pounds of liquid per gallon

10. STABILITY AND REACTIVITY

Chemical Stability:	Stable under proper conditions of storage and handling.
Conditions to Avoid:	Reacts violently with water especially when water is added to the product. Reacts with metals and metallic salts.
Incompatible Materials:	Extremely reactive or incompatible with alkalis. Do not mix with solutions containing bleach or ammonia. Slightly reactive to reactive with organic materials, metals. Very slightly to slightly reactive with reducing agents. Non-reactive with oxidizing agents, combustible materials, acids.
Corrosivity:	Extremely corrosive to steel, highly corrosive to aluminum, zinc, copper. Slightly corrosive to 304 or 316 stainless steel. Corrosive to ferrous metals and alloys. Corrosive to brass. Will corrode a wide variety of metals.
Hazardous Decomposition Products:	Combustion by-products include oxides of phosphorus. Converted to pyrophosphoric acid when heated to 213°C (415.4°F). Reacts with metals to liberate flammable hydrogen gas. Formation of flammable gases may occur with aldehydes, cyanides, mercaptans, and sulfides. Formation of toxic fumes may occur with cyanides, fluorides, halogenated organics, sulfides, and organic peroxides.
Hazardous Polymerization:	Will not occur.

11. TOXICOLOGICAL INFORMATION

Phosphoric Acid:	<p>Rats oral LD50 - 1,530 mg/kg</p> <p>Rat inhalation 1-hour LC50 - 1217 mg/m³ (as P₂O₅)</p> <p>Rat inhalation 1-hour LC50 - > 850 mg/m³</p> <p>Rabbit inhalation 1-hour LC50 - 1689 mg/m³ (as P₂O₅)</p> <p>Mouse inhalation 1-hour LC50 - 271 mg/m³ (as P₂O₅)</p> <p>Guinea pig inhalation 1-hour LC50 - 61 mg/m³ (as P₂O₅)</p>
------------------	--

MATERIAL SAFETY DATA SHEET

LIQUIFOS®

	<p>Rabbit dermal LD50 - 2,740 mg/kg Rabbit dermal LD50 (85% solution) >1,260 mg/kg Rabbit dermal LD50 (80% solution) >3,160 mg/kg Rabbit dermal LD50 (75% solution) >3,160 mg/kg</p> <p>Rabbit - application of 0.5 mL to albino rabbits for 24 hours - solutions from 75% to 85% phosphoric acid were corrosive to skin.</p> <p>Rabbit - eyes exposed to 119 mg phosphoric acid - effects were severe. Rabbit - tests using 10% and 17% dilutions - no irritating using Draize scoring criteria</p> <p>Mutagenicity - Ames test - 0.5, 1.0, and 2.0 uL/plate - with and without metabolic activator - none of the samples tested were mutagenic. In a study of the effect of pH on the induction of mitotic aberrations in sea urchins, an increase in aberrations was observed at pH < 6.5. A similar genotoxic effect was observed with sulfuric, hydrochloric, and phosphoric acids, indicating that pH rather than the anion was responsible for the effect.</p> <p>Toxicity to Reproduction - Rats were fed 0.75% phosphoric acid in feed daily for 29 weeks - no harmful effects were found on growth of offspring.</p>
Sulfuric Acid:	<p>Rat oral LD50 = 2,140 mg/kg Rat inhalation LC50 = 510 mg/m3 for 2 hours</p> <p>There is no definitive information available on irritation, carcinogenicity, mutagenicity, target organs or developmental toxicity for sulfuric acid. The International Agency for Research on Cancer (IARC) classified "strong inorganic acid mists containing sulfuric acid" as a Category I carcinogen (known human carcinogen) based upon epidemiology studies demonstrating excess pharyngeal and lung cancer in chronically exposed workers. NTP has classified strong inorganic acid mists containing sulfuric acid as a known human carcinogen.</p>
<p>There is no definitive information available on irritation, carcinogenicity, mutagenicity, target organs or developmental toxicity for this product.</p>	

12. ECOLOGICAL INFORMATION

Ecotoxicity:	<p>Harmful to fish and other water organisms if pH drops below 5. Highly soluble. Will disperse with current. Release to watercourses may cause effects down stream from the point of release. Provides a source of phosphate nutrient that can promote algal growth in waterways. Rapid algal growth may result in</p>
--------------	---

MATERIAL SAFETY DATA SHEET

LIQUIFOS®

Page 11 of 13

	<p>eutrification of waterways (oxygen depletion from decomposition of decaying plant matter), reducing the viability of waterways for other organisms.</p> <p>96-hour LC50 for acids using <i>Lepomis macrochirus</i> (bluegill sunfish) - between pH 3.0 and 3.5.</p> <p>12-hour EC50 for acids using <i>Daphnia magna</i> and <i>Daphnia pulex</i> - pH 4.6 and 4.1</p> <p>12-hour LC50 for phosphoric acid using <i>Gammarus pulex</i> and <i>Gammarus fossarum</i> - pH 3.4</p>
BOD and COD:	No data located

13. DISPOSAL CONSIDERATIONS

This material, as produced, would be a RCRA "characteristic" hazardous waste due to the characteristic of corrosivity (D002). If the material is spilled to soil or water, characteristic testing of the contaminated materials is recommended. Further, this waste is subject to the land disposal restrictions in 40 CFR 268.40 and may require treatment prior to disposal to meet specific standards. Consult state and local regulations to determine whether they are more stringent than the federal requirements.

Container contents should be completely used and containers should be emptied prior to discard. Container rinsate could be considered a RCRA hazardous waste and must be disposed of with care and in full compliance with federal, state and local regulations. Larger empty containers, such as drums, should be returned to the distributor or to a drum reconditioner. To assure proper disposal of smaller empty containers, consult with state and local regulations and disposal authorities.

Issue Date: April, 2006

MATERIAL SAFETY DATA SHEET

LIQUIFOS®

Page 12 of 13

14. TRANSPORT INFORMATION

Hazard Class or Division:	<p>United States DOT (Domestic Only):</p> <p>Proper Shipping Name - Phosphoric Acid Hazard Class - 8 RQ - 5,000 lbs Package Group - III Identification Number - UN 1805 Labels Required: Corrosive Placard: Corrosive Special Provisions: A7, N34, T7</p> <p>If the amount being shipped exceeds the RQ, then it must be noted on the shipping paper (e.g., RQ, Proper Shipping Name, Hazard Class, Package Group)</p>
	<p>Canada TDG:</p> <p>Proper Shipping Name - Phosphoric Acid TDG Class 8: Corrosive liquid TDG Class 9.2: Environmentally hazardous material. Identification Number - UN 1805 Special Provisions: 109 The consignor must determine regulated limit for this product in accordance with Schedule XIII of the TDG Regulations.</p>

15. REGULATORY INFORMATION

CERCLA	Designated as a hazardous substance. Reportable Quantity (RQ) is 5,000 lb. Persons in charge of vessels or facilities are required to notify the National Response Center (NRC) immediately when there is a release in an amount equal to or greater than the RQ. Toll free (800) 424-8802 or Washington D.C. metropolitan area (202) 426-2675.
RCRA:	No RCRA codes listed for any components. See Section 13.

Issue Date: April, 2006

MATERIAL SAFETY DATA SHEET

LIQUIFOS®

SARA Title III:	SARA 313: A petition to remove phosphoric acid from the EPCRA Section 313 toxic chemical list was upheld by the U.S. District Court for the District of Columbia on April 20, 1999. Federal rule changes by the US Environmental Protection Agency have been made to reflect the judicial ruling.
	SARA 311/312: Acute: Yes; Chronic: Yes; Fire: No; Pressure: No; Reactivity: No
	SARA 302/304: Not listed
CWA:	Designated as a hazardous substance under Section 311(b)(2)(A)
TSCA:	All ingredients are listed in the TSCA Inventory
Proposition 65: (CA Health & Safety Code Section 25249.5)	The ingredients in this product are not known to contain substances that are known to the State of California to cause cancer and/or reproductive harm.
Florida:	Listed as a toxic substance by the state of Florida
NTP, IARC, OSHA:	The International Agency for Research on Cancer (IARC) classified "strong inorganic acid mists containing sulfuric acid" as a Category I carcinogen (known human carcinogen). NTP has classified strong inorganic acid mists containing sulfuric acid as a known human carcinogen.
Canada DSL/NDSL:	Phosphoric acid is listed on the DSL NDSL: No
WHMIS:	This MSDS has been prepared according to the hazard criteria of the Controlled Product Regulations (CPR) and the MSDS contains all of the information required by the CPR. WHMIS Classification: Class D, Division 1, Subdivision B - Toxic Material/Acute Lethality Class E - Corrosive Material

16. OTHER INFORMATION

The information in this document is believed to be correct as of the date issued. HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY IS EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THIS INFORMATION, THE RESULTS TO BE OBTAINED FROM THE USE OF THIS INFORMATION OR THE PRODUCT, THE SAFETY OF THIS PRODUCT, OR THE HAZARDS RELATED TO ITS USE. This information and product are furnished on the condition that the person receiving them shall make his own determination as to suitability of the product for his particular purpose and on the condition that he assume the risk of his use thereof.